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R/3 Database Guide: Informix (BC-DB-INF-DBA)

Purpose
This component lets you administer your Informix database with the R/3 System. Read this documentation to make sure that you administer your database as efficiently as possible, which helps your company get the most from its R/3 System.

For up-to-date information on Informix with the R/3 System, you can use the alias “dbainf.” Enter the following in the address line of your web browser:

http://sapnet.sap.com/dbainf

Implementation Considerations

- For more information about installing the Informix database with the R/3 System, see:
  - R/3 Installation on UNIX: Informix Database
  - R/3 Installation on Windows NT: Informix Database
- For more information if you are new to R/3 database administration (DBA) with Informix, see Getting Started with Informix and R/3 [Page 12]. This includes checklists with links to other topics that tell you, for example, how to get started with data recovery and how to get started with SAPDBA, the SAP tool for Informix database administration.

Integration
SAP simplifies Informix database administration for you by providing various DBA functions in the Computing Center Management System (CCMS) of the R/3 System. You can use this to schedule database archives, database backups, logical-log backups, database system checks, and update statistics. Refer to SAP/Informix DBA in CCMS [Ext.].

If you are using a different database, then read the appropriate documentation:

- BC R/3 Database Guide: SAP DB [Ext.]
- BC R/3 Database Guide: DB2 common server [Ext.]
- BC R/3 Database Guide: DB2/400 [Ext.]
- BC R/3 Database Guide: MS SQL Server [Ext.]
- BC R/3 Database Guide: Oracle [Ext.]

Features

- Management of Informix Database Growth [Page 26]
  This helps you administer disk space in your database as it grows.
- Data Recovery for Informix [Page 42]
  This helps you with routine archives and backups of your database, as well as restores in the event of database failure. The Informix tools for data recovery – that is, ON-Bar, ON-Archive, and ontape – are described.
This helps you use SAPDBA, which automates many DBA tasks and is designed specially for Informix databases with the R/3 System. For example, you can use this to manage your dbspaces.

- **Solutions for Top Informix Problems [Page 488]**
  This helps you fix problems that occur most often with Informix databases for the R/3 System.

See also:
Informix documentation
Getting Started with Informix and R/3

Purpose

This section gives you an overview of database administration for the R/3 System running with Informix databases. The aim is to help you get started as quickly as possible by giving you concise information and pointers to further details.

Process Flow

1. Before productive operation, do the following:
   a) Use the Checklist: Configuration and Setup [Page 13].
   b) Decide which tools you are going to use for database administration. Refer to SAPDBA for Informix [Page 314], Computing Center Management System (CCMS) [Page 22], and Informix Tools [Page 20].
2. When you go live, use the Checklist: Regular Activities [Page 15].
3. During live operation, use the Checklist: Occasional Activities [Page 17].

See also:
Informix Dynamic Server [Page 23]
Operating System for the Informix Database [Page 24]
Checklist: Configuration and Setup

Purpose
You need to check that certain aspects of the configuration and setup are correct before starting productive operations.

Process Flow
Make sure you check the following aspects of configuration and setup:

- Directories and disk layout
  You should have configured these in the installation phase. For more information, see *Installation on Windows NT – Informix Database* or *R/3 Installation on UNIX – Informix Database*.

- Data recovery (that is, archive, backup and restore)
  Before you start using your database productively, you must decide on how you intend to perform archive, backup and restore, and then make the necessary preparations. If you are not familiar with data recovery with Informix, see *Getting Started with Data Recovery for Informix* [Page 44].

  Check the following items for data recovery:
  
  - Decide which tool to use
    There are a number of tools offered by Informix for data recovery. Refer to *Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery* [Page 59].
  
  - Decide your approach to data recovery
    With *ontape*, your choices are limited. However, you need to carefully consider your approach with *ON-Archive*, because the approach determines the configuration.

    For archive and database backup, refer to:
    
    *Approach to Database Backup (ON-Bar)* [Page 105]
    *Approach to Archive (ON-Archive)* [Page 125].
    *Approach to Archive (ontape)* [Page 153]

    For logical-log backup, refer to:
    
    *Approach to Logical-Log Backup (ON-Bar)* [Page 165]
    *Approach to Logical-Log Backup (ON-Archive)* [Page 183]
    *Approach to Logical-Log Backup (ontape)* [Page 214]

  - Configure your chosen tool
    You must configure your data recovery tool before starting to do productive archives and backups. Refer to *ON-Bar for Data Recovery* [Page 62], *Configuration of ON-Archive* [Page 75], and *Configuring ontape* [Page 101]. If you are using *ON-Archive*, you need to define volumes and volumes sets, and you might want to use the supplied scripts for configuration tasks (see below).

  - Consider using the supplied scripts (*ON-Archive*)
Checklist: Configuration and Setup

SAP strongly recommends that you use the supplied scripts (only available with ON-Archive). The scripts are mainly used for configuration tasks. Refer to SAP Scripts for ON-Archive [Page 76].

- Define volumes and volume sets

  ON-Archive requires volumes and volume sets (also known as “vsets”). You must define these before starting productive operation (the supplied script arcprep can help you with this). Refer to Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94].

- Schedule archives and backups (ON-Archive)

  You can schedule archives and logical-log backups with ON-Archive using the DBA Planning Calendar [Ext.] in CCMS. Logical-log backups can be triggered when the logical log reaches a pre-defined fill level for extra security. Refer to Choosing Automatic Logical-Log Backup (ON-Archive) [Page 186].

- Take extra steps if you use parallel archives (ON-Archive) or database backups (ON-Bar)

  Special considerations apply for parallel archives or database backups, which you can perform with ON-Archive or ON-Bar to speed up the archive or database backup. Where relevant in the documentation, these are described.

- Consider using recovery reports (ON-Archive)

  Recovery reports are also available to help you recover the database in the event of failure. However, you must set up the reports correctly before the failure occurs. The reports are only available if you use ON-Archive. Refer to Recovery Report with SAPDBA [Page 465].

- Database Sizing

  You should ensure that the database has been correctly sized for the expected volume of data and the dbspaces have been created with enough spare space. For more information about installation, see R/3 Installation on Windows NT – Informix Database or R/3 Installation on UNIX – Informix Database.

- SAPDBA

  If you intend to use SAPDBA to help administer your database, you need to install it correctly. Refer to SAPDBA Setup [Page 317].

Result

Your database is configured optimally. Therefore, problems during subsequent productive operation are minimized.
Checklist: Regular Activities

Purpose
You need to regularly perform certain activities so that the Informix database functions optimally in productive operation.

Process Flow
Make sure you regularly perform the following activities:

- **Data recovery** (that is, archive, backup and restore)

  Although you need to regularly perform archive (ON-Archive and ontape) or database backup (ON-Bar) and logical-log backup (all tools), you only need to perform a restore if a failure occurs in which data is lost or damaged. However, we strongly recommend that you test your restore procedures regularly.

  For more information about how to perform the archives, database backups, and logical-log backups, see the following:
  - Developing Good Practice for Database Backup (ON-Bar) [Page 106]
  - Developing Good Practice for Archive (ON-Archive and ontape) [Page 154]
  - Developing Good Practice for Logical-Log Backup [Page 215]

  If you need to alter your approach, change your schedule, add new volumes, and so on, see Checklist: Configuration and Setup [Page 13].

  To simplify database recovery if you are using ON-Archive, make sure that the recovery report is generated regularly (this happens automatically if correctly installed). Refer to Recovery Report with SAPDBA [Page 465].

- **Space management**

  Make sure that you regularly monitor the space situation in the database. Refer to Database Growth Monitoring [Page 30]. When necessary, you need to carry out activities such as extending dbspaces (that is, adding chunks), reorganizing tables and indexes, and so on. You should use SAPDBA to do this.

- **Change server mode**

  The safest way to change server mode is to use SAPDBA. See Server Mode with SAPDBA [Page 335].

- **Update statistics**

  To ensure top performance of the optimizer in the Informix Dynamic Server – and, therefore, top performance for your SQL applications – you should make sure that the statistics on the database data are regularly updated. You can perform this in one of the following ways:

  - Schedule the update automatically using the DBA Planning Calendar [Ext.] in the Computing Center Management System (CCMS) of the R/3 System.
Checklist: Regular Activities

- Execute the update interactively or from the command line using SAPDBA. Refer to Update Statistics with SAPDBA [Page 440].

- Database system check
  
  To check the configuration and performance of your database, run the database system checks regularly. You can do this in either of the following ways:
  
  - Checking the DB System with SAPDBA [Page 478]
  - Running DB System Checks in CCMS (Informix) [Ext.]

  You can also schedule the checks in the DBA Planning Calendar in CCMS. Refer to Checking the DB System in the DBA Planning Calendar (Informix) [Ext.].

Result

Your database is optimally set up. Therefore, problems during productive operation are minimized.
Checklist: Occasional Activities

Purpose
You need to perform certain activities from time to time – depending on the nature of your setup – so that the database functions optimally in productive operation.

Process Flow
You might occasionally need to perform the following activities:

- **Database restore**
  In the event that you need to restore the database after a failure, see Restore [Page 252]. If the database recovery report is regularly created (that is, after every archive and backup), it can significantly reduce the time taken to restore the database. Refer to Recovery Report with SAPDBA [Page 465].

- **System information**
  SAPDBA offers you a simple interface for the most commonly used commands to look in detail at particular aspects of the database. Refer to System Information with SAPDBA [Page 481]. For more detailed information about the full range of commands offered by Informix, see the Informix documentation.

- **Emergency logical-log backup**
  In the unfortunate event that the logical-log files have completely filled up, you must perform an emergency backup. Refer to Emergency Logical-Log Backup [Page 227]. This should not be necessary if you have developed a thorough approach to logical-log backup. Refer to:
  - Approach to Logical-Log Backup (ON-Bar) [Page 165]
  - Approach to Logical-Log Backup (ON-Archive) [Page 183]
  - Approach to Logical-Log Backup (ontape) [Page 214]
SAPDBA for Informix

Purpose
SAPDBA for Informix is an integrated database administration tool for Informix databases running with R/3 Systems, particularly large ones. You can use it without detailed knowledge of the database and its tools. It filters information about the database, showing you only what you need, and uses complex database statements to let you confidently manipulate the data while ensuring security and integrity.

Implementation Considerations
SAP recommends you to use SAPDBA rather than the Informix tools [Page 20], because it is designed to run with R/3 databases. You should implement SAPDBA if you want to perform a wide range of database administration tasks, which are more difficult or unavailable with other tools. The following tasks can best be completed with SAPDBA:

- Changing server mode
- Adding or extending dbspaces, and dropping dbspaces or dropping chunks
- Reorganization of tables, indexes, and dbspaces
- Checking physical data consistency
- Changing logging mode
- Checking system information

For more information about setting up SAPDBA, see SAPDBA Setup [Page 317].

Integration
The following SAPDBA functions are also available in the Computing Center Management System (CCMS) [Page 22] of the R/3 System:

- Checking and updating cost-based optimizer statistics
- Checking the DB system (that is, checking configuration and performance)
- Monitoring of space usage in tables, indexes, and dbspaces

There are some tasks that can only be performed in CCMS (for example, scheduling backups).

💡
When the R/3 System is running, you can use CCMS to access some of the same information (but not all) found in SAPDBA. Whether to use SAPDBA or CCMS depends on the task you want to perform, and the setup of your system.

Features
- Menu driven interface for ease of use
- Runs with both Informix 6.0 and 7.x
- Analysis facilities to examine the state of the database
- Action facilities to carry out alterations to the database
- Expert mode to enable privileged actions for authorized users
- Menu interface in English or German
- Context-sensitive supporting information
- Available with operating systems UNIX and NT

See also:
SAPDBA and Informix Database Administration (in SAPNet)
Getting Started with SAPDBA [Page 316]
Informix Tools

Use

Although Informix provides a range of tools for database administration, SAP recommends that you use the SAP tools when possible. However, some of the Informix tools are essential. For example, you must choose ontape, ON-Archive, or ON-Bar as the data recovery tool, because there is no equivalent supplied by SAP.

ontape, ON-Archive, and ON-Bar are the data recovery tools currently supplied by Informix. Data recovery includes archive (if you are using ON-Archive or ontape), backup, and restore. Refer to Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery [Page 59].

Informix supplies the following for use with ON-Archive:

<table>
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<th>Is used for</th>
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<tr>
<td>onarchive</td>
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</tr>
<tr>
<td>ondatartr</td>
<td>Performing offline operations, for example, to restore a database that is down</td>
</tr>
<tr>
<td>onautop</td>
<td>Performing unattended operations</td>
</tr>
<tr>
<td>oncatlgr</td>
<td>Handling communication between ON-Archive and the database</td>
</tr>
</tbody>
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You cannot use data migration tools (for example onload or dbexport) for data recovery. These tools do not use information stored in the logical-log files and do not save the necessary system-overhead information required for data recovery.

You might also need to use the following Informix tools, which use a command-line interface:

<table>
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<tr>
<th>Name</th>
<th>Is used to</th>
</tr>
</thead>
<tbody>
<tr>
<td>oncheck</td>
<td>Check and repair disk structures</td>
</tr>
<tr>
<td>onmode</td>
<td>Perform a variety of functions, including changing operating mode of the Informix Dynamic Server</td>
</tr>
<tr>
<td>onspaces</td>
<td>Modify dbspaces and their associated chunks</td>
</tr>
<tr>
<td>onstat</td>
<td>Provide monitoring information about the Informix Dynamic Server</td>
</tr>
</tbody>
</table>

Integration

Integration of Informix Tools by SAP

<table>
<thead>
<tr>
<th>Tool</th>
<th>Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON-Archive and ON-Bar</td>
<td>▪ By the Database Planning Calendar in the Computing Center Management System (CCMS) [Page 22], part of the R/3 System</td>
</tr>
<tr>
<td></td>
<td>▪ ON-Archive only: By the scripts [Page 76] that SAP supplies for Informix database administration</td>
</tr>
</tbody>
</table>
onstat

By SAPDBA to provide system information [Page 481]

See also:
Informix documentation
ON-Bar for Data Recovery [Page 62]
ON-Archive for Data Recovery [Page 69]
tontape for Data Recovery [Page 100]
Computing Center Management System (CCMS)

Use

You can use the Computing Center Management System (CCMS) [Ext.] of the R/3 System to help administer your Informix database in the following ways:

- With the DBA Planning Calendar [Ext.] you can schedule regular archives and backups automatically, as well as update the database statistics.

- With the archive and backup monitor [Ext.] you can view details of past archives and logical-log file backups, as well as view the current status of the logical log.

- With the SAP/Informix Database Monitor [Ext.] you can administer your database. This gives you an overview of a wide range of database functions. There is also an alert monitor, which you can customize to suit your database administration needs.

CCMS data recovery functions only work with ON-Bar or ON-Archive. If your data recovery tool is ontape, you can not use the data recovery functions in CCMS (that is, the DBA Planning Calendar and the archive and backup monitor).
Informix Dynamic Server

Definition

Program that constitutes the Informix database management system (DBMS).

Use

The data used by the R/3 System is stored, accessed, and updated using a DBMS such as the Informix Dynamic Server (IDS). Therefore, it is essential that IDS is fully functioning for productive operation of the R/3 System. The R/3 System is released with specified versions of IDS.

💡

The Informix server versions described in this documentation are 7.1, 7.2, and 7.3 (but there are also a few topics describing features for Informix version 6.0). The term “Informix version 7.x” is used to refer to any version of the Informix server starting with “7”. Before version 7.3, the Informix server was called "INFORMIX-OnLine Dynamic Server". The documentation shows when a particular feature is only relevant to a particular version of the Informix server.

Integration

SAPDBA, the SAP database administration tool for Informix databases, is supplied for both Informix version 7.x and 6.0. This means that you can still benefit from the latest developments in SAPDBA, even if you have not yet upgraded to Informix version 7.x. The documentation for SAPDBA describes differences between Informix version 6.0 and version 7.x, where relevant.

ON-Bar, the most recent data recovery tool supplied by Informix, runs with Informix version 7.23UC3 or a later version. For more information, see note 50157.
Operating System for the Informix Database

Definition
Platform for the Informix database management system (DBMS).

Use
The Informix DBMS for the R/3 System can be run with UNIX or Microsoft Windows NT (starting with release 3.0E) operating system platforms.

Integration
Database administration is similar on the two operating systems, except for the following important differences, which are discussed where relevant in this documentation:

- Environment differences with NT
  The disk layout differs from that of UNIX. For example, there are no raw devices.
  NT has disk drives named with a single letter (C, D, and so on). You assign chunks to a single disk drive to extend a dbspace or create a new one when using NT.

- Archive, backup and restore of database data with NT
  NT currently only supports the Informix tools **ontape** or **ON-Bar**, but **not** **ON-Archive** (it is anticipated that new Informix tools for data recovery will be supported by NT). This applies to the following sections in the documentation:
  - [ON-Bar for Data Recovery](#)
  - [ontape for Data Recovery](#)
  - [Database Backup (ON-Bar)](#)
  - [Archive](#)
  - [Logical-Log Backup](#)
  - [Emergency Logical-Log Backup](#)
  - [Restore](#)

  The following are **not** relevant for NT:
  - [ON-Archive for Data Recovery](#)
  - [Recovery Report with SAPDBA](#)

- SAPDBA
  For more information about using SAPDBA with NT, see [Use of SAPDBA with UNIX and NT](#).

- Other technical differences
  Differences between the functionality of the two operating systems are mentioned in the relevant places in the documentation. One example is the INFORMIX directory, which is called **$INFORMIXDIR** with UNIX and **%INFORMIXDIR%** with NT.
Management of Informix Database Growth

Purpose
This section provides information on how to manage the growth of your Informix database. If database objects (that is, dbspaces or tables) fill, you get error messages and the R/3 System might stop processing. Therefore, it is always better to plan in advance for database growth, so anticipating problems before they occur.

If your database has space management problems, alerts are raised in the Release 4 alert monitor in the Computing Center Management System (CCMS) of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext.].

Aim for the following goals:

- To install the database in the best possible way with the available disks, while meeting anticipated future requirements. Refer to Database Setup for Production [Page 28] and the installation documentation listed at the end of this section.
- To have enough disk space available for natural database growth by keeping a close watch on database expansion. The Informix database server does not dynamically allocate new space on disk. If the available space (including the space allowed for expansion at the table level) fills up, applications run into errors when they try to insert data. Refer to Database Growth Monitoring [Page 30] [Page 30].
- To avoid unnecessary fragmentation of dbspaces by ensuring that when you extend a dbspace, you add a sufficiently large chunk to accommodate future growth (at least in the medium term). Refer to Extension of a Dbspace [Page 36].
- To obtain optimal I/O load balance so that applications needing access to database data on disk do not experience degraded response times. Refer to Recognition of Space Problems and Errors [Page 33].

A dbspace can only use its own chunks for storage data. This means that, if the chunks for one dbspace fill up, application errors due to lack of space might occur, even though there is free space available in other dbspaces. The Informix database server cannot dynamically extend a dbspace – this is your job as administrator. At the table level, expansion occurs dynamically as required but only up to a certain limit. You need to intervene if a table has been repeatedly extended and is approaching the maximum possible number of extents.

Process Flow
1. You size the dbspaces correctly before going live, in view of anticipated data storage requirements. If you get this right, you can avoid a lot of problems in the future. Refer to Database Setup for Production [Page 28] and the installation documentation listed at the end of this section.
2. You monitor the dbspaces and tables during live operation, identifying trends as early as possible. You need to monitor both storage and I/O to optimize dbspace management. Refer to Database Growth Monitoring [Page 30] [Page 30].
3. You react in good time to avoid running out of space. This means adding chunks to dbspaces or reorganizing tables. Refer to Extension of a Dbspace [Page 36].
4. You identify, diagnose and correct problems where I/O performance is degraded or storage space is running low. Refer to Recognition of Space Problems and Errors [Page 33].

Some of the above goals might not be clear or might conflict with one another. As with any tuning operation, you have to balance the competing demands with the constraints of your particular site. Be sure to gather enough information before you make your change.

Result

Professional management of database growth increases the availability of your R/3 System. Be sure to monitor any changes you make. Refer to Database Growth Monitoring [Page 30] [Page 30].

See also:

R/3 Installation on Windows NT – Informix Database

R/3 Installation on UNIX – Informix Database
Database Setup for Production

Purpose

If you have not already set up your Informix database for live production, you can optimize your installation so that future problems can be avoided. You need to decide on the size of your dbspaces and their distribution.

Prerequisites

Be sure to talk to your hardware partner and SAP about your plans for the database. They should have used the SAP Configuration Tool to estimate how much disk space your system needs and in which dbspaces. In general, it is better to have many small disk drives than a few large ones, because this helps spread the load, so reducing potential I/O bottlenecks and improving performance.

You can also use the SAP service "GoingLive" for help with your implementation. Refer to GoingLive and EarlyWatch [Ext.].

Process Flow

1. If you have no information on the projected size of your database, you refer to your installation notes for minimum sizes for dbspaces before productive start. If you have spare disk capacity, you can either:
   - Wait and see how your system grows. When you have a better picture of the way individual dbspaces are growing, you can decide which dbspaces can best use the spare disk space. This is the safest option.
   - Assign spare disk space to the dbspaces that tend on average to grow rapidly in R/3 Systems, that is, PSAPCLU, PSAPBTAB, PSAPSTAB, PSAPPOOL, PSAPPROT.

   ![Tip]

   Your system might not conform to the average profile. Therefore, routinely monitor all dbspaces, before deciding which ones to allocate spare disk space to.

2. When working out your disk layout, you aim to:
   - Limit disk-head movement
   - Reduce disk contention
   - Balance the I/O load across available disks

3. You follow these guidelines when installing your dbspaces on the disk drives:
   - Mirror the critical dbspaces (ROOTDBS, PHYSDBS, and LOGDBS) as database operation crucially depends on them (this is also stressed in the installation notes). This means that the mirror chunk of each dbspace must be on a separate physical disk drive from the corresponding primary chunk (this in any case brings a performance improvement in read operations since the most available disk is used for the read). Use disks of the same speed otherwise the speed of the slower disk dictates the overall performance.
   - Place the critical dbspaces – that is, ROOTDBS, PHYSDBS, and LOGDBS – on fast disk drives as they are very heavily accessed. If possible, use separate physical disks.
Place the high-load dbspaces PSAPBTAB, PSAPCLU, and PSAPSTAB on separate disks to reduce disk I/O contention and use faster disk drives if available.

Place the low-load dbspaces – PSAPSOURCE, PSAPDDIC, PSAPDOCU, PSAPEESxxx, PSAPEELxxx, and, to a certain extent, PSAPLOAD – on slower disk drives and distribute them evenly to avoid a “cold” disk (that is, one with few accesses).

Place the critical dbspaces (ROOTDBS, PHYSDBS, and LOGDBS) near the center of the disk to reduce disk-head movement. Use the same approach with the high-load R/3 dbspaces (PSAPBTAB, PSAPCLU, and PSAPSTAB).

Place the low-load R/3 dbspaces (PSAPSOURCE, PSAPDDIC, PSAPDOCU, PSAPEESxxx, PSAPEELxxx and, to a certain extent, PSAPLOAD) towards the edge of your disks.

**Result**

Monitor the dbspaces in your system closely after you go live. Refer to Database Growth Monitoring [Page 30] [Page 30].
Database Growth Monitoring

Purpose

It is important to monitor the space situation in your Informix database. Otherwise, dbspaces and tables might fill and cause processing to stop. Problems with database space occur mainly due to:

- Natural database growth
- Addition of new hardware
- Addition of new applications

All of these can cause the distribution of data in the database to become unbalanced, with negative effects on performance. The purpose of monitoring is to locate problems – if possible anticipating them before they occur – and decide when and how to intervene to bring the database back into balance.

Process Flow

You use the following features of SAPDBA and CCMS to monitor the growth of dbspaces and tables in your database:

- SAPDBA (Informix database administration tool from SAP)
  You can view storage information in SAPDBA at the dbspace, table, or index level.
  - Dbspaces
    SAPDBA offers you reports showing space usage by dbspace, chunk, or device. These are as follows:
    - Listing Dbspaces with SAPDBA [Page 343] shows the free space in each dbspace.
    - Listing Chunks with SAPDBA [Page 339] shows similar information at the chunk level.
    - Listing Devices with SAPDBA [Page 346] shows information about the physical devices, including numbers of disk accesses to each chunk of a device.

Be sure to monitor dbspaces PSAPBTAB, PSAPSTAB, PSAPPOOL, PSAPPROT, PSAPCLUS carefully, as they can grow rapidly.

If you work with client computers based on different hardware platforms, be sure to also monitor PSAPLOAD carefully.

Changes to default values for dbspaces are possible, especially when SAP's EarlyWatch [Ext.] has determined other values to be more effective for your system.

- Tables
  Analyzing Tables for Critical Next Extent Size with SAPDBA [Page 368] shows the tables that could not be properly extended (due to space shortage) if the need arose. Be sure to extend the dbspaces for any tables on this report as soon as possible,
assumining that the next extent size specified for the table is reasonable. Refer to
Extension of a Dbspace [Page 36].

Analyzing Tables by Fill Level, Size, and Extents with SAPDBA [Page 362] offers
you different ways to view table information – by size, fill level, number of extents or
number of extents still available.

Analyzing Table Information with SAPDBA [Page 365] lets you look in detail at a
single table to see if it needs reorganizing.

– Indexes

Analyzing Indexes by Fill Level, Leaves, and Levels with SAPDBA [Page 370] offers
you different ways to view index information – by fill level, number of extents or
number of extents still available.

Analyzing Indexes of a Table with SAPDBA [Page 373] shows all indexes of a single

Analyzing Index Information with SAPDBA [Page 375] lets you look in detail at a
single index to see if it needs reorganizing.

• Computing Center Management System (CCMS) in the R/3 System

Reports are available at three separate levels, database, dbspace, and table level. Refer
to Checking State on Disk (Informix) [Ext.]. The following options are particularly useful
for managing database growth:

– Space statistics for dbspaces

This shows the history of dbspace growth.

– Free space statistics for dbspaces

This shows the available freespace in each dbspace and which objects in each
dbspace are in danger of filling.

– Space critical objects for tables

This shows tables that are in danger of filling.

– Space statistics for tables

This shows the size (in KB or extents) of individual tables. You can use the historical
analysis in this report to see how much a table has been extended over a certain
period of time, such as a day, week, or month.

Result

By monitoring database growth closely you can anticipate problems and so take corrective action
to avoid downtime for your R/3 System.

Deciding when to intervene is sometimes difficult and is often a matter of judgment. Refer to
Recognition of Space Problems and Errors [Page 33] for hints on what you need to look for. If
you decide to take action, see Reorganization of Tables, Indexes, and Dbspaces with SAPDBA
[Page 380].

In general, when thinking about how to accommodate database growth in relation to the available
disk drives, you can use the same guidelines as for setting up your database. Refer to Database
Setup for Production [Page 28].
Database Growth Monitoring

See also:

Informix documentation
Recognition of Space Problems and Errors

Purpose
This section describes the following to help you recognize problems and errors in the space management of your Informix database:

- Identifying tables that might need reorganizing
- Identifying dbspaces that might need extending
- Identifying and resolving input/output (I/O) bottlenecks
- Identifying common error conditions (that is, full dbspace and maximum extents for a table).

Prerequisites
Familiarize yourself with the tools discussed in Database Growth Monitoring [Page 30], as these help you to determine how the data in a dbspace is expanding and when to consider extending the dbspace.

Process Flow
1. You identify tables that need reorganization.
   
   The main reason for reorganizing a table is that it will soon reach its maximum allowable number of extents. To find out if this is true, you can use SAPDBA to check the number of available extents for the table. Refer to Analyzing Tables by Fill Level, Size, and Extents with SAPDBA [Page 362]. If the table needs extending but can no longer be extended, an error has occurred. Refer to the section on common error conditions below.

   Therefore, you need only reorganize a table when:
   
   - The table already has a very large number of extents.
   - The number of extents is steadily increasing.

   For the following reasons, SAP in general recommends you not to reorganize tables unless a clear justification exists:

   - Where possible, the database server allocates new extents for a table directly adjacent to existing ones. Therefore, tables tend to remain stored in a compact area rather than being “interleaved” (that is, scattered through the dbspace). This assumes that large enough gaps are available in the dbspace to store new table extents.

   - R/3 access normally uses indexes, so interleaved tables pose no performance problem. Note that interleaved tables only adversely impact performance with sequential table scans, because the disk head has to be frequently repositioned, and this takes time.

   For more information, see Reorganization of Tables, Indexes, and Dbspaces with SAPDBA [Page 380].

2. Identify dbspaces that need extending.

April 2001
Recognition of Space Problems and Errors

The following SAPDBA reports help you to identify the dbspaces that are running out of space:

- **Listing Dbspaces with SAPDBA [Page 343]**
- **Analyzing Tables for Critical NextExtent Size with SAPDBA [Page 368]**. Consider extending the dbspace of any tables listed on this report, because such tables cannot be properly extended due to a shortage of space in their dbspace. This assumes that the next extent sizes for the tables on the report are reasonable.

For more information if you decide to extend the dbspace, see **Extension of a Dbspace [Page 36]**.

3. You identify I/O bottlenecks.

Performance problems in database systems are usually related to disk I/O bottlenecks. These in turn are caused by a less than optimal distribution of data across the available disk drives. This can arise in the normal course of database growth, as new applications come on-line or when you reconfigure your system (adding new disk drives for example). If your operating system tools reveal that a high proportion of process time has been spent idle (that is, waiting for I/O), you need to diagnose on which disk device the problem is occurring.

You proceed as follows:

a. You check the AIO queues using the Informix tool `onstat -g ioq`. Pay particular attention to the `maxlen` (maximum queue length for I/O) and `totalops` (total number of disk accesses) columns. If these show very much higher (or very much lower) values for particular queues, this indicates an unbalanced situation.

b. You check the I/O activity for each disk device using `onstat -g iof`. This shows the actual disk device associated with each queue. Identify the devices that show very high (or very low) values.

c. You determine the dbspaces associated with the overloaded disk devices using `onstat -d`. You can also use **Listing devices with SAPDBA [Page 346]** to find this information.

4. You resolve I/O bottlenecks:

a. You consider fragmenting (available from Informix version 7.1) the high-use tables in the affected dbspaces so that some fragments reside in other dbspaces.

b. You move high-use tables to other dbspaces. Refer to **Reorganizing a Single Table with SAPDBA [Page 387]** or **Reorganizing a Group of Tables with SAPDBA [Page 394]**.

c. You create a new dbspace for selected tables. Refer to **Creation of a New Dbspace [Page 41]**.

If some disk devices appear to be “cold” (with much less than normal activity), consider using these devices when you want to relocate or fragment high-use tables.

⚠️

Be aware that R/3 System upgrades might assume a standard dbspace layout and make corresponding assumptions. These assumptions might concern the space requirements to complete the upgrade and the distribution of tables in dbspaces. If you alter the standard configuration in the ways suggested here, you might need to adjust the space requirements accordingly. Also be aware that tables might possibly
be moved back to the standard dbspace during the upgrade. In any case, note the names and sizes of any tables that you move or fragment.

5. You identify common error conditions.

The following error messages appear when an application tries to write to a table but the database server cannot satisfy the request:

- Full dbspace

  ISAMerr -131, ISAM error: no free disk space

  In this case, you need to add a chunk to extend the dbspace, which you can do using SAPDBA. Refer to Adding a Chunk with SAPDBA [Page 350].

- Table has reached maximum number of extents

  ISAMerr -136, ISAM error: no more extents

  In this case, you need to set up the table again using a larger storage area. Refer to Reorganizing a Single Table with SAPDBA [Page 387].

Result

By recognizing problems before they become serious, you can optimize database management and so avoid downtime for your R/3 System.

For more information about using SAPDBA to fix a space problem or error that you have identified, see:

- Dbspaces with SAPDBA [Page 337]
- Reorganization of Tables, Indexes, and Dbspaces with SAPDBA [Page 380]

See also:

Informix documentation
Extension of a Dbspace

Purpose

This section describes the extension of a dbspace in an Informix database. It is important to extend a dbspace in good time, otherwise the availability of your R/3 System might be affected.

To extend a dbspace, SAPDBA adds a new chunk to the dbspace, or you do this manually. Before you add the chunk, you have to decide how large to make it and where to put it.

Prerequisites

You need to extend a dbspace in any of the following situations:

- When you use Listing Dbspaces with SAPDBA [Page 343] you notice that a dbspace is almost full.
- When you use Analyzing Tables for Critical Next Extent Size with SAPDBA [Page 368] you notice that tables in a dbspace cannot be extended properly due to lack of space.
- You have an error message that indicates a full dbspace. For more information about the error message, see Recognition of Space Problems and Errors [Page 33] (the error messages are listed near the end).
- An alert [Ext.] has been raised in the Computing Center Management System (CCMS) of the R/3 System, because a dbspace is running out of space. In this case, the alert monitor lets you extend the dbspace immediately with SAPDBA functionality. Refer to Extending a Dbspace with CCMS (Informix) [Ext.]. For more information about sizing and locating the new dbspace, see “Process Flow.”

SAP recommends you to use the alert monitor to help prevent dbspaces running out of space. The alert monitor automatically warns you of problems.

Process Flow

1. You decide on the size of the dbspace extension, using the following guidelines:
   - Make the new chunk large enough to accommodate medium to long term dbspace growth. This reduces the chance of an error occurring again soon.
   - For a critical, rapidly growing dbspace, you make the chunk as large as possible.
   - You take account of the available storage space and the storage requirements of other dbspaces.
   - You do not allocate chunks where the sum of offset plus chunk size is larger than 2 GB if you are extending a dbspace or creating a new one. This leads to severe problems. Refer to SAP Notes 34722 and 28335. SAP recommends you to use SAPDBA to add chunks (see “Results” below), because it prevents the allocation of chunks larger than 2 GB.

   If you allocate raw devices (UNIX) or NTFS files (NT) with a maximum size of 2 GB, as recommended in the installation documentation, you are less likely to make this mistake with chunks.
You extend rapidly-growing dbspaces by at least the following amount:

**Minimum Extension Sizes for Rapidly-Growing Dbspaces**

<table>
<thead>
<tr>
<th>Dbspace</th>
<th>Minimum Extension Size (in MB) for Dbspace</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSAPSTAB</td>
<td>600</td>
</tr>
<tr>
<td>PSAPBTAB</td>
<td>300</td>
</tr>
<tr>
<td>PSAPCLU</td>
<td>150</td>
</tr>
<tr>
<td>PSAPPOOL</td>
<td>400</td>
</tr>
<tr>
<td>PSAPPROT</td>
<td>200</td>
</tr>
</tbody>
</table>

During an SAP update or upgrade, you might also have to extend dbspaces. The upgrade tools show you the relevant dbspaces and how much larger you must make them.

2. When deciding where to locate the dbspace extension, you use [Listing Devices with SAPDBA](Page 346) to identify a suitable disk for the new chunk. You need to beware of creating new "hotspots" as described in the following example:

You go into live production with a certain disk capacity. After some time in production, the available disks fill up. Therefore, you buy a large new disk. Now all database extensions go on the new disk. As most application activity is on new data, the new disk becomes a hot spot and performance bottleneck.

When a new disk is added to an existing system, be sure to evenly spread the current data over all available disks (that is, move a certain amount of less active data to the new disk). Therefore, you can locate future dbspace extensions on existing disks rather than concentrate them all on the new disk, if possible. However, if the existing disks are already full, this poses a problem.

One approach to the problem of full disks is to proceed as follows when you install a new disk:

a. You temporarily remove existing mirror chunks from mirrored dbspaces.
   This frees up the disk space that was being used by the mirror chunks.

b. You distribute your new chunks more evenly (that is, across existing disks rather than all on the new disk).

c. You move some dbspaces to the new disk, using [Reorganization of a Group of Tables or Dbspace with SAPDBA](Page 392).

d. You replace the mirror chunks later, distributing them evenly across all disks.

You need to think ahead when planning database growth. The best solution is to install your new disks well before the existing disks becoming full. You can then develop a sensible database expansion strategy that takes account of future requirements and allows balanced growth. This means spreading new dbspace extensions evenly across the available disk drives.
Extension of a Dbspace

**Result**

Now that you know the size and location of the new dbspace, you can extend the dbspace in either of the following ways:

- Extending a Dbspace with SAPDBA:  [Adding a Chunk with SAPDBA [Page 350]](Page 350) (recommended by SAP)
- Extending a Dbspace Without SAPDBA [Page 39]

**See also:**

Informix documentation
Extending a Dbspace Without SAPDBA

Use

This section describes how you can extend a dbspace of your Informix database by adding a new chunk using the Informix tool onspaces, that is, without using SAPDBA. You need to extend a dbspace when it is full or will soon be full. For more information, see Extension of a Dbspace [Page 36].

SAP recommends you to extend a dbspace by Adding a Chunk with SAPDBA [Page 350], because it is automated and easier to use than the procedure below. SAPDBA helps you locate free disk space and automatically adds a mirror chunk if the dbspace is mirrored.

Prerequisites

- Before adding a chunk, make sure that it does not cause the maximum number of chunks allowed in your configuration to be exceeded. The maximum number of chunks is specified by the CHUNKS parameter in the ONCONFIG file. You can view this file by Listing System Information with SAPDBA [Page 482].
- If you add a chunk to a mirrored dbspace, you must also add a mirror chunk.

⚠️ If you are manually extending a dbspace or creating a new one, do not allocate chunks where the sum of the offset plus the chunk size is larger than 2 GB, because this leads to severe problems. Refer to SAP Notes 34722 and 28335. This is one reason why SAP recommends that you add a chunk in SAPDBA, because it prevents you allocating chunks larger than 2 GB.

If you allocate raw devices (UNIX) or NTFS files (NT) with a maximum size of 2 GB, as recommended in the installation documentation, then you are even less likely to make this mistake with chunks.

Procedure

Enter a command like the following from the command line:

```
$ onspaces -a psappool -p /.../data3 -o 12 -s 10000
```

This example for UNIX adds a 10 MB chunk to the dbspace psappool.

The parameters are as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Name of the dbspace to be extended</td>
</tr>
<tr>
<td>p</td>
<td>Path to a raw device link or NTFS file where sufficient disk space is available</td>
</tr>
<tr>
<td>o</td>
<td>Offset in KB</td>
</tr>
<tr>
<td>s</td>
<td>Size in KB</td>
</tr>
</tbody>
</table>
Extending a Dbspace Without SAPDBA

To avoid problems on UNIX systems, SAP recommends that you specify an offset of 12 KB for the first chunk on a raw device. However, cooked files can have an offset of zero. For more information, see the Informix documentation.

See also:
Informix documentation
Creation of a New Dbspace

Use

SAP does not normally recommend you to create a new dbspace for your Informix database because your installation then differs from the standard setup for the R/3 System. However, you might still want to create new dbspaces if:

- You need to move certain tables to separate disks so as to reduce disk I/O bottlenecks.
- You have a very large database and you want to set up new dbspaces to make administration easier (for example, due to backup requirements).

⚠️

Be aware that R/3 System upgrades might assume a standard dbspace layout and make corresponding assumptions. These assumptions might concern the space requirements to complete the upgrade and the distribution of tables in dbspaces. If you alter the standard configuration in the ways suggested here, you might need to adjust the space requirements accordingly. Also be aware that tables might possibly be moved back to the standard dbspace during the upgrade. In any case, note the names and sizes of any tables that you move or fragment.

Process Flow

1. When deciding how to set up the new dbspace, you normally follow the same guidelines you used when first installing your system. Refer to Database Setup for Production [Page 28].

2. You create a new dbspace using SAPDBA. Refer to Adding a Dbspace with SAPDBA [Page 353].

3. You monitor the new dbspace using the following:
   - Listing Dbspaces with SAPDBA [Page 343]
   - Analyzing Tables for Critical Next Extent Size with SAPDBA [Page 368]

See also:

Informix documentation
Data Recovery for Informix

Purpose

Data recovery is the set of measures that enable your Informix database to be restored to a consistent state following a failure in which data is lost or damaged (for example, due to a fire).

Informix provides the tools ontape, ON-Archive, and ON-Bar for data recovery.

This section refers to "backups" in the general sense of any copy of database data taken for the purpose of data recovery. In this general sense, the term includes archives, which is the term used for the tools ontape and ON-Archive.

Implementation Considerations

It is extremely important to implement data recovery for your Informix database running with the R/3 System. SAP strongly recommends you make sure that you can recover data in the event of failure.

If you do not take routine backups of the database during normal production, you risk losing data.

You must choose one of the Informix data recovery tools – that is, ontape, ON-Archive, and ON-Bar – and stick to it. This is because backups taken with different tools are not compatible.

To make sure that you can use data backed up for restore, SAP recommends that you:

- Develop a well thought-out approach to data recovery
  - Keep a sufficient number of backup tapes and store at least some offsite
  - Test your backup and restore procedures from time to time, especially after major system changes

Integration

SAP does not provide tools for data recovery, but instead integrates some of the Informix tools into the R/3 System and SAPDBA:

- The Computing Center Management System [Page 22] (CCMS) of the R/3 System integrates ON-Archive, and it is planned to integrate ON-Bar in the future. You can schedule backups in the Database Planning Calendar of CCMS, and check the results afterwards.

- SAP scripts [Page 76] help you set up ON-Archive.

- Recovery Report with SAPDBA [Page 465] can be produced to minimize the time for a restore using ON-Archive.

Features

The essential features of data recovery are as follows:
Data Recovery for Informix

- Making frequent regular backups of the database during normal production (that is, before a failure has occurred). Note that backups do **not** affect normal production.

- Restoring the database to a consistent state following a failure, using backups of the database previously taken during normal production.

**Constraints**

You can only perform data recovery using the authorized Informix tools `ontape`, `ON-Archive`, or `ON-Bar`.

⚠️

You **cannot** use Informix data-migration tools such as `onunload` or `dbexport` for data recovery, because these tools are not coordinated with the information stored in the logical-log files, and they do not store the necessary system-overhead information required for data recovery.
Getting Started with Data Recovery for Informix

Purpose
This section provides you with a summary of the basic concepts involved in data recovery for your Informix database. It is useful if you are new to data recovery for an Informix database with the R/3 System.

Process Flow
1. Read the section describing what data recovery is.
2. Read the sections describing what archive, backup, and restore are.
3. Read the section comparing the data recovery tools, ON-Bar, ON-Archive, and ontape.

Result
With an understanding of the basic concepts involved, you can now begin to develop and implement an approach to data recovery. For an overview of what you need to consider, see Data Recovery for Informix [Page 42].

See also:
Informix Data Recovery [Page 45]
Informix Archive [Page 48]
Informix Whole-System and Storage-Space Backups [Page 51]
Informix Logical-Log Backup [Page 54]
Informix Restore [Page 56]
Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery [Page 59]
Informix documentation
Informix Data Recovery

Use

Data recovery involves a series of operations that enable you to copy the Informix database data so that, in the event of failure involving data loss, you can restore your system and quickly resume normal working with minimal loss. Failure can range from a corrupt disk drive to a full-scale disaster that destroys your computer site. Although data recovery routinely involves copying data to archives and backups, it also enables you to restore your database, if necessary (that is, to enable you to recover from a problem or failure).

Data recovery at database level does not replace your routine system backups at operating system level. Make sure that, when you make routine system backups, you include the configuration files essential for data recovery. For more information about these files, see the Informix documentation.

For more information about how data recovery fits into the wider picture of ensuring high availability of your R/3 System with the Informix database, see High Availability [Ext.].

With ON-Bar, the terminology used by Informix changed. The term "storage space" refers to dbspaces and blobspaces. The process of making a copy of the data and control information managed by the Informix server, formerly called an archive, is now called a "storage space backup" or a "whole system backup". For more information, see the Informix documentation.

The term "logical-log file backup" – often shortened to "logical-log backup" or even "log backup" – remains the same.

In summary, backup is the ON-Bar term for all copies of the database taken for recovery purposes.

The following operations constitute data recovery:

- **Archive (ON-Archive or ontape)**
  
  An archive is a copy of all or a portion of the data that the Informix database server manages. More precisely, an archive is a copy of one or more dbspaces and any supporting data required to restore them.

  Refer to Informix Archive [Page 48].

- **Whole-system or storage-space backup (ON-Bar)**
  
  An ON-Bar backup is a copy of one or more storage spaces and sometimes also the logical logs that the Informix database server manages. You can restore the backup if necessary.

  Refer to Informix Whole-System and Storage-Space Backups [Page 51].

- **Logical-log backup**
  
  A logical-log backup is a copy of the transaction data held in the logical-log files, used by the database server to record ongoing database activity between archives. Since the
Informix Data Recovery

Logical-log file is reused, it must be backed up regularly. The term "logical-log file backup" is sometimes shortened to "logical log backup", "log backup", or just "backup".

Refer to Informix Logical-Log Backup [Page 54].

- Restore

A restore recreates database data after failure has occurred in which data is damaged. The restore happens in the following phases:

1. Data from dbspaces (ON-Archive or ontape) or storage-spaces (ON-Bar) is recreated in the physical restore phase.
2. Logical log data is recreated in the logical restore phase.

Refer to Informix Restore [Page 56].

You can perform all the operations mentioned above with the data recovery tools supplied by Informix, that is, ontape, ON-Archive, and ON-Bar. However, there are differences in what these tools can do. Refer to Comparison of ontape, ON-Archive, and ON-Bar for Data Recovery [Page 59].

The following diagram summarizes the major data recovery operations:

See also:
ON-Bar for Data Recovery [Page 62]
ON-Archive for Data Recovery [Page 69]
ontape for Data Recovery [Page 100]
Database Backup (ON-Bar) [Page 104]
Archive (ON-Archive and ontape) [Page 123]
Logical-Log Backup [Page 163]
Restore [Page 252]
Informix documentation
Informix Archive

Use

An archive is a copy taken with ON-Archive or ontape of all or a portion of the data that the Informix database server manages.

To be exact, an archive is a copy of one or more dbspaces with any extra system information required to regenerate the data exactly as it was when copied. The purpose of an archive is to enable database data to be recovered or restored to a consistent state after a failure in which data is lost or damaged. Archives are normally written to tape, although archives to disk are also possible.

Integration

Informix supplies tools that you can use to perform an archive. See Comparison of ontape, ON-Archive, and ON-Bar for Data Recovery [Page 59] for a comparison of these tools.

Features

There are the following types of archives:

- Sequential
  
  This is the usual type of archive where data is written to a single storage device. A sequential archive is entirely self-sufficient and can be used to restore database data without any additional information.

- Parallel
  
  If you wish to increase the speed of the archive (for example, if you have a large system with a great deal of data), you can use this type of archive. Data is written simultaneously in parallel from several dbspaces to a series of storage devices. A parallel archive is not self-sufficient – you must create logical-log backups for the period of the archive in order to be able to restore the database later.

The following graphic shows the main features of sequential and parallel archives:

Sequential and Parallel Archives
Activities

You can archive at different levels:

- Level-0. The entire database (that is, all dbspaces) is archived. This is the safest archive because it is self-sufficient to restore the data. However, it might take a long time to complete if your database is large.

- Incremental. There are the following types of incremental archive:
Informix Archive

- **Level-1**
  This archives only data that has changed since the last level-0 archive.
- **Level-2**
  This archives only data that has changed since the last level-1 archive.

The following diagram illustrates this concept:

**Archive Levels**

The **scope** of the archive refers to what portion of the database is included. With ON-Archive, it is possible to archive only a subset of the data by using dbspace sets. However, we recommend you to always perform full-system archives, that is, to archive the entire database – whether at level-0, level-1 or level-2.

You can use the **DBA Planning Calendar [Ext.]** in the Computing Center Management System (CCMS) of the R/3 System to schedule archives, but **not** if you are using ontape as your archive tool. The DBA Planning Calendar also enables you to look at the results of past archives and see the resources that are required for future archives.

Archive data is written to a save set on the storage medium.

**See also:**

Archive [Page 123]

Informix documentation
Informix Whole-System and Storage-Space Backups

Use

Whole-system and storage-space backups are copies of the Informix database that you make with the data recovery tool ON-Bar. These terms refer to the scope of the database backup and have the following meanings:

- **Whole-system backup**
  
  This is a backup of all storage spaces (that is, dbspaces and blobspaces) and logical logs after a single checkpoint. ON-Bar backs up storage spaces and logical-logs **serially** during a whole-system backup. The advantage of using a whole-system backup is that you can use it to restore the database to a consistent state without a logical restore.
  
  A whole-system backup is equivalent to a full-system level-0 archive with the Informix tools ON-Archive or ontape. Refer to [Informix Archive](Page 48). A whole-system backup can also be used to replicate an Informix instance.

- **Storage-space backup**
  
  This is a backup of one or more selected storage spaces, or of all storage spaces. A storage-space backup copies the tables and indexes in each specified storage space so that they can be restored later to the state they were in at the time that the backup began.
  
  ON-Bar extracts data in parallel streams, the number of which is determined by the `BAR_MAX_BACKUP` parameter in the `ONCONFIG` file. How the data is then fed to the output devices depends on your storage manager. Since the data is extracted in parallel, you must have backups of the corresponding logical logs if you want to use a storage-space backup for a restore, because the logs synchronize the different parts of the backup.

  ![Tip]

  Since whole-system backups are always performed serially, they are slower than storage-space backups on large databases.

Features

The following graphic shows the main features of whole-system and storage-space backups:

Whole-System and Storage-Space Backups
Activities
You can perform an ON-Bar database backup at the following levels:

- **Level-0**
  
  This is the baseline backup. It contains a copy of all pages that contain data for the specified storage spaces. However, it might take a long time to complete if your database is large.

- **Level-1**
  
  This backs up only data that has changed since the last level-0 backup of the specified storage spaces.

- **Level-2**
  
  This backs up only data that has changed since the last level-1 or level-0 backup of the specified storage spaces.
Note that you can **not** use level-1 and level-2 backups without the corresponding previous level-0 backup.

For example, you might perform a level-0 backup twice a week and a level-1 backup on the remaining days in the week.

**Backup Levels**

![Backup Levels Diagram](image)

You can use the **DBA Planning Calendar [Ext.]** in the Computing Center Management System (CCMS) of the R/3 System to schedule whole-system and storage space backups. The DBA Planning Calendar also enables you to look at the results of past backups and see the resources that are required for future backups.

**See also:**

Informix documentation
Informix Logical-Log Backup

Use

A logical-log backup is a copy of the logical-log transaction data that the Informix database server creates to record ongoing database activity.

The full name for a backup is "logical-log file backup," although "logical log backup" and "log backup" are also used.

Whereas an archive is a copy of database data at a specific point in time, a logical-log backup records transactions that occurred after the archive was taken. Such transactions are stored in the logical-log files. If the database needs to be restored, the archive is first restored and then the log backup is used to roll forward transactions, so producing a consistent and up-to-date database. Backup data is written to a save set on the storage medium.

Integration

Informix supplies tools that you can use to perform a logical-log backup. See Comparison of ontape, ON-Archive, and ON-Bar for Data Recovery [Page 59] for a comparison of these tools.

Features

It is important to back up the logical-log files because this allows the database server to reuse them and make room for subsequent transactions. If the logical log completely fills, the database server stops processing and you have to perform an emergency backup (but this does not apply if you are using ON-Bar, which prevents the logical log filling completely). Although SAPDBA supports emergency logical-log backup for ON-Archive, the procedure is awkward. Avoid emergency logical-log backup by developing a sensible approach to backing up your logical log.

The following diagram illustrates what a backup is and how it relates to an archive:

Logical-Log Backup
Activities

You can use the DBA Planning Calendar [Ext.] in CCMS to schedule backups, but only if you are using ON-Archive or ON-Bar as your logical-log backup tool. The DBA Planning Calendar also lets you look at the results of past backups and see which resources are required for future backups.

See also:

Logical-Log Backup [Page 163]
Emergency Logical-Log Backup [Page 227]
Informix documentation
Informix Restore

Informix Restore

Use
A restore recreates Informix database data that has become accessible because of hardware or software failure, hardware replacement or user error. For example, the following might mean that you have to perform a restore:

- A disk containing database data fails
- You want to move your database to a new computer
- A user error or a program logic error accidentally corrupts or destroys database data

Features
There are the following types of restore:

- Cold restore
  You must use this type of restore when any of the “critical” dbspaces (that is, rootdbs, physdbs, and logdbs) have been damaged or affected by the failure. The Informix server is offline during this process because it cannot function without the critical dbspaces.

- Warm restore
  You can use this type of restore when the critical dbspaces are still operational and the Informix server is therefore online. It can be used to restore selected (but not all) dbspaces.

Activities
You perform a restore in the following steps:

1. Salvage logical-log files
   When a severe failure has caused the database server to go offline, you must do a full-system cold restore. At this point, a number of logical-log files have not yet been backed up. In this case, the first step is to back up these files before starting the physical restore. You can then use the files after the normally backed up logical-log files in the logical restore phase to make sure that the database is completely up-to-date. To salvage logical-log files, the dbspace containing them (that is, logdbs) must be intact.
   If the database server has not gone offline as a result of the failure, make sure that you back up the logical log in the normal way immediately before bringing the database server down. Then you do not have to salvage the logical-log files as described above.

2. Physical restore
   This is the process of restoring storage space (that is, dbspace and blobspace) data from an archive (ON-Archive or ontape) or a whole-system or storage-space backup (ON-Bar).

3. Logical restore
   This is the process of recreating transactions in the physically restored storage space from the first step. The transactions occurred after the archive ON-Archive or
Informix Restore

When a backup (ONTape) or whole-system or storage-space backup (ON-Bar) was taken. By performing this step you make sure that your database is as up to date as possible (and, if you restored using data from a parallel archive or backup in the physical restore step, that the database is consistent).

The following graphic illustrates what a database restore involves:

**Database Restore**

You should normally also create logical-log backups between times t0, t1, and t2. The diagram only shows the logical-log backups taken between t2 and the failure at tf because these are all that are required for the logical restore, assuming you are restoring from a sequential archive (ON-Archive or ONTape) or a whole-system backup (ON-Bar).

If you are restoring from a parallel archive (ON-Archive) or a storage-space backup (ON-Bar), then you must have the transactions from the time between the level-0 archive or storage-space backup and the point of failure. That is, you must have backups of the transactions between t0 and tf.

For further information about restores, see the following:

- **Point-In-Time (PIT) Restore (only for ON-Archive and ON-Bar)**
  
  You can do a restore to a specified point-in-time if necessary. Refer to Performing Logical Restore for Full-System Cold Restore (ON-Archive) [Page 291].
Informix Restore

- Point-In-Log (PIL) Restore (only for ON-Bar)
  You can do a restore to a specified point in the logical-log files.
- SAPDBA Recovery Report (only for ON-Archive)
  This report is very useful to help you identify the tapes required for the archive. Refer to Recovery Report with SAPDBA [Page 465].

See also:
Restore [Page 252]
Informix documentation
Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery

Use

This section compares the different tools for data recovery with Informix databases for the R/3 System. The following tools are available from Informix:

- **ON-Bar [Page 62]**
  
  ON-Bar is the most recent data recovery tool. It is easy to use with powerful functionality. SAP recommends ON-Bar particularly for larger databases where you want to use third party storage manager and storage devices. If you are starting data recovery for the first time, SAP recommends you to use ON-Bar.

- **ON-Archive [Page 69]**
  
  ON-Archive is complex to operate but has powerful functionality. With ON-Archive, you can use the DBA Planning Calendar in the Computing Center Management System (CCMS) of the R/3 System to automatically schedule your database archives and backups.

- **ontape [Page 100]**
  
  ontape is the oldest of the Informix tools. It is the easiest to use but the most restricted.

  In certain circumstances you must use a particular tool:
  - ontape if your operating system is NT
  - ON-Archive or ON-Bar if you want to use the DBA Planning Calendar [Ext.]

Integration

The following table compares the available tools:

The archives and backups written by ON-Bar, ON-Archive, and ontape are not compatible with each other. You cannot mix archives and backups from different tools. Therefore, you must decide which tool you want to use and stay with the chosen tool. Never use one tool to back up the logical log and another one to create archives or database backups.

<table>
<thead>
<tr>
<th>Feature</th>
<th>ON-Bar</th>
<th>ON-Archive</th>
<th>ontape</th>
</tr>
</thead>
</table>

Comparison of Data Recovery with ON-Bar, ON-Archive, and ontape
## Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery

<table>
<thead>
<tr>
<th>General functionality</th>
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<td><strong>Easy to use</strong></td>
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<td><strong>Informix version availability [Page 23]</strong></td>
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<td>No</td>
<td>Yes</td>
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<td><strong>Platform availability [Page 24]</strong></td>
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<td>Yes</td>
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<td>NT</td>
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<td>No</td>
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<td>No</td>
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<td><strong>Archive (ON-Archive and ontape [Page 123] and Database Backup (ON-Bar) [Page 104]</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
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<td>Parallel [Page 131]</td>
<td>Yes</td>
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<td>Of specified dbspaces</td>
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<td>With CCMS [Ext.]</td>
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<td>Yes</td>
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<tr>
<td><strong>Logical-Log Backup [Page 163]</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>With CCMS [Ext.]</td>
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<td>Yes</td>
<td>No</td>
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<td>Emergency backup with SAPDBA [Page 483]</td>
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<td>Yes</td>
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<td><strong>Storage Media</strong></td>
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<td>No</td>
<td>No</td>
<td>No</td>
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<td><strong>Restore [Page 252]</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Point-in-time: (ON-Archive) [Page 279] and ON-Bar [Page 270]</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<td>Specified dbspaces</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Recovery report with SAPDBA [Page 465]</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Prompt for specific tapes</td>
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Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery

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<th>Scheduling</th>
<th>Archive and backup with CCMS [Ext.]</th>
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<td>SAPDBA</td>
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<tr>
<td>• Emergency logical-log backup [Page 483]</td>
<td>Not relevant</td>
<td>Yes (1)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>• Recovery report [Page 465]</td>
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<td>Tape volume administration</td>
<td>No (3)</td>
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<td>• Integrated software</td>
<td>Yes</td>
<td>No</td>
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<td>• Third party software</td>
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<td>Yes</td>
<td>No</td>
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<td>• Recognize end of tape</td>
<td>Yes</td>
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<td>Other features</td>
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<td>• Software data compression</td>
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<td>• Unattended operations</td>
<td>No (3)</td>
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<td>• Access control for storage and operations</td>
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<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>• Standard interface for third party software</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

(1) Emergency log backup with SAPDBA is only available for Informix version 6.0. If you are using version 7.x, see Emergency Logical-Log Backup [Page 227].

(2) Point-in-time restore has been available since Informix version 7.2.

(3) Functionality for these and other features with ON-Bar is located in the Informix Storage Manager (ISM, released with Informix version 7.3) or a third-party storage manager.
ON-Bar for Data Recovery

Use

ON-Bar is one of a number of Informix tools for data recovery (that is, whole-system backup, storage-space backup, logical-log backup, and restore) with your Informix database. ON-Bar provides the following functions on both UNIX and NT platforms:

- Backup database (including selected dbspaces and whole system)
- Back up logical-log files
- Restore data from backups (including restore of selected dbspaces)

Unlike the other Informix data recovery tools (that is, ontape and ON-Archive), ON-Bar does not communicate directly with storage devices, such as tape drives. Instead, it passes control of storage devices to third-party storage managers using the X/Open Backup Services Application (XBSA) Programmer's Interface. You can select your own storage manager (for example, ISM, Legato/Networker, HP OmniBack, IBM/ADSM) and so exploit a wide range of intelligent and high-capacity storage devices (for example, auto loaders, robotic loading systems, or optic disks).

With ON-Bar, you can easily implement fast parallel backups and restores, so improving the availability of your database. Therefore, ON-Bar is well suited for large databases (larger than about 50 GB).

💡 With ON-Bar, the terminology used by Informix changed. The new term "storage spaces" refers to dbspaces and blobspaces. The process of making a copy of the data and control information managed by the Informix server, formerly called an archive, is now called a "storage space backup" or a "whole system backup". For more information, see Informix Whole-System and Storage-Space Backups [Page 51] or the Informix documentation.

The term "logical-log file backup" – often shortened to "logical-log backup" or even "log backup" – remains the same.

In summary, backup is the ON-Bar term for all copies of the database taken for recovery purposes.

For more information on ON-Bar, see the white paper The Informix Backup and Restore Product Strategy in SAPNet.

Integration

If you choose ON-Bar as your data recovery tool, you must do all your backups and restores with it.

⚠️ The backups written by ON-Bar are not compatible with the archives and backups from ontape and ON-Archive. You cannot mix tapes from these tools.
Compared to the other tools available, ON-Bar is easy to use and has wide functionality (but the functionality depends on the storage manager you are using). For more information about the differences between the Informix data recovery tools, see Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery [Page 59].

The following diagram shows how ON-Bar is integrated with the database server and storage manager:

You can think of ON-Bar as processing data to and from the database, whereas the storage manager handles data to and from the backup media.

**Prerequisites**

To implement ON-Bar in a production system, you must have the following:

- Informix Version 7.23UC3 (delivered as standard starting with R/3 Release 3.1H) or a later version (see SAP Note 50157)
- An Informix-certified storage manager for ON-Bar, such as the Informix Storage Manager (ISM), which is delivered with Informix Version 7.3

To find up-to-date information on these requirements, see SAP Note 78884.

Before you start using ON-Bar for data recovery with production data, you must:

- Configure ON-Bar according to your requirements. Refer to Configuring ON-Bar [Page 65].
- Work out your approach to data recovery with ON-Bar. Refer to:
ON-Bar for Data Recovery

- Approach to Database Backup (ON-Bar) [Page 105]
- Approach to Logical-Log Backup (ON-Bar) [Page 165]

- Perform a whole-system backup using ON-Bar with the R/3 System down. Refer to Performing a Manual Database Backup (ON-Bar) [Page 116].

Features

- Parallel backup and restore
- Automatic backup of logical logs
- An open interface for communication with third-party storage managers
- Support for intelligent storage devices using XBSA.

See also:
SAP Note 78884
Informix documentation
Configuring ON-Bar

Use

Before you start using ON-Bar for data recovery with your Informix database, you need to make sure that it is correctly set up. You specify configuration information for ON-Bar in the ONCONFIG file and as environment variables.

Prerequisites

How you configure ON-Bar partly depends on your approach to data recovery. Therefore, make sure that you have worked out your approach first. Refer to Approach to Database Backup (ON-Bar) [Page 105] and Approach to Logical-Log Backup (ON-Bar) [Page 165].

Procedure

1. Decide what kind of storage manager you intend to use with ON-Bar.

   You can use the Informix Storage Manager (ISM), which comes with your Informix database server, or a third-party storage manager. You must make sure that the storage manager you choose is compatible with your:
   - Storage devices (that is, disk and tape drives, and so on)
   - Version of ON-Bar

   For more information about storage managers, including how to configure ISM, see the Informix documentation and SAP Note 74440.

   ISM is more tightly integrated in ON-Bar than third-party storage managers. Therefore, if you use ISM, be sure to complete the next few steps.

2. Set the environment variables required by ON-Bar, depending on which storage manager you are using.

   If you are using ISM, set the environment variables ISM_COMPRESSION and ISM_ENCRYPTION, which determine how ISM backs up data. For more information, see the Informix documentation.

3. Set the required variables in the ONCONFIG file, depending on which storage manager you are using. For more information, see the Informix documentation.

   Summary of ONCONFIG File Parameters for ON-Bar

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Determines</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAR_MAX_BACKUP</td>
<td>Degree of parallelism used by ON-Bar</td>
</tr>
<tr>
<td>BAR_ACT_LOG</td>
<td>Path to the ON-Bar activity log</td>
</tr>
<tr>
<td>BAR_DEBUG_LOG</td>
<td>Path to the ON-Bar debug log</td>
</tr>
<tr>
<td>BAR_DEBUG</td>
<td>Degree of detail held in the ON-Bar debug log</td>
</tr>
<tr>
<td>BAR_RETRY</td>
<td>How often ON-Bar retries to send data to or receive data from the storage manager</td>
</tr>
</tbody>
</table>
Configuring ON-Bar

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAR_XFER_BUF_SIZE</td>
<td>Size of the buffer used for exchange between ON-Bar and the storage manager</td>
</tr>
<tr>
<td>BAR_NB_XPORT_COUNT</td>
<td>Number of buffers used for exchange between ON-Bar and the storage manager</td>
</tr>
<tr>
<td>BAR_BSALIB_PATH</td>
<td>Path of the shared library used as interface between ON-Bar and the storage manager</td>
</tr>
<tr>
<td>LTAPEDEV</td>
<td>Whether or not logging is switched on. See caution below.</td>
</tr>
<tr>
<td>ALARMPROGRAM</td>
<td>Event alarm, for example, used to start a logical-log backup when logs reach a certain fill level.</td>
</tr>
<tr>
<td>LOG_BACKUP_MODE</td>
<td>Mode for logical-log backup.</td>
</tr>
<tr>
<td>LBU_PRESERVE</td>
<td>This is the most important prevention against emergency logical-log backups. If other measures fail, this parameter always prevents the logical log filling completely. It specifies how many logical-log files the database server always preserves (that is, avoids writing logging data to). Set it as follows:</td>
</tr>
</tbody>
</table>

LBU_PRESERVE 1

Do not set LTAPEDEV to blank or /dev/null (UNIX) or nul (NT) if you want to be able to perform a restore of your system up to the time of failure. If you specify a null value, logical-log backups are not performed and are therefore not available if a restore is necessary.

When you have finished editing the ONCONFIG file, you have to stop and restart both the R/3 System and the Informix database server for the changes to take effect. You can check the contents of the file in SAPDBA. Refer to Listing System Information with SAPDBA [Page 482].

The entries in your ONCONFIG file relevant to ON-Bar should look similar to the following example for UNIX:

```
# Backup/Restore Variables for ON-Bar
BAR_ACT_LOG /tmp/bar_act.log # path of ON-Bar activity log
BAR_MAX_BACKUP 0 # Maximum no. of parallel onbar_d processes
BAR_RETRY 1 # Number of times to retry failures
BAR_NB_XPORT_COUNT 10 # No. of transport buffers
BAR_XFER_BUF_SIZE 31 # Size of each transport buffer
RESTARTABLE_RESTORE OFF # Enables restartable restore
# Use either LOG_BACKUP_MODE in IECC or ALARMPROGRAM, not both
LOG_BACKUP_MODE CONT # Use IECC to set value: CONT or MANUAL
ALARMPROGRAM /usr/informix/etc/log_full.sh
```
Configuring ON-Bar

BAR_BSALIB_PATH /usr/lib/ibsad001.so # XBSA shared lib path

#Informix Storage Manager Variables
ISM_DATA_POOL ISMData
ISM_LOG_POOL ISMLogs

# Log Archive Tape Device
# Do not set LTAPEDEV to blank or /dev/null
LTAPEDEV /dev/tapedev
LTAPEBLK 16
LTAPESIZE 10240

If you are using ISM, check especially the parameters towards the end of the file marked Informix Storage Manager Variables in the above example.

4. If you use a storage manager other than ISM, follow the configuration instructions supplied. Make sure that the location of the XBSA library is specified to ON-Bar. For more information, see the Informix documentation.

5. Check the contents and location of the main files for ON-Bar.

Main Files for ON-Bar

<table>
<thead>
<tr>
<th>File Name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informix message log</td>
<td>Contains all messages generated by database server. Allows you to determine if a problem is on the database server side (that is, ON-Bar or the storage manager). Use Listing System Information with SAPDBA [Page 482] to view the message log. The name of the file is specified by the MSGPATH parameter in the ONCONFIG file.</td>
</tr>
<tr>
<td>ONCONFIG file</td>
<td>Contains general configuration information for the database server, including parameters prefixed BAR_, which are specific to ON-Bar (see the example above). Use Listing System Information with SAPDBA [Page 482] to view the ONCONFIG file. The name of the file is normally onconfig.&lt;hostname&gt;.sid and it is normally in the directory $INFORMIXDIR/etc (UNIX) or %INFORMIXDIR%\etc (NT).</td>
</tr>
<tr>
<td>ON-Bar activity log</td>
<td>Contains all messages about activity in ON-Bar. It is very useful for solving problems. The name of the file is specified by the BAR_ACT_LOG parameter in the ONCONFIG file.</td>
</tr>
<tr>
<td>ON-Bar debug log</td>
<td>Contains detailed debugging information to help you solve a problem together with the Informix hotline. The name of the file is specified by the BAR_DEBUG_LOG parameter in the ONCONFIG file.</td>
</tr>
</tbody>
</table>
Configuring ON-Bar

<table>
<thead>
<tr>
<th>ON-Bar emergency boot file</th>
<th>Contains backup information similar to that in the ON-Bar catalog files for use in a restore. The file is called ixbar.&lt;server number&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server boot file</td>
<td>Contains information required to start the database server. The file is called oncfg_&lt;server name&gt;.&lt;server number&gt;</td>
</tr>
</tbody>
</table>

For more information, see the Informix documentation and SAP Note 78884.

6. Test ON-Bar with your chosen storage manager before you go live.

   For more information, see the Information documentation and SAP Note 78884. This note contains important information that you must read before going live with ON-Bar.

Result

You can now start using ON-Bar to create backups of your database and logical log. Refer to:

- Creation of a Database Backup (ON-Bar) [Page 114]
- Creation of a Logical-Log Backup (ON-Bar) [Page 176]

See also:

Informix documentation
SAP Notes 74440 and 78884
ON-Archive for Data Recovery

Use

ON-Archive is one of a number of tools for data recovery [Page 45] (that is, database archive, logical-log backup, and restore) with your Informix database. ON-Archive is only available on UNIX platforms. ON-Archive provides the following functions:

- Archive database (including archive of selected dbspaces)
- Back up logical-log files
- Restore data from archives and backups (including restore of selected dbspaces)

You can perform unattended and parallel database archives and logical-log backups with ON-Archive. SAP and Informix provide scripts making it easier to use ON-Archive.

Integration

If you choose ON-Archive as your data recovery tool, you must do all your logical-log backups and database archives with it.

⚠️ The archives and backups written by ON-Bar, ON-Archive, and ontape are not compatible. You cannot mix tapes from these tools. Do not use one tool to back up the logical log and the other to archive the database.

Compared to the other tools available, ON-Archive offers a wide range of functions but is complex. For the latest Informix tool, allowing you to use third-party storage managers, choose ON-Bar [Page 62]. For a data recovery tool that is easier to use but with reduced functionality, choose ontape [Page 100]. For more information about the differences between the Informix data recovery tools, see Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery [Page 59].

When using ON-Archive, SAP recommends that you use the following tools:

- **SAP scripts [Page 76]**
  These make it easier to set up and use ON-Archive.

- **The DBA Planning Calendar [Ext.]**
  This is part of the Computing Center Management System (CCMS) in the R/3 System and helps you to easily schedule database archives and logical-log backups.

Prerequisites

If you are new to ON-Archive, see Getting Started with ON-Archive [Page 71]. Before you start using ON-Archive for data recovery, you must:

- Work out your approach to data recovery with ON-Archive. Refer to Approach to Archive (ON-Archive) [Page 125] and Approach to Logical-Log Backup (ON-Archive) [Page 183].
ON-Archive for Data Recovery

- Configure ON-Archive according to the requirements of your chosen approach. Refer to Configuration of ON-Archive [Page 75].

Features

Some of the important features of ON-Archive are:

- Database archive and logical-log backup to either tape or disk
- Parallel operation in both archive and recovery mode
- Unattended mode (that is, operator-free)
- Tracking database archive and logical-log backup events in sysmaster database
- Access control for data recovery operations

See also:

Informix documentation
Getting Started with ON-Archive

Purpose

If you are new to ON-Archive, which is a complex tool to use, this section helps you to get started. ON-Archive is a tool for data recovery (that is, database archive, logical-log backup, and restore) for an Informix database with the R/3 System.

If you use the SAP scripts [Page 76] and the DBA Planning Calendar [Ext.] (part of the Computing Center Management System [Page 22] in the R/3 System), you do not need to enter ON-Archive commands manually. SAP recommends that you use the scripts and the DBA Planning Calendar, because they make it easier to set up and use ON-Archive.

Prerequisites

Read the Informix documentation about ON-Archive before you start. You must have a UNIX platform, because ON-Archive is not available for NT platforms. To see how this process fits in with the overall process of using ON-Archive for data recovery, see ON-Archive for Data Recovery [Page 69].

The programs that make up the data recovery tool ON-Archive use a command-line interface and include onarchive, ondatartr, onautovop, oncatlgr. For more information about these programs – all delivered with your Informix database – see the Informix documentation.

Process

1. You decide how you want to perform database archives and logical-log backups. Refer to Approach to Archive (ON-Archive) [Page 125] and Approach to Logical-Log Backup (ON-Archive) [Page 183].

2. You make sure you meet the requirements for your chosen approach. Refer to Requirements for an Archive (ON-Archive) [Page 132] and Requirements for a Logical-Log Backup (ON-Archive) [Page 194].

3. You decide if you want to use the SAP scripts for ON-Archive. For more information:
   - If you decide to use the scripts, see SAP Scripts for ON-Archive [Page 76] [Page 78].
   - If you decide not to use the scripts, see Entering ON-Archive Commands Manually [Page 73].

4. You set up the volume sets and volumes to meet the requirements of your chosen approach. Refer to Volume Sets and Volumes for ON-Archive [Page 92]. Note that, if you decide to use the SAP scripts, you can set up the required volume sets and volumes with the scripts arcprep and arcvolum.

5. You edit the configuration files used by ON-Archive according to the requirements of your chosen approach. Refer to Configuration Files for ON-Archive [Page 80]. Make sure you define the devices to be used for database archive and logical-log backup.
Getting Started with ON-Archive

For an overview of some of the configuration tasks described above, see Configuration of ON-Archive [Page 75].

Result

You are now ready to start creating database archives and logical-log backups. Refer to Creation of an Archive (ON-Archive) [Page 141] and Creation of a Logical-Log Backup (ON-Archive) [Page 199].

See also:

ON-Archive for Data Recovery [Page 69]
Informix Tools [Page 20]
Informix documentation
Entering ON-Archive Commands Manually

Use

Although SAP recommends that you use the SAP scripts [Page 76] and the DBA Planning Calendar [Ext.] – which means you do not need to enter ON-Archive commands manually – this section is provided in case you decide not to use these tools with your Informix database.

Prerequisites

Read the Informix documentation carefully because ON-Archive is a complex tool.

Procedure

1. Choose one of the following ways to interact with ON-Archive:

<table>
<thead>
<tr>
<th>Method of interaction</th>
<th>How to interact</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the operating system command line</td>
<td>Enter your command, for example:</td>
</tr>
<tr>
<td></td>
<td>$ onarchive 'archive/dbspaceset=*/level=0/vset=dbtap'</td>
</tr>
<tr>
<td>From the ON-Archive command line</td>
<td>1. Enter the following from the operating system command line:</td>
</tr>
<tr>
<td></td>
<td>$ onarchive</td>
</tr>
<tr>
<td></td>
<td>Then you see the ON-Archive command-line prompt:</td>
</tr>
<tr>
<td></td>
<td>Onarchive&gt;</td>
</tr>
<tr>
<td></td>
<td>2. Enter your command, for example:</td>
</tr>
<tr>
<td></td>
<td>Onarchive&gt; archive/dbspaceset=*/level=0/vset=dbtap</td>
</tr>
<tr>
<td>Using the menu interface</td>
<td>You can access the menu interface</td>
</tr>
<tr>
<td></td>
<td>• From the operating system command line:</td>
</tr>
<tr>
<td></td>
<td>$ onarchive menu</td>
</tr>
<tr>
<td></td>
<td>• From the ON-Archive command-line:</td>
</tr>
<tr>
<td></td>
<td>Onarchive&gt; menu</td>
</tr>
</tbody>
</table>

2. Define the action.

To define an archive or backup you have to create a request. The system enters the request in the ON-Archive catalog with a unique identification number.

3. Execute the action.

After creating the request, you have to explicitly execute it. You can execute a request immediately, or you can leave it in the catalog to be executed at a later time. You can also use onautop (the virtual operator) to start the command in unattended mode.
Entering ON-Archive Commands Manually

4. If you want, combine the “define action” and “execute action” steps into a single step by entering the parameter `immediate` on the operating system command line, for example:

```bash
$ onarchive \\
    'archive/dbspaceset=*/level=0/vset=dbtap/immediate'
```

You can also enter `immediate` on the `onarchive` command line, for example:

```
Onarchive> archive/dbspaceset=*/level=0/vset=dbtap/immediate
```

You can also define `immediate` as a default in the `oper_deflt.arc` file. This documentation uses this convention. If you use the `/immediate` qualifier as a default or enter it on the command line as part of an ON-Archive command, the command is executed immediately. Refer to Editing the File `oper_deflt.arc` for ON-Archive [Page 83].

You can use the same approach with the qualifier `/autovop` to execute the command in unattended mode. You can enter it either as a default (not recommended) or on the command line when required.

💡

The following Informix programs are used with ON-Archive:

<table>
<thead>
<tr>
<th>Program</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>onarchive</td>
<td>Works interactively with ON-Archive (as long as the database is available)</td>
</tr>
<tr>
<td>ondatatr</td>
<td>Performs off-line functions (for example, to restore a database that is down)</td>
</tr>
<tr>
<td>onautovop</td>
<td>Performs unattended operations</td>
</tr>
<tr>
<td>oncatlgr</td>
<td>Communicates between ON-Archive and the database</td>
</tr>
</tbody>
</table>

See also:

Informix documentation
Configuration of ON-Archive

Purpose
This section contains essential information for you to make sure that ON-Archive works correctly with your Informix database running with the R/3 System. ON-Archive is relatively complex and it pays to make sure that you have completed all the necessary configuration tasks before you start database archives and logical-log backups on your production database.

Prerequisites
You must have a UNIX platform, because ON-Archive is not available for NT platforms.

Before you start configuration, make sure you have worked out your approach to database archive and logical-log backup with ON-Archive. Refer to:
- Approach to Archive (ON-Archive) [Page 125]
- Approach to Logical-Log Backup (ON-Archive) [Page 183]

To see how this process fits in with the overall process of using ON-Archive for data recovery, see ON-Archive for Data Recovery [Page 69]. If you are new to ON-Archive, see Getting Started with ON-Archive [Page 71].

Process Flow

1. You read the Informix documentation for ON-Archive.
2. If you are using the SAP scripts, you prepare the scripts [Page 78].
3. You edit the configuration files for ON-Archive [Page 80]. Make sure you also define the required devices in the config.arc file [Page 85] (how you do this depends on whether you are using the SAP scripts or not).
4. You set up the required volume sets and volumes [Page 92] (how you do this depends on whether you are using the SAP scripts or not).

Result

Now you can use ON-Archive for database archives and logical-log backups with your production database. Refer to:
- Archive (ON-Archive and ontape) [Page 123]
- Logical-Log Backup [Page 163]

See also:
Informix documentation
SAP Scripts for ON-Archive

Definition

The SAP scripts simplify configuration of ON-Archive and data recovery with ON-Archive for the Informix database. You do not need to enter ON-Archive commands manually if you use these scripts. Entering ON-Archive commands manually can be complex and error-prone. However, for more information if you want to do this, see Entering ON-Archive Commands Manually [Page 73].

Use

The following SAP scripts are for use with ON-Archive:

- **arcprep** defines the following default volume sets, all of which are defined on tape:
  - **DBTAP** for database archives
  - **LOGTAP** for logical-log backups
  - **ONDATARTRLOG** for salvage logs and emergency backup of logical-log files
  - **arcprep** also helps you define volumes for these volume sets. Refer to Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94].

- **arcvolum** lets you define additional volumes for an existing volume set.

- **logevent.sh** runs in the background and detects when the logical log has reached the predefined level. It then performs the logical-log backup.

- **arcauto** performs automatic backup of the logical-log files at predefined times.
  - For more details on how to use the scripts **logevent.sh** and **arcauto** in logical-log file backup, see Automatic Logical-Log Backup (ON-Archive) [Page 186].

- **arcpanic** is used for emergency backup of the logical-log files, that is, when the logical log has filled up and the database has suspended processing. This should not be necessary if **arcauto** and **logevent.sh** are installed since these routinely back up the logical logs. As an additional safety precaution, you **must** set the parameters **ALARMPROGRAM** and **LBU_PRESERVE**. Refer to Editing the File ONCONFIG for ON-Archive [Page 81].
  - For more information on how to use the scripts in emergency logical-log backup, see Preparing for Emergency Logical-Log Backup with ON-Archive using SAP Scripts [Page 231].

- **archive_control** and **backup_control** are used to control the production of a recovery report. The report lists the volumes you need to use for a database restore. If you use the scripts continually, the recovery report is always up-to-date. You can view the report in SAPDBA. Refer to Recovery Report with SAPDBA [Page 465].

You do not need to enter ON-Archive commands manually if you use these scripts. Entering ON-Archive commands manually can be complex and error-prone.
Instructions for the SAP scripts assume that you archive sequentially. If you wish to perform parallel database archive, you can still use the SAP scripts but you need to meet some additional requirements. Refer to Define Devices for ON-Archive Without SAP Scripts [Page 89] and Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts [Page 97].

Integration

To see how the SAP scripts fit into the wider picture of configuring ON-Archive for data recovery, see Configuration of ON-Archive [Page 75].
Preparing SAP Scripts for ON-Archive

Use

You need to copy and edit the SAP scripts to prepare them for use with ON-Archive and the Informix database. Only use this procedure if you are working on a UNIX platform, because ON-Archive does not run on NT platforms.

Procedure

First, you copy the scripts, then you edit the script logevent.sh.

Copying Scripts

To use the SAP scripts, you must copy them from the CD to your own directory:

1. Mount the CD INFORMIX RDBMS.
2. Log on as user <sid>adm using the following command:
   
   `su - <sid>adm`

3. Change to the target directory (/usr/sap/<SID>/SYS/exe/run) using the following command:
   
   `cd exe`

4. Copy the file arcprep from CD with the following command, replacing <CD-Mountdir> with the actual name of your mount directory:
   
   `cp /<CD-Mountdir>/DBTOOLS/ARCPREP arcprep`

5. Repeat the previous step for the other scripts (arcvolum, arcauto, arcpanic, archive_control, backup_control, and logevent.sh).

Editing Script logevent.sh

To prepare the script logevent.sh for logical-log backup, you need to edit it as follows:

1. Mount the CD INFORMIX RDBMS.
2. Log in as user informix, using the following command:
   
   `su - informix`

3. To prepare the script logevent.sh, set the following values in the script:
   
   - `MAX_PCT=50`
     
     Set this value to the required percentage full for the logical log to trigger a logical-log backup. SAP recommends 50% full as the default.
   
   - `BACKUP_VSET=LOGTAP`
     
     Set this value to the target volume set for the logical-log backup, normally LOGTAP.

4. To activate the script logevent.sh, you must set the ALARMPROGRAM parameter in the ONCONFIG file. Make sure that the name and the directory for the parameter are correct. Refer to Editing the File ONCONFIG for ON-Archive [Page 81].
5. Stop and restart the R/3 System and the Informix server for the changes to take effect.

**Result**

Now the scripts are active and ready for use.

**See also:**
- Defining Devices for ON-Archive with SAP Scripts [Page 87]
- Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94]
- Preparing for Recovery Reports with SAPDBA [Page 466]
Configuration Files for ON-Archive

**Definition**

The configuration files contain essential information required by ON-Archive with the Informix database, so that you can perform database archive and logical-log backup.

**Use**

You should check the parameters in the following configuration files before starting to perform database archives and logical-log backups on your production database:

- **ONCONFIG [Page 81]** for essential information required by ON-Archive
- **oper_deflt.arc [Page 83]** for default parameters in ON-Archive requests
- **config.arc [Page 85]** for general configuration of ON-Archive, especially devices

You need to be logged on as user informix to change any of the above files. You can find these files in the directory $INFORMIXDIR/etc.

**Integration**

To see how configuration files fit into the wider picture of configuring ON-Archive for data recovery, see Configuration of ON-Archive [Page 75].

**See also:**

Informix documentation
Editing the ONCONFIG File for ON-Archive

Use

This procedure describes how to configure the ONCONFIG file, one of a number of files required for ON-Archive with the Informix database. This file contains essential information required by ON-Archive to correctly perform data recovery (that is, archive, backup, and restore). To see how the ONCONFIG file relates to the other files required by ON-Archive, see Configuration Files for ON-Archive [Page 80].

Follow this procedure before you start performing archives, backups, and restores of your database.

Procedure

1. Log on as user informix using the following command:
   ```bash
   su - informix
   ```

2. Open the ONCONFIG file, which you can normally find in the $INFORMIXDIR/etc directory. The full name of the ONCONFIG file is normally onconfig.<hostname>.<sid>.

3. Set the parameters LTAPEDEV and TAPEDEV.

   Although ON-Archive does not actually use LTAPEDEV and TAPEDEV to specify devices, you must enter some value other than /dev/null if you want to be able to restore your system up to the point of failure, for example:
   ```bash
   LTAPEDEV /dev/rmt/0hc
   TAPEDEV /dev/rmt/1hc
   ```

   **Warning:**

   Do not use /dev/null for LTAPEDEV or TAPEDEV if you want to perform a restore of your system up to the time of failure. If you specify the value /dev/null, the logical-log files are automatically marked as backed-up when they become full, effectively discarding logical log information.

4. Set the parameter ALARMPROGRAM.

   This parameter specifies the path to the script logevent.sh required to automatically back up your logical log [Page 186]. If you intend to use this script (recommended by SAP), set the parameter as follows:
   ```bash
   ALARMPROGRAM /informix/<SID>/etc/logevent.sh
   ```

5. Set the parameter LBU_PRESERVE (also known as the “Log Backup High Water Mark” parameter).

   To avoid having to do an emergency backup of the logical logs, you must set this parameter. It specifies how many logical-log files the Informix server always preserves (that is, it does not write logging data to these files). SAP recommends you set it as follows:
   ```bash
   LBU_PRESERVE 1
   ```
In this case, when the second to last logical-log file has filled up, the Informix server effectively stops processing, allowing you to back up the full logical-log files to allow processing to continue. Therefore, no emergency backup is necessary.

⚠️

Two of the parameters mentioned above – that is, ALARM PROGRAM and LBU_PRESERVE – are necessary in effective logical log management. They help prevent you from having to perform an Emergency Logical-Log Backup [Page 227].

For a summary of measures you can take to avoid this problem, see Preventing Emergency Logical-Log Backup [Page 250].

If LBU_PRESERVE is incorrectly set, an alert is raised in the Release 4 alert monitor in the Computing Center Management System (CCMS) of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext.].

6. When you have finished editing ONCONFIG, you need to stop and restart both the R/3 System and the Informix server for the changes to take effect.

Result

You have now completed one of the steps required to configure ON-Archive for performing archives, backups, and restores of your database.

See also:

Configuration of ON-Archive [Page 75]
Editing the oper_deftl.arc File for ON-Archive [Page 83]
Editing the config.arc File for ON-Archive [Page 85]
Informix documentation
Editing the oper_deflt.arc File for ON-Archive

Use

This procedure describes how to configure the oper_deflt.arc file, one of a number of files required for ON-Archive with the Informix database. This file sets the default values for parameters in ON-Archive requests. It contains essential information required by ON-Archive to correctly perform data recovery (that is, archive, backup, and restore). If required, you can override the defaults set in this file. To see how the oper_deflt.arc file relates to the other files required by ON-Archive, see Configuration Files for ON-Archive [Page 80].

Follow this procedure before you start performing archives, backups, and restores of your database.

Procedure

1. Log on as user informix using the following command:
   
   `su - informix`

2. If required, you can list your current ON-Archive defaults before you start editing, using the following command:
   
   `$ onarchive 'list/default'`

3. Open the oper_deflt.arc file, which you can normally find in the $INFORMIXDIR/etc directory.

4. Set the parameter IMMEDIATE.
   
   This parameter means that ON-Archive commands are executed immediately instead of being stored as a request for later execution. We recommend that you use this parameter. The convention in this documentation is to assume it has been set.

5. Set the parameter AUTOVOP.
   
   This parameter means that ON-Archive commands are executed in unattended mode using the autovop utility. It is best to set this to NOAUTOVOP for normal use.

6. Set the parameters NOCOMPRESS and NODECOMPRESS (define both parameters, as shown here).
   
   These parameters define the software compression type. SAP recommends that you use rewind tape drives with hardware compression.

7. Set the parameter EXPIRY_DATE=number of days
   
   This parameter determines how long tape volumes are kept before they can be overwritten with new archive data. Four weeks should be the absolute minimum value for this parameter in a production environment, for example:

   `EXPIRY_DATE=28`

   ON-Archive deletes information about archives and backups that have expired (even if they have not yet been overwritten). This means that valid archives or
Editing the oper_deflt.arc File for ON-Archive

backups might still exist on the tape concerned. However, ON-Archive does not recognize the existence of the data any longer (the entry has been deleted from the sysmaster database because the expiry date has been reached). Such data can be recataloged if necessary.

For more information about volume sets and volumes, see Volume Sets and Volumes for ON-Archive [Page 92].

8. Set the parameter LOG.

This parameter causes ON-Archive to write a brief log of its actions to a system file (to the working directory). See the ACTIVITYLOG parameter in Editing the config.arc File for ON-Archive [Page 85] for another way to log activity in ON-Archive.

9. Set the parameter NOTIFY.

This parameter causes ON-Archive to send an email to the operator who executed the ON-Archive request. The email contains the results of the request. If you use the DBA Planning Calendar [Ext.], the email is sent to the user <sid>adm.

10. Set the parameter NOAPART.

This parameter specifies that multiple save sets from an archive or backup can be written to the same volume. SAP recommends that you set this parameter as shown here. You can override it for particular archives or backups if required, by using the APART qualifier in an ON-Archive command that you enter manually. For more information about entering ON-Archive commands manually, see Entering ON-Archive Commands Manually [Page 73].

⚠️ On AIX, you must define the blocksize for the tape you want to use as 0 to make software changes of blocksize possible. You can do this, for example, using the AIX administration tool smitty.

Result

You have now completed one of the steps required to configure ON-Archive for performing archives, backups, and restores of your database.

See also:

Configuration of ON-Archive [Page 75]
Editing the ONCONFIG File for ON-Archive [Page 81]
Editing the config.arc File for ON-Archive [Page 85]
Informix documentation
Editing the config.arc File for ON-Archive

Use

This procedure describes how to configure the config.arc file, one of a number of files required for ON-Archive with the Informix database. The default ON-Archive configuration file is called config.arc. This file contains essential information required by ON-Archive to correctly perform data recovery (that is, archive, backup, and restore). To see how the config.arc file relates to the other files required by ON-Archive, see Configuration Files for ON-Archive [Page 80].

Follow this procedure before you start performing archives, backups, and restores of your database.

The default configuration file for ON-Archive is the config.arc file, located in the $INFORMIXDIR/etc directory. However, your installation might use a different name for the configuration file. To find the name of the ON-Archive configuration file, check the ARC_CONFIG environment variable.

Procedure

1. Log on as user informix using the following command:
   ```
   su - informix
   ```

2. Open the config.arc file, which you can normally find in the $INFORMIXDIR/etc directory.

3. Set the parameter PRIVILEGE as follows, making sure that any other privilege entry is disabled:
   ```
   PRIVILEGE = OPERATOR, GROUP
   ```

4. Set the parameter ACTIVITYLOG as follows to determine the log file for ON-Archive events:
   ```
   ACTIVITYLOG = /informix/<SID>/etc/archive.log
   ```
   In this documentation, we assume you have specified archive.log as the ON-Archive log file.

5. Set the parameter DEVICE to specify logical names for your hardware devices. A device is a logical group of physical hardware devices. For example, the logical device LOGTAP_VOP might refer to one or more physical devices /dev/rmt/0hc, /dev/rmt/1hc and so on.

   The logical device name is on the left-hand side of the device entry, the physical device name on the right-hand side. In the example below, LOGTAP_VOP is the logical device name and /dev/rmt/0m is the physical device name:
   ```
   DEVICE LOGTAP_VOP = /dev/rmt/0m
   ```
Editing the config.arc File for ON-Archive

You must define devices **before** you can define volume sets and volumes for ON-Archive. How you define devices depends on whether you are using the [SAP scripts](Page 76). Refer to one of the following:

- [Defining Devices for ON-Archive with SAP Scripts](Page 87)
- [Defining Devices for ON-Archive Without SAP Scripts](Page 89)

⚠️ If you specify the same physical device for backup and archive, you run the risk that the logical log fills up during an archive because no tape drive is available to back it up. At this point, the database stops processing and an emergency backup of logical-log files might be required. Therefore, SAP recommends you to have different physical devices for archive and backup.

6. When you have finished editing `config.arc`, you need to restart the ON-Archive cataloger for the changes to take effect. Enter the following from the command line regardless of whether the cataloger was running first:

```
$ stop_oncatlgr
$ start_oncatlgr
```

**Result**

You have now completed one of the steps required to configure ON-Archive for performing archives, backups, and restores of your database.

**See also:**

- [Configuration of ON-Archive](Page 75)
- [Editing the ONCONFIG File for ON-Archive](Page 81)
- [Editing the oper_deflt.arc File for ON-Archive](Page 83)
- Informix documentation
Defining Devices for ON-Archive with SAP Scripts

Use

This procedure describes how to define devices for ON-Archive with the Informix database if you are using the SAP scripts [Page 76]. You define devices in the config.arc file [Page 85]. The device names given in this procedure are as required by the SAP scripts.

Follow this procedure before you start performing archives, backups, and restores of your database.

⚠️ Check your Informix release notes for valid tape devices or other restrictions.

Procedure

1. Log on as user informix using the following command:
   ```
   su - informix
   ```

2. Open the config.arc file, which you can normally find in the $INFORMIXDIR/etc directory. If the file is not in this directory, see the note in Editing the config.arc File for ON-Archive [Page 85].

   The physical device names (for example, /dev/rmt/1hc) given in the following steps are examples only. However, you must use the logical device names (for example, DBTP1_VOP) given, since these are expected by the SAP scripts.

3. Enter a tape device for archive:
   ```
   DEVICE DBTP1_VOP = /dev/rmt/1hc
   ```

4. Enter a tape device for logical-log backup:
   ```
   DEVICE LOGTP1_VOP = /dev/rmt/0hc
   ```

5. Enter a tape device for emergency logical-log backup and logs salvage (this example uses the same physical device as for normal logical-log backup):
   ```
   DEVICE DATARTR_VOP = /dev/rmt/0hc
   ```

   For a summary what you can do to avoid emergency logical-log backups, see Preventing Emergency Logical-Log Backup [Page 250].

💡 You can specify multiple physical tape devices for a logical device, for example:

   ```
   DEVICE LOGTP1_VOP = /dev/rmt/0hc, /dev/rmt/1hc
   DEVICE DBTP1_VOP = /dev/rmt/2hc, /dev/rmt/3hc
   ```

   This has the following advantages:

   - If a particular physical device fails, you can switch to the next one in the sequence.
Defining Devices for ON-Archive with SAP Scripts

- If the tape on the first physical device fills up, and there is a tape already mounted on the next physical device, it is used and processing can proceed without delay.

To do parallel archives (used in large installations to speed up the process), you must define additional logical devices. If you want to add extra logical devices for parallel archive, see Defining Devices for ON-Archive Without SAP Scripts [Page 89]. In this case, you can still use the SAP scripts as described above to define the volumes for the basic set of devices.

6. When you have finished editing device names in the config.arc file, you need to restart the ON-Archive cataloger for the changes to take effect. Enter the following from the command line (it does not matter if the cataloger is already running):

```
$ stop_oncatlgr
$ start_oncatlgr
```

Result

You have now completed one of the steps required to configure ON-Archive for performing archives, backups, and restores of your database. When you set up volume sets and volumes using the SAP scripts, the device names given in this procedure are used. Refer to Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94] [Page 97].

See also:

Configuration Files for ON-Archive [Page 80]
Defining Devices for ON-Archive Without SAP Scripts [Page 89]
Informix documentation
Defining Devices for ON-Archive Without SAP Scripts

Use

This procedure describes how to define devices for ON-Archive with the Informix database if you are not using the SAP scripts [Page 76]. You define devices in the config.arc file [Page 85]. SAP recommends that you use the logical device names given in this procedure, but there might be particular requirements at your site for different names.

Follow this procedure before you start performing archives, backups, and restores of your database.

⚠️

Check your Informix release notes for valid tape devices or other restrictions.

Procedure

💡

The physical device names shown below are examples only. Use the suffix _VOP in your device names. This suffix means that a request with this device can be executed in unattended mode, that is, no user messages are issued, and user intervention during the execution of the request is not necessary. This is important, for example, if you want to run your archives overnight.

1. Log on as user informix using the following command:
   ```
   su - informix
   ```

2. Open the config.arc file, which you can normally find in the $INFORMIXDIR/etc directory. If the file is not in this directory, see the note in Editing the config.arc File for ON-Archive [Page 85].

   The physical device names (for example, /dev/rmt/0m) given in the following steps are examples only. The logical device names (for example, DBTAP_VOP) are recommended by SAP.

3. Enter tape device(s) for archive:

<table>
<thead>
<tr>
<th>Device name(s) to enter</th>
<th>Purpose</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVICE DBTAP_VOP = /dev/rmt/0m</td>
<td>Sequential archive to a single logical device, which is linked to a single physical device.</td>
<td>This is the simplest setup. However, if the tape on the specified device fills, the archive cannot continue.</td>
</tr>
<tr>
<td>DEVICE DBTAP_VOP = /dev/rmt/0m, /dev/rmt/3m, /dev/rmt/5m</td>
<td>Sequential archive to single logical device linked to multiple physical devices</td>
<td>If the tape on the first physical device fills, the archive can still continue using the tape on the next device.</td>
</tr>
</tbody>
</table>
Defining Devices for ON-Archive Without SAP Scripts

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>Purpose</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBTAP_VOP = /dev/rmt/0m, /dev/rmt/3m, /dev/rmt/5m</td>
<td>Parallel archive to multiple logical and physical devices</td>
<td>Parallel archives are useful for large databases or to reduce the time taken. You need to set up dbspace sets for parallel archives. For more information on setting up dbspace sets, see the Informix documentation.</td>
</tr>
<tr>
<td>DBTAP0_VOP = /dev/rmt/0m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBTAP3_VOP = /dev/rmt/3m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBTAP5_VOP = /dev/rmt/5m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SAP does not recommend parallel archives unless necessary. However, if you have a good reason to do parallel archives, you can use the DBA Planning Calendar [Ext.], which you access from the Computing Center Management System (CCMS) in the R/3 System.

4. Enter tape or disk devices for logical-log file backup:

<table>
<thead>
<tr>
<th>Device name(s) to enter</th>
<th>Purpose</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOGTAP_VOP = /dev/rmt/0m</td>
<td>Tape backup or copy to tape.</td>
<td>This could be used to copy logs from temporary storage area in a disk backup, as well as for normal tape backup (that is, directly to tape).</td>
</tr>
<tr>
<td>LOGDIR_VOP = /infbackup/logdir</td>
<td>Disk backup</td>
<td>Logs written to temporary storage area on disk, then copied to tape (see previous table entry). Physical device should be on separate disk for performance reasons.</td>
</tr>
</tbody>
</table>

5. Enter a disk device for emergency logical-log file backup and salvaging the logs:

DEVICE LOGPANIC = /infbackup/logpanic

This device is used when the logical log has filled up and the database has stopped processing. Refer to Emergency Backup without SAP Scripts (ON-Archive) [Page 238]. For a summary of measures which you can take to avoid the problem of emergency logical-log backups, see Preventing Emergency Logical-Log Backup [Page 250].

6. When you have finished editing device names in the config.arc file, you need to restart the ON-Archive cataloger for the changes to take effect. Enter the following from the command line (it does not matter if the cataloger is already running):

   $ stop_oncatlgr
   $ start_oncatlgr

Result

You have now completed one of the steps required to configure ON-Archive for performing archives, backups, and restores of your database. When you set up volume sets and volumes without SAP scripts, you need to enter the devices you have set up in this procedure. Refer to Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts [Page 97].
See also:

Configuration Files for ON-Archive [Page 80]

Defining Devices for ON-Archive with SAP Scripts [Page 87]

Informix documentation
Volume Sets and Volumes for ON-Archive

Definition

ON-Archive for the Informix database organizes the physical media that it uses to store backup data (that is, archived data and backed up logical-log files) into volume sets and volumes. Volumes are organized into volume sets, which are defined by characteristics such as type (that is, disk or tape), logical device, density, and so on. ON-Archive manages the volumes in a volume set, so allowing backup data to span multiple volumes without problem.

Use

The number of volumes you require in a volume set depends on how large your database is and your archive and backup approach – that is, how often you perform archives and backups. This is shown in the example below.

If you wanted to archive at level-0 (full) daily during the working week with two tape volumes per archive and a four week (28 day) cycle (the tapes are reused after this period), you would require 40 volumes (two tapes per day x five days per week x four weeks).

If you wanted to back up your logical logs daily during the working week with a single tape volume per backup and a four week (28 day) cycle (the tapes are reused after this period), you would require 20 volumes (one tape per day x five days per week x four weeks).

Make sure of the following when you perform an archive or backup with ON-Archive:

1. You have defined the corresponding devices. How you do this depends on whether you are using the SAP scripts [Page 76] for configuring ON-Archive:
   - Define Devices for ON-Archive with SAP Scripts [Page 87] (recommended by SAP)
   - Define Devices for ON-Archive Without SAP Scripts [Page 89]

2. You have defined the volume sets and volumes required. How you do this depends on whether you are using the SAP scripts [Page 76] for configuring ON-Archive:
   - Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94] (recommended by SAP)
   - Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts [Page 97]

Integration

Every archive and backup request in ON-Archive requires a volume set. The volume set points to the logical device to be used for the archive or backup. The logical device in turn points to the physical device (or to a list of available physical devices). Therefore, a volume set provides a logical grouping for your archives and backups and associates these with a specific logical device.

To see how volume sets and volumes fit into the wider picture of configuring ON-Archive for data recovery, see Configuration of ON-Archive [Page 75].
See also:
Informix documentation
Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts

Use

This procedure describes how to define volume sets and volumes for ON-Archive with the Informix database if you are using the SAP scripts [Page 76]. For more information about volume sets (including a suggestion for the default number of volumes to create), see Volume Sets and Volumes for ON-Archive [Page 92].

You should have already entered your device names in the config.arc file [Page 85]. For more information, see Defining Devices for ON-Archive with SAP Scripts [Page 87].

Follow this procedure before you start performing database archives, logical-log backups, and restores of your database.

Procedure

1. Log on as user informix with the following command:
   
   su - informix

   You can also log on as user <sid>adm if you prefer.

   The first script, arcprep, sets up the volume sets and volumes required to start archiving and backing up your database (that is, the volume sets DBTAP, LOGTAP, and ONDATARTRLOG, each containing the number of volumes you specify).

   \WARNING
   You must not run arcprep more than once. This script labels volumes starting from 1 upwards. Therefore, running it again can cause problems. If you need to define additional volumes or redefine existing ones, use the script arcvolum.

2. Change to the directory where the scripts arcprep and arcvolum are. This directory is normally /usr/sap/<SID>/SYS/exe/run, but you might have used a different directory when you copied the scripts. For more information, see Preparing SAP Scripts for ON-Archive [Page 78].

3. Start arcprep by entering the following at the command line:

   arcprep

   arcprep identifies itself as follows:

   Installation script for default Volume-Sets and Volumes in the SAP R/3 Environment

4. Enter the number of tape volumes in each volume set when arcprep prompts you.

   For more information about volume sets (including a suggestion for the default number of volumes to create), see Volume Sets and Volumes for ON-Archive [Page 92].

   arcprep tells you how many tapes you need in total. You can add additional tape volumes later if required using the second script, arcvolum.

5. Mount a tape volume on the specified device when arcprep prompts you.
6. Remove and physically label the tape volume with the name and volume label displayed by arcrep.

Steps 4 and 5 are repeated until all tape volumes in each volume set have been created. Finally, arcprep issues a message to confirm satisfactory completion.

The second script, arcvolum, sets up additional volumes as required. If one of your volumes is damaged, lost, or for some other reason unavailable, you need to redefine the missing volume. You might also want to assign new volumes to a volume set if your database archive and logical-log backup approach changes. For example, you might decide to keep a logical-log backup every day for two months instead of only one month, so requiring an extra set of volumes.

Before you start arcvolum, you need to know the name of the volume set for which you want to create a new volume. The example below uses volume set LOGTAP.

7. Make sure you are in the correct directory (see step 2) and then start arcvolum by entering the following at the command line:

```
arcvolum -v LOGTAP
```

The script displays the current contents of the volume set you have chosen.

8. Reply to the arcvolum prompt asking you which of the following types of volume you want to create:

Using the next free volume number (for example, if the last free volume is LOGT30, the next would be LOGT31) as label

Using a label of your own choice (for example, an existing volume is damaged)

9. Mount a tape volume on the specified device when arcvolum prompts you.

arcvolum calls ON-Archive to write an electronic label to the tape you have mounted.

10. Remove and physically label the tape volume with the name and volume label displayed by arcrep.

Repeat steps 7 to 10 for each new volume you want to create.

**Result**

Look in the archive.log file to see the results. You can see entries similar to the following for each volume set:

```
Apr 13 1995 13:20:03 #00000000# <21434> onarchive (informix)
Defined DBTAP:
DEFINE/VSET=DBTAP/DEVICE_TYPE=DBTP1_VOP/DRIVER=TAPE/
ACCESSIBILITY=10/CLASS=USER/USER=(root, informix, arcadm)
```

You can see entries similar to the following for each volume:

```
Apr 13 1995 13:22:37 #00000000# <21444> onarchive (informix)
Defined DBTAP:0001: DEFINE/VOLUME/VSET=DBTAP/LABEL=DBT1
```

You have now completed one of the steps required to configure ON-Archive for performing database archives, logical-log backups, and restores of your database.
Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts

See also:

Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts [Page 97]

Informix documentation
## Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts

### Prerequisites
This procedure describes how to manually define volume sets and volumes for ON-Archive with the Informix database if you are not using the SAP scripts [Page 76]. SAP recommends that you use the names for volume sets and volumes given in this procedure, but you might have particular requirements at your site for different names.

You should have already entered your device names in the config.arc file [Page 85]. For more information, see Defining Devices for ON-Archive Without SAP Scripts [Page 89].

Follow this procedure before you start performing database archives, logical-log backups, and restores of your database. You define volume sets and volumes manually in ON-Archive. Refer to Entering ON-Archive Commands Manually [Page 73] and the Informix documentation.

### Procedure
1. Log on as user informix with the following command:
   ```
   su - informix
   ```

2. Enter the following at the command line to start ON-Archive:
   ```
   $ onarchive
   ```
   You see the ON-Archive command prompt as follows:
   ```
   Onarchive>
   ```

   The volume sets and volumes in the following steps use the device names given in Defining Devices for ON-Archive Without SAP Scripts [Page 89].

3. Enter volume set(s) for database archive at the ON-Archive command prompt:

<table>
<thead>
<tr>
<th>Volume set(s) to enter</th>
<th>Purpose</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFINE/VSET=DBTAP/DEVICE_TYPE=DBTAP_VO/DRIVER=TAPE/ACCESSIBILITY=0/CLASS=SYSTEM</td>
<td>Sequential database archive, using single logical device DBTAP_VOP.</td>
<td>Note that the logical device DBTAP_VOP can be linked to several physical devices (that is, tape drives).</td>
</tr>
</tbody>
</table>
4. Enter volume set(s) for logical-log backup to tape or disk at the ON-Archive command prompt:

```
Volume set(s) to enter       Purpose                                   Comment
DEFINE/VSET=LOGTAP/DEVICE_TYPE=LOGTAP_V OP/DRIVER=TAPE/ACCESSIBILITY=0/CLASS=SYSTEM
  Tape backup of logical log or copy to tape, using single logical device LOGTAP_VOP.
  Note that the logical device LOGTAP_VOP can be linked to several physical devices.
DEFINE/VSET=LOGDIR/DEVICE_TYPE=LOGDIR_V OP/DRIVER=DISK/ACCESSIBILITY=0/CLASS=SYSTEM
  Disk backup of logical log, using single logical device LOGDIR_VOP.
  You should also define a tape volume set (see previous entry), because you need to copy the backed-up logs from disk due to space constraints.
```

5. Enter a volume set for emergency logical-log backup to disk:

```
DEFINE/VSET=ONDATATRLOG/DEVICE_TYPE=LOGPANIC/DRIVER=DISK
```

This command sets up a disk volume set, using a single logical device, LOGPANIC. This volume set is used when the logical log has filled up and the database has stopped processing. Refer to Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238]. For a summary of measures to avoid emergency logical-log backups, see Preventing Emergency Logical-Log Backup [Page 250].

Now you can start setting up the volumes for the above volume sets. For more information about the number of tape volumes that you require, see Volume Sets and Volumes for ON-Archive [Page 92].

6. For tape volume sets, enter a command like the following at the ON-Archive command prompt:

```
DEFINE/VOLUME/VSET=DBTAP
```

This command creates a volume in the volume set DBTAP. ON-Archive assigns volume numbers sequentially, starting with 1. SAP recommends that you stick a label on your tape volumes showing at least the volume set name and volume label.
Repeat this step until you have created all the tape volumes you need in each of your tape volume sets.

7. For disk volume sets, enter a command like the following at the ON-Archive command prompt:

```
DEFINE/VOLUME/VSET=ONDATARTRLOG/MAX_SPACE=99999999/VIRTUAL=(/infbackup/logpanic/V1)
```

This command creates a volume in sub-directory V1 of volume set ONDATARTRLOG. The name V1 is optional. However, you should use it in case you need to add additional volumes later, because the volumes are then in the same directory and can be easily managed.

These volumes should at least be large enough to hold the entire logical log. Therefore, MAX_SPACE is set very high in the above example.

Repeat this step for your other disk volume sets.

**Result**

Look in the archive.log file to see the results of this procedure. You can see entries for each volume set, similar to the following:

```
Apr 13 1995 13:20:03 #00000000# <21434> onarchive (informix)
Defined DBTAP:
DEFINE/VSET=DBTAP/DEVICE_TYPE=DBTP1_VOP/DRIVER=TAPE/
ACCESSIBILITY=10/CLASS=USER/USER=(root, informix, arcadm)
```

You can see entries for each volume, similar to the following:

```
Apr 13 1995 13:22:37 #00000000# <21444> onarchive (informix)
Defined DBTAP:0001: DEFINE/VOLUME/VSET=DBTAP/LABEL=DBT1
```

You have now completed one of the steps required to configure ON-Archive for performing database archives, logical-log backups, and restores of your database.

**See also:**

- Volume Sets and Volumes for ON-Archive [Page 92]
- Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94]
- Informix documentation
ontape for Data Recovery

Use

ontape is one of a number of Informix tools for data recovery (that is, database archive, logical-log backup and restore) with your Informix database. ontape provides the following functions on both UNIX and NT platforms:

- Archive database (but not selected dbspaces and not in parallel)
- Back up logical-log files
- Restore data from archives and backups (including restore of selected dbspaces)

You cannot perform unattended database archives and logical-log backups with ontape.

Integration

If you choose ontape as your data recovery tool, you must do all your database archives, logical-log backups, and restores with it.

⚠️

The archives and backups written by ON-Bar, ontape, or ON-Archive are not compatible. You cannot mix tapes from these tools. Do not use one tool to back up the logical log and the other to archive the database.

Compared to the other tools available, ontape is easy to use but has limited functionality. For a wider range of functions, choose ON-Bar [Page 62] or ON-Archive [Page 69] as your data recovery tool. For more information about the differences between the Informix data recovery tools, see Comparison of ON-Bar, ON-Archive, or ontape for Data Recovery [Page 59].

Prerequisites

Before you start using ontape for data recovery with production data, you must:

- Configure ontape according to your requirements. Refer to Configuring ontape [Page 101].
- Work out your approach to data recovery with ontape. Refer to Approach to Archive (ontape) [Page 153] and Approach to Logical-Log Backup (ontape) [Page 214].

See also:

Informix documentation
Configuring ontape

Prerequisites

You need to configure ontape before you start using it for data recovery (that is, database archive, logical-log backup, and restore) with production data. Configuration information for ontape is held in the ONCONFIG file.

SAP recommends that you have at least two tape devices for use with ontape. Use one tape device for archiving the database and the other for backing up the logical-log. The use of two devices allows you to perform backups of your logical-log files during normal database operations without interfering with the archiving.

See the Informix release notes for details of the currently recommended tape device paths for your setup.

Procedure

1. Edit the ONCONFIG file as user informix.

   The name of the ONCONFIG file is defined by the environment variable, either $ONCONFIG (UNIX) or %ONCONFIG% (NT). In R/3 Systems, the file is called by default $INFORMIXDIR/etc/onconfig.<hostname>.<sid> (UNIX) or %INFORMIXDIR%\etc\onconfig.<hostname>.<sid> (NT).

2. Make sure that the ONCONFIG file has entries for database archive as in the following table:

   Example of ONCONFIG File Entries for Archive with UNIX

<table>
<thead>
<tr>
<th>Description</th>
<th>Typical ONCONFIG entry</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape device path</td>
<td>TAPEDEV /dev/tape1</td>
<td>Use a symbolic link to the tape drive for archives (see note and caution below)</td>
</tr>
<tr>
<td>Tape block size (KB)</td>
<td>TAPEBLK 16</td>
<td>Use the maximum block size supported by your archive tape device</td>
</tr>
<tr>
<td>Tape data size (KB)</td>
<td>TAPESIZE 1950000</td>
<td>Use the maximum amount of data you want to put on the tape. See table &quot;Tapesize Values&quot; below.</td>
</tr>
</tbody>
</table>

It is a good idea to use symbolic link values for TAPEDEV and LTAPEDEV to allow you to switch between multiple tape devices without changing the path name.

Suppose that /dev/tape1 is a symbolic link to /dev/rmt/0m. If the device /dev/rmt/0m breaks, you can simply attach a new device and link /dev/tape1 to the new device.

Do not use /dev/null on UNIX or nul on NT for TAPEDEV or LTAPEDEV if you want to perform a restore of your system up to the time of failure.
Configuring ontape

If you specify a null value for TAPEDEV, database archives are not performed and are therefore not available when a physical restore is required.

If you specify a null value for LTAPEDEV, the logical-log files are marked as backed up once they are full. However, the files are not actually backed up. Therefore, you cannot use transactions recorded in these logs when a logical restore is required.

To set TAPESIZE or LTAPESIZE (see next step) correctly, see the following table:

### Tapesize Values

<table>
<thead>
<tr>
<th>Tape length</th>
<th>No compression</th>
<th>Hardware compression at ratio 1:1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAT 60 meter</td>
<td>1250000</td>
<td>1750000</td>
</tr>
<tr>
<td>DAT 90 meter</td>
<td>1950000</td>
<td>2730000</td>
</tr>
<tr>
<td>DAT 120 meter (DDS-2)</td>
<td>3950000</td>
<td>5530000</td>
</tr>
<tr>
<td>DLT 15 GB</td>
<td>14950000</td>
<td>20930000</td>
</tr>
<tr>
<td>DLT 20 GB</td>
<td>19950000</td>
<td>27930000</td>
</tr>
</tbody>
</table>

The tapesize values in the final column assume a compression ratio of 1:1.4, typical for a mature database.

SAP recommends that you use tape device compression, as follows:

- By software, for example, with DAT drives, using the command inftapeset. To turn compression on, enter inftapeset on. To turn compression off, enter inftapeset off.
- By hardware, for example, with DLT drives, by activating the compression button of your drive. Refer to the documentation supplied with your tape drive.

3. Make sure that the ONCONFIG file has entries for logical-log backup as in the following table:

#### Example of ONCONFIG File Entries for Logical-Log Backup with UNIX

<table>
<thead>
<tr>
<th>Description</th>
<th>Typical ONCONFIG entry</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape device path</td>
<td>LTAPEDEV /dev/tape2</td>
<td>Use a symbolic link to the tape drive for backups (see note and caution above)</td>
</tr>
<tr>
<td>Tape block size (KB)</td>
<td>LTAPEBLK 16</td>
<td>Use the maximum block size supported by your backup tape device</td>
</tr>
<tr>
<td>Tape data size (KB)</td>
<td>LTAPESIZE 1950000</td>
<td>Use the maximum amount of data you want to put on the tape. See table &quot;Tapesize Values&quot; above.</td>
</tr>
</tbody>
</table>

4. Specify the high water mark for logical-log backup in the ONCONFIG file as follows:

   LBU_PRESERVE 1
Configuring ontape

Set this parameter to prevent the logical logs from filling. If the logical logs all fill, you have to do an emergency backup, which is lengthy and complicated. The high water mark parameter specifies how many logical-log files the database server always preserves (that is, it avoids writing logging data to these files).

With this setting, when the second to last logical-log file has filled up, the database server stops processing. This allows you to back up the full logical-log files in the normal way to allow processing to continue. Therefore, no emergency backup is necessary.

If you have not set this parameter and all the logical-log files are full, see Performing Emergency Logical-Log Backup (ontape) [Page 248].

5. To activate the parameter changes to the ONCONFIG file, shut down the R/3 System and restart the Informix database server.

See also:

Approach to Archive (ontape) [Page 153]
Requirements for an Archive (ontape) [Page 156]
Creation of an Archive (ontape) [Page 159]
Approach to Logical-Log Backup (ontape) [Page 214]
Requirements for a Logical-Log Backup (ontape) [Page 218]
Creation of a Logical-Log Backup (ontape) [Page 220]
Full-System Cold Restore (ontape) [Page 302]
Partial-System Warm Restore (ontape) [Page 306]
Configuration of ON-Archive [Page 75]
Configuring ON-Bar [Page 65]
Database Backup (ON-Bar)

Purpose

With the Informix database, you can create a backup of the whole system or selected storage spaces using ON-Bar [Page 62]. The database backup can be serial (for the whole system) or parallel (for all or selected storage spaces).

For more information, see Informix Whole-System and Storage-Space Backups? [Page 51]

⚠️ If you use ON-Bar for database backup, you must also use it for logical-log backup [Page 163]. You cannot use different tools for database and logical-log backup, because the data produced is not compatible.

Prerequisites

You have completed the preparations necessary for using ON-Bar and have chosen a storage manager. Refer to Configuring ON-Bar [Page 65].

Process Flow

1. You decide which approach to use. Refer to Approach to Database Backup (ON-Bar) [Page 105].
2. You identify your requirements and make sure they are met. Refer to Requirements for a Database Backup (ON-Bar) [Page 111].
3. You perform the backup and check the results. Refer to Creation of a Database Backup (ON-Bar) [Page 114].

Result

You now have a backup of your database that you can use in the event of failure to restore the database [Page 252].

See also:

Informix documentation
Approach to Database Backup (ON-Bar)

Purpose
To make sure that you can create backups of the Informix database with ON-Bar in the best way, you have to decide on your approach. Database backups include whole-system and storage-space backups. If your approach is poor, you might later have trouble using the backed-up data to restore the database.

Prerequisites
You have completed the preparations necessary to set up ON-Bar, including the storage manager. Refer to Configuring ON-Bar [Page 65].

Process Flow
1. You develop good practice for database backups [Page 106].
2. You choose the level and frequency for database backups [Page 107].
3. You decide whether to use the DBA Planning Calendar in the Computing Center Management System (CCMS) of the R/3 System to schedule database backups [Page 191].

Result
You have chosen an approach for database backup with ON-Bar. You can now check the Requirements for Database Backup (ON-Bar) [Page 111].

See also:
Informix documentation
Developing Good Practice for Database Backup (ON-Bar)

Use

This section discusses guidelines for creating Informix database backups with ON-Bar.

Procedure

1. Perform database backup with the Informix database server in online mode.

   You can create database backups while the Informix database server is fully online and no extra risk is involved. Data consistency is maintained, which means that you can restore the database correctly (to the point the database backup was started).

   You can put the database server into quiescent mode for a backup, but this is normally unnecessary. You cannot perform database backups in offline mode. For more information about Informix database server modes, see Server Mode with SAPDBA [Page 335] and the Informix documentation.

2. Perform a logical-log backup after a storage-space backup.

   Storage-space backups run in parallel. This means that a logical-log backup is necessary immediately afterwards to make sure of data consistency in the event of a restore. Therefore, always follow a storage-space backup with a logical-log backup.

   Whole-system backups are always executed serially. Therefore, data consistency in the event of a restore is guaranteed. So you do not have to do a separate logical-log backup because the logical logs are included in the backup.

3. Perform database backup during off-peak hours.

   A database backup, particularly one that uses software compression, might affect the performance of the Informix database server. Since performance of your database is critical, you should perform backups during off-peak hours.

4. Perform a whole-system backup at level-0 when necessary

   Sometimes you need to perform a whole-system backup at level-0. For example, you have to perform a whole-system backup at level-0 after changing the configuration of the physical and logical logs. Whole-system backups are also required for the following:

   - Reorganizing a Single Table with SAPDBA [Page 387]
   - Reorganizing a Group of Tables with SAPDBA [Page 394]
   - Reorganizing a Dbspace and Its Tables with SAPDBA [Page 398]

   For more information about database administration activities requiring a whole-system backup at level-0, see the Informix documentation.

Result

The database is backed up using best practice, so avoiding impact on the production system as far as possible. This is an essential part of your database backup approach. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable backup that you can use to quickly restore the database with minimal data loss.
Choosing Levels and Frequency of Database Backup (ON-Bar)

Use

There are the following levels for Informix database backup (that is, whole-system and storage-space backups) for ON-Bar available with the Informix database server:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (full)</td>
<td>Backs up used pages. The most secure but biggest and longest database backup.</td>
</tr>
<tr>
<td>1</td>
<td>Backs up all changes since the last level-0 database backup</td>
</tr>
<tr>
<td>2</td>
<td>Backs up all changes since the last level-1 database backup</td>
</tr>
</tbody>
</table>

Database backups at levels 1 or 2 are known as "incremental."

Be very careful when using level-1 or level-2 database backups because they depend on the previous level-0 database backup. If the last level-0 database backup is lost or unreadable, existing level-1 or level-2 database backups are useless if the database needs to be restored. For more information about how to check that your data is readable for a restore, see Data Consistency with SAPDBA [Page 418].

Procedure

1. If possible, perform a level-0 database backup every day. In the event of failure involving data loss, you can restore the last level-0 database backup and then apply the logs backed up during the day of failure.

2. Be sure to have enough media capacity (for example, tapes and tape drives) to perform unattended full database backups. If this is possible, it becomes much easier to perform frequent full (level-0) database backups with large databases, since you do not need to continually mount new storage media.

3. Use full (level-0) database backups unless the database is so large that incremental (level-1 and level-2) database backups are really necessary. Remember that an incremental database backup is no use on its own. It can only be used with an earlier full database backup.

Result

You have decided on the levels and frequency of database backup. This is an essential part of your database backup approach. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable backup that you can use to quickly restore the database with minimal data loss.

See also:

Informix documentation
Scheduling Backups and Archives with CCMS (ON-Bar and ON-Archive)

Use

The DBA Planning Calendar [Ext.] in the Computing Center Management System (CCMS) of the R/3 System lets you schedule the following for the Informix database:

- Database backups (ON-Bar) or archives (ON-Archive)
- Logical-log backups (ON-Bar and ON-Archive)

If the necessary resources (that is, storage media) are available, the DBA Planning Calendar executes the backup or archive on the date and time that you specify.

The advantages of the DBA Planning Calendar and CCMS are:

- You have a single point from which to coordinate and supervise database backups, archives, and logical-log backups.
- You do not need to enter ON-Bar or ON-Archive commands, since CCMS handles these for you. Therefore, there is less chance of error.
- You can see a history of database backups, archives, or logical-log backups, showing past results.
- You can see how full the logical log is at any time.
- You can automatically see which volumes are needed for a future database backup, archive, or logical-log backup.
- With ON-Archive you can use an automatic logical-log backup from the DBA Planning Calendar. The backup is triggered when the fill-level of the logical log reaches a certain percentage. You can specify the percentage, for example, 50%. Refer to Backing Up the Logical Log (Automatic) in the DBA Planning Calendar (Informix) [Ext.].

Procedure

1. Use the DBA Planning Calendar to schedule a database backup or an archive to run at the required date and time.
   
   Refer to Archiving or Backing Up the Database in the DBA Planning Calendar (Informix) [Ext.].

2. Use the DBA Planning Calendar to schedule a logical-log backup to run at the required date and time.

   Refer to Backing Up the Logical Log in the DBA Planning Calendar (Informix) [Ext.].

3. Check the results using the Checking the Results of Actions in the DBA Planning Calendar [Ext.].

4. Look at an overview of the results, including the status of the logical log, using the archive and backup monitor [Ext.] in CCMS.
Result

The database and logical logs are backed up at the scheduled date and time, without you having to remember to execute them. Therefore, you can be more sure that, in the event of failure involving data loss, you have a backup that you can use to quickly restore the database with minimal data loss.
Requirements for a Database Backup (ON-Bar)

Purpose
To perform an Informix database backup – that is, a whole-system or storage-space backup – with ON-Bar, you have to meet certain requirements.

Prerequisites
You have decided on an approach to database backup [Page 105] with ON-Bar. This determines the requirements you need to meet. For example, the level and frequency of database backups determines the storage media requirements.

Process Flow
1. You check that you have the correct tape devices available.
2. You check that you have the correct tape volumes and enough tape volumes for the expected amount of data. Refer to Setting Up Storage Media for Database Backup (ON-Bar) [Page 112].
3. You print or keep a copy of essential information about your database server configuration, including the ONCONFIG file.

Result
You have met the requirements for database backup with ON-Bar. You can now perform database backup with ON-Bar [Page 114].

See also:
Informix documentation
**Setting Up Storage Media for Database Backup (ON-Bar)**

**Use**

You need to set up enough storage media – for example, tape volumes – with adequate capacity for Informix database backup with **ON-Bar**.

**Procedure**

Keep in mind the following when you choose storage media for database backup:

- **Database size**
  
  The amount of data you need to back up determines the amount of space on your storage media required for a database backup.

- **Database backup approach**
  
  For example, how often you perform database backup and at what level influences the storage space required. A database backup at level-0 requires more storage space than at level-1 or level-2.

- **Media retention cycle**
  
  The longer you keep your database backups before overwriting them, the more storage media required. The recommended period is 28 days or longer.

The following examples illustrate the number of tape volumes required for backing up a normal and a large database:

1. **This example is for backup of a normal database, assuming a four week (28-day) cycle (that is, the tapes are reused after this period).**

   Assume you want to perform database backup at level-0 (full) daily during the working week (Monday to Friday). This requires two tape volumes for each database backup.

   Then you need:
   
   \[ 2 \text{ volumes a day} \times 5 \text{ days per week} \times 4 \text{ weeks} = 40 \text{ volumes} \]

2. **This example is for backup of a large database, assuming an eight week (56-day) cycle (that is, the tapes are reused after this period).**

   Assume you want to perform database backup at level-0 (full) once a week on the weekend and this requires four volumes for each database backup. Also assume that you want to perform database backup at level-1 (incremental) daily during the working week (Monday to Friday) and this requires two tape volumes per database backup.

   Then you need:
   
   - **Level-0 database backups:**
     
     \[ 4 \text{ volumes a week} \times 8 \text{ weeks} = 32 \text{ volumes} \]
Level-1 database backups:
2 volumes a day x 5 days a week x 8 weeks = 80 volumes
Therefore, you need 112 tape volumes in total.

**Result**
You have set up storage media for optimal database backup with **ON-Bar**.
Creation of a Database Backup (ON-Bar)

Purpose
To back up the Informix database with ON-Bar, you can do either of the following:

- Use the Computing Center Management Center (CCMS) in the R/3 System (recommended by SAP)
  
  CCMS provides a complete environment so that you can manage your database backups from one place without having to switch between different tools. For example, you can schedule database backups and check the results in CCMS.
  
  For more information, see SAP/Informix DBA in CCMS [Ext.].

- Enter your own ON-Bar commands (not recommended by SAP)
  
  You need to know the ON-Bar commands for this method. For further information, refer to the Informix documentation.

Prerequisites
You have worked out an approach [Page 105] and met its requirements [Page 111].

Before you perform a database backup, verify database consistency [Page 428]. Do this as often as possible before database backups. Make sure that you always have at least one database backup that you have checked for data consistency.

Process Flow

Computing Center Management System (CCMS)
1. You use the DBA Planning Calendar [Ext.] in CCMS to schedule your database backups.
2. You make sure the necessary resources (tapes, tape drives, and so on) are available.
3. You use the archive and backup monitor [Ext.] to check the results of your database backups.

For more information about planning your database backups with the DBA Planning Calendar, see Archiving or Backing Up the Database in the DBA Planning Calendar (Informix) [Ext.].

Entering ON-Bar Commands Manually
For more information if you are new to ON-Bar, see ON-Bar for Data Recovery [Page 62].

2. You check the status and result of the database backup in either of the following ways:
   - Checking Database Backup Status and Result with Activity Log (ON-Bar) [Page 119]
   - Checking Result of Database Backup or Archive with Message Log [Page 161]
Result

The database is backed up. Therefore, you have a copy of database data that can be restored in the event of database failure.

Finally, you complete the database backup [Page 122], whether you use CCMS or manual backups.

See also:

Informix documentation
Performing a Manual Database Backup (ON-Bar)

Use
This procedure tells you how to perform an Informix database backup – that is a whole-system or storage-space backup – with ON-Bar. It assumes you are entering ON-Bar commands manually.

For more information about database backup without entering ON-Bar commands manually, see Archiving or Backing Up the Database in the DBA Planning Calendar (Informix) [Ext.].

Prerequisites
Before you start the database backup, be sure to complete the following tasks:

- Verify database consistency [Page 428]. This is not necessary for every single database backup, but always make sure that you have at least one database backup for which the data consistency has been checked.

- Decide what type of database backup you want to perform, either whole-system or storage-space backup [Page 51], and at what level [Page 107]. For more information about developing an approach to database backups, see Approach to Database Backup (ON-Bar) [Page 105].

- Copy all essential files for ON-Bar. You might need the information in these files if you have to restore the database later.

  Use Listing System Information with SAPDBA [Page 482] to view the ONCONFIG file, containing the names and locations of many of the files listed below.

  Essential Files for ON-Bar

<table>
<thead>
<tr>
<th>File Name</th>
<th>Technical Name and Where to Find it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informix message log</td>
<td>See MSGPATH parameter in the ONCONFIG file.</td>
</tr>
<tr>
<td>ONCONFIG file</td>
<td>Normally onconfig.&lt;hostname&gt;.sid and normally in directory $INFORMIXDIR/etc (UNIX) or %INFORMIXDIR%etc (NT).</td>
</tr>
<tr>
<td>ON-Bar activity log</td>
<td>See BAR_ACT_LOG parameter in the ONCONFIG file.</td>
</tr>
<tr>
<td>ON-Bar debug log</td>
<td>See BAR_DEBUG_LOG parameter in the ONCONFIG file.</td>
</tr>
<tr>
<td>ON-Bar emergency boot file</td>
<td>ixbar.&lt;server number&gt; in directory $INFORMIXDIR/etc (UNIX) or %INFORMIXDIR%etc (NT). For &lt;server number&gt;, see the ONCONFIG file.</td>
</tr>
<tr>
<td>Server boot file</td>
<td>oncfg_&lt;server name&gt;.&lt;server number&gt; in directory $INFORMIXDIR/etc (UNIX) or %INFORMIXDIR%etc (NT). For &lt;server name&gt; and &lt;server number&gt;, see the ONCONFIG file.</td>
</tr>
<tr>
<td>Storage manager files</td>
<td>Refer to your storage manager documentation.</td>
</tr>
</tbody>
</table>
Performing a Manual Database Backup (ON-Bar)

**Procedure**

Back up the database in one of the following ways:

- **Whole-system backup**
  
  Enter the following at the command level as user `informix`:
  
  ```
  $ onbar -b -w
  ```

- **Storage-space backup**
  
  Enter the following at the command level as user `informix`:
  
  ```
  $ onbar -b
  ```

  This command backs up all dbspaces. SAP does not recommend you to back up individual dbspaces unless you have a good reason.

The commands shown above are for a full, level-0 backup. If you want to perform a backup at level-1 or level-2, add the parameters `-L 1` or `-L 2`. For example, for a storage-space backup at level-1, enter the following at the command level as user `informix`:

```
$ onbar -b -L 1
```

You can check the progress of the database backup by looking in the ON-Bar activity message log file. Refer to [Checking Database Backup Status and Result with Activity Log](#) [Page 119].

**Result**

The database is backed up. Therefore, you have a copy of database data that can be restored in the event of database failure.

Make sure that you check the result of the database backup as follows:

- [Checking Database Backup Status and Result with Activity Log (ON-Bar)](#) [Page 119]
- [Checking Result of Database Backup or Archive with Message Log](#) [Page 161]

Finally, be sure to [complete the database backup](#) [Page 122].

**See also:**

Informix documentation
Checking Database Backup Status and Result with Activity Log (ON-Bar)

Procedure

You can check the status and result of an Informix database backup with ON-Bar by looking in the ON-Bar activity message log file. The BAR_ACT_LOG parameter in the ONCONFIG file specifies the name and location of the ON-Bar activity log. The default is /tmp/bar_act.log (UNIX) or %INFORMIXDIR%\bar_<servername>.log (NT).

Database backups from the ON-Bar activity log are shown below.

Here is an example of a whole-system-backup:

```
1998-10-19 11:16:07 3545  3543 /informix/AFI/bin/onbar_d -b -w
1998-10-19 11:16:14 3545  3543 Successfully connected to Storage Manager.
1998-10-19 11:16:38 3545  3543 Completed level 0 backup rootdbs.
1998-10-19 11:16:39 3545  3543 Begin level 0 backup physdbs.
1998-10-19 11:16:46 3545  3543 Completed level 0 backup physdbs.
1998-10-19 11:16:46 3545  3543 Begin level 0 backup logdbs.
1998-10-19 11:16:53 3545  3543 Completed level 0 backup logdbs.
1998-10-19 11:16:54 3545  3543 Begin level 0 backup psapbtab.
1998-10-19 11:16:58 3545  3543 Completed level 0 backup psapbtab.
... 
1998-10-19 11:17:00 3545  3543 Begin backup logical log 190.
1998-10-19 11:17:00 3545  3543 Successfully connected to Storage Manager.
1998-10-19 11:17:02 3545  3543 Completed backup logical log 190.
```

Here is an example of a storage-space backup:

```
```
Checking Database Backup Status and Result with Activity Log (ON-Bar)

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>User ID</th>
<th>Process ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-10-27</td>
<td>13:43:33</td>
<td>6740</td>
<td>6689</td>
<td>Successfully connected to Storage Manager</td>
</tr>
<tr>
<td>1998-10-27</td>
<td>13:43:34</td>
<td>6741</td>
<td>6689</td>
<td>Successfully connected to Storage Manager</td>
</tr>
<tr>
<td>1998-10-27</td>
<td>13:43:36</td>
<td>6740</td>
<td>6689</td>
<td>Successfully connected to Storage Manager</td>
</tr>
<tr>
<td>1998-10-27</td>
<td>13:44:02</td>
<td>6689</td>
<td>6687</td>
<td>Successfully connected to Storage Manager</td>
</tr>
</tbody>
</table>

**Result**

If the database backup has finished successfully, you still need to [complete it](Page 122).

**See also:**

[Checking Result of Database Backup or Archive with Message Log](Page 161)

Informix documentation
Checking Result of Database Backup or Archive with Message Log

Use

You can check the results of an Informix database backup with ON-Bar or an archive with ON-Archive or ontape by looking in the message log of the Informix database server.

The parameter MSGPATH in the ONCONFIG file specifies the name and location of the message log. However, if you use SAPDBA or onstat -m to view the message log, you do not need to know its name or location.

Procedure

Use either of the following to look in the message log:

- SAPDBA. For more information, see System Information with SAPDBA [Page 481].
- onstat -m. For more information, see the Informix documentation.

You see entries like the following for a database backup with ON-Bar or an archive with ON-Archive or ontape:

```
14:31:01   Level 0 Archive started on rootdbs, logdbs, physdbs, psapsource, psappool, psapdocu, psapuser1, psapprot, psapstab, psapbtab, psapclu, psapload, psapddic
...
14:49:01   Archive on rootdbs, logdbs, physdbs, psapsource, psappool, psapdocu, psapuser1, psapprot, psapstab, psapbtab, psapclu, psapload, psapddic completed
```

Result

If the archive has completed successfully, you still need to check the tapes (ON-Archive) [Page 162] or check the tapes (ontape) [Page 162]. This is not possible for ON-Bar.

See also:

- Checking Archive Status (ON-Archive) [Page 146]
- Checking Database Backup Status and Result with Activity Log (ON-Bar) [Page 119]
- Checking Archive Result with Activity Log (ON-Archive) [Page 147]
- Informix documentation
Completing a Database Backup (ON-Bar)

Use
To make sure the data from an Informix database backup with ON-Bar can be used quickly and effectively to restore the database, perform the tasks described in this section.

Prerequisites
You have checked the database backup result to make sure the backup has finished successfully. You can do this in either of the following ways:

- Checking Database Backup Status and Result with Activity Log (ON-Bar) [Page 119]
- Checking Result of Database Backup or Archive with Message Log [Page 161]

Procedure
1. Copy backup and store copies offsite
   Since your database backups are vital to restore your database in the event of failure, SAP recommends you to copy the volumes and store the copies at a different physical location.

2. If you are using tapes or a similar storage medium, write the following information on the tapes to simplify the restore process:
   - Date and time of database backup
   - Dbspace names (if relevant)

For more information about how to use the database backups to restore the database, see Restore [Page 252].
Archive (ON-Archive and ontape)

Purpose
You can archive your Informix database using the Informix tools ON-Archive or ontape. For more information, see Informix Archive [Page 48].

If you are using ON-Bar, the term archive has been replaced by "whole-system backup" and "storage space backup". Refer to Informix Whole-System and Storage-Space Backups [Page 51].

An archive with ON-Archive or ontape is similar to a whole-system or storage-space backup with ON-Bar. For more information about backups with ON-Bar, see Database Backup (ON-Bar) [Page 104].

Prerequisites
- You have decided which tool you are going to use for archive (ON-Archive or ontape) or database backup (ON-Bar). Refer to Comparison of ON-Bar, ON-Archive, and ontape for Data Recovery [Page 59].

You must use the same tool for logical-log backup [Page 163] as you do for database backup or archive. You cannot use different tools because the data produced is not compatible.

- You have completed the preparations for archive with your chosen tool:
  - Configuration of ON-Archive [Page 75]
  - Configuring ontape [Page 101]

Process Flow
4. You decide which approach to use. Refer to Approach to Archive (ON-Archive) [Page 125] or Approach to Archive (ontape) [Page 153].

5. You identify your requirements and make sure they are met. Refer to Requirements for an Archive (ON-Archive) [Page 132] or Requirements for an Archive (ontape) [Page 156].

6. You perform the archive and check the results. Refer to Creation of an Archive (ON-Archive) [Page 141] or Creation of an Archive (ontape) [Page 159].

Result
You now have an archive of your database, which you can use in the event of failure to restore the database [Page 252].

See also:
Informix documentation
Archive (ON-Archive and ontape)
Approach to Archive (ON-Archive)

Purpose
To make sure that you can archive the Informix database with ON-Archive in the best way, you have to decide on your approach. If your approach is poor, you might later have trouble using the archived data to restore the database.

Prerequisites
You have completed the preparations necessary to set up ON-Archive. Refer to Configuration of ON-Archive [Page 75].

Process Flow
1. You develop good practice for archives [Page 154].
2. You choose the archive level and frequency [Page 155].
3. You decide whether to use the SAPDBA recovery report [Page 193].
4. You decide whether to use the DBA Planning Calendar in the Computing Center Management System (CCMS) of the R/3 System to schedule archives [Page 191].
5. If you have a large database or need a fast archive, you decide whether to use parallel archives [Page 131].

Result
You can now check the Requirements for Archive (ON-Archive) [Page 132].

See also:
Informix documentation
Developing Good Practice for Archive (ON-Archive and ontape)

Use

This section discusses guidelines for creating Informix database archives with ON-Archive or ontape.

Procedure

1. Archive with the Informix database server in online mode.

   You can archive while the Informix database server is fully online and no extra risk is involved. Data consistency is maintained, which means that you can restore the database correctly (to the point the archive was started) without using logical-log files, unlike some other database systems. The exception to this is parallel archives, which require the logical-log files to be present if a restore is later necessary. **Always** follow a parallel archive with a logical-log file backup.

   You can archive in quiescent mode, but this is normally unnecessary. You cannot archive in offline mode. For more information about Informix database server modes, see **Server Mode with SAPDBA [Page 335]** and the Informix documentation.

2. Archive during off-peak hours.

   An archive, particularly one that uses software compression, can affect the performance of the Informix database server. Since performance of your database is critical, it is best to do your archives during off-peak hours.

3. Perform a full archive when necessary.

   Sometimes, you must perform a full (level-0) archive in sequential mode. The Informix documentation provides information about database administration activities requiring such full archives.

   For example, you have to perform a full database archive after changing the configuration of the physical and logical logs. Full archives are also required with **Reorganize Single Table [Page 387]**, **Reorganize Group of Tables [Page 392]** and **Reorganize Dbspace [Page 398]** in SAPDBA. You are also strongly advised to do a full archive after performing an emergency backup of the logical log. Refer to **Emergency Logical-Log Backup [Page 227]**. For a summary of measures you can take to avoid the problem of emergency logical-log backups, see **Preventing Emergency Logical-Log Backup [Page 250]**.

Result

The database is archived using best practice, so avoiding impact on the production system as far as possible. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable archive that you can use to quickly restore the database with minimal data loss.
Choosing Archive Levels and Frequency (ON-Archive and ontape)

Use

There are the following database archive levels for ON-Archive and ontape available with the Informix database:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (full)</td>
<td>Archives all used pages. The most secure but biggest and longest archive</td>
</tr>
<tr>
<td>1</td>
<td>Archives all changes since the last level-0 archive</td>
</tr>
<tr>
<td>2</td>
<td>Archives all changes since the last level-1 archive</td>
</tr>
</tbody>
</table>

Archives at levels 1 or 2 are known as “incremental”.

⚠️

Be very careful when using level-1 or level-2 archives because they depend on the previous level-0 archive. If the last level-0 archive is lost or unreadable, existing level-1 or level-2 archives are useless if the database needs to be restored. For more information about how to check that your data is readable for a restore, see Data Consistency with SAPDBA [Page 418].

Procedure

1. If possible, perform a level-0 database archive every day. In the event of failure involving data loss, you can restore your last level-0 archive and then apply the logs backed up during the day of failure.
2. Have enough tape drive capacity to perform unattended full database archives. If this is possible, it becomes much easier to perform frequent full (level-0) database archives with large databases, since you do not need to continually mount new tapes.
3. Only perform full (level-0) archives unless the database is so large that incremental (level-1 and level-2) archives are really necessary. Remember that an incremental archive is no use on its own. It can only be used with an earlier full archive.

Result

You have decided on the level and frequency of archive. This is an essential part of your archive approach. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable archive that you can use to quickly restore the database with minimal data loss.
Scheduling Backups and Archives with CCMS (ON-Bar and ON-Archive)

Use

The DBA Planning Calendar [Ext.] in the Computing Center Management System (CCMS) of the R/3 System lets you schedule the following for the Informix database:

- Database backups (ON-Bar) or archives (ON-Archive)
- Logical-log backups (ON-Bar and ON-Archive)

If the necessary resources (that is, storage media) are available, the DBA Planning Calendar executes the backup or archive on the date and time that you specify.

The advantages of the DBA Planning Calendar and CCMS are:

- You have a single point from which to coordinate and supervise database backups, archives, and logical-log backups.
- You do not need to enter ON-Bar or ON-Archive commands, since CCMS handles these for you. Therefore, there is less chance of error.
- You can see a history of database backups, archives, or logical-log backups, showing past results.
- You can see how full the logical log is at any time.
- You can automatically see which volumes are needed for a future database backup, archive, or logical-log backup.
- With ON-Archive you can use an automatic logical-log backup from the DBA Planning Calendar. The backup is triggered when the fill-level of the logical log reaches a certain percentage. You can specify the percentage, for example, 50%. Refer to Backing Up the Logical Log (Automatic) in the DBA Planning Calendar (Informix) [Ext.].

Procedure

5. Use the DBA Planning Calendar to schedule a database backup or an archive to run at the required date and time.
   
   Refer to Archiving or Backing Up the Database in the DBA Planning Calendar (Informix) [Ext.].

6. Use the DBA Planning Calendar to schedule a logical-log backup to run at the required date and time.
   
   Refer to Backing Up the Logical Log in the DBA Planning Calendar (Informix) [Ext.].

7. Check the results using the Checking the Results of Actions in the DBA Planning Calendar [Ext.].

8. Look at an overview of the results, including the status of the logical log, using the archive and backup monitor [Ext.] in CCMS.
Result

The database and logical logs are backed up at the scheduled date and time, without you having to remember to execute them. Therefore, you can be more sure that, in the event of failure involving data loss, you have a backup that you can use to quickly restore the database with minimal data loss.
Using the SAPDBA Recovery Report with Archives and Logical-Log Backups (ON-Archive)

Use

To make it easier with ON-Archive to use your Informix database archives and logical-log backups for restore, you can have a recovery report automatically produced during normal database operation. You can then view the report using SAPDBA. The report lists the archive and logical-log backup volumes required to restore your database to the state it was in at a given point in time, so helping you to use your archives and backups as quickly as possible. After every archive and every backup, the system creates the report.

This report is only available if you use ON-Archive for data recovery (you cannot produce it with ontape). For more information, including how to set up the report so it is created after every database archive and logical-log backup, see Recovery Report with SAPDBA [Page 465].

Procedure

If you use ON-Archive, decide if you want to use the SAPDBA recovery report.
Using Parallel Archive (ON-Archive)

Use

ON-Archive allows you to group one or more dbspaces in the Informix database into dbspace sets, which can be simultaneously archived to different volume sets independently of each other, that is, "in parallel". The advantage of performing parallel database archives is that they are more rapid than sequential archives. Therefore, parallel archives are useful for very large databases.

⚠️
You must always create a logical-log backup after a parallel archive to make sure that you can restore the database in the event of a failure. Unlike a sequential archive, a parallel archive cannot be used for a restore without the accompanying logical-log files, so a logical-log backup is essential.

Procedure

1. Decide whether to use parallel archives.

   If possible, you should archive sequentially. Assign several physical tape drives to one logical device if you have so much data that it exceeds one tape volume. Then you can perform the archive overnight in unattended mode. The archive is written in sequence to a number of tapes mounted on a series of tape drives.

   ON-Archive does not provide a tool to check whether the total dbspace sets of a parallel archive correspond to the data volume of the entire database. For example, ON-Archive does not check whether you have forgotten to archive a specific dbspace. If the database needed to be restored, you could not restore a missing dbspace. In general, take extra care with parallel archives.

2. Decide whether to use the DBA Planning Calendar [Ext.] in the Computing Center Management System (CCMS) of the R/3 System for parallel archives.

   The DBA Planning Calendar automatically groups the dbspaces of your database into dbspace sets to enable parallel archives. For more information about setting up your dbspace sets independently – not recommended by SAP unless necessary – see the Informix documentation.

   Although it is possible to do a partial archive of your database (that is, only archive certain dbspaces, but not all), SAP strongly advises against this. The R/3 System is so integrated that it makes little sense to archive only one section of the database.
Requirements for an Archive (ON-Archive)

Purpose
To archive the Informix database with ON-Archive, you have to meet certain requirements.

Prerequisites
You have decided on an approach to archive with ON-Archive [Page 125]. This determines the requirements you need to meet. For example, if you have only one tape device, you only require one volume set for archives.

Process Flow
1. You check that you have the correct tape devices [Page 133].
2. You check that you have the correct volume sets and volumes [Page 134].
3. You check that you have the correct tape volumes [Page 157].
4. If performing parallel archives, you check that you have met the parallel archive requirements [Page 137].
5. If archiving in unattended mode, you meet the necessary requirements [Page 139].

Result
You have met the requirements for archiving with ON-Archive. For more information about creating an archive, see Creation of an Archive (ON-Archive) [Page 141].

See also:
Informix documentation
Setting Up Storage Devices for Archive (ON-Archive)

Use

You need to set up storage devices – for example, tape drives – with adequate capacity for Informix database archive with ON-Archive.

Initially, one tape drive supporting a single volume set and volume is sufficient. However, as your database grows you might want to archive to multiple tape drives, either in parallel or sequentially. Multiple tape drives have the following benefits:

- Faster throughput
  This only applies to parallel archive. Two or more tape drives can be writing data at the same time, giving you a reduced elapsed time for the archive.
- Unattended mode
  You can archive the database without constant operator supervision.

These benefits apply to both parallel and sequential archives. In either case, the total volume of archive data is spread across more tape volumes and drives, allowing a greater quantity of data to be archived without an operator changing tapes.

Procedure

1. If possible, have enough tape drives to archive the entire Informix database at level-0 without operator attention (that is, in unattended mode).
2. If possible, have enough tape drives, volume sets, and volumes to mount a volume from each volume set on a separate tape drive and archive the entire database in unattended mode.

SAP recommends that you have one or more tape drives dedicated to archiving.

For more information about setup of storage devices, see Editing the File config.arc for ON-Archive [Page 85].

See also:

Informix documentation
Setting Up Volume Sets and Volumes for Archive (ON-Archive)

Use
Before you can archive the Informix database with ON-Archive, you must define at least one volume set and volume.

Procedure
You can set up volume sets and volumes on tape in either of the following ways:

- With the SAP scripts (recommended)
  The SAP scripts let you easily define the required volume sets and volumes:
  - `arcprep` generates the volume set DBTAP for archiving and a series of associated volumes labeled DBT1, DBT2, DBT3... up to the number you specify.
  - `arcvolum` defines additional volumes in pre-existing volume sets, if required.
  Refer to Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94].

- Manually
  If you are archiving to disk (not generally recommended), or archiving in parallel then you must define the volumes yourself. Refer to Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts [Page 97].

Result
Setting up volume sets and volumes is an essential part of preparing to archive the database.
Setting Up Tape Volumes for Archive (ON-Archive and ontape)

Use
You need to set up enough tape volumes with adequate capacity for Informix database archive with ON-Archive and ontape.

Procedure
Assign tape volumes for database archive, keeping the following in mind:

- **Database size**
  The amount of data you need to archive determines how many volumes you require for a single archive.

- **Archive approach**
  For example, how often you archive and at what level [Page 155] determines how many volumes you require.

- **Tape retention cycle**
  The longer you keep your tapes before overwriting them, the more volumes you require. The recommended period is 28 days or longer.

  If you use ON-Archive, to find out how to set the period after which your tapes can be overwritten with new archive data, see the parameter EXPIRY_DATE in Editing the File oper_deflt.arc for ON-Archive [Page 83].

The following examples illustrate the number of tape volumes required for archiving a normal and a large database:

Assume you want to archive at level-0 (full) daily during the working week (Monday to Friday). This requires two tape volumes per archive.

Assume you want to have a four week (28-day) cycle (that is, the tapes are reused after this period).

Then you need:
2 volumes per day x 5 days per week x 4 weeks = 40 volumes

Assume you want to archive at level-1 (incremental) daily during the working week (Monday to Friday). This requires two tape volumes per archive. Also assume that you want to archive at level-0 (full) once a week on the weekend and this requires four volumes per archive.

Assume you want to have an eight week (56-day) cycle (that is, the tapes are reused after this period).

Then you need:
Setting Up Tape Volumes for Archive (ON-Archive and ontape)

Level-1 archives: 2 volumes per day x 5 days per week x 8 weeks = 80 volumes
Level-0 archives: 4 volumes per week x 8 weeks = 32 volumes
Therefore, you need 112 volumes in total.

**Result**

Your have set up tape volumes for optimal database archive with ON-Archive and ontape.
Setting Up Parallel Archive (ON-Archive)

Use

To create a parallel archive of your Informix database with ON-Archive, you must have more than one volume set and more than one tape device since the data must be written in multiple streams at the same time. Parallel archive is not possible with ontape.

You can create a parallel archive in either of the following ways:

- With the DBA Planning Calendar of the Computing Center Management System (CCMS). For more information, see Archiving or Backing Up the Database in the DBA Planning Calendar (Informix) [Ext.].
- Manually. To do this, you enter ON-Archive commands outside CCMS.

Procedure

Whichever method you choose to create parallel archives, you need to meet the following requirements:

1. Define multiple tape devices.
   
   You associate a logical tape device with a physical tape device in the config.arc file. For more information, see the DEVICE parameter in Editing the config.arc File for ON-Archive [Page 85]. Define a set of entries similar to the following example (the logical device is on the left, the physical device on the right):
   
   ```
   DEVICE DBTAP0_VOP = /dev/rmt/0m
   DEVICE DBTAP3_VOP = /dev/rmt/3m
   DEVICE DBTAP5_VOP = /dev/rmt/5m
   ```
   
   You also need to have enough tape drives. Make sure that a tape drive is left for logical-log backup. Otherwise, you run the risk that logical-log backup cannot proceed, which might cause the database to stop.

2. Define multiple volume sets.
   
   The logical devices that you defined in the first step must be assigned to a series of volume sets. Refer to Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts [Page 97]. Define a series of volume sets, as in the following example:
   
   ```
   $ onarchive 'DEFINE/VSET=DBTAP0/DEVICE_TYPE=DBTAP0_VOP/
   DRIVER=TAPE/ACCESSIBILITY=0/CLASS=SYSTEM'
   $ onarchive 'DEFINE/VSET=DBTAP3/DEVICE_TYPE=DBTAP3_VOP/
   DRIVER=TAPE/ACCESSIBILITY=0/CLASS=SYSTEM'
   $ onarchive 'DEFINE/VSET=DBTAP5/DEVICE_TYPE=DBTAP5_VOP/
   DRIVER=TAPE/ACCESSIBILITY=0/CLASS=SYSTEM'
   ```

Result

If you used the example here, you can now start a parallel archive using three separate streams to each of the following volume sets:

- DBTAP0 on logical tape device DBTAP0_VOP using physical device /dev/rmt/0m
Setting Up Parallel Archive (ON-Archive)

- DBTAP3 on logical tape device DBTAP3_VOP using physical device /dev/rmt/3m
- DBTAP5 on logical tape device DBTAP5_VOP using physical device /dev/rmt/5m

You can perform this with the DBA Planning Calendar in CCMS (recommended) or by entering ON-Archive commands manually (more errors possible).
Setting Up Unattended Archive (ON-Archive)

Use

If you want to perform unattended archives of your Informix database with ON-Archive, you have to use the APART qualifier in the oper_dflt.arc file. When you use this qualifier, only one save set is written per volume.

Do not set the APART qualifier as a default in the oper_dflt.arc file. This could interfere with your logical-log backups by writing only one save set for a logical-log backup to a single volume, effectively preventing continuous backup (although SAP recommends that you do not normally use continuous backup). For more information on setting the APART qualifier, see Editing the File oper_deflt.arc for ON-Archive [Page 83].

SAP recommends you to perform unattended archive with the DBA Planning Calendar in the Computing Center Management System (CCMS) of the R/3 System.

Procedure

How you set up unattended archive depends on how you run your archives:

- **With the DBA Planning Calendar in CCMS**
  
The APART qualifier is used automatically when you schedule your archives using the DBA Planning Calendar in the Computing Center Management System (CCMS) of the R/3 System. You need take no further action.
  
  For more information, see Scheduling Backups and Archives with CCMS (ON-Bar and ON-Archive) [Page 191].

- **By entering ON-Archive commands manually**
  
The following is an example with the APART qualifier:
  
  
  $$
  \text{onarchive 'ARCHIVE/DBSPACESET=SET1/VSET=DBTAP/APART'}
  $$
  
  You should use the APART qualifier for unattended archives and start the archive with a fresh volume. Using a fresh volume reduces the chance that a volume fills before the archive is completed. If a volume fills during an unattended archive and you have not defined additional physical tape devices in the logical device for the volume set used in the archive, then the archive fails.
  
  For more information, see Entering ON-Archive Commands Manually [Page 73].

See also:

Informix documentation
Creation of an Archive (ON-Archive)

Purpose

To archive the Informix database with ON-Archive, you can do either of the following:

- Use the Computing Center Management Center (CCMS) [Page 22] in the R/3 System (recommended by SAP)
  
  CCMS provides a complete environment so that you can manage your archives from one place without having to switch between different tools. For example, you can schedule archives and check the results in CCMS.

- Enter your own ON-Archive commands (not recommended by SAP)
  
  You need to know the ON-Archive commands for this method, so errors are more likely. For more information, see the Informix documentation.

Prerequisites

You have worked out an approach [Page 125] and met its requirements [Page 132].

Before you perform a database archive, verify database consistency [Page 428]. Do this as often as possible before archives. Make sure that you always have at least one archive that you have checked for data consistency.

Process Flow

Computing Center Management System (CCMS)

4. You use the DBA Planning Calendar [Ext.] in CCMS to schedule your archives.

5. You make sure the necessary resources (tapes, tape drives, and so on) are available.

6. You use the archive and backup monitor [Ext.] to check the results of your archives.

For more information about planning your archives with the DBA Planning Calendar, see Archiving or Backing Up the Database in the DBA Planning Calendar (Informix) [Ext.].

Entering ON-Archive Commands Manually

For more information if you are new to ON-Archive, see Getting Started with ON-Archive [Page 71].

3. You determine the volume required [Page 143].

4. You perform the archive [Page 144].

5. You check the archive status [Page 146] if required.

6. You check the archive result. Refer to:
   - Checking Archive Result with Activity Log (ON-Archive) [Page 147]
   - Checking Result of Database Backup or Archive with Message Log [Page 161].
Result

The database is archived. Therefore, you have a copy of database data that can be restored in the event of database failure.

⚠️ To make sure that your tapes can be used in the event of a restore, you must always check your tapes after every archive, whether you use CCMS or not. For more information, see Checking Tapes After an Archive (ON-Archive and ontape) [Page 162].

Finally, you complete the archive [Page 152], whether you use CCMS or not.

See also:

Informix documentation
Determining the Volume Required (ON-Archive)

Use

When creating an archive of your Informix database with ON-Archive, you need to mount the correct volume. This procedure tells you how to identify the correct volume.

Procedure

To determine the volume from the archive volume set that you must mount on the device used for archives with ON-Archive, perform the following command:

```
$ onarchive 'LIST/VOLUME=*/VSET=DBTAP'
```

Result

The display looks similar to the following (sset = save set, psset = physical saveset, L. = Label, Max = Maximum space, Used = Used space):

<table>
<thead>
<tr>
<th>Vol No</th>
<th>Nb sset</th>
<th>Nb psset</th>
<th>Volume L.</th>
<th>Prot</th>
<th>Max</th>
<th>Used</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>1</td>
<td>1</td>
<td>0001</td>
<td>RWD</td>
<td>0</td>
<td>3401364</td>
<td>Y</td>
</tr>
<tr>
<td>0002</td>
<td>1</td>
<td>1</td>
<td>0002</td>
<td>RWD</td>
<td>0</td>
<td>1078986</td>
<td>Y</td>
</tr>
<tr>
<td>0003</td>
<td>1</td>
<td>1</td>
<td>0003</td>
<td>RWD</td>
<td>0</td>
<td>0</td>
<td>N</td>
</tr>
<tr>
<td>0004</td>
<td>1</td>
<td>1</td>
<td>0004</td>
<td>RWD</td>
<td>0</td>
<td>0</td>
<td>N</td>
</tr>
</tbody>
</table>

Total of 4 volume(s)

The display shows that the first volume that is not full is volume 3 (it has a value of N for "No" in the right-hand column, under the heading F for “Full?”). This volume is used next and you should mount it on the tape drive for archives. Mount the volume in advance if you are using unattended operation. It is also the volume that you are prompted for if you do the archive interactively.

See also:

Informix documentation
Performing an Archive (ON-Archive)

Use
This procedure tells you how to perform an Informix database archive with ON-Archive. It assumes you are entering ON-Archive commands manually.

For more information about archiving the database without entering ON-Archive commands manually, see Archiving the Database in the DBA Planning Calendar: Informix [Ext.].

Prerequisites
Before you start the archive, make sure you have completed the following tasks:

- **Verify database consistency** [Page 428]. This is not necessary for every single archive, but always make sure that you have at least one archive for which the data consistency has been checked.
- **Determine the volume required** [Page 143] for the archive and mount it in your tape drive.
- Copy the ONCONFIG and archive.log files. You might need this information if you have to do a restore later.

Procedure
To start an archive, use the `archive` command in attended or unattended mode:

- **Attended mode**
  
  For example, to start an archive for dbspace set `set1` using the volume set `DBTAP`:
  
  ```
  $ onarchive 'ARCHIVE/DBSPACESET=set1/VSET=DBTAP'
  ```
  
  You see a response similar to the following:
  
  Request 00000203 registered in the catalog
  
  The attended method of running an archive needs a dedicated window for the duration of the archive. The system prompts you to mount tapes at the relevant time.

- **Unattended mode**
  
  For example, to start the same archive as above in unattended mode, add the `/autovop` qualifier at the end of the command:
  
  ```
  $ onarchive 'ARCHIVE/DBSPACESET=set1/VSET=DBTAP/AUTOVOP'
  ```
  
  This method starts the virtual operator process `onautovop` that performs the archive in unattended mode. The virtual operator only works with device types that have `VOP` as the last three characters in the name (for example, `DBTAP_VOP`). If you use `start_autovop`, make sure that you have the correct tape volume mounted for your volume set and the archive fits on the mounted volumes. If an incorrect tape is mounted or the available tapes become full during the archive, the archive does not succeed.

You can check the progress of the archive by looking in the `archive.log` and the message log files. Refer to Checking Archive Status (ON-Archive) [Page 146].
Result

The database is archived. Therefore, you have a copy of database data that can be restored in the event of database failure.

Make sure that you check the archive result [Page 147] and check the tapes [Page 162]. Finally, be sure to complete the archive [Page 152].

See also:

Informix documentation
Checking Archive Status (ON-Archive)

Use
You can use this procedure to check the status of an Informix database archive with ON-Archive.

Procedure
You can check the status of a database archive with ON-Archive in the following ways:

- **Activity log**
  Refer to Checking Archive Result with Activity Log (ON-Archive) [Page 147].

- **Log file in current directory**
  Each request also writes a log file in the directory current at the time the request is started. You request logging with the \texttt{LOG} qualifier or you can set it up as a default in the \texttt{oper_deflt.arc} file. If the request ID is 203, then the name of the log file is \texttt{arc00000203.log}.

- **Email**
  You should periodically check your email for notification of database archive (and logical-log backup) request status. You only receive email if you use the \texttt{NOTIFY} qualifier in your request or specify \texttt{NOTIFY} in the \texttt{oper_deflt.arc} file.

  As mail is sent to the user \texttt{informix} or \texttt{<sid>adm} (depending on the user who started the archive), you should arrange for the mail to be automatically forwarded to the mailbox of a database administrator.

Result
If the archive has completed successfully, you still need to check the tapes [Page 162].

See also:
Checking Result of Database Backup or Archive with Message Log [Page 161] [Page 161]
Informix documentation
Checking Archive Result with Activity Log (ON-Archive)

Use

You can check the results of an Informix database archive with ON-Archive by looking in the ON-Archive activity log. The ON-Archive activity log is normally called archive.log and is stored in the directory /informix/<SID>/etc. For more information, see the ACTIVITYLOG parameter in Editing the config.arc File for ON-Archive [Page 85].

Two examples of archive results are given below. The first example is for a normal sequential archive and the second example for a parallel archive.

Procedure

Sequential Archive

The result of a normal sequential archive of all dbspaces should look similar to the following:

```
Apr 07 1995 11:27:25 #00000000# <11495> onarchive (arcadm) Created request #00000005#: ARCHIVE/APART/DBSPACESET=*/LEVEL=0/VSET=DBTAP
Apr 07 1995 11:27:32 #00000005# <11500> onautovop (arcadm) Begin archive to DBTAP
  12:53:59 #00000005# <11500> Processing rootdbs to DBTAP:0001
  12:54:00 #00000005# <11500> Processing logdbs to DBTAP:0001
  12:54:00 #00000005# <11500> Processing psapsource to DBTAP:0001
  12:54:01 #00000005# <11500> Processing physdbs to DBTAP:0001
  12:54:01 #00000005# <11500> Processing psappool to DBTAP:0001
  12:54:01 #00000005# <11500> Processing psapdocu to DBTAP:0001
  12:54:02 #00000005# <11500> Processing psapuser1 to DBTAP:0001
  12:54:02 #00000005# <11500> Processing psapprot to DBTAP:0001
  12:54:02 #00000005# <11500> Processing psapstab to DBTAP:0001
  12:54:03 #00000005# <11500> Processing psapbtab to DBTAP:0001
  12:54:03 #00000005# <11500> Processing psapclu to DBTAP:0001
  12:54:03 #00000005# <11500> Processing psapload to DBTAP:0001
  12:54:04 #00000005# <11500> Processing psapddic to DBTAP:0001
Apr 07 1995 12:55:03 #00000005# <11500> onautovop (arcadm) End archive: SUCCESS
```

Parallel Archive

The following display demonstrates the result of a parallel archive. The archive is split into two parts, DBTAP and DBTAP2. You can see the request numbers 1 and 3 to define the two archive requests to DBTAP and DBTAP2 respectively, under the virtual operator onautovop (the output has been reformatted slightly so it is easier to read).
Checking Archive Result with Activity Log (ON-Archive)

First, you see the archive requests:

```
Apr 06 1995 16:59:05 #00000000# <10484> onarchive (arcadm)
Created request #00000001#:
ARCHIVE/APART/DBSPACESET=SET000072A/LEVEL=0/VSET=DBTAP
```

```
Apr 06 1995 16:59:09 #00000000# <10493> onarchive (arcadm)
Created request #00000003#:
ARCHIVE/APART/DBSPACESET=SET000072B/LEVEL=0/VSET=DBTAP2
```

Then you see the archive running:

```
Apr 06 1995 16:59:11 #00000001# <10489> onautovop (arcadm) Begin archive to DBTAP
```

```
Apr 06 1995 16:59:14 #00000003# <10498> onautovop (arcadm) Begin archive to DBTAP2
```

```
18:40:03 #00000003# <10498> Processing logdbs to DBTAP2:0001
18:40:04 #00000003# <10498> Processing physdbs to DBTAP2:0001
18:40:04 #00000003# <10498> Processing psapdocu to DBTAP2:0001
18:40:04 #00000003# <10498> Processing psapuser1 to DBTAP2:0001
18:40:05 #00000003# <10498> Processing psapstab to DBTAP2:0001
18:40:05 #00000003# <10498> Processing psapbtab to DBTAP2:0001
18:40:05 #00000003# <10498> Processing psapddic to DBTAP2:0001
```

```
Apr 06 1995 18:41:07 #00000003# <10498> onautovop (arcadm) End archive:  SUCCESS
```

```
18:47:09 #00000001# <10489> Processing rootdbs to DBTAP:0001
18:47:09 #00000001# <10489> Processing psapsource to DBTAP:0001
18:47:09 #00000001# <10489> Processing psappool to DBTAP:0001
18:47:09 #00000001# <10489> Processing psapprot to DBTAP:0001
18:47:09 #00000001# <10489> Processing psapclu to DBTAP:0001
18:47:10 #00000001# <10489> Processing psapload to DBTAP:0001
```

```
Apr 06 1995 18:48:13 #00000001# <10489> onautovop (arcadm) End archive:  SUCCESS
```

You must always do a logical-log backup directly after a parallel archive. Refer to Logical-Log Backup [Page 163].

See also:

Checking Archive Status (ON-Archive) [Page 146]
Checking Result of Database Backup or Archive with Message Log [Page 161] [Page 161]
Informix documentation
Checking Result of Database Backup or Archive with Message Log

Use

You can check the results of an Informix database backup with ON-Bar or an archive with ON-Archive or ontape by looking in the message log of the Informix database server.

The parameter MSGPATH in the ONCONFIG file specifies the name and location of the message log. However, if you use SAPDBA or onstat -m to view the message log, you do not need to know its name or location.

Procedure

Use either of the following to look in the message log:

- SAPDBA. For more information, see System Information with SAPDBA [Page 481].
- onstat -m. For more information, see the Informix documentation.

You see entries like the following for a database backup with ON-Bar or an archive with ON-Archive or ontape:

14:31:01 Level 0 Archive started on rootdbs, logdbs, physdbs, psapsource, psappool, psapdocu, psapuser1, psapprot, psapstab, psapbtab, psapclu, psapload, psapddic

...  

14:49:01 Archive on rootdbs, logdbs, physdbs, psapsource, psappool, psapdocu, psapuser1, psapprot, psapstab, psapbtab, psapclu, psapload, psapddic completed

Result

If the archive has completed successfully, you still need to check the tapes (ON-Archive) [Page 162] or check the tapes (ontape) [Page 162]. This is not possible for ON-Bar.

See also:

Checking Archive Status (ON-Archive) [Page 146]
Checking Database Backup Status and Result with Activity Log (ON-Bar) [Page 119]
Checking Archive Result with Activity Log (ON-Archive) [Page 147]
Informix documentation
Checking Tapes After an Archive (ON-Archive and ontape)

Use

After an Informix database archive with ON-Archive or ontape, you should perform the legibility check described below. This makes sure that the tapes can be read successfully, if you need to do a restore. For further details of doing a restore, see Restore [Page 252].

Procedure

1. Mount the tape to be checked on your tape device and then enter the following command:
   
   \$ ondataatr ‘LIST/TAPE=(<tape device>)’

   For example, if your tape device was dev/rmt/0m, you would enter:
   
   \$ ondataatr ‘LIST/TAPE=(dev/rmt/0m)’

2. If the result of this check shows a problem, see SAP Note 61624.

   !

   A faulty tape could endanger the integrity of your database. If you need to do a restore and you use a tape that has failed the legibility check, the restore will fail.

   !

   For more information about how to use the archives to restore the database, see Restore [Page 252].

See also:

Checking Result of Database Backup or Archive with Message Log [Page 161] [Page 161]
Checking Archive Result with Activity Log (ON-Archive) [Page 147]
Informix documentation
Completing an Archive (ON-Archive)

Use

To make sure the data from an Informix database archive with ON-Archive can be used quickly and effectively to restore the database, you should perform the tasks described in this section.

Prerequisites

You have checked the archive result [Page 147] and the legibility of the tape [Page 162].

Procedure

3. Use the SAPDBA recovery report

   SAP recommends that you have the SAPDBA recovery report produced after your archives. This report can be automatically produced and reduces the time taken to perform a restore by listing the volumes required. See Recovery Report with SAPDBA [Page 465] for more details.

4. Copy archive volumes and store copies offsite

   Since your archives are vital to restore your database in the event of failure, SAP recommends copying the volumes and storing the copies at a different physical location.

   For example, to copy the volume set DBTAP (created with request ID 68), enter the following command:

   ```
   $ onarchive
   'COPY/VSET=DBTAP/DESTINATION=DBTAP_BKP/REQUEST=68'
   ```

5. Write the following information on your tapes to simplify the restore process:

   - Save set ID
   - Date and time of archive
   - Volume set and volume names
   - Dbspace names (if relevant)

   For more information about how to use the archives to restore the database, see Restore [Page 252].

See also:

Checking Result of Database Backup or Archive with Message Log [Page 161] [Page 161]
Approach to Archive (ontape)

Purpose
To make sure that you can archive the Informix database with ontape in the best way, you have to decide on your approach. If your approach is poor, you might later have trouble using the archived data to restore the database.

Prerequisites
You have completed the preparations necessary to set up ontape. Refer to Configuring ontape [Page 101].

There are the following limitations for archiving with ontape:

- No parallel archive
  You cannot archive in parallel (one group of dbspaces to one device and another group to a second device, and so on) to reduce archiving time. This disadvantage tends to be more limiting with larger databases. However, you can use ontape to restore selected dbspaces if required.

- No unattended operations
  ontape always writes its archives to tape (or tape compatible devices). Since additional tapes might have to be mounted during the archive procedure, an operator should always be present.

To overcome these limitations, you must start using ON-Archive or ON-Bar. Refer to ON-Archive for Data Recovery [Page 69] or ON-Bar for Data Recovery [Page 62].

Process Flow
6. You develop good practice for archives [Page 154].
7. You choose the archive level and frequency [Page 155].

Result
You can now check the Requirements for Archive (ontape) [Page 156].

See also:
Informix documentation
Developing Good Practice for Archive (ON-Archive and ontape)

Use

This section discusses guidelines for creating Informix database archives with ON-Archive or ontape.

Procedure

4. Archive with the Informix database server in online mode.

   You can archive while the Informix database server is fully online and no extra risk is involved. Data consistency is maintained, which means that you can restore the database correctly (to the point the archive was started) without using logical-log files, unlike some other database systems. The exception to this is parallel archives, which require the logical-log files to be present if a restore is later necessary. Always follow a parallel archive with a logical-log file backup.

   You can archive in quiescent mode, but this is normally unnecessary. You cannot archive in offline mode. For more information about Informix database server modes, see Server Mode with SAPDBA [Page 335] and the Informix documentation.

5. Archive during off-peak hours.

   An archive, particularly one that uses software compression, can affect the performance of the Informix database server. Since performance of your database is critical, it is best to do your archives during off-peak hours.

6. Perform a full archive when necessary.

   Sometimes, you must perform a full (level-0) archive in sequential mode. The Informix documentation provides information about database administration activities requiring such full archives.

   For example, you have to perform a full database archive after changing the configuration of the physical and logical logs. Full archives are also required with Reorganize Single Table [Page 387], Reorganize Group of Tables [Page 392] and Reorganize Dbspace [Page 398] in SAPDBA. You are also strongly advised to do a full archive after performing an emergency backup of the logical log. Refer to Emergency Logical-Log Backup [Page 227]. For a summary of measures you can take to avoid the problem of emergency logical-log backups, see Preventing Emergency Logical-Log Backup [Page 250].

Result

The database is archived using best practice, so avoiding impact on the production system as far as possible. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable archive that you can use to quickly restore the database with minimal data loss.
Choosing Archive Levels and Frequency (ON-Archive and ontape)

Use

There are the following database archive levels for ON-Archive and ontape available with the Informix database:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (full)</td>
<td>Archives all used pages. The most secure but biggest and longest archive</td>
</tr>
<tr>
<td>1</td>
<td>Archives all changes since the last level-0 archive</td>
</tr>
<tr>
<td>2</td>
<td>Archives all changes since the last level-1 archive</td>
</tr>
</tbody>
</table>

Archives at levels 1 or 2 are known as "incremental".

Be very careful when using level-1 or level-2 archives because they depend on the previous level-0 archive. If the last level-0 archive is lost or unreadable, existing level-1 or level-2 archives are useless if the database needs to be restored. For more information about how to check that your data is readable for a restore, see Data Consistency with SAPDBA [Page 418].

Procedure

4. If possible, perform a level-0 database archive every day. In the event of failure involving data loss, you can restore your last level-0 archive and then apply the logs backed up during the day of failure.

5. Have enough tape drive capacity to perform unattended full database archives. If this is possible, it becomes much easier to perform frequent full (level-0) database archives with large databases, since you do not need to continually mount new tapes.

6. Only perform full (level-0) archives unless the database is so large that incremental (level-1 and level-2) archives are really necessary. Remember that an incremental archive is no use on its own. It can only be used with an earlier full archive.

Result

You have decided on the level and frequency of archive. This is an essential part of your archive approach. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable archive that you can use to quickly restore the database with minimal data loss.
Requirements for an Archive (ontape)

Purpose
To archive the Informix database with ontape, you have to meet certain requirements.

Prerequisites
You decide an approach for archive with ontape [Page 153]. This determines the requirements you need to meet. For example, if you decide to perform an archive twice a day, you require more tapes than if you only perform an archive once a day.

Process Flow
6. You check that you have the correct tape devices.
   SAP recommends that you have at least two tape devices, one for archives and one for logical-log backups. Otherwise, if your logical-logs fill up when you are performing an archive, the database might stop processing.
7. You check that you have the correct tape volumes [Page 157].
8. You define the device TAPEDEV and other entries in the ONCONFIG file. Refer to Configuring ontape [Page 101].

⚠️ Do not use /dev/null on UNIX or nul on NT for TAPEDEV if you want to be able to restore your system, because then the archive is not performed.

Result
You have met the requirements for archiving with ontape. For more information about performing an archive, see Creation of an Archive (ontape) [Page 159].

See also:
Informix documentation
Setting Up Tape Volumes for Archive (ON-Archive and ontape)

Use
You need to set up enough tape volumes with adequate capacity for Informix database archive with ON-Archive and ontape.

Procedure
Assign tape volumes for database archive, keeping the following in mind:

- Database size
  The amount of data you need to archive determines how many volumes you require for a single archive.

- Archive approach
  For example, how often you archive and at what level [Page 155] determines how many volumes you require.

- Tape retention cycle
  The longer you keep your tapes before overwriting them, the more volumes you require. The recommended period is 28 days or longer.

If you use ON-Archive, to find out how to set the period after which your tapes can be overwritten with new archive data, see the parameter EXPIRY_DATE in Editing the File oper_deflt.arc for ON-Archive [Page 83].

The following examples illustrate the number of tape volumes required for archiving a normal and a large database:

Assume you want to archive at level-0 (full) daily during the working week (Monday to Friday). This requires two tape volumes per archive.

Assume you want to have a four week (28-day) cycle (that is, the tapes are reused after this period).

Then you need:
2 volumes per day x 5 days per week x 4 weeks = 40 volumes

Assume you want to archive at level-1 (incremental) daily during the working week (Monday to Friday). This requires two tape volumes per archive. Also assume that you want to archive at level-0 (full) once a week on the weekend and this requires four volumes per archive.

Assume you want to have an eight week (56-day) cycle (that is, the tapes are reused after this period).

Then you need:
Setting Up Tape Volumes for Archive (ON-Archive and ontape)

- Level-1 archives: 2 volumes per day x 5 days per week x 8 weeks = 80 volumes
- Level-0 archives: 4 volumes per week x 8 weeks = 32 volumes

Therefore, you need 112 volumes in total.

**Result**

You have set up tape volumes for optimal database archive with ON-Archive and ontape.
Creation of an Archive (ontape)

Purpose
This section tells you how to create an archive of the Informix database with `ontape`.

Prerequisites
You have worked out an approach [Page 153] and met its requirements [Page 156].

Before you perform a database archive, verify database consistency [Page 428]. Do this as often as possible before archives. Make sure that you always have at least one archive that you have checked for data consistency.

If you only have one tape drive, you should back up as many logical-log files as possible before starting the archive to avoid a full logical log during the archive. In this situation, the database stops processing. You then need a second tape drive to back up the logical log. For information about recovering from a full logical log, see Performing Emergency Backup with `ontape` [Page 248].

Process Flow
1. You perform the archive [Page 160].
2. You check the result [Page 161] with the message file.
3. You write the following information on your tapes to simplify the restore process:
   - Date and time of archive
   - Archive level
   - Tape number from `ontape`

Since your archives are vital to restore your database in the event of failure, SAP recommends copying the volumes and storing the copies at a different physical location.

Result
The database is archived. Therefore, you have a copy of database data that can be restored in the event of database failure.

To make sure that your tapes can be used in the event of a restore, you must always check your tapes after every archive. For more information, see Checking Tapes After an Archive (ON-Archive and `ontape`) [Page 162].

See also:
Informix documentation
Performing an Archive (ontape)

Use

This procedure tells you how to perform an Informix database archive with ontape.

Prerequisites

You have an up-to-date copy of the ONCONFIG file, which you might need for a restore.

Procedure

1. Place a write-enabled tape in your tape drive.
2. Log on as user informix and enter the following command:
   
   $ ontape -s

   Immediately after you execute this command, ontape prompts you to specify an archive level. If you wish, you can directly specify the level of the archive on the command line, as in the following example:

   $ ontape -s -L 0

3. When ontape prompts you, mount a tape on the tape drives specified by TAPEDEV.
4. Label the tape after ontape has filled and rewound it.

   Depending on the volume of data, an archive can require multiple tapes. After a tape fills, ontape rewinds the tape, displays the tape number for labeling, and prompts you to mount the next tape, if necessary.
5. Follow the prompts for labeling and mounting new tapes.

   A message appears when the archive has finished.

Result

The database is archived. Therefore, you have a copy of database data that can be restored in the event of database failure. Make sure that you check the tapes [Page 162].

See also:

Informix documentation
Checking Result of Database Backup or Archive with Message Log

Use

You can check the results of an Informix database backup with ON-Bar or an archive with ON-Archive or ontape by looking in the message log of the Informix database server.

The parameter MSGPATH in the ONCONFIG file specifies the name and location of the message log. However, if you use SAPDBA or onstat -m to view the message log, you do not need to know its name or location.

Procedure

Use either of the following to look in the message log:

- SAPDBA. For more information, see System Information with SAPDBA [Page 481].
- onstat -m. For more information, see the Informix documentation.

You see entries like the following for a database backup with ON-Bar or an archive with ON-Archive or ontape:

```
14:31:01 Level 0 Archive started on rootdbs, logdbs, physdbs, psapsource, psappool, psapdocu, psapuserl, psapprot, psapstab, psapbtab, psapclu, psapload, psapddic
...
14:49:01 Archive on rootdbs, logdbs, physdbs, psapsource, psappool, psapdocu, psapuserl, psapprot, psapstab, psapbtab, psapclu, psapload, psapddic completed
```

Result

If the archive has completed successfully, you still need to check the tapes (ON-Archive) [Page 162] or check the tapes (ontape) [Page 162]. This is not possible for ON-Bar.

See also:

Checking Archive Status (ON-Archive) [Page 146]
Checking Database Backup Status and Result with Activity Log (ON-Bar) [Page 119]
Checking Archive Result with Activity Log (ON-Archive) [Page 147]
Informix documentation
Checking Tapes After an Archive (ON-Archive and ontape)

Use

After an Informix database archive with ON-Archive or ontape, you should perform the legibility check described below. This makes sure that the tapes can be read successfully, if you need to do a restore. For further details of doing a restore, see Restore [Page 252].

Procedure

3. Mount the tape to be checked on your tape device and then enter the following command:

   $ ondataatr 'LIST/TAPE=(<tape device>)'

   For example, if your tape device was dev/rmt/0m, you would enter:

   $ ondataatr 'LIST/TAPE=(dev/rmt/0m)'

4. If the result of this check shows a problem, see SAP Note 61624.

   !

   A faulty tape could endanger the integrity of your database. If you need to do a restore and you use a tape that has failed the legibility check, the restore will fail.

  💡

   For more information about how to use the archives to restore the database, see Restore [Page 252].

See also:

Checking Result of Database Backup or Archive with Message Log [Page 161] [Page 161]
Checking Archive Result with Activity Log (ON-Archive) [Page 147]
Informix documentation
Logical-Log Backup

Purpose
This section describes how you can use ON-Bar, ON-Archive, or ontape to back up the logical-log files of your Informix database. For more information, see Informix Logical-Log Backup [Page 54].

Prerequisites
You have decided which tool you are going to use for logical-log backup. Refer to Comparison of ontape, ON-Archive, and ON-Bar for Data Recovery [Page 59].

⚠️ You must use the same tool for logical-log backup as you do for database backup or archive. You cannot use different tools because the data produced is not compatible.

You have completed the preparations for logical-log backup with your chosen tool:

- Configuring ON-Bar [Page 65]
- Configuration of ON-Archive [Page 75]
- Configuring ontape [Page 101]

Process Flow
1. You decide which approach to use:
   - Approach to Logical-Log Backup (ON-Bar) [Page 165]
   - Approach to Logical-Log Backup (ON-Archive) [Page 183]
   - Approach to Logical-Log Backup (ontape) [Page 214]
2. You identify your requirements and make sure that they are met:
   - Requirements for a Logical-Log Backup (ON-Bar) [Page 171]
   - Requirements for a Logical-Log Backup (ON-Archive) [Page 194]
   - Requirements for a Logical-Log Backup (ontape) [Page 218]
3. You create the logical-log backup:
   - Creation of a Logical-Log Backup (ON-Bar) [Page 176]
   - Creation of a Logical-Log Backup (ON-Archive) [Page 199]
   - Creation of a Logical-Log Backup (ontape) [Page 220]

Result
You now have a backup of your logical log, which you can use in the event of failure to restore the database [Page 252].

See also:
Logical-Log Backup

Informix documentation
Approach to Logical-Log Backup (ON-Bar)

Purpose
To make sure that you can back up the logical log of your the Informix database with ON-Bar in the best way, you have to decide on your approach. If your approach is poor, you might later have trouble using the logical-log backups to restore the database.

Prerequisites
You have completed the preparations necessary to set up ON-Bar. Refer to Configuring ON-Bar [Page 65].

Process Flow
8. You develop good practice for logical-log backup [Page 215].
10. You decide whether to use the DBA Planning Calendar in the Computing Center Management System (CCMS) of the R/3 System to schedule logical-log backups [Page 191].

With ON-Bar, a storage-space backup always triggers a logical-log backup.

Result
You can now check the Requirements for a Logical-Log Backup (ON-Bar) [Page 171].

See also:
Informix documentation
Developing Good Practice for Logical-Log Backup

Use

This section discusses guidelines for creating logical-log backups on your Informix database with ON-Bar, ON-Archive or ontape.

⚠️

It is very important to back up the logical log on time. Otherwise, if it completely fills, the database stops processing. You then have to perform Emergency Logical-Log Backup [Page 227].

Different backup approaches offer differing levels of protection against a full logical log. For a summary of measures you can take to avoid this problem, see Preventing Emergency Logical-Log Backup [Page 250].

Procedure

1. Make sure that logical-log backup is turned on.
   
   SAP strongly recommends you to run your production database with logical-log backup turned on. Make sure that the LTAPEDEV parameter is not set to /dev/null on UNIX or nul on Windows NT. Refer to Editing the ONCONFIG File for ON-Archive [Page 81] (the information on LTAPEDEV applies to ON-Bar, ON-Archive, and ontape).

2. Choose the logical-log backup mode carefully.
   
   In general, continuous is the best kind of logical-log backup, because:
   - The chance of the logical log filling up is reduced.
   - You always have the most up-to-date logical-log backup possible.
   
   However, the choice of backup mode depends on the data recovery tool you use:
   - ON-Bar
     
     Refer to Choosing Continuous or Manual Logical-Log Backup (ON-Bar) [Page 168].
   - ON-Archive
     
     Refer to Choosing Automatic Logical-Log Backup (ON-Archive) [Page 186] and Choosing Continuous Logical-Log Backup (ON-Archive) [Page 189].
   - ontape
     
     Refer to Choosing Automatic or Continuous Logical-Log Backup (ontape) [Page 217].

3. Specify a separate storage device for logical-log backup.
   
   To avoid competition with archives (ON-Archive or ontape) or database backups (ON-Bar), assign a dedicated tape device for logical-log backup. You must do this if you are using continuous logical-log backup. If you use the same device, there is a chance that the logical-log backup is held up due to contention with the archive or database backup. This might lead to a full logical log, and the database then stops processing.

   For more information on tape devices, see:
Developing Good Practice for Logical-Log Backup

- For ON-Bar, see Configuring ON-Bar [Page 65] and your storage manager documentation.
- For ON-Archive, see the DEVICE parameter in Editing the config.arc File for ON-Archive [Page 85].
- For ontape, see the TAPE... and LTAPE... parameters in Configuring ontape [Page 101].

4. Use a fast storage device, preferably local
   
   With a slow storage device, the logical-log files might fill up more quickly than they can be backed up. This is more likely to happen with a remote device. The best solution is to use a fast local device (for example, a fast local tape drive).

5. Watch out for logical-log peaks
   
   Certain activities cause the logical log to fill up rapidly, for example, data conversion. Monitor the logical log closely at such times and do the following:
   
   - If you are using continuous logical-log backup, change tapes more often.
   - If you are not using continuous logical-log backup, run extra backups.

**Result**

The logical logs are backed up using best practice. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable logical-log backup that you can use to quickly restore the database with minimal data loss.

**See also:**

Informix documentation
Choosing Continuous or Manual Logical-Log Backup (ON-Bar)

Use
You need to decide whether to back up the logical log of the Informix database with ON-Bar in continuous or manual mode.

SAP recommends you to use continuous backup with ON-Bar.

Procedure
Choose whether to use continuous or manual logical-log backup:

- Continuous
  
  For continuous logical-log backup, set the ALARMPROGRAM or LOG_BACKUP_MODE parameters in the ONCONFIG file. For more information, see Performing Continuous Logical-Log Backup (ON-Bar) [Page 177].

  The advantage of continuous logical-log backup is that the backup is performed when required, assuming that sufficient storage media is available. Therefore, you do not need to monitor the fill level of the logical log.

- Manual
  
  For manual logical-log backup, set the ALARMPROGRAM or LOG_BACKUP_MODE parameters in the ONCONFIG file. For more information, see Performing a Manual Logical-Log Backup (ON-Bar) [Page 178].

  You must monitor your logical log and perform the logical-log backup manually before the log fills. Remember that a full logical log causes the database to stop processing.

For more information about setting the ALARMPROGRAM and LOG_BACKUP_MODE parameters, see Setting Parameters for Logical-Log Backup (ON-Bar) [Page 174].

See also:
Informix documentation
Scheduling Backups and Archives with CCMS (ON-Bar and ON-Archive)

Use

The DBA Planning Calendar [Ext.] in the Computing Center Management System (CCMS) of the R/3 System lets you schedule the following for the Informix database:

- Database backups (ON-Bar) or archives (ON-Archive)
- Logical-log backups (ON-Bar and ON-Archive)

If the necessary resources (that is, storage media) are available, the DBA Planning Calendar executes the backup or archive on the date and time that you specify.

The advantages of the DBA Planning Calendar and CCMS are:

- You have a single point from which to coordinate and supervise database backups, archives, and logical-log backups.
- You do not need to enter ON-Bar or ON-Archive commands, since CCMS handles these for you. Therefore, there is less chance of error.
- You can see a history of database backups, archives, or logical-log backups, showing past results.
- You can see how full the logical log is at any time.
- You can automatically see which volumes are needed for a future database backup, archive, or logical-log backup.
- With ON-Archive you can use an automatic logical-log backup from the DBA Planning Calendar. The backup is triggered when the fill-level of the logical log reaches a certain percentage. You can specify the percentage, for example, 50%. Refer to Backing Up the Logical Log (Automatic) in the DBA Planning Calendar (Informix) [Ext.].

Procedure

9. Use the DBA Planning Calendar to schedule a database backup or an archive to run at the required date and time.
   Refer to Archiving or Backing Up the Database in the DBA Planning Calendar (Informix) [Ext.].

10. Use the DBA Planning Calendar to schedule a logical-log backup to run at the required date and time.
    Refer to Backing Up the Logical Log in the DBA Planning Calendar (Informix) [Ext.].

11. Check the results using the Checking the Results of Actions in the DBA Planning Calendar [Ext.].

12. Look at an overview of the results, including the status of the logical log, using the archive and backup monitor [Ext.] in CCMS.
Result

The database and logical logs are backed up at the scheduled date and time, without you having to remember to execute them. Therefore, you can be more sure that, in the event of failure involving data loss, you have a backup that you can use to quickly restore the database with minimal data loss.
Requirements for a Logical-Log Backup (ON-Bar)

Purpose
To back up the logical log of an Informix database with ON-Bar, you have to meet certain requirements.

Prerequisites
You have decided on an approach to logical-log backup [Page 165] with ON-Bar. This determines your requirements to some extent. For example, if you decide to use a disk staging area with continuous backup, you must have the required disk space available.

Process Flow
1. You check the storage devices [Page 172].

If your logical log is completely full, see Performing Emergency Logical-Log Backup (ON-Bar) [Page 229].

Result
You have met the requirements for logical-log backups with ON-Bar. For more information about creating a logical-log backup, see Creation of a Logical-Log Backup (ON-Bar) [Page 176].

See also:
Informix documentation
Setting Up Storage Devices for Logical-Log Backup (ON-Bar)

Use
You need to set up storage devices – for example, tape drives – for logical-log backup of your Informix database with ON-Bar.

Procedure
1. Decide the number of storage devices.

   SAP recommends that you have at least two storage devices, one for database backups and one for logical-log backups. Otherwise, if your logical logs fill up when you are performing a logical-log backup, the database might stop processing. At the minimum, you must have one storage device for logical-log backup.

2. Consider the speed and capacity of storage devices.

   Your devices must be fast enough to cope with the maximum rate at which the logical log fills. Your devices must also accept storage media with sufficient capacity for your logical-log backups. Local devices are more likely to cope than remote devices.

3. If using continuous logical-log backup, dedicate a storage device.

   SAP recommends you to dedicate a local device for logical-log backup because the performance and security is better than with a remote device.

4. Define your storage devices.

   You need to define at least the device LTAPEDEV with a suitable physical device. Refer to Configuring ON-Bar [Page 65].

   **Do not use /dev/null (UNIX) or nul (NT) for LTAPEDEV if you want to perform a restore of your system up to the time of failure.**

   ON-Bar does not use LTAPEDEV to specify the storage device for logical-log backup. However, if you specify a null value for LTAPEDEV, the logical-log files are marked as “backed up” as soon as they are full. Therefore, they cannot be backed up and the transactions recorded in these logs cannot be used for a logical restore.

5. Make sure that storage devices are correctly set up with your storage manager.

   Since the storage manager – for example, Informix Storage Manager (ISM) – handles logical-log backup with ON-Bar, you need to make sure that it is correctly set up and communicating with the storage devices. For more information, see your storage manager documentation.

Result
Your have chosen storage devices for optimal logical-log backup with ON-Bar.

See also:
Setting Up Storage Devices for Logical-Log Backup (ON-Bar)

Informix documentation
Setting Parameters for Logical-Log Backup (ON-Bar)

Use
This procedure tells you how to set parameters in the ONCONFIG file for logical-log backup on your Informix database using ON-Bar.

Prerequisites
You have decided on your approach to logical-log backup, including whether to use continuous or manual logical-log backup.

Procedure
1. To check whether the settings in your ONCONFIG file are correct, you can view the file in SAPDBA. See Listing System Information with SAPDBA.
2. Log on as user informix.
3. Open the ONCONFIG file, which you can normally find in the $INFORMIXDIR/etc (UNIX) or %INFORMIXDIR%\etc (NT) directory.
   SAP recommends you to use the IECC with Windows NT. This affects the parameters to be set in the next step.
4. Set the following parameters in the ONCONFIG file:
   - For continuous logical-log backup:
     
     ALARMPROGRAM = $INFORMIXDIR/etc/log_full.sh (UNIX)

     If you use the Informix Enterprise Command Center (IECC), set the following:

     LOG_BACKUP_MODE = CONT (UNIX and NT)

     The database server runs the program log_full.sh to continuously check the logical log. When a logical-log file fills, an event alarm is triggered and the file is backed up. You must make sure that storage media is always available for the logical-log backup. You must also reserve a dedicated storage device for the logical-log backup.

   - For manual logical-log backup:
     
     ALARMPROGRAM = $INFORMIXDIR/etc/no_log.sh (UNIX)

     If you use the Informix Enterprise Command Center (IECC), set the following:

     LOG_BACKUP_MODE = MANUAL (UNIX and NT)

     If the ALARMPROGRAM or LOG_BACKUP_MODE parameters are not specified, you have to perform manual logical-log backup.

5. Restart the database server for the changes in the ONCONFIG file to take effect.
Result

If you set parameters for continuous logical-log backup, when the database server starts, continuous logical-log backup also starts. For more information, see Performing a Continuous Logical-Log Backup (ON-Bar) [Page 177].

If you set parameters for manual logical-log backup, be sure to perform the manual logical-log backup when required. For more information, see Performing a Manual Logical-Log Backup (ON-Bar) [Page 178].

See also:
Informix documentation
Creation of a Logical-Log Backup (ON-Bar)

Purpose

You have to back up the logical log of your Informix database with ON-Bar for use in a restore in the event of database failure. Also, when the logical log is full, the database stops processing. You can use a number of different approaches for logical-log backup.

Prerequisites

You have worked out an approach [Page 165] and met its requirements [Page 171]. In particular, make sure that you have correctly set up the storage manager and the parameters for logical-log backup.

Before going live with logical-log backup, be sure to test it, including performing a restore with the backed-up data.

Process Flow

4. You perform the logical-log backup. Refer to one of the following:
   - Performing a Continuous Logical-Log Backup (ON-Bar) [Page 177] (recommended by SAP)
   - Performing a Manual Logical-Log Backup (ON-Bar) [Page 178]
   For more information, see Choosing Continuous or Manual Logical-Log Backup (ON-Bar) [Page 168].

5. You check the result in either of the following ways:
   - Checking Logical-Log Backup Result with Message Log [Page 224]
   - Checking Logical-Log Backup Result with Activity Log (ON-Bar) [Page 180]

6. You complete the logical-log backup [Page 182].

Result

The logical log is backed up. Therefore, you have a copy of logical-log data that can be used for a restore [Page 252] in the event of database failure.

See also:

Informix documentation
Performing a Continuous Logical-Log Backup (ON-Bar)

Use
This procedure tells you how to perform a continuous logical-log backup on your Informix database using ON-Bar.

Prerequisites
- You have defined your storage devices (Page 172) (for example, tape drives). With continuous logical-log backup, you need to reserve a dedicated storage device.
- You have set the required parameters (Page 174) in the ONCONFIG file and restarted the database server for the changes to take effect.

Procedure
1. Make sure that your backup medium is ready to receive data. For example, place a write-enabled tape in your tape drive.
   
   For more information about media handling, see the documentation for your storage manager.
   
   As soon as it starts, the database server automatically runs the program `log_full.sh` to back up each logical-log file as soon as it fills.

2. Change the backup medium (for example, the tape) as required.

Result
The logical log is backed up, as soon as each logical-log file fills. Therefore, you can use the logical-log backup for a restore in the event of database failure.

Make sure that you check the logical-log backup result (Page 180). Finally, be sure to complete the logical-log backup (Page 182).

See also:
Informix documentation
Performing a Manual Logical-Log Backup (ON-Bar)

Use

This procedure tells you how to perform a manual logical-log backup on your Informix database using ON-Bar.

SAP recommends you to use continuous logical-log backup. This is because the problem with manual logical-log backup is that the logs might fill before you have backed them up. You must then perform an emergency backup [Page 229], which is difficult and time-consuming. For more information about preventing this situation, see Preventing Emergency Logical-Log Backup [Page 250].

Prerequisites

- You have defined your storage devices [Page 172] (for example, tape drives).
- You have set the required parameters [Page 174] in the ONCONFIG file.

Procedure

1. Monitor the logical log to find when a logical-log backup is required. Refer to:
   - Using the Archive and Backup Monitor in CCMS (Informix) [Ext.]
   - Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext.]
   - Listing System Information with SAPDBA [Page 482]

2. Make sure that your backup medium is ready to receive data. For example, place a write-enabled tape in your tape drive.

   For more information about media handling, see the documentation for your storage manager.

3. Enter the following at the command line to perform a manual logical-log backup:
   - To back up all full logical-log files:
     $$\texttt{onbar} -l$$
   - To back up only the current logical-log file:
     $$\texttt{onbar} -l -c$$

4. Change the tape or backup medium as required.

5. Continue to monitor the logical log, as described above.

Result

The logical log is backed up. Therefore, you can use the logical-log backup for a restore in the event of database failure.
Performing a Manual Logical-Log Backup (ON-Bar)

Make sure that you check the logical-log backup result [Page 180]. Finally, be sure to complete the logical-log backup [Page 182].

See also:
Informix documentation
Checking Logical-Log Backup Result with Activity Log (ON-Bar)

Use

You can check the results of a logical-log backup of your Informix database with ON-Bar by looking in the ON-Bar activity log. The parameter BAR_ACT_LOG in the ONCONFIG file specifies the name and location of the activity log for ON-Bar. You can normally find the ON-Bar activity log in the following default location:

- UNIX
  /tmp/bar_act.log
- NT
  %INFORMIXDIR%\bar_<servername>.log

For more information, see Configuring ON-Bar [Page 65].

Procedure

The following is an example of the entries for a logical-log backup in the ON-Bar activity log:

1998-08-19  15:13:20  3663 3182 Successfully connected to storage manager.

See also:
Checking Logical-Log Backup Result with Message Log [Page 224]
Informix documentation
Checking Logical-Log Backup Result with Message Log

Use
You can check the results of a logical-log backup by looking in the message log for the Informix
database server.

The parameter MSGPATH in the ONCONFIG file specifies the name and location of the message
log. However, if you use SAPDBA or onstat -m to view the message log, you do not need to
know its name or location. Refer to System Information [Page 482].

Procedure
Use either of the following to look in the message log:

- SAPDBA.
  For more information, see System Information with SAPDBA [Page 481].
- onstat -m.
  For more information, see the Informix documentation.

You see entries like the following:

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:51:19</td>
<td>Logical Log 11 - Backup Started</td>
</tr>
<tr>
<td>10:51:22</td>
<td>Logical Log 11 - Backup Completed</td>
</tr>
<tr>
<td>10:51:22</td>
<td>Logical Log 12 - Backup Started</td>
</tr>
<tr>
<td>10:51:24</td>
<td>Logical Log 12 - Backup Completed</td>
</tr>
</tbody>
</table>

Result
If the logical-log backup has completed successfully, you still need to check the tapes [Page
225].

See also:
Checking Logical-Log Backup Result with Activity Log (ON-Bar) [Page 180]
Checking Logical-Log Backup Result with Activity Log (ON-Archive) [Page 209]
Checking Logical-Log Backup Status (ON-Archive) [Page 208]
Informix documentation
Completing Logical-Log Backup (ON-Bar)

Use

To make sure the data from a logical-log backup with ON-Bar can be used quickly and effectively to restore the database, perform the tasks described in this section.

Prerequisites

You have checked the logical-log backup result [Page 180].

Procedure

1. Write essential information such as the date and time of backup on your tapes or other backup media to simplify the restore process. You can find additional information for a restore in the ON-Bar emergency boot file. For more information about this file, see Configuring ON-Bar [Page 65].

2. Copy logical-log backup media and store copies offsite

   Since your logical-log backups are vital to restore your database in the event of failure, consider copying the backup media and storing the copies at a different physical location. For more information about copying data backed up with the storage manager, see your storage manager documentation.

3. If you are using automatic logical-log backup, use SAPDBA to display the status of the logical logs. Refer to System Information [Page 482]. If necessary, you might need to increase the frequency of the backup.

   ![Tip]

   For information about how to use the backup tapes for a restore, see Restore [Page 252].

See also:

Informix documentation
Approach to Logical-Log Backup (ON-Archive)

Purpose
To make sure that you can back up the logical log of your the Informix database with ON-Archive in the best way, you have to decide on your approach. If your approach is poor, you might later have trouble using the logical-log backups to restore the database.

Prerequisites
You have completed the preparations necessary to set up ON-Archive. Refer to Configuration of ON-Archive [Page 75].

Process Flow
13. You decide whether to use the DBA Planning Calendar in the Computing Center Management System (CCMS) of the R/3 System to schedule logical-log backups [Page 191].
14. You decide whether to use the SAPDBA recovery report [Page 193].

Always perform a logical-log backup after parallel archives [Page 131]. You cannot use a parallel archive later in a restore unless the logical-log files are available to synchronize the different parts of the archive. Therefore, you must back up the logical log straight after the parallel archive.

Result
You can now check the Requirements for a Logical-Log Backup (ON-Archive) [Page 194].

See also:
Informix documentation
Developing Good Practice for Logical-Log Backup

Use

This section discusses guidelines for creating logical-log backups on your Informix database with ON-Bar, ON-Archive or ontape.

⚠️ It is very important to back up the logical log on time. Otherwise, if it completely fills, the database stops processing. You then have to perform Emergency Logical-Log Backup [Page 227].

Different backup approaches offer differing levels of protection against a full logical log. For a summary of measures you can take to avoid this problem, see Preventing Emergency Logical-Log Backup [Page 250].

Procedure

2. Make sure that logical-log backup is turned on.

   SAP strongly recommends you to run your production database with logical-log backup turned on. Make sure that the LTAPEDEV parameter is not set to /dev/null on UNIX or nul on Windows NT. Refer to Editing the ONCONFIG File for ON-Archive [Page 81] (the information on LTAPEDEV applies to ON-Bar, ON-Archive, and ontape).

3. Choose the logical-log backup mode carefully.

   In general, continuous is the best kind of logical-log backup, because:
   - The chance of the logical log filling up is reduced.
   - You always have the most up-to-date logical-log backup possible.

   However, the choice of backup mode depends on the data recovery tool you use:
   - ON-Bar
     - Refer to Choosing Continuous or Manual Logical-Log Backup (ON-Bar) [Page 168].
   - ON-Archive
     - Refer to Choosing Automatic Logical-Log Backup (ON-Archive) [Page 186] and Choosing Continuous Logical-Log Backup (ON-Archive) [Page 189].
   - ontape
     - Refer to Choosing Automatic or Continuous Logical-Log Backup (ontape) [Page 217].

4. Specify a separate storage device for logical-log backup.

   To avoid competition with archives (ON-Archive or ontape) or database backups (ON-Bar), assign a dedicated tape device for logical-log backup. You must do this if you are using continuous logical-log backup. If you use the same device, there is a chance that the logical-log backup is held up due to contention with the archive or database backup. This might lead to a full logical log, and the database then stops processing.

   For more information on tape devices, see:
Developing Good Practice for Logical-Log Backup

- For ON-Bar, see Configuring ON-Bar [Page 65] and your storage manager documentation.
- For ON-Archive, see the DEVICE parameter in Editing the config.arc File for ON-Archive [Page 85].
- For ontape, see the TAPE... and LTAPE... parameters in Configuring ontape [Page 101].

5. Use a fast storage device, preferably local

   With a slow storage device, the logical-log files might fill up more quickly than they can be backed up. This is more likely to happen with a remote device. The best solution is to use a fast local device (for example, a fast local tape drive).

6. Watch out for logical-log peaks

   Certain activities cause the logical log to fill up rapidly, for example, data conversion. Monitor the logical log closely at such times and do the following:
   - If you are using continuous logical-log backup, change tapes more often.
   - If you are not using continuous logical-log backup, run extra backups.

**Result**

The logical logs are backed up using best practice. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable logical-log backup that you can use to quickly restore the database with minimal data loss.

**See also:**

Informix documentation
Choosing Automatic Logical-Log Backup (ON-Archive)

Use

You can back up the logical log of your Informix database using automatic backup with ON-Archive. This means starting a logical-log backup at certain times each day with tape as the storage medium.

The main problem with automatic backup is that the backup is not started in time and the logical log completely fills. However, Informix and SAP help you solve this problem with the supplied scripts `logevent.sh` and `arcauto`, which automatically detect when a backup is required and then start it. For an overview of these scripts, see SAP Scripts for ON-Archive [Page 76].

Prerequisites

To use automatic logical-log backup, you need to define volume sets and volumes. Refer to Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94]. The SAP scripts define volume sets and volumes to match the backup scripts described in "Procedure" below.

Procedure

1. Decide whether to use automatic or continuous logical-log backup [Page 189].

The following table summarizes the advantages and disadvantages of automatic backup:

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Logical log fills up if operator forgets to do backup, but scripts reduce this risk</td>
</tr>
<tr>
<td>Limited operator attention is required</td>
<td>Logical log needs lots of disk space to reduce chance of filling up (1 GB recommended, 2 GB overall required due to mirroring)</td>
</tr>
<tr>
<td>Scripts are supplied to facilitate set-up and running</td>
<td>Extreme system crash (both logical log disks fail) immediately before a backup risks losing a lot of work</td>
</tr>
<tr>
<td>DBA Planning Calendar in CCMS of R/3 System makes scheduling easy</td>
<td>ON-Archive commands need not be entered by hand causing less chance of error</td>
</tr>
</tbody>
</table>

The remainder of this process assumes that you choose automatic logical-log backup.

2. Decide which of the following approaches to use:

   - You **schedule** an automatic backup at pre-defined times in either of the following ways:

     - In the DBA Planning Calendar of the Computing Center Management System (CCMS) in the R/3 System (recommended by SAP)

       Refer to Backing Up the Logical Log in the DBA Planning Calendar (Informix) [Ext.].

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Choosing Automatic Logical-Log Backup (ON-Archive)

With this approach, you can plan backups regularly, for example, once or twice a day. You must change the tape volume as required. The DBA Planning Calendar calls the script `arcauto` at the times that you specify.

The logical logs might fill up during very high database workloads when a lot of extra transactions are generated. In this case, consider using the trigger approach (see below) as well for extra security.

- **With your own ON-Archive commands (not recommended by SAP)**

  With this method, you have to remember to start the backup regularly, for example, at 17:00 each day. However, you risk forgetting to start the backup on time. This might result in the logical log filling up and then the database stops processing. For more information, see [Performing Automatic Logical-Log Backup (ON-Archive)](Page 202).

- **You trigger an automatic backup when the logical log reaches a certain fill level, in either of the following ways:**

  - **In the DBA Planning Calendar of CCMS in the R/3 System (recommended by SAP)**

    Refer to [Backing Up the Logical Log (Automatic) in the DBA Planning Calendar (Informix)](Ext.).

  - **With the script `logevent.sh` (not recommended by SAP)**

    To install the script, see [Preparing SAP Scripts for ON-Archive](Page 78). For more information, see [Performing Automatic Logical-Log Backup (ON-Archive)](Page 202).

    Using the trigger approach makes sure that, if there is a heavy workload, the logical-log files are backed up before they fill. You must always make sure that an empty tape volume is in the tape drive, ready for the next backup. For details of the scripts used to trigger the backup, see [SAP Scripts for ON-Archive](Page 76).

- **You schedule and trigger the automatic backup**

  You combine the approaches described above to make sure that the logical logs do not fill. SAP strongly recommends this combined approach.

You can also enter your own automatic backup commands on the command line. However, [entering ON-Archive commands by hand](Page 73) is subject to error, therefore it is better to use one of the approaches outlined above.

3. **Consider the size of the logical log.**

   In general, it makes sense to have a very large logical log (at least 1 GB) with automatic backup, because this reduces the chances of the log completely filling. With very large databases (that is, with more than 1 GB of logging activity per day), consider either creating multiple logical-log backups each day or increasing the size of the logical log even more.

**Result**

You have decided to use automatic logical-log backup and you have decided which type to use. This is an essential part of deciding your approach to logical-log backup with ON-Archive.
Choosing Automatic Logical-Log Backup (ON-Archive)

See also:
Informix documentation
Choosing Continuous Logical-Log Backup (ON-Archive)

Use

You can back up the logical log of your Informix database using continuous backup with ON-Archive. With continuous backup, you start a process that backs up the individual logical-log files as they fill, either to tape or disk. SAP recommends that you back up to tape if possible because the process is easier. Continuous logical-log backup is often better than automatic backup (especially if you are only doing a periodic automatic backup, for example, once a day). Continuous backup for ON-Archive has been improved with Informix version 7.2.

If your Informix version is older than 7.2, SAP recommends you not to use continuous backup since it is difficult to operate. Starting with version 7.2, improvements have been made making it easier to use. The information in this section relates to the improved backup.

Prerequisites

To use continuous logical-log backup, you need to define volume sets and volumes. Refer to Setting Up Volume Sets and Volumes for Logical-Log Backup (ON-Archive) [Page 196].

Procedure

3. Decide whether to use continuous or automatic logical-log backup [Page 186].

   The following table summarizes the advantages and disadvantages of continuous backup:

   **Summary of Continuous Logical-Log Backup**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>The logical log is constantly backed up so chance of full logical log should be reduced.</td>
<td>Operator is required to ensure that disk backups (if used) are copied to tape in time (an extra step).</td>
</tr>
<tr>
<td>If a disk staging area is used, there is no danger that an incorrectly mounted tape halts the backup.</td>
<td>Informix offers no way to guarantee that the backup process is running when the system is started.</td>
</tr>
<tr>
<td>The worst-case scenario – logical log and its mirror both fail – only leads to loss of part of one logical-log file.</td>
<td>Overall, the chances of full logical log probably not reduced compared to “scheduled and triggered” automatic backup.</td>
</tr>
</tbody>
</table>

   The remainder of this process assumes that you choose continuous logical-log backup.

4. Decide which of the following approaches to use:

   - Back up directly to tape.
     
     You can use either attended or unattended mode:

     - Attended mode
Choosing Continuous Logical-Log Backup (ON-Archive)

When the current tape volume is full, you get a message. You then interrupt the continuous backup request, change the tape, and continue with a new backup request. Each tape volume contains one save set.

- **Unattended mode**
  
  SAP recommends that you do not use this method since it is difficult to see when the tape volume is full.

  - Back up to a temporary storage area on disk, then copy to tape later.
    
    With this approach, you back up to disk in unattended mode and later copy to tape in attended mode. This approach causes problems when you copy the disk backup to tape:
    
    - You must still make sure that the copy to tape is performed in time (so you can delete the disk backup). Otherwise your disk fills up and you have a full logical log.
    
    - The copy to tape usually takes a long time, which means that disk space is used and the chances of a full logical log are increased.
    
    - Although the logical log is only backed up to disk, it is still vulnerable to a system failure when several disk drives fail. Note that the logical-log backups ought to reside on a different disk to the disks with the logical log and its mirror.

**Result**

You have decided to use continuous logical-log backup and you have decided which type to use. This is an essential part of deciding your approach to logical-log backup [Page 183] with ON-Archive.

**See also:**

Informix documentation
Scheduling Backups and Archives with CCMS (ON-Bar and ON-Archive)

Use

The **DBA Planning Calendar [Ext.]** in the Computing Center Management System (CCMS) of the R/3 System lets you schedule the following for the Informix database:

- Database backups (**ON-Bar**) or archives (**ON-Archive**)
- Logical-log backups (**ON-Bar** and **ON-Archive**)

If the necessary resources (that is, storage media) are available, the DBA Planning Calendar executes the backup or archive on the date and time that you specify.

The advantages of the DBA Planning Calendar and CCMS are:

- You have a single point from which to coordinate and supervise database backups, archives, and logical-log backups.
- You do not need to enter **ON-Bar** or **ON-Archive** commands, since CCMS handles these for you. Therefore, there is less chance of error.
- You can see a history of database backups, archives, or logical-log backups, showing past results.
- You can see how full the logical log is at any time.
- You can automatically see which volumes are needed for a future database backup, archive, or logical-log backup.
- With **ON-Archive** you can use an automatic logical-log backup from the DBA Planning Calendar. The backup is triggered when the fill-level of the logical log reaches a certain percentage. You can specify the percentage, for example, 50%. Refer to **Backing Up the Logical Log (Automatic) in the DBA Planning Calendar (Informix) [Ext.]**.

Procedure

13. Use the DBA Planning Calendar to schedule a database backup or an archive to run at the required date and time.

   Refer to **Archiving or Backing Up the Database in the DBA Planning Calendar (Informix) [Ext.]**.

14. Use the DBA Planning Calendar to schedule a logical-log backup to run at the required date and time.

   Refer to **Backing Up the Logical Log in the DBA Planning Calendar (Informix) [Ext.]**.

15. Check the results using the **Checking the Results of Actions in the DBA Planning Calendar [Ext.]**.

16. Look at an overview of the results, including the status of the logical log, using the **archive and backup monitor [Ext.]** in CCMS.
Result

The database and logical logs are backed up at the scheduled date and time, without you having to remember to execute them. Therefore, you can be more sure that, in the event of failure involving data loss, you have a backup that you can use to quickly restore the database with minimal data loss.
Using the SAPDBA Recovery Report with Archives and Logical-Log Backups (ON-Archive)

Use

To make it easier with ON-Archive to use your Informix database archives and logical-log backups for restore, you can have a recovery report automatically produced during normal database operation. You can then view the report using SAPDBA. The report lists the archive and logical-log backup volumes required to restore your database to the state it was in at a given point in time, so helping you to use your archives and backups as quickly as possible. After every archive and every backup, the system creates the report.

This report is only available if you use ON-Archive for data recovery (you cannot produce it with ontape). For more information, including how to set up the report so it is created after every database archive and logical-log backup, see Recovery Report with SAPDBA [Page 465].

Procedure

If you use ON-Archive, decide if you want to use the SAPDBA recovery report.
Requirements for a Logical-Log Backup (ON-Archive)

Purpose
To back up the logical log of an Informix database with ON-Archive, you have to meet certain requirements.

Prerequisites
You have decided on an approach to logical-log backup [Page 183] with ON-Archive. This determines your requirements to some extent. For example, if you decide to use a disk staging area with continuous backup, you must have the required disk space available.

Process Flow
9. You check that you have the correct tape devices [Page 195].
10. You check that you have the correct volume sets and volumes [Page 196].
11. Check that you have met the additional requirements [Page 198].

💡
If your logical log is completely full, see Emergency Logical-Log Backup [Page 227] for the requirements for emergency logical-log backup.

Result
You have met the requirements for performing logical-log backups with ON-Archive. For more information about creating a logical-log backup, see Creation of a Logical-Log Backup (ON-Archive) [Page 199].

See also:
Informix documentation
Setting Up Storage Devices for Logical-Log Backup (ON-Archive)

Use
You need to set up enough storage devices – that is, tape drives – with adequate capacity for backing up the logical log of your Informix database.

If you can, it is best to have enough tape drives, volume sets, and volumes to mount a volume from each volume set on a separate tape drive and back up the logical log in unattended mode without allowing the logical log to fill completely.

Procedure
1. Decide the number of tape drives.
   
   You need at least one tape drive for logical-log backup. To reduce the chances of a tape volume overflowing, you can define additional physical devices for the logical device assigned to backup.
   
   SAP recommends that you have one or more tape drives dedicated solely to logical-log backup. This is essential if you are using continuous logical-log backup to tape.

2. Decide whether to perform logical-log backup in unattended mode.
   
   Define logical storage devices with the suffix \_VOP if you wish to use these in unattended mode (that is, using onautovop). By inserting the appropriate tape volumes in the assigned devices, you can allow the backup to proceed without operator attention. This applies to continuous or automatic logical-log backup.

3. Consider the speed of your tape drives.
   
   Your drives must be fast enough to cope with the maximum rate at which the logical log fills. Local devices are more likely to cope than remote devices.

For more information about setup of storage devices, see Editing the File config.arc for ON-Archive [Page 85].

See also:
Informix documentation
Setting Up Volume Sets and Volumes for Logical-Log Backup (ON-Archive)

Use
Before you can back up the logical log of your Informix database, you must define at least one volume set and volume.

Procedure
1. If you are using automatic backup with the script `logevent.sh`, the script expects the volume set `LOGTAP` and its volumes (although it is possible to edit `logevent.sh` to use another volume set).
2. If you are using automatic backup with the DBA Planning Calendar of CCMS in the R/3 System, you can specify whichever names you like for volume sets and volumes. For more information, see:
   - Backing Up the Logical Log in the DBA Planning Calendar (Informix) [Ext.]
   - Backing Up the Logical Log (Automatic) in the DBA Planning Calendar (Informix) [Ext.]
3. If you are using continuous backup, you can use either tape-based or disk-based backup as follows:
   - Tape-based volume sets for continuous backup
     You can use the SAP scripts `arcprep` and `arcvolum` (see final step in this procedure), as they create tape-based volume sets. The number of volumes required in a tape-based volume set for logical-log backup depends on how large your logical log is and your tape retention cycle (that is, how long you plan to keep the backup tapes before they are overwritten – this should be 28 days or longer).
   - Disk-based volume set for continuous backup
     A disk-based volume set is used as a temporary storage area for continuous backup. You should define a single volume in the disk volume set `LOGDIR`. You do not need to have more than one volume for a disk volume set, unlike tape volume sets that typically contain more than one volume (that is, tape).
     Your disk-based volume must be able to accommodate at least the entire logical log. SAP recommends that you have approximately one GB storage in the directory containing the volume. This is normally more than enough for one save set (typically around 400 MB, that is, 40 logical-log files of 10 MB each). One GB enables you to store two save sets easily, in case you fail to get the first save set copied to tape before the next backup.
     SAP recommends you to use tape-based continuous backup. See Choosing Continuous Logical-Log Backup (ON-Archive) [Page 189].
4. Depending on your requirements identified in the steps above, set up volume sets and volumes in either of the following ways:
   - With the SAP scripts (recommended)
Setting Up Volume Sets and Volumes for Logical-Log Backup (ON-Archive)

You should use the SAP scripts since they help you to define the required volume sets and volumes on tape, as follows:

- `arcprep` generates the volume set `LOGTAP` for archiving and a series of associated volumes labeled `LOGT1`, `LOGT2`, `LOGT3`... up to the number you specify.
- `arcvolum` defines additional volumes in pre-existing volume sets, if required.

Refer to Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94].

- Manually
  Refer to Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts [Page 97]. If you are backing up to a temporary storage area on disk, then you must define the volume set yourself.

Result

You have set up volume sets and volumes, which is an essential requirement for logical-log backup.

See also:

Informix documentation
Meeting Additional Logical-Log Backup Requirements (ON-Archive)

Use

You need to meet additional requirements for logical-log backup of your Informix database with ON-Archive, but only if you are using the script logevent.sh for automatic logical-log backup. For more information, see Choosing Automatic Logical-Log Backup (ON-Archive) [Page 186].

Procedure

1. Check the settings of MAX_PCT and BACKUP_VSET in the script logevent.sh. See “Editing Script logevent.sh” in Preparing SAP Scripts for ON-Archive [Page 78].

2. Check the setting of ALARMPROGRAM in the ONCONFIG file. See Editing the ONCONFIG File for ON-Archive [Page 81].

To reduce the problem of the logical log filling up, define a large logical log (that is, greater than one GB) for automatic backup. Note also that you must always mirror the log.

For more information about using the script logevent.sh, see Performing Automatic Logical-Log Backup (ON-Archive) [Page 202].
Creation of a Logical-Log Backup (ON-Archive)

Purpose
You need to back up the logical log with ON-Archive for use in a restore in the event of database failure. Also, when the logical log is full, the database stops processing. You can use a number of different approaches for the backup.

Prerequisites
You have worked out an approach [Page 183] and met its requirements [Page 194].

Process Flow

Automatic Logical-Log Backup

With CCMS (recommended by SAP)
1. You use the DBA Planning Calendar [Ext.] in CCMS to plan your logical-log backups. For more information, see the following:
   - If you want to schedule the logical-log backups, see Backing Up the Logical Log in the DBA Planning Calendar (Informix) [Ext.].
   - If you want to trigger the logical-log backups, see Backing Up the Logical Log (Automatic) in the DBA Planning Calendar (Informix) [Ext.].
2. You make sure the necessary resources (tapes, tape drives, and so on) are available.
3. You use the archive and backup monitor [Ext.] to check the results.
4. You check the tapes [Page 225] when the logical-log backup has finished.
5. You complete the logical-log backup [Page 212].

Without CCMS (not recommended by SAP)
You decide whether you want to have the logical-log backup triggered using the supplied script logevent.sh or whether you want to enter your own ON-Archive commands to start it:

- Triggering the Backup with logevent.sh
  1. You use the script logevent.sh to specify how full the logical log must be before the logical-log backup is triggered.
  2. You make sure the necessary resources (tapes, tape drives, and so on) are available.
  3. You check the logical-log backup status [Page 208] if required.
  4. You check the tapes [Page 225] when the logical-log backup has finished.
  5. You complete the logical-log backup [Page 212].

- Entering your own ON-Archive commands

⚠️ SAP especially recommends you not to rely on starting the backup yourself. The reason is that you have to remember to start it regularly. The danger is that you
Creation of a Logical-Log Backup (ON-Archive)

forget and then the logical log fills up. This might cause the database to stop processing.

1. You make sure the necessary resources (tapes, tape drives, and so on) are available.
2. At the time you choose (for example, 17:00 every day) you enter the ON-Archive command to start the logical-log backup.
3. You check the logical-log backup status [Page 208] if required.
4. You check the tapes [Page 225] when the logical-log backup has finished.
5. You complete the logical-log backup [Page 212].

Continuous Logical-Log Backup

To Tape

1. You make sure the necessary resources (tapes, tape drives, and so on) are available.
2. You enter the ON-Archive command to start the logical-log backup.
3. You check the logical-log backup status [Page 208] if required.
4. You check the tapes [Page 225] when the logical-log backup has finished.
5. You complete the logical-log backup [Page 212].

When the tape is full, you have to change it, cancel the backup, and start with step 1 again.

For more information, see Performing Continuous Logical-Log Backup to Tape (ON-Archive) [Page 204].

To Disk

1. You make sure the necessary resources (tapes, tape drives, and so on) are available.
2. You enter the ON-Archive command to start the logical-log backup.
3. You check the logical-log backup status [Page 208] if required.
4. You copy closed save sets to tape, interrupt the backup, and delete the save set on disk before starting from the beginning again.
5. You check the tapes [Page 225] when the logical-log backup has finished.
6. You complete the logical-log backup [Page 212].

When the tape is full, you have to change it, cancel the backup, and start with step 1 again.

For more information, see Performing Continuous Logical-Log Backup to Disk (ON-Archive) [Page 206].
Result
The logical log is backed up. Therefore, you have a copy of logical-log data that can be used for a restore [Page 252] in the event of database failure.

See also:
Informix documentation
Performing Automatic Logical-Log Backup (ON-Archive)

Use
This procedure describes how to perform an automatic logical-log backup on the Informix database with ON-Archive outside CCMS, as follows:

- Using the script logevent.sh
- Entering your own ON-Archive commands

Although SAP recommends using CCMS, the methods outside CCMS are described here in case you want to use them. For more information about automatic logical-log backup, including the methods recommended by SAP, see Choosing Automatic Logical-Log Backup (ON-Archive) [Page 186].

For any of the procedures in which you use tape media, you must always make sure that the correct tape volume is mounted in the appropriate tape device. If not, the operation fails. If your logical logs have filled completely, see Emergency Logical-Log Backup [Page 227].

Prerequisites
- You have defined the parameters MAX_PCT and BACKUP_VSET in the logevent.sh script and the ALARMPROGRAM parameter in the ONCONFIG file. Refer to Meeting Additional Logical-Log Backup Requirements (ON-Archive) [Page 198].
- You have defined tape devices [Page 195] as well as volume sets and volumes [Page 196].
- You have determined the volume required for the logical-log backup and loaded it into your tape drive. If you are not sure which volume to use for the next logical-log backup, you can enter the following command (assuming you have defined BACKUP_VSET to be LOGTAP):

  ```
  ./arcauto -v LOGTAP -d
  ```

Procedure

Using the Script logevent.sh

You do not have to explicitly start logevent.sh because it is automatically started when the Informix database server comes online. It triggers logical-log backups when required. All you have to do is make sure that the correct volume is available.

Check the log backup status [Page 208], if required.

Entering your own ON-Archive Commands

1. Enter a command like the following at the command line:

   ```
   $ onarchive 'BACKUP/LOGFILE/AUTOMATIC/VSET=LOGTAP'
   ```

   For more information, see the Informix documentation.
Performing Automatic Logical-Log Backup (ON-Archive)

2. Check the log backup status [Page 208], if required.

Result

The logical log is backed up. Therefore, you can use the logical-log backup for a restore in the event of database failure.

Make sure that you check the logical-log backup result [Page 209] and check the tapes [Page 225]. Finally, be sure to complete the logical-log backup [Page 212].

See also:

Informix documentation
Performing Continuous Logical-Log Backup to Tape (ON-Archive)

Use

This procedure describes how to perform a continuous backup of the Informix logical log to tape with ON-Archive. For more information about continuous logical-log backup, see Choosing Continuous Logical-Log Backup (ON-Archive) [Page 189].

⚠️

For any of the procedures in which you use tape media, you must always make sure that the correct tape volume is mounted in the appropriate tape device. If not, the operation fails. If your logical log is full, see Emergency Logical-Log Backup [Page 227].

Prerequisites

- You have defined tape devices [Page 89] as well as volume sets and volumes [Page 97].
- You have determined the volume required for the logical-log backup and loaded it into your tape drive.

⚠️

If you use a local tape drive, only fully backed up logical-log files are included on the tape and are marked as backed up. Partially backed up logical-log files are backed up the next time you start continuous backup.

If you use a remote tape drive, it is not guaranteed that the files are correctly backed up. Therefore, SAP recommends you to use a local drive for continuous backup.

Procedure

You can perform a continuous logical-log backup to tape with ON-Archive either in attended or unattended mode.

Attended mode

Proceed as follows to do an attended mode logical-log backup:

1. Enter the following from the command line in a dedicated window as user informix:

   ```
   $ onarchive 'BACKUP/LOGFILE/CONTINUOUS/VSET=LOGTAP'
   ```

   ON-Archive returns a message like the following:

   Request 00000203 registered in the catalog.

   You get a message in your dedicated backup window indicating when the tape volume is full.

2. When the tape volume is full, change the tape, cancel the backup (using Ctrl C), and start a new command as in step 1 above.
Performing Continuous Logical-Log Backup to Tape (ON-Archive)

If you want to receive mail, use NOTIFY at the end of the above command. The mail goes to the user who issued the command (usually informix).

**Unattended mode using onautovop**

For more information about using onautovop, see the Informix documentation. SAP recommends that you do not use this procedure since it is difficult to see when the tape volume is full.

To find out how the logical-log backup is progressing, see Checking Logical-Log Backup Status (ON-Archive) [Page 208].

**Result**

The logical log is backed up. Therefore, you can use the logical-log backup for a restore in the event of database failure.

Make sure that you check the logical-log backup result [Page 209] and check the tapes [Page 225]. Finally, be sure to complete the logical-log backup [Page 212].

**See also:**

Informix documentation
Performing Continuous Logical-Log Backup to Disk (ON-Archive)

Use

This procedure describes how to perform a continuous backup of the logical log to disk with ON-Archive. In a continuous logical-log backup to disk, you:

1. Use a temporary storage area on disk to back up the logical log.
2. Copy the backed-up data to tape.

For more information about continuous logical-log backup, see Choosing Continuous Logical-Log Backup (ON-Archive) [Page 189].

⚠️

For any of the procedures in which you use tape media, you must always make sure that the correct tape volume is mounted in the appropriate tape device. If not, the operation fails. If your logical logs are full, see Emergency Logical-Log Backup [Page 227].

Prerequisites

- You have defined devices for the backup to disk and the subsequent copy to tape. Refer to Defining Devices for ON-Archive Without SAP Scripts [Page 89].
- You have defined volume sets and volumes for the backup to disk and the subsequent copy to disk. Refer to Setting Up Volume Sets and Volumes for ON-Archive Without SAP Scripts [Page 97].
- You have determined the volume required for the logical-log backup and loaded it into your tape drive.

Procedure

1. Start continuous backup request by entering a command like the following:
   $$\texttt{onarchive 'BACKUP/LOGFILE/CONTINUOUS/VSET=LOGDIR'}$$
   Add the qualifier AUTOVOP for unattended mode.
2. Monitor save sets to find closed ones.
3. Copy closed save set (identified by the request ID) to your tape volume set (assuming LOGDIR was created with request ID 68):
   $$\texttt{onarchive 'COPY/VSET=LOGDIR/DESTINATION=LOGTAP/REQUEST=68'}$$
4. Interrupt continuous backup (using Ctrl-C).
5. Remove disk save set (identified by the request ID) to reclaim disk space.
6. Repeat the process for the next save set.
Performing Continuous Logical-Log Backup to Disk (ON-Archive)

Remove the disk save set as soon as possible, but *not* before you have made sure that it has been safely copied offline to tape. Always use the `copy` command in ON-Archive (*not* `rm` in UNIX). Do this as soon as possible, otherwise the disk might fill (in which case, you have to do an emergency backup).

To find out how the backup is progressing, see Checking Logical-Log Backup Status (ON-Archive) [Page 208].

**Result**

The logical log is backed up. Therefore, you can use the logical-log backup for a restore in the event of database failure.

Make sure that you check the logical-log backup result [Page 209] and check the tapes [Page 225]. Finally, be sure to complete the logical-log backup [Page 212].

**See also:**

Informix documentation
Checking Logical-Log Backup Status (ON-Archive)

Use

You can use this procedure to check on the status of a logical-log backup with ON-Archive.

Procedure

You can check the status of a logical-log backup with ON-Archive in the following ways:

- Activity log
  Refer to Checking Logical-Log Backup Result with Activity Log [Page 209].

- Log file in current directory
  Each request also writes a log file in the directory current at the time the request is started. You request logging with the LOG qualifier or you can set it up as a default in the oper_deflt.arc file. If the request ID is 203, then the name of the log file is arc00000203.log.

- Email
  You should periodically check your email for notification of database archive (and logical-log backup) request status. You only receive email if you use the NOTIFY qualifier in your request or specify NOTIFY in the oper_deflt.arc file.
  As mail is sent to the user informix or <sid>adm (depending on the user who started the archive), it is best to have the mail automatically forwarded to the mailbox of a database administrator.

Result

If the logical-log backup has completed successfully, you still need to check the tapes [Page 225].

See also:
Checking Logical-Log Backup Result with Message Log [Page 224]
Informix documentation
Checking Logical-Log Backup Result with Activity Log (ON-Archive)

Use

You can check the results of a logical-log backup on the Informix database with ON-Archive by looking in the ON-Archive activity log. The ON-Archive activity log is normally called archive.log and is stored in the directory /informix/<SID>/etc. For more information, see the ACTIVITYLOG parameter in Editing the config.arc File for ON-Archive [Page 85].

Procedure

The following is an example of an automatic logical-log backup using onautovop:

Feb 02 1995 19:29:48 #00000000# <29164> onarchive (informix) Created request #00000001#: BACKUP/LOGFILE/automatic/CURRENT/VSET=LOGTAP/AUTOVOP

Feb 02 1995 19:30:13 #00000001# <29196> onautovop (informix) Begin automatic backup to LOGTAP

19:43:43 #00000001# <29196> Processing LF00001324 to LOGTAP:0001
19:43:44 #00000001# <29196> Processing LF00001325 to LOGTAP:0001
19:43:44 #00000001# <29196> Processing LF00001326 to LOGTAP:0001
19:43:45 #00000001# <29196> Processing LF00001327 to LOGTAP:0001
19:43:45 #00000001# <29196> Processing LF00001328 to LOGTAP:0001
19:43:46 #00000001# <29196> Processing LF00001329 to LOGTAP:0001
19:43:46 #00000001# <29196> Processing LF00001330 to LOGTAP:0001

Feb 02 1995 19:44:44 #00000001# <29196> onautovop (informix) End automatic backup: SUCCESS

See also:

Checking Logical-Log Backup Status (ON-Archive) [Page 208]
Checking Logical-Log Backup Result with Message Log [Page 224]
Informix documentation
Checking Logical-Log Backup Result with Message Log

Use
You can check the results of a logical-log backup by looking in the message log for the Informix database server.

The parameter MSGPATH in the ONCONFIG file specifies the name and location of the message log. However, if you use SAPDBA or onstat -m to view the message log, you do not need to know its name or location. Refer to System Information [Page 482].

Procedure
Use either of the following to look in the message log:

- SAPDBA.
  For more information, see System Information with SAPDBA [Page 481].
- onstat -m.
  For more information, see the Informix documentation.

You see entries like the following:

10:51:19 Logical Log 11 - Backup Started
10:51:22 Logical Log 11 - Backup Completed
10:51:22 Logical Log 12 - Backup Started
10:51:24 Logical Log 12 - Backup Completed

Result
If the logical-log backup has completed successfully, you still need to check the tapes [Page 225].

See also:
Checking Logical-Log Backup Result with Activity Log (ON-Bar) [Page 180]
Checking Logical-Log Backup Result with Activity Log (ON-Archive) [Page 209]
Checking Logical-Log Backup Status (ON-Archive) [Page 208]
Informix documentation
Checking Tapes After a Logical-Log Backup (ON-Archive and ontape)

Use

After a logical-log backup with ON-Archive or ontape, perform the check described below. This makes sure that the tapes can be read successfully, if you need to do a restore. For more information about performing a restore, see Restore [Page 252].

Procedure

5. Mount the tape to be checked on your tape device and then enter the following command:

   $ ondatartr ‘LIST/TAPE=(<tape device>)’

   For example, if your tape device was dev/rmt/0m, you would enter:

   $ ondatartr ‘LIST/TAPE=(dev/rmt/0m)’

6. If the result of this check shows a problem, see SAP Note 61624.

   !

   A faulty tape could endanger the integrity of your database. If you need to do a restore and you use a tape that has failed the legibility check, the restore will fail.

See also:

Checking Logical-Log Backup Result with Message Log [Page 224]
Checking Logical-Log Backup Result with Activity Log (ON-Archive) [Page 209]
Informix documentation
Completing Logical-Log Backup (ON-Archive)

Use
To make sure the data from a logical-log backup with ON-Archive can be used quickly and effectively to restore the database, perform the tasks described in this section.

Prerequisites
You have checked the logical-log backup result [Page 209] and checked the tape [Page 225].

Procedure
1. Use the SAPDBA recovery report (not available with ontape)
   SAP recommend that you have the SAPDBA recovery report produced after your logical-log backups. This report can be automatically produced and reduces the time taken to perform a restore by listing the volumes required. For more information, see Recovery Report with SAPDBA [Page 465].

2. Copy logical-log backup volumes and store copies offsite
   Since your backups are vital to restore your database in the event of failure, you should consider copying the volumes and storing the copies at a different physical location.
   For example, to copy the volume set LOGTAP (created with request ID 68), enter the following command:
   ```
   $ onarchive 'COPY/VSET=LOGTAP/DESTINATION=LOGTAP_BKP/REQUEST=68'
   ```

3. Physically label your tapes
   Write the following information on your tapes to simplify the restore process:
   - Save set ID
   - Date and time of backup
   - Volume set and volume names
   - Logical-log file numbers

4. If you are using automatic logical-log backup, use SAPDBA to display the status of the logical logs. Refer to System Information [Page 482]. If necessary, you might need to increase the frequency of the backup.
   For information about how to use the backup tapes for a restore, see Restore [Page 252].

See also:
Checking Logical-Log Backup Result with Message Log [Page 224]
Approach to Logical-Log Backup (ontape)

**Purpose**
To make sure that you can back up the logical log of your the Informix database with ontape in the best way, you have to decide on your approach. If your approach is poor, you might later have trouble using the logical-log backups to restore the database.

**Prerequisites**
You have completed the preparations necessary to set up ontape. Refer to ontape for Data Recovery [Page 100].

**Process Flow**
15. You develop good practice for logical-log backup [Page 215].

**Result**
You can now check the Requirements for a Logical-Log Backup (ontape) [Page 218].

**See also:**
Informix documentation
Developing Good Practice for Logical-Log Backup

Use

This section discusses guidelines for creating logical-log backups on your Informix database with ON-Bar, ON-Archive or ontape.

⚠️

It is very important to back up the logical log on time. Otherwise, if it completely fills, the database stops processing. You then have to perform Emergency Logical-Log Backup [Page 227].

Different backup approaches offer differing levels of protection against a full logical log. For a summary of measures you can take to avoid this problem, see Preventing Emergency Logical-Log Backup [Page 250].

Procedure

3. Make sure that logical-log backup is turned on.

SAP strongly recommends you to run your production database with logical-log backup turned on. Make sure that the LTAPEDEV parameter is not set to /dev/null on UNIX or nul on Windows NT. Refer to Editing the ONCONFIG File for ON-Archive [Page 81] (the information on LTAPEDEV applies to ON-Bar, ON-Archive, and ontape).

4. Choose the logical-log backup mode carefully.

In general, continuous is the best kind of logical-log backup, because:

- The chance of the logical log filling up is reduced.
- You always have the most up-to-date logical-log backup possible.

However, the choice of backup mode depends on the data recovery tool you use:

- ON-Bar
  
  Refer to Choosing Continuous or Manual Logical-Log Backup (ON-Bar) [Page 168].

- ON-Archive
  
  Refer to Choosing Automatic Logical-Log Backup (ON-Archive) [Page 186] and Choosing Continuous Logical-Log Backup (ON-Archive) [Page 189].

- ontape
  
  Refer to Choosing Automatic or Continuous Logical-Log Backup (ontape) [Page 217].

5. Specify a separate storage device for logical-log backup.

To avoid competition with archives (ON-Archive or ontape) or database backups (ON-Bar), assign a dedicated tape device for logical-log backup. You must do this if you are using continuous logical-log backup. If you use the same device, there is a chance that the logical-log backup is held up due to contention with the archive or database backup. This might lead to a full logical log, and the database then stops processing.

For more information on tape devices, see:
Developing Good Practice for Logical-Log Backup

- For ON-Bar, see Configuring ON-Bar [Page 65] and your storage manager documentation.
- For ON-Archive, see the DEVICE parameter in Editing the config.arc File for ON-Archive [Page 85].
- For ontape, see the TAPE... and LTAPE... parameters in Configuring ontape [Page 101].

6. Use a fast storage device, preferably local

   With a slow storage device, the logical-log files might fill up more quickly than they can be backed up. This is more likely to happen with a remote device. The best solution is to use a fast local device (for example, a fast local tape drive).

7. Watch out for logical-log peaks

   Certain activities cause the logical log to fill up rapidly, for example, data conversion. Monitor the logical log closely at such times and do the following:
   - If you are using continuous logical-log backup, change tapes more often.
   - If you are not using continuous logical-log backup, run extra backups.

Result

The logical logs are backed up using best practice. Therefore, you can be more sure that, in the event of failure involving data loss, you have a suitable logical-log backup that you can use to quickly restore the database with minimal data loss.

See also:
Informix documentation
Choosing Automatic or Continuous Logical-Log Backup (ontape)

Use
You need to decide whether to back up the logical log of the Informix database with `ontape` in continuous or manual mode.

SAP recommends you to use continuous backup with `ontape`.

Procedure
Choose whether to use continuous or manual logical-log backup:

- **Automatic**
  
  With automatic backup, the logical log is backed up periodically, for example, at 20:00 every day. All full logical-log files are backed up at this time. However, the problem with automatic backup is that you might forget to start the backup in time and the logical log completely fills.

- **Continuous**
  
  With continuous backup, a backup is started as soon as each individual logical-log file fills. `ontape` prompts you to mount new tapes as necessary.
Requirements for a Logical-Log Backup (ontape)

Purpose
To back up the logical log of an Informix database using ontape, you have to meet certain requirements.

Prerequisites
You have decided on an approach to logical-log backup [Page 214] with ontape. This determines your requirements to some extent.

Process Flow
You check that you have the correct tape devices [Page 219].

If your logical log is completely full, see Emergency Logical-Log Backup [Page 227] for the requirements for emergency logical-log backup.

Result
You have met the requirements for logical-log backups with ontape. For more information about creating a logical-log backup, see Creation of a Logical-Log Backup (ontape) [Page 220].

See also:
Informix documentation
Setting Up Tape Devices for Logical-Log Backup (ontape)

Use
You need to set up tape devices – that is, tape drives – for logical-log backup of your Informix database with ontape.

Procedure
1. Decide the number of tape drives.
   SAP recommends that you have at least two tape drives, one for archives and one for logical-log backups. Otherwise, if your logical logs fill up when you are performing an archive, the database might stop processing. At the minimum, you must have one tape drive for logical-log backup.

2. Consider the speed of tape drives.
   Your drives must be fast enough to cope with the maximum rate at which the logical-log fills. Local drives are more likely to cope than remote ones.

3. If using continuous logical-log backup, dedicate a storage drive.
   For continuous logical-log backup, you need to dedicate a terminal and a tape drive to the logical-log backup. You should not use a remote drive for logical-log backup because it is less secure than a local one.

4. Define the tape drives.
   You need to define at least the device LTAPEDEV with a suitable physical device for logical-log backup. Refer to Configuring ontape [Page 101].

   Do not use /dev/null (UNIX) or nul (NT) for LTAPEDEV if you want to perform a restore of your system up to the time of failure.

   If you specify a null value for LTAPEDEV, the logical-log files are marked as backed up as soon as they are full. Therefore, they cannot be backed up and the transactions recorded in these logs cannot be used for a logical restore.

See also:
Informix documentation
Creation of a Logical-Log Backup (ontape)

Purpose
You have to back up the logical log of your Informix database with ontape for use in a restore in the event of database failure. Also, when the logical log is full, the database stops processing. You can use a number of different approaches for the logical-log backup.

Prerequisites
You have worked out an approach and met its requirements.

Process Flow
7. You perform the logical-log backup. Refer to one of the following:
   - Performing an Automatic Logical-Log Backup (ontape)
   - Performing a Continuous Logical-Log Backup (ontape)
8. You check the result with the message file.
9. You check the tapes.
10. You complete the logical-log backup.

Result
The logical log is backed up. Therefore, you have a copy of logical-log data that can be used for a restore in the event of database failure.

See also:
Informix documentation
Performing an Automatic Logical-Log Backup (ontape)

Use

This procedure tells you how to perform an automatic logical-log backup on your Informix database using ontape. Although SAP does not recommend this approach, we describe it in case you decide to use it.

Procedure

1. Place a write-enabled tape in your tape drive.
2. Log on as user informix and enter the command:
   
   $ ontape -a

3. Change the tape as required.

Result

The logical log is backed up. Therefore, you can use the logical-log backup for a restore in the event of database failure.

Make sure that you check the logical-log backup result [Page 224] and check the tapes [Page 225]. Finally, be sure to complete the logical-log backup [Page 226].

See also:

Informix documentation
Performing a Continuous Logical-Log Backup (ontape)

Use
This procedure tells you how to perform a continuous logical-log backup on your Informix database using ontape.

Procedure

1. Place a write-enabled tape in your tape drive.
2. Log on as user informix and enter the following command:
   $$\text{ontape -c}$$
3. When ontape prompts you, mount a tape on the drive specified by \text{LTAPEDEV}.
4. When a logical-log backup tape is full, ontape prompts you, as in the following example:
   
   Tape is full...
   
   Please label this tape as number 1 in the log tape sequence.
   This tape contains the following logical logs:
   
   843 - 912
   
   Remove the tape and label it. Refer to Completing Logical-Log Backup (ontape) [Page 226].
5. Mount a new tape when ontape prompts you. For example:
   
   Please mount tape 2 on /dev/rmt/0m and press Return to continue...
6. To end continuous backup, press the interrupt keys \text{CTRL-C}.

   If you press the interrupt keys while a logical-log file is being backed up to a local device, all files that were completely backed up before you pressed the interrupt keys are captured on tape and are marked as backed up.

   However, this is not guaranteed when you use a remote tape device. Therefore, you should not use a remote tape device for continuous backup.

Result
The logical log is backed up. Therefore, you can use the logical-log backup for a restore in the event of database failure.

Make sure that you check the logical-log backup result [Page 224] and check the tapes [Page 225]. Finally, be sure to complete the logical-log backup [Page 226].
Performing a Continuous Logical-Log Backup (ontape)

See also:
Informix documentation
Checking Logical-Log Backup Result with Message Log

Use
You can check the results of a logical-log backup by looking in the message log for the Informix database server.

The parameter `MSGPATH` in the `ONCONFIG` file specifies the name and location of the message log. However, if you use SAPDBA or `onstat -m` to view the message log, you do not need to know its name or location. Refer to System Information [Page 482].

Procedure
Use either of the following to look in the message log:

- **SAPDBA.**
  
  For more information, see System Information with SAPDBA [Page 481].

- **onstat -m.**
  
  For more information, see the Informix documentation.

You see entries like the following:

```
10:51:19  Logical Log 11 - Backup Started
10:51:22  Logical Log 11 - Backup Completed
10:51:22  Logical Log 12 - Backup Started
10:51:24  Logical Log 12 - Backup Completed
```

Result
If the logical-log backup has completed successfully, you still need to check the tapes [Page 225].

See also:
- Checking Logical-Log Backup Result with Activity Log (ON-Bar) [Page 180]
- Checking Logical-Log Backup Result with Activity Log (ON-Archive) [Page 209]
- Checking Logical-Log Backup Status (ON-Archive) [Page 208]
- Informix documentation
Checking Tapes After a Logical-Log Backup (ON-Archive and ontape)

Use

After a logical-log backup with ON-Archive or ontape, perform the check described below. This makes sure that the tapes can be read successfully, if you need to do a restore. For more information about performing a restore, see Restore [Page 252].

Procedure

7. Mount the tape to be checked on your tape device and then enter the following command:

   $ ondatastr 'LIST/TAPE=(<tape device>)'

   For example, if your tape device was dev/rmt/0m, you would enter:

   $ ondatastr 'LIST/TAPE=(dev/rmt/0m)'

8. If the result of this check shows a problem, see SAP Note 61624.

   !

   A faulty tape could endanger the integrity of your database. If you need to do a restore and you use a tape that has failed the legibility check, the restore will fail.

See also:

Checking Logical-Log Backup Result with Message Log [Page 224]
Checking Logical-Log Backup Result with Activity Log (ON-Archive) [Page 209]
Informix documentation
Completing Logical-Log Backup (ontape)

Use

To make sure the data from a logical-log backup with \textit{ontape} can be used quickly and effectively to restore the database, perform the tasks described in this section.

Prerequisites

You have checked the logical-log backup result [Page 224] and checked the tape [Page 225].

Procedure

4. Write the following information on your tapes to simplify the restore process:
   - Date and time of backup
   - Tape number from \textit{ontape}
   - Logical-log file numbers from \textit{ontape}

5. Copy logical-log backup volumes and store copies offsite
   
   Since your logical-log backups are vital to restore your database in the event of failure, you should consider copying the volumes and storing the copies at a different physical location.

6. If you are using automatic logical-log backup, use SAPDBA to display the status of the logical logs. Refer to \textit{System Information} [Page 482]. If necessary, you might need to increase the frequency of the backup.

   
   For information about how to use the backup tapes for a restore, see \textit{Restore} [Page 252].

See also:

Informix documentation
Emergency Logical-Log Backup

Purpose
This section describes what to do when the logical log of your Informix database is full. The database stops processing when the logical log is full and you must then perform an emergency logical-log backup. This occurs when you have not backed up the logical log in time. When the logical log is backed up, it is marked as free and the database can continue writing transactions to it. For more information about logical-log backup, see Informix Logical-Log Backup [Page 54].

Reasons why the logical log might fill up include the following:

- The logical-log backup has not been started in time.
- The current backup tape is full and a new one has not been mounted.
- An archive is in progress and you have no more tape drives free to back up the logical log.

In this case, you must choose between either aborting the archive to free the tape drive for the backup or leaving the database suspended until the archive has finished and freed the tape drive.

Prerequisites

You see a message like the following in the message log for the database server:

16:44:49 Logical Log Files are Full - Backup is Needed

The parameter MSGPATH in the ONCONFIG file specifies the name and location of the message log. However, if you use SAPDBA or onstat -m to view the message log, you do not need to know its name or location. Refer to System Information [Page 482].

Process Flow

⚠️ You must use the same tool to do the emergency logical-log backup as you normally use for archives and database and logical-log backups. This is because the data written by ON-Bar, ON-Archive and ontape is not compatible.

ON-Bar

Refer to Performing Emergency Logical-Log Backup (ON-Bar) [Page 229].

ON-Archive

You can take the following approaches to an emergency logical-log backup with ON-Archive:

- Use the SAP scripts to help you do the emergency backup.
  These automate the process as much as possible. SAP recommends you to use this approach. For more information, see Emergency Backup with ON-Archive using SAP Scripts (ON-Archive) [Page 230].
- Perform the emergency backup on your own.
Emergency Logical-Log Backup

SAP does not recommend you to use this approach. For more information, see Emergency Backup with ON-Archive without SAP Scripts (ON-Archive) [Page 238].

ontape

Refer to Performing Emergency Logical-Log Backup (ontape) [Page 248].

Result

The full logical log is now backed up, allowing the database to continue processing.

After the emergency logical-log backup, SAP strongly recommends that you do a level-0 database backup (ON-Bar) or a level-0 archive (ON-Archive and ontape) of the database to ensure you do not run into problems using the logical logs that were backed up in this emergency situation. Refer to:

Creation of a Database Backup (ON-Bar) [Page 114]
Creation of an Archive (ON-Archive) [Page 141]
Creation of an Archive (ontape) [Page 159]

To minimize the chances of a full logical log in the future, it is important to make sure that your approach to logical-log backup is correct, so that the logical log is always backed up in time. Refer to:

- Approach to Logical-Log Backup (ON-Bar) [Page 165]
- Approach to Logical-Log Backup (ON-Archive) [Page 183]
- Approach to Logical-Log Backup (ontape) [Page 214]

See also:

Informix documentation

Preventing Emergency Logical-Log Backup [Page 250]
Performing Emergency Logical-Log Backup (ON-Bar)

This procedure tells you how to perform an emergency logical-log backup on your Informix database using ON-Bar. You must back up the logical log quickly if processing is to continue as soon as possible.

Procedure

Perform a logical-log backup as you normally do. For more information, see Creation of a Logical-Log Backup (ON-Bar) [Page 176].

Result

The logical log is now backed up and the database resumes processing.

SAP recommends you to find out why the emergency logical-log backup was necessary and to prevent it in future. Refer to:

- Preventing Emergency Backup [Page 250]
- Approach to Logical-Log Backup (ON-Bar) [Page 165]

See also:

Informix documentation
Emergency Logical-Log Backup Using SAP Scripts (ON-Archive)

Purpose
This section describes the use of the SAP script `arcpanic` with ON-Archive to automate emergency logical-log backup on your Informix database. The advantage of using the SAP scripts is that the process is much simpler. You cannot use the scripts if your data recovery tool is `ontape` or `ON-Bar`.

For more information if you do **not** want to use the SAP scripts, see Emergency Logical-Log Backup Without SAP Scripts (ON-Archive) [Page 238].

Prerequisites
Make sure you have prepared correctly **before** using the SAP scripts for emergency logical-log backup. Refer to Preparing for Emergency Backup Using SAP Scripts (ON-Archive) [Page 231].

Process Flow
Follow the procedure Performing Emergency Backup Using SAP Scripts (ON-Archive) [Page 232] to execute the `arcpanic` script for emergency logical-log backup.

Result
The full logical log is now backed up, allowing the database to continue processing.

To find out what the results of a backup look like, see Checking Emergency Backup Result with Activity Log (ON-Archive) [Page 242].

See also:
Informix documentation
Preparing for Emergency Logical-Log Backup Using SAP Scripts (ON-Archive)

Use

This section describes how to prepare to use the SAP script arcpanic with ON-Archive to automatically perform an emergency logical-log backup on your Informix database. You must make these preparations before the emergency logical-log backup occurs.

For more information if you do not want to use the SAP scripts, see Emergency Logical-Log Backup Without SAP Scripts (ON-Archive) [Page 238].

Procedure

1. Set up ON-Archive correctly.

   Setting up ON-Archive takes time. If you need to do an emergency backup immediately, and you have not already set up ON-Archive, use the procedure Emergency Backup without SAP Scripts (ON-Archive) [Page 238] instead.

   For further details on preparation for ON-Archive, see Getting Started with ON-Archive [Page 71] and the Informix documentation.

2. Copy scripts arcprep and arcpanic.

   The script arcprep is used to set up volume sets and volumes (see next point) and arcpanic is used to run the emergency backup procedure. Refer to Preparing SAP Scripts [Page 78].

3. Set up volume set ONDATARTRLOG.

   The volume set for emergency backup expected by the scripts is ONDATARTRLOG. To find out how to set this up, see Setting Up Volume Sets and Volumes with SAP Scripts [Page 94].

Result

Now you can start the procedure. Refer to Performing Emergency Logical-Log Backup Using SAP Scripts (ON-Archive) [Page 232].

See also:
Informix documentation
Performing Emergency Logical-Log Backup Using SAP Scripts (ON-Archive)

Use

This section describes how to use the SAP script `arcpanic` with ON-Archive to automatically perform an emergency logical-log backup on your Informix database.

Prerequisites

You have performed Preparing for Emergency Logical-Log Backup using SAP Scripts (ON-Archive) [Page 231].

Procedure

1. Enter the following from the command line when signed on as user `informix`:
   
   ```bash
   ./arcpanic
   ```

   The script starts as follows:

   This script handles the situation after the Logical Logs have filled up:

   Press <RETURN> to continue...

   Mount Tape from Volume-Set ONDATARTRLOG in /dev/rmt/0hc
   Press <RETURN> to continue...

2. Mount the correct tape volume.

   The system prompts you with the details of the volume mounted:

   ON-Archive: Media Identification Function

   Tape Information:

   Vset : ONDATARTRLOG
   Volume : 000000

   ARC-W-01845, Initializing this media may overwrite an ON-Archive volume.

   Proceed and overwrite contents, Cancel operation, or Retry with another volume?

3. When you have mounted the correct volume, confirm the prompt.
The script writes the logical-log files to the volume set **ONDATARTRLOG**:

Enter (P/C/R): **p**

Save set 21850 being written to vset ONDATARTRLOG.

Logfile LF00000897 being processed.

Logfile LF00000898 being processed.

Logfile LF00000899 being processed.

Logfile LF00000900 being processed.

Logfile LF00000901 being processed.

Logfile LF00000902 being processed.

Logfile LF00000903 being processed.

Logfile LF00000904 being processed.

Logfile LF00000905 being processed.

Logfile LF00000906 being processed.

Logfile LF00000907 being processed.

Logfile LF00000908 being processed.

Logfile LF00000909 being processed.

Logfile LF00000910 being processed.

Logfile LF00000911 being processed.

Logfile LF00000912 being processed.

Logfile LF00000913 being processed.

Backup started

14:24:49 arcpanic: ONCATLGR is already running

4. **Catalog the above tape volume in **ON-Archive** as described below. Leave the same tape volume in the tape drive and confirm the prompts as they appear.**

   This is necessary because the previous step was done without **ON-Archive**, which does not function when the logical log is full.

   Now the tape volume for the backups must be cataloged:

   Devices available for **ONARCHIVE**

<table>
<thead>
<tr>
<th>DEVICE #</th>
<th>DEVICE NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>/dev/rmt/0hc</td>
</tr>
</tbody>
</table>

   Enter the device number (1) or (C)ancel : 1
Performing Emergency Logical-Log Backup Using SAP Scripts (ON-Archive)

Please mount volume ONDAT1 of ONDATARTRLOG and press < RETURN >
** READ **

Request id 00021850 rebuilt as 00000003.

To fit in with your normal logical-log backups, you have to copy the volume set ONDATARTRLOG to the volume set where you normally keep backed up log files, LOGTAP. This is described below.

You have to copy the Saveset, generated by the Emergency Backup Request, to a Volume on Tape.

Choose as the source Volume Set: ONDATARTRLOG and as the destination Volume Set you normally backup to (LOGTAP)!

To perform the copy, you have to enter the following ON-Archive commands manually (that is, outside the script). The first command registers the copy command in ON-Archive and the second command executes the copy command:

The OnArchive-Commands should look like:

```bash
onarchive
'copy/vset=ONDATARTRLOG/destination=LOGTAP/request=<Request-ID>'

<Request-ID> is the ID you find after the 'rebuilt as' statement

onarchive 'execute/request=<Request-ID of the Copy Request>'
```

In this example, the <Request-ID> is 00000003. The next prompt tells you that this copy is not possible if you only have one tape drive:

If you've got access to only one tape-drive, write the <Request-ID> of the 'rebuilt as' request on the tape and keep this volume safe. You will need it if you have to do a logical recovery !!!

5. Perform the copy following the instructions given.

SAP recommends that you do a full archive of the database to ensure that you do not encounter problems using the logical-log files that have just been backed up in this emergency situation:

SAP recommends you to perform a Level-0 archive after the situation

'logical logs full' has cleared up, to make sure that you do not run into problems if you have to perform logical recovery in the future.

Press <RETURN> to continue...

6. Perform a full (level-0) archive. Refer to Creation of an Archive (ON-Archive) [Page 141].
Performing Emergency Logical-Log Backup Using SAP Scripts (ON-Archive)

**Result**

The full logical-log is now backed up, allowing the database to continue processing.

You must now check to see that the emergency logical-log backup has completed successfully.

Refer to [Checking Emergency Backup Result with Activity Log (ON-Archive) [Page 242]].

**See also:**

Informix documentation
Checking Result of Emergency Logical-Log Backup with Activity Log (ON-Archive)

Use

This procedure is part of an emergency logical-log backup on the Informix database with ON-Archive without the SAP scripts. For an overview, see Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

In this step, you check the results of the emergency logical-log backup by looking in the ON-Archive activity log. The ON-Archive activity log is normally called archive.log and is stored in the directory /informix/<SID>/etc. For more information, see the ACTIVITYLOG parameter in Editing the config.arc File for ON-Archive [Page 85].

Prerequisites

You have finished Backing up Logical-Log Files Using ondatartr (ON-Archive) [Page 240].

Procedure

The backup should look like the following:

```
Apr 13 1995 13:45:46 #00000000# <22168> ondatartr (informix) Begin emergency backup to ONDATARTRLOG
13:45:47 #00022168# <22168> Processing LF00000537 to ONDATARTRLOG:0001
13:45:47 #00022168# <22168> Processing LF00000538 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000539 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000540 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000541 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000542 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000543 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000544 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000545 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000546 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000547 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000548 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000549 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000550 to ONDATARTRLOG:0001
Apr 13 1995 13:46:16 #00000000# <22168> ondatartr (informix) End emergency backup: SUCCESS
Apr 13 1995 13:47:30 #00000000# <22199> onarchive (informix) Created request #00000001#: 00022168```

Result

You have now checked that the emergency backup finished successfully.

If you are performing emergency backup with the SAP scripts, you have finished.

If you are performing emergency back up without the SAP scripts, the next step is to catalog the emergency save set [Page 244].

See also:

Informix documentation
Emergency Logical-Log Backup Without SAP Scripts (ON-Archive)

Purpose

If the logical log of your Informix database is full and your normal data recovery tool is ON-Archive but you are not using the SAP scripts, this process describes how to do an emergency logical-log backup. For more information about the SAP scripts, see SAP Scripts for ON-Archive [Page 76].

Prerequisites

You have defined the following on disk (or on tape if you prefer, although it is normally slower):

- DEVICE LOGPANIC = /infbackup/logpanic
  
  For details of defining devices, see config.arc [Page 85].

- DEFINE/VSET=ONDATARTRLOG/DEVICE_TYPE=LOGPANIC/DRIVER=DISK
  
  For details of defining volume sets, see Setting Up Volume Sets and Volumes Without SAP Scripts [Page 97].

- DEFINE/VOLUME/VSET=ONDATARTRLOG/MAX_SPACE=99999999/VIRTUAL=(/infbackup/logpanic/V1)
  
  For details of defining volumes, see Setting Up Volume Sets and Volumes Without SAP Scripts [Page 97].

It is best to specify the device, volume set, and volume required by ON-Archive for emergency backup before an emergency occurs. The volume set always has the name ONDATARTLOG (this volume set is also used to salvage logical-log files during a cold restore).

Process Flow

Follow all the steps in the procedure, even though the database resumes processing after the first step. The remaining steps are necessary to allow data from the emergency backup to be easily used for a restore.

1. You **back up the logical log using ondatartr [Page 240]**.
2. You **check the results of the emergency logical-log backup [Page 242]**.
3. You **catalog the emergency save set [Page 244]**.
4. You **copy the backed up logs to a regular volume set [Page 245]**.
5. You **copy the emergency save set to a regular volume set [Page 246]**.
6. You **delete the emergency save set [Page 247]**.

Result

The emergency is over because the logical log is now backed up, allowing the database to continue processing. Also, you can use the backed-up data in a restore without any extra steps.
SAP recommends you to now create a full (level-0) archive [Page 141] of the database. This makes sure that you do not run into problems using the logical-log data that you have just backed up in this emergency, because you can then use a more recent archive instead.

See also:
Informix documentation
Backing up Logical-Log Files Using ondatartr (ON-Archive)

Use

This procedure is part of an emergency logical-log backup on the Informix database with ON-Archive without the SAP scripts. For an overview, see Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

You have to use ondatartr for this step because ON-Archive is not available until the end of the step, when the logical log has been backed up.

Prerequisites

You have completed the necessary preparations. Refer to "Prerequisites" in Emergency Logical-Log Backup Without SAP Scripts (ON-Archive) [Page 238].

The program ondatartr used in this procedure writes to the volume set ONDATARTRLOG. Therefore, you must have this volume set available.

Procedure

Make sure in the command given below that:

- You specify the full volume path for ONDATARTRLOG (in this example, /infbackup/logpanic/V1). This is because access to the sysmaster database is suspended until the logs are backed up, which means that the catalog information specifying volume paths is not available.

- The parameter max_space is large enough to accommodate the entire logical log, that is, the number of logical-log files currently in use on the system. max_space is given in blocks of 512 byte.

Enter a command like the following from the command line:

```bash
$ ondatartr 'backup/logfile/disk
=/>infbackup/logpanic/V1)/max_space=99999999)'
```

As each log file is backed up, a message similar to the following appears:

```
Logfile LF00000023 being processed.
```

The backed up log files are not yet registered in the sysmaster database because the ondatartr command does not record any details in the sysmaster database. The log files are backed up to a single save set (that is, an emergency save set) in the directory /infbackup/logpanic/V1 and are called, for example, 00023370.SAV.

Result

The logical log is now backed up and the database resumes processing. Make sure you perform the remaining steps so that you can use the data backed up in this procedure in a restore.

The next step is to check the result of the emergency logical-log backup [Page 242].
See also:
Informix documentation
Checking Result of Emergency Logical-Log Backup with Activity Log (ON-Archive)

Use

This procedure is part of an emergency logical-log backup on the Informix database with ON-Archive without the SAP scripts. For an overview, see Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

In this step, you check the results of the emergency logical-log backup by looking in the ON-Archive activity log. The ON-Archive activity log is normally called archive.log and is stored in the directory /informix/<SID>/etc. For more information, see the ACTIVITYLOG parameter in Editing the config.arc File for ON-Archive [Page 85].

Prerequisites

You have finished Backing up Logical-Log Files Using ondatartr (ON-Archive) [Page 240].

Procedure

The backup should look like the following:

Apr 13 1995 13:45:46 #00000000# <22168> ondatartr (informix) Begin emergency backup to ONDATARTRLOG

13:45:47 #00022168# <22168> Processing LF00000537 to ONDATARTRLOG:0001
13:45:47 #00022168# <22168> Processing LF00000538 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000539 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000540 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000541 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000542 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000543 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000544 to ONDATARTRLOG:0001
13:45:48 #00022168# <22168> Processing LF00000545 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000546 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000547 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000548 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000549 to ONDATARTRLOG:0001
13:45:49 #00022168# <22168> Processing LF00000550 to ONDATARTRLOG:0001

Apr 13 1995 13:46:16 #00000000# <22168> ondatartr (informix) End emergency backup: SUCCESS

Apr 13 1995 13:47:30 #00000000# <22199> onarchive (informix) Created request #00000001#: 00022168
Result

You have now checked that the emergency backup finished successfully.

If you are performing emergency backup with the SAP scripts, you have finished.

If you are performing emergency back up without the SAP scripts, the next step is to catalog the emergency save set [Page 244].

See also:

Informix documentation
Cataloging the Emergency Save Set (ON-Archive)

Use

This procedure is part of an emergency logical-log backup on the Informix database with ON-Archive without the SAP scripts. For an overview, see Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

In this step, you make a catalog entry in the sysmaster database for the emergency save set ONDATARTRLOG. This is a prerequisite for using the backed up log files in a restore.

Prerequisites

You have finished Backing up Logical-Log Files Using ondatartr (ON-Archive) [Page 240].

Procedure

1. Enter the following command at the command line:

   \$ onarchive 'catalog/vset=ONDATARTRLOG/volume=1'

   You see the following response from ON-Archive:

   Request id 00023370 rebuilt as 00000106.

   ON-Archive always scans volume 1 of ONDATARTRLOG and writes the relevant information to the sysmaster database. The catalog command effectively builds and registers a backup request that would have been executed to create the save sets under normal conditions (for example, while the database is running). This process might take some time to complete.

2. Write down the second request ID (in the example, 106), because you need it for some of the later steps.

Result

The logical-log backup is now cataloged and can be used in a restore. Make sure you perform the remaining steps to copy the cataloged data to a regular volume set and then free the emergency logical-log volume for future use.

The next step depends on how you normally perform logical-log backup:

- If you perform continuous backup using a temporary storage area on disk [Page 206], the next step is Copying Backed-Up Logs to Regular Volume Set (ON-Archive) [Page 245].
- If you perform any other kind of logical-log backup, the next step is Copying Emergency Save Set to Regular Volume Set (ON-Archive) [Page 246].

See also:

Informix documentation
Copying Backed-Up Logs to Regular Volume Set (ON-Archive)

This procedure is part of an emergency logical-log backup on the Informix database with ON-Archive without the SAP scripts. For an overview of the processing, see Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

This step is only relevant if you normally perform continuous backup using a temporary storage area on disk [Page 206] to back up your logical log. In this step, you copy the backup data to the normal volume set for logical-log backup data, LOGTAP (held on tape), to allow a restore to function normally. If you do not use LOGTAP, you need to change the command given below to copy the data to your normal logical-log volume set.

Prerequisites

You have finished Cataloging the Emergency Save Set (ON-Archive) [Page 244].

Procedure

1. Use the copy command in ON-Archive to copy the save sets from the disk staging area (LOGDIR) to the regular tape volume set (LOGTAP):

   ```
   $ onarchive 'copy/vset=LOGDIR/destination=LOGTAP'
   ```

   ON-Archive confirms the request and then executes it:

   Request 00000104 registered in the catalog.

2. After you have copied the save sets to tape, you can remove them from disk as usual using the remove command in ON-Archive. Do not use the UNIX rm command.

Result

The logical-log files backed up in the emergency backup are now part of the normal volume for logical-log backup, LOGTAP.

The next step is Copying Emergency Save Set to Regular Volume Set (ON-Archive) [Page 246].

See also:

Informix documentation
Copying Emergency Save Set to Regular Volume Set (ON-Archive)

Use

This procedure is part of an emergency logical-log backup on the Informix database with ON-Archive without the SAP scripts. For an overview, see Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

In this step, you copy the cataloged emergency save set to the regular logical-log backup volume set LOGTAP (held on tape), using the copy command in ON-Archive. For information about the cataloged emergency save set, see Cataloging the Emergency Save Set (ON-Archive) [Page 244]. You need to use the request ID that was rebuilt in this step, 106 in our example.

Prerequisites

The previous step depends on how you normally perform logical-log backup:

- If you perform continuous backup using a temporary storage area on disk [Page 206], you must have completed the step Copying Backed Up Logs to Regular Volume Set (ON-Archive) [Page 245].
- If you perform any other kind of logical-log backup, you must have completed the step Cataloging the Emergency Save Set (ON-Archive) [Page 244].

Procedure

Mount the correct volume from LOGTAP and then enter the following command:

```
$ onarchive
'COPY/VSET=ONDATARTRLOG/DESTINATION=LOGTAP/REQUEST=106'
```

ON-Archive confirms the request and then executes it:

```
Request 00000107 registered in the catalog.
```

The copy can take some time to complete.

Result

The next step is Deleting the Emergency Save Set (ON-Archive) [Page 247].

See also:

Informix documentation
Deleting the Emergency Save Set (ON-Archive)

Use

This procedure is part of an emergency logical-log backup on the Informix database with ON-Archive without the SAP scripts. For an overview, see Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

In this step, you delete the emergency save set, since you should have copied it to the volume set LOGTAP in the previous set. You need to use the request ID generated in the step Cataloging the Emergency Save Set (ON-Archive) [Page 244], 106 in the example.

Prerequisites

You have finished Copying Emergency Save Set to Regular Volume Set (ON-Archive) [Page 246].

Procedure

To delete the emergency save set, you remove it from the ON-Archive catalog, by entering a command like the following:

$ onarchive 'REMOVE/REQUEST=106/VSET=ONDATARTRLOG'

This command deletes the save set from the disk. Do not use the UNIX rm command.

Result

The data from the backed-up logical log is now fully available for use during any future restore.

💡

SAP recommends you to now create a full (level-0) archive [Page 141] of the database. This makes sure that you do not run into problems using the logical-log data that you have just backed up in this emergency, because you can then use a more recent archive instead.

See also:

Informix documentation
Performing Emergency Logical-Log Backup (ontape)

Use
This procedure tells you how to perform an emergency logical-log backup on your Informix database using ontape. You must back up the logical log quickly if processing is to continue as soon as possible.

Procedure
The procedure you now follow depends on the backup approach you are using, automatic or continuous. For more information, see Choosing Automatic or Continuous Logical-Log Backup (ontape) [Page 217].

Continuous Logical-Log Backup
1. Check whether you have mounted a new tape as required for continuous backup by entering the following command at the command line:

   $ ontape -c

2. Mount a new tape on the LTAPEDEV device if prompted in the session window for continuous backup.

3. Press <ENTER> to back up the currently full logical-log files.

   The continuous logical-log backup resumes.

   For more information about continuous logical-log backup, see Performing a Continuous Logical-Log Backup (ontape) [Page 222].

Automatic Logical-Log Backup
1. To start the backup, enter the following command:

   $ ontape -a

2. Mount a new tape on the LTAPEDEV device.

   The full logical-log files are now backed up.

3. Mount new tapes if prompted.

   When all full logical-log files have been backed up, the process stops.

   For more information about automatic logical-log backup, see Performing an Automatic Logical-Log Backup (ontape) [Page 221].

Result
The logical log is now backed up and the database resumes processing.

SAP recommends you to find out why the emergency logical-log backup was necessary and to prevent it in future. Refer to:

- Preventing Emergency Backup [Page 250]
- Approach to Logical-Log Backup (ontape) [Page 214]
See also:

Informix documentation
Preventing Emergency Logical-Log Backup

Use
When the logical log in your Informix database is full, you must do an emergency logical-log backup, which is time-consuming and difficult. Therefore, SAP recommends that you take the preventive measures discussed in this section to avoid a full logical log.

The measures in this section ought to be part of your general approach to logical-log backup, so that you avoid the problem of a full logical log. Refer to:

- Approach to Logical-Log Backup (ON-Bar) [Page 165]
- Approach to Logical-Log Backup (ON-Archive) [Page 183]
- Approach to Logical-Log Backup (ontape) [Page 214]

Procedure
1. Make sure that enough backup media (that is, tapes or disk space, for example) is available for the backup.

2. Check that the backup has completed successfully. Refer to Checking Logical-Log Backup Result with Message Log [Page 224].

3. Set LBU_PRESERVE parameter in ONCONFIG file

This is the most important prevention against emergency logical-log backups. If other measures fail, this parameter always prevents the logical log filling completely. It specifies how many logical-log files the database server always preserves (that is, avoids writing logging data to). Set it as follows:

```
LBU_PRESERVE 1
```

Another name for this parameter is the “Logs-Full High-Water Mark.” It works as follows (note that its default value is 0).

If LBU_PRESERVE is set to 1, all sessions performing update, delete, and insert operations stop when the last but one logical-log file has filled up. You see the following in the message log:

```
Logical log files are almost full – backup is needed
```

Once the logical log has been backed up, processing can continue.

You can view the message log with SAPDBA. Refer to System Information [Page 482]. To find the location of the Informix message log on your system, see the MSGPATH parameter in the ONCONFIG file.

4. Set ALARMPROGRAM parameter (ON-Bar and ON-Archive)

You can use this parameter to specify the path to an event-handling program, such as logevent.sh (for ON-Archive) or log_full.sh (ON-Bar). The scripts automatically back up the logical log. You set ALARMPROGRAM in the ONCONFIG file.
For more information, see:

- Choosing Automatic Logical-Log Backup (ON-Archive) [Page 186]
- Choosing Continuous or Manual Logical-Log Backup (ON-Bar) [Page 168]

5. Use SAP scripts (ON-Archive)

You can use these scripts to automate the backup of your logical log. For an overview of the scripts, see SAP Scripts for ON-Archive [Page 76]. For information on how to set up the scripts, see Preparing SAP Scripts [Page 78].

These scripts can only be used with automatic backup of the logical log. Refer to Choosing Automatic Logical-Log Backup (ON-Archive) [Page 186].

**Result**

You can be sure that your logical log does not fill up, which means that the database stops processing and you have to perform an emergency logical-log backup [Page 227].

**See also:**

Informix documentation
Restore

Purpose

This section describes how you can use ON-Bar, ON-Archive, or ontape to restore your Informix database in the event of failure involving data loss. For more information, see Informix Restore [Page 56].

Prerequisites

You have decided which tool you are going to use for restore. Refer to Comparison of ontape, ON-Archive, and ON-Bar for Data Recovery [Page 59].

⚠️ You must use the same tool for restore as you do for other data recovery operations, that is, logical-log backup and archive or database backup. You cannot use different tools because the data produced is not compatible.

You have completed the preparations for using your chosen tool:

- Configuring ON-Bar [Page 65]
- Configuration of ON-Archive [Page 75]
- Configuring ontape [Page 101]

Process Flow

4. You get started with the restore [Page 254]. This includes identifying the problem, deciding what kind of restore to use, and so on.

5. You perform the correct kind of restore:
   - Full-System Cold Restore (ON-Bar) [Page 262]
   - Partial-System Warm Restore (ON-Bar) [Page 273]
   - Full-System Cold Restore (ON-Archive) [Page 279]
   - Partial-System Warm Restore (ON-Archive) [Page 295]
   - Full-System Cold Restore (ontape) [Page 302]
   - Partial-System Warm Restore (ontape) [Page 306]

💡 If you have lost a mirrored chunk, see Recovery of a Lost Mirrored Chunk [Page 309].

Result

Your database is now restored.

See also:
Informix documentation
Getting Started with Restore

Purpose
This section helps you start a restore of your Informix database after a failure involving data loss. For an introduction to the basic ideas behind restore, see Informix Restore? [Page 56]

Prerequisites
- A database failure involving data loss has occurred.
- You have backed-up data covering the period of data loss.

Process Flow
1. You identify the problem [Page 255].
2. You choose the correct kind of restore [Page 258].
3. If you are using ON-Archive, you can prepare for restore with the SAPDBA recovery report [Page 260].

Result
You are ready to restore the database in one of the following ways:
- Full-System Cold Restore (ON-Bar) [Page 262]
- Partial-System Warm Restore (ON-Bar) [Page 273]
- Full-System Cold Restore (ON-Archive) [Page 279]
- Partial-System Warm Restore (ON-Archive) [Page 295]
- Full-System Cold Restore (ontape) [Page 302]
- Partial-System Warm Restore (ontape) [Page 306]

See also:
Informix documentation
Identifying the Problem Requiring a Restore

Use
Before you start doing a restore with the Informix database, you need to make sure that you have identified the problem and are sure what kind of failure has occurred.

Procedure
Answer the following questions:

1. Is the database server up or has the failure caused it to go down?
   To find out whether the database server is up or down, you can enter the following from the command line:
   
   ```
   $ onstat -
   ```
   
   If the response is not similar to the following example, then the database server might have failed:
   
   ```
   INFORMIX-OnLine Version 7.20.UC3 --On-Line-- Up 6 days
   20:57:16 -- 80298 Kbytes
   ```
   
   To make sure that the database server has not terminated normally, see “What is in the message-log file?” below.
   
   If the database server is blocked, the reason is sometimes given in an extra information line, as in the following example:
   
   ```
   Blocked: Media_failure
   ```
   
   If the database server is down due to a problem, this generally means that a failure has occurred in a “critical” dbspace (logdbs, physdbs or rootdbs). Whether the database server is up or down influences what kind of restore you need.

2. Which dbspaces have failed?
   You need to identify which dbspaces have failed:
   
   - Critical dbspaces (logdbs, physdbs, rootdbs)
     
     If a critical dbspace has failed, then the database server goes down.
   
   - Non-critical dbspaces (all remaining dbspaces)
     
     If only a non-critical has failed, then the database server might still be up.
   
   The type of dbspace that has failed determines what kind of restore you need to do. If the database server is still up, identify which dbspaces have failed by using the following procedure:
   
   a. Enter the following command from the command line:
   
   ```
   $ onstat -d
   ```
   
   b. Read the second section of output from this command, as in the following example (only part of the output is shown):

   | Chunks | | | | | |
   |--------| | | | | |

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Identifying the Problem Requiring a Restore

<table>
<thead>
<tr>
<th>address</th>
<th>chk/dbs</th>
<th>offset</th>
<th>size</th>
<th>free</th>
<th>bpages</th>
<th>flags</th>
<th>pathname</th>
</tr>
</thead>
<tbody>
<tr>
<td>c34ac178</td>
<td>1 1</td>
<td>8</td>
<td>75000</td>
<td>2020</td>
<td>3</td>
<td>PO-</td>
<td>/.../physdev1/data1</td>
</tr>
<tr>
<td>c34ac398</td>
<td>2 2</td>
<td>8</td>
<td>175106</td>
<td>53</td>
<td></td>
<td>PO-</td>
<td>/.../physdev2/data3</td>
</tr>
<tr>
<td>c34ac470</td>
<td>3 3</td>
<td>75008</td>
<td>435000</td>
<td>7</td>
<td></td>
<td>PD-</td>
<td>/.../physdev1/data1</td>
</tr>
<tr>
<td>c34ac548</td>
<td>4 4</td>
<td>175114</td>
<td>205000</td>
<td>3</td>
<td></td>
<td>PO-</td>
<td>/.../physdev2/data3</td>
</tr>
<tr>
<td>c34ac620</td>
<td>5 5</td>
<td>8</td>
<td>10106</td>
<td>53</td>
<td></td>
<td>PO-</td>
<td>/.../physdev1/data2</td>
</tr>
<tr>
<td>c34ac6f8</td>
<td>6 6</td>
<td>8</td>
<td>50000</td>
<td>4993</td>
<td>9</td>
<td>PO-</td>
<td>/.../physdev2/data4</td>
</tr>
<tr>
<td>c34ac7d0</td>
<td>7 7</td>
<td>10114</td>
<td>350000</td>
<td>7434</td>
<td>5</td>
<td>PO-</td>
<td>/.../physdev1/data2</td>
</tr>
<tr>
<td>c34ac8a8</td>
<td>8 8</td>
<td>50008</td>
<td>10000</td>
<td>1295</td>
<td></td>
<td>PO-</td>
<td>/.../physdev2/data4</td>
</tr>
<tr>
<td>c34ac980</td>
<td>9 4</td>
<td>360114</td>
<td>150000</td>
<td>265</td>
<td></td>
<td>PO-</td>
<td>/.../physdev1/data2</td>
</tr>
</tbody>
</table>

...  

c. Check “flags” for a value of “D” (that is, “down”) in the second position, and then read across to find the value in “chk/dbs” (that is, “chunk/dbspace”). In this example, chunk 3 – belonging to dbspace number 3 – is down.

d. Read the first section of the output to find the name of the affected dbspace, as in the following sample of output from this example:

<table>
<thead>
<tr>
<th>dbspaces</th>
<th>address</th>
<th>number</th>
<th>flags</th>
<th>fchunks</th>
<th>nchunks</th>
<th>flags</th>
<th>owner</th>
<th>name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>c34ac108</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>N</td>
<td>informix</td>
<td>rootdbs</td>
</tr>
<tr>
<td></td>
<td>c34ad2c8</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>N</td>
<td>informix</td>
<td>logdbs</td>
</tr>
</tbody>
</table>
Identifying the Problem Requiring a Restore

<table>
<thead>
<tr>
<th>c34ad338</th>
<th>3</th>
<th>1</th>
<th>3</th>
<th>2</th>
<th>N</th>
<th>informix</th>
<th>psapes30e</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Look for the dbspace number 3 and read across to find the name of the dbspace. In this example, the affected dbspace is `psapes30e`, a non-critical dbspace.

3. What is in the message file?

Look in this file to find if there is any clue to what has happened. The database server keeps a processing audit trail in this file. The file also tells you if the database server has terminated normally, as in the following example:

```
```

In this case, you should be able to see the checkpoint information before this message, indicating that the data on disk is consistent. If so, a restore is not necessary.

You can use SAPDBA to look at the message file. Refer to Listing System Information with SAPDBA [Page 482].

4. How can I find out exactly what went wrong?

In most cases, you can use the answers to the previous questions to identify what has happened.

If you require extra confirmation and can afford to spend more time investigating, you can execute the command `oncheck` to obtain a comprehensive picture of the disk structure. For more information on `oncheck`, see the Informix documentation. Depending on which parameters you use, `oncheck` might take up to several hours to complete.

5. Did the fault occur after a particular point in time?

You might – after examining the message-log file (see “What is in the message-log file?” above) – have found that the error that caused the failure occurred at a particular time. You can then do a “Point-in-Time” (PIT) restore (only available if you use ON-Archive or ON-Bar for data recovery and are doing a cold restore). A PIT restore avoids using corrupted or faulty data from after this point. See Performing Logical Restore for Full-System Cold Restore (ON-Archive) [Page 291] or Performing Logical Restore for a Full-System Cold Restore (ON-Bar) [Page 270] for more information on PIT restores.

Result

Now that you have identified the problem, you need to decide what kind of restore [Page 258] is the most appropriate for the situation. If you suspect that the fault lies in the database server rather than in the database data, you need to find a solution to the problem because a restart might not be possible or failure might recur soon after the restart. Contact the Informix hotline in this case.

See also:

Informix documentation
Choosing the Correct Kind of Restore

Use

This section shows you how to choose the correct kind of restore when a failure with your Informix database has occurred and data has been lost.

Prerequisites

You have correctly identified the problem [Page 255]. Be sure to identify whether a critical dbspace is affected because this determines the kind of restore to use.

Critical dbspaces are essential for the database server to function properly. Critical dbspaces in the database configured for the R/3 System are rootdbs, physdbs, and logdbs. Non-critical dbspaces are all other dbspaces.

Procedure

1. Choose the correct kind of restore, depending on what the problem is. You need to perform a full-system cold restore if the problem is due to any of the following:
   - Critical dbspace is down
   - Both critical and non-critical dbspaces are down
   - A logical error caused by an application program occurred after a known point in time
   Otherwise, if the database server was not brought down by the fault, then presumably the problem is with a non-critical dbspace and you can perform a partial-system warm restore.

   Generally, SAP does not recommend you to perform a partial-system warm restore, unless you are sure that the problem only affects a small number of non-critical dbspaces. In any case, the R/3 System is not properly functional if a dbspace fails, and it might be possible that other dbspaces are affected as well. Therefore, the safest and most effective procedure is to close down the database and do a cold restore.

2. Choose the appropriate restore, depending on what kind of restore you need and what your normal data recovery tool is:
   - Full-System Cold Restore (ON-Bar) [Page 262]
   - Full-System Cold Restore (ON-Archive) [Page 279]
   - Full-System Cold Restore (ontape) [Page 302]
   - Partial-System Warm Restore (ON-Bar) [Page 273]
   - Partial-System Warm Restore (ON-Archive) [Page 295]
   - Partial-System Warm Restore (ontape) [Page 306]
The archives and backups written by ON-Bar, ON-Archive and ontape are not compatible. You cannot mix tapes from these tools. Use the same tool for restores as you normally use for archives and backups (except if you need to use ondatartr for a cold restore when your normal tool is ON-Archive).

See also:
Informix documentation
Preparing for a Restore with the SAPDBA Recovery Report (ON-Archive)

Use

You can use SAPDBA for Informix to produce a report that helps you restore your database. The report lists the tape volumes required to restore the database, so shortening the difficult job of identifying the required tapes. Refer to Recovery Report with SAPDBA [Page 465].

Prerequisites

- You normally use ON-Archive for data recovery,
- You have an up-to-date report covering the period of data loss. Refer to Preparing for Recovery Reports with SAPDBA [Page 466].

Procedure

1. Look at the most recent recovery report. See Listing Recovery Report with SAPDBA [Page 468].
2. Starting at the top of the report, locate the volumes listed. To make this easier, you should previously have physically labeled your tape volumes with:
   - At creation time (that is, when the volume was initialized in ON-Archive), the volume label and the label name for the volume set.
   - At archive/logical-log backup time, the save set id and date. For archives, you should also have written the level (that is, 0, 1 or 2) on the tapes.

   ![Warning]
   Make sure that the tape volumes that you use in all ON-Archive archives and logical-log backups are physically labeled (that is, write on the actual tape volume itself) with the information given above. If not, you need much longer to recover your database in the event of failure.

3. If your tapes are not correctly labeled, execute the following command outside SAPDBA to determine the ids of save sets on your tape:

   $ ondataatr 'list/tape=/dev/rmt/0m'

   The parameter /dev/rmt/0m refers to the physical name of the tape device on which the tape is mounted. This command is extremely time-consuming and you need to perform it for each archive and logical-log backup volume. You can interrupt it with CTRL-C. However, it is best to avoid this situation by correctly labeling your tape volumes.

4. If any volumes are missing, decide what to do next:
   - If level-0 archive volumes are missing, you must look at previous reports until you find one that starts with earlier level-0 archive volumes. This unfortunately means that your database is less up-to-date after the restore is finished.
   - If other volumes are missing, you can still restore with the volumes listed above the missing one, but you can not continue the restore to include the most recent data (that is,
Preparing for a Restore with the SAPDBA Recovery Report (ON-Archive)

the volumes listed below the missing one). This means that your database is less up-to-date when the restore is finished.

- In the case of a parallel archive (at level-0, 1 or 2), you need the accompanying logical-log backups to synchronize the parts of the archive. This means you need the logical-log backups from the time of the archive if you want to perform a restore. If these are not available, you cannot use the parallel archive.

**Result**

Having gathered the best complete set of tapes, you can now start the restore.

**See also:**

Informix documentation
Full-System Cold Restore (ON-Bar)

Purpose

This section describes how to perform a full-system cold restore of your Informix database, if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups).

If you want to stop the restore at a specific point, you can specify a “Point-in-Time” (PIT) or a "Point-in-Log" (PIL) during the logical restore stage. ON-Bar and the database server automatically know which logical logs to restore.

Prerequisites

- See Getting Started with Restore [Page 254] to make sure that you have already correctly identified the problem [Page 255] and chosen the right kind of restore [Page 258].
- Before you start, see Preparing for a Full-System Cold Restore (ON-Bar) [Page 263].

Process Flow

1. If there are logical logs that were not backed up at the time of the failure, you can salvage the logical logs [Page 265]. ON-Bar performs this by default for a cold restore, unless you specify only a physical restore (see next step).
2. You perform physical restore [Page 267] for a full-system cold restore.

Importance of Stages in Full-System Cold Restore (ON-Bar)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage required?</th>
<th>Effects of leaving out stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salvage logical log</td>
<td>Not always</td>
<td>Your database might be less up-to-date. You lose any transactions held in the logical log not backed up at time of failure.</td>
</tr>
<tr>
<td>Physical restore</td>
<td>Yes</td>
<td>You must always do at least a physical restore.</td>
</tr>
<tr>
<td>Logical restore</td>
<td>Only with a restore from a storage-space backup</td>
<td>Storage-space backup: database is inconsistent. Whole-system backup: database is less up-to-date</td>
</tr>
</tbody>
</table>

Result

Your database is now restored and can be used productively again.

See also:

Informix documentation
Preparing for a Full-System Cold Restore (ON-Bar)

Use

This section tells you what to do before performing a full-system cold restore [Page 262] of your Informix database if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups).

To make a restore easier, label your tapes after every database or logical-log backup. Include all essential information required for a restore, such as date of backup, save set id, volume set and volume, dbspace names, logical-log file numbers, and so on. Your storage manager – for example, Informix Storage Manager (ISM) – normally requests the correct storage media for each stage of the restore.

Procedure

1. Decide which database backup to use for the restore. By default, ON-Bar derives the most recent backup from the entry in the ON-Bar emergency boot file and uses this backup for the restore.

2. Decide if you want to restore to a “Point-in-Time” (PIT) or a "Point-in-Log" (PIL) during the logical restore phase. This depends on when the error occurred. Refer to Identifying the Problem Requiring a Restore [Page 255].

3. Make sure that the storage media containing your chosen level-0, level-1, and level-2 database backups are available to your storage manager, which requests storage media as required during the restore.

   You need to gather the best set of storage media possible for the restore. You need at least a full set of storage media from a level-0 backup. Use the storage media from a level-1 and level-2 backup if available, since they speed up the restore (that is, the restore runs more quickly than when you use the logical-log backup storage media instead).

4. Make sure that the storage media containing the logical-log backups are available to your storage manager, which requests storage media as required during the restore.

   You need the storage media containing logical-log backups corresponding to the database backup from the previous step. How you proceed depends on what kind of database backup you are using to restore:

   - Whole-system backup
     Make sure that the logical-log backups are available dating from the latest database backup of all dbspaces that you intend to use for the restore. The latest database backup can be at any level, but you must start with a level-0 backup.

   - Storage-space backup
     Make sure that the logical-log backups are available dating from the beginning of the first database backup that you intend to use for the restore. These backups are needed to synchronize the different components of the storage-space backup.
Preparing for a Full-System Cold Restore (ON-Bar)

For faster performance in a restore, assign separate storage devices for backing up storage spaces and logical logs. If physical and logical backups are mixed together on the storage devices, it takes longer to scan the tape during a restore.

5. Verify your database server and storage manager configuration.

Make sure that the current database server configuration is compatible with, and accommodates, all ONCONFIG parameter values assigned after the backup that you intend to use. Use the copy of this file that was in use at the time of the backup.

All raw devices or files that have been used since the level-0 backup must be available. Changes can include, for example, chunks added, dbspaces dropped, dbspaces mirrored, and so on.

6. Make sure that you have the following database configuration files dating from the backup that you intend to use for the restore:

- The ON-Bar emergency boot file (that is, the ixbar file)
- The server boot file (that is, the oncfg file)
- The sqlhost file (UNIX only)
- The ONCONFIG file
- Storage manager files

These files are normally stored in the directory $INFORMIXDIR/etc (UNIX) or %INFORMIXDIR%\etc (NT). For more information, see Configuring ON-Bar [Page 65].

7. Decide whether you want to perform a restartable restore.

A restartable restore is slower but lets you restart the restore midway through if you need to (for example, if there is a failure). You have to decide whether the restore is restartable before you start.

To allow a restore to be restarted, set the RESTARTABLE_RESTORE parameter to ON in the ONCONFIG file as follows before you start the restore. To check the setting of this parameter in the ONCONFIG file, see Listing System Information with SAPDBA [Page 482]. The default is OFF (that is, restart is not possible).

Result

Now you can go on to Salvaging Logical Logs for a Full-System Cold Restore (ON-Bar) [Page 265].

See also:

Informix documentation
Salvaging Logical Logs for a Full-System Cold Restore (ON-Bar)

Use

This is the first stage in a full-system cold restore of the Informix database if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups). It makes sure that you have as up-to-date logical-log backups as possible for the restore. This means that your database is as up-to-date as possible when the restore is finished.

💡 If you perform a physical restore with onbar -r, you do not need to perform this step, because it implicitly executes onbar -l -s (see "Procedure" below). Otherwise, SAP recommends you to perform this step.

Prerequisites

- You are logged on as user informix or root.
- The database server is offline.
- Load your storage device with suitable storage media.

Procedure

1. Enter the following at the operating system command line:
   
   ```
   $ onbar -l -s
   ```

2. Check the results in the ON-Bar activity log, the name of which is specified by the BAR_ACT_LOG parameter in the ONCONFIG file. For more information about looking in the ONCONFIG file, see Listing System Information with SAPDBA [Page 482].

   Here is an example of salvaging the logical log:

   ```
   1998-12-18 15:45:55 16674  16672 /.../bin/onbar_d -l -s
   1998-12-18 15:45:57 16674  16672 Successfully connected to Storage Manager.
   ```

3. Note the number of the logical log for use in the logical restore phase.

4. Physically label the storage media with the logical-log number and the current date, if possible.

Result

You have salvaged the logs for use in the logical restore. You can now continue with the next stage, Performing Physical Restore for a Full-System Cold Restore (ON-Bar) [Page 267].
Salvaging Logical Logs for a Full-System Cold Restore (ON-Bar)

See also:
Informix documentation
Performing Physical Restore for a Full-System Cold Restore (ON-Bar)

Use

This is the second stage in a full-system cold restore [Page 262] of the Informix database if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups). This procedure restores only the data from backups of the storage spaces. You restore logical-log data in the logical restore [Page 270] phase.

By default, ON-Bar uses the most recent backup for the restore, as listed in the ON-Bar emergency boot file. ON-Bar always takes the following level-1 and level-2 backups if available.

Prerequisites

- You are logged on as user informix or root.
- The database server is offline.
- You know which backup to use for the restore, and have made sure that the relevant storage media are available to the storage manager.
- If required, you have completed Salvaging Logical Logs for a Full-System Cold Restore (ON-Bar) [Page 265].

Procedure

5. Enter the ON-Bar command to perform the physical restore.
   - If you are restoring from a whole-system backup, enter the following:
     
     \$ onbar -r -p -w
   
   - If you are restoring from a storage-space backup, enter the following:
     
     \$ onbar -r -p

   The storage manager requests the required storage media and executes the physical restore.

6. Check the results of the physical restore by looking in the ON-Bar activity log or the message log. You can view the message log with SAPDBA. Refer to Listing System Information with SAPDBA [Page 482].

   Here is an example from the ON-Bar activity log of the physical restore phase of a whole system restore with onbar -r -w -p:

   1998-12-18 16:01:01 16715 16713 /.../bin/onbar_d -r -w -p
   1998-12-18 16:01:15 16715 16713 Successfully connected to Storage Manager.
   1998-12-18 16:01:17 16715 16713 Begin cold level 0 restore rootdbs.
Performing Physical Restore for a Full-System Cold Restore (ON-Bar)

1998-12-18 16:01:40 16715 16713 Completed cold level 0 restore rootdbs.
1998-12-18 16:01:44 16715 16713 Begin cold level 0 restore dbs1.
1998-12-18 16:01:44 16715 16713 Completed cold level 0 restore dbs1.

This is the message log from the same restore:

16:01:26  Recovery Mode
16:01:29  Physical Restore of rootdbs, dbs1 started.
16:01:41  Checkpoint Completed: duration was 0 seconds.
16:01:45  Checkpoint Completed: duration was 0 seconds.
16:01:47  Physical Restore of rootdbs, dbs1 Completed.
16:01:47  Checkpoint Completed: duration was 0 seconds.

Here is an example from the ON-Bar activity log of the physical restore phase of a parallel storage-space restore with `onbar -r -p`:

1998-12-18 17:15:47 17108 17106 /.../bin/onbar_d -r -p
1998-12-18 17:16:01 17108 17106 Successfully connected to Storage Manager.
1998-12-18 17:16:04 17108 17106 Begin cold level 0 restore rootdbs.
1998-12-18 17:16:24 17108 17106 Completed cold level 0 restore rootdbs.
1998-12-18 17:16:28 17122 17108 Successfully connected to Storage Manager.
1998-12-18 17:16:31 17122 17108 Begin cold level 0 restore dbs1.
1998-12-18 17:16:31 17122 17108 Completed cold level 0 restore dbs1.
1998-12-18 17:16:34 17108 17106 WARNING: Physical restore complete.

Logical restore required before work can continue.

This is the message log from the same restore:

17:16:12  Recovery Mode
17:16:15  Physical Restore of rootdbs started.
17:16:24  Checkpoint Completed: duration was 0 seconds.
17:16:27  Physical Restore of rootdbs Completed.
17:16:27  Checkpoint Completed: duration was 0 seconds.
Performing Physical Restore for a Full-System Cold Restore (ON-Bar)

17:16:28 Physical Restore of dbs1 started.
17:16:31 Checkpoint Completed: duration was 0 seconds.
17:16:34 Physical Restore of dbs1 Completed.
17:16:34 Checkpoint Completed: duration was 0 seconds.

3. What you do now depends on the type of restore you are doing:
   - If you are restoring from a parallel storage-space backup, you **must** now perform a logical restore because the logical logs are needed to synchronize the backup. This requirement is mentioned in the activity log (see the example above):
     
     Logical restore required before work can continue.
   
   - If you are restoring from a whole-system backup, you can bring the database server back up without a logical restore and the database is consistent. If you want to apply logical-log data to bring the database more up to date, you can do so.
     
     To leave out the logical restore phase of a whole-system restore, do the following:
     
     a. Use SAPDBA to change server mode to quiescent.
     
     b. Use SAPDBA to change server mode to online.

     Refer to Changing Server Mode with SAPDBA [Page 336].

     However, SAP recommends you to perform a logical restore if you have the necessary logical-log backups.

Result

Now that you have performed the physical restore the database server goes into fast-recovery mode. You can go on to the next stage, Performing Logical Restore for a Full-System Cold Restore (ON-Bar) [Page 270].

See also:

Informix documentation
Performing Logical Restore for a Full-System Cold Restore (ON-Bar)

Use

This is the final stage in a full-system cold restore [Page 262] if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups). This section includes how to do a “Point-in-Time” (PIT) and a "Point-in-Log" (PIL) restore.

Logical restore is not compulsory. For example, with a whole system restore, if you cannot use the logical logs for some reason (that is, they have been damaged or lost), you can restart the database after the physical restore and it is consistent but less up-to-date. See the final step in Performing Physical Restore for a Full-System Cold Restore (ON-Bar) [Page 267].

However, when you restore from a storage-space backup, you must also perform a logical restore, because the logical logs from the time of the backup are needed to synchronize the backup.

Prerequisites

- You have completed Performing Physical Restore for a Full-System Cold Restore (ON-Bar) [Page 267].
- You are logged on as user informix or root.
- The database server is in fast-recovery mode.
- The storage device contains the media with the required logical logs.
- You have decided whether you want to perform a PIT or PIL restore. If so, you know to which point you want to perform the restore.

Procedure

7. Enter the following ON-Bar command to perform the logical restore.

   $ onbar -r -l

   If you want to perform a PIL or PIT restore, enter data as required. For example, the following command restores data to a PIT of 11:30 in the morning of the 5th of February 1999:

   $ onbar -r -t "1998-02-05 11:30:00"

   Note that the format of the above command depends on your locale settings. Refer to the Informix documentation.

   For example, the following command restores data to a PIL of the third logical-log file (that is, if there are any logical-log files after this one, they are not used):

   $ onbar -r -n 3

   The storage manager requests the required storage media and executes the logical restore.
8. Check the results of the logical restore by looking in the ON-Bar activity log and the message log.

Here is an example of a logical restore from the ON-Bar activity log:

1998-12-18 16:06:42 16747 16745 Begin restore logical log 5.
1998-12-18 16:06:44 16747 16745 Completed restore logical log 5.
1998-12-18 16:06:45 16747 16745 Begin restore logical log 6.
1998-12-18 16:06:49 16747 16745 Begin restore logical log 7.
1998-12-18 16:06:50 16747 16745 Completed restore logical log 7.
1998-12-18 16:06:54 16747 16745 Begin restore logical log 8.
1998-12-18 16:06:54 16747 16745 Completed restore logical log 8.

Here is an example of a logical restore from the message log:

16:06:19 Logical Recovery Started.
16:06:19 Checkpoint Completed: duration was 0 seconds.
16:06:19 Start Logical Recovery - Start Log 9, End Log ?
16:06:19 Starting Log Position - 9 0xfa0cc
16:06:31 Checkpoint Completed: duration was 0 seconds.
16:06:38 Checkpoint Completed: duration was 2 seconds.
16:06:39 Checkpoint Completed: duration was 0 seconds.
16:06:50 Checkpoint Completed: duration was 0 seconds.
16:06:50 Checkpoint Completed: duration was 0 seconds.
16:06:50 Checkpoint Completed: duration was 0 seconds.
16:06:54 Checkpoint Completed: duration was 1 seconds.
16:06:54 Checkpoint Completed: duration was 0 seconds.
16:06:54 Checkpoint Completed: duration was 0 seconds.
16:06:55 Checkpoint Completed: duration was 0 seconds.
16:06:55 Checkpoint Completed: duration was 0 seconds.
16:06:58 Checkpoint Completed: duration was 0 seconds.
16:06:58 Checkpoint Completed: duration was 0 seconds.
Performing Logical Restore for a Full-System Cold Restore (ON-Bar)

16:06:58 Checkpoint Completed: duration was 0 seconds.
16:06:58 Checkpoint Completed: duration was 0 seconds.
16:07:04 Logical Recovery Complete.
   187 Committed, 1 Rolled Back, 0 Open, 0 Bad Locks
16:07:04 Logical Recovery Complete.
16:07:05 Quiescent Mode
16:07:05 Logical Log 9 Complete.
16:07:05 Checkpoint Completed: duration was 0 seconds.

You can view the message log with SAPDBA. Refer to Listing System Information with SAPDBA [Page 482].

After the logical restore, the database server is in quiescent mode.

9. Bring the database server online after the restore.
   Refer to Changing Server Mode with SAPDBA [Page 336].

Result

The database is now restored and you can use the R/3 System productively again.

See also:
Informix documentation
Partial-System Warm Restore (ON-Bar)

This section describes how to perform a partial-system warm restore of your Informix database, if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups).

Prerequisites

- See Getting Started with Restore [Page 254] to make sure that you have already correctly identified the problem [Page 255] and chosen the right kind of restore [Page 258].
- Before you start, see Preparing for a Partial-System Warm Restore (ON-Bar) [Page 274].

Process Flow


Result

Your database is now restored and can be used productively again.

See also:
Informix documentation
Preparing for a Partial-System Warm Restore (ON-Bar)

Use

This section tells you what to do before performing a partial-system warm restore of your Informix database if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups).

Procedure

1. Identify the dbspaces you want to restore.

2. Verify your database server configuration.

   Make sure that the current database server configuration is compatible with, and accommodates, all ONCONFIG parameter values assigned after the most recent backup. Use the copy of this file that was in use at the time of the backup.

   All raw devices or files that have been used since the level-0 backup must be available. For example, changes might include chunks added, dbspaces dropped, dbspaces mirrored, and so on.

   For more information, see the Informix documentation.

3. Make sure that the free space in the dbspace TEMPDBS is at least as large as the dbspace LOGDBS before you start the restore.

Result

Now you can go on to Performing Physical Restore for a Partial-System Warm Restore (ON-Bar) [Page 275].

See also:

Informix documentation
Performing Physical Restore for a Partial-System Warm Restore (ON-Bar)

Use
This is the first stage in a partial-system warm restore [Page 273] of the Informix database if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups).

Prerequisites
- You are logged on as user informix or root.
- The database server is online.
- You have completed Preparing for a Partial-System Warm Restore (ON-Bar) [Page 274].

Procedure
1. Check whether dbspaces you want to restore are online by entering the following at the command line:
   
   \$ onstat -d
   
   For more information about the onstat command, see the Informix documentation. If a chunk to be restored is online, ON-Bar takes it offline to perform the restore.

2. Enter the ON-Bar retrieve command, such as in the following example:
   
   \$ onbar -r -p psapbtab
   
   To restore dbspaces that are online (see previous step), use a command like the following example:
   
   \$ onbar -r -p -O psapbtab
   
   ON-Bar and your storage manager prompts you for the necessary media to complete the physical restore, including level 0, 1, and 2 database backups.

3. Check the results of the physical restore by looking in the ON-Bar activity log or the message log. You can view the message log with SAPDBA. Refer to Listing System Information with SAPDBA [Page 482].

   Here is an example from the ON-Bar activity log of a physical restore with onbar -r -p -O:
   
   1998-12-18 15:26:56 16596 16594 /.../bin/onbar_d -r -O -p psapbtab
   1998-12-18 15:26:57 16596 16594 Restore psapbtab even though it is online
   1998-12-18 15:26:59 16596 16594 Successfully connected to Storage Manager.
   1998-12-18 15:27:02 16596 16594 Begin warm level 0 restore psapbtab.
Performing Physical Restore for a Partial-System Warm Restore (ON-Bar)

1998-12-18 15:27:02 16596 16594 Completed warm level 0 restore psapbtab.

Logical restore required before work can continue.

Here is an example from the message log of a physical restore with onbar -r -p -O:
15:26:59 WARNING! Chunk 2 is being taken OFFLINE for recovery.
15:26:59 Physical Restore of psapbtab started.
15:27:03 Checkpoint Completed: duration was 0 seconds.
15:27:05 Physical Restore of psapbtab Completed.
15:27:06 Checkpoint Completed: duration was 0 seconds.

Result

Now that you have performed the physical restore, you can go on to the next stage, Performing Logical Restore for a Partial-System Warm Restore (ON-Bar) [Page 277].

See also:
Informix documentation
Performing Logical Restore for a Partial-System Warm Restore (ON-Bar)

Use

This is the final stage in a partial-system warm restore [Page 273] if you use ON-Bar as your data recovery tool (that is, for your database and logical-log backups).

Prerequisites

- You have completed Performing Physical Restore for a Partial-System Warm Restore (ON-Bar) [Page 275].
- You are logged on as user informix or root.
- The database server is online but the dbspaces for the logical restore are offline (that is, offline chunks are marked as "inconsistent").
- You have the following logical-log files available:
  - Logical-log file(s) covering the checkpoint for the database backup that was restored during the warm physical restore. If the checkpoint spans multiple logs, you need all of them.
  - Logical-log file(s) covering the checkpoint for the warm physical restore. If the checkpoint spans multiple logs, you need all of them.
  - All the logs between these two points in time.

For more information about performing a logical-log backup before you start the logical restore, see Creation of a Logical-Log Backup (ON-Bar) [Page 176].

Procedure

1. Enter the following command to perform the logical restore:

   ```bash
   $ onbar -r -l
   ON-Bar and your storage manager request the media containing the required logical-log files and perform the restore.
   ```

2. Check the results of the logical restore.

   Here is an example from the ON-Bar activity log of a logical restore with onbar -r -l:

   ```text
   1998-12-18 15:29:08 16605  16603 /.../bin/onbar_d -r -l
   1998-12-18 15:29:11 16605  16603 Successfully connected to Storage Manager.
   1998-12-18 15:29:14 16614  16613 /.../bin/onbar_d -l
   1998-12-18 15:29:15 16605  16603 Successfully connected to Storage Manager.
   ```
Performing Logical Restore for a Partial-System Warm Restore (ON-Bar)

Here is an example from the message log of a logical restore with `onbar -r -l`:

15:29:11 Logical Log 8 - Backup Started
15:29:12 Logical Log 8 Complete.
15:29:13 Logical Log 8 - Backup Completed
15:29:14 Start Logical Recovery - Start Log 3, End Log 8
15:29:14 Starting Log Position - 3 0xfa0cc
15:29:15 Checkpoint Completed: duration was 0 seconds.
15:30:30 Logical Recovery Complete.
15:30:32 Checkpoint Completed: duration was 0 seconds.

**Result**

The restored dbspaces are now available and the database server is ready for use. You can use the R/3 System productively again.

**See also:**

Informix documentation
Full-System Cold Restore (ON-Archive)

Purpose
This section describes how to perform a full-system cold restore of your Informix database, if you use ON-Archive as your data recovery tool (that is, for your archives and backups).

You cannot use ON-Archive itself to perform a cold restore because it cannot access the sysmaster database for catalog information (because the database server is down). Therefore, you must use the ondatartr tool for the restore process.

You can specify a “Point-in-Time” (PIT) restore, during the logical restore stage.

Prerequisites
- See Getting Started with Restore [Page 254] to make sure that you have already correctly identified the problem [Page 255] and chosen the right kind of restore [Page 258].
- Before you start, see Preparing for a Full-System Cold Restore (ON-Archive) [Page 281].

Process Flow
4. If there are logical logs that were not backed up at the time of the failure, you can salvage the logical logs [Page 284].
5. You perform physical restore [Page 287].
6. You perform logical restore [Page 291].

Importance of Stages in Full-System Cold Restore (ON-Archive)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage required?</th>
<th>Effects of leaving out stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salvage logical log</td>
<td>Not always</td>
<td>Your database might be less up-to-date. You lose any transactions held in the logical log not backed up at time of failure.</td>
</tr>
<tr>
<td>Physical restore</td>
<td>Yes</td>
<td>You must always do at least a physical restore.</td>
</tr>
<tr>
<td>Logical restore</td>
<td>Yes for parallel archive and PIT restore</td>
<td>Your database might be less up-to-date. Without a logical restore, the latest transactions restored are those from the archive, that is, dbspace data without logical log data.</td>
</tr>
</tbody>
</table>

Result
Your database is now restored and can be used productively again.

See also:
Informix documentation
Preparing for a Full-System Cold Restore (ON-Archive)

Use

This section tells you what to do before performing a full-system cold restore [Page 279] of your Informix database if you use ON-Archive as your data recovery tool (that is, for your archives and backups).

To make a restore easier, label your tapes after every archive or backup. Include all essential information required for a restore, such as date of archive or backup, save set id, volume set and volume, dbspace names, logical-log file numbers, and so on. This is important since the SAPDBA recovery report or the archive.log file might be damaged or lost when you want to do a restore, making it very difficult to identify the required tapes.

Procedure

7. Identify the required tapes for a restore in one of the following ways:

- Use SAPDBA recovery reports (strongly recommended)

  If you have been using SAPDBA to produce recovery reports automatically, the easiest way to see the tapes you need is to refer to the latest available report. If correctly installed, the report is automatically produced after every archive and backup so that you always have the most up-to-date information for a recovery.

  For more information about how you can use the reports to speed up the recovery process, including examples, see Recovery Report with SAPDBA [Page 465]. The recovery report in SAPDBA makes it much easier to identify the required tapes.

- Use the archive.log file

  This file contains history information regarding archives and backups. A typical entry to set up the dbspace sets for a parallel archive looks like this:

  Apr 06 1995 16:59:00 #00000000# <10480> onarchive (arcadm)
  Defined SET000072A:
  DEFINE/DBSPACESET=SET000072A/DBSPACE=(psapsource,psappool,psapload,psapprot,psapclu,rootdbs)
  Apr 06 1995 16:59:02 #00000000# <10482> onarchive (arcadm)
  Defined SET000072B:
  DEFINE/DBSPACESET=SET000072B/DBSPACE=(psapstab,psapdocu,psapddic,psapbtab,logdbs,physdbs,psapuser1)

  The result of a parallel archive looks like the following example:

  Apr 06 1995 16:59:05 #00000000# <10484> onarchive (arcadm)
  Created request #00000001#:
  ARCHIVE/APART/DBSPACESET=SET000072A/LEVEL=0/VSET=DBTAP

  Apr 06 1995 16:59:09 #00000000# <10493> onarchive (arcadm)
  Created request #00000003#:
  ARCHIVE/APART/DBSPACESET=SET000072B/LEVEL=0/VSET=DBTAP2
Preparing for a Full-System Cold Restore (ON-Archive)

Apr 06 1995 16:59:11 #00000001# <10489> onautovop (arcadm)
Begin archive to DBTAP

Apr 06 1995 16:59:14 #00000003# <10498> onautovop (arcadm)
Begin archive to DBTAP2

18:40:03 #00000003# <10498> Processing logdbs to DBTAP2:0001
18:40:04 #00000003# <10498> Processing physdbs to DBTAP2:0001
18:40:04 #00000003# <10498> Processing psapdocu to DBTAP2:0001
18:40:04 #00000003# <10498> Processing psapuser1 to DBTAP2:0001
18:40:05 #00000003# <10498> Processing psapstab to DBTAP2:0001
18:40:05 #00000003# <10498> Processing psapbtab to DBTAP2:0001
18:40:05 #00000003# <10498> Processing psapddic to DBTAP2:0001

Apr 06 1995 18:41:07 #00000003# <10498> onautovop (arcadm) End archive: SUCCESS
18:47:09 #00000001# <10489> Processing rootdbs to DBTAP:0001
18:47:09 #00000001# <10489> Processing psapsource to DBTAP:0001
18:47:09 #00000001# <10489> Processing psappool to DBTAP:0001
18:47:09 #00000001# <10489> Processing psapprot to DBTAP:0001
18:47:09 #00000001# <10489> Processing psapclu to DBTAP:0001
18:47:10 #00000001# <10489> Processing psapload to DBTAP:0001

Apr 06 1995 18:48:13 #00000001# <10489> onautovop (arcadm) End archive: SUCCESS

This information tells you the names of the volume sets and volumes used and also the allocation of dbspaces to volumes. For example, volume 0001 of volume set DBTAP2 contains dbspaces logdbs, physdbs, psapdocu, and so on. Volume 0001 of volume set DBTAP contains dbspaces rootdbs, psapsource, psappool, and so on

A sequential archive of all dbspaces looks very similar, except that the archive result appears in one section, with a single timestamp and volume set, and all dbspaces are listed.

The same principles apply to logical-log backups.

8. Gather the tapes containing the most recent level-0, level-1, and level-2 archives.
You need to gather the best set of archive tapes possible for the restore. You need at least a full set of tapes for a level-0 archive. Use the level-1 and level-2 archives if available, since they speed up the restore (that is, the restore runs more quickly than if you use the logical-log backup tapes).

9. Gather the tapes containing the corresponding logical-log backups.

You need the tapes containing logical-log backups corresponding to the archive tapes gathered in the previous step. How you proceed depends on what kind of archive you are using to restore:

- Normal sequential archive
  Gather the logical-log file backups dating from the latest archive of all dbspaces that you intend to use for the restore. The latest archive can be at any level.

- Parallel archive
  Gather the logical-log file backups dating from the beginning of the first archive that you intend to use for the restore. These backups are needed to synchronize the different components of the parallel archive.

10. Identify the tape volume containing the archive of dbspace rootdbs.

To start a cold restore you must first restore the dbspace set containing the most recent level-0 archive of the dbspace rootdbs. In the example shown above it is SET000072A.

11. Verify your database server configuration.

You need to make sure that the current database server configuration is compatible with, and accommodates, all ONCONFIG parameter values assigned after the most recent archive. Use the copy of this file that was in use at the time of the archive.

All raw devices or files that have been used since the level-0 archive must be available. Changes can include, for example, chunks added, dbspaces dropped, dbspaces mirrored, and so on.

For more information, see the Informix documentation.

**Result**

Now you can go on to Salvaging Logical Logs for Full-System Cold Restore (ON-Archive) [Page 284].

**See also:**
Informix documentation
Salvaging Logical Logs for a Full-System Cold Restore (ON-Archive)

Use

This is the first stage in a full-system cold restore [Page 279] of the Informix database if you use ON-Archive as your data recovery tool (that is, for your archives and backups). The logical-log files that were not already backed up when the failure occurred are backed up in this stage. This stage is not compulsory. However, if you leave it out, your database is less up-to-date at the end of the restore process.

Prerequisites

- You are logged on as user informix or root.
- The database server is offline.
- The procedure is easier if you have two tape devices (in the example below, /dev/rmt/0m and /dev/rmt/1m are used).
- You have completed Preparing for a Full-System Cold Restore (ON-Archive) [Page 281].

Procedure

1. Start ondataatr with level-0 archive volume.

   Load the level-0 volume containing rootdbs on the first tape device and enter the following command, including the parameter salvagelogs:

   ```bash
   $ ondataatr 'retrieve/dbspaceset=*/tape=(/dev/rmt/0m)/
   salvagelogs=(/dev/rmt/1m)'
   ```

   The parameters for this command are as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbspaceset</td>
<td>The save set containing the rootdbs dbspace. In this example, dbspaceset=* indicates that all dbspaces are archived to the same save set. For example, if you used the parallel archive illustrated in Preparing for Full-System Cold Restore (ON-Archive) [Page 281] you would enter dbspaceset=SET0000072A, because this dbspace set indicates the save set containing the dbspace rootdbs.</td>
</tr>
<tr>
<td>tape</td>
<td>The device containing the archive volume.</td>
</tr>
</tbody>
</table>
The device containing the volume on which you want to store the salvaged logical-log files.

If you are retrieving from tape you must salvage the logs to tape. Similarly, although unlikely, if you are retrieving from disk, you must salvage the logs to disk.

If you only have one tape device, mount the tape for the salvaged logical-log files first, and then mount the volume containing the archived data when prompted. It is easier if you have at least two tape devices available for the restore.

`ondatartr` starts a dialog similar to the following:

```
Executing...
Log Files 345 through 377 are eligible for salvaging.
What log file number should ONDATARTRLOG start with?: 345
```

2. Determine where to begin salvaging logical-log files.

In general, salvage all eligible logical-log files. In the example above the user chose to start salvaging with the first eligible logical-log file.

`ondatartr` displays the following prompt:

```
Please mount volume 1 of ONDATARTRLOG and press <Return>
```

3. Mount the tape volume for the salvaged logical-log files and confirm the prompt.

If you have used the SAP scripts – see script `arcprep` in SAP Scripts for ON-Archive [Page 76] – to set up your volume sets and volumes, use tape volume `ONDAT1` from `ONDATARTRLOG`. You cannot change the tape drive once the recovery has started, so make sure you get the correct tape mounted first time.

4. Note the save set ID (1345 in this example) for the end of the logical restore [Page 291].

A message like the following appears:

```
Save Set 1345 being written to vset ONDATARTRLOG.
Logfile 374 backed up
Logfile 375 backed up
Logfile 376 backed up
Logfile 377 backed up
```

5. Physically label your tape with all the information shown in the message and the current date.

The dialog continues in the next procedure (see "Result" below).

**Result**

Now that you have salvaged the logical-log files, you can go on to the next stage, Performing Physical Restore for Full-System Cold Restore (ON-Archive) [Page 287].

**See also:**
Salvaging Logical Logs for a Full-System Cold Restore (ON-Archive)

Informix documentation
Performing Physical Restore for a Full-System Cold Restore (ON-Archive)

Use
This is the second stage in a full-system cold restore [Page 279] of the Informix database if you use ON-Archive as your data recovery tool (that is, for your archives and backups).

Prerequisites
- You are logged on as user informix or root.
- The database server is offline.
- If required, you have completed Salvaging Logical Logs for Full-System Cold Restore (ON-Archive) [Page 284]. The procedure below assumes you have completed this stage first. You see the following message:
  
  Mount the volume with the archived data.
  Press the return key when ready.
  What saveset ID is to be used on volume /dev/rmt/0m?:

Procedure
4. Enter the first save set ID for the level-0 archive volume to be used in the restore.

You normally start with the latest available level-0 archive. For more information about identifying the required tapes, see Preparing for Full-System Cold Restore (ON-Archive) [Page 281].

In this example for a parallel archive, you would enter 1 as your first save set ID, corresponding to the ON-Archive request ID that created this save set. For more information about where to find the correct save set ID, see the message Created request #00000001# in Preparing for Full-System Cold Restore (ON-Archive) [Page 281].

💡 The save set ID is usually the same as the request ID of the ON-Archive request that created it. If you cannot identify the ID, enter the following command to determine the IDs of save sets on your tapes:

  $ ondatatr 'list/tape=(/dev/rmt/0m)'

The list command might take a long time (especially if the volume contains a continuous backup). You need to perform it for each archive and backup volume. You can interrupt the command with CTRL-C once you see the volume header. To avoid having to use the list command, fully label your tape volumes after archives or backups by writing all relevant information on the tape itself.

The physical restore starts after you enter the save set ID. Each dbspace is restored in sequence starting with rootdbs. The dialogue continues as follows:

  Level 0 physical restore started.
Performing Physical Restore for a Full-System Cold Restore (ON-Archive)

The file rootdbs has been retrieved.
The file physdbs has been retrieved.

............
The file psapbtab has been retrieved.
End of level 0 archived reached on this volume.
Does this saveset continue on another volume? (Y/N)

5. Mount all volumes for the save set.
   If the save set currently being restored covers more than one volume, enter Y and mount
   the continuation volume. If there are no more volumes for the save set, enter N and the
   dialogue continues.

6. Continue with higher level archives of the same dbspace set, if available.
   If you have a level-1 archive corresponding to the level-0 archive for the dbspace set
   already restored, then answer Y to the following prompt. Make sure that you do in fact
   have the tape available. If you enter Y and there is no tape, you might have to restart the
   entire restore.

   Do you have a level 1 archive to retrieve? (Y/N): Y
   Mount the volume with the archived data.
   Press the return key when ready.
   What saveset ID is to be used on volume/dev/rmt/0m?: 60

   Follow the same procedure if you have a level-2 archive corresponding to the level-0 and
   level-1 archives for the dbspace set already restored.

   In a restore from a normal sequential archive (where dbspaceset=*), the physical
   restore is finished after you have done steps 1 to 3 once. If you are doing this kind of
   restore, go straight to step "Bring the database server back up without a logical
   restore".

7. Restoring other dbspace sets (parallel archive).
   Once the dbspace set containing rootdbs has been restored, you can restore the other
   dbspace sets, as described below:
   a. Check that the following message appears in the message log file:

      Recovery Mode

   b. Enter a new ondatastr command for each dbspace set. For example, enter the
      following command:

      $ ondatastr 'retrieve/dbspaceset=
      SET0000072B/tape=/dev/rmt/0m'

      Dbspace set SET0000072B contains dbspaces not yet restored.

   c. Repeat this command for each remaining dbspace set from the archive that you are
      restoring.
Performing Physical Restore for a Full-System Cold Restore (ON-Archive)

If you have several remaining dbspace sets to restore and have sufficient tape devices and terminal windows, you can restore the other dbspace sets in parallel by entering a series of commands like the one shown above, one for each dbspace set to be restored. For example:

```
$ ondatartr 'retrieve/dbspaceset=SET0000072C/tape=/dev/rmt/1m'
$ ondatartr 'retrieve/dbspaceset=SET0000072D/tape=/dev/rmt/2m'
```

Remember that you must do a logical restore if you are restoring in parallel. The logical-log files are required to synchronize the components of the parallel archive.

5. If you want, bring the database server back up without a logical restore.

   If you do not want to do a logical restore (only possible if you have used a sequential archive for your restore, that is, dbspaceset=*) – for example, if the required logical-log file backups are lost or damaged – you can bring your database server back online without a logical restore. However, in this situation, the database is not as up-to-date as it is when you do a logical restore.

   a. Enter the following command:
      
      ```
      $ onmode -s
      ```

   b. Be sure to wait until the system goes into quiescent mode (this might take several minutes) before entering the following command to bring the database server fully online:
      
      ```
      $ onmode -m
      ```

      If you enter this command before quiescent mode is reached, you might encounter problems.

      However, SAP recommends you to perform a logical restore if you have the necessary logical-log backups.

6. Check the results of the physical restore.

   You can see the results by looking in the archive.log file. The following is an example of the results from a restore:

   Apr 06 1995 10:55:07 #00000000# <20214> ondatartr (informix) Begin retrieve dbspaces
   10:57:08 #00000000# <20214> Retrieve rootdbs #0000002# from DBTAP:DBT1:/dev/rmt/0m
   11:58:00 #00000000# <20214> Retrieve psapsource #0000002# from DBTAP:DBT1:/dev/rmt/0m
   11:58:01 #00000000# <20214> Retrieve physdbs #0000002# from DBTAP:DBT1:/dev/rmt/0m
   12:29:30 #00000000# <20214> Retrieve psappool #0000002# from DBTAP:DBT1:/dev/rmt/0m
   12:29:30 #00000000# <20214> Retrieve psapuser1 #0000002# from DBTAP:DBT1:/dev/rmt/0m
Performing Physical Restore for a Full-System Cold Restore (ON-Archive)

12:29:33 #00000000# <20214> Retrieve logdbs #00000002# from DBTAP:DBT1:/dev/rmt/0m
12:54:32 #00000000# <20214> Retrieve psapddic #00000002# from DBTAP:DBT1:/dev/rmt/0m
13:45:11 #00000000# <20214> Retrieve psapstab #00000002# from DBTAP:DBT1:/dev/rmt/0m
13:49:30 #00000000# <20214> Retrieve psapclu #00000002# from DBTAP:DBT1:/dev/rmt/0m
14:13:31 #00000000# <20214> Retrieve psapload #00000002# from DBTAP:DBT1:/dev/rmt/0m
14:22:03 #00000000# <20214> Retrieve psapbtab #00000002# from DBTAP:DBT1:/dev/rmt/0m
15:00:56 #00000000# <20214> Retrieve psapdocu #00000002# from DBTAP:DBT1:/dev/rmt/0m
15:02:39 #00000000# <20214> Retrieve psapprot #00000002# from DBTAP:DBT1:/dev/rmt/0m
Apr 06 1995 15:02:54 #00000000# <20214> ondatartr (informix) End retrieve dbspaces: SUCCESS

Result

Now that you have performed the physical restore the database server goes into fast-recovery mode. You can go on to the next stage, Performing Logical Restore for Full-System Cold Restore (ON-Archive) [Page 291].

See also:
Informix documentation
Performing Logical Restore for a Full-System Cold Restore (ON-Archive)

Use

This is the final stage in a full-system cold restore [Page 279] if you use ON-Archive as your data recovery tool (that is, for your archives and backups). This section includes how to do a "Point-in-Time" (PIT) restore.

The logical restore is not compulsory. For example, if you cannot use the logical logs for some reason (that is, they have been damaged or lost), you can restart the database after the physical restore but it is less up-to-date. Refer to the step "Bring the database server back up without a logical restore" in Performing Physical Restore for Full-System Cold Restore (ON-Archive) [Page 287].

However, when you restore from a parallel archive, you must also perform logical restore, because the data in the logical log is needed to synchronize the different parts of the archive.

Prerequisites

- You have completed Performing Physical Restore for Full-System Cold Restore (ON-Archive) [Page 287].
- You are logged on as user informix or root.
- The database server is in fast-recovery mode.

Procedure

1. Start ondatartr with first volume of logical-log backup.

   After physically restoring all dbspace sets, you need to restore the logical log to bring your database up-to-date with the most recent transactions from before the restore situation.

2. To perform the logical restore, enter a command like the following:

   $ ondatartr 'retrieve/logfile/tape=('/dev/rmt/1m')'

   You see a response like the following:

   Executing...

   Logical restore started with log number 345

   Make sure that the tape device specified (/dev/rmt/1m in this example) is present or you might run into problems later.

   ondatartr recognizes the first logical-log file needed for the logical restore. This is the logical-log file that was either current or contained the oldest open transaction at the time of the most recent level-0, level-1 or level-2 archive.

3. Identify the tape volume that contains the first logical-log file.
Performing Logical Restore for a Full-System Cold Restore (ON-Archive)

You need to find the save set ID of the tape containing the first logical-log file. In this example, the save set ID 202 corresponds to the logical-log file 345. To find the save set ID, use the SAPDBA recovery report [Page 465], look in the archive.log file, or use physical tape labels (assuming you wrote details on your tapes when they were created).

4. Mount the tape and enter the save set ID for the first logical-log file when prompted:
   - Mount the volume with the archived data.
   - Press the return key when ready.
   - What saveset ID is to be used on volume /dev/rmt/1m?: 202

   You cannot change the tape drive once started so make sure you get the correct tape mounted first time.

   You can specify a PIT restore, in which data is restored only up to the point in time that you specify. In this case, you must add an additional parameter to the end of the ondatartr command shown above. The following example shows how you would specify a recovery up to 13:48:00 on 25th January 1999:
   $ ondatartr 'retrieve/logfile=SET0000010/tape=('/dev/rmt/1m)/ until=(25-Jan-1999:13:48:00)'

   If you specify a PIT before the last checkpoint for the relevant level-0 archive (or level-1 or level-2 archive, whichever is used), you receive an error message from ondatartr.

   Logical restore starts after you enter the save set ID for the first logical-log file.

5. Continue with remaining logical-log files.
   - The database server processes the logical-log files in the first save set and then prompts for more logical-log files when it reaches the end of the save set:
   - Do you have more log backups to process? (Y/N):

   Answer yes if either of the following is true:
   - You have another save set containing logical-log files that you need to restore.
   - You are now ready to restore the files that you salvaged earlier in the restore process.

   Make sure that the tape is available. If you answer yes and there is no tape, you might encounter problems later. In the example, the save set ID of the salvaged logs is 1345.

   If you are doing a point-in-time (PIT) restore, you are only prompted for backup tapes between the time of the level-0 archive (or level-1 or level-2, whichever is used) and the time of the PIT. If the PIT is later than the most recent tape, then the recovery runs as usual and you do not receive any extra messages.

   If the PIT is reached, look in the message-log file. You see a sequence such as in the following example:

   PIT - reached:
   ------------
Performing Logical Restore for a Full-System Cold Restore (ON-Archive)

12:53:47 Checkpoint Completed: duration was 0 seconds.
12:53:47 Start Logical Recovery - Start Log 17, End Log ?
12:53:47 Starting Log Position - 17 0x2f6378
12:56:23 PIT reached - logid: 17, logpos: 0x2f7098

   0 Committed, 1 Rolled Back, 0 Open, 0 Bad Locks

12:56:32 Dropping temporary TBLspace 100020, recovering 64 pages.
12:56:32 Dropping temporary TBLspace 100021, recovering 64 pages.
12:56:32 Dropping temporary TBLspace 100022, recovering 64 pages.
12:56:33 Quiescent Mode
12:56:33 Checkpoint Completed: duration was 0 seconds.

6. Bring the database server online after the restore.

   When the logical restore is finished, enter no to the prompt Do you have more log backups to process? (Y/N). The database server is now in quiescent mode and you are returned to the operating system command line.

   Use SAPDBA to bring the database server online. Refer to Changing Server Mode with SAPDBA [Page 336].

   If you are doing a point-in-time (PIT) recovery and the PIT is reached during the restore, you are simply returned to the operating system command line without a message, and the database server goes into quiescent mode. You can check the following:

   • That the PIT recovery has functioned correctly by looking in the online message-log file (see the note in step "Continue with remaining logical-log files" above)
   • That quiescent mode has been reached by entering the following command:

     $ onstat -

7. Check the results of the logical restore.

   You can see the results by looking in the archive.log file. An example from this file is given below:

   Apr 07 1995 09:47:20 #00000016# <28282> ondatartr (informix) Begin retrieve logfiles
Performing Logical Restore for a Full-System Cold Restore (ON-Archive)

09:47:26 #00000015# <27332> Retrieve LF00000013 #00000003# from LOGTAP:0001

09:47:54 #00000015# <27332> Retrieve LF00000014 #00000003# from LOGTAP:0001

09:48:39 #00000015# <27332> Retrieve LF00000015 #00000008# from LOGTAP:0001

Apr 07 1995 09:49:03 #00000015# <27332> ondatartr (informix) End retrieve logfiles: SUCCESS

Result

The database is now restored and you can use the R/3 System productively again.

See also:

Informix documentation
Partial-System Warm Restore (ON-Archive)

Purpose
This section describes how to perform a partial-system warm restore of your Informix database, if you use ON-Archive as your data recovery tool (that is, for your archives and backups).

Prerequisites
- See Getting Started with Restore [Page 254] to make sure that you have already correctly identified the problem [Page 255] and chosen the right kind of restore [Page 258].
- Before you start, see Preparing for a Partial-System Warm Restore (ON-Archive) [Page 296].

Process Flow
3. You perform physical restore [Page 297].
4. You perform logical restore [Page 299].

Result
Your database is now restored and can be used productively again.

See also:
Informix documentation
Preparing for a Partial-System Warm Restore (ON-Archive)

Use

This section tells you what to do before performing a partial-system warm restore [Page 295] of your Informix database if you use ON-Archive as your data recovery tool (that is, for your archives and backups).

ON-Archive prompts you for tape volumes during a warm restore. In contrast to a cold restore, where you need to identify the required tape volumes yourself, ON-Archive prompts you throughout a warm restore (because the database server is online and the sysmaster database is accessible throughout).

Procedure

4. Identify the dbspaces you want to restore.
   
   ON-Archive prompts you to mount the appropriate volumes on devices throughout the physical restore. You must only specify the dbspaces you want to restore.
   
   If you are restoring from a parallel archive, you also need to enter the dbspace set that holds the dbspaces to be restored. You cannot restore the critical dbspaces (rootdbs, logdbs, physdbs) during a warm restore.

5. Verify your database server configuration.
   
   Make sure that the current database server configuration is compatible with, and accommodates, all ONCONFIG parameter values assigned after the most recent archive. Use the copy of this file that was in use at the time of the archive.
   
   All raw devices or files that have been used since the level-0 archive must be available. Changes might include, for example, chunks added, dbspaces dropped, dbspaces mirrored, and so on.
   
   For more information, see the Informix documentation.

6. Make sure that the free space in the dbspace TEMPDBS is at least as large as the dbspace LOGDBS before you start the restore.

Result

Now you can go on to Performing Physical Restore for Partial-System Warm Restore (ON-Archive) [Page 297].

See also:
Informix documentation
Performing Physical Restore for a Partial-System Warm Restore (ON-Archive)

Use

This is the first stage in a partial-system warm restore [Page 295] of the Informix database if you use ON-Archive as your data recovery tool (that is, for your archives and backups).

Prerequisites

- You are logged on as user informix or root.
- The database server is online.
- You have completed Preparing for a Partial-System Warm Restore (ON-Archive) [Page 296].

Procedure

4. Enter the retrieve command in ON-Archive, such as in the following example:

   \$ onarchive 'retrieve/dbspaceset=SET0000011
   /dbspaces=(psapstab, psapprot)'

   You see a response like the following:

   Request 203 registered in the catalog.
   Executing...
   Any online dbspaces being retrieved will first be taken offline.
   Do you want to Proceed or Cancel this request? (P/C)p
   File psappool being retrieved.
   Devices available for ONARCHIVE
   DEVICE $ DEVICE NAME
   1 /dev/rmt/0m

   Enter the device number (1) or (C)ancel : 1
   Please mount volume DBT2 of DBTAP and press <RETURN> *READ*
   ...

   ON-Archive prompts you for additional level-1 and level-2 volumes if required.

5. Check the results of the physical restore.

   You can check the results of the physical restore by looking in the archive.log file. The following is an example from the file:

   May 14 1996 09:05:07 #00000000# <25504> ondatartr (informix)
   Begin retrieve dbspaces
   09:07:03 #00000000# <25504> Retrieve psapstab #00000016# from
   DBTAP:DBT4:/dev/rmt/0m
Performing Physical Restore for a Partial-System Warm Restore (ON-Archive)

09:08:12 #00000000# <25504> Retrieve psapprot #00000016# from DBTAP:DBT4:/dev/rmt/0m

May 14 1996 10:02:41 #00000000# <25504> ondatartr (informix) End retrieve dbspaces: SUCCESS

Result

Now that you have performed the physical restore, you can go on to the next stage, Performing Logical Restore for Partial-System Warm Restore (ON-Archive) [Page 299].

See also:

Informix documentation
Performing Logical Restore for a Partial-System Warm Restore (ON-Archive)

Use

This is the final stage in a partial-system warm restore [Page 295] of the Informix database if you use ON-Archive as your data recovery tool (that is, for your archives and backups). There are two phases to this stage:

1. Backing up the “current” logical-log file
2. Restoring all available logical-log files to bring the database completely up to date.

Prerequisites

- You have completed Performing Physical Restore for Partial-System Warm Restore (ON-Archive) [Page 297]. [Page 267]
- You are logged on as user informix or root.
- The database server is online.
- You have the following logical-log files available:
  - Logical-log files(s) covering the checkpoint for the database backup that was restored during the warm physical restore. If the checkpoint spans multiple logs, you need all of them.
  - Logical-log file(s) covering the checkpoint for the warm physical restore. If the checkpoint spans multiple logs, you need all of them.
  - All the logs between these two points in time.

Procedure

Phase 1: Back up Current Logical-Log File

In this phase you back up the logical-log file current when the physical restore started so that you can apply it in phase two to bring the database completely up to date.

How you proceed now depends on your normal backup procedure:

- If you use continuous backup
  
  Copy the logical-log files out to tape (vset LOGTAP) as normal. If you use a temporary storage area on disk for the logical-log files, make sure the copy to tape has finished. You probably need to interrupt the continuous backup request to close the disk save set so you can copy it. Remember to restart the continuous backup request later.

- If you use automatic backup
  
  Start an automatic backup to tape (vset LOGTAP), as in the following example:

  ```
  $ onarchive 'backup/automatic/logfile/vset=LOGTAP/current'
  ```

  ON-Archive prompts you to mount the appropriate volume:

  Request 204 registered in the catalog.
Performing Logical Restore for a Partial-System Warm Restore (ON-Archive)

Executing...
DEVICE $DEVICE NAME
  1 /dev/rmt/3m
Enter the device number (1) or (C)ancel : 1
Please mount volume LOGT1 of LOGTAP and press <RETURN> **WRITE**
Logfile LF00000026 being processed.
Logfile LF00000027 being processed.
Logfile LF00000028 being processed.
Logfile LF00000029 being processed.
Logfile LF00000030 being processed.
Logfile LF00000031 being processed.
Logfile LF00000032 being processed.
Logfile LF00000033 being processed.
Logfile LF00000034 being processed.
Logfile LF00000035 being processed.
Logfile LF00000036 being processed.

Phase 2: Restore Available Logical-Log Files

After backing up the current logical-log file, you must perform a logical restore using all available logical-log files to bring the restored dbspaces online.

3. Enter the following command to perform the logical restore:

   $ onarchive 'retrieve/logfile'

   ON-Archive prompts you to mount the appropriate volumes.
   Request 205 registered in the catalog.
   Executing...
   File LF00000022 being retrieved.
   Devices available for ONARCHIVE
   DEVICE $DEVICE NAME
     1 /dev/rmt/3m
   Enter the device number (1) or (C)ancel : 1
   Please mount volume LOGT1 of LOGTAP and press <RETURN> **READ**
   File LF00000023 being retrieved.
   File LF00000024 being retrieved.
   File LF00000025 being retrieved.
   File LF00000026 being retrieved.
   Devices available for ONARCHIVE
Performing Logical Restore for a Partial-System Warm Restore (ON-Archive)

DEVICE $DEVICE NAME
   1   /dev/rmt/3m

Enter the device number (1) or (C)ancel: 1

Please mount volume LOGT2 of LOGTAP and press <RETURN> **READ**

File LF00000027 being retrieved.
File LF00000028 being retrieved.
File LF00000029 being retrieved.
File LF00000030 being retrieved.
File LF00000031 being retrieved.
File LF00000032 being retrieved.
File LF00000033 being retrieved.
File LF00000034 being retrieved.
File LF00000035 being retrieved.
File LF00000036 being retrieved.

4. Check the results of the logical restore

   You can check the results of the logical restore in the archive.log file.

Result

The restored dbspaces are now available and the database server is ready for use. You can use the R/3 System productively again.

See also:

Informix documentation
Full-System Cold Restore (ontape)

Use

This section describes how to perform a full-system cold restore of your Informix database, if you use ontape as your data recovery tool (that is, for your archives and backups).

Prerequisites

- See Getting Started with Restore [Page 254] to make sure that you have already correctly identified the problem [Page 255] and chosen the right kind of restore [Page 258].
- Before you start, see Preparing for a Full-System Cold Restore (ontape) [Page 303].

Process Flow

You perform a full-system cold restore [Page 304].

Result

Your database is now restored and can be used productively again.

See also:

Informix documentation
Preparing for a Full-System Cold Restore (ontape)

Use

This section describes what you need to do before performing a full-system cold restore [Page 302] of your Informix database if you use ontape as your data recovery tool (that is, for your archives and backups).

Label your tapes after every archive or backup. Include all essential information required for a restore, such as date of archive or backup, save set id, volume set and volume, dbspace names, logical-log file numbers, and so on. This makes the cold restore easier.

Procedure

1. Gather all tapes containing the most recent level-0, level-1, and level-2 archives.

2. Identify the tape that contains the last level-0 archive of the dbspace rootdbs. You need this tape first. It is assigned number 1 in the sequence of level-0 archives to be used.

3. Determine the tapes that contain the logical-log files backed up since this level-0 archive. If you want to restore level-1 or level-2 archives, you need to find only the files backed up since the most recent archive (with the highest level).

4. Make sure that the current database server configuration is compatible with, and accommodates, all parameter values specified in the ONCONFIG file after the most recent archive. Use the copy of this file that was in use at the time of the archive.

   All raw devices or files that have been used since the level-0 archive must be available. Changes might include, for example, chunks added, dbspaces dropped, dbspaces mirrored, and so on.

   For more information, see the Informix documentation.

Result

Now you can go on to Performing Full-System Cold Restore (ontape) [Page 304].

See also:

Informix documentation
Performing a Full-System Cold Restore (ontape)

Use

This section describes how to perform a full-system cold restore [Page 279] of your Informix database if you use ontape as your data recovery tool (that is, for your archives and backups).

Prerequisites

- You are logged on as user informix or root.
- The database server is offline.
- The procedure is easier if you have two tape devices (in the example below, /dev/rmt/0m and /dev/rmt/1m are used).
- You have completed Preparing for a Full-System Cold Restore (ontape) [Page 303].

Procedure

1. Mount the tape containing the level-0 archive of rootdbs onto the device specified by the TAPEDEV parameter in the ONCONFIG file and execute the following command:

   ```bash
   $ ontape -r
   ```

   For Windows NT, to check if the chunks listed really exist, enter:

   ```bash
   dir <chunkname>
   ```

   If you need to create non-existent chunks, enter:

   ```bash
   copy NUL <chunkname>
   ```

   For UNIX, check your raw device layout for chunk names.

2. If it is possible to salvage the logical-log files currently on disk, ontape prompts you to do so. Salvage the files, if possible, using a new tape.

   During the restore, ontape prompts you to mount the tapes with the relevant archives and logical-log files, including the logical-log files that you just salvaged.

3. Follow the prompts to mount new tapes.

   ontape restores the database and puts the server into fast recovery mode. You can only continue when fast recovery is finished and the server is in quiescent mode.

Result

The database is now restored and you can use the R/3 System productively again. Use SAPDBA to put the database online. Refer to Changing Server Mode with SAPDBA [Page 336].

See also:

Informix documentation
Partial-System Warm Restore (ontape)

Use

This section describes how to perform a partial-system warm restore of your Informix database, if you use ontape as your data recovery tool (that is, for your archives and backups).

Prerequisites

- See Getting Started with Restore [Page 254] to make sure that you have already correctly identified the problem [Page 255] and chosen the right kind of restore [Page 258].
- Before you start, see Preparing for a Partial-System Warm Restore (ontape) [Page 307].

Process Flow

You perform a partial-system warm restore [Page 308].

Result

Your database is now restored and can be used productively again.

See also:
Informix documentation
Preparing for a Partial-System Warm Restore (ontape)

Use

This section describes what you need to do before performing a partial-system warm restore [Page 306] of your Informix database if you use ontape as your data recovery tool (that is, for your archives and backups).

Procedure

1. Before you start the restore, gather all tapes containing the most recent level-0, level-1, and level-2 archives containing the dbspace(s) you want to restore.

2. Identify the tapes that contain the logical-log files backed up since this level-0 archive. If you want to restore level-1 or level-2 archives, you need to find only the logs backed up since the most recent archive (with the highest level).

3. Make sure that the current database server configuration is compatible with, and accommodates, all parameter values specified in the ONCONFIG file after the most recent archive. Use the copy of this file that was in use at the time of the archive.

   All raw devices or files that have been used since the level-0 archive must be available. Changes might include, for example, chunks added, dbspaces dropped, dbspaces mirrored and so on.

   For more information, see the Informix documentation.

Result

Now you can go on to Performing a Partial-System Warm Restore (ontape) [Page 308].

See also:

Informix documentation
Performing a Partial-System Warm Restore (ontape)

Use
This section describes how to perform a partial-system warm restore of your Informix database if you use ontape as your data recovery tool (that is, for your archives and backups).

Prerequisites
- You are logged on as user informix or root.
- The database server is online.
- You have completed Preparing for a Partial-System Warm Restore (ontape).

Procedure
1. Mount the tape containing the level-0 archive of the dbspaces you want to restore (psapstab and psapprot in this example) onto the device specified by the TAPEDEV parameter in the ONCONFIG file. Execute the following command to restore, for example, the dbspaces psapstab and psapprot:
   
   ```
   $ ontape -r -D psapstab psapprot
   ```

2. During the restore, the database server prompts you to mount the tapes with the appropriate dbspaces or logical-log files.

Result
The database is now restored and you can use the R/3 System productively again.

See also:
Informix documentation
Recovery of a Lost Mirrored Chunk

Use
This section explains how to recover a mirrored chunk of an Informix database after an error.

When the database server detects an error in a chunk (in the chunk itself or its mirrored chunk), it sets the status flag of the bad chunk to “D” (that is, “down”). All read and write access continues to the online chunk but there is no access to the down chunk. You must correct the problem and recover the chunk (that is, bring it back online).

The screen display examples might differ slightly if your operating system is NT. However, the principles are the same for both operating systems.

Process Flow
1. You identify the lost mirrored chunk [Page 310].
2. You create a new link for the chunk [Page 311].
3. You recover the chunk online [Page 313].

Result
The lost mirror chunk is back online and its data can be accessed by R/3 applications.

See also:
Informix documentation
Identifying a Lost Mirrored Chunk

Use

This procedure is the first step in the recovery of a lost mirrored chunk [Page 309] with an Informix database.

Procedure

1. Use the message log file to identify a lost mirrored chunk. A message indicating that an error occurred in a mirrored chunk might look like this:

   15:22:26 Assert Failed: WARNING! I/O error, Mirror Chunk '/.../sapdata3'
   15:22:26 Who: Session(22, informixSession(22, info sap10, 26981, 12) Thread(54, sqlexec, 80f20be0, 1)
   15:22:26 Results: Chunk is now unusable
   15:22:26 Action: Repair and restore from mirror or archive
   15:22:26 /tmp/af.3fea
   15:22:29 Checkpoint Completed: duration was 2 seconds

2. Use onstat -d to display the status of a dbspace. A down chunk has the status D (for "down") in the second position of the field flags. For example:

<table>
<thead>
<tr>
<th>Chunks address</th>
<th>chk/dbs</th>
<th>offset</th>
<th>size</th>
<th>free</th>
<th>bpages</th>
<th>flags</th>
<th>pathname</th>
</tr>
</thead>
<tbody>
<tr>
<td>80f2bfe0</td>
<td>6</td>
<td>8556</td>
<td>2000</td>
<td>0</td>
<td>MD</td>
<td>-</td>
<td>/.../data3</td>
</tr>
</tbody>
</table>

Result

Now that you have identified the lost mirrored chunk, you can go on to Creating a New Link for a Lost Mirrored Chunk [Page 311].

See also:
Informix documentation
Creating a New Link for a Lost Mirrored Chunk

Use

This procedure is the second step in the recovery of a lost mirrored chunk [Page 309] with an Informix database. If the mirrored chunk has been accidentally deleted, you can recover it easily. By giving a chunk a new link, you can recover it quickly, before repairing or replacing the damaged disk.

Before you can recover a damaged or lost chunk, you have to proceed as follows:

1. Replace the damaged disk with a new one (not described here).
2. Link the chunk to another file or raw device (described in detail in this section).

Prerequisites

You have completed Identifying a Lost Mirrored Chunk [Page 310].

Procedure

1. Identify the chunk’s old link
   
   Enter a command like the following to see the link:
   
   ```
   $ cd informix/C11/sapdata/physdev3
   $ ls -l
   ```
   
   The link is then displayed:
   
   ```
   lrwxr-xr-x 1 root sys....2 17:40 data3->/dev/rdsk/3s0
   ```
   
   In this example, the chunk was linked to raw device /dev/rdsk/3s0.

2. Delete the chunk’s old link using `rm`
   
   Enter a command like the following:
   
   ```
   $ rm data3
   ```

3. Specify a new link
   
   Now you can specify a new link to a raw device on another disk for the mirrored chunk.
   
   Enter a command like the following:
   
   ```
   $ ln -s /dev/rdsk/4s0 data3
   ```
   
   Use this procedure with care. Note that a raw device usually has several chunks. In this case, it is not sufficient to link only the one chunk.

Result

Now that you have created a new link for the lost mirrored chunk, you can go on to Recovering a Lost Mirrored Chunk Online [Page 313].

See also:

Informix documentation
Recovering a Lost Mirrored Chunk Online

Use
This procedure is the final step in the recovery of a lost mirrored chunk [Page 309] with an Informix database.

Prerequisites
- You have completed Creating a New Link for a Lost Mirrored Chunk [Page 311].
- You have fixed the cause of the error (for example, you have repaired the disk hardware).

Procedure
Use the onspaces tool to recover the chunk online. For more information about onspaces, see the Informix documentation. Enter a command like the following:

$ onspaces -s logdbs -p /.../data3 -o 17112 -0

You get a message in the message log indicating that the chunk has been restored and is available online. For example:

15:47:28 Chunk Number 6 - '/.../data3' — Recovery Begins(-2131622640)
15:47:33 Chunk Number 6 - '/.../data3' — Online
15:47:35 Checkpoint Completed: duration was 2 seconds
15:47:36 Chunk Number 6 - '/.../data3' — Recovery Complete(-2131622640)

Result
The lost mirror chunk is back online and its data can be accessed by R/3 applications.

See also:
Informix documentation
SAPDBA for Informix

Purpose
SAPDBA for Informix is an integrated database administration tool for Informix databases running with R/3 Systems, particularly large ones. You can use it without detailed knowledge of the database and its tools. It filters information about the database, showing you only what you need, and uses complex database statements to let you confidently manipulate the data while ensuring security and integrity.

Implementation Considerations
SAP recommends you to use SAPDBA rather than the Informix tools [Page 20], because it is designed to run with R/3 databases. You should implement SAPDBA if you want to perform a wide range of database administration tasks, which are more difficult or unavailable with other tools. The following tasks can best be completed with SAPDBA:

- Changing server mode
- Adding or extending dbspaces, and dropping dbspaces or dropping chunks
- Reorganization of tables, indexes, and dbspaces
- Checking physical data consistency
- Changing logging mode
- Checking system information

For more information about setting up SAPDBA, see SAPDBA Setup [Page 317].

Integration
The following SAPDBA functions are also available in the Computing Center Management System (CCMS) [Page 22] of the R/3 System:

- Checking and updating cost-based optimizer statistics
- Checking the DB system (that is, checking configuration and performance)
- Monitoring of space usage in tables, indexes, and dbspaces

There are some tasks that can only be performed in CCMS (for example, scheduling backups).

💡 When the R/3 System is running, you can use CCMS to access some of the same information (but not all) found in SAPDBA. Whether to use SAPDBA or CCMS depends on the task you want to perform, and the setup of your system.

Features
- Menu driven interface for ease of use
- Runs with both Informix 6.0 and 7.x
- Analysis facilities to examine the state of the database
• Action facilities to carry out alterations to the database
• Expert mode to enable privileged actions for authorized users
• Menu interface in English or German
• Context-sensitive supporting information
• Available with operating systems UNIX and NT

See also:
SAPDBA and Informix Database Administration (in SAPNet)
Getting Started with SAPDBA [Page 316]
Getting Started with SAPDBA

Purpose
This section gives you an overview of SAPDBA for Informix database administration. The aim is to help you get started as quickly as possible by giving you concise information and pointers to further details.

Process Flow
1. Before you start SAPDBA, see SAPDBA Setup [Page 317].
2. When you are ready to start, see Starting SAPDBA [Page 324].
3. If you need to print a SAPDBA report, see Printing a SAPDBA Report [Page 329].
4. For information on regular clearing up required for SAPDBA, see SAPDBA Housekeeping [Page 330].

See also:
SAPDBA for Informix [Page 314]
SAPDBA Setup

Purpose
The installation of SAPDBA automatically performs most of the preparations needed to successfully use this tool. However, before you start using SAPDBA, you must perform the checks described in this section.

Process Flow
1. You define the users for SAPDBA. Refer to Setting Up SAPDBA Users [Page 318].
2. You set the language to either English (the default) or German.
   With NT, you can set the language dynamically by choosing View → Language.
   With UNIX, all screen displays are in the language that you specify when you start SAPDBA. You can set the environment variable SAPDBA_Language to control the display language. For more information, see the step below on screen handling.
3. You might need to set up environment variables. Refer to Setting Up SAPDBA Environment Variables [Page 319].
4. If your operating system is UNIX, you need to set up screen handling. Refer to Setting Up SAPDBA Screen Handling [Page 321].
5. You might need to set up the SAPDBA working directories. Refer to Setting Up SAPDBA Working Directories [Page 322].

There are some slight differences between SAPDBA when used on NT and UNIX operating system platforms. Refer to Use of SAPDBA with UNIX and NT [Page 327].

See also:
Getting Started with SAPDBA [Page 316]
Setting Up SAPDBA Users

Procedure

1. Assign your database administrators to expert or non-expert mode. Note that users working in expert mode can perform all SAPDBA actions, whereas users working in non-expert mode are restricted to simpler actions that cannot endanger the database.

   How you implement this feature depends on your operating system, as shown in the following table:

   **Expert and Non-Expert Mode in SAPDBA**

<table>
<thead>
<tr>
<th>Expert mode</th>
<th>Non-expert mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIX</td>
<td></td>
</tr>
<tr>
<td>User informix</td>
<td>Normally user &lt;sid&gt;adm, although other users in this group are also treated as non-experts. SAPDBA regards any user in the group sapsys to be non-expert.</td>
</tr>
<tr>
<td>NT</td>
<td></td>
</tr>
<tr>
<td>User informix</td>
<td>All users except informix.</td>
</tr>
</tbody>
</table>

   On UNIX platforms, SAPDBA can only be started by the user informix or by any user in the sapsys group.

   The rest of this procedure only applies if your operating system is UNIX. For more information about setting environment variables, see Setting Up SAPDBA Environment Variables [Page 319].

   SAPDBA is set up to run for the users informix and <sid>adm.

2. You need to only set the environment variables SAPDBA_LANGUAGE and TERM for the users informix and <sid>adm.

3. Make sure that all necessary environment variables are correctly set for other authorized users (that is, users in the group sapsys who are not <sid>adm).
Setting Up SAPDBA Environment Variables

An environment variable gives SAPDBA information about the operating environment of your system. For example, there are environment variables for your terminal type (variable TERM) and the language in which you want to use SAPDBA (variable SAPDBA_LANGUAGE). Environment variables apply to a user id, so you need to make sure they are correct for each SAPDBA user.

Procedure

You check and set environment variables for SAPDBA differently according to your operating system, UNIX or NT.

UNIX

1. To check the current value of your environment variables, do the following:
   - With the C shell:
     ```
     env
     ```
   - With the Bourne (or Korn) shell:
     ```
     set
     ```

   The system displays the current values of all environment variables.

   Users informix and <sid>adm do not normally need to set environment variables because they should have been defined when the R/3 System was installed. The only variables that these users might need to set are TERM (that is, for screen handling) and SAPDBA_LANGUAGE.

   Users other than informix and <sid>adm need to check that environment variables are set as follows:

<table>
<thead>
<tr>
<th>Environment Variable</th>
<th>Value</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFORMIXDIR</td>
<td>/informix/&lt;SID&gt;</td>
<td>/informix/JP2</td>
</tr>
<tr>
<td>INFORMIXSERVER</td>
<td>&lt;hostname&gt;&lt;sid&gt;shm</td>
<td>hw1143jp2shm</td>
</tr>
<tr>
<td>INFORMIX_DBID</td>
<td>&lt;sid&gt;</td>
<td>jp2</td>
</tr>
<tr>
<td>PATH</td>
<td>/usr/sap/&lt;SID&gt;/SYS</td>
<td>/usr/sap/JP2/SYS/exe/run</td>
</tr>
<tr>
<td></td>
<td>/exe/run/sapdba</td>
<td>/sapdba</td>
</tr>
</tbody>
</table>

2. To set an environment variable, do the following:
   - With the C shell:
     ```
     setenv <variable name> <variable value>
     ```

   For example, to set the TERM variable to vt100:

   ```
   setenv TERM vt100
   ```

   - With the Bourne (or Korn) shell:

     ```
     <variable name>=<variable value>
     ```
Setting Up SAPDBA Environment Variables

```
export <variable name>
For example, to set the TERM variable to vt100:
TERM=vt100
export TERM
```

NT

You do not normally need to set environment variables specifically for SAPDBA with NT.

1. To check the current value of your environment variables, enter the following command:
   ```
   set
   The system displays the current values of all environment variables.
   ```
2. To set an environment variable, enter the following command:
   ```
   set <variable name>=<variable value>
   For example, to set the value of the variable INFORMIXDIR:
   set INFORMIXDIR=d:\INFORMIX\<SID>
   ```
Setting Up SAPDBA Screen Handling

If your operating system is NT, screen handling is completely automated.
If your operating system is UNIX, follow this procedure to make sure SAPDBA can correctly produce screen displays on your terminal.

Procedure

1. Set the terminal type using the environment variable \texttt{TERM}.

For more information on how to set environment variables, see Setting Up SAPDBA Environment Variables [Page 319].

If your terminal has previously been used with the Informix database, the terminal type is probably already set. If it is not (or if the SAPDBA display is erratic), you must make sure that the environment variable \texttt{TERM} is set properly set. The most common values are:

- \texttt{xterm} for the \texttt{X} Window program
- \texttt{hp} for the \texttt{hpterm} program
- \texttt{vt100} is a generic value that enables most terminals to work with SAPDBA

If none of these values produce a reliable display, you should consult the documentation supplied with your terminal.

2. Set the display size using the environment variables \texttt{COLUMNS} and \texttt{LINES}.

In most cases you do not need to adjust the display size because SAPDBA can automatically detect the size of your display window during start-up and generate the correct size of screen display. If for some reason SAPDBA cannot detect your window or screen size automatically, SAPDBA sets a default display of 24 lines by 80 columns.

You can explicitly set the environment variables. This can be useful if SAPDBA has set a default display for your session and you would like to use a larger display. Make sure that the minimum values you set are 80 for \texttt{COLUMNS} and 24 for \texttt{LINES} and remember to restart SAPDBA.

Do not change the size of your screen display while SAPDBA is running because the results are unpredictable. SAPDBA sets the size during start-up and adjusts its displays accordingly.
Setting Up SAPDBA Working Directories

The installation procedure normally sets up the required working directories for SAPDBA. If for any reason the directories are not present, use this procedure to create them.

**Procedure**

You set up SAPDBA working directories differently according to your operating system, UNIX or NT.

**UNIX**

1. Change to the Informix directory:
   
   ```
   cd $INFORMIXDIR
   ```

2. Create the first new directory and assign the correct access rights to it:
   
   ```
   mkdir sapreorg
   chmod 755 sapreorg
   ```

3. Create the second new directory and assign the correct access rights to it:
   
   ```
   mkdir sapreorg/recover.rpt
   chmod 777 sapreorg/recover.rpt
   ```

4. Assign the correct ownership to these directories (this step is only necessary if you are performing these instructions when not logged on as user informix):
   
   ```
   chgrp -R informix sapreorg
   chown -R informix sapreorg
   ```

**NT**

The instructions below are for the Microsoft Windows NT 4.0 operating system.

1. Start the Windows NT Explorer by choosing the following:

   ```
   Start → Programs → Windows NT Explorer
   ```

2. Choose the drive where the Informix directory is located, for example D:

3. Choose the Informix directory, %INFORMIXDIR% in the left window of the Explorer.
   
   The Informix directory should now be highlighted in the left window of the Explorer.

4. Create a new directory by choosing File → New → Folder.
   
   The new directory appears with a temporary name.

5. Type in the name for the new directory as follows:
   
   ```
   sapreorg
   ```

6. Choose the new directory in the left window of the Explorer.
   
   The new directory should now be highlighted in the left window of the Explorer.

7. Create a second new directory as follows:
a) Repeat step 4.

b) Type in the name for the new directory as follows:

`recover.rpt`

8. If the access rights for these directories are incorrect, then change them as follows:

a) Choose `File → Properties → Security → Permissions.`

b) Enter the correct permissions.

Refer to your Microsoft documentation for further details.

In the directory `$INFORMIXDIR/sapreorg` for UNIX or `%INFORMIXDIR%/sapreorg` for NT, additional sub-directories are created as required (that is, when you reorganize dbspaces, tables, and indexes). You should periodically delete these sub-directories and their contents when you are sure that you no longer need them. Refer to `SAPDBA Housekeeping [Page 330].`
Starting SAPDBA

Use
This procedure tells you how to start SAPDBA for Informix.

Prerequisites
Make sure that SAPDBA is correctly set up before starting it. Refer to SAPDBA Setup [Page 317].

Procedure

1. Log on to the host where you want to start SAPDBA.

You can only execute all functions in SAPDBA when you are logged on to the database host. Some functions fail if started from other hosts.

There are the following modes for working with SAPDBA, depending on how you log on:

<table>
<thead>
<tr>
<th>Logon Mode</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| Non-expert | • UNIX
Non-expert mode is for users in the sapsys group. The SAP system administrator is in this group and logs on as `<sid>adm`.
For example, if the `sid` (that is, system ID) is `jp2`, the SAP system administrator signs on as `jp2adm`.

• NT
All users not logged on as `informix` are logged-on in non-expert mode. |
| Expert     | Expert mode is available automatically for users logged on as `informix`. This mode enables certain critical functions that are not permitted in non-expert mode. For example, exporting and importing data (to reorganize an index or table) is only permitted in expert mode. |

For more information, see Setting Up SAPDBA Users [Page 318].

If you want to set the screen displays in SAPDBA to German, you need to set the environment variable `SAPDBA_LANGUAGE` to `GERMAN` before you start. Refer to Setting Up SAPDBA Environment Variables [Page 319].

2. To start SAPDBA enter the following from the command line:

`sapdba`

With NT, you can also choose the SAPDBA icon.

Result
The SAPDBA main menu appears. For more information, see the following:

• Server Mode with SAPDBA [Page 335]
For more information about the heading lines that appear on SAPDBA menu screens, see SAPDBA Heading Lines [Page 326].

When you make an entry in a variable field in SAPDBA, and you want to quit (for example, you are not sure what the entry should be or you have selected the wrong field), simply press ESC.
SAPDBA Heading Lines

Definition
The heading lines in SAPDBA appear on all menu screens.

Structure
The heading lines contain the following information about your current system environment:

- **Informix Version** is the full name for your version of the Informix database server.
- **Informix Server** is the name of the database server to which you are currently connected.
- **Server Mode** is the current mode of the database server. For more details about server modes, refer to the Informix documentation.
- **Informixdir** is the installation directory for the database server, which you defined using the `INFORMIXDIR` environment variable when R/3 was installed.
- **Database** is the name of the Informix database to which you are currently connected. With SAP, this corresponds to the name of the R/3 instance, either in upper or lower case, depending on which release of R/3 you installed (before version 2.2C or 2.1G, this is in upper-case, after in lower-case).
- **SID** is the system id name (`<SID>`) of the R/3 instance that you are running.
- ‘sapr3’ user(s) shows you how many sapr3 users are connected to the database. If this field shows not connected, then no users are connected to the database. For SAPDBA with NT (which itself connects to the database as user sapr3), you can disconnect while keeping SAPDBA running by using `ServerMode → Disconnect from OnLine` (this is useful when reorganizing tables, which requires all users to be disconnected).
- **Logging Mode** tells you whether logging for the database is turned on or off. For normal operation, this should always be on. You need to turn logging off during some of the “reorganize” actions under Reorganization but you **must** turn logging back on when you re-start normal productive operations.

Logging Mode should normally be on. If it is off, database transactions are not being logged. Therefore, you cannot restore the database correctly in the event of failure. In this case, you risk losing production data.
Use of SAPDBA with UNIX and NT

Purpose

You can use SAPDBA with both UNIX and Microsoft Windows NT operating systems. However, be sure to take note of the differences between them. NT version has standard Microsoft Windows features.

The NT version of SAPDBA has the standard Microsoft windows features. For example, you can access the help file which you are now reading directly from SAPDBA. Furthermore, SAPDBA for NT has a toolbar and a status line, which can be turned on or off. You can easily print SAPDBA reports by choosing File → Print.

Process Flow

1. If using SAPDBA with NT, you familiarize yourself with the following options, which are not available with UNIX:
   - View lets you use the following functions:

<table>
<thead>
<tr>
<th>Menu option</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toolbar and Status Bar</td>
<td>Using these toggle options, you can modify the appearance of SAPDBA for NT, in the same way as with any other standard Microsoft Windows application. You can, for example, toggle the toolbar or the status line to appear or disappear.</td>
</tr>
<tr>
<td>Clear report</td>
<td>Using this function, you can clear the report area (this is the large central box where data is dynamically displayed by SAPDBA according to actions you take).</td>
</tr>
<tr>
<td>Refresh Info</td>
<td>Using this function, you can refresh the information appearing in the four heading lines at the top of all menu screens (for more information about the contents of these lines, see “Heading Lines in SAPDBA”). This is useful, for example, if you want to see how many users are currently connected to the R/3 System.</td>
</tr>
<tr>
<td>Language</td>
<td>Using this function, you can dynamically change the SAPDBA language to English or German.</td>
</tr>
</tbody>
</table>

   - Help provides you with detailed help information and lets you find out the version of SAPDBA you are currently using.

2. You familiarize yourself with the user interface for your platform. Whereas the UNIX interface is character-based, NT has a graphical user interface (GUI). This means that the menus appear in a different format for each operating system.

3. When getting started with SAPDBA, you do not need to initialize screen handling for NT, although this is necessary with UNIX. Furthermore, with NT you can alter the language directly from within SAPDBA. See SAPDBA Setup [Page 317].

4. If you need to add chunks to extend dbspaces, you recognize that, due to environment differences in the operating system, chunks are assigned to drives with NT but to devices with UNIX. Refer to Listing Chunks with SAPDBA [Page 339]. For similar reasons, the report...
Use of SAPDBA with UNIX and NT

available under Listing Devices with SAPDBA [Page 346] has a different appearance with NT.

However, the process of adding a chunk or a dbspace is similar and is very easy to understand with both operating systems. Refer to Adding a Chunk with SAPDBA [Page 350] and Adding a Dbspace with SAPDBA [Page 353].

5. If you are using NT, you recognize that the recovery reports are not available. This is because these reports assume that you are using ON-Archive, which is incompatible with NT. Refer to Recovery Report with SAPDBA [Page 465].

6. You read the documentation noting that it covers minor technical differences between SAPDBA-relevant functionality with the two operating systems.

   The Informix directory is referenced differently in UNIX and NT, $INFORMIXDIR with UNIX and %INFORMIXDIR% with NT.

Result
You can use SAPDBA successfully on both operating system platforms and are aware of the differences.
Print a SAPDBA Report

Procedure

To print the report currently being displayed in SAPDBA, proceed as follows, depending on your operating system:

UNIX

1. Choose Print.

   The following Print Report screen appears:
   - Columns: 80
   - Lines: 60
   - Command: lp

   Execute Return

2. If you want to alter the dimensions of the report, choose Columns or Lines.

3. If you want to use a different UNIX command, choose Command and enter the UNIX command you want.

   For example, you could enter the following to send the report results to a file for later printing:
   ```
   cat > print_file
   ```

4. Choose Execute to print the report.

NT

Choose File → Print and follow the prompts.

Printing is the same as usual in Microsoft Windows applications.
SAPDBA Housekeeping

SAPDBA Housekeeping

SAPDBA creates working files, directories, and reports during normal operation and these are not deleted in case you have to use them in the event of difficulties. You need to occasionally perform housekeeping to remove any of these that are no longer required.

⚠️

Do not delete recent data in case it is needed in the event of problems. Allow a sensible period to elapse before deletion. If you are not sure, contact the Informix hotline.

Procedure

1. Identify the files you want to delete
   
   There are a number of different kinds of files and directories that you need to clear up. For more information, see SAPDBA Files, Directories, and Reports [Page 331].

2. Use operating system commands outside SAPDBA to perform the deletion.
SAPDBA Files, Directories, and Reports

Definition
The files, directories, and reports created by SAPDBA are listed in this section.

💡
You need to delete this data from time to time. For more information about deleting the data listed below, see SAPDBA Housekeeping [Page 330].

Use
The following topics are described here:
- Directories and files from reorganizations
- Directories and files from dbspace actions
- Directories and files from data consistency checks
- Download files from "export/import" reorganizations
- SAPDBA recovery report files

Directories and Files from Reorganizations
SAPDBA creates directories and files when you reorganize indexes, tables and dbspaces. This includes all the actions under the following sub-menus of the Reorganization menu (including the corresponding Test Unloads):
- Reorganize Index(es)
- Reorganize Single Table
- Reorganize Group of Tables
- Reorganize Dbspace

The directories are held under the directory $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) and are date and time stamped to enable you to tell the age of the data. SAPDBA creates the following kinds of directory for indexes and tables:
- **Indexes**
  These are named as follows:
  - Reorganizing a single index [Page 381]
    RI_<index name>_<date/time stamp>
  - Reorganizing all indexes of one table [Page 383]:
    RI_<table name>_<date/time stamp>

  For example, the directory RI_affh_p_950601094502 refers to the reorganization of the index affh_p carried out on 1st June 1995 at 09:45:02.
- **Tables**
**SAPDBA Files, Directories, and Reports**

These are named as follows:

- **Reorganizing a dbspace and its tables [Page 398]**
  
  DBS_REORG_<dbspace to reorganize>_<date/time stamp>

  For example, DBS_REORG_psapload_960710165308

- Reorganizations of table(s) using the "alter fragment" procedure:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Table Name</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reorganize tables in dbspace by &quot;alter fragment&quot;</td>
<td>FRAG_&lt;source dbspace name&gt;_&lt;date/time stamp&gt;</td>
<td>FRAG_psapload_960710165308.</td>
</tr>
<tr>
<td>Reorganize tables listed in file by &quot;alter fragment&quot;</td>
<td>FRAG_FILE_&lt;date/time stamp&gt;</td>
<td>FRAG_FILE_960710165308.</td>
</tr>
</tbody>
</table>

- Reorganizations of table(s) using the "insert into select from..." procedure:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Table Name</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reorganize single table by &quot;insert into select from&quot;</td>
<td>MOVE_&lt;table name&gt;_&lt;date/time stamp&gt;</td>
<td>MOVE_a014_960710165308.</td>
</tr>
<tr>
<td>Reorganize tables in dbspace by &quot;insert into select from&quot;</td>
<td>MOVE_&lt;source dbspace name&gt;_&lt;date/time stamp&gt;</td>
<td>MOVE_psapload_960710165308.</td>
</tr>
<tr>
<td>Reorganize tables listed in file by &quot;insert into select from&quot;</td>
<td>MOVE_FILE_&lt;date/time stamp&gt;</td>
<td>MOVE_FILE_960710165308.</td>
</tr>
</tbody>
</table>

- Reorganizations of a table by "export/import"
  
  EXIM_<table name>_<date/time stamp>

  For example, EXIM_a014_960710165308. For a test run, the prefix is TEST instead of EXIM.

  For more information about reorganizing groups of tables, see **Reorganizing a Group of Tables with SAPDBA [Page 394]**.

The files contained in these directories are prefixed with the index or table name to further assist you in case you need to be quite sure that they can safely be deleted. Once sure, you can delete all the files in these directories and then drop the directories themselves.

**Directories and Files from Dbspace Actions**

The following write to the dbspace.log file, which contains logging information about actions on dbspaces:

- Adding a Chunk with SAPDBA [Page 350]
- Dropping a Chunk with SAPDBA [Page 352]
- Adding a Dbspace with SAPDBA [Page 353]
- Dropping a Dbspace with SAPDBA [Page 355]
You can find the `dbspace.log` file in the directory `$INFORMIXDIR/sapreorg` (UNIX) or `%INFORMIXDIR%\sapreorg` (NT).

### Directories and Files from Data Consistency Checks

The following generate directories and files:

- [Checking a Single Table for Data Consistency with](Page 422)
- [Checking Tables of a Dbspace for Data Consistency with SAPDBA](Page 424)
- [Checking Indexes of Tables with ‘Blob’ Fields Using SAPDBA](Page 430)
- [Checking All Tables of R/3 Database for Data Consistency with SAPDBA](Page 428)
- [Checking Indexes of Tables with ‘Blob’ Fields Using ONCHECK -cL with SAPDBA](Page 430)
- [Checking Tables with ‘Blob’ Fields Using ONCHECK -cD with SAPDBA](Page 432)

The directories are held under `$INFORMIXDIR/sapreorg` (UNIX) or `%INFORMIXDIR%\sapreorg` (NT) and are date/time stamped to enable you to tell the age of the data. SAPDBA creates the following kinds of directory according to whether the action name starts with `Check...` or `ONCHECK`... :

- **Check** actions
  
  For example, a check of the table `a014` on the 6th January 1997 at 14:24:03 would produce a directory called:
  
  `CHECK_a014_970106142403`

- **‘ONCHECK’... actions**

  For `‘ONCHECK -cI’ for all tables that contain ‘Blob’ Fields`, the following directory is created:

  `ONCHECK_cI_BLOB_<date/time stamp>`

  For example, `CHECK_cI_BLOB_970106142403`.

  For the `‘ONCHECK -cD’ for all tables that contain ‘Blob’ Fields` action, the names are the same except that “cD” appears instead of “cI”.

The files contained in these directories are prefixed with the table name to further help you in case you need to be sure that they can safely be deleted. Once sure, you can delete all the files in these directories and then drop the directories themselves.

### Download Files from "Export/Import" Reorganizations

Download files containing table data that is generated when you reorganize tables using the "Export/Import" method. See [Reorganizing a Group of Tables with SAPDBA](Page 394). You must delete the download file resulting from this procedure yourself.

⚠️

Do not delete the download file unless you are sure it is no longer required. If you are not sure about whether or not to delete the download file after a SAPDBA operation
SAPDBA Files, Directories, and Reports

has unexpectedly failed, contact the Informix hotline because otherwise you might lose database data.

The download files are located in the directory you specified for download path. For example, if you reorganize a table called a014, SAPDBA produces a file called a014.uld000.Z. There are two exceptions to this naming scheme: first, small tables which are not compressed and so are downloaded to files without the .Z suffix; second, large tables (only with UNIX) are compressed into several files, numbered sequentially. For example: atab.uld000.Z, atab.uld001.Z, atab.uld002.Z and so on.

SAPDBA Recovery Report Files

When you produce a recovery report in SAPDBA, a file is generated. For more information about recovery reports, see Recovery Report with SAPDBA [Page 465].

The recovery report feature is only available if your operating system is UNIX and you use ON-Archive for your archives and backups. You can find the reports in the directory $INFORMIXDIR/sapreorg/recover.rpt. The report name contains the date and time. For example:

1995.05.29_18:43:50_recover.rpt
Server Mode with SAPDBA

Use
You can use SAPDBA for Informix to change the server mode of the Informix database server. SAP recommends you to use SAPDBA rather than the Informix tools (ON-Monitor, onmode, oninit) to change server mode because it is very easy to handle. Furthermore, SAPDBA warns you if you attempt to bring the server down while the R/3 System is still running.

Integration
Changing server mode is fully integrated in SAPDBA. It is available for changing the server mode with databases running on UNIX and NT operating system platforms.

Prerequisites
You know how to use SAPDBA and have set it up correctly. Refer to Getting Started with SAPDBA [Page 316].

Features
The database management system (DBMS) for the Informix database – for example, the Informix Dynamic Server – has a number of different operating modes, as shown in the table below. The first three modes described below come directly under your control with SAPDBA (offline, quiescent, online). The last three modes are invoked as background modes and are all transitory.

### Operating Modes for an Informix Database

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offline</td>
<td>Database server is not running.</td>
</tr>
<tr>
<td>Quiescent</td>
<td>Database server is running but paused. Users informix and root (UNIX) can perform administrative functions. Other users cannot connect to the database but can see status information.</td>
</tr>
<tr>
<td>Online</td>
<td>Database server is fully operational and users can connect to the database for all activities.</td>
</tr>
<tr>
<td>Recovery</td>
<td>Database server is moving from offline to quiescent mode. This mode is automatically invoked if required to bring the database to a consistent state.</td>
</tr>
<tr>
<td>Shutdown</td>
<td>Database server is moving from online to quiescent mode, or from online to offline mode.</td>
</tr>
<tr>
<td>Initializing</td>
<td>Database server is moving from offline to quiescent mode and the shared memory structures are being initialized.</td>
</tr>
</tbody>
</table>

Activities
For more information about using this function, see Changing Server Mode with SAPDBA [Page 336].
Changing Server Mode with SAPDBA

Use
You can use this procedure to change the mode of the Informix database server.

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
1. Choose Server Mode in SAPDBA to change the current server mode
   A dialog box appears displaying the current server mode and stating how many sapr3 users are connected. If not connected is displayed, it is safe to change to offline mode.

   If your operating system is NT, SAPDBA connects to the database as user sapr3. If you want to bring the database into offline mode for any reason – for example, useful when reorganizing tables, which requires all users to be disconnected – you can disconnect while keeping SAPDBA running. Choose ServerMode → Disconnect from OnLine. When the database is later back online and SAPDBA needs a database connection, it automatically reconnects.

2. Choose the server mode you want to switch to.

   When changing to offline or quiescent mode, make sure that the R/3 System is not running. If it is still running, SAPDBA warns you. If other users are still connected to the database, SAPDBA also warns you.

   When changing to online mode, SAPDBA sometimes needs to expand system tables. If so, SAPDBA displays a message and there is a short delay while SAPDBA performs the expand. This occurs automatically and you need take no action.

   The Server Mode you switch to can be any of the three switchable server modes – that is, online, offline, quiescent – described in Server Mode with SAPDBA [Page 335]. The change between modes usually lasts only a short period, depending on which change you have requested. For example, changing from offline to online or quiescent with a large database might take longer since a large amount of shared memory has to be initialized.

Result
SAPDBA switches the database server to the mode you choose.

See also:
Informix documentation
Dbspaces with SAPDBA

Use
You can use SAPDBA for Informix to check the condition of your dbspaces and to modify them, that is, extend, add, or drop dbspaces, and drop chunks. You can choose alternative views of the dbspaces (for example, by chunk or device). You can specify the parameters when modifying dbspaces (for example, the size of a new dbspace).

Integration
Dbspace administration is fully integrated in SAPDBA. You can use this functionality for databases running on UNIX and NT operating system platforms.

Prerequisites
You know how to use SAPDBA and have set it up correctly. Refer to Getting Started with SAPDBA [Page 316].

Features
- SAPDBA executes the commands required to analyze and administer dbspaces. For example, a simple display shows you the available space when you add a dbspace. If you still prefer to use the Informix tools, see Extending a Dbspace Without SAPDBA [Page 39].
- SAPDBA helps you administer temporary and mirrored dbspaces.
- SAPDBA enforces the 2 GB limit for dbspaces and also makes sure that the size of the dbspace is a multiple of the page size on your machine.
- SAPDBA enforces expert mode for actions that modify the database, that is, adding a chunk, adding a dbspace, or dropping a dbspace or chunk. This reduces the risk of unintended changes to the database by inexperienced personnel.
- SAPDBA creates an audit log of its actions on dbspaces in the dbspace.log file in the directory $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT). For more information, see SAPDBA Files, Directories, and Reports [Page 331].

Activities
- Listing Dbspaces with SAPDBA [Page 343]
- Listing Chunks with SAPDBA [Page 339]
- Listing Devices with SAPDBA [Page 346]
- Adding a Chunk with SAPDBA [Page 350]
- Dropping a Chunk with SAPDBA [Page 352]
- Adding a Dbspace with SAPDBA [Page 353]
- Dropping a Dbspace with SAPDBA [Page 355]
- Renaming Chunk Paths with SAPDBA [Page 356]
Dbspaces with SAPDBA

To monitor dbspaces online in the R/3 System, you can use the DBA operations monitor in the Computing Center Management System (CCMS). See Using the DBA Operations Monitor [Ext.].

See also:
Informix documentation
Management of Informix Database Growth [Page 26]
Listing Chunks with SAPDBA

Use

You can use SAPDBA to view information about the chunks in an Informix database.

The display differs slightly according to whether your operating system is UNIX or NT. This is due to the underlying differences in the physical environment between the two operating systems.

If the number of chunks for a dbspace is approaching the maximum or the chunk size is approaching the maximum, an alert is raised in the Release 4 alert monitor in the Computing Center Management System (CCMS) of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext.]

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

1. To view information about chunks in the database, choose Dbspaces → Analyze Dbspace Reports → List Chunks in SAPDBA.

   You see entries similar to the following examples (taken from a UNIX system):

<table>
<thead>
<tr>
<th>dbsname</th>
<th>dev</th>
<th>rawdevice</th>
<th>size[KB]</th>
<th>free[KB]</th>
<th>free[%]</th>
<th>maxgap[KB]</th>
<th>avggap[KB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>logdbs</td>
<td>4</td>
<td>data4</td>
<td>350212</td>
<td>106</td>
<td>0.0</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>logdbs</td>
<td>3</td>
<td>data3</td>
<td>350212</td>
<td>106</td>
<td>0.5</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>physdbs</td>
<td>3</td>
<td>data3</td>
<td>20212</td>
<td>106</td>
<td>0.5</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>physdbs</td>
<td>4</td>
<td>data4</td>
<td>20212</td>
<td>106</td>
<td>0.5</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>psapbtab</td>
<td>3</td>
<td>data3</td>
<td>300000</td>
<td>132326</td>
<td>44.1</td>
<td>132138</td>
<td>26465</td>
</tr>
<tr>
<td>psapclu</td>
<td>1</td>
<td>data1</td>
<td>150000</td>
<td>58814</td>
<td>39.2</td>
<td>58814</td>
<td>58814</td>
</tr>
<tr>
<td>psappool</td>
<td>3</td>
<td>data3</td>
<td>100000</td>
<td>84458</td>
<td>84.5</td>
<td>63978</td>
<td>42229</td>
</tr>
<tr>
<td>psappool</td>
<td>4</td>
<td>data4</td>
<td>200000</td>
<td>10290</td>
<td>5.1</td>
<td>10290</td>
<td>10290</td>
</tr>
</tbody>
</table>

April 2001
Each line refers to a chunk. The lines are displayed in alphabetical order of the dbspace to which the chunk belongs. A mirrored dbspace or a dbspace consisting of a number of chunks appears on more than one line.

The columns above are explained in the following table:

<table>
<thead>
<tr>
<th>Column</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbname</td>
<td>The name of the dbspace to which the chunk belongs. If a dbname appears on two or more lines, then the dbspace is composed of two or more chunks. For example, psappool contains two chunks, one on device 3, file data3 and one on device 4, file data4.</td>
</tr>
<tr>
<td>dev</td>
<td>Depends on your operating system:</td>
</tr>
<tr>
<td></td>
<td>– UNIX</td>
</tr>
<tr>
<td></td>
<td>dev refers to the physical device (that is, disk drive) on which the chunk resides. A physical device normally contains a number of chunks. Therefore, the same value of dev appears on a number of different lines in this report. A question mark appears here if your R/3 System was installed before Release 2.1G.</td>
</tr>
<tr>
<td></td>
<td>– NT</td>
</tr>
<tr>
<td></td>
<td>dev refers to the disk drive on which the chunk resides. According to NT conventions, this is displayed as a letter, for example, C.</td>
</tr>
<tr>
<td>size [kb]</td>
<td>The total size of the chunk, in kilobytes</td>
</tr>
<tr>
<td>free [kb]</td>
<td>The free space, in kilobytes, might not be contiguous, that is, available as a single gap within the chunk.</td>
</tr>
<tr>
<td>free [%]</td>
<td>The amount of free space expressed as a percentage of the overall size of the chunk.</td>
</tr>
<tr>
<td>maxgap [kb]</td>
<td>The size of the maximum free contiguous portion of space available in the chunk, in kilobytes. You can use such a gap to extend tables residing in the dbspace to which the chunk belongs. If a very large table needs extending, the maximum gap might be needed to extend the table.</td>
</tr>
<tr>
<td>avggap [kb]</td>
<td>The size of the average free contiguous portion of space available in the chunk, in kilobytes. You can use such a gap to extend tables residing in the dbspace to which the chunk belongs.</td>
</tr>
</tbody>
</table>

2. For more information about printing the report, see Printing a SAPDBA Report [Page 329].

Result

You have a better picture of the space situation in the chunks of your Informix database. For more information, see Management of Informix Database Growth [Page 26].

See also:

Listing Chunk Paths with SAPDBA [Page 349]
Adding a Chunk with SAPDBA [Page 350]
Dropping a Chunk with SAPDBA [Page 352]
Listing Chunk Paths with SAPDBA [Page 349]
Renaming Chunk Paths with SAPDBA [Page 356]
Listing Dbspaces with SAPDBA

Use

You can use SAPDBA to view information about the dbspaces in an Informix database.

⚠️ To avoid downtime due to dbspaces running out of space, use this report regularly to monitor your dbspaces.

If the amount of free space in a dbspaces is very low or tables cannot be extended with the full next extent size required, an alert is raised in the Release 4 alert monitor in the Computing Center Management System (CCMS) of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext].

For more information, see Database Growth Monitoring [Page 30].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

3. To view information about dbspaces in the database, choose Dbspaces → Analyze Dbspace Reports → List Dbspaces in SAPDBA.

You see entries similar to the following examples:

<table>
<thead>
<tr>
<th>dbsname</th>
<th>size free</th>
<th>free maxnext</th>
<th>avgnext</th>
<th>objs</th>
<th>maxgap</th>
<th>avggap</th>
</tr>
</thead>
<tbody>
<tr>
<td>logdbs</td>
<td>M 3502 12</td>
<td>106 0.0 100 100 1 106 106</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>physdbs</td>
<td>M 2021 2 106 0.5 100 200 1 106 106</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>psapbta</td>
<td>3000 1323</td>
<td>44.1 10240 198 871 1321 38 2646 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>....</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Listing Dbspaces with SAPDBA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>tmpdbs1</td>
<td>T</td>
<td>1024</td>
<td>1020</td>
<td>99.7</td>
<td>100</td>
<td>58</td>
<td>2</td>
<td>9582</td>
<td>3401</td>
</tr>
</tbody>
</table>

Summary DB: 5.55 GB 0.78 GB 14.0% ('free' without temp dbspaces)

Each line refers to a dbspace, except the final line Summary DB, which refers to the entire database. Temporary dbspaces are not shown in the Summary DB line.

The columns above are explained in the following table:

<table>
<thead>
<tr>
<th>Column</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbname</td>
<td>The name of the dbspace, listed in alphabetical order</td>
</tr>
<tr>
<td>mirrored/ temporary</td>
<td>Refers to whether the dbspace is replicated on a second disk drive for extra data reliability, or whether it is a temporary dbspace. M means mirroring is switched on. T means the dbspace is temporary. It is not possible for a dbspace to be both mirrored and temporary. For more information about temporary dbspaces, refer to your Informix documentation.</td>
</tr>
<tr>
<td>size [KB]</td>
<td>The total size of the dbspace, in kilobytes, including all chunks allocated to the dbspace (even if these chunks are partly empty).</td>
</tr>
<tr>
<td>free [KB]</td>
<td>The remaining free space available in the dbspace, in kilobytes. Any space allocated to tables is excluded from this figure. In other words, this refers to the available space left in the dbspace to extend tables.</td>
</tr>
<tr>
<td>free %</td>
<td>The amount of free space expressed as a percentage of the overall size of the dbspace. If this is very small (except in the case of logdbs and physdbs), you need to extend the dbspace. Refer to Adding a Chunk with SAPDBA [Page 350].</td>
</tr>
<tr>
<td>maxnext [KB]</td>
<td>The largest next extent of any table in the dbspace, in kilobytes. If the table with the largest extent received an inflow of data and needed to be extended, this is the amount of space required for the extension. If this amount of space is not available in full, the database server simply acquires the next largest available contiguous portion of space it can find (but no error message appears).</td>
</tr>
<tr>
<td>avgnext [KB]</td>
<td>The average next extent of all tables in the dbspace, in kilobytes. The next extent for a table that needed to be extended would, on average, be this figure.</td>
</tr>
<tr>
<td>objs</td>
<td>The number of objects in the dbspace, including temporary and system tables. When you add a new dbspace, this is always set to 1 because the database server immediately sets up its own system table in the new dbspace.</td>
</tr>
<tr>
<td>maxgap [KB]</td>
<td>The size of the maximum free contiguous portion of space available in the dbspace, in kilobytes. You can use such a gap to extend tables residing in the dbspace. If a very large table needs extending, the maximum gap might be needed to extend the table.</td>
</tr>
<tr>
<td>avggap [KB]</td>
<td>The average size of available contiguous space in the dbspace, in kilobytes. You can use such a gap to extend tables residing in the dbspace.</td>
</tr>
</tbody>
</table>

4. For more information about printing the report, see Printing a SAPDBA Report [Page 329].
Result

You have a better picture of the space situation for the dbspaces of your Informix database. Be sure to add a chunk to a dbspace that is getting too full.

For more information about space management, see Management of Informix Database Growth [Page 26].

See also:

Adding a Dbspace with SAPDBA [Page 353]
Dropping a Dbspace with SAPDBA [Page 355]
Listing Devices with SAPDBA

Use

You can use SAPDBA to view information about the devices in an Informix database.

The display differs according to whether your operating system is UNIX or NT. This is due to the underlying differences in the physical environment between the two operating systems.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

To view information about devices in the database, choose Dbspaces → Analyze Dbspace Reports → List Devices in SAPDBA.

What you see depends on your operating system, UNIX or NT.

UNIX

When you list device information, you see entries similar to the following examples:

<table>
<thead>
<tr>
<th>dev</th>
<th>rawdevice</th>
<th>dbsname</th>
<th>size[KB]</th>
<th>free[KB]</th>
<th>free[%]</th>
<th>accessed</th>
<th>accessed[%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>data1</td>
<td>rootdbs</td>
<td>50000</td>
<td>23278</td>
<td>46.6</td>
<td>9803</td>
<td>9.2</td>
</tr>
<tr>
<td>1</td>
<td>data1</td>
<td>psapuser1</td>
<td>20000</td>
<td>19878</td>
<td>99.4</td>
<td>25</td>
<td>0.0</td>
</tr>
<tr>
<td>1</td>
<td>data1</td>
<td>psapstab</td>
<td>600000</td>
<td>0</td>
<td>0.0</td>
<td>2596</td>
<td>2.4</td>
</tr>
<tr>
<td>1</td>
<td>data1</td>
<td>GAP</td>
<td>98000</td>
<td>98000</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>1</td>
<td>data2</td>
<td>physdbs</td>
<td>20212</td>
<td>106</td>
<td>0.5</td>
<td>343</td>
<td>0.3</td>
</tr>
<tr>
<td>1</td>
<td>data2</td>
<td>psappool</td>
<td>200000</td>
<td>0</td>
<td>0.0</td>
<td>2285</td>
<td>2.1</td>
</tr>
<tr>
<td>1</td>
<td>data2</td>
<td>psapdocu</td>
<td>450000</td>
<td>29582</td>
<td>6.6</td>
<td>21892</td>
<td>20.6</td>
</tr>
<tr>
<td>1</td>
<td>data2</td>
<td>GAP</td>
<td>17788</td>
<td>17788</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Each line refers to an area on a device. This area can either be a chunk (that is, recognized by the database server as a valid storage area holding data) or a gap (that is, free space that might become a chunk in the future). This report is very similar to Listing Chunks with SAPDBA [Page 339], but differs in the following ways:

- Extra lines are displayed showing gaps (that is, free space) on the device. The gaps are available to add chunks if you need to set up a new dbspace or extend an existing dbspace.
The columns *accessed* and *accessed[\%]* only appear on this report.

The columns in the report are explained in the following table:

<table>
<thead>
<tr>
<th>Column</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>dev</td>
<td>The physical device (that is, disk drive) on which the chunk (or gap) resides. A physical device normally contains a number of chunks and gaps. Therefore, the same value of <em>dev</em> appears on a number of different lines in this report. A question mark appears if your R/3 System was installed before Release 2.1G.</td>
</tr>
<tr>
<td>rawdevice</td>
<td>The raw device on which the chunk (or gap) resides. For example, a chunk in R/3 might lie in the directory <code>$INFORMIXDIR/sapdata/physdev3/data4</code>. The value of <em>rawdevice</em> in this example is <em>data4</em>. A raw device normally contains a number of chunks. Therefore, the same value of <em>rawdevice</em> appears on a number of different lines in this report.</td>
</tr>
<tr>
<td>dbsname</td>
<td>The name of the dbspace to which the chunk belongs. If a <em>dbsname</em> (other than <em>gap</em>) appears on two or more lines, this means that the dbspace is composed of two or more chunks. If <em>gap</em> appears, this portion of space is not yet set up as a chunk, that is, it is not actually allocated to a dbspace. A gap is free space that you can use to add a chunk.</td>
</tr>
<tr>
<td>size [KB]</td>
<td>The total size of the chunk or gap, in kilobytes</td>
</tr>
<tr>
<td>free [KB]</td>
<td>The remaining contiguous free space available in the chunk, in kilobytes. For a gap, this is equivalent to <em>size</em> because a gap consists of free space.</td>
</tr>
<tr>
<td>free [%]</td>
<td>The amount of free space expressed as a percentage of the overall size of the chunk or gap. For a gap, this is always 100% because a gap is by definition composed of free space.</td>
</tr>
<tr>
<td>accessed</td>
<td>The number of disk accesses for the chunk.</td>
</tr>
<tr>
<td>accessed [%]</td>
<td>The percentage of all disk accesses for the chunk.</td>
</tr>
</tbody>
</table>

**NT**

You see entries similar to the following examples:

<table>
<thead>
<tr>
<th>drive</th>
<th>free [KB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>10030</td>
</tr>
<tr>
<td>D</td>
<td>14404</td>
</tr>
<tr>
<td>......</td>
<td></td>
</tr>
</tbody>
</table>

Each line refers to a single disk drive, as follows:

- *drive* refers to the name of the disk drive.
- *free [KB]* refers to the remaining free space available on the disk drive.

For more information about printing the report with UNIX or NT, see *Printing a SAPDBA Report* [Page 329].
Listing Devices with SAPDBA

Result

You have a better picture of the space situation in the devices of your Informix database. For more information, see Management of Informix Database Growth [Page 26].
Listing Chunk Paths with SAPDBA

Use
You can use SAPDBA to view information about chunk paths in an Informix database.
If you want to rename the chunk paths, see Renaming Chunk Paths with SAPDBA [Page 356].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
1. Choose Dbspaces → Analyze Dbspace Reports → List Chunk Paths in SAPDBA.

   You see entries similar to the following examples:

<table>
<thead>
<tr>
<th>Nr</th>
<th>Type</th>
<th>Chunk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P</td>
<td>/informix/CX5/sapdata/physdev1/data1</td>
</tr>
<tr>
<td>2</td>
<td>P</td>
<td>/informix/CX5/sapdata/physdev1/data1</td>
</tr>
<tr>
<td>3</td>
<td>P</td>
<td>/informix/CX5/sapdata/physdev3/data5</td>
</tr>
<tr>
<td>4</td>
<td>P</td>
<td>/informix/CX5/sapdata/physdev1/data1</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>/informix/CX5/sapdata/physdev2/data4</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   The Type column refers to whether the chunk is a primary chunk or a mirrored chunk.

2. For more information about printing the report, see Printing a SAPDBA Report [Page 329].

Result
You have a better picture of the chunk path names in your Informix database.
Adding a Chunk with SAPDBA

**Use**

You can use SAPDBA to extend an existing dbspace in your Informix database, because the dbspace is full or soon will be. Adding a chunk extends a dbspace. For more information about checking how full your dbspaces are, see *Listing Dbspaces with SAPDBA [Page 343]*. For more information, see *Extension of a Dbspace [Page 36]*.

**Prerequisites**

- SAPDBA is installed correctly. Refer to *SAPDBA Setup [Page 317]*.
- You are logged on in *expert* mode, that is, as user *informix*, and you have started SAPDBA. Refer to *Starting SAPDBA [Page 324]*.
- There is enough disk space available for the new chunk. SAPDBA checks the available disk space during the procedure.

**Procedure**

1. Choose *Dbspaces → Add a Chunk* in SAPDBA.
2. Enter the *dbspace* you want to extend with a new chunk. If you are not sure which name you require, you can use a partial entry (for example, *ps*).
3. Choose *Continue* to carry on.

   SAPDBA displays further fields for you to specify the size and location of the new primary chunk. If you are adding a chunk to a mirrored dbspace, SAPDBA also displays fields for the location of the mirror chunk. The size of the mirror chunk is the same as the primary chunk.

   The minimum size is 1000 KB and the maximum is 2 GB. SAPDBA checks that the size you enter is a multiple of the page size on your machine, usually either 2 or 4 KB. The size you enter is also the threshold for the display in the dialog boxes for *location of primary chunk* and *location of mirror chunk*.

4. To define the chunk size in kilobytes, enter a value in the field *Size*.
5. Use *location of primary chunk* to define where the new primary chunk is stored:
   a. Choose *Select gap* (UNIX) or *Select device* (NT).

      SAPDBA displays a dialog box showing the *Available Gaps* (UNIX) or disk drives (NT) on your system. The entries in the dialog box are the same as on *Listing Devices with SAPDBA [Page 346]* but only the free space is shown.

      Only devices with free space equal to or greater than the *Size* of the chunk you entered in the previous step are displayed. Therefore, if you specified a large chunk size, it is possible that no gaps or disk drives are displayed.

   b. Select a suitable gap (UNIX) or disk drive (NT).

      SAPDBA fills the fields specifying the location of the primary chunk, using the values you selected.
6. If the dbspace is mirrored, use the box location of mirror chunk to define where the new mirror chunk is stored. Follow the instructions given for location of primary chunk in the previous step. SAPDBA looks for disk space for the mirror chunk on a physically different disk drive than the primary chunk.

7. Choose Execute.

**Result**

SAPDBA adds the chunk. For a mirrored dbspace, SAPDBA adds both primary and mirror chunks.

SAPDBA displays a confirmation message. If the chunk could not be added, SAPDBA displays an error message including any further information available.

You can check the results by looking in the dbspace.log file, which you can find in the directory $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT). For more information, see SAPDBA Files, Directories, and Reports [Page 331]. Here is an example of the entry that SAPDBA writes to this file:

<table>
<thead>
<tr>
<th>DBSPACE EXTENSION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
</tr>
<tr>
<td>11.Dec.98, 13:37:10</td>
</tr>
</tbody>
</table>

Primary Path:
/informix/CX5/sapdata/physdev1/data1

See also:

Dropping a Chunk with SAPDBA [Page 352]
Dropping a Chunk with SAPDBA

**Use**

You can use SAPDBA to drop an empty chunk from your Informix database. SAPDBA only lets you delete empty chunks.

**Prerequisites**

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- The chunk to be dropped is empty (that is, it does not contain any data).

**Procedure**

1. Choose Dbspaces → Drop a Chunk in SAPDBA. SAPDBA displays a list of empty chunks.
2. Select the chunk you want to drop.
3. Choose Continue.

**Result**

SAPDBA drops the chunk and displays a confirmation message. If the chunk could not be dropped, SAPDBA displays an error message including any further information available.

You can check the results by looking in the dbspace.log file, which you can find in the directory $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT). For more information, see SAPDBA Files, Directories, and Reports [Page 331]. Here is an example of the entry that SAPDBA writes to this file:

<table>
<thead>
<tr>
<th>Date</th>
<th>Dbspace</th>
<th>Size [KB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.Dec.98, 13:37:10</td>
<td>PSAPBTAB</td>
<td>1000</td>
</tr>
</tbody>
</table>

Primary Path:
/informix/CX5/sapdata/physdev1/data1

**See also:**

Dropping a Chunk with SAPDBA [Page 350]
Adding a Dbspace with SAPDBA

Use

You can use SAPDBA to add a dbspace to your Informix database. For more information about when to add a new dbspace, see Creation of a New Dbspace [Page 41].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- There is enough disk space available for the new dbspace. SAPDBA checks the available disk space during the procedure.

Procedure

1. Choose Dbspaces → Add a Dbspace in SAPDBA.

   If you are adding a dbspace for the R/3 System, make sure you give it a name beginning with psap, for example, psapdbs01. The ABAP Dictionary in the R/3 System is only updated with the new dbspace name if it begins with psap. If the ABAP Dictionary contains information about a dbspace, the dbspace is retained during upgrades, so you do not have to recreate the dbspace and its objects (that is, tables, indexes and so on). If you choose a name for your dbspace that does not begin with psap, SAPDBA warns you that it will not be registered in the Dictionary.

2. Enter the name of the dbspace you want to add.

   The characteristics of the new dbspace are whether it is mirrored and whether it is temporary. Mirroring is used to replicate the dbspace on a second physical disk drive for improved reliability. Temporary dbspaces are used to store temporary tables. For more information about temporary dbspaces, refer to your Informix documentation.

3. Select whether you want the dbspace to be mirrored, and whether you want it to be temporary.

4. Choose Continue.

   SAPDBA displays further fields for you to specify the size and location of the primary chunk of the new dbspace. If you are adding a mirrored dbspace, SAPDBA also displays fields for the location of the mirror chunk. The size of the mirror chunk is the same as the primary chunk.

   You must specify the size first, followed by the location.

5. To define the chunk size in kilobytes, enter a value in the field Size.

   The minimum size is 1000 KB and the maximum is 2 GB. SAPDBA checks that the size you enter is a multiple of the page size on your machine, usually either 2 or 4 KB. The size you enter here is also the threshold for the display in the dialog boxes for location of primary chunk and location of mirror chunk.

6. To define where the new primary chunk is stored, use location of primary chunk:

   a. Choose Select gap (UNIX) or Select device (NT).
Adding a Dbspace with SAPDBA

SAPDBA displays a dialog box showing the Available Gaps (UNIX) or disk drives (NT) on your system. The entries in the dialog box are the same as on Listing Devices with SAPDBA [Page 346] but only the free space is shown.

Only devices with free space equal to or greater than the Size of the chunk you entered in the previous step are displayed. Therefore, if you specified a large chunk size, it is possible that no gaps or disk drives are displayed.

b. Select a suitable gap (UNIX) or disk drive (NT).

SAPDBA fills the fields specifying the location of the primary chunk, using the values you selected.

7. If the dbspace is mirrored, use the box location of mirror chunk to define where the mirror chunk is stored. Use the instructions given for location of primary chunk in the previous step. SAPDBA looks for disk space for the mirror chunk on a physically different disk drive than the primary chunk.

8. Choose Execute.

SAPDBA adds the dbspace. For a mirrored dbspace, SAPDBA adds both primary and mirror chunks.

Result

SAPDBA displays a confirmation message. If the dbspace could not be added, SAPDBA displays an error message including any further information available.

You can check the results by looking in the dbspace.log file, which you can find in the directory $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT). For more information, see SAPDBA Files, Directories, and Reports [Page 331]. Here is an example of the entry that SAPDBA writes to this file:

<table>
<thead>
<tr>
<th>Date</th>
<th>Dbspace</th>
<th>Size [KB]</th>
<th>Offset [KB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.Dec.98, 13:37:10</td>
<td>PSAPSTAB</td>
<td>1000</td>
<td>2090016</td>
</tr>
</tbody>
</table>

Primary Path:
/informix/CX5/sapdata/physdev1/data1

See also:

Dropping a Dbspace with SAPDBA [Page 355]
Dropping a Dbspace with SAPDBA

Use
You can use SAPDBA to drop an empty dbspace from your Informix database. SAPDBA checks whether the dbspace is empty during the procedure.

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- The dbspace to be dropped is empty (that is, it does not contain any tables).

Procedure
1. Choose Dbspaces → Drop a Dbspace in SAPDBA.
2. Enter the dbspace that you want to drop.
3. Choose Continue.

Result
SAPDBA drops the dbspace and displays a confirmation message. If the dbspace could not be dropped, SAPDBA displays an error message including any further information available.

You can check the results by looking in the dbspace.log file, which you can find in the directory $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT). For more information, see SAPDBA Files, Directories, and Reports [Page 331]. Here is an example of the entry that SAPDBA writes to this file:

<table>
<thead>
<tr>
<th>DBSPACE DELETION:</th>
<th>Date</th>
<th>Dbspace</th>
<th>Size [KB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11.Dec.98, 13:37:10</td>
<td>PSAPBTAB</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>Primary Path: /informix/CX5/sapdata/physdev1/data1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See also:
Adding a Dbspace with SAPDBA [Page 353]
Renaming Chunk Paths with SAPDBA

Use
You can use SAPDBA to rename chunk paths in your Informix database. For example, you can use this during a system copy.

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- Create a level-0 (full) database backup (ON-Bar) or archive (ON-Archive or ontape) before reorganization. For more information, see:
  - Creation of a Database Backup (ON-Bar) [Page 114]
  - Creation of an Archive (ON-Archive) [Page 141]
  - Creation of an Archive (ontape) [Page 159]
    If data is lost during the renaming of the chunk paths, you can then restore [Page 252] the database using this database backup or archive.
- The database server is in offline mode. Refer to Changing Server Mode with SAPDBA [Page 336].

Procedure
4. Choose Dbspaces → Rename Chunk Path in SAPDBA.
   SAPDBA prompts to make sure that you have completed a level-0 backup.
5. Enter the new SID (that is, system id) for the chunk paths.
6. If you are using Windows NT, specify the disk drive too. You can specify the disk drive for all chunks or for individual chunks.
7. If required, choose List Chunk Paths to see the names of the current chunk paths.
   This is the same functionality as in Listing Chunk Paths with SAPDBA [Page 349].
8. Choose Continue.

Result
SAPDBA renames the chunk paths and displays a confirmation message.

See also:
SAP Notes 191314 and 158079
Dropping a Chunk with SAPDBA [Page 352]
Adding a Chunk with SAPDBA [Page 350]
Reorganization with SAPDBA

Use
You can use SAPDBA for Informix to view the storage parameters on database objects (that is, tables and indexes) and, if necessary, reorganize the objects. Storage parameters include extent sizes, locking modes, dbspace for a table, and so on. If you use SAPDBA to view storage parameters and reorganize, you do not need to know the Informix commands.

Having completed an analysis of a table or index, you might then decide on a reorganization to resolve the problem.

Integration
Reorganization is fully integrated in SAPDBA. You can use this functionality for databases running on UNIX and NT operating system platforms.

Prerequisites
You need to know how to use SAPDBA and to have set it up correctly. Refer to Getting Started with SAPDBA [Page 316].

Features
- Reports available on storage parameters of tables and indexes
- Reorganization of tables, indexes, and dbspaces possible
- Usually no need to bring database down
- Uncompleted reorganizations – whether intentionally or due to error – can be restarted or deleted
- Log to show the course of the reorganization
- Expert mode required for reorganizations

Activities
1. You use the SAPDBA reports to analyze the storage of database objects. Refer to Storage Analysis of Tables and Indexes with SAPDBA [Page 360].

   If a reorganization is required, alerts are also raised in the Release 4 alert monitor in the Computing Center Management System of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext].

2. If you want to monitor storage of database objects online in the R/3 System, you can use the DBA operations monitor in the Computing Center Management System (CCMS). See Using the DBA Operations Monitor [Ext].

3. You use SAPDBA to perform the reorganization on the database object with the problem. Refer to Reorganization of Tables, Indexes, and Dbspaces with SAPDBA [Page 380].
See also:
Informix documentation

Management of Informix Database Growth [Page 26]
Storage Analysis of Tables and Indexes with SAPDBA

Purpose
You can use SAPDBA for Informix to analyze the following storage information on tables and indexes:

- Dbspace
- Fill level
- Fragmentation
- Largest free segment (that is, tables with critical next extent size)
- Leaves and levels for indexes
- Locking mode for table
- Number and size of rows for table
- Number of columns for table
- Number of extents for table
- Number of extents still available for table
- Number of indexes for a table
- Size

SAPDBA sorts the information according to various criteria. For example, you can view tables or indexes sorted by fill level, by size, and so on.

For more information, see Database Growth Monitoring [Page 30].

Process Flow
You choose the SAPDBA analysis that you require from the following:

- Tables
  - Analyzing Tables by Fill Level, Size, and Extents with SAPDBA [Page 362]
  - Analyzing Table Information with SAPDBA [Page 365]
  - Analyzing Tables for Critical Next Extent Size with SAPDBA [Page 368]
  -

- Indexes
  - Analyzing Indexes by Fill Level, Leaves, and Levels with SAPDBA [Page 370]
  - Analyzing Indexes of a Table with SAPDBA [Page 373]
  - Analyzing Index Information with SAPDBA [Page 375]

- Analyzing a Tablespace with SAPDBA [Page 378]
Result

Having formed the best possible picture of the storage situation, you can now decide what action to take, if any. You might decide on the following actions:

- Reorganize an object
  Refer to Reorganization of Tables, Indexes, and Dbspaces with SAPDBA [Page 380].

- Extend a dbspace that is too full
  Refer to Adding a Chunk with SAPDBA [Page 350].

See also:
Informix documentatation
Analyzing Tables by Fill Level, Size, and Extents with SAPDBA

Use

You can use SAPDBA for Informix to analyze tables by fill level, size, number of extents, and number of extents left.

If a table has very few extents left, an alert is raised in the Release 4 alert monitor in the Computing Center Management System (CCMS) of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

1. Choose Reorganization → Analyze Table Reports in SAPDBA for Informix.
2. Choose one of the following:
   - Tables by Fill Level
   - Tables by Size
   - Tables by Number of Extents
   - Tables by Number of Extents left
3. In the field dbspace, you specify the dbspace that SAPDBA searches for tables to include in the report.
   The default is ALL, that is, tables from all dbspaces are included in the report. If you do not know the name of the dbspace you want, you can use a partial entry (for example, ps*) and SAPDBA lists the matching dbspaces.
4. In the field threshold value, you specify a minimum value that SAPDBA uses to filter the tables for the report.
   The threshold varies according to the report you have selected, as follows:

<table>
<thead>
<tr>
<th>Selection Criterion</th>
<th>Report title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table size KB</td>
<td>Tables by Fill Level</td>
</tr>
<tr>
<td>Table size KB</td>
<td>Tables by Size</td>
</tr>
<tr>
<td>Number of extents</td>
<td>Tables by Number of Extents</td>
</tr>
<tr>
<td>Number of extents</td>
<td>Tables by Number of Extents Still Available</td>
</tr>
</tbody>
</table>
If possible, set a sensible threshold value to restrict reports to a single dbspace. This means that the average processing time to produce a report is usually between a few seconds and a few minutes. If you set low thresholds and include all dbspaces then the run times are significantly longer.

5. In the field sort order, you specify how the report is sorted, either ascending or descending.

6. Execute the report.

SAPDBA displays the report with entries similar to the following example (this report is for all dbspaces by size):

<table>
<thead>
<tr>
<th>table</th>
<th>fill [%]</th>
<th>size [KB]</th>
<th>extents</th>
<th>dbspace</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ddxtf</td>
<td>71</td>
<td>25280</td>
<td>1</td>
<td>psapddic</td>
</tr>
<tr>
<td>2) dprsr</td>
<td>71</td>
<td>20480</td>
<td>1</td>
<td>psapprot</td>
</tr>
<tr>
<td>3) d331l</td>
<td>-</td>
<td>19480</td>
<td>1</td>
<td>psapload</td>
</tr>
<tr>
<td>4) ce2s001</td>
<td>-</td>
<td>17760</td>
<td>1</td>
<td>psapstab</td>
</tr>
<tr>
<td>5) ddlog</td>
<td>74</td>
<td>15000</td>
<td>1</td>
<td>psapprot</td>
</tr>
</tbody>
</table>

The tables are listed in order of the report title. The entries on the report have the following meaning:

<table>
<thead>
<tr>
<th>Column</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>fill [%]</td>
<td>Indicates approximately how full a table is. Consider the following when reading this value:</td>
</tr>
<tr>
<td></td>
<td>- Fill level might be out of date in some cases because the statistics for the table have not recently been updated. If you choose the action to display more information about such a table, you can request that SAPDBA updates statistics [Ext.] to calculate a current fill level.</td>
</tr>
<tr>
<td></td>
<td>- Fill level is not displayed if the table contains blobpage information (because this would take too long). Instead, you see a hyphen. SAPDBA can calculate the fill level in such cases when you view table information [Page 365]. Therefore, such tables do not appear in the Tables by Fill Level report. However, they are included in the other table reports and appear with a hyphen in the fill level field (for example, table d331l in the previous example). For information about blobpages, see the Informix documentation.</td>
</tr>
<tr>
<td>size [KB]</td>
<td>Shows the total storage used by the table, in kilobytes. This includes all space currently allocated to the table (that is, data, index and blobpages). The size given here is not necessarily full with data. See the fill [%] field for how full the table is.</td>
</tr>
<tr>
<td>extents</td>
<td>Shows the number of physical storage units occupied by the table. It is not advisable for a table to have a large number of extents.</td>
</tr>
</tbody>
</table>
Analyzing Tables by Fill Level, Size, and Extents with SAPDBA

| dbservice | Shows where the table is stored. If the table is fragmented (possible with Informix version 7.1 or later), it is stored in a number of different dbspaces instead of in a single dbservice. This only appears when you specify ALL for the dbservice. |

7. To see more detailed storage information for a single table, choose one of the numbers on the left of the report. For more information, see Analyzing Table Information with SAPDBA [Page 365].

8. For more information about printing the report, see Printing a SAPDBA Report [Page 329].

Result

You now have a better picture of the storage situation for the tables in question. For more information if you want to perform a reorganization, see:

- Reorganizing a Single Table with SAPDBA [Page 387]
- Reorganization of a Group of Tables or Dbspace with SAPDBA [Page 392]

See also:

Informix documentation
Analyzing Table Information with SAPDBA

Use
You can use SAPDBA for Informix to comprehensively analyze information about a single table. If you want to look at information on more than one table, see Analyzing Tables by Fill Level, Size, and Extents with SAPDBA [Page 362].

If a table has very few extents left, an alert is raised in the Release 4 alert monitor in the Computing Center Management System (CCMS) of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext.].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
7. Choose Reorganization → Analyze Table Reports → Table Information in SAPDBA for Informix.
8. In table name, enter data as required. If you do not know the name of the table you want, you can use a partial entry (for example, a0*) and SAPDBA lists the matching tables.
9. Execute the report.

SAPDBA displays the report.

Sometimes SAPDBA offers to update statistics [Ext.] before the Table Information report screen appears, because statistics data on the table is out-of-date. You can immediately perform an update for the table concerned to get an accurate report on it. For more information about how to identify tables needing an update and how to perform the update, see Update Statistics with SAPDBA [Page 440].

The entries on the report have the following meanings:

<table>
<thead>
<tr>
<th>Entry</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbspace</td>
<td>Shows where the table is logically stored. If the table is fragmented, it is stored in a number of different dbspaces instead of in one single dbspace.</td>
</tr>
<tr>
<td>fragmentation</td>
<td>Allows tables to be spread across separate dbspaces. Possible values are none, round-robin, or by expression. Only relevant for Informix version 7.1 or later.</td>
</tr>
<tr>
<td>locking mode</td>
<td>Refers to how data in the table is locked by the database server.</td>
</tr>
</tbody>
</table>
Analyzing Table Information with SAPDBA

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>first extent</td>
<td>Shows the size (in kilobytes) of the first extent (that is, physical storage unit) of the table</td>
</tr>
<tr>
<td>next extent</td>
<td>Shows the size (in kilobytes) of the next extent, which would be allocated if the table needed expanding</td>
</tr>
<tr>
<td>size</td>
<td>Shows how big the table is (in kilobytes). The size given here is not necessarily filled with data. See the fill level field for how full the table is.</td>
</tr>
<tr>
<td>extents</td>
<td>Shows the number of extents currently used by the table, with the number still available for extension of the table shown in brackets. If there are no extents still available and the table needs expanding, SAPDBA reports an error message. You can prevent this situation arising by performing Reorganize Single Table [Page 387].</td>
</tr>
<tr>
<td>rows</td>
<td>Shows the number of rows in the table</td>
</tr>
<tr>
<td>columns</td>
<td>Shows the number of columns in the table</td>
</tr>
<tr>
<td>row size</td>
<td>Shows the width of a row in bytes</td>
</tr>
<tr>
<td>indexes</td>
<td>Shows the number of indexes on the table</td>
</tr>
<tr>
<td>fill level</td>
<td>Shows approximately how full the table is. Fill level is not known immediately if the table contains blobpages. In this case, the field simply contains a hyphen. You can request SAPDBA to calculate the table fill level.</td>
</tr>
</tbody>
</table>

10. If the table is fragmented, you can display the dbspaces that contain the table fragments by choosing Display Dbspaces Containing Table Fragments.

11. If the table contains blobpages, you can display the fill level by choosing Calculate Fill Level.

   SAPDBA has to count the blobpages individually, so this can take some time, especially with larger tables. The fill level is calculated for data pages and blobpages together.

   ! Warning

   SAPDBA locks the table when calculating fill level. A locked table can affect the operation of the R/3 System if the table needs to be accessed. Therefore, it is best to execute this action when the R/3 System is down or not being heavily used.

12. For more information about printing the report, see Printing a SAPDBA Report [Page 329].

**Result**

You now have a better picture of the storage situation for the table in question. If you want to change the storage parameters on the table or its indexes, choose one of the following:

- Reorganize all Indexes of the Table [Page 383]
- Reorganize Single Table [Page 387]
- Change ‘Next Extent Size’ or ‘Lock Mode’ of Table [Page 416]

**See also:**

Informix documentation
Analyzing Tables for Critical Next Extent Size with SAPDBA

Use

You can use SAPDBA for Informix to analyze tables for which the next extent size is critical. If such tables need to be extended, the database server cannot meet the demand for the next extent in full.

If a table cannot be fully extended, an alert is raised in the Release 4 alert monitor in the Computing Center Management System (CCMS) of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix)

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

13. Choose Reorganization → Analyze Table Reports → Table with Critical Next Extent Size in SAPDBA for Informix.

14. In the field dbspace, you specify the dbspace that SAPDBA searches for tables to include in the report.

   The default is ALL, that is, tables from all dbspaces are included in the report. If you do not know the name of the dbspace you want, you can use a partial entry (for example, ps*) and SAPDBA lists the corresponding dbspaces.

15. Execute the report.

   SAPDBA displays the report, listing tables in descending order of next extent size.

   If you specify ALL for the dbspace, the report looks like the following example:

<table>
<thead>
<tr>
<th>table</th>
<th>dbspace</th>
<th>next_extent [KB]</th>
<th>largest_free_seg [KB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) d010s</td>
<td>psapsource</td>
<td>10240</td>
<td>2</td>
</tr>
<tr>
<td>2) d301s</td>
<td>psapsource</td>
<td>10240</td>
<td>2</td>
</tr>
<tr>
<td>3) d311m</td>
<td>psapsource</td>
<td>10240</td>
<td>2</td>
</tr>
<tr>
<td>4) adrg</td>
<td>psapstab</td>
<td>10240</td>
<td>2</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   If you specify a dbspace, the report looks like the following:

<table>
<thead>
<tr>
<th>dbspace:</th>
<th>psapsource</th>
</tr>
</thead>
<tbody>
<tr>
<td>largest free space segment: 3928 KB</td>
<td></td>
</tr>
</tbody>
</table>
### Analyzing Tables for Critical Next Extent Size with SAPDBA

<table>
<thead>
<tr>
<th>table</th>
<th>next_extent [KB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>d010s</td>
<td>10240</td>
</tr>
<tr>
<td>d301s</td>
<td>10240</td>
</tr>
<tr>
<td>d311m</td>
<td>10240</td>
</tr>
</tbody>
</table>

The entries on the report have the following meanings:

<table>
<thead>
<tr>
<th>Field or Column</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbspace</td>
<td>Shows where the dbspace is stored. This only appears when you specify ALL for the dbspace.</td>
</tr>
<tr>
<td>next_extent</td>
<td>Shows how large the table’s next extent ought to be, in kilobytes.</td>
</tr>
<tr>
<td>largest_free_seg or largest free space segment</td>
<td>Shows the size of the largest free contiguous area of storage in the dbspace, in kilobytes. If a table needs to be extended, this is the largest single piece of storage available for the extension.</td>
</tr>
</tbody>
</table>

16. To see more detailed storage information for a single table, choose one of the numbers on the left of the report. For more information, see [Analyzing Table Information with SAPDBA](Page 365).

⚠️

You must extend dbspaces for tables with a critical next extent size. If tables in the dbspace are expanding, soon the requirement for extra storage cannot be met at all and you get an error message, “SQL error -271”.

If you do not extend dbspaces containing tables with a critical next extent size, the tables might end up with a large number of very small extents. The result is performance loss, especially on sequential table scans.

17. For more information about printing the report, see [Printing a SAPDBA Report](Page 329).

**Result**

You now know which tables have a critical next extent size. Be sure to extend dbspaces containing tables with a critical next extent size. Refer to [Adding a Chunk with SAPDBA](Page 350). For more information if you want to reallocate the dbspace and reorganize all its tables, see [Reorganizing a Dbspace and Its Tables with SAPDBA](Page 398).

**See also:**

Informix documentation
Analyzing Indexes by Fill Level, Leaves, and Levels with SAPDBA

Use
You can use SAPDBA for Informix to analyze indexes by fill level, leaves, and index levels.

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
18. Choose Reorganization → Analyze Index Reports in SAPDBA for Informix.
19. Choose one of the following:
   - Unique Indexes by Fill Level
   - Indexes by Number of Leaves
   - Indexes by Number of Levels
20. In the field dbspace, you specify the dbspace that SAPDBA searches for indexes to include in the report.
    The default is ALL, that is, indexes from all dbspaces are included in the report. If you do not know the name of the dbspace you want, you can use a partial entry (for example, ps*) and SAPDBA lists the corresponding dbspaces.
21. In the field threshold value, you specify a minimum value that SAPDBA uses to filter the indexes for the report.
    The threshold varies according to the report you have selected, as follows:

<table>
<thead>
<tr>
<th>Selection Criterion</th>
<th>Report title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of index levels</td>
<td>Unique Indexes by Fill Level</td>
</tr>
<tr>
<td>Number of index leaves</td>
<td>Indexes by Number of Leaves</td>
</tr>
<tr>
<td>Number of index levels</td>
<td>Indexes by Number of Levels</td>
</tr>
</tbody>
</table>

If possible, set a sensible threshold value to restrict reports to a single dbspace. This means that the average processing time to produce a report is usually between a few seconds and a few minutes. If you set low thresholds and include all dbspaces then the run times are significantly longer.

22. In the field sort order, you specify how the report is sorted, either ascending or descending.
23. Execute the report.
    SAPDBA displays the report with entries similar to the following example (this report is for number of leaves):
Analyzing Indexes by Fill Level, Leaves, and Levels with SAPDBA

<table>
<thead>
<tr>
<th>index</th>
<th>fill [%]</th>
<th>levels</th>
<th>leaves</th>
<th>table</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 1093_2102</td>
<td>68</td>
<td>3</td>
<td>171</td>
<td>funkt</td>
</tr>
<tr>
<td>2) setdata0</td>
<td>75</td>
<td>3</td>
<td>144</td>
<td>dokhl</td>
</tr>
<tr>
<td>3) 1439_1502</td>
<td>56</td>
<td>3</td>
<td>138</td>
<td>dsysd</td>
</tr>
<tr>
<td>4) makt__m</td>
<td>-</td>
<td>3</td>
<td>128</td>
<td>dsysa</td>
</tr>
<tr>
<td>5) tbtco__2</td>
<td>-</td>
<td>3</td>
<td>102</td>
<td>dd031</td>
</tr>
<tr>
<td>....</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The indexes are listed in order of the report title. The entries on the report have the following meanings:

<table>
<thead>
<tr>
<th>Column</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>fill [%]</td>
<td>Indicates approximately how full the index is. SAPDBA can only derive this figure for unique indexes. The report <em>Unique Indexes by Fill Level</em> does not contain any duplicate (that is, non-unique) indexes. With duplicate indexes, SAPDBA would have to scan each table to work out how many unique values there are for the indexed column and this would take too long. Therefore, for the other reports, duplicate indexes are shown with a hyphen in the <em>fill [%]</em> column.</td>
</tr>
<tr>
<td>levels</td>
<td>Shows how many levels the index has, indicating how large the index is</td>
</tr>
<tr>
<td>leaves</td>
<td>Shows how many leaf pages the index has, indicating how large the index is</td>
</tr>
<tr>
<td>table</td>
<td>Shows which table the index belongs to</td>
</tr>
<tr>
<td>dbspace</td>
<td>Shows where the index is stored. If the index is fragmented (possible with Informix version 7.1 or later), it is stored in a number of different dbspaces instead of in a single dbspace. This only appears when you specify a dbspace.</td>
</tr>
</tbody>
</table>

The figures in this report might be out of date if the statistics on the table owning an index are out of date. In this case, when you select one of the numbers on the left to see detailed index information, SAPDBA offers to update statistics [Ext.] on the table.

24. To see more detailed storage information for a single index, choose one of the numbers on the left of the report. For more information, see *Analyzing Index Information with SAPDBA* [Page 375].

25. For more information about printing the report, see *Printing a SAPDBA Report* [Page 329].

**Result**

You now have a better picture of the storage situation for the indexes in question. For more information if you want to perform a reorganization, see:

- *Reorganizing a Single Index with SAPDBA* [Page 381]
- *Reorganizing All Indexes of One Table with SADPBA* [Page 383]
Analyzing Indexes by Fill Level, Leaves, and Levels with SAPDBA

See also:

Informix documentation
Analyzing Indexes of a Table with SAPDBA

Use

You can use SAPDBA for Informix to see information about all the indexes of a table, including unique and duplicate indexes.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

26. Choose Reorganization → Analyze Index Reports → Indexes of Table in SAPDBA for Informix.

27. In table name, enter data as required. If you do not know the name of the table you want, you can use a partial entry (for example, a0*) and SAPDBA lists the matching tables.

28. Execute the report.

   SAPDBA displays the report.

   Sometimes SAPDBA offers to update statistics [Ext.] before the Index Information report screen appears, because the statistics data on the table is out-of-date. You can immediately perform an update for the table concerned to get an accurate report on it. For more information about how to identify tables needing an update and how to perform the update, see Update Statistics with SAPDBA [Page 440].

The entries on the report have the following meaning:

<table>
<thead>
<tr>
<th>Entry</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>table name</td>
<td>Shows which table the index(es) relate to</td>
</tr>
<tr>
<td>type</td>
<td>Shows how the index was created:</td>
</tr>
<tr>
<td></td>
<td>• Unique</td>
</tr>
<tr>
<td></td>
<td>Two rows can have the same value for the indexed column(s).</td>
</tr>
<tr>
<td></td>
<td>• Duplicate</td>
</tr>
<tr>
<td></td>
<td>Two or more rows can have the same value for the indexed column(s).</td>
</tr>
<tr>
<td>levels</td>
<td>Shows how many levels the index has, indicating how large the index is</td>
</tr>
<tr>
<td>leaves</td>
<td>Shows how many leaves the index has, indicating how large the index is</td>
</tr>
<tr>
<td>fill [%]</td>
<td>Shows approximately how full the index is. Note that duplicate (that is, non-unique) indexes appear with a hyphen in this field, because it would take too long for SAPDBA to derive a fill level.</td>
</tr>
</tbody>
</table>
Analyzing Indexes of a Table with SAPDBA

4. To see more detailed storage information for a single index, choose one of the numbers on the left of the report. For more information, see Analyzing Index Information with SAPDBA [Page 375].

5. For more information about printing the report, see Printing a SAPDBA Report [Page 329].

Result

You now have a better picture of the storage situation for the indexes of the table in question. For more information if you want to perform a reorganization, see Reorganizing All Indexes of One Table with SADPBA [Page 383].

See also:

Informix documentation
Analyzing Index Information with SAPDBA

Use

You can use SAPDBA for Informix to comprehensively analyze information about a single index. If you want to look at information on more than one index, see Analyzing Indexes by Fill Level, Leaves, and Levels with SAPDBA [Page 370].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

29. Choose Reorganization → Analyze Index Reports → Index Information in SAPDBA for Informix.

30. In index name, enter data as required. If you do not know the name of the index you want, you can use a partial entry (for example, pa*) and SAPDBA lists the matching indexes.

31. Execute the report.

SAPDBA displays the report.

Sometimes SAPDBA offers to update statistics [Ext.] before the Index Information report screen appears, because the statistics data on the table is out-of-date. You can immediately perform an update for the table concerned to get an accurate report on it. For more information about how to identify tables needing an update and how to perform the update, see Update Statistics with SAPDBA [Page 440].

The entries on the report have the following meaning:

<table>
<thead>
<tr>
<th>Entry</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>table name</td>
<td>Shows which table the index relates to</td>
</tr>
<tr>
<td>dbspace</td>
<td>Shows where the index is logically stored (an index can be stored in a separate dbspace from its associated table with Informix version 7.1 or later). If fragmented (Informix version 7.1 or later), an index is stored in a number of different dbspaces instead of in one single dbspace.</td>
</tr>
<tr>
<td>index type</td>
<td>Shows how the index was created:</td>
</tr>
<tr>
<td></td>
<td>- Unique</td>
</tr>
<tr>
<td></td>
<td>Two rows can have the same value for the indexed column(s).</td>
</tr>
<tr>
<td></td>
<td>- Duplicate</td>
</tr>
<tr>
<td></td>
<td>Two or more rows can have the same value for the indexed column(s).</td>
</tr>
</tbody>
</table>
## Analyzing Index Information with SAPDBA

<table>
<thead>
<tr>
<th><strong>fragmentation</strong></th>
<th>Shows whether the index is fragmented or not. With indexes, the fragmentation strategy can be either of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>table based</strong></td>
<td>The index follows the model of the associated table. This means that the fragmentation strategy of the table must be expression-based rather than round robin since an index cannot be set up as round robin</td>
</tr>
<tr>
<td><strong>by expression</strong></td>
<td>The index has been set up with its own specific expression, independent of its associated table.</td>
</tr>
<tr>
<td><strong>detached</strong></td>
<td>The index resides in a separate storage area (that is, in a separate tablespace) from its associated table.</td>
</tr>
</tbody>
</table>

| **index levels** | Shows how many levels the index has, indicating how large the index is |
| **index leaves** | Shows how many leaves the index has, indicating how large the index is |

<table>
<thead>
<tr>
<th><strong>index size</strong></th>
<th>Shows approximately how large the index is, in kilobytes. You see one of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>index size: 126835 KB (+/- 5%)</strong></td>
<td>This means that the figure is given with a confidence level of plus or minus a certain amount. The confidence level in this example is +/- 5% because the table is relatively large: other confidence levels which you might see with smaller tables are +/- 10% or +/- 30%.</td>
</tr>
<tr>
<td><strong>index size: 2545 KB (TBLspace Disk Util. Rpt for exact value!)</strong></td>
<td>In this case, you also see dbspace: fragmented. For fragmented indexes (Informix version 7.1 or later), the index size is approximate because SAPDBA takes an average sample of the index. If the data is skewed, which occurs sometimes with expression-based fragmentation, then the figure given is less accurate. For more information if you need a very accurate value, see Analyzing a Tablespace with SAPDBA [Page 378]. The index is not necessarily completely full with data. See <strong>index fill level</strong> below for how full the index is.</td>
</tr>
</tbody>
</table>

| **index fill level** | Shows approximately how full the index is. Note that duplicate (that is, non-unique) indexes appear with a hyphen in this field, because it would take too long for SAPDBA to derive a fill level. |

4. If the index is fragmented, choose Display Dbspaces Containing Index Fragments to see the dbspaces that contain the index fragments.

5. For more information about printing the report, see Printing a SAPDBA Report [Page 329].
Result
You now have a better picture of the storage situation for the index in question. If you want to change the storage parameters on the index, choose Reorganizing a Single Index with SADPBA [Page 381].

See also:
Informix documentation
Analyzing a Tablespace with SAPDBA

Use

You can use SAPDBA for Informix to analyze all the information held by the database server on a single table. SAPDBA calls the Informix command `oncheck -pT` for this report. You can use this report to:

- Calculate an exact size for an index (SAPDBA normally displays an approximate value for this), especially with fragmented indexes and tables (Informix version 7.1 or later).
- Display very detailed information about tables, blobpages, indexes and so on. For example, you can see the details of physical storage, creation date and time, how full the blobpages are, how the index is structured, and so on.
- Display detailed information about table fragments (Informix version 7.1 or later).

You need extensive knowledge of the Informix database to make best use of this report.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure


33. In table name, enter data as required. If you do not know the name of the table you want, you can use a partial entry (for example, `a0*`) and SAPDBA lists the matching tables.

34. Execute the report.

When you execute this report, the table it reads is locked and this might last some time, particularly for large tables. This can affect the operation of the R/3 System if it requires access to the same table. Therefore, it is best to execute this report when the R/3 System is down or not being heavily used. SAPDBA warns you of this.

SAPDBA displays the report.

For this report, SAPDBA uses the normal `oncheck -pT` display, in pages. For other reports, SAPDBA displays output in kilobytes (KB).

To convert, multiply the number of pages given in `oncheck` by the page size of your system.

For more information about the entries in the report, see the Informix documentation.

35. To print the report, choose Print. Refer to Printing a SAPDBA Report [Page 329].
**Result**

You now have a very detailed picture of the storage situation for the table in question. For more information if you want to perform a reorganization, see [Reorganizing a Single Table with SAPDBA](#) [Page 387].

**See also:**

Informix documentation
Reorganization of Tables, Indexes, and Dbspaces with SAPDBA

Purpose

You can use SAPDBA for Informix to reorganize tables, indexes, and dbspaces.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You have completed a storage analysis of tables and indexes with SAPDBA [Page 360]. This helps you identify the table, index, or dbspace that you want to reorganize.

Process Flow

You choose the type of reorganization required:

- Reorganizing a Single Index with SAPDBA [Page 381]
- Reorganizing All Indexes of One Table with SAPDBA [Page 383]
- Reorganizing a Single Table with SAPDBA [Page 387]
- Reorganizing a Group of Tables with SAPDBA [Page 394]
- Reorganizing a Dbspace and Its Tables with SAPDBA [Page 398]

Result

After a reorganization, your database is less likely to run into space problems. However, you need to keep on monitoring the space situation. Refer to Storage Analysis of Tables and Indexes with SAPDBA [Page 360].

See also:

Informix documentation
Reorganizing a Single Index with SAPDBA

Use

You can use SAPDBA for Informix to reorganize a single index. SAPDBA rebuilds the index using the parameters that you specify.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You have analyzed the storage parameters for the index to make sure that the reorganization is necessary. Refer to Analyzing Index Information with SAPDBA [Page 375].

Procedure

2. In index name, enter data as required. If you do not know the name of the index you want, you can use a partial entry (for example, pa*) and SAPDBA lists the matching indexes.
3. If you want to analyze the index information [Page 375] before you reorganize, choose Index Information.
4. Choose Continue.
   SAPDBA displays a set of parameters specifying the reorganization.
5. Enter the fill factor.
   This parameter specifies the fill level of the index when it is reorganized. Set it as follows:
   - If the underlying table is dynamic (that is, a lot of new data is being added) specify a low fill factor.
   - If the underlying table is static (that is, little new data is being added) specify a high fill factor.
   The value initially displayed is a default that you can find in the ONCONFIG file:
   FILLFACTOR 90 # Fill factor for building indexes
   You can use SAPDBA to view the ONCONFIG file. Refer to Listing System Information with SAPDBA [Page 482]. The file is called onconfig.<hostname>.<sid> and you can find it in the directory $INFORMIXDIR/etc (UNIX) or %INFORMIXDIR%/etc (NT).
6. Enter the value for 'detach' index in dbspace.
   This parameter specifies whether the reorganized index remains in the same dbspace. You can enter a new dbspace if you want to detach the index and store it in a separate dbspace.
Reorganizing a Single Index with SAPDBA

To reorganize the index, SAPDBA needs to lock it. Therefore, it is best to reorganize when the R/3 System is down, to avoid performance problems. You might also experience unpredictable results if the index you are trying to reorganize is locked by another process.

7. Choose **Continue** to reorganize the index.

SAPDBA reorganizes the index.

You might see warning messages [Ext.] during the reorganization. These alert you to possible problems and often advise you on the best course of action.

You need to periodically clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to **SAPDBA Housekeeping** [Page 330].

**Result**

After an index reorganization, your database is less likely to run into space problems. However, you need to keep on monitoring the index, especially if the underlying table is growing rapidly. Refer to **Storage Analysis of Tables and Indexes with SAPDBA** [Page 360].

**See also:**

Informix documentation
Reorganizing All Indexes of One Table with SADPBA

Use

You can use SAPDBA for Informix to reorganize all the indexes of one table. SAPDBA rebuilds the indexes using the parameters that you specify.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You have analyzed the storage parameters for the index to make sure that the reorganization is necessary. Refer to Analyzing Index Information with SAPDBA [Page 375].
- You want to use the same fill factor for all the indexes of a table. If this is not true, see Reorganizing a Single Index with SAPDBA [Page 381], which lets you specify an individual fill factor for each index.

Procedure

8. Choose Reorganization → Reorganize Index(es) → All Indexes of one Table in SAPDBA for Informix.
9. In table name, enter data as required. If you do not know the name of the table for which you want to reorganize the indexes, you can use a partial entry (for example, a0*) and SAPDBA lists the matching tables.
10. If you want to analyze the table information [Page 365] again before you reorganize, choose Table Information.
11. Choose Continue.
   SAPDBA displays a set of parameters specifying the reorganization.
12. Enter the fill factor.
   This parameter specifies the fill level of the indexes when reorganized. Set it as follows:
   - If the underlying table is dynamic (that is, a lot of new data is being added) specify a low fill factor.
   - If the underlying table is static (that is, little new data is being added) specify a high fill factor.
   The value initially displayed is a default which you can find in the ONCONFIG file:
   FILLFACTOR 90 # Fill factor for building indexes
   You can use SAPDBA to view the ONCONFIG file. Refer to Listing System Information with SAPDBA [Page 482]. The file is called onconfig.<hostname>.<sid> and you can find it in the directory $INFORMIXDIR/etc.
13. Enter the value for 'detach' index in dbspace.
Reorganizing All Indexes of One Table with SADPBA

This parameter specifies whether the reorganized indexes remain in the same dbspace. You can enter a new dbspace if you want to detach the indexes and store them in a separate dbspace.

⚠️

To reorganize the indexes, SAPDBA needs to lock them. Therefore, it is best to reorganize when the R/3 System is down, to avoid performance problems. You might also experience unpredictable results if the indexes you are trying to reorganize are locked by another process.

14. Choose Continue to reorganize the indexes.

SAPDBA reorganizes the indexes.

⚠️

You might see warning messages [Ext.] during the reorganization. These alert you to possible problems and often advise you on the best course of action.

Result

After an index reorganization, your database is less likely to run into space problems. However, you need to keep on monitoring the index, especially if the underlying table is growing rapidly. Refer to Storage Analysis of Tables and Indexes with SAPDBA [Page 360].

💡

You need to periodically clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%/sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to SAPDBA Housekeeping [Page 330].

See also:

Informix documentation
Preparing for Table or Dbspace Reorganization with SAPDBA

Use

Before you reorganize a table, a group of tables, or a dbspace with SAPDBA for Informix, you must complete the preparations described here.

Prerequisites

The reorganizations for which you must prepare are the following:

- The following options only in the menu Reorganize Single Table:
  - Reorganize Table by 'insert into select from …'
  - Reorganize Table by 'Export/Import'
    Refer to Reorganizing a Single Table with SAPDBA [Page 387].

- Options in the menu Reorganize Group of Tables. Refer to Reorganizing a Group of Tables with SAPDBA [Page 394].

- Reorganize Dbspace. Refer to Reorganizing a Dbspace and Its Tables with SAPDBA [Page 398].

Procedure

1. Make sure that the R/3 System is down, to prevent problems with locks on the tables that you are reorganizing.
   
   At the top of any menu screen in SAPDBA, you see ‘sapr3’ User(s): 1 when R/3 is down. SAPDBA requires a connection. If you have multiple SAPDBAs running, you see the number of SAPDBAs in this field, because each SAPDBA requires a sapr3 user.
   
   ! If you are reorganizing a table that is significantly smaller than the size of your logical log, you can perform the reorganization without switching database logging off. In this case, make an entry SAPDBA_IGNORELOGGING 1 in the ONCONFIG file, but only for the duration of the reorganization. If you decide to do this, you can skip the next two steps.

2. Create a level-0 (full) database backup (ON-Bar) or archive (ON-Archive or ontape) before reorganization. For more information, see:
   - Creation of a Database Backup (ON-Bar) [Page 114]
   - Creation of an Archive (ON-Archive) [Page 141]
   - Creation of an Archive (ontape) [Page 159]
   
   If data is lost during the reorganization, you can then restore [Page 252] the database using this database backup or archive.

3. Switch the database server to "no logging mode."
Preparing for Table or Dbspace Reorganization with SAPDBA

You must switch the database server to no logging mode before you start the process. For more information, see Switching to "No Logging Mode" with SAPDBA [Page 463].

In no logging mode, the database server does not log the reorganization. Logging uses up logical-log storage, possibly causing the logs to fill. You cannot start the process unless the database is in no logging mode.

4. Make sure that there are no locks on the tables you want to reorganize
   If a lock has been set on a table by some other database process, you cannot reorganize the table. You have to wait for the lock to be released before proceeding with the reorganization. Make sure that no other database activity has placed a lock on the table. The best way to do this is to bring the R/3 System down (see first step above).

5. Make sure of enough space in SAPDBA working directory.
   SAPDBA stops processing if there is less than 1 MB of space left in the directory $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT), used to store scripts and log files for the reorganization. Make sure that there is enough space in this directory before you start these actions. This does not apply to the actions under Reorganize Single Table.
   If you are not using the "export/import" method, you have now finished the procedure, so see "Result".

6. If you are using the "export/import" method, check the following:
   a. Make sure of enough space in download path.
      SAPDBA displays the available space in a dialog box when you start the process. If there is not enough space left in the download path during processing, SAPDBA recognizes this and stops processing so that no data is lost.
   b. Make sure of access rights in download path.
      You must be able to write to this directory. Prevent other users from accessing this directory. This is because any change to the downloaded file endangers the integrity of your data and should be avoided.
   c. Delete existing unload files.
      If there are existing unload files left over from a previous job, delete them before starting the process. SAPDBA prompts you to delete them if you forget.

7. If the table to be reorganized has been altered with In-Place Alter Table much more space might be required for the reorganization than required for the existing table. You can check this with oncheck -pT.

Result
You are now ready to perform the reorganization. For more information, see:

- Reorganizing a Single Table with SAPDBA [Page 387]
- Reorganizing a Group of Tables with SAPDBA [Page 394]
- Reorganizing a Dbspace and Its Tables with SAPDBA [Page 398]
Reorganizing a Single Table with SAPDBA

Use

You can use SAPDBA for Informix to reorganize a single table. SAPDBA rebuilds the table using the parameters that you specify.

In normal operation, you do not need to regularly reorganize the tables in Informix databases. Therefore, make sure you have a good reason before you reorganize.

You can change the following storage parameters for a table:

- Dbspace
- First extent size
- Next extent size
- Locking mode

The following guidelines can help you choose the new storage parameters:

- Make the next extent size large enough to allow growth without causing a high number of new extents to be created.
- Make the new first extent of the table larger than the current size of the entire table to allow for growth.
- Decide if the table needs to be relocated to another, less-heavily used dbspace if you are trying to remove an I/O bottleneck.
- Decide if the table needs to be fragmented (this is not available in SAPDBA).

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324]. However, expert mode is only required for the reorganization method Change 'Next Extent Size' or 'Lock Mode' of Table if you want to change the locking mode of the table.
- You have analyzed the storage parameters for the table to make sure that the reorganization is necessary. Refer to Analyzing Table Information with SAPDBA [Page 365].
- If you are using the reorganization method Reorganize Table by 'insert into select from …' or Reorganize Table by 'Export/Import', you have completed the preparations [Page 385] for reorganizing a table.

Procedure

1. Choose Reorganization → Reorganize Single Table in SAPDBA for Informix.
2. In table name, enter data as required. If you do not know the name of the table you want, you can use a partial entry (for example, a0*) and SAPDBA lists the matching tables.
Reorganizing a Single Table with SAPDBA

3. Select the reorganization method you want:

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reorganize Table by 'insert into select from …’</td>
<td>SAP recommends you to normally use this method. This method runs entirely within the database (instead of using the file system) and is more rapid as well as more secure. To use it successfully there must be sufficient space available in the database to store a second copy of the table being reorganized. SAPDBA checks this.</td>
</tr>
<tr>
<td>Reorganize Table by 'Export/Import'</td>
<td>Use this method if you do not have enough space in the database for a second copy of the table to be reorganized.</td>
</tr>
<tr>
<td>TEST UNLOAD of table (no Table Locks)</td>
<td>Use this method if you want to check that there is enough space in the file system to allow the previous method to function correctly. SAPDBA only performs the export phase, including data compression, and deletes the downloaded data at the end. No table locks are needed for this method.</td>
</tr>
<tr>
<td>Change 'Next Extent Size' or 'Lock Mode' of Table</td>
<td>This is best if you only want to alter the next extent size or locking mode, because it is much simpler and quicker than the other methods. No data is moved with this method.</td>
</tr>
</tbody>
</table>

4. If you want to analyze the table information [Page 365] before you reorganize, choose Table Information.

5. Choose Continue.

SAPDBA displays:

- Fixed table parameters that you cannot change
- Variable table parameters that you can change for the reorganization

The table parameters displayed vary, depending on the reorganization method you have chosen (that is, not all parameters appear for every method). The parameters include the following:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>used size</td>
<td>Shows the maximum amount of storage space that the table has ever occupied (in kilobytes). You cannot change this.</td>
</tr>
<tr>
<td>rows</td>
<td>Shows the current number of rows in the table. You cannot change this.</td>
</tr>
</tbody>
</table>
Reorganizing a Single Table with SAPDBA

| **first extent** | Shows the size (in kilobytes) of the first extent (physical storage unit) for the table. If a table has a large number of extents and you wish to compact it into one single extent, you would increase this value. We recommend you enter a value here that is greater than or equal to the current used size of the table. The minimum extent size is four times the page size on your system (zero is an exception – see below).

If you enter a first extent size of zero, SAPDBA calculates an optimal size for the first extent. We recommend you enter zero if you want to reduce the storage space used by the table. This calculation can take some time with large tables, especially if there are blobpages present (the estimate is also less precise with blobpages). A message appears, informing you that SAPDBA is calculating:

Estimating optimal size of ‘first extent’. Please wait a moment... |
---|---
| **next extent** | Lets you redefine the size of the next extent (physical storage unit) for the table. The value displayed is the current next extent size for the table. If you expect the table to grow very rapidly (that is, more than expected when first created) it is a good idea to increase this parameter. On the other hand, you might want to decrease it if you are sure the table will not grow very much in the future. The following limitations apply to this parameter:

- The minimum extent size is four times the page size on your system. So with a 2 KB page size, the minimum size is 8 KB. SAPDBA warns you if you attempt to set a lower next extent size.
- If you redefine the next extent size as less than 5% of the table size, SAPDBA warns you. You can still proceed with this change if you are sure. |
| **locking mode** | Shows how the table is locked. Tables are normally locked at the row level because this increases the general availability of the data. |
| **target dbspace** | Shows the dbspace where the table is currently stored. This field is used to specify where the table will be stored after the reorganization, so you can change it if you want to move the table. For more information about finding a new dbspace with enough space, see Listing Dbspaces with SAPDBA [Page 343]. |
Reorganizing a Single Table with SAPDBA

<table>
<thead>
<tr>
<th>index options</th>
<th>Lets you specify how the indexes are handled by the reorganization:</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘detach’ indexes in dbspace</td>
<td>You can specify that the indexes are detached and which dbspace they are stored in.</td>
</tr>
<tr>
<td>Create indexes BEFORE or AFTER loading data</td>
<td>This is available starting with Informix version 7.30. You can specify that indexes are created before or after the data has been loaded:</td>
</tr>
<tr>
<td>- Use the default AFTER option normally, unless you have good reason not to (for example, insufficient space in the temporary dbspace).</td>
<td></td>
</tr>
<tr>
<td>- Avoid the BEFORE option if possible, because this can lead to difficulties with the “insert into select from” method. This option is more complicated because it requires renaming of the indexes, which can cause difficulties if there is a problem during the reorganization.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>download path</th>
<th>Lets you specify the working directory for reorganizing the table, if you are using the “Export/Import” method. Remember the following when you set up this directory:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Specify appropriate access rights so that your chosen directory is protected from access by third parties and available for read/write access by user informix (a dialog box informs you if the access rights are insufficient).</td>
<td></td>
</tr>
<tr>
<td>- Do not use directory /tmp because it is frequently used by other processes and is often cleared in system housekeeping operations.</td>
<td></td>
</tr>
<tr>
<td>- Avoid using the same file system as the directory that contains working scripts and log files during the reorganization process, that is, $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT).</td>
<td></td>
</tr>
</tbody>
</table>

6. Enter data as required to change the variable table parameters.

7. Choose Continue.

<table>
<thead>
<tr>
<th>If you are</th>
<th>Then</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performing Change ‘Next Extent Size’ or ‘Lock Mode’ of Table</td>
<td>SAPDBA reorganizes the table and the procedure is complete. See &quot;Result.&quot;</td>
</tr>
<tr>
<td>Performing any other type of reorganization.</td>
<td>SAPDBA prepares for the reorganization, which is not yet complete.</td>
</tr>
</tbody>
</table>

8. Execute the reorganization.

   SAPDBA reorganizes the table.
If you are using the method Reorganize Table by 'Export/Import' or TEST UNLOAD of table (no Table Locks), SAPDBA creates a directory and files during the unload phase. You do not normally need to look at this unloaded data.

For more information if there is a problem, see SAPDBA Files, Directories, and Reports [Page 331].

Result

After a table reorganization, your database is less likely to run into space problems. However, you need to keep on monitoring the table, especially if it is growing rapidly. Refer to Analyzing Table Information with SAPDBA [Page 365].

If you have used the method Reorganize Table by 'insert into select from …' or Reorganize Table by 'Export/Import,' see Finishing a Table or Dbspace Reorganization with SAPDBA [Page 416].

See also:

Informix documentation
Reorganization of a Group of Tables or Dbspace with SAPDBA

Purpose
You can use SAPDBA for Informix to reorganize a group of tables or a dbspace (including all tables in the dbspace).

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You have completed a storage analysis of tables and indexes with SAPDBA [Page 360]. This helps you identify the tables or the dbspace that needs reorganization.

Process Flow
1. You choose a reorganization method, depending on the purpose of the reorganization:
   - Tables in Dbspace by ‘alter fragment...’ and Tables Listed in File by ‘alter fragment...’
     The "alter fragment" method is the fastest. However, SAPDBA does not alter the storage parameters (although some tables that were scattered might end up with fewer extents) and the table statistics are not updated. This is best if you want to move tables to another dbspace.
     Refer to Reorganizing a Group of Tables with SAPDBA [Page 394].
   - Tables in Dbspace by ‘insert into select from ...’ and Tables Listed in File by ‘insert into select from ...’
     The "insert into select from" method tunes the storage parameters for each table optimally, so this is best if you want to reclaim space.
     Refer to Reorganizing a Group of Tables with SAPDBA [Page 394].
   - Reorganize Dbspace
     This uses the "alter fragment" or the "insert into select from" method, depending on the phase of the reorganization and the Informix version that you are using. This method is normally a good compromise. For more information, see Reorganizing a Dbspace and Its Tables with SAPDBA [Page 398].
     If you use the "tables in dbspace" methods, then SAPDBA reorganizes all the tables of the dbspace. If you use the "tables listed in file" methods, then SAPDBA uses a file containing a list of dbspaces and other parameters. You must set up the file yourself before the reorganization.
Reorganization of a Group of Tables or Dbspace with SAPDBA

If there are problems, you troubleshoot [Page 402] the reorganization.

**Result**

After a reorganization, your database is less likely to run into space problems. However, you need to keep on monitoring the space situation. Refer to Storage Analysis of Tables and Indexes with SAPDBA [Page 360].

**See also:**

Informix documentation
Reorganizing a Group of Tables with SAPDBA

Use

You can use SAPDBA for Informix to reorganize groups of tables. For more information, see Reorganization of a Group of Tables or Dbspace with SAPDBA [Page 392].

In normal operation, you do not need to regularly reorganize the tables in Informix databases. Therefore, make sure you have a good reason before you reorganize.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You have analyzed the storage parameters for the tables and dbspaces to make sure that the reorganization is necessary. Refer especially to the following:
  - Analyzing Tables by Fill Level, Size, and Extents [Page 362]
  - Analyzing Tables for Critical Next Extent Size with SAPDBA [Page 368]
- You have completed the preparations [Page 385] for reorganizing a group of tables.

Procedure

6. Choose Reorganization → Reorganize Group of Tables in SAPDBA for Informix.

7. Select the reorganization method you want:
   - Tables in Dbspace by 'alter fragment …'
   - Tables in Dbspace by 'insert into select from'
   - Tables Listed in File by 'alter fragment …'
   - Tables Listed in File by 'insert into select from …'

   For more information about the reorganization methods, see Reorganization of a Group of Tables or Dbspace with SAPDBA [Page 392].

SAPDBA prompts you as follows:

<table>
<thead>
<tr>
<th>If you are reorganizing with the</th>
<th>Then SAPDBA prompts you for the</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Tables in dbspace&quot; method</td>
<td>Name of the source and target dbspace (these can be the same if you want)</td>
</tr>
<tr>
<td>&quot;Tables listed in file&quot; method</td>
<td>Name of the input file for the reorganization. For more information, see Input File for Reorganizing Groups of Tables with SAPDBA [Page 396].</td>
</tr>
</tbody>
</table>

3. Choose Continue.
You might see a dialog box informing you that the target dbspace is not registered in the ABAP data dictionary in the R/3 System. This occurs when you have created a new dbspace – for example, using an early version of SAPDBA – which does not appear in the data dictionary. SAPDBA offers to update the data dictionary automatically for you.

SAPDBA performs the reorganization.

During the reorganization, SAPDBA keeps you informed of progress. You can abort processing by pressing \texttt{Ctrl-C}, but this works only between one table and the next. Every 10 tables, SAPDBA performs a checkpoint, which avoids unnecessarily large data loss if a serious fault occurs midway through processing.

**Result**

After a reorganization, your database is less likely to run into space problems. However, you need to keep on monitoring the tables, especially if they are growing rapidly. Refer to Analyzing Tables by Fill Level, Size, and Extents [Page 362].

You must now finish the reorganization [Page 416].

For more information if there are problems with the reorganization, see Reorganization Troubleshooting with SAPDBA [Page 402].

**See also:**

Informix documentation
Input File for Reorganizing Groups of Tables with SAPDBA

Definition

The input file tells SAPDBA the tables to reorganize and how to perform the reorganization.

Use

When you reorganize a group of tables with SAPDBA for Informix, you can use an input file to specify the tables and parameters for the reorganization. This is relevant to the following SAPDBA reorganization options:

- *Tables Listed in File by 'alter fragment …'*
- *Tables Listed in File by 'insert into select from …'*

For more information, see Reorganizing a Group of Tables with SAPDBA [Page 394].

The input file contains a list of tables to be reorganized and the parameter target dbspace. To set up your input file correctly, observe the following points:

- If you enter no input parameters other than the table name, SAPDBA reorganizes the table to the same dbspace as at the start of processing.
- The following is an example of how to specify the target dbspace:

  ```
  target_dbspace: psapsource
  ```

- Input parameters can be of the following types:
  - The default dbspace applies to all tables listed after it is specified, until another default dbspace is given. For example:

    ```
    default: target_dbspace: psapsource
    ```
  - A specific parameter relates only to a single table (dd14s in this example). It overrides the current default dbspace parameter. For example:

    ```
    dd14s nextExtent: 15
    ```

- List the tables you want to reorganize, observing the previous points about input parameters.
- An example of some entries in a typical input file is given below:

  ```
  default: lock_mode: page
  default: target_dbspace: psapddic
  dd02mss
dd02syb
verpf
verpf2 lock_mode: row
dd10l
default: target_dbspace: paspsource
  ```

This example is for the "insert into select from" method. If you are using the "alter fragment" method, you can only use the target_dbspace parameter.
dd15t
ddac1
ddntf
ddntt    next_extent: 25
ignss
default: lock_mode: row
macid
macob    first_extent: 45
svers
tdi01    target_dbspace: psapclu
tvegl

SAPDBA checks the syntax of this file before processing starts so there is no problem with misspelt entries.
Reorganizing a Dbspace and Its Tables with SAPDBA

Use

You can use SAPDBA for Informix to reorganize a dbspace and all its tables. SAPDBA optimizes the space allocation of tables in the dbspace. For more information, see Reorganization of a Group of Tables or Dbspace with SAPDBA [Page 392]. If you use the interrupt facility, you can use this procedure to resize a dbspace and optimize its storage.

In normal operation, you do not need to regularly reorganize the tables in Informix databases. Therefore, make sure you have a good reason before you reorganize.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You have analyzed the storage parameters for the tables and dbspaces to make sure that the reorganization is necessary. Refer especially to the following:
  - Analyzing Tables by Fill Level, Size, and Extents with SAPDBA [Page 362]
  - Analyzing Tables for Critical Next Extent Size with SAPDBA [Page 368]
  - Listing Dbspaces with SAPDBA [Page 343]
- You have completed the preparations [Page 385] for reorganizing a dbspace.

Procedure

1. Choose Reorganization → Reorganize Dbspace in SAPDBA for Informix.
2. In Dbspace to reorganize, enter the dbspace that you want to reorganize.
3. In Dbspace for intermediate storage, enter the dbspace where the tables are stored during reorganization. This dbspace cannot be the same as the Dbspace to reorganize.
4. If you want, use SAPDBA to set up a dbspace [Page 353] for intermediate storage (or you can use an existing dbspace if you prefer).
5. In No space gain for tables smaller than [KB], enter the threshold for the table size used by SAPDBA to determine the method of reorganization used for individual tables during the import phase of the reorganization.

   This field is not relevant if you are using Informix version 6.0, because SAPDBA uses the “insert into select from” method for all tables. However, if you are using a later Informix version, then SAPDBA determines the method to use as follows:

<table>
<thead>
<tr>
<th>If table is</th>
<th>Then SAPDBA performs a reorganization with the</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger than value of No space gain for tables smaller than [KB]</td>
<td>“Insert into select from” method. This is the slower reorganization method but is aimed at reclaiming space (more important for larger tables).</td>
</tr>
</tbody>
</table>
Reorganizing a Dbspace and Its Tables with SAPDBA

6. Select whether to interrupt the reorganization using *Interrupt Selection*. If you interrupt the reorganization, you can also reorganize the dbspace itself (that is, not only the tables in the dbspace). The interrupt selections are as follows:

<table>
<thead>
<tr>
<th>Interrupt selection</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>No interruption</td>
<td>SAPDBA continues without pause from the first phase (that is, moving tables to intermediate storage) to the second phase (that is, moving tables back to original dbspace).</td>
</tr>
<tr>
<td>Interrupt after selected dbspace is empty</td>
<td>SAPDBA pauses between the two phases. This allows you to drop and recreate the original dbspace before the tables are loaded back into it. SAPDBA automatically offers you this functionality so that the entire operation can run as one sequence. Alternatively, you can resume normal production with the R/3 System during the interruption and finish the operation later. Refer to “Interrupting the procedure” in “Performing Reorganize Dbspace” below.</td>
</tr>
</tbody>
</table>

7. In *Intermediate Storage*, select what SAPDBA does with the tables during processing:

<table>
<thead>
<tr>
<th>Intermediate storage</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data only</td>
<td>SAPDBA only stores the data, not the index. Therefore, processing is generally faster and less intermediate storage space is required. However, the tables in the dbspace cannot be productively used while they are held in intermediate storage, as they are incomplete without indexes.</td>
</tr>
<tr>
<td>Data + indexes</td>
<td>SAPDBA stores both data and index. Therefore, processing is slower because SAPDBA needs time to create indexes for the tables in the intermediate storage area. An update statistics is also performed. Select this option if you want to use the database productively while the tables are in intermediate storage or if you want a time delay between the first phase of the reorganization and the second phase. In this case, you <strong>must</strong> do a level-0 archive. See description in section “After Reorganize Dbspace”.</td>
</tr>
</tbody>
</table>

8. Choose *Continue* to start the reorganization.

SAPDBA performs the first phase of the reorganization, processing each table in turn until all the tables in the *Dbspace to reorganize* have been processed.

During the reorganization, SAPDBA keeps you informed of progress. You can abort the reorganization by pressing **Ctrl-C**, but this works only between one table and the next. Every 10 tables, SAPDBA performs a checkpoint, which avoids unnecessarily large data loss if a serious error occurs midway through the reorganization.
Reorganizing a Dbspace and Its Tables with SAPDBA

The additional parameters necessary to reorganize tables using the "insert into select from" method are assigned as follows (you cannot alter these yourself):

- Next extent and locking mode (that is, page or row) are taken from the values previously held for the table by the database server.
- First extent is optimally calculated by SAPDBA for each table, according to the amount of data currently in the table. However, this calculation is only approximate if the table contains blobpages.

What happens now depends on whether you selected "interrupt":

<table>
<thead>
<tr>
<th>If you</th>
<th>Then</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not select interrupt</td>
<td>SAPDBA continues without pause to the second phase of the reorganization. The reorganization procedure is finished when SAPDBA displays the appropriate message. See &quot;Result.&quot;</td>
</tr>
<tr>
<td>Selected interrupt</td>
<td>SAPDBA stops at the end of the first phase. Continue with the procedure as described below.</td>
</tr>
</tbody>
</table>

⚠️ You can safely interrupt the reorganization for a short time. However, a long interruption can be more of a problem. Make sure that, if you intend to use the database productively during a long interruption, you immediately perform a full level-0 database backup [Page 104] (ON-Bar) or archive [Page 123] (ON-Archive or ontape).

You can also exit SAPDBA during a long interruption and then restart uncompleted reorganization requests with SAPDBA [Page 413] to complete the procedure. In this case, SAPDBA prompts you to "update" the request if you have used any of the tables involved during the interruption (for example, if the R/3 System has been productive in the meantime). Do not do this if you have lost data.

SAP recommends that you complete the procedure without a long interruption.

9. Use SAPDBA to drop the original dbspace [Page 355] and recreate it [Page 353] with more or fewer chunks (that is, resize it). If you want, you can create a new mirrored dbspace to reduce the chances of data loss and reduce system downtime (but this requires more disk space).

10. Start the second phase of the reorganization.

    SAPDBA finishes the reorganization, moving the tables back to the original dbspace.

11. Use SAPDBA to drop the intermediate dbspace [Page 355].

Result

After a reorganization, your database is less likely to run into space problems. However, you need to keep on monitoring the dbspace and its tables, especially if they are growing rapidly. Refer to Analyzing Tables by Fill Level, Size, and Extents [Page 362].

You must now finish the reorganization [Page 416].

For more information if there are problems with the reorganization, see Reorganization Troubleshooting with SAPDBA [Page 402].
Reorganizing a Dbspace and Its Tables with SAPDBA

See also:
Informix documentation
Reorganization Troubleshooting with SAPDBA

Purpose
If reorganization of a group of tables or a dbspace with SAPDBA for Informix runs into problems, this process helps you to find a solution. SAPDBA normally issues a message to tell you what has happened.

Prerequisites
You have problems with any of the following table or dbspace reorganizations:

- Reorganizing a Single Table with SAPDBA [Page 387] using method Reorganize Table by 'insert into select from …' or Reorganize Table by 'Export/Import'. See SAPDBA menu Reorganize Single Table.
- Reorganizing a Group of Tables with SAPDBA [Page 394]. See SAPDBA menu Reorganize Group of Tables.
- Reorganizing a Dbspace and Its Tables with SAPDBA [Page 398]. See Reorganize Dbspace.

Process Flow
1. You write down any message that SAPDBA issues.
2. You look at the reorganization log, which is essential in the diagnosis of problems, especially when contacting the Informix hotline. Refer to Reorganization Log with SAPDBA [Page 403].
3. If the problem is not easy to solve – for example, you have had a database crash during the reorganization – you refer to Fixing Difficult Reorganization Problems with SAPDBA [Page 409]. Be sure to call the Informix hotline if you are not sure how to proceed.
4. Having resolved the problem which prevented successful completion, you can do either of the following:
   - Restart the processing. Refer to Restarting Uncompleted Reorganization Requests with SAPDBA [Page 413].
   - Delete the uncompleted requests to remove them from the SAPDBA control table. Do not perform this action if you have an outstanding problem that you have not yet solved. Refer to Deleting Uncompleted Reorganization Requests with SAPDBA [Page 415].

   The only reason why a restart of an uncompleted request is not possible for a particular table is when data has been lost (that is, either entire tables, or rows from a table, or views or indexes). In any case, you should be able to restart the uncompleted requests for the other tables from the same request.
Reorganization Log with SAPDBA

Definition

SAPDBA for Informix writes a log containing detailed information about reorganization of a group of tables or a dbspace.

The log is called reorg_log, except for Reorganize Dbspace, when SAPDBA writes one log for the export phase (reorg_log_exp) and one for the import phase (reorg_log_imp).

You can find the log in directories held under $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) with the following names:

- Dbspace reorganization
  DBS_REORG_<dbspace to reorganize>_<date/time stamp>
  For example, DBS_REORG_psapload_980710165308

- Reorganizations of groups of tables using the “alter fragment” method:
  - "Tables in dbspace" method
    FRAG_<source dbspace name>_<date/time stamp>
    For example, FRAG_psapload_980710165308.
  - "Tables listed in file" method
    FRAG_FILE_<date/time stamp>
    For example, FRAG_FILE_980710165308.

- Reorganizations of groups of tables using the “insert into select from” method:
  - "Tables in dbspace" method
    MOVE_<source dbspace name>_<date/time stamp>
    For example, MOVE_psapload_980710165308.
  - "Tables listed in file" method
    MOVE_FILE_<date/time stamp>
    For example, MOVE_FILE_980710165308.

The date/time stamp is composed of the date (in reverse format) followed by the time. All the examples above were performed on 10th July 1998 at 16:53:08.

Use

You can use the log to see what happened during a reorganization in the event of failure.

💡

For more information about how to proceed, see Reorganization Troubleshooting with SAPDBA [Page 402]. You can also check the log if you want to make sure that a reorganization has completed successfully.
Reorganization Log with SAPDBA

Structure

The Log After Successful Completion

The best place to see if processing has completed successfully is to look at the summary section at the end of the log.

The log consists of the following sections (the examples below show a typical log where processing has completed successfully for all tables):

- **Header section at the start of the log**
  
  This contains a title and a date/time stamp, such as in the following example:

  ****************************************************
  ----------------------------------------------------
  LOG FOR MOVING OF TABLES SELECTED FROM:
  ‘psapddic’
  ----------------------------------------------------
  ****************************************************

  The title varies according to the type of processing and the object selected.

- **A central section containing a description of processing for a single table.** The example below shows a normal (that is, successful) table reorganization using the “insert into select from” method:

  Moving Table ‘vrsx’
  Rows/views/indexes:  2790/0/1

  Reorganization Strategy: ‘Insert into Select from...’

  Source dbspace: psapddic
  Target dbspace: psapddic

  ROWS Before/After: 2790/2790
  VIEWS Before/After: 0/0
  INDEXES Before/After 1/1

  SPACE GAIN: 88%

  Actual status of TABLE: MOVED
  Status of MOVING: SUCCESS

  Note the following:

  - The first line, Rows/views/indexes 2790/0/1, is always written before the table is processed, and is a safety precaution in case figures cannot be given later due to a processing problem.
If the number of rows, views or indexes Before and After does not match, this indicates a problem.

SPACE GAIN is a measure of whether the table now requires more or less space after the operation has finished. A negative value indicates that more space is required than previously.

Actual status of TABLE can be any of a number of possible values:

REORGANIZED. This indicates successful completion for a table, as in this example: this term only appears when the "export/import" procedure is used.

MOVED. This indicates successful completion for a table: this term only appears when the "insert into select from" or "alter fragment" procedure is used.

ORIGINAL. This indicates that the table is in its original condition, without having been touched by the reorganization.

The following values indicate problems:

TABLE LOST
INDEXES, VIEWS AND CONSTRAINTS LOST
UNKNOWN

Status of REORGANIZATION/MOVING can be any of the following values:

SUCCESS. The table has been successfully reorganized, as in this example.

FAILED. The reorganization has failed due to a critical problem (for example, Target dbspace is too small).

ERROR. There has been a (usually) non-critical problem with the reorganization.

WAITING. The table is due to be reorganized but has not been processed yet, presumably due to a problem with another table.

Summary section at the end of the log

This contains a summary of the processing. The following example illustrates what this looks like when processing has finished successfully:

************************************************
Summary for MOVING of selected tables from: 
‘psapddic’
************************************************

Tables with status FAILED: 0
Tables with status ERROR: 0
Tables with status WAITING: 0
Tables with status SUCCESS: 152

Total number of reorganized tables: 152
Total number of tables to reorganize: 152

SPACE GAIN of dbspace reorganization: 25 KB (88%)

LOST TABLES/tables with DATA LOSS: 0
Tables with LOST INDEXES/VIEWS/CONSTRAINTS...: 0
Reorganization Log with SAPDBA


If the values appearing next to LOST TABLES/tables with DATA LOSS and Tables with LOST INDEXES/VIEWS/CONSTRAINTS are not zero, you have a serious problem (although usually you can fix it without doing a restore). Call the Informix hotline.

The Log After Problems

First, look at the summary section of the log (appearing at the end of the log) since this contains valuable information, alerting you to the fact that a problem has occurred:

Summary for MOVING of selected tables from:
psapddic

Tables with status FAILED: 2
Tables with status ERROR: 0
Tables with status WAITING: 149
Tables with status SUCCESS: 1

Total number of reorganized tables: 1
Total number of tables to reorganize: 152

Lost TABLES/tables with DATA LOSS: 1
Tables with LOST INDEXES/VIEWS/CONSTRAINTS... : 0


Compare this with the summary section for the normal case, described above in "The Log after Processing Successfully Completed". If the following criteria are not true, then SAPDBA has hit a problem:

- The value for Tables with status SUCCESS should be the same as that for Total number of reorganized tables and for Total number of tables to reorganize.
- All other fields should contain zero.

If the values appearing next to LOST TABLES/tables with DATA LOSS, Tables with LOST INDEXES/VIEWS/CONSTRAINTS are not zero, you have a serious problem (although usually you can fix it without doing a restore). Call the Informix hotline.

Second, to identify exactly where the problem has occurred (that is, which tables are affected and why) look at the central section of the log, containing details of individual tables, scanning for the keywords FAILED and ERROR. The following entry shows a typical situation where reorganization on a particular table has failed:
Moving Table 'tadir':
Rows/views/indexes: 239227/72/3
Reorganization Strategy: ‘Insert into Select from...’
Source dbspace: psapddic
Target dbspace: psapddic
Actual status of TABLE: ORIGINAL
Status of MOVING: FAILED
Location of error: Target dbspace is too small
Recommendation: Provide more space in target dbspace! -> Restart!

Note the following:

- **Actual status of TABLE** should be **MOVED** if processing was successful. See the discussion of this field as given above, “The Log after Processing Successfully Completed”.

- **Status of MOVING** should be **SUCCESS** if processing was successful. See the discussion of this field above in “The Log after Processing Successfully Completed”.

- Two new messages appear when problems arise:
  - **Location of error**: This message tells you in what area SAPDBA has identified a problem.
  - **Recommendation**: This message tells you what action SAPBDA recommends you take to recover from the error. This usually consists of doing something to fix the problem and then restarting the processing. In the example above, you need to add a chunk to the target dbspace (you can use SAPDBA to do this) and then restart the processing.

  There are a few very awkward cases in which SAPDBA cannot make a proper recommendation and therefore there is no restart recommendation made. These errors are described below in “Awkward Problems”.

In exceptional cases, SAPDBA has to completely abort processing because of some fatal error. In this case, an emergency message is written to the log (immediately before the summary section at the end), as in the following example:

```
EMERGENCY PROTOCOLL ENTRY:
Caused by SQL Error during update of log table (sapdba_reorg)!
Status of Operation:
FAILED (get target dbspace), table is ORIGINAL -> Restart!
```

In awkward cases, where SAPDBA can not make a proper restart recommendation, you see the following message in the field **Recommendation**:
Check SAPDBA documentation for help!
Fixing Difficult Reorganization Problems with SAPDBA

Use

SAPDBA sometimes cannot offer a recommendation due to a difficult reorganization problem. The problem can normally be easily fixed. For more information about the reorganization log, see Reorganization Log with SAPDBA [Page 403].

Procedure

⚠️ Do not delete any data and do not perform Delete Uncompleted Requests. If you are using the “export/import” procedure and you have a difficult problem, do not delete the download file containing the table data. Also do not delete SAPDBA’s working directory or any of the files in it. This directory is date-stamped directory with the prefix EXIM_, MOVE_ or DBS_REORG_ (for more information, see explanation at start of this section).

If you perform Delete Uncompleted Requests this removes entries from the control table used by SAPDBA. These entries might contain valuable diagnostic information.

⚠️ If your database host machine crashes or a disk crashes, see the final step.

1. Proceed as follows for each table where SAPDBA has issued the message Check SAPDBA documentation for help.

   What you need to do for each table depends on Actual status of TABLE as listed in reorg_log (or, in the case of Reorganize Dbspace, either reorg_log_exp or reorg_log_imp):

   - TABLE LOST, MISSING ROWS INDEXES/VIEWS/TRIGGERS/CONSTRAINTS LOST
     To repeat, do not delete any data. Call the Informix hotline.
   - UNKNOWN
     - Check existence of the table and current number of rows
       You can do this choosing Reorganization → Analyze Table Reports → List Table Information in SAPDBA. If this fails, you can also use DB-Access, entering one of the following commands:
       UNIX
       Select count(*) from <table_name>
       NT
       dbaccess select count(*) from <table_name>
       The result returned is the number of the rows in the table or a message that the table does not exist. For more information about how to use DB-Access, see the Informix documentation.
Fixing Difficult Reorganization Problems with SAPDBA

- Check `reorg_log` (or, in the case of `Reorganize Dbspace`, either `reorg_log_exp` or `reorg_log_imp`) for number of rows before reorganization.
  
  Look for an entry in `reorg_log` for `Rows of table BEFORE reorg`. If this is missing, look in the first line of the log (for example, `Moving Table 'vrsx' Rows/views/indexes: 2790/0/1`).

- Check the script with the suffix `.out`.
  
  See the table “Types of Reorganization Files” below to find out the names of the various output files. These files can contain valuable information to help you identify the problem before calling the Informix hotline.

  If the table exists and the current number of rows matches the number of rows before reorganization, then no data has been lost.

  If the table does not exist or the current number of rows does not match number of rows before reorganization, then call the Informix hotline. To repeat, do **not** delete any data.

2. If you need to call the Informix hotline, use the following resources to help find the problem:

   - The contents of the date-stamped directory with the prefix `EXIM_`, `MOVE_` or `DBS_REORG_` (for further details, see explanation at start of this section).

     This directory contains the following categories of file:

     - A log file (called `reorg_log` or, in the case of `Reorganize Dbspace`, `reorg_log_exp` and `reorg_log_imp`) which SAPDBA uses to keep a central record of its processing actions (including details of errors).

     - The individual script files used to execute the steps that make up the overall process.
       
       A different set of files is created for each table.

       The individual script files used to reorganize each table in turn can be grouped into the following types (the name is always prefixed with the table name):

   **Types of Reorganization Files**

<table>
<thead>
<tr>
<th>UNIX</th>
<th>NT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unload</strong></td>
<td><code>&lt;table name&gt;.unload</code></td>
</tr>
<tr>
<td>Example: <code>euinfo.unload</code></td>
<td>Example: <code>euinfo.unload.sql</code></td>
</tr>
<tr>
<td><strong>Schema</strong></td>
<td><code>&lt;table name&gt;.schema</code></td>
</tr>
<tr>
<td>Example: <code>euinfo.schema</code></td>
<td>Example: <code>euinfo.schema.sql</code></td>
</tr>
<tr>
<td><strong>Load</strong></td>
<td><code>&lt;table name&gt;.load</code></td>
</tr>
<tr>
<td>Example: <code>euinfo.load</code></td>
<td>Example: <code>euinfo.load.sql</code></td>
</tr>
</tbody>
</table>

   For some of these types, there is a corresponding file with the same name stem but suffixed `.out` containing output details from the relevant operation. For example, `euinfo.load.out` (UNIX) or `euinfo.load.sql.out` (NT) contains output details from the load operation.

   The unload files are only present if you are doing an “export/import” type of reorganization.
The download file that contains database data for the selected tables and is held in the directory specified in download path. This is only relevant if you are doing an “export/import” type of reorganization.

3. If you are sure that you have identified the problem and want to re-run particular steps in the reorganization of a table, execute the following command:

- If your operating system is UNIX:

  `<filename>`

  For example, to re-run a step for the file `euinfo`:

  `euinfo.schema.views` 

- If your operating system is NT:

  **⚠️**

  Do not forget the `-X` parameter for `dbaccess` with NT. If you forget this parameter, you risk losing data.

  `dbaccess -e -X <sid> <filename>`

  For example, to re-run the unload step for the file `euinfo`:

  `dbaccess -e -X jp2 euinfo.schema.views<.sql>`

4. If you have had a database host or disk crash (for example, due to a power failure) proceed with special caution. If in any doubt as to how to proceed, call the Informix hotline.

   This kind of problem often means that shared memory buffers could not be flushed to disk correctly. The result is that data might have been lost.

   Even tables for which the reorg_log file (or, in the case of Reorganize Dbspace, either reorg_log_exp or reorg_log_imp) reports a successful completion can be affected in this situation. Note that this file might also have been affected by the failure and might not be fully up-to-date. Everything that happened after the last checkpoint is possibly lost. A checkpoint is taken after every ten tables in SAPDBA reorganizations, so you can be sure that the data on disk is fully up-to-date at this point.

   Check all tables that have been reorganized after the last checkpoint for completeness. You should check the number of rows, views, and indexes and then proceed as follows:

   - If data has been lost, a restore [Page 252] is the only possible way to get the data back. The danger of this possibility highlights the need to always create a full database backup [Page 104] (ON-Bar) or archive [Page 123] (ON-Archive or ontape) immediately before you start a reorganization.

   - If data has not been lost, you can try to restart the request [Page 413], but do not perform an “update request.” See the “caution” below. SAPDBA then warns you if data has indeed been lost. Before reorganization starts, SAPDBA writes a reference count of the number of rows in each table. If you update the request, this reference count is overwritten.

     **⚠️**

     Do not use the “update request” feature in the restart processing. If you use “update request” during restart processing when data has been lost, you run the risk of overlooking the problem and continuing as if nothing had happened.
Fixing Difficult Reorganization Problems with SAPDBA

See also:
Reorganization Troubleshooting with SAPDBA [Page 402]
Restarting Uncompleted Reorganization Requests with SAPDBA

Use
A restart is automatically invoked by SAPDBA for Informix when you attempt to start a reorganization of a group of tables or dbspace using the same source dbspace and dbspace to reorganize as you used for a previous request that did not successfully complete.

For more information about how to proceed when a reorganization was unsuccessful, see Reorganization Troubleshooting with SAPDBA [Page 402].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You start a reorganization and then see a message such as in the following example, indicating that SAPDBA is about to automatically perform a restart:

  There already exists a request for tables selected from ‘psapddic’ that was not successful for all tables!
  Do you want to restart the uncompleted request?

You do not see this message unless you try to execute exactly the same request as one that previously failed.

Procedure
1. Decide whether to restart the uncompleted request or not:

<table>
<thead>
<tr>
<th>If you decide</th>
<th>Then SAPDBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>To restart the request</td>
<td>Offers to update the request if any of the tables in the request have meanwhile been used (for example, if R/3 was productive during the interruption). You must update the request if the number of rows of any of the tables has changed.</td>
</tr>
<tr>
<td></td>
<td>Do not update the request if you have had a severe failure in which database data has been lost (for example, a database host machine or disk failure). In this situation, you must do a restore. Refer to “Database Host or Disk Crash” at the end of Fixing Difficult Reorganization Problems with SAPDBA [Page 409].</td>
</tr>
<tr>
<td></td>
<td>The procedure continues below.</td>
</tr>
</tbody>
</table>
Restarting Uncompleted Reorganization Requests with SAPDBA

| Not to restart the request | Offers to delete the request. You can also delete the request using Deleting Uncompleted Reorganization Requests with SAPDBA [Page 415]. The procedure is now finished. |

SAPDBA displays a summary of the tables comprising the uncompleted request, broken down into the following categories:

- **WAITING**
  These tables have not yet been processed by SAPDBA. This was probably due to a fatal problem found for another table, which caused SAPDBA to abort the entire processing run.

- **FAILED**
  These tables were not successfully processed by SAPDBA due to some critical problem and SAPDBA had to abort processing on such tables.

2. Select whether you want to include the tables in the above categories in the restarted processing run. If preferred, you can restart the process a number of times, until you have re-processed all the tables from the uncompleted request.

3. Choose **Execute** to perform the restart.

SAPDBA performs the reorganization. SAPDBA writes data to the same date-stamped directory used in the original request. For more information, see SAPDBA Files, Directories, and Reports [Page 331] and Reorganization Log with SAPDBA [Page 403].

**Result**

After a reorganization, your database is less likely to run into space problems. However, you need to keep on monitoring the tables, especially if they are growing rapidly. Refer to Analyzing Tables by Fill Level, Size, and Extents with SAPDBA [Page 362].

You must now finish the table reorganization [Page 416].
Deleting Uncompleted Reorganization Requests with SAPDBA

Use

If a reorganization of a group of tables or a dbspace in SAPDBA for Informix was unsuccessful (that is, uncompleted), you can either delete the reorganization request or restart it [Page 413].

The following are typical reasons why you might decide to delete an uncompleted request:

- You do not want to use the restart processing to repeat the action.
- You want to start the entire process again from the beginning.
- You have tried the restart processing but this has not worked for some reason.
- You want to perform housekeeping for requests that have been left in the control table.

For more information about how to proceed when a reorganization was unsuccessful, see Reorganization Troubleshooting with SAPDBA [Page 402].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- A reorganization failed midway through and SAPDBA informed you with an error message. The reorganization request is still in the control table used by SAPDBA for reorganization.

Procedure

1. Choose one of the following in SAPDBA for Informix:
   - Reorganization → Delete Uncompleted Requests
   - Reorganization → Reorganize Group of Tables → Delete Uncompleted Requests
     SAPDBA displays a list of uncompleted requests.

2. Choose the relevant request and delete it. You can also delete all uncompleted requests in one go.

Result

The uncompleted request is no longer available. Note that you cannot restart a request that you have deleted.
Finishing a Table or Dbspace Reorganization with SAPDBA

Use
You must perform this procedure to complete a table or dbspace reorganization with SAPDBA for Informix.

Prerequisites
You have performed a table or dbspace reorganization with one of the following methods:

- Reorganizing a Single Table with SAPDBA [Page 387] using method Reorganize Table by 'insert into select from …' or Reorganize Table by 'Export/Import'.
- Reorganizing a Group of Tables with SAPDBA [Page 394]
- Reorganizing a Dbspace and Its Tables with SAPDBA [Page 398]

Procedure

1. Put the database server back into unbuffered logging mode to run the R/3 System. Refer to Switching to "Unbuffered Logging Mode" with SAPDBA [Page 464].
2. Create a level-0 (full) database backup (ON-Bar) or archive (ON-Archive or ontape). For more information, see:
   - Creation of a Database Backup (ON-Bar) [Page 114]
   - Creation of an Archive (ON-Archive) [Page 141]
   - Creation of an Archive (ontape) [Page 159]
3. If you have moved the table or tables to a new dbspace during the reorganization, then you need to:
   a. Keep the information on the new dbspace for the next R/3 System upgrade. SAPDBA displays a message telling you of this. The information is held in the ABAP data dictionary of the R/3 System. Refer to Maintaining Technical Settings [Ext.].
   b. Enter a transport request using transaction SE13. Otherwise, the next R/3 upgrade erases the information about the new dbspace from the data dictionary. For more information about setting up a transport request, see BC - Change and Transport Organizer [Ext.].
4. From time to time, clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR\sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to SAPDBA Housekeeping [Page 330].

Result
You have now finished the reorganization. If you want to make sure that the reorganization has finished successfully, you can check the SAPDBA reorganization log [Page 403].

See also:
Informix documentation
Data Consistency with SAPDBA

Use

It is very important to regularly check the data in your Informix database for physical consistency. If you do not check regularly, you might not notice data corruption until you attempt to restore the database in the event of failure. Corrupt data in your archives and backups might then prevent successful restore of the database.

You do not notice data corruption when you create an archive or backup. The SAPDBA consistency checks cannot damage your data since they only read the data without changing it. The checks do not check for logical consistency.

Integration

Data consistency checks are fully integrated in SAPDBA. You can use this functionality for databases running on UNIX and NT operating system platforms.

Prerequisites

You know how to use SAPDBA and have set it up correctly. Refer to Getting Started with SAPDBA [Page 316].

Features

SAPDBA data consistency checks operate on different objects, that is, single tables, tables of a dbspace, tables with "blob" fields, and all the tables of an R/3 database. For a faster check on tables with blob fields, SAPDBA offers you an interface to the Informix oncheck tool.

Activities

For guidelines on how to use the data consistency checks in SAPDBA, see How to Run Data Consistency Checks with SAPDBA [Page 420]. You have the following possibilities:

- If you want to perform a thorough check, choose one of the following:
  - Checking a Single Table for Data Consistency with SAPDBA [Page 422]
  - Checking Tables of a Dbspace for Data Consistency with SAPDBA [Page 424]
  - Checking Tables with Blob Fields for Data Consistency with SAPDBA [Page 426]
  - Checking All Tables of R/3 Database for Data Consistency with SAPDBA [Page 428]

- If you want to perform a faster check limited to tables containing blob fields, choose one of the following:
  - Checking Indexes of Tables with ‘Blob’ Fields Using ONCHECK -cI with SAPDBA [Page 430]
  - Checking Tables with ‘Blob’ Fields Using ONCHECK -cD with SAPDBA [Page 432]

- If you want to delete any previous requests that you have stopped or that failed to complete correctly for some reason, choose Deleting Uncompleted Consistency Requests with SAPDBA [Page 434].
If you try to re-execute a check that has previously failed, SAPDBA automatically leads you to Restarting Uncompleted Consistency Requests with SAPDBA [Page 435].

To prevent problems arising, SAP recommends you to regularly check your data for consistency. You can do this by scheduling the check with the DBA Planning Calendar in the Computing Center Management System (CCMS) of the R/3 System. Refer to Checking Physical Consistency in the DBA Planning Calendar (Informix) [Ext.].

To monitor database consistency online in the R/3 System, you can use the DBA operations monitor in the Computing Center Management System (CCMS). See Using the DBA Operations Monitor [Ext.].

See also:
Informix documentation
How to Run Data Consistency Checks with SAPDBA

Purpose

Consistency checks on your Informix database can take a long time to perform and might sometimes impact system performance. Therefore, it makes sense to identify high-risk data and do checks that you can fit into the time available. This section looks at how to choose the:

- Type of check (that is, whether to use ONCHECK and whether to check "blob" fields)
- Level of check (that is, whether to check a single table, all R/3 tables, and so on)
- Frequency of checks and when to run them
- Tool to use, SAPDBA or the Computing Center Management System (CCMS)

Process Flow

1. You decide on the type of check. Consider the following:
   - Remember that the Check ... actions are a more thorough way of checking the physical data consistency of tables than the ONCHECK ... actions. However, the Check ... actions take longer to perform since all data is examined with a read operation.
   - The riskiest type of data is in "blob" fields. Therefore, there are several actions available that only examine the tables with blob fields. It makes sense to run checks on your blob data more often than on other types of data.

2. You decide on the level of check. Consider the following:
   - Checking All Tables of R/3 Database for Data Consistency with SAPDBA [Page 428] is a very time-consuming procedure depending on the size of the database.
   - Checking Tables of a Dbspace for Data Consistency with SAPDBA [Page 424] breaks up the task of checking the entire database. You need to perform it once for each dbspace in the database. Do not forget any dbspaces.

3. You decide when to run the checks and how often. You need to make sure that you have at least one level-0 database backup (ON-Bar) or archive (ON-Archive and ontape) containing data which you have checked for consistency. Refer to Database Backup (ON-Bar) [Page 104] or Archive (ON-Archive and ontape) [Page 123]. Therefore, it is best to run a data consistency check on all data in the R/3 database as often as you can before a level-0 database backup or archive.

   ![](image)

   Consistency checks have an impact on database performance. Therefore SAP recommends that you schedule them for off-peak periods, for example, at weekends or overnight. If the performance of your system is affected during a consistency check, you can stop the check and then restart it later.

4. You decide if you want to use the DBA Planning Calendar in CCMS to schedule the check. Refer to Checking Physical Consistency in the DBA Planning Calendar (Informix) [Ext.]. It is not possible to schedule checks with SAPDBA.
Result

Your database data is checked for consistency in the best way, with the least possible impact on your production system.
Checking a Single Table for Data Consistency with SAPDBA

Use
You can use SAPDBA to check the data consistency of a single table of your Informix database. If there is any doubt, check the entire database for consistency since other tables might also be affected. This procedure checks the table by reading it and does not require storage space.

To find out which kind of check to do and how often, see How to Run Data Consistency Checks with SAPDBA [Page 420].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
1. Choose Data Consistency → Check Single Table.
2. Enter the name of the table that you want to check. If you are not sure which name you require, you can use a partial entry (for example, d01*).
3. Choose Continue. You can cancel the action if you want.

   SAPDBA checks the table for data consistency. As the processing runs, you see a message like the following:

   A014:
   Checking table ‘a014’ (1/1)

   Unloading to ‘/dev/null’... (32 rows)

   You can stop the check before it has finished by twice simultaneously pressing the keys Ctrl C. This is useful if you have run out of time, for example, or the performance on your system is poor. You can then restart the action by choosing the same action again. However, you must use exactly the same parameters as the first time. Refer to Restart Uncompleted Consistency Requests [Page 435]

Result
The table is now checked for data consistency.

- Success
  SAPDBA displays a message like the following when the check has successfully completed:

  ‘Consistency Check’ of selected tables detected no problems!!

- Problems
SAPDBA displays an error message like the following when there are problems:

Unload to '/dev/null' of one or more tables failed!!
Please check the log carefully.

For more information about how to find and check the log and output file from the check, see Log for Data Consistency [Page 437].

💡
You need to periodically clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to SAPDBA Housekeeping [Page 330].

See also:
Informix documentation
Checking Tables of a Dbspace for Data Consistency with SAPDBA

Use

You can use SAPDBA to check the data consistency of all the tables in a specified dbspace of your Informix database. If there is any doubt, check the entire database for consistency since other tables might also be affected. This procedure checks tables without changing them and it does not require storage space.

To find out which kind of check to do and how often, see How to Run Data Consistency Checks with SAPDBA [Page 420].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

4. Choose Data Consistency → Check Tables of a Dbspace.
5. Enter the name of the dbspace that you want to check. If you are not sure which name you require, you can use a partial entry (for example, psap*).
6. Choose Continue. You can cancel the action if you want.

SAPDBA checks the tables in the dbspace for data consistency. As the processing runs, you see a message like the following for each table checked:

A014:
Checking table ‘a014’ (1/136)
Unloading to ‘/dev/null’... (32 rows)

You can stop the check before it has finished by twice simultaneously pressing the keys Ctrl C. This is useful if you have run out of time, for example, or the performance on your system is poor. You can then restart the action by choosing the same action again. However, you must use exactly the same parameters as the first time. Refer to Restarting Uncompleted Consistency Requests with SAPDBA [Page 435].

Result

The tables of the dbspace are now checked for data consistency.

- Success
  SAPDBA displays a message like the following when the check has successfully completed:

    ‘Consistency Check’ of selected tables detected no problems!!

- Problems
SAPDBA displays an error message like the following when there are problems:

Unload to ‘/dev/null’ of one or more tables failed!!
Please check the log carefully.

For more information about how to find and check the log and output file from the check, see Log for Data Consistency with SAPDBA [Page 437].

You need to periodically clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to SAPDBA Housekeeping [Page 330].

See also:
Informix documentation
Checking Tables with Blob Fields for Data Consistency with SAPDBA

Use
You can use SAPDBA to check the data consistency of all the tables with "blob" fields in your Informix database. If there is any doubt, check the entire database for consistency since other tables might also be affected. This procedure checks tables without changing them and it does not require storage space.

To find out which kind of check to do and how often, see How to Run Data Consistency Checks with SAPDBA [Page 420].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
7. Choose Data Consistency → Check Tables with 'Blob' Fields.
8. Choose Continue. You can cancel the action if you want.

SAPDBA checks the tables with blob fields for data consistency. As the processing runs, you see a message like the following for each table checked:

A014:
Checking table ‘a014’ (1/136)
Unloading to ‘/dev/null’... (32 rows)

You can stop the check before it has finished by twice simultaneously pressing the keys Ctrl C. This is useful if you have run out of time, for example, or the performance on your system is poor. You can then restart the action by choosing the same action again. However, you must use exactly the same parameters as the first time. Refer to Restarting Uncompleted Consistency Requests with SAPDBA [Page 435].

Result
The tables with blob fields are now checked for data consistency.

- Success
  SAPDBA displays a message like the following when the check has successfully completed:

  ‘Consistency Check’ of selected tables detected no problems!!

- Problems
  SAPDBA displays an error message like the following when there are problems:
Checking Tables with Blob Fields for Data Consistency with SAPDBA

Unload to '/dev/null' of one or more tables failed!!
Please check the log carefully.

For more information about how to find and check the log and output file from the check, see Log for Data Consistency with SAPDBA [Page 437].

💡
You need to periodically clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to SAPDBA Housekeeping [Page 330].

See also:
Informix documentation
Checking All Tables of R/3 Database for Data Consistency with SAPDBA

Use
You can use SAPDBA to check the data consistency of all the tables in your R/3 Informix database. If there is any doubt, check the entire database for consistency since other tables might also be affected. This procedure checks tables without changing them and it does not require storage space.

To find out which kind of check to do and how often, see How to Run Data Consistency Checks with SAPDBA [Page 420].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
9. Choose Data Consistency → Check all Tables of R/3 database.
10. Choose Continue. You can cancel the action if you want.

SAPDBA checks the tables of the R/3 database for data consistency. As the processing runs, you see a message like the following for each table checked:

A014: Checking table ‘a014’ (1/136)
Unloading to ‘/dev/null’... (32 rows)

You can stop the check before it has finished by twice simultaneously pressing the keys Ctrl C. This is useful if you have run out of time, for example, or the performance on your system is poor. You can then restart the action by choosing the same action again. However, you must use exactly the same parameters as the first time. Refer to Restarting Uncompleted Consistency Requests with SAPDBA [Page 435].

Result
The tables with blob fields are now checked for data consistency.
- Success
  SAPDBA displays a message like the following when the check has successfully completed:
  ‘Consistency Check’ of selected tables detected no problems!!
- Problems
  SAPDBA displays an error message like the following when there are problems:
Checking All Tables of R/3 Database for Data Consistency with SAPDBA

Unload to `/dev/null` of one or more tables failed!!
Please check the log carefully.

For more information about how to find and check the log and output file from the check, see Log for Data Consistency with SAPDBA [Page 437].

You need to periodically clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to SAPDBA Housekeeping [Page 330].

When you run Check all Tables of R/3 Database a large number of entries in the internal control table used by SAPDBA are generated. Therefore, delete or restart uncompleted requests from this action as soon as possible, especially if you plan to do a reorganization, which uses the same control table. Otherwise the performance of the reorganization deteriorates.

See also:
Informix documentation
Checking Indexes of Tables with ‘Blob’ Fields Using ONCHECK -cI with SAPDBA

Use

You can use SAPDBA to check the data consistency of the indexes in tables with "blob" fields in your Informix database. If there is any doubt, check the entire database for consistency since other tables might also be affected. This procedure checks tables without changing them and it does not require storage space.

To find out which kind of check to do and how often, see How to Run Data Consistency Checks with SAPDBA [Page 420]. For more information on the Informix tool ONCHECK used in this procedure, see the Informix documentation.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

12. Choose Continue. You can cancel the action if you want.

SAPDBA checks the tables for data consistency. As the processing runs, you see a message like the following for each table checked:

A014:
Checking table ‘a014’ (1/136)
Running ‘ONCHECK -cI’... (32 rows)

You can stop the check before it has finished by twice simultaneously pressing the keys Ctrl C. This is useful if you have run out of time, for example, or the performance on your system is poor. You can then restart the action by choosing the same action again. However, you must use exactly the same parameters as the first time. Refer to Restarting Uncompleted Consistency Requests with SAPDBA [Page 435].

Result

The tables with blob fields are now checked for data consistency.

- Success
  SAPDBA displays a message like the following when the check has successfully completed:

  ‘Consistency Check’ of selected tables detected no problems!!

- Problems
  SAPDBA displays an error message like the following when there are problems:
Checking Indexes of Tables with 'Blob' Fields Using ONCHECK -cl with SAPDBA

Unload to '/dev/null' of one or more tables failed!!
Please check the log carefully.

For more information about how to find and check the log and output file from the check, see Log for Data Consistency with SAPDBA [Page 437].

💡

You need to periodically clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to SAPDBA Housekeeping [Page 330].

See also:
Informix documentation
Checking Tables with ‘Blob’ Fields Using ONCHECK -cD with SAPDBA

Use

You can use SAPDBA to check the data consistency of the data in tables with "blob" fields in your Informix database. If there is any doubt, check the entire database for consistency since other tables might also be affected. This procedure checks tables without changing them and it does not require storage space.

To find out which kind of check to do and how often, see How to Run Data Consistency Checks with SAPDBA [Page 420]. For more information on the Informix tool ONCHECK used in this procedure, see the Informix documentation.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

13. Choose Data Consistency -> 'ONCHECK -CI' for Tables with 'Blob' Fields.
14. Choose Continue. You can cancel the action if you want.

    SAPDBA checks the tables for data consistency. As the processing runs, you see a message like the following for each table checked:

    A014:
    Checking table ‘a014’ (1/136)
    Running ‘ONCHECK -cD’... (32 rows)

    You can stop the check before it has finished by twice simultaneously pressing the keys Ctrl C. This is useful if you have run out of time, for example, or the performance on your system is poor. You can then restart the action by choosing the same action again. However, you must use exactly the same parameters as the first time. Refer to Restarting Uncompleted Consistency Requests with SAPDBA [Page 435].

Result

The tables with blob fields are now checked for data consistency.

- Success
  SAPDBA displays a message like the following when the check has successfully completed:

  'Consistency Check' of selected tables detected no problems!!

- Problems
  SAPDBA displays an error message like the following when there are problems:
Checking Tables with ‘Blob’ Fields Using ONCHECK -cD with SAPDBA

Unload to ‘/dev/null’ of one or more tables failed!!
Please check the log carefully.

For more information about how to find and check the log and output file from the check, see Log for Data Consistency with SAPDBA [Page 437].

💡
You need to periodically clear up the $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) directory in which SAPDBA creates working directories and files. Refer to SAPDBA Housekeeping [Page 330].

See also:
Informix documentation
Deleting Uncompleted Consistency Requests with SAPDBA

Use

SAPDBA uses a control table to regulate data consistency checks (this table is also used for SAPDBA reorganizations). If an action from the Data Consistency menu has not successfully completed, it leaves entries in the SAPDBA control table. Use this action to delete such uncompleted requests from the control table.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Delete uncompleted requests in the following circumstances:

- You have started an action from the Data Consistency menu and the action has not successfully completed and any of the following conditions is true:
  - You do not want to use the restart processing to repeat the action
  - You want to start the entire process again from the beginning
  - You have tried the restart processing, but it has not worked for some reason
  For details of restart processing, see Restarting Uncompleted Consistency Requests with SAPDBA [Page 435].
- You want to perform housekeeping for requests that have been left in the control table.

Procedure

1. Choose Reorganization → Delete Uncompleted Requests.
   SAPDBA displays a list of uncompleted requests.

2. Select the relevant request and delete it. You can also delete all uncompleted requests at once.

   Checking All Tables of R/3 Database for Data Consistency with SAPDBA [Page 428] generates a lot of entries in the SAPDBA control table. Therefore, delete or restart uncompleted requests from this action as soon as possible. This is especially important if you do a reorganization, because reorganizations use the same control table. Otherwise the performance of the reorganization deteriorates.
Restarting Uncompleted Consistency Requests with SAPDBA

Use
This process is automatically invoked by SAPDBA when you try to start any of the actions from Data Consistency using exactly the same input parameters as those used for a previous request that did not successfully complete.

You do not see the uncompleted request unless you try to execute a request exactly like the one that previously failed.

Prerequisites
You tried to execute a request but it failed or you stopped it deliberately. You are now trying to re-execute exactly the same request.

Procedure
1. Start a request exactly the same as one that previously failed.
   SAPDBA displays a message telling you there is already an uncompleted request. The uncompleted request is identical to the one you have just entered. SAPDBA asks if you want to restart the uncompleted request.
2. Choose whether you want to restart the uncompleted request.
   – If you choose no restart, SAPDBA gives you the chance to delete the request. You can also delete the request using Deleting Uncompleted Consistency Requests with SAPDBA [Page 434].
   – If you choose restart, SAPDBA displays a summary of the tables comprising the uncompleted request.

The remainder of the procedure assumes you choose to restart the uncompleted request.

The tables comprising the uncompleted request are broken down into the following categories:
   – Tables with a status of WAITING have not been processed by SAPDBA when the uncompleted request was run. This is normally due to a fatal problem found for another table, which caused SAPDBA to stop the entire processing run. The other reason why you might see tables with a status of WAITING is because you stopped the processing yourself.
   – Tables with a status of FAILED could not be successfully processed by SAPDBA due to a critical problem. SAPDBA had to stop processing on such tables.

For both of these categories, you have the option of setting the current processing run to either re-process the tables in the category, or to leave them for the time being. This
Restarting Uncompleted Consistency Requests with SAPDBA

allows you to restart the process a number of times, until you have re-processed all the
tables that make up the uncompleted request.

3. Select the reprocessing option for each category of table.

4. Choose Execute to perform the restart.

Result

Each time you do a restart, SAPDBA creates a new date-stamped directory. The directories are
named as follows:

- **Check**... actions:
  
  CHECK_<object name>_<_date/time stamp>

  For example, a check of the table a014 on the 6th January 1997 at 14:24:03 would
  produce a directory called:

  CHECK_a014_970106142403

- **‘ONCHECK’**... actions:
  
  For **‘ONCHECK -cI’ for tables with ‘Blob’ Fields**, the following directory is created:

  ONCHECK_cI_BLOB<_date/time stamp>

  For example, CHECK_cI_BLOB_970106142403

  For **‘ONCHECK -cD’ for tables with ‘Blob’ Fields**, the following directory is created:

  ONCHECK_cD_BLOB<_date/time stamp>

  For example, CHECK_cD_BLOB_970106142403

The date/time stamp is composed of the date (in reverse format) followed by the time.
Log for Data Consistency with SAPDBA

Definition

SAPDBA for Informix writes a log containing detailed information about processing for all actions available under Data Consistency. The log is called check_log and is held in directories under $INFORMIXDIR/sapreorg (UNIX) or %INFORMIXDIR%\sapreorg (NT) with the following names:

- **Check**... actions:
  
  CHECK_<object name>_<date/time stamp>

  For example, a check of the table a014 on the 6th January 1998 at 14:24:03 would produce a directory called:

  CHECK_a014_980106142403

  You can use the log for these actions to see if the action has completed successfully.

- **‘ONCHECK’**... actions:
  
  - For the ‘ONCHECK -cI’ for tables with ‘Blob’ Fields action, the following directory is created:

    ONCHECK_cI_BLOB_<date/time stamp>

    For example, CHECK_cI_BLOB_980106142403.

  - For the ‘ONCHECK -cD’ for tables with ‘Blob’ Fields action, the following directory is created:

    ONCHECK_cD_BLOB_<date/time stamp>

    For example, CHECK_cD_BLOB_980106142403.

  For these actions, the log only indicates whether the Informix tool oncheck has been successfully called. You need to look at the file ending .out (in the same directory as check_log) to find further details.

The date/time stamp is composed of the date (in reverse format) followed by the time.

Use

You can use the log to see what happened during a data consistency check in the event of failure.

Structure

The Log After Processing Successfully Completed

The log consists of the following sections (the examples below show a typical log where processing has completed successfully):

- **Header section at the start of the log**

  This contains a title and a date/time stamp, such as in the following example:
Log for Data Consistency with SAPDBA

***********************
LOG FOR CONSISTENCY CHECK:
'a014'
***********************
Start: 10. Jan. 98, 10:32

The name ‘a014’ is replaced by the relevant object name where appropriate. For example, ‘psapddic’ if checking this dbspace.

- A central section containing a set of lines describing the processing for a given table. The example below shows a normal (that is, successful) consistency check:

-----------------------------------------------
Checking table ‘a014’:
Start: 25. Jan. 98. 10:32
Ready: 25. Jan. 98. 10:33
Status of CHECK: SUCCESS
-----------------------------------------------

This is repeated once for each table processed.

💡 For ‘ONCHECK’... actions, the following applies:
- The text of the final line differs slightly. It appears as either Status of ‘ONCHECK -cD’ call: or Status of ‘ONCHECK -cI’ call.
- You must check the output file (ending .out, in the same directory as the log file) to see how the oncheck call finished. You can only see from the log whether or not oncheck has been successfully called for each table.

- Summary section at the end of the log

This contains a summary of the processing. The following example illustrates what this looks like when there have been no problems:

***********************
Summary for CONSISTENCY CHECK:
'a014'
***********************

Tables with status FAILED: 0
Tables with status INTERRUPTED: 1
Tables with status WAITING: 20
Tables with status SUCCESS: 11

End of CONSISTENCY CHECK: 10. Jan. 98. 10:33
***********************
Log for Data Consistency with SAPDBA

The Log After Processing Hit a Problem

The summary section of the log (appearing at the end of the log) contains important information, alerting you to the problem. For example:

```
****************************************************
Summary for CONSISTENCY CHECK of selected tables from:
  'blob'
****************************************************
Tables with status FAILED: 0
Tables with status INTERRUPTED: 1
Tables with status WAITING: 25
Tables with status SUCCESS: 6
End of CONSISTENCY CHECK: 10. Jan. 98. 10:33
****************************************************
```

The central section of the log contains further details of what has gone wrong. For example:

```
Status of 'ONCHECK -cI' call: INTERRUPTED
Location of error: Interrupted by user!
Recommendation: You can restart the request if you want!
```

In this example, we aborted the action prematurely. The next time we went into this same action, we would see a prompt from SAPDBA telling us that the action was incomplete and we could then restart it. For more information about restarting SAPDBA actions, see Restarting Uncompleted Consistency Requests with SAPDBA [Page 435].

Integration

One further resource that you can use in finding the cause of problems – also useful if you need to call the Informix hotline – is the file ending .out. This file contains output details from the data consistency action. It is found in the same directory as check_log (see details at start of this section). For the ‘ONCHECK’ actions, this contains output from the underlying Informix tool oncheck.
Update Statistics with SAPDBA

Use

You can use SAPDBA for Informix to analyze and update the statistics held on database tables. This enables the query optimizer to choose the best query plan, so reducing the time taken by your R/3 applications to access data. SAPDBA’s integrated functionality offers you a much simpler and more secure approach than entering SQL commands by hand.

The query optimizer for the Informix database needs current, up-to-date statistics about the number of data rows, size of indexes and the distribution of data in individual fields of a table. Using this information, it can work out the optimal access path for a query. If the statistics held by the optimizer are out of date or not present at all, this can lead to, for example, poor access paths use of the wrong index or inappropriate use of a full table sequential scan when a suitable index exists. This leads to poor performance.

Integration

Update statistics is fully integrated in SAPDBA. You can use this functionality for databases running on UNIX and NT operating system platforms.

Prerequisites

You need to know how to use SAPDBA and to have set it up correctly. Refer to Getting Started with SAPDBA [Page 316].

Features

- SAPDBA executes the commands required to analyze the statistics on database tables, so identifying when an update is necessary.
- SAPDBA executes the commands required to update statistics on different sets of tables.
- SAPDBA can be customized for optimal processing of specified larger tables.
- SAPDBA has a command-line option for extra flexibility.
- SAPDBA enforces expert mode for updating statistics on more than one table. This reduces the risk of unintended changes to the database by inexperienced personnel.

Activities

- You identify when update statistics is required using the normal SAPDBA menus.
  See Listing Tables with Deviation with SAPDBA [Page 444] and Listing Tables with Non-Updated Indexes with SAPDBA [Page 446].
- You perform update statistics using the normal SAPDBA menus.
  See Updating Statistics for One Table [Page 449], Updating Statistics for All Tables [Page 451], and Updating Statistics for All System Tables [Page 453].

⚠️ To avoid poor performance of your database, we recommend that you run update statistics frequently, at least once a week. You can schedule this using the DBA...
Update Statistics with SAPDBA

If you want to, you can perform update statistics from the operating system command line.

See Updating Statistics from the Command Line with SAPDBA [Page 455]. Update statistics executes at different levels:

- **High**
  The exact distribution of all data in the table column is determined.

- **Medium**
  A sample of data for the table column is taken and the distribution of this sample is taken as representative of the overall data distribution. This is usually adequate for small tables but not for larger ones. With larger tables a significant discrepancy can occur since the maximum allowable sample size might be insufficient.

- **Low**
  This is only relevant at the “table level” rather than for individual columns. Data is collected on the table as a whole, such as the number of rows and size of indexes.

SAPDBA runs update statistics at different levels for different columns of each table it processes, since the distribution of data in index columns (especially heading index columns) is more important than that of non-index columns.

SAPDBA can also perform update statistics in parallel when you execute it from the command line.

For more information about the defaults used in SAPDBA, see How SAPDBA Performs Update Statistics [Page 442].

- If you want to, you can override SAPDBA settings for particular tables (this makes sense especially for large tables). See Customizing Update Statistics with SAPDBA [Page 459].

- If you want to monitor update statistics online in the R/3 System, you can use the DBA operations monitor in the Computing Center Management System (CCMS). See Using the DBA Operations Monitor [Ext.].

See also:
Informix documentation
How SAPDBA Performs Update Statistics

Use
SAPDBA for Informix performs update statistics on table columns using the following defaults:

- Heading index columns at level high (you cannot alter this)
- Non heading index columns at level medium (you can alter this)
- No update statistics is carried out for non-index columns (you can alter this)

Features
SAPDBA also performs update statistics at “table level” to update the size of indexes, number of rows and so on (this is done at level low).

For a table with multiple indexes where the indexes are similar, SAPDBA behaves as follows:

- All leading index columns that are the same between two or more indexes are evaluated at level high.
- The first index column that differs between two or more indexes is evaluated at level high.
- Remaining index columns are evaluated as usual at level medium.

A table has two indexes as follows:

- Index 1 contains columns A, B, C, F, G, and X.
- Index 2 contains columns A, B, C, E, H, I, and X.

The result is that SAPDBA updates statistics at level high for columns A, B, C, E, and F and at level medium for columns G, H, I, and X.

SAPDBA can perform update statistics in parallel for greater throughput. For more information, see Updating Statistics from the Command Line with SAPDBA [Page 455].

Activities
SAPDBA lets you update the statistics of a table when:

- The difference between the statistics held by the optimizer for the number of rows in a table deviates from the current (that is, correct) value by more than a certain threshold.
  For more information about how to identify such tables, see Listing Tables with Deviation with SAPDBA [Page 444].

- No statistics have yet been calculated for a table. For more information about how to identify such tables (assuming they have at least one index), see Listing Tables with Non-Updated Indexes with SAPDBA [Page 446].

- A new index has been created on a table and the statistics have not been updated since.
  For more information about how to identify such tables, see Listing Tables with Non-Updated Indexes with SAPDBA [Page 446] [Page 446].
How SAPDBA Performs Update Statistics

- An entry in the update statistics control table `DBSTATC` specifies update statistics for particular tables (such as large ones), overriding the default settings in SAPDBA. Refer to Customizing Update Statistics with SAPDBA [Page 459].

See also:
Informix documentation
Listing Tables with Deviation with SAPDBA

Use
You can use SAPDBA for Informix to identify tables where the statistics deviate from the current (that is, correct) values by more than a certain threshold. For more information, see Update Statistics with SAPDBA [Page 440].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
1. Choose Update Statistics → Tables with Deviation in SAPDBA for Informix.

   The first screen you see allows you to enter the deviation in percent. The recommended default value is 10%. Only tables where the deviation is equal to or greater than 10% are displayed in the subsequent report.
   - If you enter a low threshold value for deviation (say 5%), even tables where the statistics deviate only slightly are displayed in the report.
   - If you enter a high value (say 25%), only tables where the statistics deviate greatly appear.

2. Choose Execute.

   You see a report screen with entries similar to the following examples:

<table>
<thead>
<tr>
<th>table</th>
<th>deviation [%]</th>
<th>current_rows</th>
<th>statistic_rows</th>
<th>deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) d020I</td>
<td>14</td>
<td>1433</td>
<td>1232</td>
<td>201</td>
</tr>
<tr>
<td>2) onstatopt</td>
<td>?</td>
<td>62</td>
<td>0</td>
<td>62</td>
</tr>
<tr>
<td>3) osmon</td>
<td>5</td>
<td>18</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>....</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   - If you choose one of the numbers on the left of the report, you can perform update statistics on the single table selected. Refer to Updating Statistics for One Table with SAPDBA [Page 449]. With this action, you can have SAPDBA update the old statistics information for the table with the current value.

   - The deviation [%] field is the percentage difference between current_rows and statistic_rows. A question mark is displayed in this column when the value of statistic_rows is zero and the percentage cannot be sensibly derived.

   - The current_rows field is the correct, up-to-date number of rows in the table (dating from the last time the statistics were updated).

   - The statistic_rows field is the less up-to-date number of rows held in the table's statistics.

   - The deviation field is the absolute difference between current_rows and statistic_rows.
Listing Tables with Deviation with SAPDBA

- Sort order for the report is *current_rows* followed by table *name*.

3. For more information about printing the report, see Printing a SAPDBA Report [Page 329].

**See also:**

Informix documentation
Listing Tables with Non-Updated Indexes with SAPDBA

Use

You can use SAPDBA for Informix to identify tables with new indexes (and new tables with at least one index) for which no statistics are held. For more information, see Update Statistics with SAPDBA [Page 440].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

1. Choose Update Statistics → Tables with Non-Updated Indexes.

   You see a screen with entries similar to the following examples:

<table>
<thead>
<tr>
<th>table</th>
<th>number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>dd03l</td>
</tr>
<tr>
<td>2)</td>
<td>draw</td>
</tr>
<tr>
<td>3)</td>
<td>aufk</td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

   - If you choose one of the numbers on the left of the report, you can perform update statistics on the selected table. See Updating Statistics for One Table with SAPDBA [Page 449].
   - The number field refers to the number of indexes on the table which have been added since the table last had an update statistics. For a table without any previous statistics, all its indexes are displayed here.
   - Sort order for the report is number (descending) followed by table name.

2. For more information about printing the report, see Printing a SAPDBA Report [Page 329].

See also:
Informix documentation
Listing Update Statistics Log File

Use

You can use SAPDBA for Informix to list the log file used in update statistics. For more information, see Update Statistics with SAPDBA [Page 440]. For more information about the log file, see the logfile parameter in Updating Statistics from the Command Line with SAPDBA [Page 455].

There are the following levels of detail for the log file report:

- **Default**
  - The report only shows a header with the SAPDBA arguments and a summary of how many single tasks were processed successfully or unsuccessfully.

- **Extended**
  - The report shows all tasks processed by SAPDBA, which is useful for support purposes. You can specify this with the XXL parameter when you update statistics from the command line. However, the extended report requires more processing time and disk space.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure

2. In Show last enter the number of rows to view.
   - You see a screen with the name of the log file at the top followed by the number of rows that you specified from the file.

   By default, the log file is named as follows:
   ```
   /$INFORMIXDIR/sapreorg/updstat_<SID>.log
   ```
   where <SID> is system ID, for example:
   ```
   /informix/CX5/sapreorg/updstat_cx5.log
   ```
   If you use parallel processing, the results are written by default to the following log files:
   ```
   /$INFORMIXDIR/sapreorg/updstat_<SID>..<PID>
   ```
   where <SID> is system ID and <PID> is child process ID, for example:
   ```
   /informix/CX5/sapreorg/updstat_cx5.002
   ```
3. For more information about printing the report, see Printing a SAPDBA Report [Page 329].
Updating Statistics for One Table with SAPDBA

Use

You can use SAPDBA for Informix to update statistics on a single table, so making sure that the query optimizer for the Informix database has up-to-date information when it optimizes queries at execution time. For more information, see Update Statistics with SAPDBA [Page 440].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].
- To perform update statistics in parallel, you must meet the requirements given in SAP Note 189399. See the working processes field below. SAP intends to automate the preparations required in future.

Procedure

1. Choose Update Statistics → Update Statistics for One Table in SAPDBA for Informix.

   This is identical to the report that you can obtain by selecting one of the numbers on the left from the Listing Tables with Deviation with SAPDBA [Page 444] or Listing Tables with Non-Updated Indexes with SAPDBA [Page 446].

   You see a screen with the following possibilities:

<table>
<thead>
<tr>
<th>Field</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>table name</td>
<td>The name for the table you want to process. If you are not sure which name you require, you can use a partial entry (for example, sta*).</td>
</tr>
<tr>
<td>threshold value: deviation %</td>
<td>The threshold for how much the table’s statistics differ from the current value held by the query optimizer. If the deviation is less than this threshold, no update statistics is actually performed when you select Execute.</td>
</tr>
<tr>
<td>logfile output</td>
<td>The method of storing logging information from a processing run of update statistics:</td>
</tr>
<tr>
<td></td>
<td>• Normal                                                               A single entry is written to the file.</td>
</tr>
<tr>
<td></td>
<td>• Extra large                                                         One entry is written to the file for each table processed.</td>
</tr>
<tr>
<td>working processes: number</td>
<td>The number of processes used by update statistics. If you specify more than 1, SAPDBA performs update statistics in parallel, but you must first meet certain prerequisites (see above).</td>
</tr>
</tbody>
</table>
Updating Statistics for One Table with SAPDBA

<table>
<thead>
<tr>
<th>update level</th>
<th>This dialog box has the levels defaulted to high and medium. For more information about update levels, see the Informix documentation. Unless you have very good knowledge of the Informix database, we recommend you leave them as they are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- <strong>heading index columns</strong>&lt;br&gt;This refers to the leading component of an index and is set to high because the query optimizer can best optimize queries with exact information on such columns. You cannot change this parameter.</td>
</tr>
<tr>
<td></td>
<td>- <strong>non heading index columns</strong>&lt;br&gt;This refers to the secondary component of an index and is defaulted to medium because the query optimizer requires fairly accurate information about such columns in order to optimize queries.</td>
</tr>
</tbody>
</table>

2. Choose *Execute*.

You see a message to confirm that SAPDBA is running the update. Then you see a message to confirm satisfactory completion:

```
Update statistics for table 'state' was successful!
```

**See also:**

Informix documentation
Updating Statistics for All Tables with SAPDBA

Use

You can use SAPDBA for Informix to update statistics on all tables in the database. This makes sure that the query optimizer for the Informix database has up-to-date information when it optimizes queries at execution time. This action also updates system tables. For more information, see Update Statistics with SAPDBA [Page 440].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- To perform update statistics in parallel, you must meet the requirements given in SAP Note 189399. See the working processes field below. SAP intends to automate the preparations required in future.

Procedure


⚠️

Depending on the size of your database, this action might take several hours to run. Schedule it for a period when your system is not heavily loaded and you have plenty of time, so you do not impact your normal service levels.

You see a screen with the following possibilities:

<table>
<thead>
<tr>
<th>Field</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>threshold value: deviation</td>
<td>The threshold for how much the table’s statistics differ from the current value held by the query optimizer. If the deviation is less than this threshold, no update statistics is actually performed when you select Execute.</td>
</tr>
<tr>
<td>%</td>
<td></td>
</tr>
<tr>
<td>logfile output</td>
<td>The method of storing logging information from a processing run of update statistics:</td>
</tr>
<tr>
<td></td>
<td>• Normal</td>
</tr>
<tr>
<td></td>
<td>A single entry is written to the file.</td>
</tr>
<tr>
<td></td>
<td>• Extra large</td>
</tr>
<tr>
<td></td>
<td>One entry is written to the file for each table processed.</td>
</tr>
<tr>
<td>working processes: number</td>
<td>The number of processes used by update statistics. If you specify more than 1, SAPDBA performs update statistics in parallel, but you must first meet certain prerequisites (see above).</td>
</tr>
</tbody>
</table>
Updating Statistics for All Tables with SAPDBA

**update level**

This dialog box has the levels defaulted to high and medium. For more information about update levels, see the Informix documentation. Unless you have very good knowledge of the Informix database, we recommend you leave them as they are:

- **heading index columns**

  This refers to the leading component of an index and is set to high because the query optimizer can best optimize queries with exact information on such columns. You cannot change this parameter.

- **non heading index columns**

  This refers to the secondary component of an index and is defaulted to medium because the query optimizer requires fairly accurate information about such columns in order to optimize queries.

2. Choose **Execute**.

   You see the following message:
   
   Will now update statistics for all tables.
   
   Do you want to continue?

3. To stop, choose **cancel**.

   If you proceed, you see a message to confirm that SAPDBA is running the update:
   
   Running update statistics for all tables...

   Then you see a message to confirm satisfactory completion:

   Update statistics for all tables was successful!
Updating Statistics for All System Tables with SAPDBA

Use

You can use SAPDBA for Informix to update statistics on all system tables in the database. This makes sure that the query optimizer for the Informix database has up-to-date information when it optimizes queries at execution time. System tables are particularly important for optimal performance of your database. For more information, see Update Statistics with SAPDBA [Page 440].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- To perform update statistics in parallel, you must meet the requirements given in SAP Note 189399. See the working processes field below. SAP intends to automate the preparations required in future.

Procedure


You see a screen with the following possibilities:

<table>
<thead>
<tr>
<th>Field</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>threshold value: deviation %</td>
<td>The threshold for how much the table's statistics differ from the current value held by the query optimizer. If the deviation is less than this threshold, no update statistics is actually performed when you select Execute.</td>
</tr>
<tr>
<td>logfile output</td>
<td>The method of storing logging information from a processing run of update statistics:</td>
</tr>
<tr>
<td></td>
<td>- Normal</td>
</tr>
<tr>
<td></td>
<td>A single entry is written to the file.</td>
</tr>
<tr>
<td></td>
<td>- Extra large</td>
</tr>
<tr>
<td></td>
<td>One entry is written to the file for each table processed.</td>
</tr>
<tr>
<td>working processes: number</td>
<td>The number of processes used by update statistics. If you specify more than 1, SAPDBA performs update statistics in parallel, but you must first meet certain prerequisites (see above).</td>
</tr>
</tbody>
</table>
4. Choose **Execute**.

   You see the following message:

   Will now update statistics for all system tables.

   Do you want to continue?

5. To stop, choose **cancel**.

   If you proceed, you see a message to confirm that SAPDBA is running the update:

   Running update statistics for all system tables...

   Then you see a message to confirm satisfactory completion:

   Update statistics for all system tables was successful!

**See also:**

Informix documentation
Updating Statistics from the Command Line with SAPDBA

Use
You can use SAPDBA for Informix from the operating system command line to perform update statistics. This gives you extra flexibility in specifying exactly how update statistics is performed and is useful for large tables when you want to customize SAPDBA [Page 459].

Prerequisites
To perform update statistics in parallel, you might need to perform additional preparations:

- Install a special version of SAPDBA
- Install an extra executable file, called CHILD4US
- Create a new table, called INFREQ4US

For more information, see SAP Note 189399. When you have finished these preparations, you can use the parameters tabsparallel and colsparallel (see below). SAP intends to automate these preparations in future.

Procedure
Enter a command with the following syntax (\$ is the command line prompt):

```
$ sapdba-updstat
   -threshold <n>
   -level <high | medium>
   -t <tabname>
   -duration <min>
   -check
   -am
   -nrowsl <low> -nrowsh <high>
   -logfile <filepath>
   -XXL
   -systabs
   -fc <n>
   -forcedlow
   -tabsparallel <n>
   -colsparallel <n>
```

Parameters for update statistics from the command line:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>sapdba-updstat</td>
<td></td>
</tr>
<tr>
<td>-threshold &lt;n&gt;</td>
<td></td>
</tr>
<tr>
<td>-level &lt;high</td>
<td>medium&gt;</td>
</tr>
<tr>
<td>-t &lt;tabname&gt;</td>
<td></td>
</tr>
<tr>
<td>-duration &lt;min&gt;</td>
<td></td>
</tr>
<tr>
<td>-check</td>
<td></td>
</tr>
<tr>
<td>-am</td>
<td></td>
</tr>
<tr>
<td>-nrowsl &lt;low&gt; -nrowsh &lt;high&gt;</td>
<td></td>
</tr>
<tr>
<td>-logfile &lt;filepath&gt;</td>
<td></td>
</tr>
<tr>
<td>-XXL</td>
<td></td>
</tr>
<tr>
<td>-systabs</td>
<td></td>
</tr>
<tr>
<td>-fc &lt;n&gt;</td>
<td></td>
</tr>
<tr>
<td>-forcedlow</td>
<td></td>
</tr>
<tr>
<td>-tabsparallel &lt;n&gt;</td>
<td></td>
</tr>
<tr>
<td>-colsparallel &lt;n&gt;</td>
<td></td>
</tr>
</tbody>
</table>
### Updating Statistics from the Command Line with SAPDBA

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-threshold &lt;n&gt;</code></td>
<td>If set, this determines the percentage deviation between the statistics held by the optimizer for the number of rows in a table and the current (that is, correct) value. When the threshold is exceeded, update statistics is performed for the table. If the value is set to 0, all tables are updated. If not set, the default of 10% deviation is used.</td>
</tr>
<tr>
<td><code>threshold &lt;n&gt;</code></td>
<td>(default: 10)</td>
</tr>
<tr>
<td>`-level &lt;high</td>
<td>medium&gt;`</td>
</tr>
<tr>
<td>`-level &lt;high</td>
<td>medium&gt;`</td>
</tr>
<tr>
<td><code>-t &lt;tabname&gt;</code></td>
<td>If set, this restricts update statistics to a single specified table. If not set, all tables are updated.</td>
</tr>
<tr>
<td><code>-t &lt;tabname&gt;</code></td>
<td>(default: all tables)</td>
</tr>
<tr>
<td><code>-duration &lt;min&gt;</code></td>
<td>If set, this determines the maximum run-time for update statistics. If not set, the processing runs normally to completion.</td>
</tr>
<tr>
<td><code>-check</code></td>
<td>If set, no update statistics is run. Instead, each table is checked to see if update statistics is necessary. If so, an entry is made in the control table. If not set, a normal update statistics is run.</td>
</tr>
<tr>
<td><code>-am</code></td>
<td>If set, additional statistics are collected for the application monitor. However, this has a substantial performance overhead for update statistics. If you do not use the application monitor, do not set this parameter.</td>
</tr>
</tbody>
</table>
| `-nrowsl <low> -nrowsh <high>` | If set, this determines the lower and upper limits for the number of rows in tables included in update statistics. For example:  
  `-nrowsl 200 -nrowsh 10000`  
  In this example, all tables having between 200 and 10 000 rows (inclusive) would be processed by update statistics. |
### Updating Statistics from the Command Line with SAPDBA

#### -logfile `<filepath>`
If set, update statistics writes its log file to the `<filepath>` file. You can specify `<filepath>` in the following ways:

- With a directory name, for example:
  ```
  -logfile
  $INFORMIXDIR/dbatemp/updstat.log (UNIX)
  -logfile
  %INFORMIXDIR%\dbatemp\updstat.log (NT)
  ```
- Without a directory name, for example:
  ```
  -logfile updstat.log
  ```

If you do not include a directory name, the file is written to the current directory.

The default log file from update statistics is called `updstat<sid>.log` and is stored in the default directory `$INFORMIXDIR/sapreorg` (UNIX) or `%INFORMIXDIR%\sapreorg` (NT). The log file is appended with information from the current run, until it reaches a size of 250 000 lines (approximately 10 MB). When it reaches this size, it is copied to `updstat<sid>.old` and a new file is started with the original name, `updstat<sid>.log`.

#### -XXL
If set, the logfile for update statistics contains extra information, useful for support purposes. You should not normally set this parameter.

#### -tabfile `<filepath>`
If set, update statistics processes only the tables listed in the `<filepath>` file. You can specify `<filepath>` in the following ways:

- With a directory name, for example:
  ```
  -tabfile
  $INFORMIXDIR/dbatemp/updstat.tab (UNIX)
  -tabfile
  %INFORMIXDIR%\dbatemp\updstat.tab (NT)
  ```
- Without a directory name, for example:
  ```
  -tabfile updstat.tab
  ```

If you do not include a directory name, the file is read from the current directory, `$INFORMIXDIR/sapreorg` (UNIX) or `%INFORMIXDIR%\sapreorg` (NT).

#### -systabs
If set, update statistics is only performed on database system tables. This corresponds to Updating Statistics for All System Tables with SAPDBA [Page 453], which you can start interactively from the menus in SAPDBA.
### Updating Statistics from the Command Line with SAPDBA

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-fc &lt;n&gt;</code></td>
<td>(default: 1) If set to a value greater than the default of 1, update statistics works with a different method. With a value of 2, for example, 2 fields are updated by each pass of the processing. You can set <code>n</code> to a value between 1 and 9. This brings a performance improvement for update statistics, but needs more sort space. Therefore, you should <strong>not</strong> set it for systems with large tables and a small amount of main storage space.</td>
</tr>
<tr>
<td><code>-forcedlow</code></td>
<td>If set, this causes an update statistics at level low for all tables in the current run of update statistics, regardless of what threshold you have set. This overrides the parameter threshold (see above in this section).</td>
</tr>
<tr>
<td><code>-tabsparallel &lt;n&gt;</code></td>
<td>(where 2 &lt;= n &lt;= 50) If set, this causes update statistics to run in parallel at table level. SAPDBA starts <code>n</code> &quot;child processes&quot; to process <code>n</code> different tables, so giving you faster throughput. You must specify a value for <code>n</code> (there is no default). The value of the parameter <code>NUMCPUVPS</code> in the <code>ONCONFIG</code> file is a good value for <code>n</code>. This option only makes sense for multiprocessor platforms and when more than one table is being updated. Therefore, you <strong>must</strong> not set the <code>-t</code> option when using this option.</td>
</tr>
<tr>
<td><code>-colsparallel &lt;n&gt;</code></td>
<td>(where 2 &lt;= n &lt;= 50) If set, this causes update statistics to run in parallel at column level. SAPDBA starts <code>n</code> &quot;child processes&quot; to process <code>n</code> different columns, so giving you faster throughput. You must specify a value for <code>n</code> (there is no default). The value of the parameter <code>NUMCPUVPS</code> in the <code>ONCONFIG</code> file is a good value for <code>n</code>. This option only makes sense for multiprocessor platforms and when a <strong>single</strong> table is being updated. Therefore, you <strong>must</strong> also set the <code>-t</code> option when using this option.</td>
</tr>
</tbody>
</table>

If you use parallel processing, the results are written by default to the following log files:

```
/$INFORMIXDIR/sapreorg/updstat_<SID>.<PID>
```

where `<SID>` is system ID and `<PID>` is child process ID, for example:

```
/informix/CX5/sapreorg/updstat_cx5.002
```

**See also:**

Informix documentation
Customizing Update Statistics with SAPDBA

Use

You can use this procedure to customize update statistics with SAPDBA for Informix, because the default values are often not suitable for large tables.

Prerequisites

You want to improve database performance on problematic large tables by making sure that update statistics is more accurate.

Procedure

Do one or both of the following to improve database performance:

- Set up entries in the control table, DBSTATC, for specified tables. These entries override the default values used by SAPDBA whenever update statistics is run. See below for more details.
  
  As well as setting up entries for large tables where a more accurate set of statistics is required, you can also exclude tables for which no update statistics is necessary (for example, static tables).

- Run update statistics from the command line for selected large tables. See the parameter table in Updating Statistics from the Command Line with SAPDBA [Page 455].

  The table DBSTATC overrides all threshold settings and levels, whether you are performing update statistics with SAPDBA using the normal menus or using the command line. For more information, see Log Table for Update Statistics with SAPDBA [Page 460].

Result

For information about how to alter the control table DBSTATC, see Configuring Update Statistics in CCMS (Informix) [Ext.].

See also:

Informix documentation
Log Table for Update Statistics with SAPDBA

Definition

The log table `DBSTATINF` contains details of update statistics.

Use

Every time you run update statistics with SAPDBA for Informix, `DBSTATINF` is updated with details of the tables that have been checked and of the tables that have had new statistics generated.

Structure

One row is updated in `DBSTATINF` for each table processed by update statistics. The most important fields for this are as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>tabname</td>
<td>Table name</td>
</tr>
<tr>
<td>lupdstat</td>
<td>Date and time of the last update statistics with SAPDBA. Format: yyyymmddhhmm</td>
</tr>
<tr>
<td>cupdstat</td>
<td>Date of the last &quot;check statistics&quot;</td>
</tr>
<tr>
<td>threshold</td>
<td>Threshold for the update statistics — in other words, the percentage deviation between the statistics and the current (that is, correct) number of rows in the table</td>
</tr>
<tr>
<td>value</td>
<td>Update statistics level, in format char(3) as follows:</td>
</tr>
<tr>
<td></td>
<td>• 1st char = level for heading index columns</td>
</tr>
<tr>
<td></td>
<td>• 2nd char = level for non-heading index columns</td>
</tr>
<tr>
<td></td>
<td>• 3rd char = level for non-index columns</td>
</tr>
<tr>
<td></td>
<td>For example, \texttt{HMN} means:</td>
</tr>
<tr>
<td></td>
<td>• High for heading index columns</td>
</tr>
<tr>
<td></td>
<td>• Medium for non-heading index columns</td>
</tr>
<tr>
<td></td>
<td>• None for non-index columns</td>
</tr>
<tr>
<td>duration</td>
<td>Duration of update statistics in seconds</td>
</tr>
</tbody>
</table>

Integration

To find out which tables have had their statistics updated by a run of update statistics, you can enter an SQL command like the following using the Informix tool \texttt{DBACCESS}:

```sql
Select *
from dbstattinf
where lupdstat like "<date of the last update statistics run>\%"
and tabname = "<table name>"
;
```
For example, for a run of update statistics on the 23rd January 1999 that might possibly have affected table a014:

```sql
Select *
from dbstattinf
where lupdstat like "19990123%"
and    tabname = "a014"
;
```

If a row is returned from this query, this means that table a014 has had its statistics updated on this date. Examine the row to find out what has happened.

If you used `cupdstat` in the above query, you can find out if a table has had its statistics checked on this date. For more information, see the section on the check parameter in Update Statistics from the Command Line [Page 455]. During an update statistics run, tables where the threshold is not reached do not have the field `lupdstat` updated. Instead, the field `cupdstat` is updated.

See also:

Informix documentation
Logging Mode with SAPDBA

Use
You can use SAPDBA for Informix to change the logging mode of the Informix database server. This is easier and more secure than using the Informix tools. It is easier because you do not have to manually enter Informix commands. It is more secure because SAPDBA only lets you choose between the allowable logging modes for use with the R/3 System, so avoiding selection of an incorrect logging mode.

⚠️
Do not run the database in "no logging mode" except for essential maintenance. Otherwise you will not be able to restore the database in the event of failure.

Integration
If the logging mode is incorrect (that is, no logging mode), an alert is raised in the Release 4 alert monitor in the Computing Center Management System (CCMS) of the R/3 System. For more information, see Monitoring the Database with the Release 4 Alert Monitor (Informix) [Ext.].

Features
These actions enable you to alter the logging mode of the database, as follows:

- Unbuffered logging mode
  This means that database transactions are written to the logical log. You must use this setting for normal productive database operation.

- No logging mode
  This means that database transactions are not written to the logical log. You use this setting for essential database maintenance, such as reorganizations.

Activities
Choose the action you require from the following:

- Switching to "No Logging Mode" with SAPDBA [Page 463]
- Switching to "Unbuffered Logging Mode" with SAPDBA [Page 464]

💡
If you want to check the current logging mode of the database, SAPDBA displays this logging mode on all menu screens.

See also:
Informix documentation
Switching to "No Logging Mode" with SAPDBA

Use

You can use this action in SAPDBA to put the Informix database into "no logging mode." In no logging mode, database transactions are not written to the logical log. For more information, see Logging Mode with SAPDBA [Page 462].

⚠️ Do not run your database in no logging mode except for essential maintenance. If you use no logging mode for productive database operation, you cannot restore the database following a failure.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].
- All users must be disconnected from the database before a switch to no logging mode is possible. SAPDBA warns you if users are still connected when you start the switch.

Procedure

Choose Logging Mode → Switch to 'No Logging Mode' in SAPDBA.

Result

The database is now in no logging mode. Do not now use the database for production.

⚠️ As soon as you switch back to unbuffered logging mode, you must do a level-0 database archive or backup. Refer to Database Backup (ON-Bar) [Page 104] or Archive (ON-Archive and ontape) [Page 123]. Without this, you can not restore transactions executed after you switch back to unbuffered logging mode.

See also:

Informix documentation
Switching to "Unbuffered Logging Mode" with SAPDBA

Use
You can use this action in SAPDBA to put the Informix database into "unbuffered logging mode". In this mode, database transactions are written to the logical log. In normal productive database operation, you must use this mode. For more information, see Logging Mode with SAPDBA [Page 462].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].
- All users must be disconnected from the database before this switch is possible. SAPDBA warns you if users are still connected when you start the switch.

Procedure
Choose Logging Mode → Switch to 'Unbuffered Logging Mode' in SAPDBA.

Result
The database is now in unbuffered logging mode. You can now use the database safely for production.

⚠️ As soon as you switch to unbuffered logging mode, you must do a level-0 database archive or backup. Refer to Database Backup (ON-Bar) [Page 104] or Archive (ON-Archive and ontape) [Page 123]. Without this, you can not restore transactions executed after you switch back to unbuffered logging mode.

See also:
Informix documentation
Recovery Report with SAPDBA

Use

You can use SAPDBA for Informix to create a report that provides essential information if you need to recover your database after failure with data loss. Recovery means restoring database data that you have previously stored in archives and backups. With the recovery report, you can more quickly and easily restore your database.

Once correctly installed, SAPDBA automatically generates an up-to-date report after every archive and logical-log backup. You can only use this procedure with ON-Archive, as the recovery reports are not available for ontape or ON-Bar.

- The information given here applies if you are using an Informix version later than 6.0.
- For more information if you are using Informix version 6.0, see Creation of Recovery Report with SAPDBA (Informix 6.0) [Page 474].

Integration

The recovery report is fully integrated in SAPDBA. You can use this functionality for databases running on UNIX and NT operating system platforms.

Prerequisites

- You know how to use SAPDBA and have set it up correctly. Refer to Getting Started with SAPDBA [Page 316].
- You are using an Informix version later than 6.0 with ON-Archive [Page 69].

Activities

1. You prepare for the recovery report [Page 466] (you do this once only).
   SAPDBA then creates the recovery report automatically after every archive [Page 123] and logical-log backup [Page 163].

2. You view the recovery report [Page 468] if you need to perform a restore [Page 252] (that is, in the event of database failure with data loss).

See also:

Informix documentation
Preparing for Recovery Reports with SAPDBA

Use

To be able to create the SAPDBA recovery reports for your Informix database, follow the information given here, which only applies if you are using an Informix version later than 6.0.

For more information, see Recovery Report with SAPDBA [Page 465].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].
- You are using an Informix version later than 6.0. If you are using version 6.0, see Preparing for Recovery Reports (Informix 6.0) [Page 475].
- You are using the Informix tool ON-Archive [Page 69] for data recovery. The recovery reports are not available if you are using ontape or ON-Bar.

Procedure

If you have correctly configured ON-Archive [Page 75] and set up SAPDBA [Page 317], you have already performed the preparations described in this procedure.

1. Copy the scripts archive_control, backup_control, and logevent.sh from the CD SAP-Kernel into the directory that SAPDBA can use, as described in Preparing SAP Scripts for ON-Archive [Page 78]. If you have not performed these preparations, then proceed as follows:
   a. Mount the CD SAP-Kernel.
   b. Log in as user <sid>adm:
      ```
      su - <sid>adm
      ```
   c. Change to the target directory, $INFORMIXDIR/etc:
      ```
      cd $INFORMIXDIR/etc
      ```
   d. Copy the scripts from CD, for example, archive_control:
      ```
      cp /sapcd/DBTOOLS/archive_control archive_control
      ```
      The access rights on this file must allow users to execute it.

2. Make sure that the parameter ALARMPROGRAM in the ONCONFIG file is correctly set. Refer to Editing the ONCONFIG File for ON-Archive [Page 81].

3. Define the entry for the archive.log file in the config.arc file. See parameter ACTIVITYLOG in Editing the config.arc File for ON-Archive [Page 85].

4. Make sure that the directory $INFORMIXDIR/sapreorg/recover.rpt exists with write access for all users. You should have completed this step as part of installing SAPDBA. Refer to Setting Up SAPDBA Working Directories [Page 322].
Result

SAPDBA now automatically creates the recovery report after every archive [Page 123] and logical-log backup [Page 163] with ON-Archive. To make sure that the report is being created, or if you need to perform a restore [Page 252] in the event of database failure involving data loss, see Listing Recovery Report with SAPDBA [Page 468].

See also:
Informix documentation
Listing Recovery Report with SAPDBA

Use
You can use SAPDBA to list a recovery report to help you restore your database. However, you must have prepared correctly for the report before the restore is necessary, that is, during normal database operation.

You can use this procedure to list the report whichever version of Informix you are using. For more information, see:
- Recovery Report with SAPDBA [Page 465] (applies to Informix versions later than 6.0)
- Creation of Recovery Report with SAPDBA (Informix 6.0) [Page 474].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].
- You are using the Informix tool ON-Archive [Page 69] for data recovery. The recovery reports are not available if you are using ontape or ON-Bar.
- You have prepared correctly for the report:
  - If you have an Informix version later than 6.0, refer to Preparing for Recovery Reports with SAPDBA [Page 466]. SAPDBA automatically creates the report after every archive and logical-log backup.
  - If you have Informix version 6.0, refer to Preparing for Recovery Reports with SAPDBA (Informix 6.0) [Page 475]. With version 6.0, you also need to create the report after every archive logical-log backup. Refer to Creating the Recovery Report with SAPDBA (Informix 6.0) [Page 476].

Procedure
2. Choose one of the numbers from the list of available recovery reports.
   You see a report similar to the following:
## Listing Recovery Report with SAPDBA

**Recovery requirements as of 1995-05-30 14:22:52 for *+ = required for minimal restore**

<table>
<thead>
<tr>
<th>Vol</th>
<th>Vset</th>
<th>Save Set</th>
<th>Label</th>
<th>Device</th>
<th>Date</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>DBTAP1</td>
<td>0000001</td>
<td>DBT1_1</td>
<td>DBTP1_VOP</td>
<td>1995-05-26 12:12:37</td>
<td>0</td>
</tr>
</tbody>
</table>
### Listing Recovery Report with SAPDBA

<table>
<thead>
<tr>
<th>DBTAP2</th>
<th>DBT2_1</th>
<th>DBTP2_VOP</th>
<th>1995-05-26 12:12:39</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>00000002</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DBTAP1</th>
<th>DBT1_1</th>
<th>DBTP1_VOP</th>
<th>1995-05-26 15:04:49</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>00000005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DBTAP2</td>
<td>00000010</td>
<td>DBT2_1</td>
<td>DBTF2_VOP</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>----------</td>
<td>--------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LOGTAP</td>
<td>00000003</td>
<td>LOGT1</td>
<td>LOGTP1_VOP</td>
</tr>
</tbody>
</table>

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Listing Recovery Report with SAPDBA

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LF0</td>
<td>000</td>
<td>118</td>
<td>0</td>
</tr>
<tr>
<td>LOGTAP</td>
<td>00000009</td>
<td>LOGT1</td>
<td>LOGTP1_VOP</td>
</tr>
<tr>
<td>LF0</td>
<td>000</td>
<td>118</td>
<td>1</td>
</tr>
</tbody>
</table>

- The report title *Recovery requirements as of 1995-05-30 14:22:52 for * means that, if you correctly restore the data listed in this report, your database will be consistent with the state it was in at this date and time.
- The entry + = *required for minimal restore* means that, for a minimal restore, you only need the dbspaces listed with +. However, the R/3 System is so integrated that you must have all dbspaces online and in a consistent state in order to run the system reliably.
- The *Vol* field refers to the volume number for the tape volume containing the data.
- The *Vsets* field refers to the volume set in which the tape volume logically resides.
- The *Save set* field refers to the logical group of data created from an ON-Archive logical-log backup or archive request.
- The *Label* field refers to the logical label of the tape volume.
- The *Device* field refers to the logical name used by ON-Archive for the tape (or disk) drive which writes the archive or logical-log backup data.
- The *Date* field refers to the actual date and time of the archive or logical-log backup.
- The *Level* field refers either to the level of the archive (possible values are 0, 1 or 2). In the case of a logical-log backup, the word *backup* appears here. In the case where a save set has been copied, the word *copy* appears here.
- The second line of each entry contains one of the following pieces of information:
  - For archives (for example +rootdbs, psapsource, psappool), these lines refer to the dbspaces contained in the restore. For a minimal restore, you only need the dbspaces listed with +. However, SAP does not recommend you to do a minimal restore because the remaining dbspaces are also essential for correct functioning of the R/3 System.
  - For logical-log backups (for example LF00001180), these lines refer to the logical-log files contained in the backup.
- The information is presented in the order in which you need to restore the data when recovering your database. You start at the top and work down. You always see at the top of the report the most current level-0 (full) archive existing at the time the report was produced. This is because you must always start a restore with this data.
As you do more and more incremental archives (level 1 or 2), and more and more logical-log backups, the report gets longer and longer. Only when you next do a level-0 archive, does the report shrink again to include just the level-0 archive data.

The first entry on the report shows that a level-0 (full) archive was taken on the 26th May at 12:12:37. The archive was written to the first volume of volume set DBTAP1, labeled DBT1_1, using tape device DBTP1_VOP. The save set created was 00000001 and included dbspaces rootdbs, psapsource, psapool, psapuser1, psapprot, psapclu, and psaplod. It was the first half of a parallel archive. The second entry is the other half, writing the remaining dbspaces as save set 00000002 to volume labeled DBT2_1 of volume set DBTAP2, using device DBTP2_VOP.

3. For more information about printing the report, see Printing a SAPDBA Report [Page 329].

Result

You can now use the information on the report to restore your database. See Restore [Page 252] and Preparing for Restore with the SAPDBA Recovery Report [Page 260].

You must perform regular housekeeping to clear up the directory containing the reports (that is, $INFORMIXDIR/sapreorg/recover.rpt). Refer to SAPDBA Housekeeping [Page 330].
Creation of Recovery Report with SAPDBA (Informix 6.0)

Use

You can use SAPDBA for Informix to create a report that provides essential information if you need to recover your database after a failure with data loss. Recovery means restoring database data that you have previously stored in archives and backups. With the recovery report, you can more quickly and easily restore your database.

You must create the report before the restore is necessary, that is, during normal database operation. You can only use this procedure with ON-Archive, as the recovery reports are not available for ON-Bar or ontape.

You only see the option Create Recovery Report if you are using SAPDBA for Informix version 6.0. With later versions of Informix, the recovery report is automatically created once you have correctly installed it.

For more information if you are using an Informix version later than 6.0, see Recovery Report with SAPDBA [Page 465]. This topic also contains information about the contents of the report, whichever Informix version you are using.

Integration

Creation of the recovery report for Informix 6.0 is fully integrated in SAPDBA. You can use this functionality for databases running on UNIX and NT operating system platforms.

Prerequisites

- You know how to use SAPDBA and have set it up correctly. Refer to Getting Started with SAPDBA [Page 316].
- You are using Informix version 6.0 with ON-Archive [Page 69].

Activities

3. You prepare for the recovery report (Informix 6.0) [Page 475].
5. You view the recovery report [Page 468] if you need to perform a restore (that is, in the event of database failure with data loss).

See also:

- Restore [Page 252]
- Informix documentation
Preparing for Recovery Reports with SAPDBA (Informix 6.0)

Use
To be able to create the SAPDBA recovery reports for your Informix database, follow the information given here, which only applies if you are using SAPDBA for Informix version 6.0.
For more information, see Creation of Recovery Report with SAPDBA (Informix 6.0) [Page 474].

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].
- You are using Informix version 6.0. If you are using a version later than 6.0, see Preparing for Recovery Reports with SAPDBA [Page 466].
- You are using the Informix tool ON-Archive [Page 69] for data recovery. The recovery reports are not available if you are using ontape.

Procedure
5. Copy the script arcrecover from the CD SAP-Kernel into the directory that SAPDBA can use.
   a. Mount the CD SAP-Kernel.
   b. Log in as user <sid>adm:
      
      su - <sid>adm
   c. Change to the target directory:
      
      cdexe
   d. Copy arcrecover from CD:
      
      cp /sapcd/DBTOOLS/arcrecover arcrecover
      
      The access rights on this file must allow users to execute it.

6. Make sure that the directory $INFORMIXDIR/sapreorg/recover.rpt exists with write access for all users. This is part of the installation process for SAPDBA. Refer to Setting Up SAPDBA Working Directories [Page 322].

Result
You can now create the recovery report (Informix 6.0) [Page 476].

See also:
Informix documentation
Creating the Recovery Report with SAPDBA (Informix 6.0)

Use

You can use SAPDBA for Informix version 6.0 to create a recovery report to help you restore your database. You must create the report before the restore is necessary, that is, during normal database operation. For more information, see Creation of Recovery Report with SAPDBA (Informix 6.0) [Page 474].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].
- You are using the Informix tool ON-Archive [Page 69] for data recovery. The recovery reports are not available if you are using ontape.
- You are using Informix version 6.0. If you have a later Informix version, refer to Recovery Report with SAPDBA [Page 465].
- You have prepared for the recovery report [Page 475].

Procedure

Choose Create Recovery Report in SAPDBA for Informix 6.0.

If an archive or backup is running at the time, SAPDBA first lets it finish. A message confirms that the recovery report is being created.

💡

You must create the recovery report after every archive [Page 123] and logical-log backup [Page 163] to make sure that, if the database fails and you have to perform a restore [Page 252], you have the most up-to-date recovery report available.

Result

You now have a recovery report that you can use in the event of database failure to help you restore the database more quickly and easily. You can now view the report [Page 468].

You must perform regular housekeeping to clear up the directory containing the reports. Refer to SAPDBA Housekeeping [Page 330].
DB System Checks with SAPDBA

Purpose
You can use SAPDBA to run a series of configuration and performance checks on your database settings. The settings you can check include:

- Parameters in the ONCONFIG file
- Chunk and disk layout
- Lock mode of tables
- Number of extents for a table
- Access rights for programs

The checks make no amendments to your database. You can also perform the checks in the Computing Center Management System (CCMS). Refer to DB System Checks in CCMS (Informix) [Ext.]. The checks are easy to perform, are quickly finished, and have a minor effect on database performance while running.

Process Flow
SAP recommends you run the checks as follows:

1. If required, you configure the checks to better suit your system. Refer to Configuring DB System Checks in CCMS (Informix) [Ext.][Ext.].

2. To prevent problems arising, you run the checks regularly. For more information on how to regularly schedule the checks using the DBA Planning Calendar in CCMS, see DBA Planning Calendar (Informix) [Ext.].

3. If you have a problem with your database or you have changed the configuration, you run the checks to help find what is wrong or to make sure the new configuration is acceptable. Refer to Checking the DB System with SAPDBA [Page 478][Ext.]

Result
Since many database problems are due to incorrect settings, the DB system checks in SAPDBA help you to easily identify common problems. The result is improved performance of your database and high availability for your R/3 System.
Checking the DB System with SAPDBA

Use

You can use SAPDBA for Informix to run database system checks (shortened to "DB system checks") for your Informix database.

You can also run the DB system checks in the DBA Planning Calendar [Ext.] or the Computing Center Management System (CCMS) [Ext.], both of which are in the R/3 System.

Prerequisites

- SAPDBA is correctly installed. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have started it. Refer to Getting Started with SAPDBA [Page 316] and Starting SAPDBA [Page 324].
- The program infcfgcheck is installed in the /usr/sap/<SID>/SYS/exe/run directory. This is part of the standard R/3 System installation after release 3.1G.
- You can change the settings for the check using CCMS. Refer to Configuring DB System Checks in CCMS (Informix) [Ext.] [Ext.]. Any configuration changes made in CCMS also affect checks that you run in SAPDBA.

Procedure

1. Choose DB System Checks in SAPDBA.
2. Choose one of the following options:
   - All checks or All checks [HTML]
     These options include all available checks.
   - All non-performance checks or All non-performance checks [HTML]
     These options include all checks except performance checks. Most of the checks run with this option are configuration checks.
   - All performance checks or All performance checks [HTML]
     These options include all checks related to database performance. If you correct problems identified with these options, you should be able to improve the performance of your database.

     Using the [HTML] option has no effect on the information produced.

     SAP recommends that you always look at the results of check runs as soon as possible, otherwise you might fail to react in good time to a warning or error. At worst, this might lead to data loss.

3. Look at the results of the check run as follows, depending on which option you chose:
   - If you chose a [HTML] option, an output file containing the report is written to the current directory, with the name infcfg.html. The format of the file is HTML, so you can view the report with your usual HTML browser.
Otherwise, you can view the report directly on screen.

Whenever you run a check, you see a summary and a detail section.

4. Look at the highest detected severity in the summary section. If this is *nothing to complain*, you need take no action, as your system has passed all checks. Otherwise, continue with this procedure.

5. In the detail section, look at the results for each individual parameter checked, as follows:

### DB System Check Results

<table>
<thead>
<tr>
<th>Severity</th>
<th>What to do</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abort</strong></td>
<td>You must <strong>immediately</strong> correct the severe error, otherwise data might be lost</td>
</tr>
<tr>
<td><strong>Error</strong></td>
<td>You should correct the error <strong>as soon as possible</strong>, otherwise a severe error might occur leading to data loss</td>
</tr>
<tr>
<td><strong>Warning</strong></td>
<td>You should correct the setting, but do not need to do so immediately</td>
</tr>
<tr>
<td><strong>Not checked</strong></td>
<td>As the system could not perform the check, you should find out why not (this is usually given in the recommendation)</td>
</tr>
<tr>
<td><strong>Nothing to complain</strong></td>
<td>As the check is OK, you need not do anything.</td>
</tr>
</tbody>
</table>

6. If the check returns *abort, error, warning, not checked, or nothing to complain*, perform the necessary action, as identified in the table above.

For each such check, the system displays the expected value and the current value, together with a recommendation, as shown in the following example:

```
When looking at the detailed results for a check run, you might see something like the following for a single check:

**EXTENTS for table vrsx (class DBGENERAL)** *non-performance check*

**expected... <= 200** *(SAP original)*

**found ....... 228**

**recommendation.. section D-021 in note ‘64001’?**

please reorganize table immediately
```

This means that the value in the variable *EXTENTS* found for the table *vrsx* exceeds the recommended maximum value of 200. Refer to SAP Note 64001, or choose ? to display background information about this single check.

You can also see the following information:

- The **class** of the check is **DBGENERAL**, that is, general database checks.
- The check is a **non-performance check**.
- The expected value of the check is **SAP original**. This means that the expected value had not been amended before the check was run.
Checking the DB System with SAPDBA

**Result**

If you follow the recommendations given for the checks, you can make sure that your system remains as well tuned as possible. This leads to reduced downtime and better system performance.
System Information with SAPDBA

**Use**

You can use SAPDBA for Informix to view system information about your database. SAPDBA calls the Informix tool `onstat` for the information.

**Integration**

System information is fully integrated in SAPDBA. You can use this functionality for databases running on UNIX and NT operating system platforms.

**Prerequisites**

You need to know how to use SAPDBA and to have set it up correctly. Refer to [Getting Started with SAPDBA](#) [Page 316].

**Features**

<table>
<thead>
<tr>
<th>List Information on</th>
<th>Information Displayed</th>
<th><code>onstat</code> Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message File</td>
<td>Last 20 lines of the system message log (the name of the log file is specified by the <code>MSGPATH</code> parameter in the <code>ONCONFIG</code> file – see next function)</td>
<td><code>onstat -m</code></td>
</tr>
<tr>
<td>Configuration File</td>
<td><code>ONCONFIG</code> file</td>
<td><code>onstat -c</code></td>
</tr>
<tr>
<td>Profile Information</td>
<td>Profile counts</td>
<td><code>onstat -p</code></td>
</tr>
<tr>
<td>User Information</td>
<td>Profile of user activity</td>
<td><code>onstat -u</code></td>
</tr>
<tr>
<td>Lock Information</td>
<td>Active locks on the database</td>
<td><code>onstat -k</code></td>
</tr>
<tr>
<td>Physical and Logical-Log Information</td>
<td>Physical and logical logs</td>
<td><code>onstat -l</code></td>
</tr>
</tbody>
</table>

**Activities**

When [Listing System Information with SAPDBA](Page 482), you do not need to know how to use `onstat`, because SAPDBA handles this for you.

**See also:**

Informix documentation
Listing System Information with SAPDBA

Use
You can use SAPDBA to quickly view information about your Informix database system. For more information, see System Information with SAPDBA [Page 481]. Although SAPDBA uses onstat Informix commands, you can use this function without knowledge of onstat.

Prerequisites
- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You know how to use SAPDBA and have logged on. Refer to Starting SAPDBA [Page 324].

Procedure
1. Choose System Information in SAPDBA.
2. Choose one of the following to display the system information you require:
   - List Informix Message File
   - List Informix Configuration File
   - List Profile Information
   - List User Information
   - List Lock Information
   - List Physical and Logical Log Information
     For more information about the meaning of the individual fields displayed, see the Informix documentation on onstat.
3. For more information if you want to print the report, see Printing a SAPDBA Report [Page 329].

Result
You now have information on the current status of the database, which helps to improve your administration. Make sure you act in good time on the information listed.

The end result is a more highly tuned database that is more available for your users.

See also:
Informix documentation
Emergency Logical-Log Backup with SAPDBA (Informix 6.0)

Use
You can use SAPDBA for Informix to perform an emergency logical-log backup of your logical log when it is full. You only see the option *Emergency Backup* if you are using SAPDBA for Informix version 6.0. You can only use this procedure with ON-Archive.

For more information about logical-log backup, see Emergency Logical-Log Backup [Page 227].

Integration
Emergency logical-log backup is fully integrated in SAPDBA. You can use this functionality for databases running on UNIX and NT operating system platforms.

Prerequisites
- You know how to use SAPDBA and have set it up correctly. Refer to Getting Started with SAPDBA [Page 316].
- You are using Informix version 6.0 with ON-Archive [Page 69].

Activities
6. You prepare for emergency logical-log backup [Page 484].
7. If the logical-log is full, you perform an emergency logical-log backup with SAPDBA [Page 486].

See also:
Informix documentation
Preparing for Emergency Logical-Log Backup with SAPDBA (Informix 6.0)

Use

You can use SAPDBA for Informix to perform an emergency logical-log backup when the logical log is full. For more information, see Emergency Logical-Log Backup with SAPDBA (Informix 6.0) [Page 483].

⚠️ Perform this procedure **before** an emergency logical-log backup becomes necessary. Otherwise, you need more time to create the backup when the logical log is full, so extending the downtime during which the database cannot operate.

The preparations in this procedure are part of Configuration of ON-Archive [Page 75] using the SAP Scripts for ON-Archive [Page 76]. If you have completed the configuration and are using the SAP scripts, then you do not have to perform this procedure.

If you are not using the SAP scripts and your logical log is full, refer to Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in **expert** mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You are using Informix version 6.0.
- You are using the Informix tool ON-Archive [Page 69] for data recovery.

Procedure

1. Check that the script `arcpanic` (used in the emergency backup process) is in the directory `/usr/sap/<SID>/sys/exe/run`. For more information, see "Copying Scripts" in Preparing SAP Scripts for ON-Archive [Page 78].
2. Check that `$INFORMIXDIR/bin` is in the path for user informix.
3. Define the tape device for emergency logical-log backup. To do this, edit the ON-Archive configuration file – normally called `config.arc` and found in directory `$INFORMIXDIR/etc` – as user informix. Refer to Editing the config.arc File for ON-Archive [Page 85]. Make an entry like the following (the script `arcpanic` expects the name `DATARTR_VOP`):

   ```
   DEVICE   DATARTR_VOP = /dev/rmt/0hc
   ```

   For more information, see Defining Devices for ON-Archive with SAP Scripts [Page 87].

   After editing the file, you need to restart the ON-Archive cataloger for the changes to take effect, as follows:

   ```
   stop_oncatlgr  (it does not matter if the cataloger was not running)
   ```
Preparing for Emergency Logical-Log Backup with SAPDBA (Informix 6.0)

start_oncatlgr

4. Define the volume set for emergency logical-log backup, by entering the following at the command line:

```bash
$ onarchive 'DEFINE/VSET=ONDATARTRLOG/DEVICE_TYPE=DATARTR_VOP/DRIVER=TAPE/ACCESSIBILITY=0/CLASS=SYSTEM'
```

5. Define the tape volume for emergency logical-log backup, by entering the following at the command line:

```bash
$ onarchive 'DEFINE/VOLUME/VSET=ONDATARTRLOG/LABEL=ONDAT1'
```

For more information, see Setting Up Volume Sets and Volumes for ON-Archive with SAP Scripts [Page 94].

**Result**

You are now ready to perform an emergency logical-log backup with SAPDBA [Page 486].

**See also:**

Informix documentation
Performing Emergency Logical-Log Backup with SAPDBA (Informix 6.0)

Use

You can use SAPDBA for Informix to perform an emergency logical-log backup when the logical log is full. For more information, see Emergency Logical-Log Backup with SAPDBA (Informix 6.0) [Page 483]. SAPDBA uses the SAP script arcpanic to perform the logical-log backup.

If you are not using the SAP scripts and your logical log is full, refer to Emergency Logical-Log Backup without SAP Scripts (ON-Archive) [Page 238].

You must perform an emergency logical-log backup when a message like the following appears in the system message log file:

16:44:49 Logical Log Files are Full - Backup is Needed

The database stops processing and you must back up the logical log to let processing continue.

Prerequisites

- SAPDBA is installed correctly. Refer to SAPDBA Setup [Page 317].
- You are logged on in expert mode, that is, as user informix, and you have started SAPDBA. Refer to Starting SAPDBA [Page 324].
- You are using Informix version 6.0.
- You are using the Informix tool ON-Archive [Page 69] for data recovery.
- You have prepared for emergency logical-log backup with SAPDBA [Page 484] and have the required tapes ready.

Procedure

1. Choose Emergency Backup in SAPDBA.
   - You see a dialog box confirming that you wish to start the emergency backup.
2. Choose yes.
   - SAPDBA executes the SAP script arcpanic to perform the emergency logical-log backup. For more information, see Performing Emergency Logical-Log Backup Using SAP Scripts (ON-Archive) [Page 232].

Result

The logical log is no longer full, allowing the database to continue processing and writing transactions.

💡

After the emergency backup has successfully completed, create a full (that is, level-0) archive in case you have problems using the data just backed up. SAP advises this although it should not strictly be necessary if the emergency backup was successful. Refer to Creation of an Archive (ON-Archive) [Page 141].
Performing Emergency Logical-Log Backup with SAPDBA (Informix 6.0)

To make sure you do not need to perform another emergency backup because the logical log is full, we strongly recommend that you review your logical log backup approach. Refer to Approach to Logical-Log Backup (ON-Archive) [Page 183].

See also:
Informix documentation
Solutions for Top Informix Problems

Purpose
This section tells you about common problems affecting Informix databases with the R/3 System.

Prerequisites
You have a problem with the Informix database.

Process Flow
1. You check to see if the problem is listed in this documentation.
2. If you can find the problem, you follow the instructions given here.
3. If you cannot find the problem, you contact the Informix hotline.
Solving Database Startup Problems

Use

This section tells you how to solve the problem when database startup fails with the following error message:

```
16:46:54 INFORMIX-OnLine Stopped
16:46:54 mt_shm_remove: WARNING: may not have removed all/correct segments
```

It is possible that not all shared memory segments were correctly removed due to a previous database server crash or unsuccessful startup.

Procedure

1. Analyze the problem by using `ipcs` to check the allocated segments.
2. Solve the problem:
   - Remove allocated segments in either of the following ways:
     - With the following command:
       ```
       ipcrm -m <segment id>
       ```
     - By rebooting the machine
   - If another problem caused an unsuccessful startup, identify the original problem before restarting the database server.
Solving Problems with 32-Bit SAPDBA Access to 64-Bit Software

Use

This section tells you how to solve problems occurring between 32-bit and 64-bit software in an Informix environment. SAPDBA, currently 32-bit software, cannot successfully connect to 64-bit software, such as a 64-bit operating system or database, using shared memory.

Prerequisites

The problem occurs in the following situation:

- 64-bit operating system
- 64-bit database
- 32-bit SAPDBA running on the database server with shared memory connection to the database

The database server issues the following error message:

- DBA011E: The program could not establish a connection to the database.
- sqlerror -25588
- The appl process cannot connect to Dynamic server
- <host><dbid>shm.
- isam error 4:
- Interrupted system call

Procedure

When starting SAPDBA, set the environment variable INFORMIXSERVER from shared memory to TCP/IP. See the example below. For more information about environment variables, see Setting Up SAPDBA Environment Variables [Page 319].

This example shows how to change the environment variable to TCP/IP if you are using the C shell with UNIX:

```
setenv INFORMIXSERVER <host><dbid>tcp
```

Only set the environment variable to TCP/IP while starting SAPDBA. After you have started SAPDBA, set it back to shared memory.
Solving Problems with Memory Allocation on HP-UX

Use

This section tells you how to solve memory allocation problems for the Informix database with the HP-UX operating system. Problems occur when it is impossible to allocate a single large segment at operating system level, but the allocation of many small segments causes the database server to crash. The result is that not enough memory can be allocated.

This problem only occurs with 32-bit operating systems. With 64-bit operating systems, memory allocation problems no longer occur.

Prerequisites

Consider the following when solving this problem:

- HP with Informix only functions successfully with as few segments as possible, that is, no more than five. Therefore, the default with the latest releases is to allocate a single shared memory segment for the resident and the first virtual memory portions.

- If more memory needs to be allocated than is available in a single operating system segment, distribute the memory sensibly and then perform the allocation immediately after the database start. In this case, the allocation should not be dynamic according to the SHMADD parameter. Instead, allocate the memory segments manually using onmode -a <bytes>.

Procedure

1. Analyze the problem:
   - Check the amount of memory that is regularly required for database operation by entering the following command:
     ```
     onstat -g seg
     ```
     You can also find relevant information in the Informix message file [Page 482].
   - Check how much memory is being used by each process.
   - Check operating system limits.

2. Solve the problem:
   - Consider measures to reduce the requirement for shared memory. See SAP note 38307.
   - Make sure that you have installed all necessary patches for the operating system from HP. See SAP note 76862.
   - Restart the database.

Result

If you carefully plan shared memory allocation, the database server should be able to successfully allocate memory when it starts.
Solving Problems with Corruption

Use

This section tells you about the problem when Informix data or index pages are corrupted, that is, they are destroyed and can no longer be processed. This section covers how to:

- Check for corruption so as to discover it as soon as possible
- Deal with corruption once it has occurred

⚠️

Give checking for corruption **very high priority** because the consequences of corruption going undetected for some time are serious. For more information, see SAP note 29155 and *How to Run Data Consistency Checks with SAPDBA* [Page 420].

We **strongly recommend** you to check the entire database for corruption at least once per turnaround cycle of backup media (for example, tapes). Otherwise there is no way to restore the data in the event of corruption.

Procedure

Checking for Corruption

How you check for corruption depends on how much downtime you can afford on the production system and whether you have a test system available on a different machine:

💡

To check the entire database can take several hours, depending on the size of the database. During this time the system cannot be used productively because otherwise the results of the check are unreliable.

- If you have **enough downtime** available, check the database for corruption at least once a week.
- If you only have **limited downtime** available, you can reduce the downtime required for the check by fully exploiting parallelism. The maximum number of parallel processes depends on the maximum physical disk access that can run in parallel (that is, it depends on the number of controllers, disks, and so on).
- If you have **no downtime** available on the production system, you can import the database backup onto a test system on a different machine, then run the check on the test machine. This has the following advantages:
  - It causes no downtime and no impact on the production system
  - At the same time you can check that the backup is OK

⚠️

If you do not check for corruption regularly, you might run into serious problems with the backup. If you back up a corrupted database, the backup will also be corrupted.
Solving Problems with Corruption

A corrupted backup can sometimes not be used for a restore. Or, if a corrupted backup is usable, it still contains the corruption, that is, destroyed data. Therefore, the last method described above is the best.

Dealing with Corruption

1. Check your hardware. Corruption is very often caused by defective controllers, disks, and so on.
2. If necessary, repair or replace your hardware.
3. Decide how to recover the database to a consistent state, depending on the nature of the corruption:
   - If only index pages were corrupted, rebuild the indexes.
   - If necessary – for example, if a disk containing data was corrupted – perform a full database restore.

Contact the Informix hotline in the following cases:
   • If you cannot deal with the corruption yourself
   • If the data is corrupt and you do not know whether the backup is also corrupt and whether it can be restored. It is likely that you will lose data in this case.

Result

You identify corruption as soon as possible after it has occurred. This means that you can react quickly and effectively, so keeping data loss and the associated costs to a minimum.
Solving Assert Problems

Use

This procedure tells you how to fix an assert problem in your message-log file. The message-log file is normally called online.log. You can find its name and location on your system by checking the MSGPATH parameter in the ONCONFIG file.

This procedure reflects SAP note 110757.

Prerequisites

The error message looks as follows:

- Assert Failed: Short description
- Who: Description of user/sessions/thread running at the time
- Result: State of the affected Online entity
- Action: What action the online administrator should take
- See also: DUMPDIR/af.uniqid containing more diagnostics

Procedure

Open a problem message at SAP and supply the following information:

- Informix version. To find this, enter the following command:
  `onstat -g183`
- Operating system version. To find this, enter the following command:
  `uname -a/g183`
- Kernel version and patch level. To find this, enter the following command:
  `disp+work -V/g183`
- Relevant excerpt from the message-log file.
- af- file, specified in the message-log file under "see also". This file contains important structures or buffer information required to analyze your problem.
- If this is the first time that the error occurred, was anything recently changed in your system?
- If this is not the first time the error occurred, how often has it already occurred? How were you able to continue after this error in the past?
- If the line Action: Run… exists in the message-log file, was this action executed? If so, what was the result?

You can write this data directly to the message if it is more than 20 lines or, according to note 40024, to the sapservX. If you write the message to sapservX, tell Support the file names.
Solving Error Message INF-271 Without ISAM Error Code

Use

When the Informix database runs out of space, it generates error message INF-271, sometimes without an ISAM error code. This means you cannot identify the table or dbspace causing the problem, nor the ISAM error code itself.

Frequently you cannot identify a dbspace that is full because the problem was temporary. The allocated space is then released during rollback. Often, update is deactivated.

For more information, see SAP Note 178012.

Prerequisites

When space becomes limited and there are only small gaps available in a dbspace, the Informix database always uses the largest available gap, even when this is smaller than the next extent size of the table to be extended. Therefore, the table soon needs extending again, so another relatively small extent is allocated. The result is the:

- Creation of a large number of small extents
- Rapid increase in the next extent size caused by "extent doubling," which occurs when the table repeatedly needs new extents

Finally, when no more space is available, message INF-271 is issued and the database stops processing.

Another cause of this problem is if a database table exceeds 32 GB in size and your system is 32-bit.

Procedure

1. Analyze the space problem using the following tools:
   - SAPDBA
     - If you do not know which table is causing the problem, see Analyzing Tables for Critical Next Extent Size with SAPDBA [Page 368].
     - If you suspect that a particular table is too big, see Analyzing Table Information with SAPDBA [Page 365] and check the number of extents still available.
     - If you want to check dbspaces, see Listing Dbspaces with SAPDBA [Page 343].
   - Informix tool oncheck -pe. For more information, see the Informix documentation.
   - R/3 transaction DB02. See Checking State on Disk (Informix) [Ext.].

2. Solve the problem:
   - If the next extent is bigger than the available space:
     - Assuming the next extent is set to a reasonable size for the table, extend the dbspace by adding a chunk with SAPDBA [Page 350].
If the next extent is unreasonable, set it to another value. Refer to Reorganizing a Single Table with SAPDBA [Page 387].

- If there are no more extents available, you must reorganize the table [Page 387].

See also:

Management of Informix Database Growth [Page 26]
Solving Performance Problems with a SELECT Statement

Use
This procedure tells you how to solve problems with a single SELECT statement.
This procedure reflects SAP note 29873.

Prerequisites
- You have performed a thorough performance analysis in one of the following ways:
  - According to SAP note 15374
  - Using the CD "SAP Service Products"
  - In an EarlyWatch session
- You have definitely located the problem in the execution of a specific SELECT statement.

Procedure
1. Determine the SQL statement as follows:
   a. Activate the SQL Trace immediately before execution of the problematic transaction.
   b. Start the transaction to be traced in the old window. Once finished, switch off SQL Trace
      by choosing TRACE OFF.
   c. Choose LIST TRACE.
   d. In the displayed listing you can analyze all SQL statements with their respective
      database duration in the DURATION column. The values are shown in microseconds.
      For more information on SQL Trace, see Performance Trace: Overview [Ext.].
2. Produce a query plan as follows:
   a. Place the cursor on the relevant SELECT statement.
   b. Choose EXPLAIN SQL.
3. Evaluate the query plan as follows. If it is clear from the plan that no index is used but that a
   sequential scan is performed or an unsuitable index is used, this can have several reasons:
   - There is no suitable index. In this case, create a schema of the relevant table at UNIX
     level, as follows:
     $ su - informix
     $ dbchema -d <sid> -t <table> -ss <table>.sql
     $ more <table>.sql
     For example:
     $ dbchema -d c11 -t rfblg -ss rfblg.sql
Solving Performance Problems with a SELECT Statement

If no appropriate index for the SELECT statement (WHERE-statement fields, starting on the left, specified without a 'like', up to the first gap) exists in the file, this also does not exist in the database. As the creation of an index can have extensive side effects on other applications, we now recommended you to contact the EarlyWatch hotline.

- An appropriate index is available but might be corrupt:
  - In the online log file there is a reference to a corrupt index, such as:
    Index <abc> is now unusable. Run 'oncheck -c <xyz>',
  - Or a transaction terminates with the SQL error -243, -244, -245 or -246:
    -243   Could not position within a table table-name.
    -244   Could not do a physical-order read to fetch next row.
    -245   Could not position within a file via an index.
    -246   Could not do an indexed read to get the next row.
  - Or, during the explicit check with oncheck, an error is reported:

    $ su - informix
    $ oncheck -ci <sid>:<tab>

    For example:
    $ oncheck -ci c11:rfblg

    You must then set up the index in question again. For this, use the current version of the SAP database administration tool, SAPDBA, for this. You can find the current version on the sapserv host. For more information, see SAP note 38401.

- The index exists, but the statistical distribution data is (partially) out of date or missing for some key fields. You can determine the construction date for the distribution data of a table with the following SQL statement:

    select distinct t.tabname, c.colname, d.constructed
    from systables t, sysdistrib d, syscolumns c
    where d.tabid=t.tabid
    and d.tabid=c.tabid
    and d.colno=c.colno
    and t.tabname='<table>';

    If the date is not current or key fields are missing, you must renew the statistics, as described in SAP note 12184. Use the SAP database administration tool, SAPDBA, for this. You can find the current version on the sapserv host. For more information, see SAP note 38401. For more information about new features in SAPDBA for update statistics, see SAP note 79094.

    The statistical distribution of all key fields should now be up-to-date. The new distribution data is nonetheless only activated if the relevant SELECT statement is reprepared (see below).

- The statement was not reprepared.
If the previous reasons are not relevant, you can then check whether the index is used to execute a SELECT statement. To do this, you should construct a SELECT statement that structurally resembles the one to be analyzed.

The table is tab, the index consists of col1 and col2.

The SELECT statement to be analyzed is:

```
SELECT * FROM tab
WHERE col1 = 'a' and col2 = 'b' and col3 = 'c'
```

A suitable test statement could then be:

```
SELECT * FROM tab
WHERE col1 = 'x' and col2 = 'y'
```

It is best if no hit is returned from the statement.

Enter the following commands:
```
$ su - informix
$ dbaccess <sid> -
> set explain on;
> select * from tab where col1 = 'x' and col2 = 'y';
> set explain off;
> <CTRL C>
$ more sqexplain.out
```

From the last entry of the file sqexplain.out, it can be seen whether the index is used. An example of the output is:

```
QUERY:
------
select * from tab where col1 = 'x' and col2 = 'y';
Estimated Cost: 327
Estimated # of Rows Returned: 1
1) sapr3.tab: INDEX PATH
 (1) Index Keys: col1 col2
    Lower Index Filter: (sapr3.tab.col1 = 'x'
                        AND sapr3.tab.col2 = 'y' )
```

To now make sure that a new query plan is also created in R/3 for a SELECT statement, it must be reprepared. To do this, the cursor cache must be initialized. This occurs in the following situations:

- If R/3 is completely restarted – all work processes (WPs) are initialized.
- If an application server is restarted – all WPs on this server are initialized.
• If each individual WP on an application server is stopped without a core, using transaction SM50.
Solving Problems with Out-of-Date Optimizer Access Paths

Use

When the access paths used by the Informix optimizer are out-of-date, data access gets worse. This affects especially access to large tables and views. If you run Explain SQL this often shows that the correct index is being used but that the costs for the access are still very high. This problem is worsened if the database server is not often restarted.

Database data changes dynamically during production operation. However, if the number of rows in a database table does not change, the access path is not updated by the optimizer – although the path no longer corresponds to the current data distribution. Note that the access path is always updated if statistics are updated with SAPDBA using zero deviation.

The data distribution in some database tables of the R/3 System can lead the optimizer to choose a poor access path. This problem is worsened if there are large changes in the data distribution after the optimizer statistics are generated. Therefore, it is sometimes better for particular tables not to use the access path suggested by the optimizer.

Procedure

1. Analyze the problem:
   - Check that the following parameter is set in the ONCONFIG file:
     \[
     \text{OPTCOMPIND} = 0
     \]
     For more information, see SAP note 143956.
   - Check that the environment parameters specified in SAP notes 141054, 152378, and 176175 are correctly set.
   - Check whether the SYSDISTRIBUT table contains entries by entering the following SQL command:
     \[
     \text{select * from syددistrib} \\
     \text{where tabid in} \\
     (\text{select tabid from systables} \\
     \text{where tabname = 'table name'});
     \]

2. Solve the problem:
   - Restart the database and the R/3 System. This refreshes the database shared memory.
   - Delete the entries that you identified above from the syددistrib table by entering the following SQL command:
     \[
     \text{delete from syددistrib} \\
     \text{where tabid in} \\
     (\text{select tabid from systables} \\
     \text{where tabname = 'table name'});
     \]
     Another way to do this is by entering the following SQL command:
update statistics low for table <table name>

drop distributions

The second method generates new statistics and drops the distributions. Therefore, it takes longer than the first method.

- Generate new distribution information for the tables identified above by running update statistics. Refer to Updating Statistics for One Table with SAPDBA [Page 449]. Refresh the statistics daily or as often as possible.

- You might need to customize update statistics [Page 459] for the tables identified above:
  - Set the threshold to 0 or perform update statistics without distributions.
  - For views, check whether there is an index for the join condition and whether this has had an update statistics.
  - For more information on update statistics parameters, see Updating Statistics from the Command Line with SAPDBA [Page 455].
  - When you have identified the best way to perform update statistics for a particular table, you can enter the parameters in the control table DBSTATC. Refer to Configuring Update Statistics in CCMS (Informix) [Ext.]. This means that all future update statistics use the new parameters.

**Result**

The statistics are more up-to-date and reflect the current data distribution. Monitor problematic tables in future and update statistics on such tables frequently, customizing the update statistics parameters if necessary.

**See also:**

Update Statistics with SAPDBA [Page 440]
Solving Problems with In-Place Alter Table

Use

The use of the command **In-Place Alter Table** to alter the structure of an Informix database table often causes performance or space problems if the actual structure change is triggered during normal system operation at once rather than gradually. This occurs if the table structure has been previously altered with **In-Place Alter Table** and then an application updates a large number of rows in the table at once. The result is to trigger structure changes on all updated rows, which is very resource intensive.

For tables that have multiple data definition versions, it is better to convert the table **manually at a chosen time** after you use **In-Place Alter Table**. You can then choose a time outside normal system operation when the database is not heavily used and make sure that sufficient space is available, so avoiding performance and space problems.

This procedure describes how to prevent problems with **In-Place Alter Table**.

**Procedure**

1. **Analyze the situation using the Informix oncheck tool:**
   
   ```sh
   oncheck -pT <database id>:<owner>.<table name>
   ```
   
   This tells you if there are multiple data definition versions of a table. For more information, see **Examples for In-Place Alter Table [Page 505]**.

2. **Before** you alter table structure always be sure to:
   
   - Work out how much extra space is required for the new structure.
   - Plan for the calculated new space requirement.
   - Choose a suitable time for the operation, that is, when the database is not heavily used.

3. **Perform the structure alteration at the chosen time in one of the following ways:**
   
   - With **in-place alter table** followed by a dummy update on all rows in the table
   - With a table reorganization if this is required in any case
     
     When the table is recreated as part of a reorganization, you can specify the new structure straightaway.
Examples for In-Place Alter Table

This example relates to Solving Problems with In-Place Alter Table [Page 504]. The following output is from oncheck -pT:

- **Before the in-place alter table command:**

<table>
<thead>
<tr>
<th>Version</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (current)</td>
<td>25</td>
</tr>
</tbody>
</table>

  The first column shows the versions of the table that exist and the second column shows the number of pages that exist in this version.

- **After you enter an in-place alter table command like the following:**

  `alter table a005 modify field1 char(6) default '00000' not null`

<table>
<thead>
<tr>
<th>Version</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (oldest)</td>
<td>25</td>
</tr>
<tr>
<td>1 (current)</td>
<td>0</td>
</tr>
</tbody>
</table>

  There are now two versions of the table but all pages still exist in the original version.

- **After an update to the table:**

<table>
<thead>
<tr>
<th>Version</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (oldest)</td>
<td>23</td>
</tr>
<tr>
<td>1 (current)</td>
<td>2</td>
</tr>
</tbody>
</table>

  Due to the update, two pages have now been converted to the current table version.

- **After you enter another in-place alter table command:**

<table>
<thead>
<tr>
<th>Version</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (oldest)</td>
<td>23</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2 (current)</td>
<td>0</td>
</tr>
</tbody>
</table>

  There are now three versions of the table. Most pages still exist in the original version, some exist in version 1 but none exist yet in the current version.

- **After a further update:**

<table>
<thead>
<tr>
<th>Version</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (oldest)</td>
<td>23</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2 (current)</td>
<td>0</td>
</tr>
</tbody>
</table>
Examples for In-Place Alter Table

<table>
<thead>
<tr>
<th>Version</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (oldest)</td>
<td>23</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2 (current)</td>
<td>1</td>
</tr>
</tbody>
</table>

- After you force an update of all fields in the table at a convenient time with a command like the following:

  ```sql
  update a005 set field1 = field1
  ```

Home Data Page Version Summary

<table>
<thead>
<tr>
<th>Version</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (oldest)</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2 (current)</td>
<td>25</td>
</tr>
</tbody>
</table>

Due to the update, all pages have now been converted to the current version.