

MM MM-MOB and WM-LSR Interfaces



HELP.MMWMLVS

Release 4.6C



Copyright

© Copyright 2001 SAP AG. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP AG. The information contained herein may be changed without prior notice.

Some software products marketed by SAP AG and its distributors contain proprietary software components of other software vendors.

Microsoft[®], WINDOWS[®], NT[®], EXCEL[®], Word[®], PowerPoint[®] and SQL Server[®] are registered trademarks of Microsoft Corporation.

IBM[®], DB2[®], OS/2[®], DB2/6000[®], Parallel Sysplex[®], MVS/ESA[®], RS/6000[®], AIX[®], S/390[®], AS/400[®], OS/390[®], and OS/400[®] are registered trademarks of IBM Corporation.

ORACLE[®] is a registered trademark of ORACLE Corporation.

INFORMIX[®]-OnLine for SAP and Informix[®] Dynamic Server[™] are registered trademarks of Informix Software Incorporated.

UNIX[®], X/Open[®], OSF/1[®], and Motif[®] are registered trademarks of the Open Group.

HTML, DHTML, XML, XHTML are trademarks or registered trademarks of W3C[®], World Wide Web Consortium, Massachusetts Institute of Technology.

JAVA[®] is a registered trademark of Sun Microsystems, Inc.

JAVASCRIPT[®] is a registered trademark of Sun Microsystems, Inc., used under license for technology invented and implemented by Netscape.

SAP, SAP Logo, R/2, RIVA, R/3, ABAP, SAP ArchiveLink, SAP Business Workflow, WebFlow, SAP EarlyWatch, BAPI, SAPPHIRE, Management Cockpit, mySAP.com Logo and mySAP.com are trademarks or registered trademarks of SAP AG in Germany and in several other countries all over the world. All other products mentioned are trademarks or registered trademarks of their respective companies.

Icons

Icon	Meaning
	Caution
	Example
	Note
	Recommendation
	Syntax
	Tip

Contents

MM MM-MOB and WM-LSR Interfaces	6
External System Interface to the Logistics Module	7
Functions	8
Partner Concept	9
Technology	10
Certification.....	11
Minimum Requirements for the WM-WCU Interface.....	12
Minimum Requirements for the MM-MOB Interface.....	13
Assignment of IDOC to Interface	14
Scenarios: Mobile Data Entry in Warehouse Logistics	15
Posting Goods Receipts from External Systems in IM	16
Putaways from the Production Plant to the IM.....	17
Putaways from the Production Plant to WM.....	18
Putaway to WM with Manual Storage Bin Allocation.....	19
Replenishment TO for the Production Plant	20
Entering Inventory Count Data Without WM (Offline)	21
Entering Inventory Count Data with WM.....	22
Report Packing to SD.....	23
Interfacing Picking Systems	24
Posting Goods Receipts and Goods Issues Using Weighed Quantities.....	25
Scenarios: Warehouse Control Unit Interface	26
Manual Warehouse: Scenario 1	28
Semi-automatic Warehouse: Scenario 2.....	30
Fully-automatic Warehouse: Scenario 3.....	32
Fully-automatic Warehouse - BLACK BOX: Scenario 4	36
Interface to an External WM System: Scenario 5.....	39
WM Interface to Non-warehouse Systems.....	41
Data Flow: Technical Descriptions	42
Sending Transfer Orders	43
Receiving Transfer Orders	46
Technical Implementation	48
Sending IDocs to an External System	49
TCP / IP Settings	51
Sending IDocs: External System to SAP System	52
Transaction Identification Management (TID)	54
Formatting Data	56
Data Transfer Format	60
Description of the IDocs	61
Goods Movements	63
Verification of Shipping Unit Data	71
Example: Data Verification Message Structure	75
Sending Picking Requests	77

Updating Picking Requests in the Delivery Document	80
Example: Packaging	83
Transfer Orders	85
Confirming Transfer Orders	92
Cancelling Transfer Orders	98
Releasing Groups	101
Blocking Storage Bins	103
Creating/Cancelling Transfer Requirements	105
Generating Transfer Requirements	108
Cancelling Transfer Requirements	109
Moving Storage Units	110
Inventory in the Warehouse Management System	112
General Information Texts	114
SAP System Settings and Modification Concept	115
Activating Error Processing	117
Displaying the Inbox	120
Error Analysis	121
Technical Errors in the ALE Service Layer	122
Logical Errors in the Application	124
Modification Concept	126
Input (Receiving IDocs from the External System)	127
Output (Sending IDocs to an External System)	130
SAP Customer-Exits	132
Sending Documents to External Systems	133

MM MM-MOB and WM-LSR Interfaces

[Interfacing External Systems to the SAP Logistics \[Page 7\]](#)

[Scenarios: Mobile Data Entry in Warehouse Logistic \[Page 15\]](#)

[Scenarios: Warehouse Control Unit Interface \[Page 26\]](#)

[Data Flow: Technical Descriptions \[Page 42\]](#)

[Description of the IDocs \[Page 61\]](#)

[SAP System Settings and Modification Concept \[Page 115\]](#)

In the Warehouse Management Guide, see [Interfaces to External Systems \[Ext.\]](#).

External System Interface to the Logistics Module

General Information

The logistics environment features two interfaces:

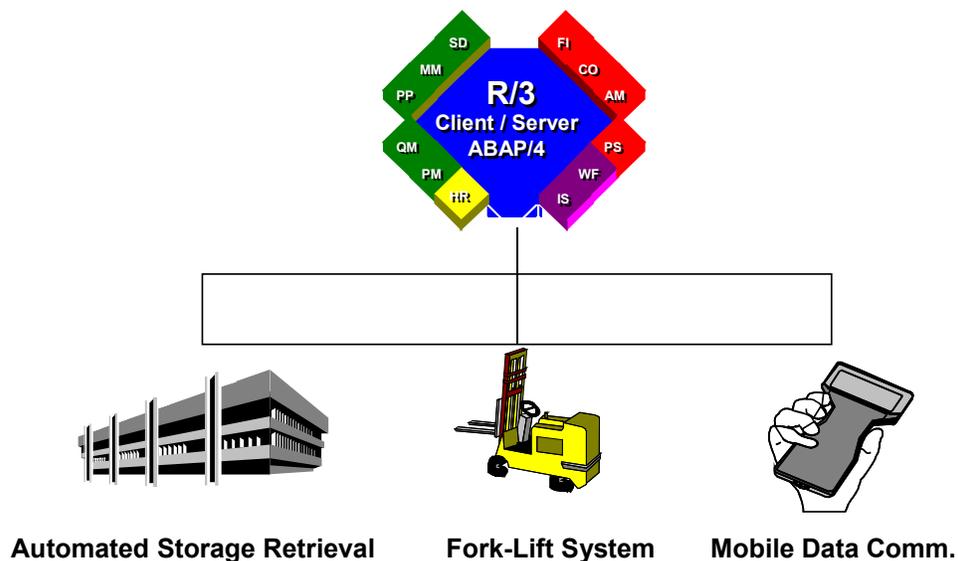
1. MM-MOB Mobile data entry interface
2. WM-LSR Warehouse control unit interface

The **mobile data entry** interface enables:

- Mobile entry and transfer of data to SAP with/without radio support
- Implementation of wireless barcode readers for paper-free data entry
- Fast and reliable data transfer

The **warehouse control unit interface** enables:

- Integration of warehouse control units in the SAP environment
- Connection of fork-lift control systems, carousels...
- Costs to be reduced as a result of defined, release-neutral interfaces



Functions

Functions

Mobile Data Entry Interface

The mobile data entry interface supports the following functions:

- Entry of goods movements
- Entry of inventory count data
- Entry of packing
- Transfer of delivery notes to the external system
- Entry of picking quantities for the delivery document
- Entry of movements in the warehouse

The scenarios that are possible here are very diverse; for example, entry of goods receipts via handheld terminals, inventory count data entry via portable devices, goods receipts from the production plant etc.

The prevailing situation must be analyzed carefully when this interface is to be implemented.

Warehouse Control Unit Interface

The warehouse control unit interface supports the following functions:

SAP to external system:

- Reporting of transfer orders
- Reporting of multiple processing releases
- Cancellation requests for transfer orders

External system to SAP:

- Generation of reported transfer orders
- Confirmation of transfer orders
- Movement of storage unit
- Blocking of storage bins (aisles)
- Generation of transfer requirements
- Cancellation of transfer orders that have not been confirmed

Partner Concept

We will be working in conjunction with a number of carefully selected partners in order to enable our customers to connect mobile data entry devices, warehouse control systems, fork-lift control systems, carousels etc. both flexibly and reliably. The various responsibilities are allocated as follows:

SAP will supply the technical tools (IDocs, ALE, RFC), that are necessary for interfacing the external computers, as standard from Release 3.0 onwards. Functions (standard IDocs) that map commonly-used business transactions and initiate the appropriate processing steps in the SAP system are also available on the application side.

The partners will assume full responsibility for implementing the processing logic and for the screen layout and communication that takes place between the computers. **They will also be the first point of contact for joint customers in the event of communication errors.**

A **certification procedure** has been implemented by SAP for its partners which checks whether the partners fulfill the necessary requirements for successfully interfacing external systems to SAP by means of the technology and techniques described above. No functional check for testing the application software of the partners is available.

Technology

Technology

The interface is based on the transactional Remote Function Call (**tRFC**). This is a simplified technique which enables communication to take place on a program-to-program basis.

In contrast to the **sRFC** (synchronous remote function call), tRFC buffers the data before it is sent. The application and communication side are thus separate from each other.

The sRFC can, however, be used, in particular, for data acquisition purposes in a mobile data entry environment, i.e. for read accesses.

SAP offers a sophisticated monitoring system for logical error analysis. In the event of an error, messages can be sent to different persons or employee groups from whose inboxes repostings can be made.

Certification

SAP will award either a **full certificate** or a **part certificate** depending on whether the partner in question is able to implement all or only some of the IDocs.

The list of IDocs required for a full certificate and the assignments of the IDocs to the two interfaces can be seen in [Description of the IDocs \[Page 61\]](#). The minimum requirements that must be fulfilled in order to obtain a part certificate are described below for each of the two interfaces.

The certificates will contain a list of the certified IDocs.

Minimum Requirements for the WM-WCU Interface**Minimum Requirements for the WM-WCU Interface**

For the warehouse control unit (WCU), the following activities must be considered:

1. SAP sends a transfer order. Receipt of the order (WMTOID01) must be verified.
2. SAP receives confirmation of the transfer order from the subsystem (WMTCID01)
3. The external system generically blocks an aisle in the warehouse (send WMBIID01)
4. The external system moves a storage unit (send WMSUID01).

Minimum Requirements for the MM-MOB Interface

For the mobile data entry (MOB) interface, the following activities must be considered:

1. From the external system a synchronous Remote Function Call to a function module ('L_PO_READ_MDE') in SAP has to request the purchasing data. After the verification of the purchasing data in the external system a goods receipt should be executed for the purchase order (WMMBID01).
2. Either the minimum prerequisites of the WM-WCU (warehouse control unit) interface have to be fulfilled or the IDocs of the SD component have to be linked.

Assignment of IDOC to Interface

Assignment of IDOC to Interface

Assignment of IDOC to Interface

IDOC	Component	Designation
WMMBID01	MOB	Goods movements
SDPIOD01	MOB	Transfer of delivery notes to external system
SDPIID01	MOB	Verification of pick quantities for the delivery
SDPAID01	MOB	Verification of shipping unit
LSR/MOB	LSR/MOB	Transfer orders TO
LSR/MOB	LSR/MOB	Confirming transfer orders
LSR/MOB	LSR/MOB	Cancellation / Cancellation request TOs
LSR/MOB	LSR/MOB	Transfer orders TO
LSR/MOB	LSR/MOB	Blocking of storage bins (aisles)
LSR/MOB	LSR/MOB	Reporting of multiple processing releases
LSR/MOB	LSR/MOB	Movement of storage units
LSR/MOB	LSR/MOB	Entry of inventory count data
LSR/MOB	LSR/MOB	Information text

Scenarios: Mobile Data Entry in Warehouse Logistics

This section describes possible scenarios for interfacing mobile data entry systems to SAP R/3 and explains the related business principles. The collection of scenarios described is not complete and should be regarded merely as a series of possible interfaces illustrating typical applications. In contrast to the LSR interface, the mobile data entry interface is module-neutral, i.e. interfaces to the Warehouse Management system as well as the Inventory Management and Sales and Distribution modules are also discussed.

Summary

The interfaces described in this section are examples of implementing mobile data entry devices. Each individual case must be analyzed in order to determine which applications are possible and practical.

All standard IDocs of the WM-LSR and MM-MOB interfaces can, in principle, be used for mobile data entry applications.

Mobile functions can also be used as an extension of the logistics chain using a control computer to enable paper-free stock placement and removal.

Refer to the appropriate descriptions of the individual IDocs for details on their technical structure and sending and receiving them.

Posting Goods Receipts from External Systems in IM

Posting Goods Receipts from External Systems in IM

Purpose

Entry of goods receipts for orders

The mobile entry of goods receipts in the Inventory Management module is an example of a typical customer requirement. The problem with standard procedures is that the procedural details vary considerably. The standard SAP system, therefore, 'only' supports transmission and posting of goods receipts. Checks and dialogs that may be required by the customer are not supported. These can, however, be implemented without any difficulty.

Prerequisites

The **standard IDoc WMMBID01** must be used. The data entered in the external system must be structured in the same way as this IDoc so that the goods receipt can be posted in the Inventory Management module in the SAP system. The IDoc is sent to the SAP system via a transactional RFC.

All checks made against orders in the external system, order number printing on delivery notes, converting data to IDoc format and complex dialogs between the external system and handheld terminal must be implemented in accordance with the specific requirements of the customer. Order data can be downloaded from the external system without any difficulty via a synchronous RFC (see also synchronous RFC).

Activities carried out in the warehouse (generating transfer orders, physical transfer etc.) are independent of this as it is the Inventory Management system that is interfaced in this case.

Process Flow

A typical process after goods have been received from the vendor can be seen below:

1. The order number on the delivery note is read in by means of a barcode scanner.
2. The order data is downloaded from the R/3 system to the external system.
3. The delivery note items are then entered in the external system.
4. The external system checks the order against the delivery.
5. The external system then sends the data and the good receipt is posted in the R/3 system.

Putaways from the Production Plant to the IM

Purpose

Entry of goods receipts for production orders.

This function can be used to speed up stock placement from the production plant. This is made possible by preplanning goods receipts by means of the production order.

Prerequisites

The **standard IDOC WMMBID01** is used in this case as well. The barcoded stickers must be generated in accordance with individual requirements.

Activities carried out in the warehouse (generating transfer orders, physical transfer etc.) are independent of this as it is the Inventory Management system that is interfaced in this case.

Process Flow

An example of a possible process can be seen below assuming that the goods are sent to the warehouse from the production plant once the manufacturing process has been completed.

1. The production order number, material and quantity are marked on stickers which are attached to the appropriate pallet before the goods leave the production plant.
2. The data is read in via barcode scanners in the goods receipt zone and sent to the SAP system where it is then posted.

Putaways from the Production Plant to WM

Putaways from the Production Plant to WM

Purpose

To place manufactured goods into stock from the warehouse

In this example, we are merely concerned with an actual physical stock placement procedure in contrast to the above example where the received goods were posted in the Inventory Management system. This involves the confirmation of preplanned **transfer orders (TOs)**. These transfer orders must have been generated, printed and sent to the production plant beforehand in the system. The pallets sent to the warehouse from the production plant should, in this case, be accompanied by a transfer order document.

Prerequisites

The **standard IDoc WMTOID01** must be used. The TO document, including the barcode, is implemented as standard. The quantities placed into stock in the WM system are accumulated as an offsetting entry in an interim storage type. The goods are only made available for planning and the interim storage stock balanced when the goods receipt (GR) is posted in the Inventory Management system.

The advantage of this is that the number of GR postings can be drastically reduced as the quantities are posted cumulatively.

Process Flow

1. The transfer order number is scanned in in the warehouse.
2. The external system generates the data required to confirm the TO. If the number of quantities to be placed into stock is less than the planned number of quantities, the difference will be confirmed.
3. Once the data has been sent, it is posted in the WM system and is thus available in the warehouse.

Putaway to WM with Manual Storage Bin Allocation

Purpose

Putaway goods into in a manually-allocated storage bin with system message.

Prerequisites

The **standard IDoc WMTOID01** must be used. The generated transfer orders are already confirmed when they are generated as the physical transfer has already taken place. This function is useful if warehouse employees are to or wish to organize stock placement themselves. Generation of a TO for transfer requirements is currently not implemented. It is, therefore, not possible to establish a reference to the transfer requirements.

Process Flow

This function is a pure storage function. The goods are placed in a storage bin.

1. The storage bin, material and quantity are scanned in.
2. The data is sent and the transfer order generated in the SAP system

Replenishment TO for the Production Plant

Replenishment TO for the Production Plant

Purpose

To create a replenishment transfer order for the production plant.

Prerequisites

The **standard IDoc WMTOID01** must be used. The barcoded information must be generated in accordance with individual requirements, e.g. in the form of a Kanban chart.

Process Flow

Creation of a replenishment transfer order for the production plant is mapped as a storage function. The following scenario results if the system recognizes that a WM-managed production storage bin must be replenished:

1. The material, quantity and storage bin are scanned in
2. The data is sent and a TO is generated in the WM system.
3. The TO is printed and physical transfer takes place to the storage bin.

Entering Inventory Count Data Without WM (Offline)

The Inventory Management system of Release 3.0 features a report which can be used to post inventory count data, that has been stored in a sequential file, in the SAP system. The file is transferred via the SAP-UNIX path by means of file transfer. A more detailed description of this interface can be found in the R/3 retail specification 'Transfer MDC Data for Inventory'.

Entering Inventory Count Data with WM

Entering Inventory Count Data with WM

Purpose

Mobile entry of count data for system inventory records.

Prerequisites

The **standard IDoc WMIVID01** must be used. The records which are to be reported to the system can appear in any order. The count records are automatically assigned to the correct records.

Process Flow

As soon as warehouse management systems are used, inventories must be drawn up in accordance with the storage bins as any differences that occur must be assigned to the storage bin. A typical procedure for drawing up an inventory in the WM system includes the following steps: generation of inventory records (i.e. assigning bins to documents), printing, counting, recording results, posting differences. An example of such a procedure using mobile data entry can be seen below:

1. Enter system inventory records in the WM system
2. Send inventory records to the external system
3. Enter count data on the handheld terminals
4. Send and post the count results in the WM system
5. Post differences, etc., standard processing

Step 2 is not mandatory but does facilitate generation of the count data in the appropriate IDoc format as the same format is also used to send data to the external system.

Report Packing to SD

Purpose

To update the current packing in the delivery document.

Process

You can update shipping elements in the delivery document in three different ways. You can update the system for

- Free shipping elements without specification of contents (without reference to the delivery item)
- Packed items
- Packed shipping elements

You can pack shipping elements as often as necessary into other shipping elements. Delivery items can be generated from the shipping elements in the delivery document so that these can then be billed and processed by the Inventory Management system.

Prerequisites

The standard IDOC SDPAID01 must be used.

Interfacing Picking Systems

Interfacing Picking Systems

Sending picking requests

You can specify, for each shipping point, whether the data in the picking list (i.e. items to be picked which are not picked with WM transfer orders) is to be output in the form of a hard copy or sent to an external system. Delivery header and item data which is relevant for picking is sent. A picking request is generated in both cases.

If the items are subject to confirmation, the picked quantities must be reported.

The standard IDOC SDPIOD01 must be used.

Updating picking requests in the delivery document

Picking requests can be updated in the delivery document either via the online transaction /nVL08 or, in the case of an external system, via an IDOC. It is currently possible to update confirmed quantities, batch splits and movement type splits.

You also have the option of matching the delivery quantity to the picked quantity and to initiate a goods issue posting.

The standard IDOC SDPIID01 must be used.

Posting Goods Receipts and Goods Issues Using Weighed Quantities

Usage

To work with weighed quantities you can use this IDoc with the same interface as in the standard system, even if the data entry in this case does not take place through a mobile terminal.

To do this, enter the difference in weight of a truck before and after loading into the SAP system in order to post the goods receipt or goods issue.

Scenarios: Warehouse Control Unit Interface

Scenarios: Warehouse Control Unit Interface

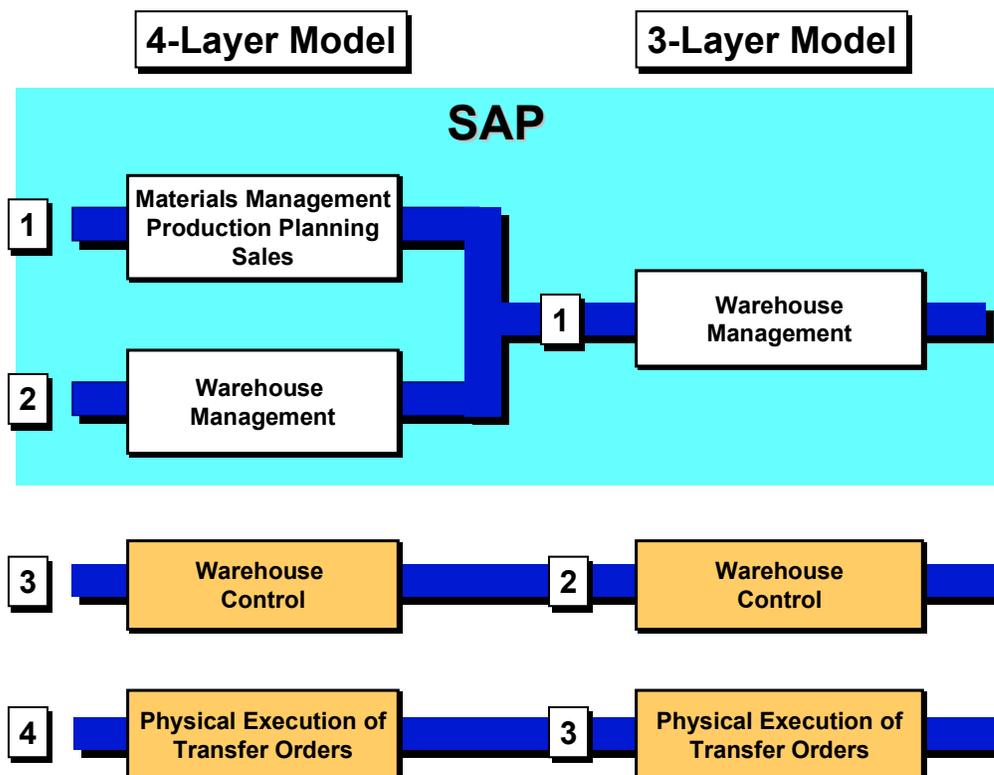
This section describes the possible scenarios for interfacing the SAP R/3 Warehouse Management system (WM) to an external system. The interface is described from the point of the view of the application.

The term “external system” can refer to both secondary storage systems such as warehouse control units (LSR) or fork-lift control systems (FLS) and systems, such as production control stations, that remove stock from the warehouse automatically. The interface to the WM system can be used effectively irrespective of the type of external system.

The complexity of the interface is not just due to the wide range of external systems that can be interfaced to the WM system but is rather more the result of the functionality that it must take account of. The intention of the scenarios described in the following section is to illustrate typical examples of applications for this interface paying special attention to function distribution between the WM system and the external system.

The individual scenarios are preceded by a description of how the SAP Warehouse Management system fits into the system landscape, i.e. the role the system plays in the system architecture, as seen from the point of view of SAP, and the tasks it performs. This can be illustrated using the 4 and 3-layer models.

The 4-layer model describes the use of an R/2 host system (layer 1) with a distributed R/3 Warehouse Management system. The 3-layer model describes the use of the integrated R/3 system.



Scenarios: Warehouse Control Unit Interface

Materials management, production planning and sales and distribution are at the materials planning level (1). Warehouse management on layer 2 is, in fact, an independent component but is fully integrated in the materials planning layer. From the point of view of the system architecture, the two layers run on the same system or, to be more precise, on the same database. Only in the case of the distributed WM system, which is linked to the R/2 system, are there two separate systems.

The two layers perform all of the warehouse management functions. The warehouse control functions and executable moving commands are not, however, executed by the SAP system. These layers must, therefore, always be regarded as independent systems from the point of view of the application. The warehouse control functions must, therefore, be performed by an external system which, in addition to controlling the material flow, can also perform other tasks such as optimizing warehouse control or implement additional check mechanisms.

The objective of the new interface to the external system is to provide more effective support for communication between warehouse management and warehouse control by means of standardized data carriers (IDocs) and communication techniques (tRFC) and by means of the flexible interface options.

The scenarios can be divided into 6 groups according to the mode of operation:

1. [Manual warehouse with Warehouse Management system \[Page 28\]](#)
2. [Semi-automatic warehouse with Warehouse Management system \[Page 30\]](#)
3. [Fully-automatic warehouse with Warehouse Management system \[Page 32\]](#)
4. [Fully-automatic warehouse \[Page 36\]](#) (black box) with restricted warehouse management functionality
5. ; an external WMS is interfaced directly to the materials planning layer of the SAP system

In addition to warehouse management systems, a wide range of other systems can be interfaced to the WM system depending on the mode of operation:

6. [Interfacing the WM system to non-warehouse management systems \[Page 41\]](#)

Summary

The interfaces in this section are examples of how external systems can be implemented in conjunction with the WM system or in place of the WM system. The individual scenarios can be summarized as follows:

- There are many different ways of interfacing warehouse systems
- There is no rigid formula for choosing the optimum scenario
- Function distribution between the WM system and external system must always be determined in accordance with individual customer requirements
- A high coverage is already achieved for the interface with the standard
- The flexibility of the interface enables customer-specific configurations and enhancements to be incorporated

Refer to the appropriate descriptions of the individual IDocs for details on their technical structure and sending and receiving them.

Manual Warehouse: Scenario 1

Manual Warehouse: Scenario 1

Purpose

The purpose of this scenario is to enhance the WM functionality by implementing an external system.

In the case of a manual warehouse, the WM system assumes full control over the management of the warehouse. The functions performed include:

- Management of material stocks and storage bins
- Generation of all possible goods movements (stock placement/removal/transfer and posting changes)
- Determination of storage bins for movements with defined stock placement and removal strategies
- Inventory taking

The following additional functions can be used to optimize management of a manual warehouse:

- Implementation of a fork-lift control system
- Picking without documents
- Reporting of completed goods movements via radio terminal

The implementation of a fork-lift control system (SLS) is described as an example of interfacing an external system in a manual warehouse.

Fork-lift control system

Function distribution between WM and external system

WM: 

- Initiates goods movements
- Generates transfer orders for all possible goods movements
- Sends generated transfer orders to the SLS

WM interface  to external system

External system: 

- Optimizes goods movements
- Additional mechanisms for checking goods movements
- Executes goods movements
- Reports goods movements to the WM system

Interface external system to  WM

WM:

- Reports confirmed transfer orders

Manual Warehouse: Scenario 1

The transfer orders generated in the WM system are transferred to the external system with the standard IDoc WMTOID01. The goods are moved in the warehouse on the basis of the data which is transferred by means of this IDoc. All movements are monitored by the SLS and, if necessary, optimized. The transfer order sent to the SLS specifies whether the movement is to be reported to the WM system. The movement is reported by means of the standard IDoc WMTCID01. The data for this must be structured in the same way as this IDoc on the SLS side and sent to the SAP system so that the transfer order can be confirmed in the SAP system.

If goods movements, such as stock transfers within a warehouse (e.g. remaining quantities are moved together to create more space) are initiated manually, they can be executed in the SLS and reported to the WM system. The movement, which is given priority, is reported by means of the standard IDoc WMTOID01. The transfer order data must be structured in the same way as this IDoc on the SLS side and sent to the SAP system so that the latter can generate a transfer order for the goods movement in order to update the WM system.

The situation is similar with manual stock placements where the storage bin is determined by the warehouse personnel in the warehouse. The goods movement is entered by means of mobile data entry devices and reported to the WM system.

Semi-automatic Warehouse: Scenario 2

Semi-automatic Warehouse: Scenario 2

Purpose

The external system is to assume responsibility for controlling the automatic conveyors.

Full control over the management of the warehouse is assumed by the WM system also in the case of semi-automatic warehouses. The functions that must be performed by the warehouse management system in this case are comparable with those for the manual warehouse. These include:

- Management of material stocks and storage bins
- Generation of all possible goods movements (stock placement/removal/transfer and posting changes)
- Determination of storage bins for movements with defined stock placement and removal strategies
- Inventory taking

The external system merely performs the warehouse control functions, i.e. transfers and execution of goods movements. Possible functions in detail:

- Control of the conveyors and automatic conveyors
- Control of the material flow

In this scenario, it should be considered whether an interface between the WM system and external system is at all necessary. A simple barcode interface would also provide an effective solution in this case. In the following examples for stock placement and stock removal, no data is sent to the external system by the WM system. Only the goods movements are reported by the external system via this interface.

Stock Placement

Function distribution between the WM system and external system

WM:

- Initiates goods movements
- Determines the destination for the stock placement
- Generates transfer orders for the stock placement. This includes:
 - determining the storage bin for the stock placement
 - printing an accompanying note (pallet note) with the storage bin in the form of a barcode

External system: 

- Scans in the barcode from the accompanying note in order to place the pallet into stock
- Transfers the pallet to the destination and places it into stock
- Reports the goods movement to the WM system

Interface external system to  WM

Semi-automatic Warehouse: Scenario 2

WM:

- Confirms confirmed transfer orders

The transfer orders are only output in hard copy form as pallet notes upon which the storage bin for the stock placement appears in the form of a barcode. The pallet is transferred to the automatic conveyor. The barcode is scanned in on the automatic conveyor in order to select the storage bin. The pallet is then moved to this storage bin and placed into stock.

If the external system is to report the goods movement to the WM system, the data for this must be structured in the same way as the standard IDoc WMTCID01 on the external system side and sent to the SAP system so that the transfer order can be confirmed in the SAP system.

Stock Removal

Function distribution between the WM system and the external system

WM:

- Initiates the goods movements
- Determines the type and scope of the stock removal
- Generates transfer orders for the stock removal. This includes:
 - determining the storage bin for the stock removal
 - printing a stock removal list (picking list) with the storage bin in the form of a barcode

External system: 

- Scans the individual storage bins in the stock removal list in order to remove all pallets for a transfer order from stock or to approach the storage bins if picking is carried out directly in the warehouse
- Removes the pallet from stock, picks from the pallet or picks directly at the storage bin
- (Reports the good movements or the picking procedure to the WM system
(Interface external system to WM)

WM:

- Reports confirmed transfer orders

The transfer orders are only output in hard copy form as stock removal lists or picking lists which contain the storage bins concerned in the form of bar codes. If it is necessary to remove the individual pallets from stock, e.g. full pallets are sent or picking takes place in a picking zone and not directly in the warehouse, removal of the individual pallets from stock will be initiated by scanning the barcode in the list. If picking takes place directly in the warehouse, the automatic conveyor will be moved to the appropriate storage bin by scanning the barcode.

If the external system is to report the stock removal or picking to the WM, the data for this must be structured in the same way as the standard IDoc WMTCID01 on the external system side and sent to the SAP system so that the transfer order can be confirmed in the SAP system.

Fully-automatic Warehouse: Scenario 3

Fully-automatic Warehouse: Scenario 3

Purpose

The external system is assume responsibility for warehouse control and, if necessary, a specific part of warehouse management.

Scenarios 3, 4 and 5 must be considered in conjunction with an automatic warehouse. This section describes the third scenario. You should consider all three scenarios if, in a concrete situation, a decision regarding the use of the WM system in an automatic warehouse is to be made.

In a fully-automatic warehouse, both the warehouse as a whole and the specifications of the automatic warehouse systems must be taken into consideration in order to determine how the functions can be distributed effectively within this warehouse between the WM system and the external system. There is no standard solution for distributing the functions. This must be carried out separately for each individual customer and in accordance with the project in question. As in the other scenarios, warehouse management is always carried out by the WM system. This includes:

- Management of material stocks and storage bins
- Generation of all possible goods movements (stock placement/removal/transfer and posting changes)
- Determination of storage bins for movements with defined stock placement and removal strategies

The external system assumes full responsibility for warehouse control:

- Control of the conveyors
- Control of the material flow
- Optimization of resources

It is not always possible to accommodate all of the warehouse management functions in the WM system alone. There are meaningful ways of allocating the warehouse management functions to the two systems which may differ from one case to the next. The degree of automation implemented in the warehouse is of central importance here. In a simple automatic warehouse, all aspects of warehouse management will, in many cases, be controlled by the WM system. The external system only performs the warehouse control functions whereby the goods movements generated by the WM system can be optimized effectively by means of warehouse control. If the warehouse is more highly automated, the storage technique must also be taken into consideration when the transfer order is generated so that they can be used to optimum effect. For example, different pick points are selected via the movement type of the transfer order when the stock is removed. The following examples outline a method of distributing the functions between the WM system and external system in a warehouse that is automated to a relatively high degree.

A simple warehouse is, however, described in the first scenario. The interface between the WM system and external system is not used any differently in this case to the interface between a manual warehouse and a fork-lift control system.

Process Flow

Stock Placement via Identification Point

Function distribution between the WM system and external system

WM: 

- Initiates the goods movements
- Determines the destination for the delivered or prepared pallet
- Generates transfer orders from the GR zone to the pick point; the pallet number is printed on the pallet note in the form of a barcode
- Sends the generated transfer orders to the external system

Interface WM to  external system

External System: 

- Scans in the barcode from the pallet note at the pick point in order to identify the pallet
- Determines the pallet type by checking the contours and allocates the storage bin
- Places the pallet into stock
- Reports that the pallet has been placed into stock to the WM system

Interface external system to  WM

WM:

- Generates transfer orders for the reported pallet movements

The delivered pallet (storage unit) is placed into stock in the SAP system or the pallet is first formed in the GR zone. The destination for the pallet that is to be placed into stock is then determined in the WM system using the application-specific data. When the destination is determined, either the storage type alone or the storage bin of a storage type is determined for stock placement. If stock placement is carried out, as described in this example, via the pick point, a transfer order from the GR zone to the pick point of an automatic warehouse will be generated. This transfer order is sent together with the necessary data to the external system with the standard IDoc WMTOID01. This IDoc is used, amongst other things, to transfer the pallet number.

The pallet to be placed into stock is transferred to the pick point where it is identified by the external system by means of the barcode. The storage bin is assigned by the external system to ensure that the conveyors are used as efficiently as possible. The pallet is placed into stock and a message to this effect is sent to the WM system. A pallet movement is reported via the standard IDoc WMSUID01. The pallet data with the storage bin must be structured in the same way as this IDoc on the external system side and sent to the SAP system so that a transfer order can be generated for the moved pallet in the SAP system and the movement generated by the external system posted again in the WM system.

Stock Removal via the Pick Point

Function distribution between the WM system and external system

WM: 

- Initiates the goods movements

Fully-automatic Warehouse: Scenario 3

- Determines the type and scope of the stock removal
- Generates transfer orders from the warehouse to the GI or picking zone.
- Sends generated transfer orders to the external system
Interface WM to  external system
- (Sends reference number release to the external system
Interface WM to  external system)

External system: 

- Determines the most appropriate sequence for removing the individual pallets from stock
- Removes individual pallets from stock and moves them to a pick point determined by the external system
- Picks stock at the pick point with visualization of the individual pick items
- Confirms withdrawal and reports to the WM system
Interface external system to  WM
- Determines the storage bin for returning a pallet to stock that was not emptied as a result of withdrawal
- Returns the pallet to stock
- Reports the returned pallet to the WM system
Interface external system to  WM

WM:

- Reports confirmed transfer orders
- Generates transfer orders for the reported pallet movements

Stock removal or picking is initiated in the WM system. The scope and type of withdrawal depends on many different criteria; as an example, several delivery notes for a route are combined in one picking procedure. Transfer orders are generated for these delivery notes and are transferred to the external system with the standard IDoc WMTOID01.

Picking can be carried out in two different ways:

1. Picking takes place on the basis of the delivery notes, i.e. each transfer order sent is treated as a separate picking request by the external system.
2. Picking does not take place on the basis of the delivery notes but is, as described in the example, referred to a route, i.e. the transfer orders that have been sent must not be picked straight away. Picking cannot start until all of the transfer orders for a route have been sent. Order picking is initiated in the WM system when the reference number is released. The reference number release is sent to the external system with the standard IDoc WMRRID01.

The picking request sent by the WM system which comprises one or more transfer orders is processed by the external system. The individual goods movements which result from the picking request are optimized by the external system, that is, the external system determines the sequence in which the individual pallets are removed from stock. If there are several pick points, the external system also assigns the individual picking procedures or pallets to the individual pick points. An optimum pick point assignment can only be made by the external system since the

Fully-automatic Warehouse: Scenario 3

extent to which the warehouse systems resources are utilized plays an extremely important role in this situation as well. Picking takes place at the pick point. The goods and quantity to be picked are displayed by the external system on the screen of the pick point. Picking is confirmed and the differences recorded if any deviations occur. The picking procedure is reported to the WM system via the standard IDoc WMTCID01; the individual pallets (storage units) are reported. The data for this, with any differences that occurred, must be structured in the same way as this IDoc on the external system side and sent to the SAP system so that storage unit withdrawal and thus all of the transfer order items relevant to the storage unit can be confirmed in the SAP system.

All pallets that were not emptied as a result of withdrawal must be returned to stock. The pallets are transferred to the pick point. A new pallet type and corresponding storage bin are determined by checking the contours. The pallet is placed into stock and reported to the WM system with the standard IDoc WMSUID01 as in a normal stock placement procedure.

Blocking storage bins

It is often the case in automatic warehouses that certain storage bins cannot be approached. Either it is not possible for the conveyors to negotiate certain conveyor routes or certain storage bins can no longer be reached by the warehouse systems. Since the storage bins are managed in the WM system, these storage bins must also be blocked as soon as possible in the WM system so that no further goods movements can be generated for these storage bins. The individual storage bins are blocked with the standard IDoc WMBBID01. The individual storage bins or entire aisles must be sent to the WM system by the external system in the same format as this IDoc. If the blocked storage bins are to be unblocked, the storage bins or aisles in question must be transferred to the WM system by the external system with IDocs which are structured in the same way.

Fully-automatic Warehouse - BLACK BOX: Scenario 4

Fully-automatic Warehouse - BLACK BOX: Scenario 4

Purpose

The external system is to perform all warehouse functions and assume responsibility for warehouse management and warehouse control for a specific warehouse.

Scenarios 3, 4 and 5 must be considered in conjunction with an automatic warehouse. This section describes the fourth scenario. You should consider all three scenarios if, in a concrete situation, a decision regarding the use of the WM system in an automatic warehouse is to be made.

In a warehouse complex with many different warehouses (these are different storage types from the point of view of SAP), different storage techniques can be used in the individual warehouses. A warehouse with several manual storage types and one or more automatic storage types would be possible. The automatic storage type is highly automated and very complex with regard to its structure and the storage technique used. Management of this storage type is linked directly to warehouse control, that is, in order to define a goods movement, information on the current status of the warehouse systems is required. A large number of individual communication processes between the WM system and external system would have to be expected in this case. This communication is also very time-critical, i.e. certain events in the warehouse control unit would require an immediate response from the warehouse management system. The asynchronous interface, which is currently used for communication between the WM system and external system, is thus not suitable for such a dynamic warehouse. A system which can handle all aspects of warehouse management and control in one software package would be far more effective for managing this storage type.

Since the automatic storage type only represents part of the warehouse complex and most of the warehouses are managed manually, the WM system can be used for the entire warehouse complex. The WM system manages the entire warehouse complex and distributes the individual stock placement and removal procedures amongst the individual storage types. In manual warehouses, all aspects of warehouse management are controlled by the WM system. The automatic warehouse is regarded as a 'black box' by the WM system, i.e. the WM system does not recognize any storage bin stock in the warehouse.

Process Flow

In this scenario, the following functions are performed by the WM system for the automatic warehouse:

- Management of summarized stock for each material
- Initiation and generation of goods movements

The external system assumes full responsibility for warehouse management and warehouse control within this storage type. This includes:

- Determining the storage bins for the individual movements
- Generating goods movements within the storage type
- Inventory taking
- Controlling the conveyors
- Controlling the material flow

Fully-automatic Warehouse - BLACK BOX: Scenario 4

- Optimizing resources

The automatic warehouse is defined in the WM system as a specific storage type. There are several different ways in which the storage type can be managed by the WM system:

1. The storage type is defined with a fixed storage bin (similar to an interim storage area) and all stock is managed in this storage bin
2. Several storage bins are defined in the storage type which do not, however, correspond to the physical storage bins. Additions to existing stock must be possible in the warehouse with the result that a storage bin is always occupied with one material. The stock for one specific material thus accumulates in one storage bin; a new material is always assigned to a new storage bin. This type of management can be used if you encounter problems blocking the storage bins with option 1.

The storage bin in the WM system has no significance for the external system.

A possible method for distributing the functions between the WM system and the external system for this warehouse is described in the following examples:

WM: 

- Communicates with other SAP components such as SD, MM and PP
- Initiates goods movements
- Generates transfer orders
- Sends generated transfer orders to the external system; the material identification, quantity and cause of the movement, but not the storage bin, are of significance

Interface WM to  external system

External system: 

- Determines storage bins for stock placement and stock removal
- Optimizes the material flow
- Executes the individual goods movements
- (Reports the goods movements to the WM system

Interface external system to  WM)

- Executes inventory
- Reports differences to the WM system
- Initiates and executes movements such as stock transfers within the warehouse

Interface external system to  WM

WM:

- (Reports confirmed transfer orders)
- Generates transfer orders for the reported differences

The WM system handles communication with the other SAP components for the entire warehouse complex and thus also for the automatic warehouse. When goods are received, the MM system informs the WM system of the pending stock placement. The WM system generates a transfer order with one or more items for the goods receipt. The destination of the stock placement is determined, i.e. the storage type in which the goods are to be placed into stock. If

Fully-automatic Warehouse - BLACK BOX: Scenario 4

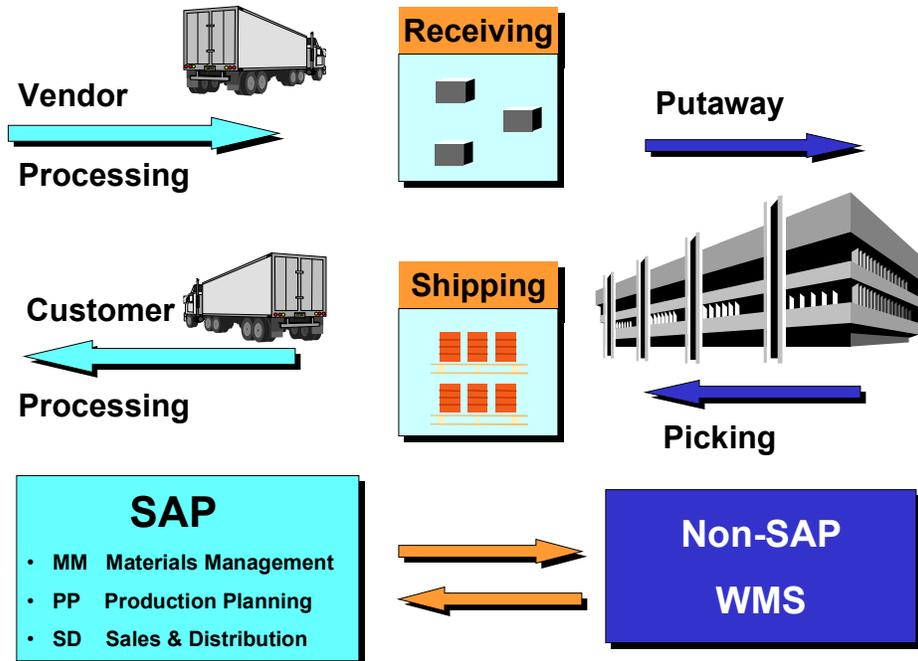
the automatic warehouse is selected for the stock placement, the transfer order items concerned are transferred to the external system with the standard IDoc WMTOID01. The stock placement procedure is then processed further by the external system. The goods to be placed into stock are identified in the external system either by means of the transfer order number and items that have been sent or the storage unit number. It is not essential for this goods movement to be reported to the WM system.

When stock is removed or picked, the scope of the procedure is determined in the WM system and one or several transfer orders are generated. A picking procedure can involve several different storage types in this case as well. All of the transfer order items which are relevant for the automatic warehouse are prepared in the WM system and transferred to the external system with the standard IDoc WMTOID01. The storage bin from which the goods are optimally removed from stock or picked is selected in the external system. If picking is carried out in the external system, the picking procedure should also be reported to the WM system. The data for this must be structured in the same way as the standard IDoc WMTCID01 on the external system side and sent to the SAP system so that the individual transfer order items with the actual quantities can be confirmed in the SAP system.

Any differences that are established in the external system, either by means of an inventory or online, must be reported to the WM system. The standard IDoc WMTOID01 must be generated in the external system for individual material differences and sent to the WM system. A transfer order is generated from the IDoc in the WM system in order to post the difference from the warehouse in an interim record for differences.

The movements within the warehouse do not need to be sent to the WM system as only the summarized stock is managed in here.

Interface to an External WM System: Scenario 5



Purpose

The external system is to assume full responsibility for storage functions as well as warehouse management and warehouse control for an entire warehouse.

Scenarios 3, 4 and 5 must be considered in conjunction with an automatic warehouse. This section describes the fifth scenario. You should consider all three scenarios if, in a concrete situation, a decision regarding the use of the WM system in an automatic warehouse is to be made.

When a WM system is used, communication takes place between the SAP-WM system and the external system, i.e. an interface between Materials Management (MM), Sales and Distribution (SD) or Production Planning (PP) and the external system is not necessary in this case for any of the warehouse processes since it is always the WM system that is activated first. There are, however, warehouses for which the use of an external warehouse management system (not SAP-WM) would, in fact be appropriate. The following reasons can be cited for implementing an external warehouse management system:

- The warehouse is fully automatic with highly complex storage techniques, i.e. based on a warehouse like the one in scenario 4; there are, however, no longer any warehouses that can be managed using conventional methods. As described in scenario 4, the WM system should not normally be used in a highly automated warehouse.
- The functionality of the WM system is far from capable of managing the warehouse. The outlay for adapting standards to the requirements of the warehouse is too high.

Interface to an External WM System: Scenario 5

- The customer uses the SAP system in a storage section which is already being run by means of warehouse management software. This warehouse management system should be retained by all means.

The SAP system does not currently feature a standard interface for connecting the individual components MM, SD and PP to an external warehouse management system. The task of interfacing an external WMS system is left, therefore, left entirely to the customer; for example, in a project with the supplier of this system. A number of standard SAP objects can be used here:

Inventory Management (IM):

- IM - external WMS:
A user exit 'MB_CF001' can be activated in the Inventory Management module when a material document is posted. This user exit can be used to format and send the necessary data for the external WMS in accordance with individual customer requirements. The standard IDoc WMMBID01 can be used for this. Sample coding is available in the documentation of the user exit as of Release 3.0C.
- External WMS - IM:
The goods movements in an external WMS are reported to the IM system via the standard IDoc WMMBID01 as with the mobile data entry interface.

Production Planning (PP):

In the production planning component, there is a user exit for production requests as of Release 3.0C. You can call this up using Transaction /nCMOD for development class CO.

As of Release 3.0D, SAP provides a user exit to be able to send transfer requirements for material staging for production requests (WM-PP link) to an external system. Here, too, sample coding is provided in the documentation of the user exit.

Sales and Distribution (SD):

- SD - external WMS:
Pick requests are sent from the Sales and Distribution module to an external system with the standard IDoc SDPIOD01
- External WMS - SD:
The picking procedure is reported by the external system to the Sales and Distribution module via the standard IDoc SDPIID01.
The shipping units are reported by the external system to the Sales and Distribution module via the standard IDoc SDPAID01.

WM Interface to Non-warehouse Systems

The WM system can also be interfaced to other systems (non-warehouse systems). In this scenario these are usually systems which send requests regarding goods movements to the WM system. Goods receipt announcements or goods issue requirements are sent. The following systems are affected by this interface:

- External picking or shipping systems
- External production planning and control systems
- External materials management systems

The requests or announcements received by the WM system are generated as transfer requirements. These can be converted to transfer orders in various different ways in the WM system. This interface currently only supports the path from the external system to the WM system. It is not possible to report requests in the standard system once the warehouse transfers have been made.

The following example describes the process of sending requests for picking and preparing goods:

External system: 

- Determines the scope of picking and preparation
- Reports requests to the WM system

Interface external system  WM

WM:

- Generates transfer requirements for the reported requests
- Converts transfer requirements to transfer orders
- Executes picking or preparation

The requests must be structured in the same way as the standard IDoc WMTRID01 on the external system side and sent to the SAP system. The system determines the materials and respective quantities to be picked, the time at which this is to take place and where the picked quantities are to be transferred to. On the WM side, transfer requirements are generated from these IDocs which are then converted at some later point in time to transfer orders in the WM system.

Data Flow: Technical Descriptions

Data Flow: Technical Descriptions

This first section deals with the flow of data using the transmission and receipt of transfer orders between WM and the external systems and includes descriptions of error handling and safety mechanisms. The second section discusses the technical implementation of the interface.

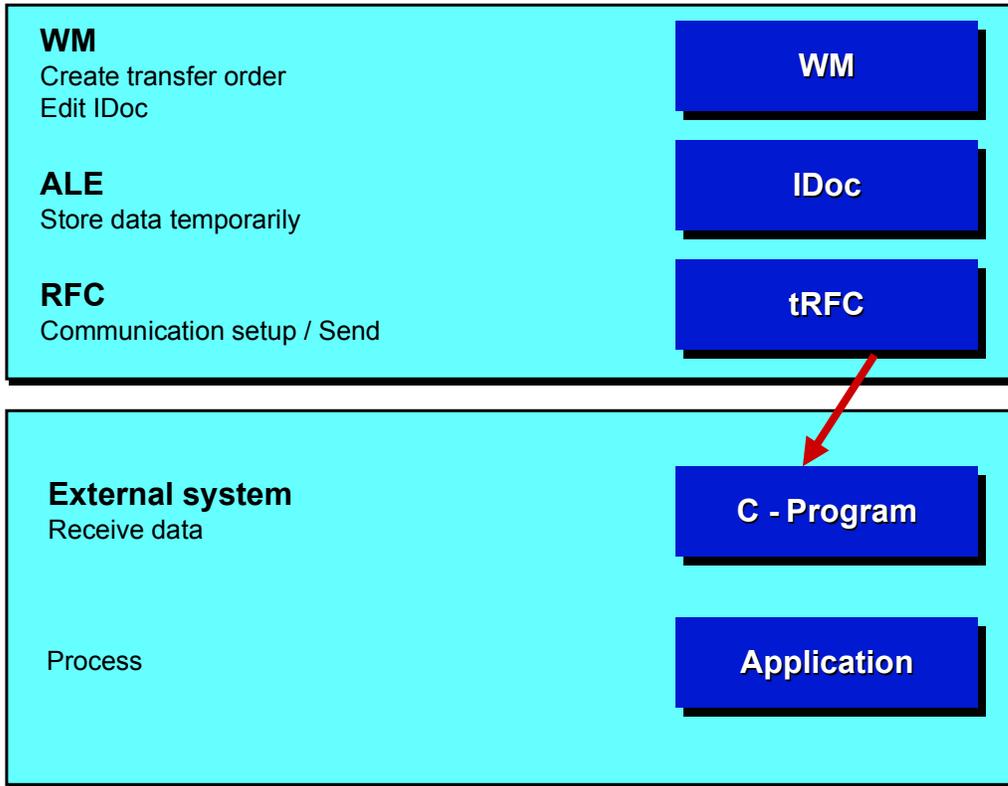
The description first of all explains how data is transferred to an external system and then how the data is received by the external system.

Data flow is described using the transmission and reception of transfer orders as an example. A transfer order forms the central medium within the warehouse management system with which materials are transferred from location A to location B. Search strategies etc. are executed in the system when the transfer order is generated.

The section which describes the various scenarios discusses how the generation of transfer orders is integrated in the interface concept from a business point of view.

Sending Transfer Orders

The following overview is a schematic representation of the transmission procedure.



Generating a Transfer Order in the WM System

Transfer orders are generated in a number of different ways in the WM system. This can be carried out manually, automatically (follow-up processing) or by means of multiple processing.

An important question that must be answered at this point is whether or not a transfer order is relevant for an external system. This can be defined on an individual basis in the Implementation Guide 'Link to external system via ALE'. A transfer order item can be activated for this interface and the recipient of this goods movement defined for a storage type or a specific movement type within a warehouse number.

Table: interface control

WhN	SrcTyp	DestTyp	MTy	CrNo	Inact	Rec.system	Variant
001	***	HRS				EXT. SYSTEM	
001	HRS	***				EXT. SYSTEM	

All transfer order items, i.e. all goods movements for the storage type HRS would be reported in the example. The data of the transfer order is formatted in the WM system and passed on internally to a function module of ALE in the appropriate IDoc format.

Sending Transfer Orders

Buffering Data

The data is formatted as repository (data dictionary) structures by the function module of the ALE layer within the same logical unit of work (LUW) process. These structures are called IDocs (intermediate documents). The generated IDocs are stored in the database.

Refer to [Description of the IDocs \[Page 61\]](#) for details on defining an IDoc and the structure of the various IDocs.

Communication and Transmission

Transmission of the IDoc is initiated by ALE asynchronously to the generation of the transfer order and the IDoc, i.e. after the IDoc has been generated. An IDoc can be sent directly or added to a package of IDocs and then sent after a delay.

The IDocs are sent by ALE using remote function calls. On the external system a Remote Shell is started which itself starts a C-program. The C-program gets as a program parameter the name of the function module which is to be executed. The technique which enables the transmission procedure to be executed correctly in accordance with the protocol is visualized on the surface as an RFC layer. On the program side, a complete library of C programs is available for processing purposes which are, however, hidden from the user.

Details regarding the generation of C programs and the system settings for the connection can be found later on in the technical documentation.

Tasks Performed by the External System

On the external system there has to exist the receiving C-program. A sample program is available here. This is supported by the RFC library which can be obtained from SAP.

The program itself must buffer the data after it has been received before confirmation of receipt is sent to R/3. The data can then be processed. We recommend that the data be buffered so that communication can take place independently of the processing logic in the external system too.

The external system should also incorporate a status management function for the received data in order to prevent the data from being processed twice. It is also necessary to be able to determine, on the external system side, whether an IDoc has already been sent once by the R/3 system. This is made possible by means of a unique transaction ID for each communication process (refer also to the technical documentation for the RFC). In addition to the transaction ID, an IDoc number can be used to determine whether an IDoc has been transferred twice. The IDoc number is only unique in a client of an SAP system. If communication takes place with several clients or several SAP systems, it is not possible to determine whether the IDoc is unique on the basis of the IDoc number alone.

Error Handling

The following problems may be encountered when an IDoc is being transmitted:

Posting procedure aborted in the application (e.g. when a TO is generated)

This is not of interest from the point of view of communication since it is not possible to generate an IDoc without a transfer order. Both postings are made in the same LUW and are thus executed synchronously.

Sending Transfer Orders**Error in the ALE layer**

1. The syntax of the data formatted in the WM system and sent to ALE is incorrect. The IDoc is indeed copied and saved by ALE but cannot be sent. Further details on this error can be found in the section [SAP System Settings and Modification Concept \[Page 115\]](#).
2. The partner profile for the output has not been defined for the recipient and message type of the IDoc in the ALE. The IDoc is buffered but cannot be sent. Further details on this error can be found in the section [SAP System Settings and Modification Concept \[Page 115\]](#).

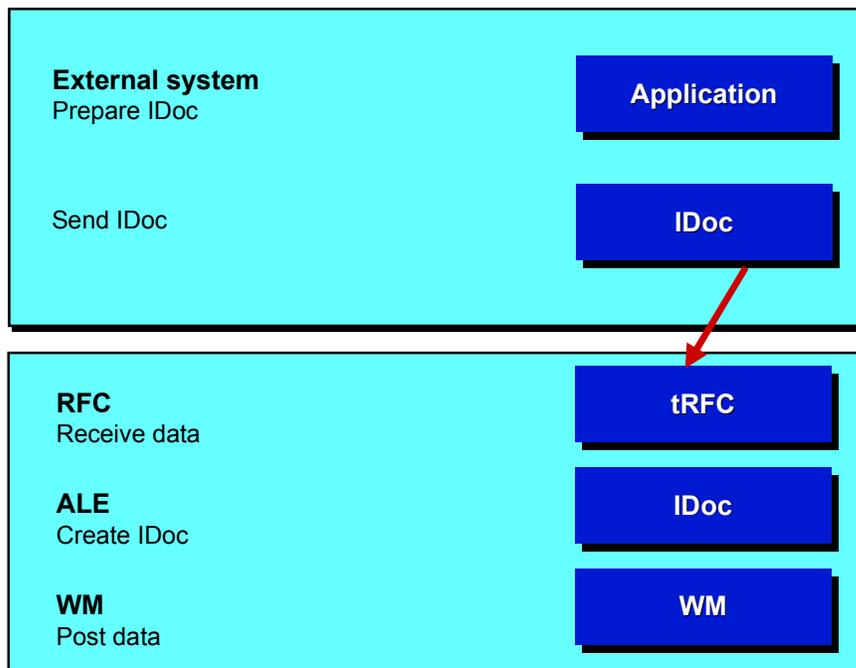
No connection

If an IDoc has been generated but the connection cannot be set up, a continuous report in the batch processor ensures that communication is initiated sporadically. Pending IDocs are sent automatically if the connection is then re-established.

Receiving Transfer Orders

Receiving Transfer Orders

The following overview illustrates how transfer orders are received.



Formatting and Sending Data

The most important task of the external system is, of course, to communicate with terminal equipment such as fork-lift control systems, control systems in general, handheld terminals for mobile data entry etc. The subject of this discussion is, however, the communication that takes place with the SAP R/3 system after the data has been generated in the external system. The tasks performed with regard to this are described below:

Buffer and prepare data in IDoc format

Refer to the appropriate documentation for details on defining the IDoc and the structure of the various IDocs.

Call a central function module in R/3 by means of a send program

You will also require the RFC library as a programming aid for the send program. The central function module is once again part of the ALE layer.

It is possible for several IDocs to be transferred in one communication process, i.e. in one R/3 function module call. There are, however, IDoc types which can only be sent individually. Explicit reference will be made to this in the descriptions of the IDocs concerned.

Update the IDocs accordingly once they have been sent

The external system must also manage the status of the data sent during the transmission procedure. The IDoc must be resent if it is not sent successfully the first time.

Receiving Transfer Orders

Double transmission of the IDocs must also be prevented on the SAP side. The transaction ID is used for this purpose. This is assigned for each communication process on the SAP side. The data which was transferred by the external system must always be sent with this transaction ID (refer also to the technical documentation for the RFC). The same transaction ID must also be used if the IDoc is resent.

The IDoc number is not used on the SAP side to check for double transmissions.

Receive and Post the Data

ALE receives the IDoc and writes it to the database. A receipt confirmation is sent back to the external system once the data has been buffered. The IDoc is then passed on to the application where it is then processed.

The application, in this case for generating the transfer order, sends one status per IDoc back to the ALE. This IDoc status forms the basis for the initiation of a possible error processing procedure.

Error Processing

The following errors can occur:

It is temporarily not possible to establish a connection.

The external system should also ensure, via status management, that reposting is possible.

Error in the ALE layer

An IDoc has been generated but it is not possible to initiate processing.

This is the same as the error that occurs during transmission from the WM system if the syntax of the IDoc received is incorrect or if the partner profile of the input for the sender and message type of this IDoc is missing. Further details on this error can be found in the section [SAP System Settings and Modification Concept \[Page 115\]](#).

Error in the application (e.g. when a transfer order is posted)

This is a logical error in the application. A message is sent to a position using the above-mentioned status in the IDoc. Several users can be assigned to a position. The users receive the error message in their respective SAP OFFICE inbox. The message disappears from the other inboxes as soon as one of the users picks it up and processes it.

Technical Implementation

Technical Implementation

This section provides you with an overview of the technical implementation of an interface.

Communication is executed through the SAP interface *Remote Function Call* (RFC).

As of Release 3.0, data can be transmitted between R/3 systems and external programs reliably and safely using the **transaction Remote Function Call** (tRFC).

The function module is executed **once** in the RFC server system. The remote system does not have to be available at the time when the RFC client program executes a tRFC. The tRFC component stores the called RFC function together with the respective data in the R/3 database under a unique transaction ID (TID).

For a detailed description of the RFC interface, refer to the documentation [Remote Communications \[Ext.\]](#).

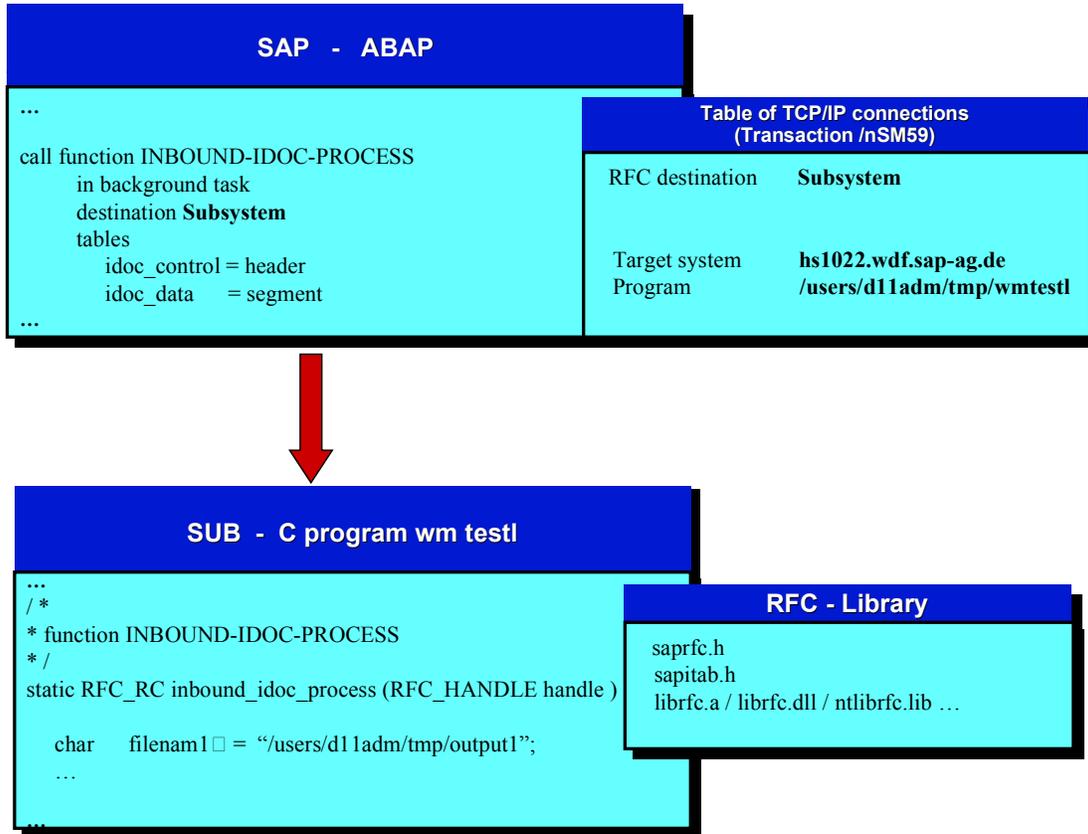
For details on the required TCP/IP settings, refer to the documentation [BC - SAP Communication: Configuration \[Ext.\]](#).

This section gives you an overview of the program techniques involved. It is not a complete description.

If you wish to set up a connection yourself, you must refer to the documentation listed above.

Sending IDocs to an External System

The following diagram illustrates the program logic.



You transmit IDocs from the R/3 System by calling one of the two following function modules with a destination:

- IDOC_INBOUND_ASYNCHRONOUS**
 You use this function module **from** release 4.0 upwards. It processes IDocs in record types that are valid for 4.x releases. Longer IDoc segment names are thus supported.
- INBOUND_IDOC_PROCESS**
 You use this function module for releases **up to** 4.0. It processes IDocs in record types that were valid for 3.x releases. For compatibility reasons, it should also be possible to use this function module in 4.x. External programs, too, should be able to support this function module.

The additional statement IN BACKGROUND TASK for the function call indicates the transaction RFC.

As with synchronous calls, the parameter DESTINATION defines the destination system and the destination program with the path (program context) in the remote system through a table in R/3.

Refer also to the ABAP test program SRFCTEST.

Sending IDocs to an External System

In the remote system, the destination program maintained in SM59 must exist. This program must also contain a function with the name of the function module call.

In R/3, the application data in the internal table is transmitted to the structure EDI_DD40 (EDI_DD before 4.0). For each IDoc, a control record of the structure EDI_DC40 (EDI_DC before 4.0) is also transmitted with the administrative data of the IDoc. In the example given, this data is transmitted in the form of internal tables.

For further information on this topic, refer to the documentation [RFC Programming in ABAP \[Ext.\]](#).

For examples of tRFC programs, refer to the documentation *RFC Software Development Kit* (RFC-SDK):

- trfctest.c (client program)
- trfcserv.c (server program)

For details on the required functions, refer to the documentation [The RFC API \[Ext.\]](#) or to the documentation of the RFC-SDK.

You can use these programs as examples for your own.

To interpret the useful data in the IDoc, you also need the data structures of the IDoc at the C program level. If you have an R/3 System available, you can **generate a header file of the IDoc** directly from the transaction WE60 (*Documentation for IDoc types*).

TCP / IP Settings

The following TCP/IP settings are required to start the communication process:

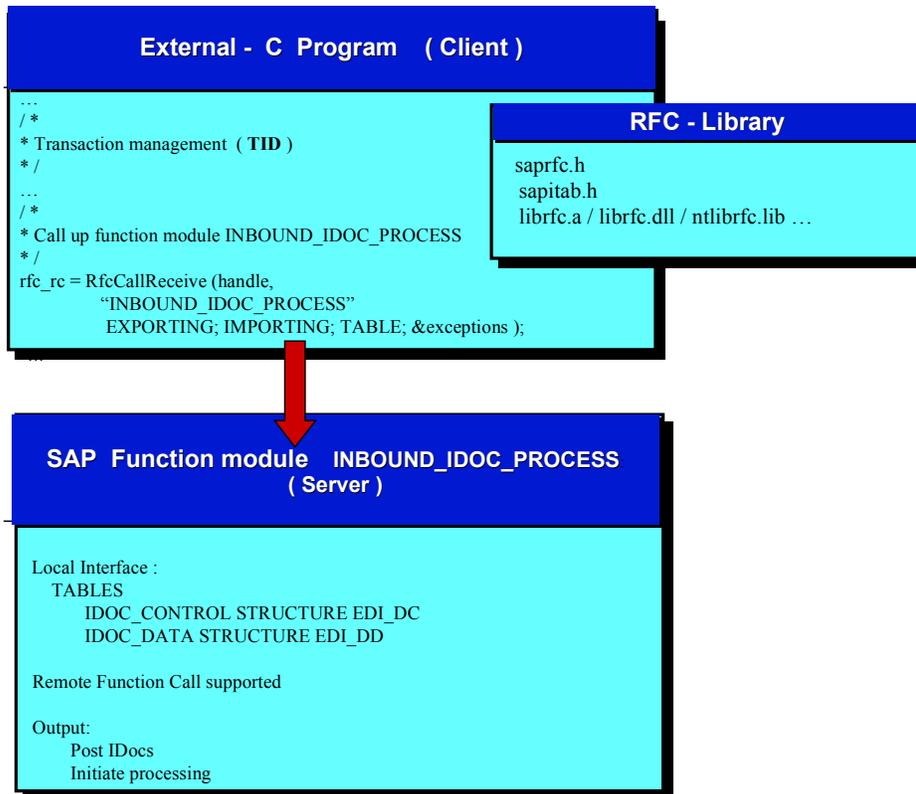
- So that the R/3 System can find the destination system, these TCP/IP prerequisites must be fulfilled, in particular the IP addresses in the respective file *hosts* must be known.
- The name of the gateway and the dispatcher must be entered in the file *services*, for example, *sapgw00* and *sapdp00*.
- In the R/3 System, Idocs are transmitted from the actual posting (update). Therefore, the TCP/IP link must also be created for the posting system.
- The SAP Gateway must have the right to start the external program (RFC server) via Remote Shell.
As of release 3.0C, you can work in register mode. In this way, the connection between the external system program and Gateway remains open (see [Registering Server Programs with the SAP Gateway \[Ext.\]](#) in *The RFC API*).

For details on the TCP/IP settings, refer to the documentation [BC - SAP Communication: Configuration \[Ext.\]](#).

Sending IDocs: External System to SAP System

Sending IDocs: External System to SAP System

The following diagram illustrates the program logic.



The calling, external program uses the following functions of the *RFC Software Development Kit* (RFC-SDK):

- **RfcOpen**

Using this call, the system sets up an RFC connection to the server system. You can define the logon to the SAP System, including the server name of the SAP destination system, SAP logon, user ID, and so on in the C program or in the file *saprfc.ini*.

As soon as the connection to the server system has been set up, you must call the two following functions for the tRFC in the client program:

- **RfcCreateTransID**

The transaction ID that was created in the server system is determined with this call.

- **RfcIndirectCall**

The RFC data, together with the TID, is transmitted to the server system with this call.

If there is an error, the client program repeats this call.

Here the system must use the old TID with the call **RfcCreateTransID**. Otherwise, it will not be guaranteed that the RFC function is executed only once in the R/3 System.

Sending IDocs: External System to SAP System

The transaction is completed after successful execution of this call. The calling program can then update its own TID administration data (for example, delete the TID entry).

For more information, refer to the documentation [The RFC API \[Ext.\]](#) or to the documentation of the RFC-SDK.

The useful data must be structured in the same way as the IDoc and placed in the internal table of the structure EDI_DD40 (EDI_DD before 4.0). The control record must be generated for each IDoc and placed in the internal table of the structure EDI_DC40 (EDI_DC before 4.0). The form in which the data is transferred is also described in detail in the documentation.

Transaction Identification Management (TID)

Transaction Identification Management (TID)

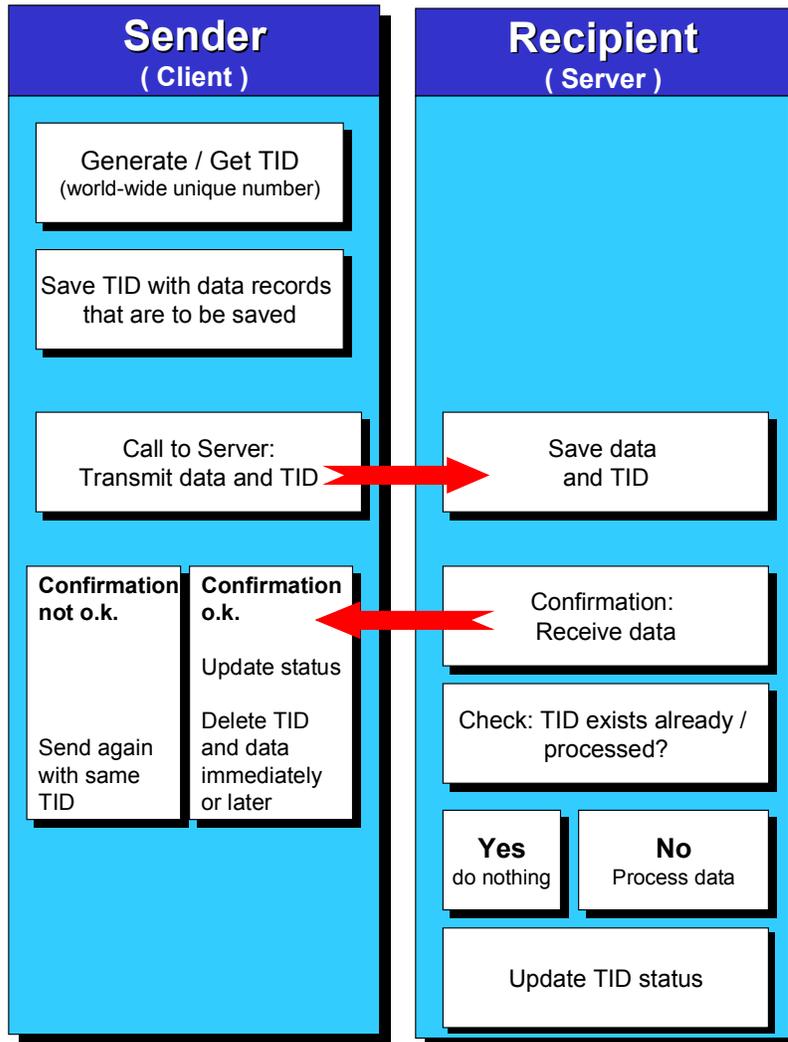
A unique code must be used for a communication process in order to guarantee the integrity of the data to be transferred. The receiving system can then use this code to decide whether this data has already been received and processed.



For example, communication may break down during data transmission when goods receipts are entered on mobile data entry devices. The person handling the data would then have to send it again to make sure that it is posted in the SAP system. If, however, the data was successfully received and processed the first time it was sent to the SAP system, the system must be able to recognize this and then not process the second data record.

This example inevitably results in the following sequence of operations between the sending and receiving system.

Transaction Identification Management (TID)



Formatting Data

Formatting Data

Use

The structures **EDI_DC** and **EDI_DD** are described in the following for the output. Since these structures are also used for EDI, they contain a number of fields which are redundant for our purposes.

The actual useful data is generally hidden in the field EDI_DD-SDATA. If, for example, you send two IDocs, transfer orders each with three items, you must send one EDI_DC record per IDoc, i.e. two EDI_DC records and eight EDI_DD records, one header segment and three position segments for each IDoc. The four segments of an IDoc are bound together via the unique number of the IDoc or intermediate document. The associated EDI_DC record is also identified via the DOCNUM.

(Rel = relevant for receiving IDocs. Not relevant = indicator does not need to be set when receiving IDocs. All data, except for TABNAM, is transferred when IDocs are sent to the external system)

EDI_DD

Field	Format	Designation	Rel	Comment
TABNAM	CHAR 10	Name of table structure		Not relevant
MANDT	CLNT 3	Client		Not relevant; is transferred, however, to the external system
DOCNUM	CHAR 16	Intermediate Document number	X	Unique communication number
SEGNUM	CHAR 6	Number of the SAP segment		Consecutive numbering of IDoc segments; is transferred to the external system but is not required when the IDoc is received
SEGNAME	CHAR 10	Name of SAP segment	X	IDoc-Segmentname
PSGNUM	CHAR 6	Number of the higher-level SAP segment		Is transferred to the external system but is not mandatory for receipt of IDoc
HLEVEL	CHAR 2	Hierarchy level of SAP segment		Is transferred to the external system but is not mandatory for receipt of IDoc
DTINT2	CHAR 2	Blank field for EDI_DD		Not relevant
SDATA	LCHR 1000	Application data	X	Actual useful data in form of IDoc segments

EDI_DC

Formatting Data

Field	Format	Designation	Rel	Comment
TABNAM	CHAR 10	Name of table structure		
MANDT	CLNT 3	Client		
DOCNUM	CHAR 16	Intermediate Document number	X	Unique communication number.
DOCREL	CHAR 4	SAP Release of Intermediate Document		Is transferred to the external system but is not required for receipt of IDoc
STATUS	CHAR 2	Status of Intermediate Document		
DOCTYP	CHAR 8	Intermediate Document type		Recommended like IDocTYP
DIRECT	CHAR 1	Direction		
RCVPOR	CHAR 10	Receiver port (SAP System, EDI external system)		Not relevant
RCVPRT	CHAR 2	Partner type of receiver	X	Value: "LS"
RCVPRN	CHAR 10	Partner number of receiver	X	For example: "WM_SUB_001" für SAP to SUB
RCVSA D	CHAR 21	EDI: SADR fields in total		
RCVLAD	CHAR 70	Logical address of receiver		
STD	CHAR 1	EDI standard		
STDVRS	CHAR 6	Version of EDI standard		
STDME S	CHAR 6	EDI message type		
MESCOD	CHAR 3	Logical message variant	*	See text below
MESFCT	CHAR 3	Logical message function	*	See text below
OUTMOD	CHAR 1	Output mode		
TEST	CHAR 1	Test option		
SNDPOR	CHAR 10	Sender port (SAP System, EDI external system)		Not relevant
SNDPRT	CHAR 2	Partner type of sender	X	Value: "LS"

Formatting Data

SNDP RN	CHAR 10	Partner number of sender	X	For example: "S11MAND000" if S11 is the sending SAP-system
SNDSAD	CHAR 21	EDI: SADR fields in total		
SNDLAD	CHAR 70	Logical address of sender		
REFINT	CHAR 14	Reference to interchange file		
REFGRP	CHAR 14	Reference to message group		
REFMES	CHAR 14	Reference to message		
ARCKEY	CHAR 70	EDI archive key		
CREDIT	DATS D 8	Date IDoc was created		
CRETIM	TIMS T 6	Time IDoc was created		
MESTYP	CHAR 6	Logical message type	X	For example, WMTORD for transfer orders
IDocTYP	CHAR 8	Name of basic IDoc type	X	For example, WMTOID01 for TOs
CIMTYP	CHAR 8	Name of IDoc type extension		
RCVPC	CHAR 2	Partner function of receiver		
SNDPC	CHAR 2	Partner function of sender		
SERIAL	CHAR 20	EDI/ALE: Serialization field		
EXPRSS	CHAR 1	Overriding in inbound processing		

* Both fields can be used to incorporate a different module to the standard function module in the ALE service layer in the table of the input methods in order to process the IDoc.

Not all of the fields have to be filled. But you have to **initialize the whole structure** before filling them and sending the IDoc to SAP.

If you want to send an IDoc from an external system to SAP, you will have to define a **logical system for the sender(/nSALE->Distribution model->Logical systems)**. Then you will have to define partner profile for this partner number. It is not mandatory to specify the Receiving partner

Formatting Data

(RCVPRN) but we recommend it in order to be able to follow the data flow in SAP. The **logical system in SAP is defined per client in table T000**.

When the IDoc is created in the R/3 system with the transaction /nWE30, three structures are automatically created for each IDoc segment which are also numbered consecutively, e.g. for the transfer order items E1LTORI, E2LTORI and E3LTORI. E1LTORI is release-neutral, E2LTORI release-dependent and E3LTORI is used for documentation purposes.

When segment names are transferred, you must specify E2 segment names so that these are independent of the SAP release.

In the transfer order example above, (two TOs, each with three items), two internal tables with the following structure would be transferred:

EDI_DD

9000000000123456	E2LTORH	00112345678905011E	... (TO header data)
9000000000123456	E2LTORI	0001FRASCATI	... (Item)
9000000000123456	E2LTORI	0002BORDEAUX	... (Item)
9000000000123456	E2LTORI	0003CHIANTI	... (Item)
9000000000123457	E2LTORH	00112345678912011A	... (TO header data)
9000000000123457	E2LTORI	0001CHATEAU-NEUF	... (Item)
9000000000123457	E2LTOR	0002BORDEAUX	... (Item)
9000000000123457	E2LTORI	0003SOAVE	... (Item)

EDI_DC

9000000000123456	L S	S11MAND00 2	L S	EXT. SYSTE M	WMTOR D	WMTOID0 1
9000000000123457	L S	S11MAND00 2	L S	EXT. SYSTE M	WMTOR D	WMTOID0 1

Data Transfer Format

Data Transfer Format

Data is only passed on via the interface in CHAR format. Conversions with the associated standardizations are thus carried out to CHAR formats in the SAP system for the input fields. The following table contains the anticipated inputs for the cases which are of greatest interest.

Field	Format	Designation
MATNR	18	'000000000012345678' numeric with leading zeros
	18	'Bordeaux_____ ' if string
LENUM	20	'00000000001234567891' if 10-digit SU numbers are used in the SAP system
DATUM	8	YYYYMMDD e.g.: 19951231
UZEIT	6	HHMMSS
Quantity fields in general	15	13 digits, 1 dec. point and 1 sign, left-justified. For example '302.35_____' or '302.35-_____'

Description of the IDocs

The standard IDocs that are supplied with Releases 3.0a and 4.0a are described here. The following table provides you with an overview of the IDoc designations:

<u>IDoc</u>	<u>I/O</u>	<u>Message type</u>	<u>Appl.</u>	<u>Segments</u>	<u>Description</u>	<u>Comp</u>
WMMBID01	I	WMMBXY	IM	E2MBXYH E2MBXYI	Goods movement	MOB
SDPIOD01	O	PICKSD	SD	E2VPPIH E2VPPII	Transmission of picking data to an external system	MOB
SDPIID01	I	SDPICK	SD	E2VPDLH E2VPDLI	Verification of picking unit	MOB
SDPAID01	I	SDPACK	SD	E2VPACD E2VPACH E2VPPACI	Verification of shipping unit	MOB
WMTOID01	B	WMTORD	WM	E2LTORH E2LTORI	Transfer orders	LSR
WMTCID01	I	WMTOCO	WM	E2LTCOX E2LTCOH E2LTCOI	Confirmation of transfer orders	LSR
WMCAID01	B	WMCATO	WM	E2LTCAH E2LTCAI	Cancellation request TO/ Cancel TO	LSR
WMTRID01	I	WMTREQ	WM	E2LTRQH E2LTRQI	Create transfer requirements	LSR
WMBIID01	I	WMBBIN	WM	E2LBINH E2LBINI	Block storage bins	LSR
WMRRID01	O	WMRREF	WM	E2LRRFX	Release of reference numbers	LSR
WMSUID01	I	WMSUMO	WM	E2LSUMX	Move storage unit	LSR
WMIVID01	I	WMINVE	WM	E2LINVX	Inventory count data and data entry	LSR
WMINID01	I	WMINFO	WM	E2LINFx	Information text	LSR
WMTCID02	I	WMTOCO	WM	E2LTCOX, 2LTCOG, E2LTCOH, E2LTCOI	Confirm transfer orders	LSR

Description of the IDocs

WMMBID02	I	WMMBXY	IM	E2MBXYH, E2MBXYI, E2MBXYJ	Goods Movements	MOB
----------	---	--------	----	---------------------------------	--------------------	-----

I = input (i.e. received by SAP system)

O = output (to external system)

B = can be used bidirectionally

SD = Sales and Distribution

IM = Inventory Management

WM = Warehouse Management

The column "Comp." for component indicates the assignment for the respective interface component.

Many segments of the interface IDocs have received segment expansions for Release 4.0. These are upwards compatible as far as the release status of the IDocs is explicitly defined as in the partner agreement. If you intend to continue working with the 3.0 segment definitions for data transfers to/from the external system, you need to also include the release status 3.0a in the partner agreement.

The IDocs WMTCID02 and WMMBID02 are assigned to the same message type. If you want to work with these IDocs, you need to simply replace the old IDoc names with the new ones in the partner agreement. Additionally, the segment E2LTCOH was changed when confirming IDocs; this means, you need to also append the release status in the partner agreement: 3.0a for the "old" version and 4.0a for the new segment.

Goods Movements

Use

This section describes the IDoc **WMMBID01** (WMMBID02 from Release 4.0) and a matrix of the required fields for various movement types with which postings are performed in the SAP Inventory Management module. The IDoc WMMBID01 comprises two segments, namely **E2MBXYH** for the header data and **E2MBXYI** for the item data and additionally E2MBXYJ for new fields in Release 4.0.

The partner profile input must be maintained for the message type **WMMBXY**.

This IDoc can, in principle, be used to post all good movements that can also be executed online using the usual standard transactions (MB01, MB1A, MB1B, MB1C, MB31). The respective posting can be made directly in the system in order to determine which fields of the IDoc are required fields. These fields can then be noted. The matrix below details the most important movements (M = required field).

Required Field Table - Goods Movements (M = required field)

Fields	MvT	MvT	MvT	MvT	MvT	MvT	MvT
	101	101	102	201	321	501	301
E2MBXYH-BLDAT	M	M	M	M	M	M	M
E2MBXYH-BUDAT	M	M	M	M	M	M	M
E2MBXYH-TCODE	MB31	MB01	MB01	MB1A	MB1B	MB1C	MB1B
E2MBXYI-WERKS	M	M	M	M	M	M	M
E2MBXYI-LGORT	M	M	M	M	M	M	M
E2MBXYI-MATNR	M			M	M	M	M
E2MBXYI-BWART	M	M	M	M	M	M	M
E2MBXYI-INSMK		M	M				
E2MBXYI-EBELN		M	M				
E2MBXYI-EBELP							
E2MBXYI-ERFMG	M	M	M	M	M	M	M
E2MBXYI-ERFME	M	M	M	M	M	M	M
E2MBXYI-VFDAT							
E2MBXYI-KZBEW	M 'F'	M 'B'	M 'B'				
E2MBXYI-KOSTL				M			
E2MBXYI-UMWRK							M
E2MBXYI-UMLGO							M
E2MBXYI-AUFNR	M						
E2MBXYI-AUFPS	M						

Description of the IDocs

Legend Movement types

Movement type	Transaction code	Designation
101	MB01	Goods receipt for purchase order
101	MB31	Goods receipt for production order
102	MB01	Goods receipt for purchase order - Reversal
201	MB11	Consumption for cost center
321	MB11	Transfer posting quality inspection to unrestricted
501	MB11	Receipt w/o purchase order
301	MB11	Transfer posting plant to plant
...		See also Customizing Inventory management

Notes

1. In order to post goods receipts for an order to quality control, you must also specify the field E2MBXYI-INSMK = 'X'. Use the movement type 101.
2. 'B' must be entered for the indicator KZBEW for a goods receipt for an order and 'F' for goods receipts for a production order.
3. If the expiration date of the material is to be checked, the field E2MBXYI-VFDAT must also be specified.
4. Reverse postings usually require the same required fields and differ therefore from the original posting only with respect to the movement type.
5. The report RLMBXY00 is available for testing purposes. Refer also to the appropriate report documentation.
6. When the records are being processed, a number of error messages will cause the program to be terminated abnormally. These error messages can, however, be converted to non-interfering warning messages in the table T160M. Examples of these messages include 'Shortfall below & amounting to &&' or similar. 'Real' errors are intercepted by means of logical error handling (see [SAP System Settings and Modification Concept \[Page 115\]](#)).
7. You should remember that it is not possible to send several IDocs simultaneously. In many cases you can, however, specify any number of items for the IDoc header, i.e. send a large IDoc.

The segments of the IDoc WMMBID01 are described in the following tables.

E2MBXYH

Fields	Format	Designation	Req.	Sample value
BLDAT	DatC 8	Document date in document	X	19951231
BUDAT	DatC 8	Posting data in document	X	19951231
XBLNR	CHAR 16	Reference document number		

Description of the IDocs

BKTX	CHAR 25	Document header text		
FRBNR	CHAR 16	Number of bill of lading at time of goods receipt		
XABLN	CHAR 10	GR/GI slip number		
TCODE	CHAR 4	Session: Current transaction code	X	MB11
USNAM	CHAR 12	User name (Release 4.0)		
VBUND	CHAR 6	Society number (Release 4.0)		

E2MBXYI

Fields	Format	Designation	Req.	Sample value
BEAKZ	CHAR 1	Indicator: line already edited		
XSTOB	CHAR 1	Flag: Reverse posting		
MATNR	CHAR 18	Material number	X	00000000102345
WERKS	CHAR 4	Plant	X	0001
LGORT	CHAR 4	Storage location	X	0087
CHARG	CHAR 10	Batch number		
BWART	CHAR 3	Movement type (inventory management)	X	501
INSMK	CHAR 1	Stock type		
SOBKZ	CHAR 1	Special stock indicator		
KZVBR	CHAR 1	Indicator: consumption posting		
LIFNR	CHAR 10	Vendor account number		
KUNNR	CHAR 10	Customer number		
KDAUF	CHAR 10	Sales order number		
KDPOS	CHAR 6	Item number in customer order		
KDEIN	CHAR 4	Scheduling of customer order		
SHKZG	CHAR 1	Debit/credit indicator		
WAERS	CHAR 5	Currency key		
DMBTR	CHAR 15	Amount in local currency		
BWTAR	CHAR 10	Valuation type		
ERFMG	CHAR 15	Quantity in unit of entry		
ERFME	CHAR 3	Unit of entry		
BPMNG	CHAR 15	Quantity in order price quantity unit		
BPRME	CHAR 3	Order price quantity unit		

Description of the IDocs

EBELN	CHAR 10	Purchasing document number		
EBELP	CHAR 5	Item number of purchasing document		
ELIKZ	CHAR 1	"Delivery completed" indicator		
SGTXT	CHAR 50	Line item text		
WEMPF	CHAR 12	Goods recipient		
ABLAD	CHAR 25	Unloading point		
KOSTL	CHAR 10	Cost center		
AUFNR	CHAR 12	Order number		
ANLN1	CHAR 12	Asset main number		
ANLN2	CHAR 4	Asset sub-number		
RSNUM	CHAR 10	Number of reservation / dependent requirements		
RSPOS	CHAR 4	Item number of reservation / dependent requirements		
KZEAR	CHAR 1	Indicator: final issue for this reservation		
UMMAT	CHAR 18	Receiving/issuing material		
UMWRK	CHAR 4	Receiving plant/issuing plant		
UMLGO	CHAR 4	Receiving/issuing storage location		
UMCHA	CHAR 10	Receiving/issuing batch		
KZBEW	CHAR 1	Movement indicator		
WEUNB	CHAR 1	Indicator: goods receipt non-valuated		
LGNUM	CHAR 3	Warehouse number		
LGTYP	CHAR 3	Storage type		
LGPLA	CHAR 10	Storage bin		
GRUND	CHAR 4	Indicator: Reason for goods transaction		
EVERS	CHAR 2	Shipping instructions		
EVERE	CHAR 2	Compliance with shipping instructions		
IMKEY	CHAR 8	Internal key for real estate object		
KSTRG	CHAR 12	Cost object		
PAOBJNR	CHAR 10	Number for business segment (CO-PA)		
PRCTR	CHAR 10	Profit center		
PS_PSP_PNR	CHAR 8	Project structure plan element (PSP element)		

Description of the IDocs

NPLNR	CHAR 12	Network number for account assignment		
AUFPL	CHAR 10	Planning number for transactions in the order		
APLZL	CHAR 8	Counter for distinguishing DB entries		
AUFPS	CHAR 4	Number of order item		
VPTNR	CHAR 10	Partner account number		
FIPOS	CHAR 14	Commitment item		
GSBER	CHAR 4	Business area		
BSTMG	CHAR 15	Goods receipt quantity in order unit t		
BSTME	CHAR 3	Order unit		
EXBWR	CHAR 15	Posting amount in local currency entered externally		
KONTO	CHAR 10	G/L account number		
RSHKZ	CHAR 1	Debit/credit indicator		
BDMNG	CHAR 15	Requirement quantity		
ENMNG	CHAR 15	Issued quantity		
QPLOS	CHAR 12	Inspection lot number		
UMZST	CHAR 1	Status of receiving batch		
UMZUS	CHAR 1	Status key of transfer batch		
UMBAR	CHAR 10	Valuation type of transfer batch		
UMSOK	CHAR 1	Special stock indicator for physical stock transfer		
LFBJA	CHAR 4	Fiscal year of a reference document		
LFBNR	CHAR 10	Document number of a reference document		
LFPOS	CHAR 4	Item in a reference document		
SJAHR	CHAR 4	Material document year		
SMBLN	CHAR 10	Number of a material document		
SMBLP	CHAR 4	Item in material document		
EXVKW	CHAR 15	Sales value specified externally in local currency		
QM_ZUS TD	CHAR 1	Batch status with status changed in QM (internal)		
POSNR	CHAR 6	Delivery item for link to ext. system		
VBELN	CHAR 10	Delivery		

Description of the IDocs

QM_UMZ ST	CHAR 1	Status of received batch when status changed in QM (intern.)		
BWLVS	CHAR 3	Movement type for WM		
UMREZ	CHAR 5	Numerator for converting to base unit of measure		
UMREN	CHAR 5	Denominator for conversion to base unit of measure		
VFDAT	CHAR 8	Expiration date or best-before date		

E2MBXYJ

Fields	Format	Designation
PARGB	CHAR 4	Business section of business partner
PARBU	CHAR 4	Clearing company code
CLASS	CHAR 18	Class number
UMCLA	CHAR 18	Class number
XCLAS	CHAR 1	Selection field
UMXCL	CHAR 1	Selection field
XNIBU	CHAR 1	Selection field
BDTER	CHAR 8	Date components are required
TBBEL	CHAR 10	Material document number of the transfer requirement to be cancelled
TBBPO	CHAR 4	Material document number of the transfer requirement item to be cancelled
TBBJR	CHAR 4	Material document year of the transfer requirement to be cancelled
OBJNR	CHAR 22	Object number
AUTYP	CHAR 2	Order type
QPLOA	CHAR 12	Inspection lot from which usage decision was made
TBPKZ	CHAR 1	Indicator: Do not create transfer requirement
TAFKZ	CHAR 1	Indicator: Do not initiate automatic TO creation
KZEAR_OLD	CHAR 1	Indicator: Final issue of the reservation
RSART	CHAR 1	Record type
PPRCTR	CHAR 10	Partner-Profit Center
XMEVO	CHAR 1	Indicator: Propose quantity
UMLGT	CHAR 3	Storage type
UMLGP	CHAR 10	Storage bin

Description of the IDocs

MENGE	CHAR 15	Quantity
MEINS	CHAR 3	Base unit of measure
FKBER	CHAR 4	Functional area
MHDAT	CHAR 8	Expiration date / Shelf life expiration date or date of manufacture
BSSKZ	CHAR 1	WM special movement indicator
EXIDV	CHAR 20	External shipping unit identification
BERKZ	CHAR 1	Staging indicator for production supply
PRVBE	CHAR 10	Production supply area
KZECH	CHAR 1	Control of batch entry in production order or process order
UPTYP	CHAR 1	Sub-item type purchasing document
REFIX	CHAR 11	Field defined the same as SY-TABIX
VLIEF_AVIS	CHAR 10	Delivery
VBELP_AVIS	CHAR 6	Delivery item
XWAIT	CHAR 1	Selection field
XNOEQ	CHAR 1	Selection field
ILINR	CHAR 6	Add stock movement from external system: Item ++
VOLUM	CHAR 17	Volume
VOLEH	CHAR 3	Volume unit
ANZL1	CHAR 4	Number of storage units to be putaway
ANZL2	CHAR 4	Number of storage units to be putaway
LMEN1	CHAR 15	Quantity per storage unit that is to be putaway in alternate unit of measure
LMEN2	CHAR 15	Quantity per storage unit that is to be putaway in alternate unit of measure
LETY1	CHAR 3	Storage unit type
LETY2	CHAR 3	Storage unit type
KZKUB	CHAR 1	Indicator: Create no posting change notice
UBTYP	CHAR 3	Storage type
UBLGP	CHAR 10	Storage bin
MBLNR	CHAR 10	Number of material document
MBLPO	CHAR 4	Item in material document
MJAHR	CHAR 4	Material document year
URZEI	CHAR 4	Original line in material document
GEBER	CHAR 10	(mutual) funds

Description of the IDocs

FISTL	CHAR 16	Funds center
KZBWS	CHAR 1	Indicator: Special stock evaluation
KDAUF_SD	CHAR 10	Sales order number
KDPOS_SD	CHAR 6	Item number in sales order

L_PO_READ_MDE

In the scenario "Goods receipt for purchase order" you can download the purchase order data for the purchase order number to the external system before you enter the goods receipt data with the hand-held terminal. You use the function module L_PO_READ to download the data.

The L_PO_READ_MDE is a sample function module in SAP for this type of link. If you have the need for information procurement in other areas, you can use a synchronous RFC to existing function modules or function modules to be created for these areas also. The synchronous RFC should only be used for procurement of information. If data is to be posted to the partner system, this should be executed using an IDoc and transactional RFC.

You can display the parameters of the function module L_PO_READ_MDE using the editor /nSE37 in SAP. Also using /nSE37, you can generate from SAP C or Visual Basic-Coding. After compiling is completed, this coding can call up the SAP function module, that is, the client that you can include in your program is generated.

Verification of Shipping Unit Data

The IDOC **SDPAID01** is used to verify the packaging in the delivery document.

It comprises three segments, namely **E2VPACD** (delivery reference), **E2VPACD** (header data for shipping element) and **E2VPACI** (item data).

You must maintain the partner profile input for the message type **SDPACK**. The segments and their possible applications are described in the following.

E2VPACD

Fields	Format	Designation	Req.	Comments
VBELN	CHAR 10	Delivery	X	Establishes a reference to the delivery

E2VPACH

Fields	Format	Designation	Req.	Comments
EXIDV	CHAR 20	External shipping unit ID	X	
EXIDA	CHAR 1	Type of external shipment ID		
VSTEL	CHAR 4	Shipping point		
LSTEL	CHAR 2	Loading point		
BRGEW	CHAR 15	Total weight		Unit GEWEI_MAX
NTGEW	CHAR 15	Loading weight		Unit GEWEI_MAX
MAGEW	CHAR 15	Allowed weight		Unit GEWEI_MAX
TARAG	CHAR 15	Tare weight		Unit GEWEI
GEWEI	CHAR 3	Unit of weight		
BTVOL	CHAR 15	Total volume		Unit VOLEH_MAX
NTVOL	CHAR 15	Loading volume		Unit VOLEH_MAX
MAVOL	CHAR 15	Allowed volume		Unit VOLEH_MAX
TAVOL	CHAR 15	Tare volume		Unit VOLEH
VOLEH	CHAR 3	Volume unit		
ANZGL	CHAR 5	R/2 table		Function currently not implemented

Verification of Shipping Unit Data

ERNAM	CHAR 12	Name of the user who created the object		
ERDAT	DATS D 8	Date on which the record was created		
ERUHR	TIMS T 6	Entry time		
AENAM	CHAR 12	Name of user who changed record		Function currently not implemented
AEDAT	DATS D 8	Changed on		Function currently not implemented
AEZET	TIMS T 6	Time last change was made		Function currently not implemented
SORTL	CHAR 10	Sort field		
VEGR1	CHAR 5	Shipping unit group 1		Spare for customer
VEGR2	CHAR 5	Shipping unit group 2		Spare for customer
VEGR3	CHAR 5	Shipping unit group 3		Spare for customer
VEGR4	CHAR 5	Shipping unit group 4		Spare for customer
VEGR5	CHAR 5	Shipping unit group 5		Spare for customer
VHILM	CHAR 18	Shipping material	X	Material number of shipping material
LAENG	CHAR 13	Character field 13 digits		Function currently not implemented
BREIT	CHAR 13	Character field 13 digits		Function currently not implemented
HOEHE	CHAR 13	Character field 13 digits		Function currently not implemented
MEABM	CHAR 3	Field length of 3 bytes		Function currently not implemented
ERLKZ	CHAR 1	Status (at this time without functionality)		Function currently not implemented
GEWTO	CHAR 3	Weight tolerance		Function currently not implemented
VOLTO	CHAR 3	Volume tolerance		Function currently not implemented
MEINS	CHAR 3	Unit of measure		Function currently not implemented
VOLEH_MAX	CHAR 3	Volume unit		
GEWEI_MAX	CHAR 3	Unit of weight		

Verification of Shipping Unit Data

INHALT	CHAR 40	Description of shipping unit content		Text field, freely definable
WERKS	CHAR 4	Plant		see note
PSTYV	CHAR 4	SD document item category		see note
LADLG	CHAR 6	Loading weight		in loading unit of length
LADEH	CHAR 3	Loading unit of length		
FARZT	CHAR 6	Journey time		
FAREH	CHAR 3	Journey time unit		
ENTFE	CHAR 6	Distance travelled		
EHENT	CHAR 3	Unit of distance		
LGORT	CHAR 4	Storage location		see note
GEWFX	CHAR 1	Weight and volume fixed		

E2VPACI

Fields	Format	Designation	Versions		
EXIDV_OB	CHAR 20	ID of the (preceding) shipping unit in which goods are packed	1	2	3
EXIDV	CHAR 20	Following shipping unit ID	1		
VBELN	CHAR 10	Delivery		2	3
POSNR	NUMC N 6	Delivery item		2	
TMENG	CHAR 15	Packed quantity		2	3
VRKME	CHAR 3	Field length of 3 bytes			
MATNR	CHAR 18	Material number			3
CHARG	CHAR 10	Batch number			3

The following matrix maps the possible IDOC applications:

E2VPACD = D
 E2VPACH = H
 E2VPACI = I

At least one E2VPACD and one E2VPACH must be sent.

SDPAID01 options

Segments	Version	Meaning
D + H		Reporting a shipping element without reference to the delivery item
D + H + I	1	Reporting a shipping element in the shipping element (EXIDV in EXIDV_OB)

Verification of Shipping Unit Data

D + H + I	2	Reporting packed delivery items. The material number and batch need not be specified if the item is specified
D + H + I	3	Reporting packed materials with quantities and batch. Version 3 is necessary as additional delivery items that are not yet known to the external system are generated in the event of a batch split

A shipping unit consists of a single packing material, the shipping material (SHM). One shipping material is a material with material type VERP. Each material (regardless of the material type) that is to be packed must be assigned to an shipping material group (SHM group). This partitioning of materials takes place in the material master record. This way, a check is made as to whether a particular packaging for a material is permitted. For this purpose, the shipping materials are assigned to a shipping material type (SHM type). You also maintain this characteristic in the material master record. The assignment of the SHM group group to the SHM type determines what materials are permitted. You define SHM groups and SHM types and their assignments in Customizing (Shipping/Packaging).



[Packaging \[Page 83\]](#)



Irrespective of how the shipping element is reported, it is possible to specify in the SD customizing application whether a shipping element is to generate a delivery item so that it can then be invoiced and processed by the Inventory Management system or whether it is merely to be noted in the delivery for information purposes. As a rule, the associated plant or storage location is determined automatically in this case. This can, however, be specified explicitly in the fields WERKS and LGORT. If the plant (and also the storage location) are automatically specified, a determination rule must be stored in the SHM type (see above). The same applies for the field PSTYV (item type). An item type can be stored in Customizing (Shipping/Delivery/Item type search) for the usage PACK.

Example: Data Verification Message Structure

Example: Data Verification Message Structure

Delivery 80001234 consists of 2 items 10 and 20, each with 50 pieces of materials MAT1 and MAT2. Picking order 765 is sent to the external system with the entire delivery quantity. 50 pieces of material MAT1 and 40 pieces of material MAT2 are picked in the warehouse. The difference, consisting of 10 pieces of material MAT2, is definitely not available. Therefore, the delivery quantity must be adjusted. The structure of the data verification message must be filled as follows:

- E2VPDLH
 - VBELN_VL 80001234
 - VBELN 765
 - KOMUE X
- E2VPDLI
 - VBELN_VL 80001234
 - POSNR_VL 10
 - VBELN 765
 - POSNN 10
 - PIKMG 50
 - MATNR MAT1
- E2VPDLI
 - VBELN_VL 80001234
 - POSNR_VL 20
 - VBELN 765
 - POSNN 20
 - PIKMG 40
 - MATNR MAT2

If a goods issue must also be posted, the corresponding indicator WABUC must also be set. If no adjustment of the delivery quantity takes place, the system generates a new picking message for the difference. In the meantime, if a data verification notice with the indicator KOMUE results, an open message is discarded again. An adjustment of the delivery quantity is only possible if all items referencing the picking order(s) are confirmed.

To expand on the above example, let's say, for example, that the missing quantity for item 20 eventually becomes available. This should take place in a second notification. The first data verification notice then results in the creation of a new item. This item can be selected, but the selection must be unambiguous. The complete message then appears as shown below:

Example: Data Verification Message Structure

- E2VPDLH
 - VBELN_VL 80001234
 - VBELN 765
- E2VPDLI
 - VBELN_VL 80001234
 - POSNR_VL 10
 - VBELN 765
 - POSNN 10
 - PIKMG 50
 - MATNR MAT1
- E2VPDLI
 - VBELN_VL 80001234
 - VBELN 765
 - POSNN 21
 - ORPOS 20
 - PIKMG 40
 - NDIFM 0
 - MATNR MAT2

In this case, the new item number is 21 and is referenced to the old picking Item 20 (ORPOS). Due to the difference quantity of zero, the system does not generate a new picking message. That way, it is possible to reference the quantity of 10 pieces (that is still open) back to the old Item 20.

- E2VPDLH
 - VBELN_VL 80001234
 - VBELN 765
- E2VPDLI
 - VBELN_VL 80001234
 - POSNR_VL 20
 - VBELN 765
 - POSNN 20
 - PIKMG 10
 - MATNR MAT2

Sending Picking Requests

You can use the IDOC **SDPIOD01** to transfer the data in the picking list to an external system for each shipping point.

Message determination must be modified in the Sales and Distribution customizing application for this purpose. The message EKSU is assigned with the medium 8 and the parameter "External system" (logical system) to the shipping point instead of the message EK00 which refers to the picking list. This activates the transfer procedure to the external system. Additionally, it is important to maintain the partner profile output for the message type **PICKSD**.

The IDOC SDPIOD01 comprises the segments **E2VPIIH** (header data) and **E2VPPII** (item data). The structure of these is described below.

E2VPIIH

Fields	Format	Designation	Req.	Comments
VBELN	CHAR 10	Delivery		
VSTEL	CHAR 4	Shipping point		
ROUTE	CHAR 6	Route		
BEROT	CHAR 20	Picked items location		Text field from del.header
LPRIO	NUMC N 2	Delivery priority		
KODAT	DATS D 8	Picking date		
LDDAT	DATS D 8	Loading date		
BTGEW	CHAR 15	Gross weight		
GEWEI	CHAR 3	Unit of weight		
VOLUM	CHAR 15	Volume		
VOLEH	CHAR 3	Volume unit		
ANRED	CHAR 15	Title		
NAME1	CHAR 35	Name 1 - Vendor		
NAME2	CHAR 35	Name 2		
NAME3	CHAR 35	Name 3		
NAME4	CHAR 35	Name 4		
STRAS	CHAR 35	House number and street		
PFACH	CHAR 10	Post office box		
PSTL2	CHAR 10	Postal code of PO box		
LAND1	CHAR 3	Country key		
PSTLZ	CHAR 10	Postal code		
ORT01	CHAR 35	City		

Sending Picking Requests

ORT02	CHAR 35	District		
REGIO	CHAR 3	Region		
KUNNR	CHAR 10	Ship-to party		
KOMAU	CHAR 10	Picking request		Important for data verification

E2VPPII (the fields correspond, for the most part, to the item data of the delivery (/nVL02 items))

Fields	Format	Designation	Req.	Comments
VBELN	CHAR 10	Delivery		
POSNR	NUMC N 6	Delivery item		
SORTKRI	CHAR 20	Sort term		
KDMAT	CHAR 22	Material belonging to the customer		Material ID of customer (e.g. from mat.master)
MATNR	CHAR 18	Material number		
ARKTX	CHAR 40	Short text for sales order item		
WERKS	CHAR 4	Plant		
LGORT	CHAR 4	Storage location		
BWTAR	CHAR 10	Valuation type		
CHARG	CHAR 10	Batch number		
LFIMG	CHAR 15	Delivery quantity in sales UoM		
LGMNG	CHAR 15	Delivery quantity in warehouse UoM		
KOMNG	CHAR 15	Quantity to be picked		
VRKME	CHAR 3	Sales unit of measure		
MEINS	CHAR 3	warehouse unit of measure		as in VL02 or in the data base-
UMVKZ	CHAR 5	Numerator		Table LIPS
UMVKN	CHAR 5	Denominator		- " -
BWART	CHAR 3	Movement type (inventory management)		- " -
BWLVS	NUMC N 3	Movement type for Warehouse Management		not relevant
LGNUM	CHAR 3	Warehouse number		not relevant
LGTYP	CHAR 3	Storage type		not relevant

Sending Picking Requests

LGPLA	CHAR 10	Storage bin		not relevant
KZDLG	CHAR 1	Indicator: dynamic storage bin in warehouse management		not relevant
LGPBE	CHAR 10	Storage bin		not relevant
MBDAT	DATS D 8	Material availability date		Latest commencement of picking
SOBKZ	CHAR 1	Special stock indicator		
VGBEL	CHAR 10	Document number of the reference document		
BRGEW	CHAR 15	Gross weight		
NTGEW	CHAR 15	Net weight		
GEWEI	CHAR 3	Unit of weight		
VOLUM	CHAR 15	Volume		
VOLEH	CHAR 3	Volume unit		
XCHPF	CHAR 1	Indicator for batch management requirement		Material requires batch handling
XCHAR	CHAR 1	Batch management indicator (internal)		Valuation type must be verified

The inputs in the fields correspond to the definition in the delivery document.

The SAP System creates a picking request for each delivery document. This determines, for the most part, the materials and quantities to be picked at this time and this data is passed on to the external system with the IDOC **SDPIOD01**. If an item is created in the delivery document later or if an amount is increased in an old item, a new picking request is created for the changes and then transmitted.



If you are sending delivery documents and picking verifications to SAP, you can no longer work with the random picking technique in the Warehouse Management module WM, that is, no transfer orders for deliveries can be created. If you still want to manage your materials in WM, this will only work with the picking technique "Fixed storage bin". In this case, the stock is deducted directly in the respective fixed storage bin when the goods issue for the delivery item takes place (for more information on the picking techniques, refer to the online documentation in WM).

Updating Picking Requests in the Delivery Document

Updating Picking Requests in the Delivery Document

You can use the IDoc **SDPIID01** to update confirmed quantities, batch splits and movement-type splits in the delivery.

The partner profile input must be maintained for the message type **SDPICK** for this purpose.

The IDoc SDPIID01 comprises the segments E2VPDLH (header data) and E2VPDLI (item data). The structure of these segments is described below.

E2VPDLH

Fields	Format	Designation	Req.	Comments
VBELN_VL	CHAR 10	Delivery	X	
VBELN	CHAR 10	Subsequent sales and distribution document	X	Picking request, KOMAU field
LGNUM	CHAR 3	Warehouse number		Function currently not implemented
TANUM	NUMC N 10	Transfer order number	X	Input as for VBELN
KODAT	DATS D 8	Picking date		
KOUHR	TIMS T 6	Entry time		
BRGEW	CHAR 15	Gross weight		Planned, function currently not implemented
NTGEW	CHAR 15	Net weight		Planned, function currently not implemented
GEWE	CHAR 3	Unit of weight		Planned, function currently not implemented
VOLUM	CHAR 15	Volume		Planned, function currently not implemented
VOLEH	CHAR 3	Volume unit		Planned, function currently not implemented
KOMUE	CHAR 1	Automatically overwrite delivery quantity with picking qty		If no further quantities for the item are reported
WABUC	CHAR 1	Automatic goods issue		Indicator X

E2VPDLI

Fields	Format	Designation	Req.	Comments
VBELN_VL	CHAR 10	Delivery	X	
POSNR_VL	NUMC N 6	Delivery item	X	

Updating Picking Requests in the Delivery Document

VBELN	CHAR 10	Subsequent sales and distribution document	X	See above, input as for KOMAU
POSNN	NUMC N 6	Subsequent item of an SD document	X	New item for batch split
VBTYP_N	CHAR 1	Document category of subsequent document		Input is always 'Q'
PIKMG	CHAR 15	Picked quantity	X	
MEINS	CHAR 3	Unit of measure		Function currently not implemented
NDIFM	CHAR 15	Difference quantity		Quantity 0 allowed
TAQUI	CHAR 1	Confirmation		Is always confirmed
BRGEW	CHAR 15	Gross weight		Function currently not implemented
NTGEW	CHAR 15	Net weight		Function currently not implemented
GEWEI	CHAR 3	Unit of weight		Function currently not implemented
VOLUM	CHAR 15	Volume		Function currently not implemented
VOLEH	CHAR 3	Volume unit		Function currently not implemented
CHARG	CHAR 10	Batch number		
MATNR	CHAR 18	Material number	X	For testing purposes
ORPOS	NUMC N 6	OR item from which the current OR item originates		See example

The verification notice must always refer to a pick order that was sent to an external system (via the field KOMAU in segment E2VPPIH). That way, no new item number is issued for the pick order since it is the same as the item number in the delivery. The fields POSNN and POSNR VL are in agreement if this is processed without splitting the item. On the other hand, if several records are verified for one item (for example, due to a batch split) the records in field POSNN must contain a new item number. In this case, the field ORPOS contains a reference to the old item number, that is, to the contents POSNR VL.

The field NDIFM displays the quantity that cannot be picked. The field is only analyzed if items are split (fields POSNN and ORPOS)(see the example below). If no new items are verified, the difference between the requested and verified quantities are automatically calculated. If there are items in the delivery that have been fully supplied after verification has taken place, the system creates a new picking message. When the new message is processed, the system creates a new pick order. If you do not want this to happen, you must indicate this in the header field KOMUE. By doing this, the delivery quantities in all items are adjusted to match the picking quantities. If there is an open picking message, it is deleted.

Updating Picking Requests in the Delivery Document



[Data Verification Message Structure \[Page 75\]](#)



The reaction to the fields XCHPF and XCHAR in the picking request is as follows: If the indicator XCHPF is set, then the material requires batch handling and the external system must send the batch in the field CHARG of the item when the data is being verified. Here a particular batch can already be preset in the picking request. Otherwise, the batch determination must take place in the external system. If the indicator XCHAR is set, then this is not a request batch but a special valuation type. Then the valuation type must be supplied in the field CHARG.

Example: Packaging

We will explain the functionality using the following example. Delivery 80001234 contains item 10 with 10 pieces of the material MATERIAL. This material is packed in 2 cartons with 6 pcs and 4 pcs. Both cartons are contained in a crate. This information is to be verified by the external system.

Both packages, carton and crate, are available as materials CARTON and CRATE with material type PACK in the material master. In this way they can be used as shipping materials. The shipping material group INSIDE is assigned to the material MATERIAL; the shipping material group OUTSIDE is assigned to the shipping material CARTON. No shipping material group is assigned to the shipping material CRATE. Therefore it cannot be packed further.

The individual fields of the segments are to be filled as follows:

- E2VPACD
VBELN 0080001234
- E2VPACH
EXIDV VP1
VHILM CARTON
- E2VPACH
EXIDV VP2
VHLIM CARTON
- E2VPACH
EXIDV VP3
VHLIM CRATE
- E2VPACI
EXIDV_OB VP1
VBELN 00800001234
POSNR 000010
TMENG 30
- E2VPACI
EXIDV_OB VP2
VBELN 00800001234
POSNR 000010
TMENG 20
- E2VPACI
EXIDV_OB VP3
EXIDV VP2

Example: Packaging

- E2VPACI
EXIDV_OB VP3
EXIDV VP2

The fields EXIDV and EXIDV_OB contain the external identification of a shipping unit. These are required to assign the package contents uniquely. When data is verified, an internal system identification is assigned. Package weight and volume can be assigned to a shipping material. This information is used to make sure that each packaging used is appropriate. In the above example, the material MATERIAL has a gross weight of 0.5 KG, the shipping material CARTON has a package weight of 4 KG. Therefore, 6 pieces of MATERIAL can be packed into shipping unit VP1 (3 KG < 4 KG). The same view applies to the volume. Note that no measurements (width, height, depth) are checked.

Transfer Orders

Receiving / Sending Transfer Orders

The IDoc **WMTOID01** is used to send and receive transfer orders. It comprises the segments **E2LTORH** for the transfer order header and **E2LTORI** for the transfer order items.

The associated message type for maintaining the partner profiles input and output is called **WMTORD**.

All goods movements within a warehouse number are monitored by means of the **transfer order** in the WM system. The transfer order contains information on these movements and the transfer of a specific quantity of a material from one storage bin to another. All of these goods movements are mapped as transfer orders irrespective of whether the goods are being placed into stock, removed from stock or transferred to stock.

An external system often requires the goods movements to be clearly divided into stock placements, stock removals, stock transfers and posting changes. The individual goods movements are never categorized in the WM system, i.e. the transfer order, that always transfers the data to the external system in the same format as the IDoc WMTOID01, is always generated irrespective of the 'type' of movement. The following transfer order data can be used on the external system side so that the transfer orders that have been sent can be distinguished in accordance with the 'type' of goods movement:

1. Movement type
2. Transfer type
3. Storage types concerned

In addition to the transfer order data, the variants of the WM message, that is specified when the movements for this interface connection are defined, can also be used to determine the type of goods movement.

Sending Transfer Orders from WM to an External System

Warehouse-specific data must be maintained in order to **send transfer orders** to an external system, e.g. for which movements to which storage type an IDoc is to be sent. The necessary customizing settings can be found in the online **Implementation Guide (IMG)**.

When a transfer order is sent to the external system, all of the fields that contain inputs in the transfer order are transferred to the IDoc. The fields that are sent with the IDoc will depend on a number of criteria:

1. **Type of transfer order**, i.e. whether this is a stock placement, removal, transfer or posting change.
2. Definition of the **movement type**, e.g. whether the GR date is to be set when the goods are placed into stock.
3. **Cause** of the transfer orders:
 - manual transfer order
 - Transfer order for delivery
 - Transfer order for transfer requirements
 - Transfer order for material document

Transfer Orders

4. Type of warehouse management, i.e. whether warehouse management within the warehouse takes place with or without **storage unit management (SU)**.

In a warehouse with storage unit management, the storage units are transferred via the fields 'VLENR' and 'NLENR'. The following should be noted here:

- if a stock placement is made in a warehouse with storage unit management, the storage unit number is sent in the field 'NLENR'
- if a stock removal is made from a warehouse with storage unit management, the storage unit number appears in the field 'VLENR'
- if stock transfers are made between two warehouses with storage unit management, the storage unit number is transferred in both fields. The two storage unit number are identical if a storage unit is completely transferred. If the goods are transferred from one storage unit to another, both storage unit numbers involved will be transferred.

The contents of this IDoc must be determined in accordance with **the individual requirements of the customer**. It is thus advisable to generate transfer orders, that are to be sent to the external system, and to check the contents of the generated IDocs by means of the IDoc display once all of the WM customizing settings have been made.

For example, the transferred unit of measure in which the TO quantity is transmitted is the same as the unit in which the TO was created. If in the SAP System an alternative unit of measure "L" is maintained for a material with the base unit of measure "PC", a transfer order created in the SAP System can pass on an "L" as well as a "PC" unit of measure, depending on the unit in which the transfer order itself was created.

Sending Transfer Orders from an External System to the WM System

If specific **goods movements are initiated in the external system**, i.e. the physical transfer determined by the external system is carried out first of all, these must also be made known to the WM system. The IDoc WMTOID01 is, in this case, generated in the external system and transferred to the WM system. A transfer order is generated from the IDoc in the WM system that maps the executed transfer in the system and carries out the necessary postings to the storage bins concerned.

The IDoc **WMTOID01** is described in the following. The columns "Req." and "Comments" refer to required fields which must contain inputs when the IDoc is sent from the external system to the WM system.

The individual segments are described in the following.

E2LTORH

Fields	Format	Designation	Req.	Comments
LGNUM	CHAR 3	Warehouse number	X	Activate interface in warehouse number.
TANUM	CHAR 10	Transfer order number		
BWLVS	CHAR 3	Movement type for Whse Mgmt	X	
TBPRI	CHAR 1	Transfer priority		
TRART	CHAR 1	Transfer type		E = stock placement, A = stock removal, U = stock transfer

Transfer Orders

REFNR	CHAR 10	Reference number		Individual TOs can be bound together
BETYP	CHAR 1	Requirement type		
BENUM	CHAR 10	Requirement number		
KZPLA	CHAR 1	Indicator: preplanned transfer order		
PLDAT	CHAR 8	Planned execution date for a transfer order		
PLZEI	CHAR 6	Planned execution time for a transfer order		
LZNUM	CHAR 20	Additional reference number for transport		Additional reference field
BNAME	CHAR 12	User name		
KISTZ	CHAR 1	Indicator: Actual processing time in TO required		
KZLEI	CHAR 1	Indicator: Performance data		
PERNR	8 R	Processor of the TO (Personnel number)		
SOLWM	CHAR 15	Planned processing time from WM		
SOLEX	15 R	Planned processing time from external system		
ISTWM	CHAR 15	Actual processing time of WM transfer order		
ZEIEI	CHAR 3	Time unit for performance data		
STDAT	CHAR 8	Start date of the transfer order		
ENDAT	CHAR 8	End date of the transfer order		
STUZZ	CHAR 6	Start time of the transfer order		
ENUZZ	CHAR 6	End time of the transfer order		
L2SKA	CHAR 1	Type of transfer order within 2-step picking		
LGTOR	CHAR 3	(Receiving/Shipping) Door of the warehouse number		
LGBZO	CHAR 10	Material staging area of the warehouse number		
NOSPL	1 R	No TO splitting		

Transfer Orders

SWABW	CHAR 4	Threshold value of deviation in planned TO processing time / actual time		Determined when TO is generated and included in outbound IDoc
VBTYP	CHAR 1	Sales doc type transmitted with outbound IDoc		Identifies whether transaction concerns TO for returned stock, inbound delivery TO or outbound delivery TO
AUSFB	CHAR 4			Allows return confirmation of an indicator for processing a TO

E2LTORI

Fields	Format	Designation	Req.	Comments
TAPOS	CHAR 4	Transfer order item	X	
MATNR	CHAR 18	Material number		
WERKS	CHAR 4	Plant	X	
CHARG	CHAR 10	Batch number	x	If material is to be handled in batches
BESTQ	CHAR 1	Stock category in the Warehouse Management system	x	If stock with qualification
SOBKZ	CHAR 1	Special stock indicator	x	If special stock
LSONR	CHAR 24	Special stock number	x	If special stock
MEINS	CHAR 3	Unit of measure	X	
LETYP	CHAR 3	Storage unit type		
KZQUI	CHAR 1	Indicator: confirmation required		
KZNKO	CHAR 1	Indicator: execute zero stock check		
WEMPF	CHAR 12	Goods recipient		
ABLAD	CHAR 25	Unloading point		
WDATU	CHAR 8	Date of goods receipt		
WENUM	CHAR 10	Goods receipt number		
WEPOS	CHAR 4	Goods receipt item		
ZEUGN	CHAR 10	Certificate number		
VLTYP	CHAR 3	Source storage type	x	
VLBER	CHAR 3	Source storage section	x	
VLPLA	CHAR 10	Source storage bin	x	
VPPOS	CHAR 2	Position in source storage bin		

Transfer Orders

VSOLM	CHAR 15	Source target quantity in stockkeeping unit	x	
NLTYP	CHAR 3	Destination storage type	x	
NLBER	CHAR 3	Destination storage section	x	
NLPLA	CHAR 10	Destination storage bin	x	
NPPOS	CHAR 2	Position in destination storage bin		
NSOLM	CHAR 15	Destination target quantity in stockkeeping unit	X	
RLTYP	CHAR 3	Return storage type		
RLBER	CHAR 3	Return storage area		
RLPLA	CHAR 10	Return storage bin		
RPPOS	CHAR 2	Position in return storage bin		
RSOLM	CHAR 15	Return target quantity in stockkeeping unit		
MAKTX	CHAR 40	Material description		
VLENR	CHAR 20	Source storage unit number		
NLENR	CHAR 20	Destination storage unit number		
VFDAT	CHAR 8	Expiration date or best-before date	x	If material is subject to SLED
HOMVE	CHAR 1	Indicator: Removal of a whole homogeneous storage unit		
QPLOS	CHAR 12	Inspection lot number		
QPLOA	CHAR 12	Inspection lot, from which usage decision was made		
KZSTI	CHAR 1	Indicator: Transport sample		
KOBER	CHAR 3	Picking area		
LGORT	4 R	Storage location		
SOLPO	CHAR 15	Planned processing time for transfer order item		
ZEIEI	CHAR 3	Time unit for performance data		
L2SKR	CHAR 1	Relevance for 2-step picking		
VOLUM	CHAR 15	Volume		
VOLEH	CHAR 3	Volume unit		

In addition to the fields marked with X, it may also be necessary for **other data** to be transferred from the external system. The scope of the IDoc is also affected in this case by a number of WM

Transfer Orders

customizing settings in the same way as when the IDoc is sent from the WM system to the external system.

Below are a few examples:

1. The transferred movement type defines a stock placement with a permanently-defined SOURCE interface, i.e. the movement type determines the SOURCE storage type and SOURCE storage bin:
 - the SOURCE data (storage type, storage section, storage bin) must not be transferred in the segment E2LTORI. The destination with DESTINATION storage type and DESTINATION storage bin are, however, required.
2. The transferred movement type defines a **stock removal** to a **interim storage type** with dynamic bin location which corresponds to the cost center:
 - the SOURCE storage type and SOURCE storage bin must be sent in the segment E2LTORI.
 - The requirement type must be transferred with the value 'K' and the requirement tracking number with the assigned cost center in the segment E2LTORH in order to determine the dynamic bin location.
3. The transferred movement type defines an unspecified **stock transfer** within a warehouse number:
 - both the SOURCE data and DESTINATION data, i.e. the storage type and storage bin in each case, must be transferred in the segment E2LTORI.
4. The transferred movement type requires the **GR date** when a stock placement is made:
 - the date of the goods receipt must be transferred in the segment E2LTORI.
5. The transferred movement type or the storage types concerned permit a **return transfer** to be made
 - the return transfer data can also transferred in the segment E2LTORI if a return transfer has taken place.
6. **Storage unit management** is active within the transferred storage type:
 - if additions are made to existing stock in a storage unit in this storage type, the storage unit number must be transferred in the segment E2LTORI in the field 'NLENR'
 - if a quantity is picked from a storage unit in this storage type, the storage unit number must be transferred in the segment E2LTORI in the field 'VLENR'.
 - if a quantity is transferred from one storage unit to another, both storage units must be sent in the segment E2LTORI.
 - if a full storage unit is moved, this movement must be reported to the WM system via the IDoc WMSUID01.

The contents of this IDoc must also be determined in accordance with the **individual requirements of the customer**. Before this is carried out, we recommend that generation and transmission of the IDoc be simulated in the SAP system. You can use the test report RLTORD10 for this purpose. Further information on performing tests with this report can be found in the documentation for the report.



Since it is assumed, when transfer orders are received, that the associated moving command will already have been executed by the external system, only movement types that allow immediate confirmation can be used. The transfer order in the SAP system generated from the IDoc is confirmed immediately.

7. Comments:

- NOSPL means: the splitting criteria defined in the system are to be ignored.
- PERNR also enters the personnel number of the worker in the TO.
- SOLEX is the externally calculated processing time that is added to the internally calculated processing time (this is useful in special cases in which the internal logic does not cover all the details).
- Fields with entries that are not marked with an R, are passed to an outbound IDoc.

Transfer Orders

Confirming Transfer Orders

Transfer orders that have been executed can be reported to the SAP system using the IDoc **WMTCID01** (**WMTCID02** in Release 4.0). These are then confirmed in the SAP system.

The partner profile input must be maintained for the message type **WMTOCO**.

Not every transfer order must be confirmed, i.e. it is not always necessary to report the transfer orders sent. A customizing setting in the WM system specifies whether or not a generated transfer order is to be confirmed. This information is transferred with the field 'KZQUI' in the segment E2LTORI using the IDoc WMTOID01 (**WMTCID02** in Release 4.0). The **confirmation requirement** refers to the individual items and not to the entire transfer order.

The IDoc comprises three segments, namely **E2LTCOX** for confirming entire storage units, **E2LTCOH** for the transfer order headers and **E2LTCOI** for the TO item data.

A **storage unit** can, in the event of mixed storage, be moved with several transfer orders. Under normal circumstances, however, one transfer order with one item corresponds to one storage unit. The simplest solution is to confirm the entire storage unit (see version 1).

If you are working without storage unit management, simply confirm entire **transfer orders** (see version 2). This type of confirmation is usually used for stock removal. **Item-by-item confirmation** is recommended for stock placements if several pallets are placed into stock with one transfer order (see version 4).

If **differences** are established within a storage unit (e.g. picking from storage unit), confirm the entire storage unit with those items with differences (see version 5). Differences can also be entered explicitly for the individual items when the entire transfer order is reported (see version 3).

The following matrix indicates the various confirmation options. The individual segments of the IDoc are then described in more detail.

E2LTCOX = 1, E2LTCOH = 2; E2LTCOI = 3. These abbreviations also correspond to the hierarchical levels of the segments in the IDoc.

IDoc Set up for confirmation

Version	Segment	Number	Meaning
1	1	1	Confirm entire storage unit
2	2	1	Confirm entire transfer order
3	2 3	1 1... n	Confirm entire transfer order except for 1 to n items with difference
4	2 3	1 1 (... n)	Confirm one or several transfer order items
5	1 2 3	1 1... n 1... m	Confirm entire storage unit except for a number of transfer orders that have items with differences.

E2LTCOX relevant for version 1 and 5

Fields	Format	Designation	Req.	Comment
LGNUM	CHAR 3	Warehouse number	X	
LENUM	CHAR 20	Storage unit number	X	
QNAME	CHAR 12	User name for confirmation		
SQUIT	CHAR 1	Flag: Confirm entire storage unit (actual = target)	X	Value "X"
NLPLA	CHAR 10	Dest. bin		See note below
NPPOS	CHAR 2	Dest. item		See note below



Nlpla and **Nppos** are the **destination storage bin** and the **item** in that bin. For this, the destination storage bin and item are referenced to the deviating destination storage bin of the entire **storage unit**.

E2LTCOH relevant for version 2, 3, 4 and 5

Fields	Format	Designation	Req.	Comment
LGNUM	CHAR 3	Warehouse number	X	
TANUM	CHAR 10	Transfer order number	X	
QNAME	CHAR 12	User name for confirmation		
SQUIT	CHAR 1	Flag: Confirm entire transfer order (actual = target)	x	If the entire transfer order is to be confirmed (version 2, 3 + 5)
KOMIM	CHAR 1	Copy pick quantities into the delivery / post goods issue (from Release 4.0)		
EINLM	CHAR 1	Copy putaway quantity into inbound delivery		See note below
TBELI	CHAR 1	Closes TR		Sets the originating TR to "processing complete" when TO is confirmed



For confirming a TO created for an inbound delivery, the switch **Einlm** determines whether or not the putaway quantity will be copied into the inbound delivery document and the goods receipt posting will take place. It behaves like the **KOMIM** for the outbound delivery.

E2LTCOI relevant for version 3, 4 and 5

Fields	Format	Designation	Req.	Comment
--------	--------	-------------	------	---------

Transfer Orders

TAPOS	CHAR 4	Transfer order item	x	
SQUIT	CHAR 1	Indicator: confirmation of a transfer order item	x	If item is to be confirmed without difference
NISTA	CHAR 15	Dest.act.qty	x	If difference in destination storage bin
NDIFA	CHAR 15	Dest.difference qty	x	If difference in destination storage bin
RISTA	CHAR 15	Returned actual quantity	x	If difference in destination storage bin
RDIFA	CHAR 15	Diff.quantity for returned stock	x	If difference in destination storage bin
KZNUL	CHAR 1	Indicator: bin empty at zero stock check	x	If zero stock check
PISTA	CHAR 15	Remaining quantity after zero stock check	x	If zero stock check
ALTME	CHAR 3	Unit of measure	x	If any quantities are specified
KZDIF	CHAR 1	Difference indicator	x	If posting to interim record for differences is required
LENUM	CHAR 20	Storage unit number	x	If confirmation in block storage area
VQUIT	CHAR 1	Confirmation in block storage area: removal of complete SU	x	If confirmation in block storage area
PICKM	CHAR 15	Picking quantity for block storage confirmation		
DIFFM	CHAR 15	Difference from block storage confirmation		
RESTM	CHAR 15	Remaining quantity after block storage confirmation		
BQUIT	CHAR 1	Confirmation in block storage area: no further items		
KZFOL	CHAR 1	Indicator subseq.action		
NLPLA	CHAR 10	Dest. bin		See note below
NPPOS	CHAR 2	Dest. item		See note below



Nlpla and **Nppos** are the **destination storage bin** and the **item** in that bin, in case the destination storage bin deviates from the bin suggested by the system. In the segment **E1LTCOI** the bin is referenced to one TO item.

E2LTCOG

(You need this segment if you intend to enter planned and actual processing times for transfer orders.)

Transfer Orders

Fields	Format	Designation	Req.	Comment
LGNUM	CHAR 3	Warehouse number		
TANUM	CHAR 10	Transfer order, for which the data is confirmed/verified		
SOLEX	CHAR 15	Planned processing time from external system		
PERNR	CHAR 8	Processor of the TO (personnel number)		
STDAT	CHAR 8	Start date of the transfer order		
ENDAT	CHAR 8	End date of the transfer order		
STUZZ	CHAR 6	Start time of the transfer order		
ENUZZ	CHAR 6	End time of the transfer order		
ISTWM	CHAR 15	Actual processing time for the WM transfer order		
AUSFB	CHAR 4			

When you confirm transfer orders, the actual processing time of the TO can be reported to the system. The planned processing time for TO is normally determined in the SAP system, but it can also be amended by the planned processing time that is reported from the external system (SOLEX). The format in which the actual times can be reported is dependent upon the data transmitted in the transfer order IDoc (KZLEI and KISTZ).

Actual data can be reported for KZLEI = 2, 3 or 4. This can take place independently of the actual confirmation by transmitting the E2LTCOG segment. Depending on the indicator KISTZ from the TO IDoc, the reporting can take place in the following form:

KISTZ = 1 => Fields: ISTWM, PERNR.

KISTZ = 2 or 3 => Fields: STDAT, STUZZ, ENDAT, ENUZZ, PERNR.

In this case, the unit from SOLEX and ISTWM is related to the time unit that is in the field ZEIEI in the TO IDoc.

With KOMIM = 1, the pick quantities in the delivery item are adjusted when the TO is confirmed and, additionally, the goods issue is initiated with KOMIM = 2. The goods issue posting does not take place until all of the delivery items have been confirmed.



Important: If you want to initiate the goods issues for the delivery, only one transfer order per IDoc and communication process may be provided. KOMIM = 2 thus reduces the "mass" capability of the IDoc.

Goods Movements

There are a number of goods movements that must be discussed separately with regard to their confirmation.

1. Reporting differences.

If differences are detected when a goods movement is executed, these must be transferred by the external system in the segment E2LTCOI via the IDoc WMTCID01 when the movement is reported. The following fields must be sent:

Transfer Orders

SQUIT	Empty
NISTA	Actual quantity of the goods movement, i.e. the quantity that is actually moved or withdrawn
NDIFA	Difference quantity of the goods movement, i.e. the difference between the quantity transferred in the transfer order and the actual quantity
RISTA	Actual quantity for the return sub-item (only if return sub-item is present)
RDIFA	Difference quantity for the return sub-item
ALTME	Unit of measure to which the quantities refer (from the transfer order sent by the WM system)
KZDIF	If the storage type and storage bin for which the difference is posted, are to be overridden Versions 3, 4 and 5 must be used to report differences

To report differences, versions 3, 4 and 5 must be used.

As a rule, the entire target quantity of the respective TO item must be verified. This applies to E2LTORI-VSOLM:

$VSOLM = NISTA + NDIFA + RISTA + RDIFA$. If a remaining quantity PISTA has been found, it is not entered here but specified separately.

2. Reporting with zero stock check

When stock is removed from a storage type with zero stock check, the storage bin that becomes empty as a result of the goods movement to be confirmed, must be reported explicitly.

If an X is transferred in the field 'KZSKO' in the segment E2LTORI in the transfer order sent from the WM system, the zero stock check must be reported in the segment E2LTCOI in the IDoc WMTCID01. If the storage bin is empty after withdrawal has taken place, an X must be transferred in the field 'KZSKO'. If there is any remaining stock in this bin, the following fields must be transferred in the segment E2LTCOI:

KZSKO	Empty
PISTA	Counted remaining stock
ALTME	Unit of measure to which the quantities refer (from the transfer order sent by the WM system)

If no zero stock check is requested by the WM system, the zero stock check can still be reported by the WM system if the storage bin is empty after withdrawal has taken place (stock in the system deviates from physical stock). The field 'KZSKO' in the segment E2LTCOI in the IDoc WMTCID01 must be set to 'X' in this case as well.

Version 3 or 4 must be used when confirmations are made with zero stock check.

3. Confirmation in the block storage area with storage unit management

When the transfer order is confirmed in the block storage area with storage unit management, the storage units that have been withdrawn must be reported.

If a storage unit that has been completely withdrawn is to be reported, the following fields must be transferred in the segment E2LTCOI:

LENUM	Number of the withdrawn storage unit
-------	--------------------------------------

VQUIT	X
-------	---

If the withdrawn storage unit is to be reported with the difference and/or remaining quantity, the following fields must be transferred in the segment E2LTCOI:

LENUM	Number of the withdrawn storage unit
'PICKM	Picking quantity
'DIFFM	Difference quantity
'RESTM	Remaining quantity
ALTME	Unit of measure to which the quantities refer (from the transfer order sent by the WM system)

- If withdrawal is to be 'declared complete', i.e. reporting of the individual storage units for a transfer order item has been completed, the field 'BQUIT' must be sent with an X in the segment E2LTCOI.
- Reporting must, in this case, be carried out item by item, i.e. version 4 must be used. Each transfer order item can be reported several times, each withdrawn storage unit once.

Transmission of the confirmation from the external system can be **simulated** in the SAP system. We recommend that the confirmation procedures that are relevant for you be tested first in this way. You can use the report **RLTOCO00** to test transfer order confirmations and the report **RLTOCO10** for storage unit confirmations.



The field 'KZFOL' in the segment E2LTCOI can be used in accordance with the individual requirements of the customer.

The intention here is that customers use this indicator by means of a user exit in the WM system for their own purposes. It can be used, for example, to initiate follow-up actions in the event of differences. How this follow-up action is defined and executed is left entirely to the customer.

Cancelling Transfer Orders

Cancelling Transfer Orders

Cancellation Request for Transfer Order

The IDoc **WMCAID01** can be used to send a reversal request to an external system or to report a reversal movement to the SAP system.

The partner profiles output and input must be maintained for the message type **WMCATO** so that the IDoc can be transmitted bidirectionally.

In general, the following applies: **only transfer orders that have not yet been confirmed can be cancelled.**

Since physical transfers are carried out by the external system, the SAP system is not in a position to determine whether or not reported transfer orders have already been carried out. The SAP system can, therefore, only send a **cancellation request**. The external system must then decide how it is to respond to this. If the movement has not yet been executed, the external system can prevent this from taking place and send confirmation of the **cancellation** to the SAP system. If this is not the case, an appropriate message must be sent to the SAP system indicating that the movement has already been executed and that **cancellation** is no longer possible. A specific user in the WM system is then informed of this. An appropriate message is sent to the inbox of this user. The procedure to be adopted with transfer order items that cannot be cancelled must be determined in accordance with the process to be carried out and any necessary adjustments must be carried out manually.

Warehouse-specific data must also be maintained in accordance with execution of the transfer order in order to **send cancellation requests** to an external system. Refer also to the customizing guidelines.

The IDoc itself comprises two segments, namely the header data **E2LTCAH** and the item data **E2LTCAI**. The segments are described in detail in the following.

E2LTCAH

Fields	Format	Designation	Req.	Comments
LGNUM	CHAR 3	Warehouse number	X	
TANUM	CHAR 10	Transfer order number	X	
CNAME	CHAR 12	User name for TO cancellation		
CANRQ	CHAR 1	Inquiry cancelled transfer order	x	'X' for cancellation request
CANCL	CHAR 1	Reply to canc. transfer order	x	'X' for cancellation from external system
SOLEX	CHAR 15	Planned processing time from the external system		(see note below)



SOLEX: If you cancel the transfer order in the integrated system, the planned processing time in the TO is reset. If you cancel the TO via the IDoc, you can still copy the externally calculated planned processing time into the TO.

Cancelling Transfer Orders

E2LTCAI

Fields	Format	Designation	Req.	Comments
TAPOS	CHAR 4	Transfer order item	X	
VLENR	CHAR 20	Source storage unit number	x	
NLENR	CHAR 20	Destination storage unit number	x	
SFEHL	CHAR 1	Indicator: error during cancellation of transfer order		
SFTXT	CHAR 80	Error text for cancellation or cancellation req. for subsys. link		
KZFOL	CHAR 1	Indicator subsequent action		

Cancellation Request from the WM System to the External System

The individual fields in the segments must be set as follows:

E2LTCAH

- In addition to the required fields 'LGNUM' and 'TANUM', the field 'CANRQ' must be sent with X

E2LTCAI

- In addition to the required field 'TAPOS', inputs must be made in the fields 'VLENR' and 'NLENR' if the transfer order item refers to storage units (storage unit management is activated for the storage types concerned)

Cancellation from the External System to the WM System

The individual fields in the segments must be set as follows:

E2LTCAH

- In addition to the required fields 'LGNUM' and 'TANUM', the field 'CANCL' must be sent with X

E2LTCAI

- If cancellation is to be confirmed as being positive by the external system, no further data must be transferred apart from the field 'TAPOS'
- If cancellation is to be confirmed as being negative by the external system (cancellation not possible), the field 'SFEHL' must, in addition to the field 'TAPOS', be set to X and an explanatory text can also be transferred in the field 'SFTXT'. This text appears in the error message inbox.

Transmission of the cancellation response from the external system can be **simulated** in the SAP system. We recommend that the cancellation procedures that are relevant for you be tested first of all in this way. The reports **RLCATO00** and **RLCATO10** are available for testing the cancellation.

Cancelling Transfer Orders

The field 'KZFOL' in the segment E2LTCAI can be used in accordance with the individual requirements of the customer. The intention here is that customers use this indicator by means of a USER exit in the WM system for their own purposes (see also [SAP System Settings and Modification Concept \[Page 115\]](#)).

Releasing Groups

The IDoc **WMRRID01** is used to release transfer orders assigned to a group that have already been sent to an external system.

The associated message type is called **WMRREF**. An output partner profile must be maintained for this.

The **group number** is used in the WM system to combine several transfer orders or to identify these. It is used when a transfer order is generated by means of multiple processing. A defined number of transfer orders are generated as a group. The group number is sent to the external system in the header of the generated transfer order (E2LTORH segment in the IDoc WMTOID01).

The transfer orders are combined to form the group in order to execute the goods movements for several transfer orders in **one step**, for example processing transfer orders for a specific shipping point or stock removal to the same interim storage area. This means that the goods movement should not take place immediately after the transfer order has been received in the external system. These goods movements must be started explicitly.

The start command for the goods movements is transferred to the external system as a result of a specific group in a WM warehouse number being **released**.

The IDoc comprises the segment **E2LRRFX** which is described below.

E2LRRFX

Fields	Format	Designation
LGNUM	CHAR 3	Warehouse number
REFNR	CHAR 10	Group
DATUM	CHAR 8	Date
UZEIT	CHAR 6	Time
L2KSR	CHAR 1	Relevance for 2-step picking
LSKSO	CHAR 1	2-step picking: release level

The date and time for the release are currently not used in the standard system. They can, however, be used if the group release is to be implemented in accordance with the individual requirements of the customer.



The release of TOs for 2-step picking can take place in separate steps (Field LSKSO):

- 1 = Only direct TOs (without 2-step picking) from the group
- 2 = Only allocation TOs from the group
- 3 = Direct TOs and allocation TOs from the group
- L2KSR the value „space“ or „2“ are active for 2-step picking.

Releasing Groups

Blocking Storage Bins

The IDOC **WMBIID01** can be used to send individual storage bins or all storage bins (e.g. an entire aisle) from the external system to the WM system so that they can be **blocked** or **unblocked**.

The partner profile input must be maintained for the message type **WMBBIN**.

On the external system side, it is often not possible to approach certain storage bins or aisles due to technical problems. These storage bins must be blocked so that they are not taken into consideration when the storage bins are determined in the WM system. Blocking of these storage bins must be initiated by the external system. The bins must then be unblocked by the external system when they are ready to be used again.

The IDOC comprises two segments, namely the header data **E2LBINH** and the item data **E2LBINI**. The segments are described in the following.

E2LBINH

Field	Format	Designation	Req.	
LGNUM	CHAR 3	Warehouse number	X	
LGTYP	CHAR 3	Storage type	X	
BLOCK	CHAR 1	Block storage bins	x	either BLOCK or DEBLO
DEBLO	CHAR 1	Unblock storage bins	x	either BLOCK or DEBLO

E2LBINI

Field	Format	Designation	Req.	
LGPLA	CHAR 10	Storage bin	X	input also generic, e.g. 01
SKZUA	CHAR 1	Blocking indicator: for stock removals (user)	x	at least one of the three indicators
SKZUE	CHAR 1	Blocking indicator: for stock placements (user)	x	at least one of the three indicators
SKZSI	CHAR 1	Blocking indicator: current inventory (system)	x	at least one of the three indicators
SPGRU	CHAR 1	Blocking reason		

The segment **E2LBINH** is used to specify whether the storage bins are to be blocked or unblocked. An X must be sent in the field 'BLOCK' if the bins are to be blocked and X in the field 'DEBLO' if the bins are to be unblocked.

The individual fields in the segment **E2LBINI** are handled in the same way irrespective of whether the bins are to be blocked or unblocked. The following should be noted with regard to this:

- At least one of the three block indicators 'SKZUA', SKZUE' or 'SKZSI' must be sent.

Blocking Storage Bins

- An asterisk * must be used if the storage bins are to be blocked generically (an entire aisle), e.g. all storage bins that begin with 01: enter = 01* in the field "LGPLA".
- If a blocking reason is transferred in the field 'SPGRU', the associated text must also be maintained in the WM customizing application.

Blocking and unblocking the storage bins from the external system can be **simulated** in the SAP system. We recommend that the procedures that are relevant for you be tested first in this way. The report **RLBBIN00** is available for testing purposes.



If specific storage bins are to be blocked on an individual basis, one E2LBINI segment must be transferred for each storage bin.

Creating/Cancelling Transfer Requirements

The IDoc **WMTRID01** enables you to send transfer requirements from an external system to the SAP system, where they can then be generated, or to cancel transfer requirements that have already been sent.

The partner profile input must be maintained for the message type **WMTREQ**.

In contrast to direct transfer order generation, no search strategy has yet been implemented in the warehouse by means of the transfer requirement.

The transfer requirement is used to plan a goods movement. Examples of this include transfer requirements that are preplanned from production. The actual stock placement procedure, i.e. generation and processing of transfer orders with reference to the transfer requirements could then take place in real-time when the product is completed.

The transfer requirements also represent requests for goods movements. An example of this is a request from the production plant to supply specific goods. The production plant specifies the materials and the respective quantities that are required as well as the time and location at which these must be made available. In the warehouse, the transfer requirements generated from the requests are converted to transfer orders so that the materials can be supplied to the production plant.

The IDoc WMTRID01 comprises two segments, namely the header data **E2LTRQH** and the item data **E2LTRQI**. Both segments are described in the following. The columns "Req." and "Comments" refer to required fields in which inputs must be made by the external system in order to generate the transfer requirements. The fields that are required for cancellation purposes are described separately.

E2LTRQH

Field	Format	Designation	Req.	Comments
LGNUM	CHAR 3	Warehouse number	X	
TBNUM	CHAR 10	Transfer requirement for IDoc		
TRART	CHAR 1	Transfer type		
TBPRI	CHAR 1	Transfer priority		
TBKTX	CHAR 40	Header text of transfer requirement		
BNAME	CHAR 12	User name		
BETYP	CHAR 1	Requirement type		
BENUM	CHAR 10	Requirement number		
BWLVS	CHAR 3	Movement type for Warehouse Management	X	
VLTYP	CHAR 3	Source storage type		
VLPLA	CHAR 10	Source storage bin		
NLTYP	CHAR 3	Destination storage type		
NLPLA	CHAR 10	Destination storage bin		
PDATU	CHAR 8	Date of planned execution of transfer request		

Creating/Cancelling Transfer Requirements

PZEIT	CHAR 6	Time of planned execution of transfer requirement		
LZNUM	CHAR 20	Additional reference number for transport	x	For cancellation
TBRUE	CHAR 1	Indicator for verifying transfer requirement		
KTBAE	CHAR 1	Flag: Change transfer requirement	x	For cancellation

E2LTRQI

Field	Format	Designation	Req.	Comments
TBPOS	CHAR 4	Transfer requirement item for IDoc		
MATNR	CHAR 18	Material number	X	
WERKS	CHAR 4	Plant	X	
BESTQ	CHAR 1	Stock category in the Warehouse Management system	x	If stock with qualification
CHARG	CHAR 10	Batch number	x	if material is to be handled in batches
SOBKZ	CHAR 1	Special stock indicator	x	If special stock
LSONR	CHAR 24	Special stock number	x	If special stock
MENGE	CHAR 15	Transfer request qty	X	
MEINS	CHAR 3	Unit of measure	X	
WEMPF	CHAR 12	Goods recipient		
ABLAD	CHAR 25	Unloading point		
WENUM	CHAR 10	Goods receipt number		
WDATU	CHAR 8	Date of goods receipt		
ZEUGN	CHAR 10	Certificate number		
ELIKZ	CHAR 1	Indicator: delivery complete		
VFDAT	CHAR 8	Expiration date or best-before date	x	If expiration date of the material is to be checked
LGORT	4 R	Storage location		
L2SKR	1 R	Relevance of 2-step picking		Can be initial or have the value 2.

In addition to the fields marked with X, it may also be necessary for **other data** to be transferred from the external system. The scope of the data required in this IDoc must be determined on case-to-case basis. The contents and scope of the IDoc are determined by the type of request, e.g. stock placement from the production plant or supply of goods to the production plant, and the fields of the IDoc that are to be sent by various WM

Generating Transfer Requirements

Generating Transfer Requirements

The following must be taken into consideration when the segments are generated:

E2LTRQH

- The field 'TBNUM' for the transfer requirement tracking number must not be sent as the number is assigned in the WM system.
- The fields 'BETYP' and 'BENUM' must be sent if the requirement tracking number is expected by the movement type. The reference to the cause of the goods movement can be represented by means of the requirement tracking number, e.g. if the value 'F' is transferred in the field 'BETYP' and the production order number in the field 'BENUM' when a goods receipt from the production plant is announced.
- Transmission of the SOURCE and DESTINATION data (storage type and storage bin) depends on the definition of the movement type and can be used to define the destination of the goods movement more precisely.
- The fields 'PDATU' and 'PZEIT' can be used to specify when the transfer requirement is to be executed, i.e. when the requirement is to be converted to goods movements
- The field 'LZNUM' is used for an additional reference number. The transfer requirement generated from the IDoc in the WM system is assigned a separate transfer requirement tracking number. The reference number must be assigned in the external system and transferred to the WM system so that, from the point of view of the external system, this transfer requirement can be clearly identified. This reference number is required if a transfer requirement, that has already been generated, is cancelled via this IDoc. The transfer requirement to be cancelled can only be accessed in the WM system via the unique reference number.
- The field 'TBRUE' is currently not used in the standard system. It is intended for customer configurations if it is necessary for the processed transfer requirements to be reported by the external system to the WM system.

E2LTRQI

- The fields 'ABLAD' and 'WEMPF' can be used to determine the exact destination for the goods movement in accordance with the item, e.g. a transfer requirement is generated in order to supply several materials for a production order in the production plant. The production storage type is determined in the header of the transfer requirement. The individual materials, however, are required at several work centers. The individual work centers can be transferred in the field 'WEMPF'.
- The fields 'WENUM' and 'WDATU' are used if notification of the goods receipt is to be sent or if the goods receipt is to be planned with the transfer requirements that have been sent.

Cancelling Transfer Requirements

The following must be taken into consideration when the segments are generated:

E2LTRQH

- The following fields must be sent:
- 'LGNUM'
- 'LZNUM'

E2LTRQI

- The field 'TBPOS' for the transfer requirement item is a consecutive number within a transfer requirement. This field is not transferred for the generation of a transfer requirement by the external system as the item number is assigned in the WM system when the transfer requirement is generated. Cancellation is carried out item by item, i.e. the transfer requirement item must be known. The external system can, if necessary, transfer the item number. This number must, however, be known in the external system as a consecutive number within the IDoc that was sent beforehand. If the number is not known in the external system, the entire quant identification of an item must be sent, i.e. the fields 'MATNR', 'BESTQ', 'CHARG', 'SOBKZ' and 'LSONR'.
- If the transfer requirement item is to be cancelled completely, an X must be entered in the field 'ELIKZ'. If only a part quantity is to be cancelled, the quantity to be cancelled must be sent. If the quantity is to be increased, a quantity that is to be confirmed as being negative must be sent. The fields 'MENGE' and 'MEINS' must be transferred for this purpose.

Since the contents of this IDoc must be determined in accordance with the **individual requirements of the customer**, it is advisable to **simulate** generation and transmission of the IDoc in the SAP system. You can use the test report **RLTREQ00** for this purpose. Further details on using this test report can be found in the documentation for the report.

Moving Storage Units

Moving Storage Units

The IDoc **WMSUID01** can be used to report storage unit movements, such as stock transfers, to the SAP system and trace them there.

The partner profile input must be maintained for the message type **WMSUMO**.

In certain cases it is necessary for a **storage unit** transfer to be initiated in the external system. It is also advisable for the final storage bin assignment in the HRS to be made by the external system when a pallet is placed into stock. The executed storage unit movement must be reported to the WM system. A prerequisite here is that the storage unit is formed in the WM system and is thus also known there. The reported storage unit movement is posted in the WM system.

The IDoc comprises the segment **E2LSUMX** which is described in the following. The "Req." column indicates the fields in which an input must be made.

E2LSUMX

Fields	Format	Designation	Req.
LGNUM	CHAR 3	Warehouse number	X
LENUM	CHAR 20	Storage unit number	X
BWLVS	CHAR 3	Movement type for Warehouse Management	X
LETYP	CHAR 3	Storage unit type	
LZNUM	CHAR 20	Additional reference number for transport	
BNAME	CHAR 12	User name	
KZQUI	CHAR 1	Indicator: confirmation required	
VLTYP	CHAR 3	Source storage type	
VLBER	CHAR 3	Source storage section	
VLPLA	CHAR 10	Source storage bin	
VPPOS	CHAR 2	Position in source storage bin	
NLTYP	CHAR 3	Destination storage type	
NLBER	CHAR 3	Destination storage section	
NLPLA	CHAR 10	Destination storage bin	
NPPOS	CHAR 2	Position in destination storage bin	
STATU	CHAR 1	Status of storage unit	
REFNR	CHAR 10	Reference number	
PERNR	8 R	Processor of the TO (personnel number)	
SOLEX	15 R	Planned processing time from external system	

Using "Move storage unit" you can also include the external planned processing time.

The following must be taken into consideration when the segment **E2LSUMX** is sent:

Moving Storage Units

- The field 'LETYP' for the storage unit type must not be transferred in every case
- The field 'LZNUM' is used when a transfer order is reported
- The confirmation indicator 'KZQUI' should normally not be set as the reported goods movement will already have been executed and is thus no longer subject to confirmation.
- The SOURCE data (source storage type, source storage bin) must not be sent as the storage unit, and thus also the storage bin in which storage unit is currently located, is known in the WM system.
- The field 'NPPOS' is only used in conjunction with a specific stock placement strategy, namely the pallet type strategy, and describes the precise position of the storage unit within a shelf section at which the unit was placed into stock.
- The fields 'STATU' and 'REFNR' are not used by the external system for reporting the movement.

The process by which the storage unit movement is reported by the external system can be **simulated** in the SAP system. We recommend that the procedures that are relevant to you be tested first in this way. You can use the report **RLSUMO00** for this purpose.

Synchronous call of 'L_SU_MOVE_LSR' (new as of Release 3.0D)

In the case of a stock placement via the ID point, it can be appropriate to call up the named function module synchronously (directly) instead of using an IDoc, that is, to explicitly await the SAP reply. The scenario is as follows:

- TO for ID point is send by SAP to the external system. The pallet note is printed in SAP.
- The external system identifies the pallet and carries out the contour check.
- Depending on the result of the contour check, the storage unit type or other data is changed (or perhaps the destination storage type is determined by the external system).
- The external system calls up L_SU_MOVE_LSR synchronously and awaits the destination storage bin (or if has specified the destination, it waits for successful posting in the SAP System).

Possible double postings in SAP can be avoided because SAP can determine for sure where a pallet is located. If the pallet has already been moved, the function module delivers only the actual storage bin.

Inventory in the Warehouse Management System

Inventory in the Warehouse Management System

This section describes the IDoc WMIVID01. It comprises the segment E1LINVX and is used both to send system inventory records and to report count results.

The system inventory records are sent from the Warehouse Management screen: *Physical Inventory* → *Inventory document* → *Print*. The send report is called **RLLI0405**. Enter the receiving system and mark the check box "Send". The inventory records can also be printed out parallel to this. An indicator is updated in both cases. This draws attention to the reprint if the send or print procedure has to be repeated. All of the data of the system inventory record, in particular the storage bin, material and target quantities, and so on, is sent.

The partner profile output must be maintained for the message type **WMINVE**.

The same IDoc is used to receive the count data. One E1LINVX segment must be sent for each counted quant. The receiving sequence is of no relevance here. You can, therefore, send an IDoc with many E1LINVX records without having to worry about the posting sequence in the SAP system.

The partner profile input must be maintained for the message type **WMINVE** for reporting the count results.

The segment E1LINVX has the following structure. The required fields apply when the SAP system is receiving.

E1LINVX

Fields	Format	Designation	Req.	
LGNUM	CHAR 3	Warehouse number	X	
IVNUM	CHAR 10	Number of system inventory record		
IVPOS	CHAR 4	Physical inventory item		
LGTYP	CHAR 3	Storage type	X	
LGPLA	CHAR 10	Storage bin	X	
PLPOS	CHAR 2	Position in storage bin	x	if stock placement strategy P is being used for the storage type
MATNR	CHAR 18	Material number	X	
WERKS	CHAR 4	Plant	X	
CHARG	CHAR 10	Batch number	x	if batch is being used
SOBKZ	CHAR 1	Special stock indicator	x	if special stock
LSONR	CHAR 24	Special stock number	x	if special stock
BESTQ	CHAR 1	Stock category in the Warehouse Management system	x	if Q stock
WDATU	CHAR 8	Date of goods receipt		
LENUM	CHAR 20	Storage unit number	x	if storage type with storage unit management

Inventory in the Warehouse Management System

MENGA	CHAR 15	Quantity for counting result entry	X	either here or quantity 0 KZNUL
ALTME	CHAR 3	Unit of measure	X	
LQNUM	CHAR 10	Quant number		
NANUM	CHAR 2	Recount number		
NVERS	CHAR 2	Recount version		
ISTAT	CHAR 1	Item status of inventory at quant level		
IDATU	CHAR 8	Date of physical inventory		
KZINV	CHAR 2	Inventory method		
IRNUM	CHAR 10	Inventory reference number		
MAKTX	CHAR 40	Material description		
ISEIT	CHAR 4	Inventory page		
LETYP	CHAR 3	Storage unit type		
KZNUL	CHAR 1	Indicator: storage bin empty or quant does not exist		either here or quantity MENGA
VFDAT	CHAR 8	Expiration date or best-before date	x	if expiration date of material is to be checked
LGORT	4 R	Storage location		
UNAME	CHAR 25	Counter name		Permits the transmission of the name of person taking inventory



The report RLINVE00 can be used for testing purposes. This report can be used to test the inventory interface between an external system (external system) and the WM system. Entry of the data by means of a mobile data entry device is simulated in the system.

The system takes the data from existing inventory documents. Input of the IDoc WMIVID01 can thus be simulated in the system. Caution should be exercised in the production system - a document will actually be posted!

General Information Texts

General Information Texts

You can use the IDoc **WMINID01** to send information texts from an external system to the SAP system. These texts are placed as messages in the respective inboxes of the users assigned to the position (see [SAP System Settings and Modification Concept \[Page 115\]](#)).

The partner profile input must be maintained for the message type **WMINFO** for this purpose.

Transmission of the text by the external system can be **simulated** in the SAP system. The report **RLINFO00** is available for this purpose.

The IDoc comprises one segment, namely **E2LINF**. The segment is described in the following.

E2LINF

Fields	Format	Designation	Req.
LGNUM	CHAR 3	Warehouse number	X
ITEXT	CHAR 80	Information text for linking sub-systems to MM-WM	X
DATUM	CHAR 8	Date	
UZEIT	CHAR 6	Time	

SAP System Settings and Modification Concept

Purpose

This section provides you with an overview of the necessary settings within the SAP system and information on additional modifications which are possible in connection with user exits.

Sources of Information

The following information is available:

1. Implementation Guide (online)

Tools → Business engineer → Customizing - Implem. projects → SAP Reference IMG → Logistics Execution → Warehouse management → Interfaces → External systems → Define ALE link

You will be guided through the necessary table settings in order to specify, on the application side, which processes are relevant for an external system.

2. Master menu (online)

Logistics → Logistics Execution → Warehouse management → Environment → External systems → ALE functions

The ALE functions enable dedicated monitoring of the IDocs that have been received and sent.

3. The following documentation (in hard copy form) is also available:

- RFC manual
Detailed technical description of the programming interface.
- ALE manual
General information on ALE and its functions
- WorkFlow manual
General information on the WorkFlow concept (see error handling)

4. Evaluation Report

This evaluation report enables you to display the application object numbers for IDocs that were posted with status 53 (posted without errors). For example, it is possible to see which IDoc number has created which transfer order. The prerequisite is that the application enables this.

To display this report from the menu bar, choose *Environment → External systems → Evaluations → Linked objects*.

Customizing

SAP uses the term "customizing" to refer to the table settings that must be made on the application side in order to specify, for example, when a transfer order is to be sent to an external system etc. Detailed online information on this is available in the system in the Implementation Guide.

SAP System Settings and Modification Concept**Error Handling**

TCP/IP is used as a basis for transmission. If an error occurs during transmission, a fault will occur in the connection between the sender and receiver. The sender is then able to check whether or not a call has been successful via the return codes of the RFC functions used. In the case of TCP/IP errors, the connection must be cleared down and the IDoc resent.

Errors that occur in the ALE layer during transmission and reception of the IDocs are referred to as technical errors. If technical or logical (see below) errors occur, the SAP system will create a work item for each IDoc in error. A work item is part of a work flow. The work item is basically an error message which is sent to all users in the system who are assigned to a specific position. The error message contains the error text. If one of the users picks up the message from their inbox, analyzes the error and posts the document, the error message will disappear from all of the other inboxes.

When the IDoc is received, it is stored in the database before processing is initiated. Communication is thus separate from the processing side. If an error occurs during processing, e.g. posting with an impermissible or incorrect movement type, i.e. a logical application error, the SAP system will create a work item with the appropriate error text.

Activating Error Processing

If a logical error occurs when an IDoc is being processed, a message will be sent to one or several users. This procedure, in accordance with which an error is processed, is described below.

From a technical point of view, the system initiates a standard message-type-specific task. The standard task must be allocated to a position which, in turn, must be assigned users or owners.

You can create one or several positions. These are parenthesized in a central organizational unit.

Various options are available here:

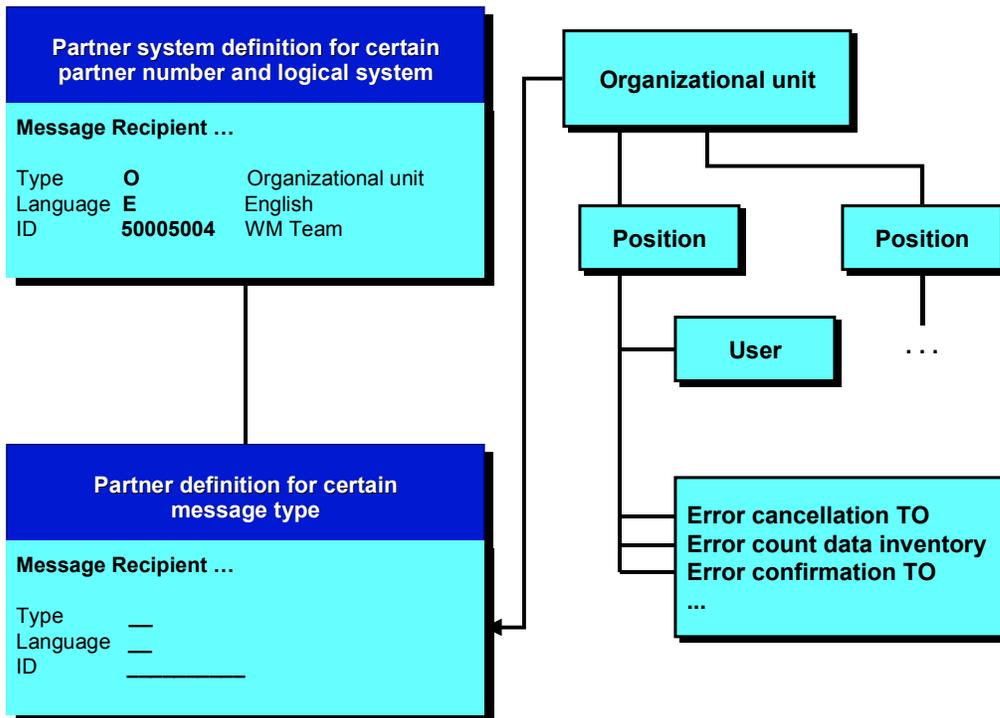
1. You can enter the organizational unit globally in the partner definition and make no further specifications for any of the messages types in the actual partner profile. All of the messages are then sent to the users, who are assigned to the organizational unit, with whose position the Standard task is associated.
2. You can enter a specific position in the partner definition and not the organizational unit.
3. You can also override the entry in the partner definition with entries in the partner profile for a message type.

Under normal circumstances version 1 will suffice. If, however, you have two external systems that have two different warehouse numbers, and the persons dealing with the errors are two different warehouse employees, you can use version 2 to handle the same error via the two different partner numbers.

The hierarchy is illustrated in the following diagram:

Assignment of Error Messages

Activating Error Processing



It is not enough to simply enter user names in the partner definition or profile as the assignment to the standard task cannot be found.

All settings can be made via the Implementation Guide or directly via transaction /nPPOM.

1. An **organizational unit** must first be defined. This corresponds to a root to which many positions can be connected.
2. Create a **position**.
3. Assign the appropriate users.
4. Assign the **standard tasks**.

Standard tasks for IDoc processing (technical errors)

Choose *Cross-application Components* → *Distribution (ALE)* → *Error handling* → *Create organizational units and assign standard tasks* in the Enterprise IMG.

ALE/EDI: Error handling (outbound)
ALE/EDI: Error handling (inbound)
ALE/EDI: Syntax errors (outbound)

ALE/EDI: Syntax errors (inbound)

Standard tasks for WM, IM application (logical errors)

Choose *Interfaces* → *External systems* → *Define ALE Link* and then *Ort.unit standard tasks* in the Warehouse Management IMG.

- Error cancellation TO
- Error inventory count data
- Error confirm TO
- Error goods movements
- Error transfer orders
- Error moving storage unit
- Error blocking storage bins
- Error transfer requirement
- Information

Standard tasks for SD application (logical errors)

- Error shipping element data confirmation
- Error picking confirmation

Displaying the Inbox

Displaying the Inbox

You can individually set the display mode of the inbox. A recommended setting is described below.

Procedure

1. Call transaction `/nSIN1`.
2. Choose *Settings* **Configuration** and create a new setting.
3. Choose the push-button Start configuration.
In that way you ensure that you always use this configuration automatically. Save your changes.
4. Choose *Settings* **Group**.
5. Choose those fields from the right-hand column that are to be used to sort the overview display by double-clicking them.
We recommend: 1 "Task" and 2. "Created on".
6. Choose *Settings* **Select columns**
7. Choose those fields from the right-hand column that you want to see in the detail display by double-clicking them.
We recommend: 1. "Viewed", 2. "Process ", 3. "Description ", 4. "Author ", 5. "Date received ", 6. "Time received", and 7. "Status".

Error Analysis

[Technical Errors in the ALE Service Layer \[Page 122\]](#)

[Logical Errors in the Application \[Page 124\]](#)

Error Analysis

Technical Errors in the ALE Service Layer

The following errors can occur in the ALE service layer:

- IDoc syntax error
- Missing partner profile
- IDoc was not transferred to aRFC when it was sent
- IDoc was not transferred to the application when it was received

Output

IDoc syntax error: IDoc status '07'

The syntax of the individual IDocs is checked when these are sent and received. The syntax is defined when the IDoc is defined:

- Individual segments of an IDoc type
- Relationship between the individual segments
- Number of segments that can be sent in an IDoc

The syntax check for the IDoc can be activated in the partner profile for an IDoc type and a specific partner. We recommend that you activate this check in particular for IDocs that you have generated yourself. This error usually only occurs in the test mode. The IDocs in error cannot be repaired and must, therefore, be sent again after the IDoc structure has been corrected in the SAP system.

Missing or incorrect partner profile: IDoc status '29'

When an IDoc is **sent** from the SAP system to the external system, the output of the partner profile for the IDoc type (message type) and all relevant partners must be defined. A detailed description of the partner profiles can be found in the online documentation of the Implementation Guide (IMG). Proceed as follows if it is not possible to determine the partner (external system) for the IDocs to be sent:

- The partner profile must be maintained again
- All IDocs that are waiting to be sent must be activated so that they can be sent again. Since, in the case of this error, a work item for the standard task 'ALE/EDI: Error handling (outbound)' is initiated and placed in the inboxes of the appropriate users, retransmission of the IDoc in error must be activated from the inbox. When the IDoc in error is transmitted again, it is assigned the status '31' and is copied to a new one to which the data from the partner profile is added and which is then transferred to the aRFC.

Errors in the partner profiles usually only occur in the test mode.

The IDoc was not transferred to aRFC when it was sent: IDoc status '30'

The IDoc was not transferred to the aRFC although the partner profile has been maintained, i.e. the IDoc was generated but not sent. Furthermore, it is not possible to find an open entry in the RFC transaction evaluation (/nSM58) for the appropriate external system. The IDoc is indeed ready to be sent but transmission of the IDoc must be activated explicitly.

This is carried out by means of the report RSEOUT00 which is scheduled as a periodic job or can be started directly via the WM menu *Environment* → *External systems* → *ALE functions* → *Periodic processing* → *Process ALE outbound IDocs*.

The output mode for the appropriate IDoc should be tested in this case in the partner profile. In output mode '2' the generated IDoc is sent directly, in output mode '4', the IDocs are grouped together and sent in defined packet sizes. Mode '4', therefore, specifies explicitly that the IDocs are not to be sent directly.

Status '30' in the IDoc can usually only occur in conjunction with the output mode '4'.

Input

IDoc syntax error: IDoc status '60'

As with the output, the syntax check for the IDoc can be activated with the partner profile for an IDoc type and a specific partner. It is advisable to activate this check. This error usually only occurs in the test mode. The IDocs in error cannot be repaired and must, therefore, be sent again after the IDoc structure has been corrected in the transmitting system.

Missing or incorrect partner profile: IDoc status '63'

The input of the partner profile for the IDoc type (message type) and the transmitting partner must be defined when an IDoc is **received** by the SAP system. A detailed description of the partner profiles can be found in the online documentation of the Implementation Guide (IMG). If it is not possible to find the partner profile for the IDocs that have been received and thus the input method, the application for processing the IDoc cannot be activated and the IDoc remains in the system with its status set to open. Proceed as follows if this error occurs:

- the partner profile must be maintained again
- all open IDocs must be reactivated so that they can be processed. Since, in the case of this error, a work item for the standard task 'ALE/EDI:Error handling (inbound)' is initiated and placed in the inboxes of the appropriate users, the application for processing the IDoc in error must be reactivated from the inbox.

Partner profile errors usually only occur in the test mode.

The IDoc was not transferred to the application when it was received: IDoc status '64'

The IDoc that was received has not been processed and has not been identified as being in error although the partner profile has been maintained, i.e. the application for processing this IDoc was not activated. The IDoc is indeed ready to be transferred to the application, the application for processing the IDoc must, however, be activated explicitly.

This is carried out by means of the report RBDAPP01 which is scheduled as a periodic job or can be started directly via the WM menu *Environment* → *External systems* → *ALE functions* → *Periodic processing* → *Process ALE outbound IDocs*.

The check carried out on the processing type in the partner profile when the IDoc was sent must also be performed here. In processing mode '1' the IDocs are transferred to the application for processing as soon as they are received. Processing mode '3' and, to a certain extent mode '2', therefore clearly specify that processing is to be activated explicitly and not carried out directly.

Status '64' in the IDoc can usually only occur in conjunction with mode '3' and '2'.

Error Analysis

Logical Errors in the Application

The errors described in the application refer to the receipt (input) of an IDoc in the SAP system. The IDoc to be transferred is generated in the application when it is output. Errors caused as a result of missing or incorrect customizing settings for this connection are, therefore, reported directly in the SAP system, e.g. when the transfer order is generated or the reference number is released.

The following errors can occur in the application when an IDoc is received in the SAP system.:

- Missing or incorrect customizing settings in the SAP system
- Missing or data in error in the IDoc
- Errors caused by blocked objects
- The IDoc in error is assigned the status '51'.

Missing or incorrect customizing settings in the SAP system

The IDoc received cannot be processed in the SAP system as certain data in the IDoc are not maintained in the system, e.g. a movement type that is not defined in the SAP system is transferred with a goods movement reported by the external system. The appropriate customizing settings must be made in the case of these errors. Posting of the IDoc in error can then be activated. The IDoc can be posted either from the inbox of an appropriate user or via the report RBDMANIN which is scheduled as a periodic job or which can be started directly via the WM menu *Environment* → *External systems* → *ALE functions* → *Periodic processing* → *Process ALE outbound IDocs*.

Furthermore, it is not possible to process the IDoc if the IDoc data does not correspond to the customizing settings, e.g. the goods movement reported by the external system is to be confirmed directly. Immediate confirmation is, however, not possible with the movement type for this goods movement. The customizing settings must, in this case, first be adapted before posting of the IDoc in error can be activated from the inbox of an appropriate user or via the report RBDMANIN.

Missing or data in error in the IDoc

If the data in the received IDoc is incomplete, the user must decide whether the IDoc in error is to be sent again or whether it is possible or even practical to correct it in the SAP system. Corrections can be made directly to the IDoc or, in the case of certain IDocs, posting can be carried out by means of a dialog and the data thus corrected directly in the SAP transaction. Corrections to the IDoc can, in principle, be made via the IDoc editor. This should, however, only be used in exceptional cases. When postings are made by means of a dialog, corrections to the data are only possible when the inventory is reported (IDoc WMIVID01).

As with the errors in the customizing settings, the IDoc in error can be posted from the inbox of an appropriate user or via the report RBDMANIN.

Errors caused by blocked objects

Problems are often encountered in the SAP system if the user wishes to block individual objects. If an attempt to access an SAP object results in a conflict, processing will be aborted and a message output to indicate the blocked object. This error is treated in the same way as all other errors that occur when an IDoc is being processed. No response is, however, required from the user in order to rectify the error. The problem will be solved automatically when the IDoc is processed again at some later point in time. The background processing function (periodic job) of the report is thus an effective tool for posting the IDocs. Using the parameter 'Error status' of this

report, posting can be restricted for certain errors by means of an error message identification; in this case only for the error messages of a blocking error.

Important information in the inbox

A work item is created and placed in the inboxes of the appropriate users for all of the errors described. The work items are also used for a number of important messages which are either sent directly by the external system or generated internally in the application when the IDoc is being processed. These work items are not used to enable processing of the IDoc to be reinitiated from the inbox. They are used to inform the user of a conflict or to pass on an important message from the external system to the SAP system. This message is transferred to the SAP system via the IDoc WMINID01. An internal message is issued, for example, if an attempt is made to confirm a transfer order or storage unit that has already been confirmed. This means that confirmation is no longer possible. This must be reported to the appropriate person as confirmation can usually only be carried out by the external system.

The work item for these messages must not be processed in the same way as the other errors in the inbox but must be completed.

Modification Concept

Modification Concept

This section provides you with an overview of the customer exits that are relevant to the interface and the ways in which processing can be modified.

[Input \(Receiving IDOCs from the External System\) \[Page 127\]](#)

[Output \(Sending IDOCs to an External System\) \[Page 130\]](#)

[List of User Exits \(SAP User Exits\) \[Page 132\]](#)

Input (Receiving IDocs from the External System)

Use

The following modification scenarios are possible:

1. You are using the standard IDoc but want to process the IDoc in accordance with your own requirements.
2. You are using the standard IDoc but want to modify standard IDoc processing, i.e. error handling is to be modified or the contents of the IDoc are to be interpreted in accordance with the individual requirements of the customer.
3. You are using a modified IDoc with your own segments and want to process the data from these segments in a certain way.
4. You are using a modified IDoc with your own segments and want to define the procedure for processing the IDoc yourself.
5. You are using your own IDoc with a new message type and have to define the procedure for processing the IDoc yourself.

The various modification options are described in the following.

After an IDoc has been received and saved, a master function module in the SAP application, which assumes responsibility for processing an IDoc, is activated. This is the first situation in which you can intervene by generating **your own processing function module**. You must enter this module in an ALE customizing table so that it can be called (transaction */nSALE : Inbound* → *Control* → *Methods (inbound)*). The key of the table is, in addition to the message type, also **message variant** and **message function**. This means that you can define an additional partner profile for a specific message variant and function which is specified for the IDoc in the external system. The master function modules available are assigned, as standard, to the following message types:

Input master function modules

WMBBIN	L_IDoc_INPUT_WMBBIN	Block storage bins
WMCATO	L_IDoc_INPUT_WMCATO	Cancellation TO
WMINFO	L_IDoc_INPUT_WMINFO	Information
WMINVE	L_IDoc_INPUT_WMINVE	System inventory records
WMMBXY	L_IDoc_INPUT_WMMBXY	Goods movements
WMSUMO	L_IDoc_INPUT_WMSUMO	Move storage unit
WMTOCO	L_IDoc_INPUT_WMTOCO	Confirm TO
WMTORD	L_IDoc_INPUT_WMTORD_MULTIPLE	Transfer orders (TO)
WMTREQ	L_IDoc_INPUT_WMTREQ	Release reference number
SDPICK	SD_IDoc_INPUT_PICKING	Report delivery quantities
SDPACK	SD_IDoc_INPUT_PACKING	Report shipping elements

The master function module filters the useful data for each IDoc and calls the actual processing function module in the application in a loop. A **customer exit** is implemented both immediately

Modification Concept

before and after this function module is called. You can use the exit after the call to update a *user-defined error status* or to change the set error status. You can use the exit before the call to carry out *user-defined updates*, for example, or to evaluate your own segments that you added to the IDoc definition. You can define **your own IDoc segments** in the IDoc maintenance transaction (/nWE30). Refer to the appropriate ALE group documentation.

The source code of the master function modules contain the names of the customer exits.

Make sure that **no commit work** is issued when generating your own function module or when using the customer exits as the function module branches back to the ALE service layer, after processing has been completed; application errors that have occurred are updated, the IDoc status is set and even rollbacks, should these be necessary, are performed here. After a commit work, it would no longer be possible to perform a rollback in the event of an error. This would result, in certain cases, in partially-posted IDocs and thus inconsistent error processing.

It should be noted that additional I/Os which take place in the customer exits can have a negative affect on performance.

If you create your **own master function modules**, the SAP system offers a series of general-purpose function modules for the various tasks to be performed. Refer also to the above master function modules with regard to this.

Input auxiliary function modules

L_IDoc_CONTINUE_SAVE	Buffer application objects for follow-up actions
L_IDoc_CREATED_OBJECTS_SAVE	Buffer the documents generated from an IDoc
L_IDoc_ERROR_SAVE	Buffer IDocs in error
L_IDoc_INPUT_REFRESH	Initialize for processing IDocs (table refresh)
L_IDoc_OK_SAVE	Buffer processed IDocs
L_IDoc_RETURN_CREATE	Determine and generate status record of the IDocs
L_IDoc_ROLLBACK_SAVE	Update IDoc tables after necessary rollback
L_IDoc_STATUS_CREATE	Determine and generate status record of the IDoc
L_IDoc_TIDoc_FETCH	Display the internal table to update the status

You can define your **own IDoc** (intermediate document type) in the same way as you maintain your own segments. This IDoc must be assigned to a new message type. You must maintain the partner profile for the new message type. The input tables must continue to be maintained in the transaction /uSALE. The standard task TS 0000 8049 can be used for error processing.

The following modifications can be made in the individual modification scenarios:

1. You can implement your **own processing function module** for processing the IDoc. This module can be copied from the standard function module of the respective message type and adapted accordingly.
2. You can activate the **customer exits** in the standard function module. You must activate and implement the customer exit for a *user-defined error status* if you wish to modify error handling. The customer exit for *user-defined updates* must be activated and implemented if IDoc processing is to be modified.
3. You can define **your own IDoc segments** in the standard IDoc and use the customer exit for *user-defined updates* to process data from your own segments.

Modification Concept

4. You can define **your own IDoc segments** in the standard IDoc and implement your **own processing function module** as in scenario 1.
5. You can define **your own IDoc segments** and implement your **own processing function module**. The standard auxiliary function modules can be used when generating the function module.

Modification Concept

Output (Sending IDocs to an External System)

Use

The following modification scenarios are possible:

1. You are using the standard IDoc but want to modify standard processing, i.e. the structure of this IDoc.
2. You are using the standard IDoc but want to specify yourself when and to whom a transfer order item is to be sent, i.e. not use the default procedure of the interface.
3. You are using a modified IDoc with your own segments and want to initiate your own processing sequence for generating the data of this segment.
4. You are using a modified IDoc with your own segments and want to define the procedure for processing the IDoc yourself, i.e. structure the IDoc yourself.
5. You are using a modified IDoc with your own segments and do not want to use the default procedure of the interface as in scenario 2.
6. You are using your own IDoc with a new message type and have to define the procedure for processing the IDoc yourself.
7. You are using your own IDoc with a new message type and do not want to use the default procedure of the interface as in scenario 2.

The individual options are described in the following.

The preparatory steps for sending IDocs are carried out within the application. The IDoc is generated, the partners determined and the ALE layer activated. The IDoc is generated in the application function modules.

This is the first situation in which you can intervene in the WM system by generating your **own processing function module**. You must enter this module in a WM customizing table (see customizing setting of the interface in the WM system) so that it can be called by the application.

The WM system uses the following function modules to generate and send IDocs:

Output function modules

L_IDoc_CREATE_WMTOID01	Transfer orders
L_IDoc_CREATE_WMRRID01	Release reference number
L_IDoc_CREATE_WMCAID01	TO cancellation request
L_IDoc_CREATE_WMIVID01	System inventory records

Take a look at the function modules. **User exits** can also be used here to add your own IDoc segments or modify the structure of the standard IDoc.

If the standard interface in the WM system is not to be used because you want to decide yourself when the external system is to be interfaced and to which external systems the data is to be sent, you must configure the interface yourself. The interface in the WM system must not be activated in this case. The general WM user exit MWMTO001 'Extensions for end of transfer order generation' can be used if you are **configuring the interface yourself**.

Modification Concept

You can define **your own IDoc segments** in the IDoc maintenance transaction (cf. input). It is also possible to define a **customer-specific IDoc** for the output. All that is needed here in addition to the IDoc definition is the partner profile output.

If you want to generate **your own send function module** from your application, you can simplify the procedure by using the following function modules which are already used in the SAP send modules.

Output auxiliary function modules

L_IDoc_HEADER_CREATE	Generate the necessary EDIDC data for each IDoc
L_IDoc_SEGMENT_CREATE	Generate an IDoc segment
L_IDoc_SEND	Send the generated IDocs
L_IDoc_FETCH	For accessing the data in your program after calling your IDoc_CREATE_....

The following modifications can be made in the individual modification scenarios:

1. You can implement your **own processing function module** for processing the IDoc. This module can be copied from the standard function module of the respective message type and adapted accordingly.
2. You can activate the **customer exit** in the standard function module in order to modify the standard IDoc structure.
3. You can set up **your own interface** between the WM system and the external system.
4. You can define **your own IDoc segments** in the standard IDoc and use the customer exit to enter data in your own segments.
5. You can define **your own IDoc segments** in the standard IDoc and implement your **own function module** that can be copied from the standard function module of the respective message type and adapted accordingly.
6. You can define **your own IDoc segments** in the standard IDoc and set up your own interface between the WM system and the external system.
7. You can define **your own IDoc** and implement your **own function module**. You can use the standard auxiliary modules when generating the function module.
8. You can define your own IDoc and set up your own interface between the WM system and the external system.

SAP Customer-Exits

SAP Customer-Exits

Customer-Exits

Dev.Cl.	Exit	Name
MB	MB_CF001	Update the material document (output)
VL	VMDE0001	Error handling IDoc input for SDPICK and SDPACK
VL	VMDE0002	Message PICKSD (Picking, output)
VL	VMDE0003	Message SDPICK (Picking, input)
VL	VMDE0004	Message SDPACK (Packaging, input)
LVS	MWMIDI01	Error handling for IDoc input for IDocs: WMTOCO, WMCATO, WMBBIN, WMTREQ, WMSUMO together
LVS	MWMIDI02	Message WMTOCO (Confirm TO) input
LVS	MWMIDI03	Message WMCATO (Cancel TO) input
LVS	MWMIDI04	Message WMBBIN (Block stor.type.) input
LVS	MWMIDI05	Message WMTREQ (Create TR) input
LVS	MWMIDI06	Message WMSUMO (Move stor.unit) input
LVS	MWMIDO07	Error handling for IDoc input: MDE for IDocs: WMMBXY, WMINVE, WMTORD together
LVS	MWMIDO08	Message WMMBXY (Goods movement) input
LVS	MWMIDO09	Message WMINVE (Count data inventory) input
LVS	MWMIDO10	Message WMTORD (Create TO) input
LVS	MWMIDO01	IDoc WMTOID01 (Transfer order) output
LVS	MWMIDO02	IDoc WMCAID01 (Cancel request TO) output
LVS	MWMIDO03	IDocs WMRRID01 (Release ref.number) output
LVS	MWMIDO04	IDocs WMIVID01 (System inventory record) output

Sending Documents to External Systems

The standard version of Rel. 3.0 does not support the transfer of goods movement documents to an external system, e.g. reporting goods receipts. It is, however, possible to send documents of this type in connection with a customer exit. The name of the module is **EXIT_SAPLMBMB_001** in the function group XBMG. The module is called via **CALL CUSTOMER FUNCTION '001'**.... Transaction /nSMOD can be used to obtain an overview of the customer functions available. The functions are activated with transaction /nCMOD. The module is called from the goods movement update task. It belongs to the development class 'MB'.