

Test Catalog

Warehouse Control Systems

WM-LSR



R/3 Enterprise Release 4.7

Version 0.7



Copyright

© Copyright 2002 SAP AG. All rights reserved.

No part of this brochure 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® and SQL Server® are registered trademarks of Microsoft Corporation.

IBM®, DB2®, OS/2®, DB2/6000®, Parallel Simplex®, 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, California, USA.

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, Laboratory for Computer Science NE43-358, Massachusetts Institute of Technology, 545 Technology Square, Cambridge, MA 02139.

JAVA® is a registered trademark of Sun Microsystems, Inc., 901 San Antonio Road, Palo Alto, CA 94303 USA.

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

SAP, SAP Logo, mySAP.com, mySAP.com Marketplace, mySAP.com Workplace, mySAP.com Business Scenarios, mySAP.com Application Hosting, WebFlow, R/2, R/3, RIVA, ABAP, SAP Business Workflow, SAP EarlyWatch, SAP ArchiveLink, BAPI, SAPPHIRE, Management Cockpit, SEM, 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.

Typographic Conventions

This type style	Represents
<i>Interface Text</i>	words or characters that appear on the screen. This includes system messages, field names, screen titles, pushbuttons, menu names, and menu options.
<i>Document Title</i>	cross-references to other documentation
User Entry	exact user entry. These are words and characters that you enter exactly as they appear in the documentation.
< Variable User Entry >	variable user entry. Pointed brackets indicate that you replace these words and characters with appropriate entries.
NAME	names of elements in the R/3 System. These include report names, program names, transaction codes, table names, ABAP/4 language elements, file names, and directories.
KEY	keys on your keyboard. These include function keys (for example, F2) and the ENTER key, among others.
This icon	helps you identify
 Note	a note. Notes contain important information like special considerations or exceptions.
 Example	an example. Examples help clarify concepts or procedures.
 Caution	a caution. Cautions help you avoid errors such as those that could lead to data loss.

Contents

1	Introduction.....	5
1.1.1	Purpose of this document	5
1.1.2	Related Documents	5
1.1.3	Overview	5
2	Test Preparations.....	7
2.1	Customizing of R/3 system.....	7
2.2	Structure of organization.....	7
2.3	Setting up the connection	8
3	Test Steps	9
3.1	Semantic Test Steps as of R/3 Release 4.0.....	9
3.1.1	Material Master Data Download (Optional).....	9
3.1.2	Putaway without SU Management	10
3.1.3	Internal Warehouse Communication	10
3.1.4	Putaway with SU Management.....	11
3.1.5	Handling of Reference Numbers.....	11
3.1.6	Transfer Requirements (Optional).....	12
3.1.7	Inventory Counting (Optional).....	12
3.2	Semantic Test Steps as of R/3 Enterprise Release 4.7.....	12
3.2.1	Two-step confirmation of Transfer Orders (optional).....	12
3.2.2	Pick and Pack (required for WM-LSR 4.7).....	13
3.3	Technical Test.....	14
3.3.1	TID Handling	14
3.3.2	Error Handling of IDocs.....	14
3.3.3	Status Message for Received Idocs (Optional).....	14
3.3.4	Mass Processing of Incoming IDocs.....	14

1 Introduction

1.1.1 Purpose of this document

This document describes the test that has to be performed to obtain an SAP certificate for the integration of warehouse control systems (WM-LSR).

1.1.2 Related Documents

- Online Documentation for the SAP Warehouse Management System
- Implementation Guide for the SAP Warehouse Management System
- Documentation for the WM-LSR interface
- Implementation Guide for Application Link Enabling (ALE)
- Transactional RFC Technical Description

1.1.3 Overview

In this test catalog, we consider the scenario of a warehouse control system that is coupled to the SAP Warehouse Management System through the interface WM-LSR.

During the testing we will examine if the warehouse control system is properly coupled to the SAP interface, i.e. that it is technically correct and that the basic business processes are supported.

We consider goods transfers in a storage type without storage unit management, in one with storage unit management, and a pick & pack scenario.

Test Environment

The certification test will be performed at one of the ICC certification laboratories, while the vendor candidate has to bring the necessary equipment (computer, keyboard, etc.) with the installed software.

We recommend using the same hardware for certification as for the remote testing. Please check beforehand that the version of the RFC Libraries used is in accordance with the operating system and the hardware platform.

The vendor's system will be integrated in SAP's network. The network topology is Ethernet. The connections are type RJ45. The used protocol is TCP/IP. The integration and the test of relevant settings will be done in the presence of an ICC member.

Certification Requirements

The IDocs with the following message types have to be processed by the vendor's software:

- WMTORD
- WMTOCO
- WMCATO
- WMRREF
- WMSUMO

- WMBBIN

To achieve a certificate for the Enterprise Release, also the following message type has to be processed:

- WMPIHU

2 Test Preparations

2.1 Customizing of R/3 system

The configuration of the warehouse and the customizing of the partner profile are done by SAP before the certification day.

2.2 Structure of organization

- Plant: 1000
- Storage location: CERT
- Warehouse number: CER, with the following storage types:
 - 001: High rack storage without storage unit (SU) management
 - Storage bins (aisle-stack-level) 01-01-01 to 04-10-10
 - Storage Section 001 (fast moving items), aisles 01 and 02
 - Storage Section 002 (slow moving items), aisles 03 and 04
 - 010: High rack storage with SU management
 - Storage bins (aisle-stack-level) 01-01-01 to 04-10-10
 - 011: ID point and pick point for storage type 010
 - 902: Goods receipt area
 - 910: Goods issue area
 - 916: Shipping area deliveries
 - 999: Interim storage area for differences; difference indicators:
 - ‘ ‘ (Space): Stock difference
 - 1: Theft
 - 2: Source storage bin
- Movement types:
 - 101: Goods receipt for purchase order
 - 255: Goods issue general
 - 501: Goods receipt without purchase order
 - 601: Goods issue to delivery note
 - 999: Warehouse supervision
- Blocking reasons:
 - 1: Maintenance
 - 2: Access blocked
- Allowed packaging materials:
 - CER-VER1

- CER-VER2
- Suggested statuses for the SYSTAT01 IDoc (message type STATUS):
 - 12: Dispatch OK
 - 14: Interchange Acknowledgement positive
 - 15: Interchange Acknowledgement negative
 - 16: Functional Acknowledgement positive
 - 17: Functional Acknowledgement negative

2.3 Setting up the connection

The R/3 system will communicate with the vendor system through transactional RFC (tRFC). The logical system name and the name for the RFC destination are both CERT_LSR.

The RFC server program will have to register on the gateway of the SAP test system. The program ID can be chosen by the vendor and will be entered in the R/3 system using transaction SM59.

Due to our firewall between the internal SAP network and the network for the test systems, no gateway in the internal network can be chosen. Furthermore, all communication has to pass through an SAP router provided by SAP.

The network details and the name and password for the RFC client program will be provided on the testing day.

3 Test Steps

3.1 Semantic Test Steps as of R/3 Release 4.0

3.1.1 Material Master Data Download (Optional)

An optional step is the synchronization of the main master data. This data is sent from the R/3 system to the decentralized WM. The amount of the transmitted data will be limited by using filters and reduced IDoc types.

We have to distinguish between the initial download where all data is sent at once and later incremental synchronizations that have to occur when data was changed in the R/3 system.

Creation of reduced message type

The vendor has to create a reduced message type from the standard message type MATMAS so that only the necessary information is transferred to the Decentralized Warehouse.

The creation is done in the customizing under: *Basis Components* → *Application Link Enabling (ALE)* → *Modeling and Implementing Business Processes* → *Master Data Distribution* → *Scope of Data for Distribution* → *Message Reduction* → *Create Reduced Message Type* (transaction BD53).

After the creation the new message type has to be included in the Distribution Model.

Initial data transfer

To call up the initial material data transmission, select:
Tools → *ALE* → *Master Data Distribution* → *Cross-application* → *Material* → *Send* (transaction BD10)

On the selection screen, specify the materials to be sent and the logical system they are to be transmitted to. The data will be sent in an IDoc of the chosen message type.

The vendor system has to show which data was sent and that all the important information like e.g. material number, description, and base unit of measurement was interpreted correctly. Furthermore, the packaging information (*material group packaging material* and *packing material group*) has to be interpreted in order to allow for an automatic finding of allowed packaging materials.

Transmission of changes

During the certification test, one material will be changed. The changed material will be sent in an IDoc of the chosen message type. For the certification, this will be done manually through *ALE* → *ALE Administration* → *Services* → *Change pointers* → *Process* (transaction BD21) and a selection of the appropriate message type.

The vendor system has to update the material accordingly.

3.1.2 Putaway without SU Management

Receiving a Transfer Order (WMTORD)

Create a transfer order (transaction LT01) from the goods receipt zone to the high rack storage 001. Movement type varies, material varies. The order can contain several line items. This transfer order is sent to the vendor's system via an IDoc of message type WMTORD.

Verify the data received by the vendor and compare it to the data sent.

Confirming a Transfer Order (WMTOCO)

The transfer order just received is confirmed with a difference. First, only one line item should be confirmed in an IDoc of message type WMTOCO. After that, the remaining line items should be confirmed in one separate IDoc.

The inbound IDocs are checked in the IDoc monitor (transaction WE05). Furthermore, the status of the transfer order is checked (transaction LT21).

Cancellation Request for a Transfer Order from SAP R/3 (WMCATO)

A new transfer order is created as before. This transfer order is marked for cancellation in the SAP warehouse management (transaction LT15), which creates an IDoc of message type WMCATO.

The warehouse control system has to check if the corresponding is already being processed. If so, the cancellation request has to be declined. Otherwise, the request can be confirmed. In both cases, an IDoc of message type WMCATO has to be sent.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). Furthermore, the status of the transfer order is checked (transaction LT21).

Cancellation of a Transfer Order by Warehouse Control System (WMCATO)

The vendor has to be able to cancel a transfer order without a cancellation request.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). Furthermore, the status of the transfer order is checked (transaction LT21).

3.1.3 Internal Warehouse Communication

Blocking an Aisle (WMBBIN)

In the high rack storage 001 the aisle 02 should be blocked. The corresponding bin in the IDoc of message type WMBBIN should be '02*', for allowed blocking reasons, see 2.2.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). Furthermore, the aisle is checked in the bin status report (transaction LX03) or in transaction LS08.

Unblocking an Aisle (WMBBIN)

The blocked storage bins should be unblocked again. For this, an IDoc of message type WMBBIN has to be sent again.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). Furthermore, the aisle is checked in the bin status report (transaction LX03) or in transaction LS08.

Information Text (WMINFO) (Optional)

An information text is sent to the SAP warehouse management system by using the message type WMINFO.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). Furthermore, the message text is checked in the respective inbox (transaction SIN1).

3.1.4 Putaway with SU Management**Transfer of goods to the ID point (WMTORD, WMTOCO)**

A transfer order is created from the goods receipt zone to the ID point (storage type 011) of the high rack storage 010. The TO contains an SU number.

This transfer order should be confirmed as in the case without SU management.

Repalletization at ID point (WMTORD) (optional)

If a contour control shows that a repalletization is necessary, the warehouse control system sends an incomplete transfer order of movement type 999 with the quantity of the material that has to be moved. The source SU is the one where the goods are taken from, the destination storage type is 011 (ID point). The SAP warehouse management system automatically completes the transfer order with a new SU number. This TO is sent down to the vendor.

The IDocs involved are checked in the IDoc monitor (transaction WE05). The vendor has to check the new SU number.

Putaway of the storage unit by the warehouse control system (WMSUMO)

The warehouse control system picks the destination bin in the high rack storage 010. It communicates the putaway to the SAP R/3 system by sending an IDoc of message type WMSUMO.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). The storage unit is checked (transaction LS33).

3.1.5 Handling of Reference Numbers**Sending of Transfer Orders with a Reference Number (WMTORD)**

Either several transfer requirements (transaction LB01) or several deliveries (transaction VL01N, VL01NO) are created and grouped together. For this group, transfer orders are created and sent to the warehouse control system. The TOs contain the group as a reference number.

The warehouse control system must not process transfer orders with a reference number before the number was released.

Release of a Reference Number (WMRREF)

The group is released in the SAP warehouse management system (transaction LT44), which triggers an IDoc of message type WMRREF.

All transfer orders with this reference number must now be open for processing in the vendor system.

3.1.6 Transfer Requirements (Optional)

Sending a Transfer Requirement (WMTREQ)

The warehouse control system sends an IDoc of message type WMTREQ to create a transfer requirement for a material known in SAP R/3. It has to contain a reference number created by the warehouse control system.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). The processing is verified by listing the transfer requirements for the material used (transaction LB11).

Canceling a Transfer Requirement (WMTREQ)

The transfer requirement created above has to be canceled. The identification works by using the same reference number as in the former IDoc.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). The processing is verified by viewing the details of the transfer requirement (transaction LB03).

3.1.7 Inventory Counting (Optional)

Receiving an Inventory Report (WMINVE)

An inventory report with at least two storage bins is created in the SAP warehouse management system (transaction LI01N) and transmitted to the vendor system (transaction LI04). The report contains empty bins as well as filled ones.

The warehouse control system has to display the inventory report and state which material numbers are expected in the bins involved.

Sending Count Data (WMINVE)

The warehouse control system has to count the data. The vendor has to present a strategy for handling a situation when a material is found in a presumably empty bin or a material number differs from the expected one.

The count data has to be sent back in an IDoc of message type WMINVE.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). Furthermore, the count data are displayed (transaction LI13N).

3.2 Semantic Test Steps as of R/3 Enterprise Release 4.7

3.2.1 Two-step confirmation of Transfer Orders (optional)

Preparation

Switch on the two-step confirmation for the involved movement types (transaction OMLX).

Receiving a Transfer Order for two-step confirmation (WMTORD)

Create a transfer order (transaction LT01) for two-step confirmation. The order can contain several line items. This transfer order is sent to the vendor's system via an IDoc of message type WMTORD.

Verify the data received by the vendor and compare it to the sent data. The vendor has to recognize that the transfer order has to be confirmed in two steps.

Confirming a Transfer Order (WMTOCO) in two steps

A confirmation for the withdrawal and one for the material shipment are sent by the warehouse control unit.

At least one of them has to contain a difference.

The inbound IDocs are checked in the IDoc monitor (transaction WE05). Furthermore, the status of the transfer order is checked (transaction LT21) after each step of the confirmation.

3.2.2 Pick and Pack (required for WM-LSR 4.7)

Receiving a Transfer Order for picking (WMTORD)

Create several deliveries (transaction VL01NO). Group them manually (transaction VG01) or in the delivery monitor (transaction VL06O).

Create a transfer order for multiple deliveries (transaction LT0S). This transfer order is automatically sent to the warehouse control system.

Subsequently, the group is released (transaction LT44).

Verify that the vendor correctly received the IDoc and can relate every item of the transfer order to the corresponding delivery.

Creating Pick HUs (WMPIHU)

The warehouse control system has to create pick HUs for every delivery by sending an IDoc of message type WMPIHU specifying the delivery number and the packaging material (see 2.2), but not the HU number. For one of the deliveries at least two pick HUs should be created.

The inbound IDoc is checked in the IDoc monitor (transaction WE05). If the IDoc was processed successfully, the SAP warehouse management system sends back an IDoc of message type WMPIHU with the correct HU numbers and the corresponding identification of the HU within the transfer order.

Picking into a Pick HU (WMTOCO)

One item of the transfer order is confirmed by specifying the pick HU. There should be a difference.

Splitting the Item of a Transfer Order (WMTOCO)

The next item should be the one with at least two pick HUs. A partial quantity of the item should be picked into one of the HUs and the split indicator in the IDoc be set.

In a subsequent step, the remainder is picked into the other HU.

Picking Several Items into the Same Pick HU and Posting Goods Issue (WMTOCO)

As a last step, several items should be picked into the same pick HU. In the confirmation, the indicator for adjusting delivery quantities and posting goods issue should be set.

The warehouse control system has to make sure that only items that belong to the same delivery can be packed into the same pick HU.

3.3 Technical Test

3.3.1 TID Handling

To make sure, that IDocs are processed exactly once, the vendor has to implement the correct handling of transaction IDs as described in the ALE documentation.

We verify this handling by reviewing the code of the communication programs. Furthermore, we ask the vendor candidate to build exit statements or breakpoints into the program to allow for a simulation of a communication failure. The exact location of these breakpoints differs for the server and the client program.

Test of the Server Program

For the server program, the breakpoint of program exit should be inserted just before the RfcSendData call.

When the breakpoint is executed, the TID should not be in the database table yet, since no COMMIT has been sent yet.

Test of the Client Program

For the client program we need two breakpoints. The first one should be just before RfcIndirectCallEx and the second one before RfcConfirmTransID.

At the time of the first breakpoint, the IDoc data must be associated with the correct TID in the database to make sure that the data can be resent. Furthermore, the client program should have a functionality to provide for a resending of this data.

When the program stops at the second breakpoint, the TID should be set to 'confirmed', to make sure that the data is not sent again if there should be an error in the call of RfcConfirmTransID.

3.3.2 Error Handling of IDocs

If an IDoc was received by the vendor, but could not be posted successfully (e.g. a transfer order contains a material that is unknown to the vendor), it should be possible to reprocess the same IDoc on the vendor side (e.g. after the material master data for the new material was entered) without resending the IDoc from SAP R/3.

3.3.3 Status Message for Received IDocs (Optional)

There is an IDoc of message type STATUS to update the status record for IDocs sent by the SAP R/3 system. For example, one could send a status when the IDoc was received, and another one when it was successfully (or unsuccessfully) processed by the vendor system. These status updates are displayed in the IDoc monitor (transaction WE05), thus increasing a lot the visibility of the process.

We suggest that you use the statuses mentioned in 2.2.

For the test, the vendor system must be able to automatically send the status message for received IDocs. The correctness of both the STATUS IDoc and the status of the outbound IDoc are checked in the IDoc monitor (transaction WE05).

3.3.4 Mass Processing of Incoming IDocs

This step checks the behavior of the software when a great number of IDocs are to be processed. For this purpose, a CATT run (computer aided test tool) will be

invoked that will create about 100 different transfer orders. These IDocs will be sent packaged, that is several IDocs will be sent in one tRFC call with one TID.

We will explicitly check a few randomly picked transfer orders in the vendor system. These should then also be confirmed.