Infor LN Warehousing User Guide for Handling Units

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About this document

This guide describes the setup and use of handling units.

Intended Audience

This book is intended for those who want to learn how to use handling units and to set up the handling unit functionality in the way that best serves their purposes. Both end users and users on administrator level will find the information they require. The latter will find setup information in the closing chapter of this book that deal with master data and parameter settings.

Assumed Knowledge

Familiarity with the business processes involved in handling inbound and outbound goods in the warehouse, and general knowledge of the LN functionality will help you understand this book. In addition, Warehousing training courses are available to give you a head start.

References

Use this guide as the primary reference for handling units. Use the current editions of these documents for information that is not covered in this guide:

- *User Guide for Warehousing Procedures*
- *User Guide for Warehouses*
- *User Guide for the Inbound Goods Flow U9788 US*
- *User Guide for the Outbound Goods Flow U9794 US*
- *User Guide for Warehousing Inspections U9875 US*
- *User Guide for Warehousing Quarantine Handling U9876 US*
- *User Guide for Delivery Notes and Shipments U8982 US*

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Chapter 1
Introduction

1

Handling units

A handling unit is a uniquely identifiable physical unit that consists of packaging and contents. A handling unit can contain <u>items</u> registered in Warehousing and can contain other handling units.

Structure

A handling unit has a structure of packing materials and items. A <u>handling-unit structure</u> can vary from a simple box that contains a particular number of items, to a more complex structure such as a pallet with a number of boxes, which in turn can contain smaller boxes that contain a number of items. A handling unit structure can consist of various handling units related in a parent-child fashion. You can manually create a handling unit structure for a given number of items, or you can define a package definition in which you set up a template that determines the handling unit structure for particular types of items. For further information, see *Package definitions (p. 123)* and *Handling unit structures (p. 14)*.

The use of handling units

A handling unit is a single entity that is used to process goods in the warehouse. As a result, you can use a handling unit to receive, store, and issue goods.

To use a handling unit for warehouse processing, you must link the handling unit to the entity that represents the applicable warehouse movement:

- Inbound or outbound warehousing order line
- Receipt header or receipt line
- Inspection line
- Inbound or outbound advice line
- Shipment header or shipment line

By linking handling units to warehousing order lines, receipt lines, and so on, the handling units will represent both administrative information, as well as physical information about the contents. For more information, refer to *Inbound procedures and handling units (p. 39)* and *Outbound and shipment procedures for handling units (p. 40)*.

To link a handling unit to any of these types of headers or lines, generate a handling unit for this line. For example, if you generate a handling unit for a shipment line, you establish the link between the handling unit and the shipment line. For further information, see *To maintain handling units (p. 17)*.

Because users must be able to control item movements with as few keystrokes as possible, automatic identification of handling units is possible. For this purpose, you can attach a label to a handling unit. Defining handling unit structures and scanning labels enables you to have a highly automated execution of warehousing activities at receiving and shipping.

You can use both warehouse processing based on handling units and warehouse processing based on order lines.

Handling unit structures

A handling unit structure shows how handling units are structured to pack particular items. A handling unit can have a hierarchical structure that consists of several handling units that are related in a parent - child fashion. In the **Handling Unit Tree** session, a handling unit structure is displayed as a hierarchical structure of nodes. Each node represents a handling unit.

Example

For example, a fluid item such as milk is packed in cartons, the cartons are packed in boxes of twenty cartons each, and 50 boxes are placed on a pallet.
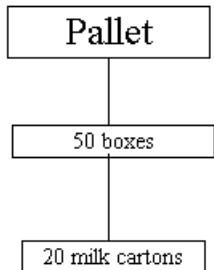
- **Top**
  The top node includes the whole structure. In the previous example, the pallet is the top node.
- **Parent**
  A node that ranks higher than another node by one level. A parent node includes one or more children. In the previous example, the boxes are the parent nodes of the milk cartons. At the same time, the pallet (the top node) is the parent of the boxes, thus the boxes are the children of the pallet.

- **Child**
  A node that is linked to a parent. In the previous example, the milk cartons are the children of the boxes.

A node includes the following information:

- The parent node to which the node belongs (except for the top node, of course).
- The packing item that is used for the node. In the previous example, the packing item for the top node is pallet, and for the children of the top node the packing item is box.
- The number of packing items used for the node. In the previous example, the number of packing items for the top node is one (one pallet), and for the second node the number is 50 (50 boxes per pallet). For fixed packaging definitions, the number of packaging items is determined in a different way. For further information, see *Packaging levels (p. 103)*.
- The number of items that the packaging item contains.
- The node is labeled or unlabeled. Labeled means that for each packing item defined for the node, a label record is created. In this way, each existing packing item is uniquely identified. These labels can be printed. If the boxes with milk cartons from the previous example are labeled, each box obtains a label when handling units are generated for an order for milk cartons. For further information on labels, see Label layout and printing.
- Auxiliary packing material, such as sealing plastic that is used for the node.

You can manually create a handling unit structure for a number of items in the Compose Handling Units (whwmd5130m100) session, or you can define a package definition with a handling unit template that determines the handling unit structure for particular items.

Chapter 2
Maintaining Handling Units

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To maintain handling units

Handling unit and handling unit structure maintenance include the following activities:

- **Create handling unit**
  You can create new handling units and create a handling unit structure for the new handling unit in the Compose Handling Units (whwmd5130m100) session.

- **Change handling unit details**
  For further information, see *To change handling unit data (p. 27)*.

- **Create handling unit structures**
  You can use *Package definitions (p. 123)* to create handling unit structures or you can *Manually create handling units and handling unit structure for items (p. 23)* in the Compose Handling Units (whwmd5130m100) session. The easiest way to create a handling unit structure for an item is to define a package definition with a handling unit template for the item, and, if required, manually change the handling unit structure. Changing the handling unit structure can be required if, for example, goods must be repacked for shipping or storage.

- **Maintain handling unit structures**
  In the Compose Handling Units (whwmd5130m100) session, the following commands are available for handling unit structure maintenance:

  - *Create detail handling units (p. 24)*

  - *Pack: to generate a handling unit for multiple items (p. 21)*

  - *Unlink: remove a child handling unit from a parent handling unit (p. 26)*

  - *Link: add a child handling unit to a parent handling unit (p. 25)*

  - Move child handling unit to other parent handling unit. For this purpose, you first unlink the child handling unit from the parent, as discussed in *Unlink: remove a child handling unit from a parent handling unit (p. 26)*. Next, you link the unlinked handling unit to another parent, as discussed in *Link: add a child handling unit to a parent handling unit (p. 25)*.

  - You can move a handling unit to another parent handling unit if the new parent handling unit allows multiple stock points or if the stock point details of both handling units match.

    For example, handling unit A contains lot A. Handling unit B allows multiple stock points. In that case, you can move handling unit A to parent B. If handling unit B does not allow

multiple stock points, but contains lot A, moving handling unit A to handling unit B is also allowed.

If handling unit B does not allow multiple stock points, and contains lot C, moving handling unit A to handling unit B is not allowed. If handling unit B does not allow multiple stock points, and handling unit A contains multiple lots, moving handling unit A to handling unit B is not allowed.

- **Close handling unit**
  You can close handling units that are not being processed in the inbound or the outbound flow. You can close a handling unit if the handling unit has one of the following statuses:
  - **Inactive**
  - **Open**
  - **In Stock**
  - **Shipped**

- **Delete handling unit**
  You can delete a handling unit if the handling unit has the following status:
  - **Inactive**
  - **Closed**

Alternatively, you can use drag-and-drop functionality in the **Tree Structure** to maintain handling units and handling unit structures. For further information, see *How to operate the Tree Structure (p. 29)*.

Note that handling unit maintenance is subject to various conditions. For further information, see *Handling unit maintenance conditions (p. 20)*.

Note

If you change or create a handling unit structure for handling units with a package definition, LN does not validate the handling unit structure. Consequently, the resulting handling unit structure may not meet the requirements of the handling unit template of the package definition. To avoid this, you can manually validate handling units using the **Validate Handling Unit** option in the Compose Handling Units (whwmd5130m100) session.

Handling units with status **Partially Frozen** or **Confirming**

If the handling unit status is **Confirming**, these actions are not allowed in the Compose Handling Units (whwmd5130m100) session:

- Close
- *Create detail handling units (p. 24)*
- Move to location
- Create transfer order
- Inbound activities
- Set handling unit to not shipped
- Reset not shipped
- Modify shipped quantity

If the handling unit status is **Partially Frozen** or **Confirming**, these actions are not allowed in the Compose Handling Units (whwmd5130m100) session:

- Reopen
- Freeze

To generate handling units

You can generate handling units during any stage of the inbound goods flow, the outbound goods flow, or storage, provided that the handling unit functionality is set up as required.

For further information, see *To set up handling units (p. 91)*. Various options to generate handling units are available:

- **Automatically**
  For both inbound and outbound goods, you can set up automatic generation of handling units. For further information, see *To set up automatic generation of handling units from ASNs (p. 106)* and **Generate Handling Unit Automatically during Picking**.

- **By batch**
  In the Generate Handling Units (whwmd5230m000) session, you can generate handling units for ranges of order lines, shipment lines, receipt lines, and so on.

- **Manually**
  You can manually generate handling units for individual entities in the following sessions:

  Inbound
  - Inbound Order Lines (whinh2110m000)
  - Warehouse Receipts Overview (whinh3110m000)
  - Warehouse Receipt (whinh3512m000)
  - Receipt Lines (whinh3112s000)
  - Shipment Notices (whinh3100m000)
  - Shipment Notice Lines (whinh3101m000)
  - Inbound Advice (whinh3525m000)
  - Warehouse Inspections Overview (whinh3122m000)

  Outbound
  - Outbound Advice (whinh4525m000)
  - Warehouse Inspections Overview (whinh3122m000)
  - Shipments (whinh4130m000)
  - Shipment Lines (whinh4131m000)

If you generate a handling unit for a header record, LN generates a parent handling unit for the header and a child handling unit for each of the lines. For example, if you generate a handling unit for a shipment with three shipment lines, LN generates a parent handling unit for the shipment header and a child handling unit for each of the three shipment lines.

If you select the **Generate Handling Unit for Shipment Header during Picking** check box in the Warehouses (whwmd2500m000) session, the handling units are generated for the shipment header. The existing shipment line handling units are linked to the generated shipment header handling unit. For more information, refer to *Using handling units in shipment processes (p. 50)*.

If you generate a handling unit for a line, for example, a receipt line, LN generates a handling unit for the receipt line, but:

- If the line includes a <u>bill of material (BOM)</u> item, LN generates a parent handling unit for the line, and a child handling unit for each of the component items.

- If package definitions are defined for items or business partners, these package definitions are defaulted on order lines or shipment lines with matching items or business partners. If you select the default package definition of the order line or shipment line (or select a different package definition instead of the default package definition), LN generates the handling units as specified in the package definition. For further information, see *Package definitions (p. 123)*, *To define package definitions (p. 129)*, and How package definitions distribute item quantities.

In the Compose Handling Units (whwmd5130m100) session, you can adjust the structure of parent and child handling units.

Handling unit maintenance conditions

You can maintain handling units with all statuses in all stages of the inbound flow, storage, or outbound flow, except for the following:

- The handling unit is dormant and has the **Inactive** status. However, you can link handling units to empty inactive handling units. As a result, the inactive handling unit becomes the parent and obtains the status of the handling unit that you linked. You can link other handling units to this parent if their statuses match the status of the parent.
- The handling unit has the **Quarantine** status.
- The handling unit is ready for shipment and has the **Frozen** status.
- The handling unit has left the warehouse and has the **Shipped** status.
- The handling unit is being transferred to another warehouse and has the **In Transit** status.

Note that you cannot link handling units with different statuses.

If any of these exceptions apply to a handling unit, the handling unit maintenance commands are unavailable. If you use the drag-and-drop functionality in the **Handling Unit Tree** to move handling units, messages appear if a particular action is unavailable.

Linking and unlinking handling units can affect the underlying structure of advice lines or shipments. You cannot link handling units that are advised to different locations. Modifying handling unit structures for handling units linked to shipments and shipment lines results in the following:

Handling units and shipments

- If you move a child handling unit to another parent, the shipment line linked to the child handling unit is linked to the shipment header of the new parent and removed from the shipment header from which the child handling unit was moved.

- If you link a handling unit linked to a shipment line to an empty, inactive handling unit, the inactive handling unit becomes the parent, and LN generates a shipment for the parent handling unit. The data for the new shipment are copied from the shipment from which the shipment line/child handling unit was removed.

- If you move all child handling units/shipment lines from a parent/shipment, the shipment linked to the parent handling unit is deleted.

See Conditions for shipment composition for the conditions that apply to the maintenance of handling units linked to shipments or shipment lines.

Pack: to generate a handling unit for multiple items

You can use the **Pack** command on the appropriate menu of the Compose Handling Units (whwmd5130m100) session to create a handling unit for a number of items of a particular type.

You can use the **Pack** command for items during all stages of the inbound, storage, and outbound flows in the warehouse, which means that you can use this command for items attached to the following entities:

- Receipts
- Inbound order lines
- Inbound and outbound advice
- Inbound and outbound inspections
- Storage locations
- Shipments, unless the shipments have the **Shipped** status.

Note that, except for items in storage locations, you can also use the Generate Handling Units (whwmd5230m000) session to create handling units for items.

You can use the **Pack** command if, for example, a large quantity of a particular item in your warehouse has no handling units and you want to maintain a handling unit for these items in LN.

To create a handling unit for a number of items of a particular type, proceed as follows:

1. Select the **Pack** command on the **Actions** menu of the Compose Handling Units (whwmd5130m100) session.

2. In the dialog box that appears, enter the following details of the item for which you want to create handling units:

   - The warehouse where the item is located, or, in case of items listed on a receipt, the warehouse in which the item will be stored.
   - The location in which the item is stored or will be stored.

- The code of the item.
- The status that the handling unit must obtain:
    - If you are creating a handling unit for items in a storage location, you must select the **In Stock** status. As a result, the handling unit that you are creating for the items will obtain the **In Stock** status.
    - If you are creating a handling unit for items on a receipt that are about to arrive, you must select the **Receipt Open** status. As a result, the handling unit will obtain the **Receipt Open** status. For further information, see Handling Unit Status.

3. Click **Select Lines**. As a result, the session opens that relates to the stage of the item in the inbound or outbound flow or storage. The handling unit status that you specified in the previous step determines the session that opens.
   For example:

   - If you selected the **In Stock** status, the Item - Inventory Structure (whinr1550m000) session opens showing the inventory for the selected item.
   - If your item is located on the staging location and you selected the **Staged** or **Frozen** status in the previous step, the Shipment Lines (whinh4131m000) opens showing the shipment lines listing the selected item.

4. Select the order line, receipt line, shipment line, approval line, advice line, or inventory structure, as the case may be, of the item for which you want to create a handling unit and click **OK**. As a result, a dialog box appears, which informs you that a handling unit will be generated if you continue.

5. In the dialog box, click **Yes** to generate a handling unit for the selected items. As a result:

   - An error message appears If the use of handling units is not enabled for the selected item and warehouse, in which case you might consider enabling handling units for the warehouse. For further information, see *To set up handling units (p. 91)*.

   - LN generates a handling unit that comprises the items on the selected order line, receipt line, shipment line and so on. A message appears informing you that the handling unit is generated and shows the code of the new handling unit.

     You have now completed the procedure, unless you selected the **In Stock** status in Step 2.

   - If you selected the **In Stock** status in Step 2, the **Required Quantity** dialog box appears. For further information, see the following procedure.

In the **Required Quantity** dialog box, proceed as follows:

1. In the **Package Definition** field, you can enter or select a package definition. This step is optional.

   You can only enter a package definition that is linked to the item for which you are defining a handling unit. As a result, the handling unit will be generated as defined in the handling unit template of the package definition after you carry out the next step. For further information, see How package definitions distribute item quantities.

2. In the **Required Quantity** field, you can enter the number of items for which you want to create a handling unit.

For example, if 1000 items of the required item type are available on the selected inventory structure, and you want to create handling units for 150 items of the inventory structure, enter 150 in this field.

3. Click **OK**.

    As a result, LN generates a handling unit that comprises the items on the selected inventory structure. A message appears informing you that the handling unit is generated and shows the code of the new handling unit.

    If you entered a specific number of items in the **Required Quantity** field, the handling unit is generated for this number of items. If you entered a package definition in the **Package Definition** field, the handling unit is generated as specified in the package definition. The message that appears shows the codes of any child handling units.

Note that if you did not specify a package definition, you can create a handling unit structure for the newly created handling unit, if required. For further information, see *Create detail handling units (p. 24)*.

Manually create handling units and handling unit structure for items

To create handling units for a large quantity of items of a particular type at once and set up a handling unit structure for these items, you can use the **Pack** command and the **Create Detail Handling Units** command on the <u>appropriate</u> menu of the Compose Handling Units (whwmd5130m100) session. These commands are very useful if, for example, a large quantity of a particular item in your warehouse has no handling units and you want to maintain handling units with a handling unit structure for these items in LN.

Use the Pack command

This procedure consists of the following steps:

1. From the <u>appropriate</u> menu of the Compose Handling Units (whwmd5130m100) session, select the **Pack** command.
2. Select the item and specify the quantity of the item for which you want to create handling units.
3. Optionally, select a package definition for the item.
4. Create a handling unit for the selected item.
    - If you selected a package definition, the handling unit and the handling unit structure is generated as specified in the package definition.
    - If you did not select a package definition, a handling unit is created that includes all selected items. For example, if you select 100 items of a particular type, LN generates one handling unit for all of the selected items. For further information, see *Pack: to generate a handling unit for multiple items (p. 21)*. To create child handling units for this handling unit, use the **Create Detail Handling Units** command. For further information, see *Create detail handling units (p. 24)*.

Create detail handling units

You can use the **Create Detail Handling Units** command on the <u>appropriate</u> menu of the Compose Handling Units (whwmd5130m100) session or the Handling Units (whwmd5130m000) session to create detail handling units for a particular handling unit. In this way, you set up a handling unit structure in which the detail handling units become the child handling units. Note that the total number of items contained in the handling unit structure is not affected, only the number of handling units is increased.

For example, a handling unit has 100 items and you want these handling units to be packed in 10 boxes. For this purpose, you specify 10 packaging items of type Box (a user-defined packaging item). The number of packaging items of the handling unit determines the number of detail handling units that LN generates.

As a result, for each of the 10 packaging items a handling unit of type Box is created. The 100 items are evenly divided over the 10 packaging items (the number of items remains unchanged). These detail handling units become the child handling unit of the original handling unit, which becomes the parent. For the parent handling unit, you can specify a new packaging item, for example of type Pallet (another user-defined packaging item). The result is a handling unit structure consisting of a pallet and 10 boxes, each box containing 10 items.

Procedure

To create detail handling units for a particular handling unit, proceed as follows:

1. In the Compose Handling Units (whwmd5130m100) session, the Handling Units (whwmd5130m000) session, or the **Handling Unit Tree**, select the handling unit for which you want to create detail handling units.

2. Start the Handling Units (whwmd5130m000) details session for the selected handling unit. To start the Handling Units (whwmd5130m000) details session for the selected handling unit, proceed as follows:

    a. In the Compose Handling Units (whwmd5130m100) session or the Handling Units (whwmd5130m000) session, double-click the selected handling unit.

    b. In the **Handling Unit Tree**, right-click the selected handling unit and click Details from the context menu.
    As a result, the Handling Units (whwmd5130m000) details session appears displaying the handling unit details.

3. On the **Quantity/Weight** tab of the Handling Units (whwmd5130m000) session, select the required packaging item, of type Box, for example, and enter the required number of packaging items.

4. Save the data and exit the Handling Units (whwmd5130m000) session.

5. Back in the Compose Handling Units (whwmd5130m100) session, the **Handling Unit Tree** or the Handling Units (whwmd5130m000) session, highlight the handling unit and click **Create Detail Handling Units** on the <u>appropriate</u> menu. As a result, a message appears informing you that detail handling units have been created.

6. To remove detail handling units, highlight the handling unit and, on the <u>appropriate</u> menu, click **Remove Detail Handling Units**. To use the previous example, if you created 10 boxes containing 10 items each, the boxes are removed and one handling unit (the pallet, the former parent) remains containing 100 items.

Distribution of items among packaging items

If you define packaging items for a handling unit, LN proportionally distributes the items contained in the handling unit among the packaging items that you define. For example, if you define 10 packaging items for a handling unit that contains 100 items, each packaging item contains 10 items.

If the number of packaging items and items rule out proportional distribution, LN distributes the items as evenly as possible among the packaging items. For example, if you define 10 packaging items of type Box for a handling unit that contains 27 items, LN generates 9 packaging items, each of which will contain three items. If you define 12 packaging items of type Box for a handling unit that contains 45 items, LN generates 11 packaging items, 10 of which contain four items and one containing one item.

Link: add a child handling unit to a parent handling unit

You can click **Link to Parent** on the <u>appropriate</u> menu of the Compose Handling Units (whwmd5130m100) session to add a child handling unit to another handling unit.

Linking a handling unit to a parent handling unit is subject to the following conditions:

- The handling unit and the child handling unit must be located in the same warehouse.
- The child handling unit cannot have a parent. If you want to link a handling unit that has a parent, you must unlink the handling unit from the parent first. For further information, see *Unlink: remove a child handling unit from a parent handling unit (p. 26)*.
- You can move a handling unit to another parent handling unit if the new parent handling unit allows multiple stock points or if the stock point details of both handling units match.

  For example, handling unit A contains lot A. Handling unit B allows multiple stock points. In that case, you can move handling unit A to parent B. If handling unit B does not allow multiple stock points, but contains lot A, moving handling unit A to handling unit B is also allowed.

  If handling unit B does not allow multiple stock points, and contains lot C, moving handling unit A to handling unit B is not allowed. If handling unit B does not allow multiple stock points, and handling unit A contains multiple lots, moving handling unit A to handling unit B is not allowed.

- The child handling unit and the parent handling unit cannot contain the same item. To add a child handling unit to a parent that contains the same item, you must create detail handling units for the parent. For further information, see *Create detail handling units (p. 24)*.
- The child handling unit can have child handling units of its own.
- For further information about restrictions to handling unit maintenance, see *Handling unit maintenance conditions (p. 20)*.

To add a child handling unit to a handling unit structure, proceed as follows:

1. In the Compose Handling Units (whwmd5130m100) session, use the fields of the **Selection Filter** group box to retrieve the child handling unit and the parent handling unit to which you want to add the child handling unit.

2. In the Compose Handling Units (whwmd5130m100) session, select the handling unit that you want to add to the parent handling unit.

3. On the <u>appropriate</u> menu, select the **Link to Parent** command.

4. In the dialog box that appears, enter the code of the parent handling unit to which you want to add the child handling unit.

As a result, the child handling unit is linked to the parent.

> **Tip**
>
> Use the **Handling Unit Tree** to maintain a handling unit or handling unit structure. The tree structure provides a graphical overview of the structure of the handling unit that you are viewing or maintaining and has the same maintenance functionality as the Compose Handling Units (whwmd5130m100) session.

Unlink: remove a child handling unit from a parent handling unit

You can use the **Unlink from Parent** command on the <u>appropriate</u> menu of the Compose Handling Units (whwmd5130m100) session to remove a child handling unit from its parent.

To remove a child handling unit from its parent, proceed as follows:

1. In the Compose Handling Units (whwmd5130m100) session, select the handling unit that you want to remove from its parent.

2. On the <u>appropriate</u> menu, choose **Unlink from Parent**.

As a result, the child handling unit and any children of the child handling unit have no connection with the parent, they become a handling unit structure of their own.

> **Tip**
>
> Use the **Handling Unit Tree** to maintain a handling unit or handling unit structure. The tree structure provides a graphical overview of the structure of the handling unit that you are viewing or maintaining and has the same maintenance functionality as the Compose Handling Units (whwmd5130m100) session.

To change handling unit data

Throughout most of the stages of the inbound flow, storage, and the outbound flow you can change handling unit data such as the packaging item, the quantity of packaging items, and so on. The following list shows the changes you are enabled to make for each Handling Unit Status.

Status	Changes
Closed	No changes
Quarantine	No changes
Shipped	No changes
In Transit	No changes
Inactive	**Warehouse**, **Location**, **Packaging Item**, **Quantity of Packaging Items Number of Visible Units**, packaging item dimensions, **Dimensions Fixed**, **Complete**, **Splittable**, **Labeled**, **Reference**, **Packaging Item Handling**, and add or modify the auxiliary packaging.
Open	**Packaging Item**, **Quantity of Packaging Items Number of Visible Units**, packaging item dimensions, **Dimensions Fixed**, **Splittable**, **Labeled**, **Reference**, **Packaging Item Handling**, and add or modify the auxiliary packaging.
Receipt Open	Same as previous
Received	**Packaging Item**, **Quantity of Packaging Items Number of Visible Units**, packaging item dimensions, **Dimensions Fixed**, **Complete**, **Splittable**, **Labeled**, **Reference**, **Packaging Item Handling**, and add or modify the auxiliary packaging.
Advised	Same as previous
Allocated	**Received**
To Be Inspected	**Received**
Approved	**Received**

Released	Received
In Stock	Received
Frozen	Received

Examples of Changing Handling Units (Single Item<=> Multi-Item)

LN generates only single-item handling units. The composition of multi-item handling units is a manual process. You can change a single-item handling unit into a multi-item handling unit. When you change a single-item handling unit into a multi-item handling unit, often a different label layout applies. For details, refer to the online Help of:

- **Automatic Labeling of Multi-Item Handling Unit** field in Warehouses (whwmd2500m000) session.

- **Multi-Item Label Layout** field in Handling Units (whwmd5130m000) session.

Example

A shipment contains two items, inner mirror and outer left mirror of a car. Initially the shipment has two shipment lines, one line for item inner mirror and one for item outer left mirror. Assume that there are 2 single-item masters and every master has 2 singles (this means that: every (single item) parent handling unit contains 2 child handling units. This means that there are 4 single-item singles (this means that there are four child hadling units). The table below shows the defined label layout codes.

Selling Item	Packaging Info Single	Packaging Info Master
Inner Mirror	KLT1234, Label Layout Code Single-Item = AAA	Pallet, Label Layout Single-Item = KKK, Label Layout Multi-Item = LLL
Outer Left Mirror	KLT5678, Label Layout Code Single-Item = BBB	Container, Label Layout Single-Item = MMM, Label Layout Multi-Item = NNN

Different Scenarios

- *Scenario 1:* The singles containing the outer left mirrors are manually taken from the container and put on the pallet containing the inner mirrors. This means that the pallet becomes a multi-item handling unit. Multi-item label Layout LLL is now used for printing the label for the pallet. Label layouts AAA and BBB are still used for printing the labels of the singles. Multi-item label layout NNN of the container does not play a role.

- *Scenario 2:* Now in the alternative procedure, the singles containing the inner mirrors are manually taken from the pallet and put in the container containing the outer left mirrors. This means that the container becomes a multi-item handling unit. Multi-item label Layout NNN is now used for printing the label for the Container. Label layouts AAA and BBB will still be used for printing the labels of the singles. Multi-item label layout LLL of the Pallet does not play a role.

- *Scenario 3:* A brand new master handling unit is created. The singles are taken from the pallet and the container and put on the brand new handling unit. When creating the brand new handling unit, no package definition is available and also no default label layout is available. In this case it is the responsibility of the end-user to manually populate the desired label layout code.

How to operate the Tree Structure

To maintain handling units and handling unit structures, you can use the commands available on the appropriate menu and the toolbar. For further information on these commands, see *To maintain handling units (p. 17)*.

In addition to the toolbar and appropriate menu commands, drag-and-drop functionality is available to move child handling units to different parents.

To use a command to maintain a handling unit or handling unit structure, select the handling unit and click the relevant command on the toolbar or the appropriate menu. Alternatively, you can right-click the handling unit and select the relevant option from the context menu that appears.

To expand or collapse the structure of a node, double-click the node. If you double-click a node without an underlying structure of child handling units, the Handling Units (whwmd5130m000) session appears showing the details of the handling unit that the node represents.

View menu

On the View menu, the following options are available:

- **Show handling unit info**
  This is the default option. If this option is selected, for each handling unit a few handling unit details are displayed, such as the status, the packing material, the item content, and so on.

- **Show order info**
  If this option is selected, for each handling unit a few details of the order related to the handling unit are displayed, such as the order origin, the order/order line number, the order line status, and so on.

- **Show shipment/receipt info**
  If this option is selected, for each receipt or shipment that is linked to the handling unit a few details are displayed, such as the shipment/receipt line status, ID number/line number, and so on.

Note

If the status of a handling unit changes, the handling unit is no longer displayed in the **Handling Unit Tree** or the Compose Handling Units (whwmd5130m100) session because the changed status no longer matches the criteria of the **Selection Filter** in the Compose Handling Units (whwmd5130m100) session.

appropriate menu

In addition to the commands described in *To maintain handling units (p. 17)* and Compose Handling Units (whwmd5130m100), the following commands are available:

- **Details**
  Use this command to view detailed information about the selected handling unit in the Handling Units (whwmd5130m000) session.

- **Process Data**
  Use this command to view inbound or outbound process information about the selected handling unit. If the selected handling unit is inbound, the Handling Unit Process Inbound (whinh2113m000) session starts showing information about the inbound order/order line, receipt/receipt line, advice/advice line, or inspection/inspection line linked to the selected handling unit. If the selected handling unit is outbound, the Handling Unit Process Outbound (whinh2123m000) session starts showing information about the outbound order/order line, shipment/shipment line, or advice line that is linked to the selected handling unit.

Blocking or unblocking handling units

Use the Handling Unit Blocking (whwmd6140m000) session to partially block, block, or unblock handling units for all transactions.

To view the blocked stock points of a parent handling unit, in the Handling Unit Blocking (whwmd6140m000) session, select the line containing the blocked parent handling unit and from the appropriate menu, select **Blocked Stock Points** to start the Blocked Stock Points (whwmd6550m000) session.

The Blocked Stock Points (whwmd6550m000) session displays the stock points contained in the blocked handling unit. If the blocked handling unit is linked to child handling units, the child handling units are displayed together with the blocked stock points contained in them.

If project peg or ownership details exist for the blocked inventory contained in the handling units, you can view and maintain the project peg or ownership details in the Blocked Stock Point Details (whwmd6152m000) session. You can start this session from the Blocked Stock Points (whwmd6550m000) session.

Chapter 3
Lot and Serial Numbers in Handling Units

<div style="text-align:right">**3**</div>

To register lot and serial numbers for handling units

The serial registration parameters of the Item - Warehousing (whwmd4600m000) session determine the types of warehouse transaction for which registration of lot or serial numbers is required.

If you use handling units for lot and serialized items in the high volume scenario, you can register the lot or serial numbers for either of the following:

- The handling units that contain the lot or serialized items.

    This allows you to accurately locate your lot and serialized items.

- The <u>associated lines</u> of the handling units

Automatic generation of lot and serial numbers for handling units

Sometimes, LN *automatically registers lot and serial numbers for a handling unit (p. 34)* if you create the handling unit after you have registered the lot and serial numbers for the associated line.

To manually register lot or serial numbers for handling units

You can also register the lot or serial number for handling units manually. The lot and serial numbers are then automatically updated on the associated lines.

Lot and serial registration in handling unit structures

When you use handling unit structures, you are not required to register lot and serial numbers for each of the handling units within the structure. If you do not, you must register the remaining lot or serial numbers for the associated line. This is because LN does not allow incomplete registration of lot and serial numbers.

Registration procedure depends on requirements

Based on your requirements you can register lot or serial numbers for:

- The associated lines before registering for the handling units
- The handling units only and not for the associated lines (LN updates the lot and serial numbers on the associated lines anyway)
- Part of the handling unit structure and register the remaining numbers on the associated lines

High volume and low volume lot and serial registration combined

The procedure is different for the receipt of handling units containing items that are both high volume serialized and low volume lot controlled.

To change lot or serial numbers for handling units

In the Handling Unit Stock Point Details (whwmd5136m000) session, you can change the lot or serial numbers that you registered for the selected handling unit.

Automatic generation of lot and serial numbers for handling units

If you create a handling unit after you have registered lot or serial numbers for the associated line of this handling unit, the lot or serial numbers are automatically registered for the handling unit. Then, if you create child handling units for the handling unit, the items and the lot or serial numbers are evenly divided among the child handling units.

Example

Outbound advice line A has 10 items. A user registers serial numbers for these items. After release of outbound advice line A, the user generates handling unit A1234 for the corresponding shipment line A. The 10 serial numbers registered for outbound advice line A are automatically allocated to handling unit A1234.

Next, the user creates child handling units B1235 and C1236. Each child handling unit automatically obtains 5 serial numbers and the serial numbers are removed from parent handling unit A1234.

In the following cases, lot or serial number registration for handling units is done manually:

- No lot and serial numbers are present on the associated line of the handling unit.
- A package definition is used to create the handling unit structure.
- A manually created handling unit structure, consisting of a top level and a child level, is present before the lot or serial numbers were generated.

To manually register lot or serial numbers for handling units

In the following cases, lot or serial number registration for handling units is done manually:

- No lot and serial numbers are present on the associated line of the handling unit.
- A package definition is used to create the handling unit structure.
- A manually created handling unit structure, consisting of a top level and a child level, is present before the lot or serial numbers were generated.

To manually register lot or serial numbers for handling units:

1. In the Compose Handling Units (whwmd5130m100) session, the Handling Units (whwmd5130m000) session, and the **Handling Unit Tree**, select the relevant handling unit and click **Stock Point Details** on the toolbar.
2. In the Handling Unit Stock Point Details (whwmd5136m000) session, click Generate Lot Codes or Generate Serials to register lot or serial numbers for the lot or serialized items of the handling unit.

If no lot or serial numbers are present on the associated line before registering the lot or serial numbers for the handling units, LN updates lot or serial numbers on the associated line.

Using the Split commands

If lot or serial numbers are present on the associated line before registration for the handling unit is to take place, the Generate Lot Codes and Generate Serials commands are not displayed. In such cases, you must use the Split Line for Serials and Split Line for Lots options and manually enter a lot or serial number for each item individually.

FIFO and LIFO items

For FIFO or LIFO items, register the lot or serial numbers for the handling units and not for the associated line. You can then use the Generate Serials or Generate Lot Codes options to register the lot or serial numbers simultaneously, which takes less time than registration through the Split Line for Serials or Split Line for Lots options.

Note

Lot and serial registration is not allowed for handling units with the **Partially Allocated** status. LN consumes lot and serial numbers in alphabetic order when releasing outbound advice or confirming picking lists.

Lot and serial registration in handling unit structures

Registration of lot and serial numbers is done manually if the handling unit structure is:

- Based on a <u>package definition</u>
- Manually created before the lot or serial numbers were registered for the <u>associated line</u>

There is also a procedure to *automatically generate lot or serial numbers for handling unit structures (p. 34)*.

In handling unit structures, registration of lot or serial numbers is only allowed at the bottom level handling units, because this reflects the actual whereabouts of the lot or serialized items within the handling unit structure. The easiest way to register lot or serial numbers for a bottom level handling unit is to select it in the **Handling Unit Tree** and click **Stock Point Details** in the toolbar.

You are not required to register lot or serial numbers for each of the bottom level child handling units, but:

- Each of the items within the bottom level handling units for which you do register must be provided with a lot or serial number.
- You must register the remaining lot or serial numbers for the associated line if no lot or serial numbers were present on the associated line before registering the lot or serial numbers for the handling units.

The lot and serial numbers generated for the handling units are updated on the associated lines.

Example

A handling unit structure associated with a receipt line with a quantity of 40 serialized items consists of a top level handling unit of type Pallet and four bottom level handling units of type Box. Each of the Boxes contains 10 serialized items.

You are not required to register serial numbers for each of the Boxes, but you must register 10 serial numbers for each Box that you do register.

Consider the following situations:

- **Situation A**
  No serial numbers were registered for the receipt line prior to creating the handling unit structure. You register serial numbers for two of the Boxes in the Handling Unit Stock Point Details (whwmd5136m000) session. Now you must register the remaining serial numbers for the receipt line in the Receipt Line Lots and Serials (whinh3123m200) session. When you open this session, the 20 serial numbers you just registered for the handling units are displayed. If you do not register serial numbers for any of the Boxes, you must register 40 serial numbers for the receipt line.

- **Situation B**
  You registered the serial numbers for the receipt line prior to creating the handling unit structure, which was based on a <u>package definition</u>. You can register serial numbers for any of the child

handling units using the Split Line for Serials command in the Handling Unit Stock Point Details (whwmd5136m000) session. No further action required.

- **Situation C**
  You registered the serial numbers for the receipt line prior to creating the handling unit structure as described in *Automatic generation of lot and serial numbers for handling units (p. 34)*. The lot or serial numbers are automatically allocated to the child handling units. No further action required.

High volume and low volume lot and serial registration combined

The method to process the receipt or shipments of handling units containing items that are both high volume serialized and low volume lot controlled requires special attention.

If the lot codes are registered for the handling units and the serial numbers are registered for the associated lines of the handling units, you must register the serial numbers for the handling units to ensure that the serial numbers are allocated to the correct lot codes.

Example

Handling unit HU001 has two child handling units: HU002 and HU003. The handling unit structure is associated with receipt line R001 and HU002 and HU003 each have an item A1 with a quantity of 10. The items A1 are high volume serialized and low volume lot controlled.

HU002 has lot number L1 and HU003 has lot number L2. The serial numbers of the items A1 are registered at receipt line R001.

Before confirming receipt line R001, you must register the serial numbers for HU002 and HU003 to ensure that the serial numbers are allocated to the correct lot numbers.

To change lot or serial numbers for handling units

In the Handling Unit Stock Point Details (whwmd5136m000) session, you can change the lot or serial numbers that you registered for the selected handling unit.

To change a lot or serial number, do either of the following in the **Serial Number** field:

1. Zoom to the Lots and Serials session of the associated receipt line, advice line, outbound order line, or shipment line and select a lot or serial number. This option is only available if the lot or serial numbers are registered for the associated line.
2. Select the lot or serial number and specify the new lot or serial number.

If you change the lot or serial numbers for a handling unit, LN updates the lot or serial numbers specified for the underlined associated line. For example, if you change a lot or serial number for a handling unit associated with a receipt line, LN updates the lot or serial number of the receipt line. You can view the updated lot or serial number in the Receipt Line Lots and Serials (whinh3123m200) session.

If you delete a lot or serial number for a handling unit, the lot or serial number of the associated line is also deleted.

Important!

You can also change the lot or serial numbers for the associated line, but then LN does not update the lot and serial numbers of the handling units.

The lot or serial numbers of the handling units and the associated lines must be the same. Else, an error message is displayed when you confirm receipts or shipments, or perform inbound or outbound inspections. To reconcile the differences, you must update the lot or serial numbers of the handling units in the Handling Unit Stock Point Details (whwmd5136m000) session.

Chapter 4
Handling Units and Warehousing Procedures

4

Inbound procedures and handling units

To receive and store goods in a warehouse, you can process the inbound order lines on which the goods are listed, or you can process the handling units used to pack the goods.

Both inbound or outbound order lines and handling units are processed according to user-defined warehousing procedures. If you use handling units to process goods, the order lines related to the handling units are updated in the background.

The warehousing procedures used to process handling units are identical to those used to process order lines.

You can generate handling units for an order line during any stage of the inbound or outbound procedures. This is described in *To generate handling units (p. 19)* and *To maintain handling units (p. 17)*.

Various settings are available to enable the use of handling units for inbound and/or outbound procedures, and for specific items and warehouses. For more information, refer to *To set up handling units (p. 91)*.

The receipt procedure includes the following steps:

Step 1: Receive handling unit

The first step of the inbound flow is the arrival of the goods at the receipt location of the warehouse. At the receipt location, the handling units used to pack the goods are counted and the receipt of the handling units is confirmed. If the supplier and the warehouse support handling units and EDI, the receipt is performed by scanning the labels of the handling units. After handling units are confirmed, the items are added to the inventory of the warehouse. For more information, refer to *To receive handling units (p. 45)*.

Step 2: Advise handling unit

From the receipt location the handling units are then moved to the storage locations or, if required, inspection locations. The storage and/or inspection locations are printed on an inbound advice that is created after the receipt of the handling units is confirmed. For more information, refer to *To advise inbound handling units (p. 48)*.

Step 3: Inspect handling unit

The inbound inspection procedure is one of the main inbound procedures, but this procedure is not mandatory. For more information, refer to *To inspect handling units (p. 75)*.

Step 4: Put away handling unit

After receipt and/or inspection, the handling units are stored in the warehouse. For more information, refer to *To store handling units (p. 49)*.

> **Note**
>
> - The Generate Inbound Advice (whinh3201m000), Generate Storage List (whinh3415m000), Storage List (whinh3525m100) activities are unavailable for warehouses without locations.
> - If the warehouse that receives the goods is not location-controlled, LN skips these activities and stores the goods in the warehouse after you confirm the receipt. The handling unit then obtains the **In Stock** status. If inspections are included in the warehousing procedure, the handling unit obtains the **To Be Inspected** status.

Outbound and shipment procedures for handling units

To retrieve and ship goods from a warehouse, warehouse processing is either based on handling units or outbound shipments and warehousing order lines. If you use handling units to process goods, the order lines and/or shipments related to the handling units are updated in the background. For more information on outbound order lines and shipments, see Warehousing orders and Shipments and loads.

Both inbound or outbound order lines and handling units are processed according to user-defined warehousing procedures. The warehousing procedures used to process handling units are identical to those used to process order lines. For more information, refer to To define warehousing procedures

The warehousing procedures that comprise the outbound flow are grouped into two main procedures, the **Outbound Procedure** and the **Shipment Procedure**.

Generate handling units in the outbound flow

Various settings are available to enable the use of handling units for inbound and/or outbound procedures, and for specific items and warehouses. For more information, refer to *To set up handling units (p. 91)*.

You can generate handling units for an order line when you create:

- An outbound order line with the **Planned** or **Open** status
- Outbound advice
- An inspection
- A shipment
- A shipment line

If your warehouse uses handling units and the use of handling units is enabled in Warehousing, LN allocates handling units to the order line when outbound advice is generated for the order line. This procedure is described in *To generate handling units (p. 19)* and *To maintain handling units (p. 17)*. For more information on the **Planned** status, see Planned status for warehousing orders and order lines. For more information on the shipment procedure, see *Using handling units in shipment processes (p. 50)*.

Outbound procedures for handling units

The warehousing procedures that comprise the outbound flow are grouped into two main procedures, the **Outbound Procedure** and the **Shipment Procedure**. This topic outlines the **Outbound Procedure** for handling units.

Step 1: Generate outbound advice

To retrieve the handling units that contain the goods listed on the outbound order lines from the warehouse, outbound advice is created that lists the locations from which the handling units must be collected. If automatic creation of the outbound advice is not defined in your outbound warehousing procedure, you must generate the outbound advice in the Generate Outbound Advice (whinh4201m000) session.

If the use of handling units is enabled for the item and the warehouse listed on the outbound order lines, the search engine checks the warehouse for handling units. If handling units containing the required items are available, LN allocates these handling units to the outbound advice.

If suitable handling units are not available, or if handling units are not used in inventory, you can generate handling units for the outbound advice. For more information, refer to *To generate handling units (p. 19)*.

Handling units for which outbound advice is created receive the **Allocated** status.

If no handling units are found that contain the entire required quantity, part of the quantity of items contained in the handling unit is allocated to outbound advice. The status of the handling unit is then set to **Partially Allocated**.

When allocating handling units to outbound advice, the application first searches for handling units that contain the entire required quantity. For example, if the required quantity is 100, the application searches for a handling unit that contains 100 items or multiple handling units that together contain 100 items.

If not found, the application must partially allocate one or more handling units. For example, if the required quantity is 100 and four handling units each containing 30 items are available, three handling units are allocated and from the fourth handling unit, a quantity of 10 is allocated and this handling unit receives the **Partially Allocated** status.

When partially allocating handling units, the application first selects handling units that were partially allocated in previous runs. If insufficient partially allocated handling units are found, the application partially allocates handling units with the **In Stock** status.

Lot and serial registration is not allowed for handling units with the **Partially Allocated** status. LN consumes lot and serial numbers in alphabetic order when releasing outbound advice or confirming picking lists.

Step 2: Release outbound advice

You can release the outbound advice immediately after the outbound advice is generated. Releasing the outbound advice implies that the handling units are moved from the storage location to the staging location. The handling unit obtains the **Released** status. For more information, refer to *To release handling units (p. 49)*.

Step 3: Generate picking list

After releasing the outbound advice, you can print picking lists. The picking lists includes detailed information about the locations from which the warehouse personnel must collect the handling units or the goods. For more information, refer to To generate picking lists.

Step 4: Pick advice

After the goods are collected as specified on the picking list (or the outbound advice, if the use of picking lists is not part of your outbound flow), you must use the **Pick Advice** option to indicate that the handling units are collected from the storage locations and moved to the staging location or inspection location. To access the **Pick Advice** option, select the **Execute Inbound** submenu on the appropriate menu of the Handling Units (whwmd5130m000) session.

If inspections are part of your outbound flow, the handling unit status becomes **To Be Inspected**.

If inspections are not included in your outbound flow, the handling units are moved to the staging location and the handling unit status becomes **Staged**.

If present, the lot and serial information of the handling unit is also forwarded to the shipment line. To generate handling units for the shipment line, handling unit generation during picking or shipment creation must be specified in the setup.

Step 5: Inspection

If inspections are included in the warehousing procedure for handling units, the handling units are inspected at the staging location. In some cases, the goods undergo various tests. The handling units are approved or rejected.

Approved handling units will be shipped when the shipment is conformed. It depends on the shipment procedure whether this is done automatically or manually. Rejected handling units are unlinked from the handling unit structure and their contents are removed from inventory through an adjustment order.

After approval, the handling unit obtains the **Staged** status.

The shipment procedure for handling units

The warehousing procedures that comprise the outbound flow are grouped into two main procedures, the **Outbound Procedure** and the **Shipment Procedure**. This topic outlines the **Shipment Procedure** for <u>handling units</u>.

Step 1: Staging

At the staging location, the handling units that have the **Staged** status are ready to be loaded onto a truck or other vehicle.

Before loading handling units, repacking or recomposing handling unit structures can be required. Tthis depends on the packing requirements for the delivery address. For more information, refer to *To maintain handling units (p. 17)* and *To set up handling units (p. 91)*.

Step 2: Set not shipped

If an outbound handling unit with the **Staged** status is not shipped immediately, for example, because the loading capacity of the truck is insufficient, you can put this handling unit on hold. This is done as follows:

1. Open the Handling Units (whwmd5130m000) session.
2. Open the <u>appropriate</u> menu.
3. Select the **Execute Outbound** submenu.
4. In the **Execute Outbound** submenu, select **Set Not Shipped**. As a result, the quantity of the items of the handling unit that you put on hold appears in the **Expected Not Shipped** field.

Step 3: Confirm shipment

After you load the handling units, you can confirm the shipments related to the handling units to indicate that the goods are loaded and leave the warehouse.

As a result, the handling units and the outbound order lines to which the handling units are allocated obtain the **Shipped** status.

For information on the shipment and shipment line status, refer to topic Shipment and load status.

You may want to keep the handling unit until the customer has paid for the goods, and then set the handling units to **Closed**.

If the customer returns the goods by means of a sales return order, you can use the handling unit to receive the returned goods. In the Warehouse Receipt (whinh3512m000) session, you can use the **Receive** option on the <u>appropriate</u> menu to zoom to receive the handling unit. The handling unit is then set to **Receipt Open**.

You can also confirm the handling units that are linked to a shipment or shipment line.

Handling units are confirmed after a successful scan if the scan-to-verify process is activated or after using the Confirm option on the **Execute Outbound** submenu of the Handling Units (whwmd5130m000) session.

As a result, LN selects the **Confirmed for Shipping** check box for the handling unit. If the **Confirm Shipment Lines when confirming Handling Units** check box is selected in the Warehousing Order Types (whinh0110m000) session, the shipment line that contains the handling unit is also confirmed when all of the handling units are confirmed. If cleared, the linked shipment line must be manually confirmed.

Confirm shipment with Not Shipped handling units

If you confirm a shipment that includes a handling unit that could not be shipped, LN performs the following actions:

- In the Handling Unit Process Outbound (whinh2123m000) session, the **Not Shipped** field shows the quantity of the items of the handling units that are not shipped.

- The remainder of the shipment that included the handling unit is shipped and obtains the **Shipped** status.

- The handling unit that could not be shipped obtains the **Closed** status if it contains multiple stock points. For more information, refer to *Set and reset handling units to not shipped (p. 55)*.

  Otherwise, the handling unit obtains the **In Stock** status and is (temporarily) stored on the staging location. You can process this handling unit as follows:

  a. Make this handling unit available for new outbound advice, so that you can ship this handling unit with the next shipment. For this purpose, select the **Reset Not Shipped** option on the **Execute Outbound** submenu on the appropriate menu of the Handling Units (whwmd5130m000) session.

  b. Move the handling unit back to the storage location because the handling unit will not be shipped after all. To move a handling unit back to the storage location in the warehouse, you can use the **Return not Shipped Goods** option on the appropriate menu of the Shipment Lines (whinh4131m000) session to create a transfer order for the storage location.

  c. Transfer the handling unit to another location for inspection. If the goods were damaged due to some accident, you must find out whether the goods must be written off or kept in inventory. For that purpose, you must manually create a transfer order.

  d. Remove the handling unit and its contents from inventory. If the **Automatic Adjustment of Quantity Not Shipped** check box is selected in the Shipment Lines (whinh4131m000) session, the handling unit is automatically deleted.

Step 4: Print shipping documents

If shipping documents are used in the outbound flow of your warehouse, the shipping documents are printed after the handling units and related shipments have obtained the **Shipped** status. The settings of the shipment procedures determine whether the documents are printed automatically or manually. For more information, refer to To define warehousing procedures.

Chapter 5
Handling Units in the Inbound and Outbound Flow

<div style="text-align: right">5</div>

To receive handling units

You can use handling units to receive goods into a warehouse. Handling units help speed up the receipt of goods. To receive goods based on handling units, you must generate handling units for the shipment notices or order lines that list these goods.

Shipment notices and handling units

A ship-from business partner can use an <u>advance shipment notice (ASN)</u> to send information about the goods, and the handling units used to pack these goods, that are on the way. If available, the ship-from business partner's handling unit identification codes are stored in the **External Handling Unit** field in the Shipment Notices (whinh3100m000) session.

You can use a shipment notice to generate handling units and a handling unit structure based on the shipment notice, shipment-notice lines, and the item load structure.

The shipment notice's handling unit is the top handling unit in the <u>handling unit structure</u>. The shipment-notice lines' handling units are the child handling units of the shipment notice's handling unit. The item-load structure's handling units are the child handling units of the shipment-notice lines' handling units.

However, if a <u>package definition</u> with a handling unit template is related to the items on the shipment lines, the handling unit structure is generated as defined in the handling unit template. For further information, see *The use of package definitions (p. 128)* and *Package definitions (p. 123)*.

In addition, various settings for automatic generation of handling units from ASNs are available in LN. For further information, see *To set up automatic generation of handling units from ASNs (p. 106)*.

Shipment notice lines and handling units

If a handling unit is generated for the shipment notice, handling units are also generated for the shipment-notice lines. You can also generate handling units for individual shipment lines.

Handling unit identification codes

The identification codes of the newly generated handling units are stored in the following sessions:

- Handling Units (whwmd5130m000)
- Shipment Notices (whinh3100m000)
- Shipment Notice Lines (whinh3101m000)

If the supplier provides the ASN with handling unit codes, these codes are copied to create LN handling unit codes.

However, if identical handling unit codes exist in LN before the arrival of the ASN, this would result in duplicate records. In such cases, LN generates new unique internal handling unit codes using the mask functionality.

Inbound order lines and handling units

You can generate handling units for inbound order lines. If a package definition is entered on the order lines, the handling unit structure is generated as defined in the handling unit template of the package definition. For further information, see *The use of package definitions (p. 128)*.

How to receive handling units - procedure

You can receive goods based on handling units as follows:

- In the warehouse, scan the handling unit's label. After scanning, the handling units are automatically set to **Received** in LN. This method is available if the supplier provides handling unit codes in an ASN announcing the arrival of the goods.
- Manually receive the handling unit in LN

To manually receive the handling unit in LN, proceed as follows:

1. Start the Handling Units (whwmd5130m000) session.

2. Look up the handling unit that you want to receive. To be available for receipt, a handling unit must have the **Open** status or the **In Transit** status. For further information, see Handling Unit Status.

3. On the appropriate menu, select the **Execute Inbound** submenu.

4. From the **Execute Inbound** submenu, click **Receive**.

   As a result, a receipt record is created for the handling unit. If the handling unit includes child records, a receipt line is created for each child handling unit. The status of the handling unit and any related child handling units is set to **Receipt Open**.

5. To confirm the receipt of the handling unit, select **Confirm** from the **Execute Inbound** submenu or click the **Confirm** button on the toolbar. The handling unit is received in the warehouse and the status of the handling unit is set to **Received**.

Goods received notes

If your warehousing procedure includes goods received notes, before you complete step 4, proceed as follows:

- From the **Execute Inbound** sub-menu, click **Goods Received Notes** to access the Print Goods Received Note (whinh3412m100) session.

- In the Print Goods Received Note (whinh3412m100) session, specify the required settings and print the **Goods Received Notes** list for the handling unit.

- On the appraisal menu, select the **Execute Inbound** sub-menu.

- Continue with step 4 of the previous procedure.

Receipts and handling units

To receive a handling unit, the handling unit **Status** must be **Open**. To receive warehousing orders with **Transfer** or **Transfer (Manual)** origins, the handling unit must have the **In Transit** status.

When a handling unit is received, the status of this handling unit and the status of any related child handling units obtain the **Receipt Open** status.

When the receipt is confirmed, the handling units are automatically updated with the manual changes on the receipt lines and obtain the **Received** status.

If you confirm the receipt of a handling unit, you actually receive inventory for the warehousing order line to which the handling unit is related. The confirmed receipt triggers logistical and financial transactions and actually registers inventory in stock.

Receipt lines and handling units

When you carry out the receipt of a handling unit in the Handling Units (whwmd5130m000) session, a separate receipt line is created for the handling units with the lowest levels in the handling unit structure. Therefore, a receipt line is created for each child handling unit if a parent handling unit is received in the Warehouse Receipt (whinh3512m000) session.

If a receipt is performed for a transfer order for which handling units were used during shipment, but the receiving warehouse uses no handling units, the receipt lines are created based on the shipment stock point details.

To receive sequenced shipments with handling units and references

The receipt of sequenced shipments by means of handling units is carried out in the same way as handling units for non-sequenced shipments, as described previously, except that the ASN that is sent by the ship-from business partner has a reference to the relevant purchase schedule.

When a handling unit is generated for the ASN, the reference is also linked to the handling unit. If handling units with references are received, the references are also linked to the receipt lines created.

When the receipt (line) is confirmed, the reference is, together with other receipt information, passed on to the Purchase Control module. The Purchase Control module passes on the reference to the Assembly Control module to inform that the sequenced shipment has arrived.

To advise inbound handling units

Inbound advice are used for warehouses with locations. You must generate an inbound advice for handling units after the receipt of the handling units is confirmed and, if inspections are part of the inbound flow for a particular warehouse, again after the handling unit is approved. After approval, an inbound advice for the inspected and approved handling units is required.

To generate an inbound advice for a handling unit, proceed as follows:

1. Start the Handling Units (whwmd5130m000) session.

2. Select the handling unit for which you want to generate an inbound advice. You can generate inbound advice for handling units that have the **Received** status or the **Approved** status.

    A handling unit obtains the **Received** status after its receipt is confirmed in the warehouse. For some warehouses, an inspection procedure is included in the inbound flow.

    After inspection and approval of a handling unit, the handling unit obtains the **Approved** status, and another inbound advice must be created for the approved handling units. For further information, see Handling Unit Status.

3. On the appropriate menu, select the **Execute Inbound** sub-menu.

4. From the **Execute Inbound** sub-menu, click **Generate Advice**. As a result, an inbound advice is created for the handling unit.

    The inbound advice lists the storage locations for the handling unit. If the goods included in the handling unit require inspection, the inbound advice lists the inspection locations for the handling units. For further information on how to specify whether items require inspection, see Warehousing inspections.

    After the inbound advice is created for the handling unit, the status of the handling unit and any related child handling units is set to **Advised**.

5. If the creation of storage lists is defined in the applicable warehousing procedure, select **Generate Storage List** from the **Execute Inbound** sub-menu to open the Generate Storage List (whinh3415m000) session.

6. In the Generate Storage List (whinh3415m000) session, specify the required settings for the storage list and click **Generate** to create the storage list. After the storage list is created, you return to the Handling Units (whwmd5130m000) session. The status of the handling unit remains **Advised**.

7. If required, you can undo the inbound advice. This might be required if, for example, the goods fall from the fork lift and are heavily damaged on their way to the storage location. To undo an inbound advice, select the **Undo Advice** option from the **Execute Inbound** sub-menu of the Handling Units (whwmd5130m000) session.

8.   You can view the inbound advice in the Inbound Advice (whinh3525m000) session. You can access this session if you select the **Inbound Advice** option on the **Open** sub-menu of the Handling Units (whwmd5130m000) session. You can also access the Inbound Advice (whinh3525m000) session from the Web Browser or the Menu Browser.

To store handling units

You can store a handling unit in the warehouse if the following conditions are met:

- The handling unit obtained the **Advised** status after the handling unit's receipt was confirmed and an inbound advice was created for the handling unit. Note that handling units are put away automatically if the warehouse is non-location controlled. For further information, see Overview of receipt and inbound inspection procedures.
- The handling unit obtained the **Advised** status after the handling unit was approved after inspection and an inbound advice was created for the handling unit.

To store a handling unit, proceed as follows:

1.   Access the Handling Units (whwmd5130m000) session.
2.   Select the handling unit that you want to store. You can store handling units that have the **Advised** status.
3.   On the appropriate menu, select the **Execute Inbound** sub-menu.
4.   From the **Execute Inbound** sub-menu, click **Put Away**. The handling unit is stored in the warehouse and obtains the **In Stock** status. The quantity of the items included in the stored handling unit is updated in the **Quantity in Storage Unit** field of the Handling Units (whwmd5130m000) session. Note that if the handling unit is due for inspection, the handling unit obtains the **To Be Inspected** status after you select the **Put Away** option. The **To Be Inspected** status indicates that the handling unit is ready for inspection.

To release handling units

In the outbound flow, a handling unit must be linked to outbound advice to be retrieved from the warehouse. A handling unit that is linked to outbound advice has the **Allocated** status. If a part of the item quantity is allocated to outbound advice and the remainder is unallocated, the status of the handling unit is set to **Partially Allocated**.

The item quantity of a handling unit can be allocated to multiple outbound advices. If a handling unit is partially allocated and the outbound advice of the allocated quantity is released or the picking list is confirmed, the allocated quantity is removed from the handling unit.

Next, the allocated quantity is anonymously added to the shipment line and new handling units are generated for the shipment line according to the package definition of the related outbound order line.

The status of the handling unit remains **Partially Allocated**. The status changes to **Allocated** when the entire handling unit quantity is allocated to outbound advice.

To release a handling unit, proceed as follows:

Step 1: Select a handling unit

In the Handling Units (whwmd5130m000) session, select the handling unit that you want to release.

Step 2: Select release option

On the appropriate menu of the Handling Units (whwmd5130m000) session, select the **Execute Inbound** sub-menu. From this sub-menu, select **Release Outbound Advice**. As a result, the handling unit is released. The handling unit obtains the **Released** status.

Alternatively, in the Release Outbound Advice (whinh4202m000) session you can release the outbound advice to which the handling unit is linked. To use the Release Outbound Advice (whinh4202m000) session to release the outbound advice, you can look up the outbound order to which the outbound advice is related in the Handling Unit Process Outbound (whinh2123m000) session first.

If required, you can use the **Undo Release** option from the **Execute Inbound** sub-menu of the appropriate menu to indicate that the goods are not moved to the staging location after all. This may be required, for example, if the goods or handling units turn out not to be present in the locations listed in the outbound advice, or if the goods are damaged.

Using handling units in shipment processes

This topic describes the shipment processes that use handling units.

Handling units-general principles

- The handling unit hierarchy is independent of the administrative shipment structure. The administrative shipment structure is minimally modified when you manually compose handling unit structures.

- Multiple handling units can be linked to a shipment line as a result of the picking process. You can modify the handling unit structure proposed by LN, many times. You can move handling units within a shipment line, between two shipment lines and even between shipments after the confirmation. You cannot compose handling units originating from different ship-from warehouses.

- You can use the Shipment Line Handling Units (whinh4534m000) session to view handling units linked to a shipment line.

- You can confirm a shipment either by shipment line or by handling unit. You can confirm any handling unit in the handling unit tree structure or in the Handling Units (whwmd5130m000) session. When you confirm a shipment by handling unit, the shipment lines are partially or

entirely confirmed, provided that the **Confirm Shipment Lines when confirming Handling Units** check box is selected in the Warehousing Order Types (whinh0110m000) session.

When a shipment is partially confirmed, the status of the handling units of the confirmed shipment lines is set to **Shipped**, and the status of the handling units of the not yet confirmed shipment lines remains **Staged**.

- You can freeze any handling unit in the handling unit tree structure. When you freeze a handling unit, the shipment line is set to **Partially Frozen**. After all the handling units are set to **Frozen**, the shipment line is set to **Frozen**.

See Shipment and load status and *To maintain handling units (p. 17)*.

Create shipment line

When picking a handling unit, the handling unit is linked to an existing shipment line. You can update an existing shipment line if the status of the shipment line is set to **Open**.

Linking handling units to a shipment line

Select the **Consolidate Handling Units in one Shipment Line during Picking** check box in the Item Data by Warehouse (whwmd2110s000) session to link multiple handling units to a single shipment line, during the picking process.

If the **Consolidate Handling Units in one Shipment Line during Picking** check box is cleared, LN links only one handling unit to the shipment line during the picking process. The picking of the subsequent handling unit results in a new shipment line.

Handling unit for shipment header

If you select the **Generate Handling Unit for Shipment Header during Picking** check box in the Warehouses (whwmd2500m000) session, a handling unit is generated for the shipment header. The handling units of the shipment lines are linked to this handling unit.

If a shipment line does not have a handling unit, the handling unit can be generated, provided the item of the shipment line is handling unit enabled. The newly created handling unit is linked to the shipment header.

The link between the shipment header and the handling unit can be broken at a later stage during the composing process of handling units.

Example

- When handling units from a different shipment are added, the newly composed handling unit is related to multiple shipments.

- When handling units are moved to the handling unit tree of a different shipment, the newly composed handling unit reflects only a part of the shipment line.

Handling unit related to shipment line

Multiple handling units can be linked to a shipment line. Use the Shipment Line Handling Units (whinh4534m000) session to link handling units to a shipment line.

Multiple handling units are generated for a single shipment line if a package definition is linked to a shipment line. The maximum content of a handling unit is the quantity that a packaging item, attached to a particular level, can hold, within a package definition.

If only one handling unit is linked to the shipment line, the **Handling Unit** field in the Shipment Lines (whinh4131m000) session displays the shipment line handling unit number. If multiple handling units are linked, the shipment line handling unit number is not displayed. The **Handling Unit(s) Present** check box in the Shipment Lines (whinh4131m000) session is selected in both cases.

Setting handling unit to not shipped

You can set a **Staged** handling unit to not shipped. When you set a **Staged** handling unit, that is not directly related to an active outbound process, to not shipped, the **Expected Not Shipped** quantity is modified for the child handling units in the Handling Unit Process Outbound (whinh2123m000) session. The shipment line packing structure and the shipment line are modified accordingly.

For more information, refer to *Outbound and shipment procedures for handling units (p. 40)* and *Set and reset handling units to not shipped (p. 55)*.

Split handling unit

You can split a handling unit in the **Staged** status. The selected handling unit is split based on either packaging quantity or content quantity. You can split a handling unit linked to an outbound process.

Split shipment line

When handling units are linked to a shipment line, it is possible to split the shipment line only by selecting a child handling unit that is moved to the destination shipment.

Compose shipment

When you compose shipments, you can move shipment lines to different shipments. The handling unit tree structure is not impacted. However, the handling unit is linked to a different shipment line. The Shipment Line Handling Units (whinh4534m000) and Handling Unit Process Outbound (whinh2123m000) sessions values are updated with the new shipment information.

Confirm shipment by handling unit

You can confirm a shipment line by handling unit. You can confirm any **Staged** or **Frozen** handling units linked to the shipment line.

A handling unit is confirmed if the **Confirmed for Shipping** check box is selected for the handling unit.

Automatically or manually confirming shipment lines when confirming handling units

The setting of the **Confirm Shipment Lines when confirming Handling Units** check box in the Warehousing Order Types (whinh0110m000) session determines whether the shipment lines are automatically confirmed when all of the linked handling units are confirmed.

Confirm shipment by shipment line

To confirm a shipment by shipment line and handling units exist for the shipment line, the shipment line handling units must be confirmed first.

You can reverse:
- Partially frozen/frozen shipment line
- Partially frozen/frozen handling unit

You cannot reverse:
- Partially confirmed/confirmed shipment line
- Partially confirmed/confirmed handling unit

Remove handling unit from open shipment line

If you remove the handling unit from an open shipment line, LN deletes all the shipment line handling units. If LN is unable to delete one or multiple shipment line handling units, none of the linked handling units are deleted.

To remove the handling units, select **Remove Handling Unit** from the appropriate menu.

If you remove the handling unit from an open shipment line:

- The **Handling Unit** field in the Shipment Lines (whinh4131m000) session is set to blank.

- The **Handling Unit(s) Present** check box is cleared in the Shipment Lines (whinh4131m000) session.

- The shipment line handling units are deleted and closed.

Alternative handling unit structures

In various industries, goods are picked from an anonymous stock, which means that no handling units are present in the stock, and moved to the staging area. At the staging area, final preparations are

carried out to make the goods ready for shipment. Goods are packed in packaging materials such as crates and pallets.

In this business scenario, handling units are created automatically during the confirmation of the pick. LN creates handling units based on the package definition of the warehouse order outbound line. The packaging definition defaulted at the warehouse order outbound line is usually a packaging definition which is applied for the item or item/business partner combination under normal conditions.

At times there can be shortage of packaging materials. In most cases the shipment of goods cannot wait until the correct packaging materials are available. In practice, alternative packaging materials are used, for example, another type or size of box or another pallet can be used.

This means that an alternative package definition or handling unit template must be used.

For this purpose, on the appropriate menu of the Shipment Lines (whinh4131m000) session, select **Handling Units** and either of these options:

- **Alternative Package Definition**
  For details, refer to the online Help of the Select Alternative Package Definition (whinh4231m400) session.

- **Specific Packaging**
  For more information, refer to *Shipment line specific handling unit template (p. 55)*.

Both options are unavailable if:

- The **Package Definition** field in the Shipment Lines (whinh4131m000) session is not of type **Variable** or empty.

- The **Package Definition Binding** check box is selected in the Outbound Order Lines (whinh2120m000) session.
- The status of the shipment line is not **Open**.

- The handling unit does not refer to inventory. The handling unit linked to the shipment line contains information about the linked lots. In this scenario, the removal of handling units at shipment line level is not allowed because relevant inventory characteristic information only present at the handling unit linked to the shipment line will be lost. This information is not stored in the shipment line.

- The generation of handling units is not allowed if:
  - The shipment line is marked as **Manual** in the Shipment Lines (whinh4131m000) session.
  - The warehouse is WMS controlled.
  - The manual outbound process is not allowed.
  - Handling units are not in use in shipments.
  - The quantity **Not Shipped Quantity in Inventory Unit** in the Shipment Lines (whinh4131m000) session is greater than zero.

Shipment line specific handling unit template

You can compose a specific packaging structure for a shipment line. This structure is only applied to the shipment line concerned and cannot be reused for other shipment lines. For example, you normally put boxes on a pallet but you now want to put boxes in a container.

To replace packaging material, on the appropriate menu of the Shipment Lines (whinh4131m000) session, select **Handling Units** and **Specific Packaging**. The Handling Unit Templates (whwmd4160m000) session starts. In this session you can define the shipment line specific handling unit template.

If there is no pre-existing specific shipment line handling unit template, LN:

1. Generates a new handling unit template ID.

2. Defaults a new shipment line specific template. The defaulted template is copied from:

   a. The **Package Definition** field in the Shipment Lines (whinh4131m000) session.

   b. The package definition on the outbound line.

   c. If both package definitions in the steps above are empty, no shipment line specific template is defaulted.

3. Auxiliary packaging, if present, is copied to the new shipment line specific template.

Click the **(Re)generate Handling Unit** button in the Handling Unit Templates (whwmd4160m000) session to create a new handling unit structure based on this shipment line specific handling unit template.

Note

LN removes shipment line specific handling unit templates when the corresponding shipment line is deleted from the system.

Set and reset handling units to not shipped

You can set an entire handling unit or a part of a handling unit to **Not Shipped** if the handling unit status is **Staged**.

Set entire handling unit to **Not Shipped**

To set an entire handling unit to **Not Shipped**, select **Set Not Shipped** from the **Execute Outbound** submenu of the appropriate menu in the Handling Units (whwmd5130m000) session.

Alternatively, in the **Handling Unit Tree**, select the handling unit that must not be shipped and on the toolbar, select **Set Not Shipped**.

If the handling unit that is set to not shipped is linked to multiple shipment lines, the shipment lines are updated.

Set part of handling unit to **Not Shipped**

To set part of a handling unit to **Not Shipped**, use the Handling Unit Stock Point Details (whwmd5136m000) session. This session is started from the Handling Units (whwmd5130m000) session or the **Handling Unit Tree**.

In the **Handling Unit Tree**, the staged quantity is adjusted for the handling unit. If part of a handling unit structure, the handling unit is unlinked from the structure. In the Handling Units (whwmd5130m000) session, the staged quantity is adjusted for the *parent* handling unit.

How to set part of handling unit to **Not Shipped**

1. In the Handling Units (whwmd5130m000) session, select a handling unit.
2. On the toolbar of the Handling Units (whwmd5130m000) session, select **Stock Point Details**.
3. In the Handling Unit Stock Point Details (whwmd5136m000) session that starts:
   - If you are working with serialized items, select the **Not Shipped** check box for each item that must not be shipped.
   - For lot items or items with inventory dates, specify the quantity of the items that must not be shipped.
4. Save and close the Handling Unit Stock Point Details (whwmd5136m000) session.

Partially not-shipped: handling unit quantity exceeded

When a part of the handling unit is not shipped, you can generate a new outbound advice for the same shipment line. The bottom level handling unit that is partially not-shipped, is filled up based on the fill-up criteria. As a result, the handling unit stock point details display a quantity greater than the total handling unit quantity.

If the not-shipped quantity is reset, the bottom-level handling unit quantities exceed the maximum handling unit template quantity. If this is not desired, you must regenerate the handling unit structure for the related shipment line.

To view the shipped and not shipped quantities

In the **Handling Unit Tree** and the Handling Units (whwmd5130m000) session, the staged (=shipped) quantity is adjusted for the handling unit and the parent handling unit. The not shipped quantity of the handling unit is also displayed in the **Expected Not Shipped** field of the Handling Unit Process Outbound (whinh2123m000) session.

Not shipped handling unit with multiple stock points closed

A not-shipped handling unit that contains multiple stock points is set to **Closed** when the linked shipment is confirmed. The items are put back into inventory. This is because handling units in inventory are not allowed to contain multiple stock points.

Reset not-shipped handling units

If the handling unit is **Not Shipped**, either fully or partially, you can reset the not-shipped quantity. The **Not Shipped** quantity is reset to 0 (zero) in the **Expected Not Shipped** field of the Handling Unit Process Outbound (whinh2123m000) session. The related shipment line is updated accordingly.

To reset entire handling units, select **Reset Not Shipped** from the **Execute Outbound** submenu of the appropriate menu in the Handling Units (whwmd5130m000) session.

To reset **Not Shipped** quantities, in the Handling Unit Stock Point Details (whwmd5136m000) session:

- For serialized items, clear the **Not Shipped** check box for each item that must be reset.
- For lot items or items with inventory dates, specify the quantity of the items that must be reset.

Note

Resetting handling units with multiple stock point details is allowed before the linked shipment is confirmed, because after the shipment is confirmed, the application sets not-shipped handling units with multiple stock points to **Closed**.

The reuse of bottom-level handling units

LN reuses bottom-level handling units when repacking items:

- In inventory
- During cross-docking
- During picking

In these processes, reuse is allowed if the packaging item and the item quantity of the source and the target bottom-level handling units match.

Reusing picked handling units

If the packaging item and the item quantity of the bottom-level handling units of the picked handling unit and the shipment line package definition match, the bottom handling units are reused.

Example

The picked handling unit HU001 is of type Box1 and contains 10 items A. According to the current package definition, handling unit HU001 is contained in crates containing 12 boxes each.

The shipment line package definition specifies a top level handling unit of type Pallet that contains 20 bottom-level handling units of type Box1 containing 10 items A.

In this case, the reuse criteria are met and HU001 is added to the shipment line. If the **Auto Complete Handling Unit Structure during Picking** check box is selected in the Item - Package Definitions

(whwmd4130m000) session for the item, the application creates a top-level Pallet and adds HU001 to the pallet according to the package definition of the shipment line.

If the shipment line package definition includes bottom-level handling units of a different packaging item or item quantity, HU001 is closed and the 10 items a are packed in a bottom-level handling unit of the type specified in the shipment line package definition.

Reusing handling units in stock

If the packaging item and the item quantity of the bottom-level handling units of the source handling unit and the target package definition match, the bottom handling units are reused.

Example

Source handling unit HU001 is of type Box1 and contains 10 items A. According to the current package definition, handling unit HU001 is contained in crates containing 12 boxes each.

The target package definition specifies a top level handling unit of type Pallet that contains 20 bottom-level handling units of type Box1 containing 10 items A.

In this case, HU001 is reused. The application creates a top-level Pallet and adds HU001 to the pallet.

If the target package definition has bottom-level handling units of a different packaging item or item quantity, HU001 is not reused and the 10 items a are packed in a bottom-level handling unit of the type specified in the target package definition.

Chapter 6
Additional Handling Unit Processes

<div style="text-align: right">6</div>

Scan-to-verify

Scan-to-verify is an optional step that you can add to the outbound flow. It is a process that is used to verify if the handling units about to be loaded at the staging location match the handling units linked to the shipment lines in LN. If yes, the handling units can be loaded, the shipments can be confirmed, and the ASNs can be sent.

To start the scan-to-verify process, a shipment must be set to **Frozen** to prevent that changes are made to the shipment while scanning is in progress.

The verification is done by scanning the labels of the handling units at the loading dock.

If a scanned handling unit label matches a handling unit label in LN, the **Confirmed for Shipping** check box is selected for the handling unit. If all handling units are scanned successfully, the scan-to-verify process is completed and the shipment line to which the handling units are linked can be confirmed.

Note

When the **Confirmed for Shipping** check box is selected for a handling unit, the status of the handling unit is still **Staged**.

The status of the handling unit is set to **Shipped** when the linked *shipment line* is confirmed. The setting of the **Confirm Shipment Lines when confirming Handling Units** check box in the Warehousing Order Types (whinh0110m000) session determines whether the shipment lines are confirmed automatically when all of the linked handling units are confirmed.

In the Shipment Lines (whinh4131m000) session, the **Indicator** field shows the actions to be taken to complete the shipment procedure (which can include the scan-to-verify process). In the Shipments (whinh4130m000) and Shipment Lines (whinh4131m000) sessions, the **Handling Unit Based Confirmation** check box shows whether handling unit based confirmation is mandatory.

Setup

To use the scan-to-verify functionality, the **Freeze Mandatory** and the **Handling Unit Based Confirmation** check boxes must be selected in the Warehousing Order Types (whinh0110m000) session.

Automatically or manually confirming shipment lines when confirming handling units

The setting of the **Confirm Shipment Lines when confirming Handling Units** check box in the Warehousing Order Types (whinh0110m000) session determines whether the shipment lines are automatically confirmed when all of the linked handling units are confirmed.

Handling units are confirmed in one of these ways:

- Using the **Confirm** option in the **Handling Unit Tree**.
- Using the Confirm option on the **Execute Outbound** submenu of the Handling Units (whwmd5130m000) session.
- After a successful scan if the scan-to-verify process is used.

As a result, the **Confirmed for Shipping** check box is selected for the handling unit.

The status of the handling unit changes to **Shipped** when the shipment line of the handling unit is confirmed. The shipment line is automatically confirmed if the **Confirm Shipment Lines when confirming Handling Units** check box is selected and all of the linked handling units are confirmed.

If the shipment lines containing the handling units are automatically confirmed, the status of the shipment lines changes to **Confirmed** and the status of the handling units changes to **Shipped** after the last handling unit is successfully scanned. Consequently, changes to the shipment lines or the handling units are not allowed.

If the shipment lines are not automatically confirmed after confirming the handling units, the shipment line status **Frozen** and the handling unit status **Staged** are retained. Consequently, you can adjust the shipping structure if required.

For example, if the shipment line contains 100 handling units of type Box but the truck can contain only 80 boxes. You can solve this by reopening the shipment line and setting 20 handling units of type Box to **Not Shipped**. Consequently, these handling units are no longer part of the shipment and the **Confirmed for Shipping** check box is cleared.

Unconfirmed handling units after scan is completed

If after scanning the bar code scanner generates an error message and some of the handling units of the shipments in LN are unconfirmed, the labels of the unconfirmed handling units of the shipment are different from the labels of the scanned handling units at the loading dock. This means that incorrect handling units are picked and must be replaced with the correct handling units. After replacement, the scanning process must be repeated for the newly picked handling units.

Sequencing

The **Sequencing** functionality is used in the outbound process to pack handling units in a predefined structure and release the handling units for shipment in ascending order based on loading sequence numbers.

Loading sequence numbers and outbound advice lines or picking list lines are created based on the reference numbers of the originating sales schedule lines.

The handling unit structures are based on the reference numbers and the packaging reference numbers of the originating sales schedule lines.

LN releases the advice lines or picking lines in ascending order based on the reference numbers.

> **Note**
>
> LN does not monitor the actual loading activities carried out on the loading platform. If the handling units must be loaded in *descending* order, it is the docking personnel's responsibility to load the handling unit with the highest sequence number first.

Process details

The reference number of the originating sales schedule line is specified in the **Reference** field of the Sales Schedule Lines (tdsls3107m000) session.

The originating packaging reference numbers are specified in the **Packaging Reference A** and **Packaging Reference B** fields of the Sales Schedule Lines (tdsls3107m000) session.

From the sales schedule lines, the reference numbers are passed on to the reference and packaging reference fields in the Outbound Order Line Reference Distribution (whinh2529m000) and Shipment Line Reference Distribution (whinh4529m000) sessions.

Because the sequencing functionality uses projected shipments, the load and shipment structure is created when the outbound order lines are created.

In the outbound process, an outbound advice line is generated for each reference number. If picking lists are used in the outbound procedure, a picking list line is generated for each reference number.

During the release of the outbound advice or the confirmation of the picking lists:

- The handling unit structures are built based on the reference numbers and the packaging reference A or packaging reference B codes. See the Example.
- The advice lines or picking list lines are released in ascending order based on the reference numbers.

If this order is not observed, the process stops and an error message is displayed. For example, if a picking list line is manually picked and confirmed while other not yet picked lines with lower sequence numbers are present, an error message is displayed.

Handling unit building

If the **References based Handling Unit Building at Shipments** check box in the Package Definitions (whwmd4110m000) and Item - Package Definitions (whwmd4130m000) sessions are selected, handling units are created by <u>reference</u> number.

The handling unit structures are based on the settings of the **Single Reference**, **Single Packaging Reference A**, or **Single Packaging Reference B** check boxes in the handling unit template nodes.

If the bottom-level node is set to virtual, the number of bottom-handling units and the quantity of items contained in them is variable, but the total item quantity of the bottom-level node cannot exceed the quantity of the parent node. See *Flexible template - virtual handling units (p. 98)*.

Setup

1. Define a <u>package definition</u> for the shipment procedure.
2. Select the **References based Handling Unit Building at Shipments** check box in the Package Definitions (whwmd4110m000) and Item - Package Definitions (whwmd4130m000) sessions.
3. In the Handling Unit Templates (whwmd4160m000) session, select these check boxes:
   - **Allow Multi Item for Shipping** for the parent nodes.
   - **Single Packaging Reference A** or **Single Packaging Reference B** for the second-level node.
   - For the bottom node:
     - **Single Reference**
     - **Single Packaging Reference A** or **Single Packaging Reference B**
     - Optionally, **Virtual Node**. See the Example.
4. In the **Generate Handling Units Automatically during** section of the Item Data by Warehouse (whwmd2110s000) session, select **No** in the **Creation of Projected Shipments** field.
5. Select these check boxes:
   - **Projected Shipments in use** in the Inventory Handling Parameters (whinh0100m000) session
   - **Projected Shipments in use** and **Sequencing** for the relevant <u>warehousing order types</u> in the Warehousing Order Types (whinh0110m000) session
   - **Generate Handling Units Automatically During Confirm Picking** in the Item Data by Warehouse (whwmd2110s000) session.

Example

For handling unit template T1, this structure is defined:

Node	Packaging item	Packaging item quantity	Item quantity	Multi-item	Single reference	Single reference A	Virtual node
1	Pallet	1		Selected			Not applicable
2	Crate	2	40	Selected	Cleared	Selected	Not applicable
3	Box		Not applicable	Not applicable	Selected	Selected	Selected

Projected shipment line SHP1000/10 is present with this reference information in the Shipment Line Reference Distribution (whinh4529m000) session:

Line	Reference	Item	Packaging Reference A	Quantity
1	1111	A1	80	20
2	3333	A1	100	15
3	2222	A2	100	5

According to the sequencing rules, line 1 with reference number 1111 is picked first. For line 1, this handling unit structure is generated based on template T1:

Node level	Handling unit	Packaging item	Reference	Packaging Reference A	Item	Item quantity
1	HU001	Pallet	1111	80	A1	
2	HU002	Crate	1111	80	A1	
3	HU003	Box	1111	80	A1	20

Next, line 3 is picked with reference number 2222. For line 3, another Box and another Crate is generated, because the single reference A restriction applies to the Crate level and the HU003 Box contains the maximum item quantity defined for the Box level. This handling unit structure is generated:

Node level	Handling unit	Packaging item	Reference	Packaging Reference A	Item	Item quantity
1	HU001	Pallet				
2	HU002	Crate	1111	80	A1	
3	HU003	Box	1111	80	A1	20
2	HU004	Crate	2222	100	A2	
3	HU005	Box	2222	100	A2	5

Finally, line 2 is picked with reference number 3333. Line 2 has packaging reference A 100 and quantity 15. HU0006 Box is created and added to Crate HU004:

Node level	Handling unit	Packaging item	Reference	Packaging Reference A	Item	Item quantity
1	HU001	Pallet				
2	HU002	Crate	1111	80	A1	
3	HU003	Box	1111	80	A1	20
2	HU004	Crate		100		
3	HU005	Box	2222	100	A2	5
3	HU006	Box	3333	100	A1	15

The entire quantity of line 1 is contained in one Box. If the item quantity for the Box level in this template would be set to 15, another Box would have been generated, while in actual practice the docking personnel would have put the items in one box anyway. The advantage of using a virtual bottom node in this situation is that an exact number of Boxes for each Crate is not required. This allows for different numbers of boxes containing different item quantities to be generated for the bottom node, as long as the maximum item quantity of 20 items per Crate is not exceeded.

Thus the same template can be used for all structures in which one pallet carries two crates, and each crate contains a maximum of 20 items while a fixed item quantity for each box is not essential.

Part change tags and reasons

For each underlined handling unit, a supplier can specify two pairs of part change tags and part change reasons to notify the ship-to business partner of a change in the design, production, inspection or packing of a part. A part is an end item or a component item.

Part change tags and reasons are specified in these fields in the Handling Units (whwmd5130m000) session:

- **Part Change Tag 1**
- **Part Change Reason 1**
- **Part Change Tag 2**
- **Part Change Reason 2**

In each tag field, you must manually specify the relevant code of the part change tag. In each reason field, select the required part change reason.

You can specify or modify part change tags and reasons at any stage in the outbound or shipment process.

When the shipment of the handling unit is confirmed, part change tags and reasons are published on the:

- Outbound advance shipping notice (ASN)
- Packing list
- Business Object Document (BOD)

The ASN and the packing list are documents created by the automotive exchange applications TFS (Transformation Services) and EXM (Automotive Exchange Export Manager).

The impact of item conversion on bottom-level handling units

Item conversion affects the stock point detail information present in bottom-level handling units in the following situations.

Lot conversion

- In the following conversions the lot information is added to the handling unit in the Handling Unit Stock Point Details (whwmd5136m000) session. If no stock point details were present prior to this conversion, the **Stock Point Details Present** check box is selected in the Handling Units (whwmd5130m000) session:
  - Not lot controlled to low volume lot controlled
  - High volume lot controlled to low volume lot controlled (if lot registration was not performed)

- **Not lot controlled to high volume lot controlled**
  Lot information is not generated. The user can register lot numbers in the Handling Unit Stock Point Details (whwmd5136m000) session.

- **Low volume lot controlled to high volume lot controlled**
  The lot information in the Handling Unit Stock Point Details (whwmd5136m000) session remains unchanged.

- **Lot controlled to not lot controlled**
  The lot code is removed from the handling unit stock point details. If the item is not serialized and the outbound method is by location, the stock point details are removed and the **Stock Point Details Present** check box in the Handling Units (whwmd5130m000) session is cleared.

Serial conversion

- **Low volume serialized to high volume serialized**
  The lot information in the Handling Unit Stock Point Details (whwmd5136m000) session remains unchanged.

- **Not serialized to high volume serialized**
  Serial information is not generated. The user can register serial numbers in the Handling Unit Stock Point Details (whwmd5136m000) session.

Outbound method conversion

- **LIFO or FIFO to By Location**
  In the Handling Unit Stock Point Details (whwmd5136m000) session, the inventory date is removed. When the item is not serialized and not lot controlled, the stock point details are removed. If the item is high volume serialized or high volume lot controlled and no lot or serial registration is performed, the handling unit stock point details are removed. When the handling unit stock point details are removed, the **Stock Point Details Present** check box in the Handling Units (whwmd5130m000) session is cleared.

- **By Location to LIFO or FIFO**
  In the Handling Unit Stock Point Details (whwmd5136m000) session, the handling unit stock point details are created if the item is not serialized or lot controlled. If lot controlled or serialized, the stock point details are updated

Multicompany handling units

You can use handling units in multicompany warehouse transfers. If you transfer a handling unit by means of a multicompany warehouse transfer and the shipment is confirmed, LN copies the shipment's handling-unit structure to the ship-to company. In addition, LN copies the ship-from company's handling

unit numbers to the ship-to company and generates the ship-to company's internal handling unit numbers by means of the ship-to company's **Internal Handling Unit Mask**.

When the handling unit structure is copied to the ship-to company and:

- A package definition that does not exist in the ship-to company is linked to a handling unit, the handling unit is not copied to the ship-to company.
- A packaging item that does not exist in the ship-to company is linked to the handling unit, the handling unit is copied to the ship-to company without a packaging item.

When the shipment is confirmed, the handling unit's status is **In Transit** in both logistical companies. When the handling unit is received in the ship-to company, the handling unit's status becomes:

- **Shipped** in the ship-from company.
- **Received** in the ship-to company.

Handling units and cross-docking

In LN, handling units can be cross-docked if handling units are used in both the inbound and the outbound processes.

An inbound handling unit can be linked to various cross-dock order lines, and various inbound handling units can be used to fulfill an individual cross-dock order line.

If the item quantity to be cross-docked is lower than the handling unit quantity, the cross-dock quantity is taken from the handling unit and cross-docked anonymously (without handling units). If child handling units are present, the required number of child handling units is cross-docked.

If the cross-dock quantity is not equal to the quantities of one or more of the child handling units, the difference is taken from one of the child handling units and cross-docked anonymously. The handling unit is put away in inventory without the cross-docked quantities.

The handling units and anonymous items to be cross-docked are advised from a receipt location to a staging location.

Example

A receipt line contains a handling unit of type Pallet and five child handling units of type Box, each box containing 10 items X. To fulfill an outbound-order line for 47 items X, four of the child handling units (Boxes) are cross-docked, and 7 items X are taken from the fifth child handling unit. These items are cross-docked anonymously. The box now contains 3 items X and is put in inventory. For the receipt line, this inbound advice is created:

Inbound Advice (whinh3525m000)	From Handling Unit	To Handling Unit	Item quantity	From Location	To Location
INB00001/1	HU010 Pallet	HU011 Box	10 item X	Receive A	Staging B
INB00001/2	HU010 Pallet	HU012 Box	10 item X	Receive A	Staging B
INB00001/3	HU010 Pallet	HU013 Box	10 item X	Receive A	Staging B
INB00001/4	HU010 Pallet	HU014 Box	10 item X	Receive A	Staging B
INB00001/5	HU010 Pallet		7 item X	Receive A	Staging B
INB00001/6	HU010 Pallet	HU010 Pallet	3 item X	Receive A	Storage A

In INB00001/6, the child handling unit HU015 Box that actually contains the three items to be stored is displayed in the Handling Unit Tree.

Cross-docking is performed in warehouses both with and without location control.

The handling units and the anonymous quantity taken from the handling unit are cross-docked when the inbound advice is put away. If locations and inbound advice are not applicable, cross-docking is performed when the receipt of the handling unit is confirmed. If inbound inspections apply, cross-docking is performed when the approved quantity is put away in inventory.

Unsplittable handling units

You can cross-dock unsplittable handling units if the entire handling unit can be cross-docked. Cross-docking part of the contents of such handling units is not allowed. Handling units can be split up if the **Splittable** check box is selected in the Handling Units (whwmd5130m000) session.

Projected shipments

If projected shipments and projected handling units are used, the application closes the received handling units. The item quantities are cross-docked anonymously. The handling units of the projected shipments are filled up with the cross-docked item quantities.

To use projected shipments, select the **Projected Shipments in use** check box in the Inventory Handling Parameters (whinh0100m000) session. For the relevant order types, select the **Projected Shipments in use** check box in the Warehousing Order Types (whinh0110m000) session.

To automatically generate projected shipments, select the **Generate Projected Shipments Automatically** check box in the Warehousing Order Types (whinh0110m000) session. If this check box is cleared,, projected shipments are generated using the Generate Projected Shipments (whinh4230m200) session.

Using the **Generate Handling Unit Automatically during Projected Shipments** field of the Warehouses (whwmd2500m000) session, you can specify that handling units must be generated for projected shipments. Handling units are generated for projected shipments to enable outbound labels to be printed when the items are received from production.

Reuse of cross-docked handling units

Cross-docked handling units (such as the four Boxes of the previous example) are reused for the shipment lines generated for the cross-dock order lines if the reuse criteria are met. If not, the handling units are removed and new handling units are generated for the shipment lines.

Cross-docking handling units and location control

In warehouses without <u>locations</u>, <u>inbound advice</u> is not mandatory. In location-controlled warehouses, inbound order lines that must be cross-docked are advised to a staging location. When the receipt is confirmed, the cross-dock order lines are created. If inbound advice is defined as an automatic activity in the warehousing procedure, the inbound advice lines are also created. Otherwise, the user must manually create the inbound advice lines.

A handling unit is present on multiple inbound advices or multiple advice lines of an inbound advice when part of a handling unit is advised to a staging location to be cross-docked and the remainder is advised to a storage location.

Example

Receipt line 00010 contains handling unit HU00001, which contains 50 items A. Outbound order line 00101 lists 20 items A.

To fulfill outbound order line 00101, 20 items A must be cross-docked because item A is not present in inventory. This is accomplished by removing 20 items A from HU00001 and cross-docking these items without handling units to outbound order line 00101, and advising HU00001 with the remaining items A to the storage location:

Inbound advice	From Handling Unit	To Handling Unit	Item quantity	From Location	To Location
INB00001/1	HU00001		20 item A	Receive A	Staging B
INB00001/2	HU00001	HU00001	30 item A	Receive A	Storage A

If the **Generate Handling Unit Automatically during Picking** check box is selected for the relevant warehouses in the Warehouses (whwmd2500m000) session, handling units are generated for the shipment line.

Cross-docking handling units and inbound advice

If a user removes an inbound advice linked to a cross-docking order line, the item quantity of the removed advice line is added to the item quantity that is advised to the storage location. If the advice is subsequently put away in inventory, the linked cross-dock order line is canceled. A new cross-dock order line must be created to fulfill the demand.

Example

These outbound order lines are present, for which no inventory is available:

Order	Item quantity	Package definition
Sales S0001/10	20 item A	PDef01
Sales S0002/10	30 item A	PDef01
Sales S0003/10	40 item A	-

For these order lines, cross-dock orders are created based on this inbound order line:

Order	Item quantity	Package defini-tion
Purchase P0001/10	150 item A	PDef01

When the purchase order is received, handling unit HU00123 containing 150 item A is created. When the receipt of the purchase order is confirmed, these cross-dock order lines and inbound advice lines are created:

Cross-dock order line	Inbound advice	From Handling Unit	To Handling Unit	Item quantity	From Loca-tion	To Location
P0001/10	INB00001/1	HU00123		20 item A	Receive A	Staging B
P0001/20	INB00001/2	HU00123		30 item A	Receive A	Staging B
P0001/30	INB00001/3	HU00123		40 item A	Receive A	Staging B
	INB00001/4	HU00123	HU00123	60 item A	Receive A	Storage A

A user removes P0001/20/INB00001/2. Consequently, the item quantity of INB00001/2 is added to HU00123, which is advised to storage:

Inbound ad-vice	From Handling Unit	To Handling Unit	Item quantity	From Location	To Location
INB00001/1	HU00123		20 item A	Receive A	Staging B
INB00001/3	HU00123		40 item A	Receive A	Staging B
INB00001/4	HU00123	HU00123	*90 item A*	Receive A	Storage A

If the user decides to put away the handling unit quantity advised to storage before the quantities to be cross-docked are handled, the handling unit is put away and the reference to the handling unit is removed from the advice lines to be cross-docked. In the previous example, the result would be:

Inbound advice	From Handling Unit	To Handling Unit	Item quantity	From Location	To Location
INB00001/1			20 item A	Receive A	Staging B
INB00001/3			40 item A	Receive A	Staging B
INB00001/4	HU00123	HU00123	90 item A	Receive A	Storage A

Also, the cross-dock order line P0001/20 is canceled. To fulfill the demand of outbound order line Sales S0002/10, a new cross-dock order line must be created.

Chapter 8
To Inspect Handling Units

8

To inspect handling units

The handling unit setup determines whether handling units are generated, must be created by the user, or are not used for items in the inbound and/or outbound flow. If generated, inspection handling units are generated when the inspection header and inspection lines are created.

If handling units are present for an inbound or outbound inspection header or inspection lines, you can specify the inspection results for the inspection handling units or in the inspection lines.

The **Handling Unit(s) Present** field in the inspection header in the Warehouse Inspections Overview (whinh3122m000) session shows whether handling units are present.

If you specify the inspection results for the handling units, the corresponding inspection line quantities are updated.

Inspection results specified in the inspection lines are updated on the corresponding handling units after you process the inspection, but only if all inspection lines of the inspection have the same inspection results, that is, the entire inspection must be approved, rejected, or (inbound only) destroyed.

Partial inspections are manually processed in the Warehouse Inspections Overview (whinh3122m000) session or the Warehouse Inspection (whinh3622m000) session.

After you have specified the inspection results for all of the handling units of an inspection, the inspection is processed:

- By LN if the inspection results were specified starting from the Handling Units (whwmd5130m000) or the Handling Units (whwmd5630m000) session.
- Manually by the user

Note

If you process an inspection for which part of the item quantity is not approved, rejected, or (inbound only) destroyed, LN creates a new inspection for the remaining quantity.

However, processing an inspection is not allowed if a corresponding bottom-level handling unit has an unspecified quantity and an approved quantity. In such cases a message is displayed and you must specify the entire quantity and process the corresponding inspection handling units.

If the bottom-level handling unit has an unspecified quantity and a rejected or destroyed, but no approved quantity, processing the inspection is allowed. In such cases the destroyed and rejected quantities are removed from the handling unit and processed anonymously, that is, outside the handling unit. The unspecified quantity stays in the handling unit, for which LN creates a new inspection sequence.

How to specify inspection results for handling units

1.   Look up the inspection in the Warehouse Inspections Overview (whinh3122m000) session.
2.   Select the inspection.
3.   On the toolbar, click the **Handling Unit Tree**.
4.   In the **Handling Unit Tree**, you can:
     ▪   Approve, reject, or destroy an entire handling unit including its children, if present.
     ▪   For bottom handling units only, approve, reject, or destroy the items contained.

Approve or reject handling unit including children

1.   In the **Handling Unit Tree**, select the handling unit.
2.   On the toolbar, click **Approve Remaining** or **Reject Remaining**. If you click **Reject Remaining**, select a reject reason in the dialog box that is displayed.
3.   Save and close the **Handling Unit Tree**.

To destroy the entire quantity of a handling unit including children, if present, see the following list.

Approve, reject, or destroy bottom-level handling units

1.   In the **Handling Unit Tree**, select the handling unit.
2.   From the appropriate menu, select **Inspect Handling Unit** to open the Inspect Handling Unit (whinh2234m000) session.
3.   Specify the quantities to approve, reject, or (inbound only) destroy. If you reject or destroy items, enter a reject or destroy reason. If the items have stock point details, see the following list.
4.   Save and close the Inspect Handling Unit (whinh2234m000) session.
5.   Save and close the **Handling Unit Tree**.

Approve, reject, or destroy bottom-level handling units with stock point details

1.   Do either of the following:
     ▪   In the Inspect Handling Unit (whinh2234m000) session, click **Stock Point Details**.

- In the **Handling Unit Tree**, select **Stock Point Details** from the <u>appropriate menu</u>.

2. In the Handling Unit Stock Point Details (whwmd5136m000) session that opens, specify the quantities to approve, reject, or (inbound only) destroy. If you reject or destroy items, enter a reject or destroy reason.

Note

If the items in the handling unit are high volume serialized, and the handling units correspond to multiple inspection lines, you must register the serial numbers before specifying the inspection results. For more information, refer to *Serial registration for inspection handling units (p. 77)*.

Serial registration for inspection handling units

For each high volume serialized item that requires inspection, and each low volume serialized item if the **Consolidate Stock Points in one Warehouse Inspection** check box is selected, LN creates a separate inspection line. If handling units are present for such inspection lines and you specify inspection results for these handling units, LN updates the inspection results on the inspection lines.

However, if no serial numbers are present for the handling units, LN cannot determine the inspection lines on which to update the inspection results in situations as described in the following examples. In such cases, a message is displayed prompting you to register the serials before entering the inspection results.

Example

Inspection INS00001 has the following inspection lines:

Inspection Line	Serial	Approved	Destroyed	Rejected
1	S1	0	0	0
2	S2	0	0	0
3	S3	0	0	0
4	S4	0	0	0
5	S5	0	0	0
6	S6	0	0	0

Each inspection line has 1 high volume serialized item. For INS00001 handling unit HU001 is present, which has two child handling units: HU002 and HU003, each of which contain 3 serialized items. If you decide to reject HU002 entirely, LN cannot determine to which inspection lines the rejected items must be updated. Therefore, you must first register the serial numbers for HU002.

If you generate serials S1, S2, and S3 for HU002 and then reject these items for HU002, LN updates the inspection lines as follows:

Inspection Line	Serial	Approved	Destroyed	Rejected
1	S1	0	0	1
2	S2	0	0	1
3	S3	0	0	1
4	S4	0	0	0
5	S5	0	0	0
6	S6	0	0	0

If you then decide to approve HU003 entirely, registering the serial numbers for HU003 is not required, because LN can determine that all of the remaining inspection lines must be approved. When you process the inspection, inspection lines 4, 5, and 6 will be updated:

Inspection Line	Serial	Approved	Destroyed	Rejected
1	S1	0	0	1
2	S2	0	0	1
3	S3	0	0	1
4	S4	1	0	0
5	S5	1	0	0
6	S6	1	0	0

Example

Inspection INS00002 has the following inspection lines:

Inspection Line	Lot	Serial	Approved	Destroyed	Rejected
1	L1	S1	0	0	0
2	L1	S2	0	0	0
3	L1	S3	0	0	0
4	L2	S4	0	0	0
5	L2	S5	0	0	0
6	L2	S6	0	0	0

Each inspection line has 1 item which is high volume serialized and low volume lot controlled. For INS00002 handling unit HU004 is present, which has two child handling units: HU005 and HU006.

HU005 contains lot L1 with 3 serialized items, HU006 contains lot L2, also with 3 serialized items.

If you approve HU005 entirely and reject one item of HU006, LN cannot determine to which inspection lines the approved and rejected items must be updated. Therefore, you must first register the serial

numbers for HU005 and HU006. If you then approve HU005 and reject S in HU006, you cannot process INS00002, because in HU006 there are still two items without inspection results. Processing an inspection is not allowed if one of its bottom level handling units has a quantity not approved, rejected, or destroyed.

To process handling unit inspection results

Partial inspections are manually processed in the Warehouse Inspections Overview (whinh3122m000) session or the Warehouse Inspection (whinh3622m000) session.

After processing, rejected or destroyed handling units are unlinked from the handling unit structure. Rejected handling units obtain the **Quarantine** status if the quarantine functionality is activated, otherwise these handling units obtain the **Closed** status. Destroyed handling units obtain the **Closed** status.

After processing a partial inspection, LN unlinks the handling units for which no inspection results were specified from the handling unit structure and creates a new inspection for these handling units.

However, processing an inspection is not allowed if a corresponding bottom-level handling unit has an unspecified quantity and an approved quantity. In such cases a message is displayed and you must specify the entire quantity and process the corresponding inspection handling units.

If the bottom-level handling unit has an unspecified quantity and a rejected or destroyed, but no approved quantity, processing the inspection is allowed. In such cases the destroyed and rejected quantities are removed from the handling unit and processed anonymously, that is, outside the handling unit. The unspecified quantity stays in the handling unit, for which LN creates a new inspection sequence.

If a handling unit is partly approved and partly rejected or (inbound only) destroyed, after processing the destroyed or rejected quantity is removed from the handling unit and processed anonymously.

For further information on processed inspections, refer to Warehousing inspections after processing.

Inspection handling-unit structures in the Handling Unit Tree

The handling unit setup determines whether handling units are generated, must be created by the user, or are not used for items in the inbound and/or outbound flow. If generated, inspection handling units are generated when the inspection header and inspection lines are created.

The inspection lines do not correspond directly with the handling units created for an inspection. The handling unit structure of an inspection is determined by:

- The quantity of the items to be inspected
- The package definition used
- If no package definition is used, a manually created handling unit structure.
- The number of stock points present for the quantities to be inspected

The handling units created for the inspection are displayed in the Warehouse Inspection (whinh3622m000) satellite session. If a handling unit structure is present, the top-level handling unit of the handling unit structure is displayed in the Warehouse Inspection (whinh3622m000) session. Depending on the total quantity of items to be inspected and the package definition used, more than one instance of a handling unit structure can be present for an inspection. In such cases, an extra top-level handling unit is superimposed on the instances of the handling unit structure present, as shown in the following example.

Example

Inspection INS0001 uses package definition PD01 to create handling units. PD01 is set up as follows:

Node	Packaging Item	Packaging item quantity	Item quantity
1	Pallet	1	-
2	Box	2	40 pcs, 20 pcs per box

Inspection INS0001 has a total quantity of 40 items to be inspected. The resulting handling unit structure is:
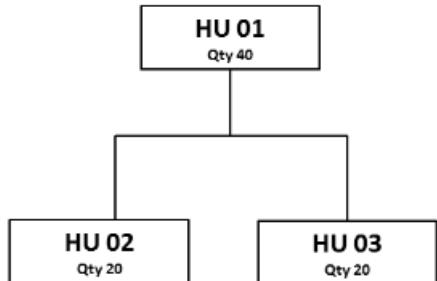
Handling unit HU 01 is displayed in the Warehouse Inspection (whinh3622m000) satellite session.

Inspection INS0002 also uses package definition PD01. Inspection INS0002 has a total quantity of 80 items to be inspected. The resulting handling unit structure is:
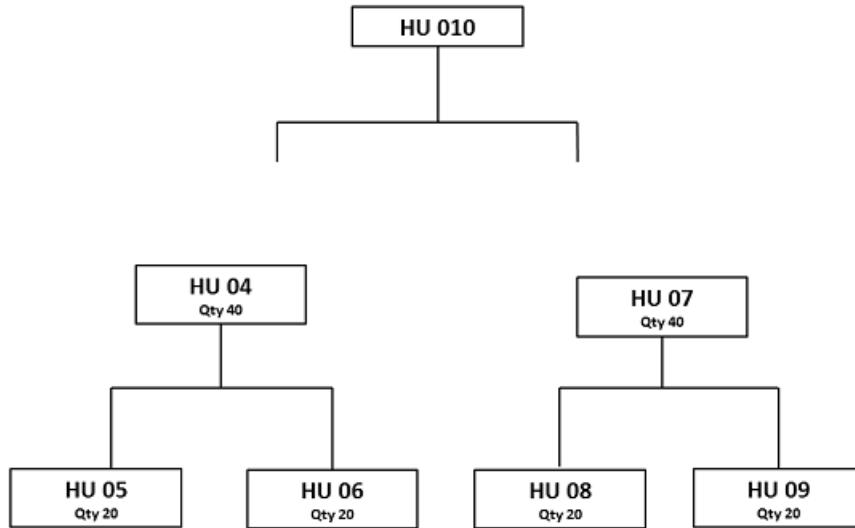
Because the total number of items to be inspected exceeds the maximum quantity that can be contained in package definition PD01, LN creates another instance of the handling unit structure. That is, an additional pallet with two boxes. For such additional instances, no packaging information is present, and no labels are printed. Handling units HU 04 and HU 07 are displayed in the Warehouse Inspection (whinh3622m000) satellite session.

In addition, LN superimposes top handling unit HU 10 on HU 04 and HU 07. This is to keep all handling units of INSP0002 together in a single handling-unit structure, which would otherwise have consisted of two separate structures under HU 04 and HU 07. HU 10 is not shown in the Warehouse Inspection (whinh3622m000) satellite session, but is visible in the **Handling Unit Tree**.

Therefore, if you select handling unit HU 04 in the Warehouse Inspection (whinh3622m000) satellite session and open the **Handling Unit Tree**, the entire structure from HU 10 onwards is displayed. If you select HU 01 for INS0001 in the Warehouse Inspection (whinh3622m000) satellite session, HU 01 is the top handling unit of the entire structure.

Chapter 9
Quarantine Handling

9

Handling units in quarantine inventory

Quarantine items can be contained in handling units. These handling units are sent to quarantine from warehousing inbound or outbound inspections or from production. These handling units obtain the **Quarantine** status when the quarantine ID is created.

You cannot manually generate or compose quarantine handling units.

If handling units are present in quarantine, you can process or specify dispositions for the handling units or the entire quarantine ID. You cannot handle individual disposition lines, because a disposition line can be related to a part of a handling unit and processing a part of a handling unit is not allowed.

Lot and serialized items in quarantine handling units

For high volume lot or serialized items, lot or serial registration for the handling units must be completed before the handling units arrive in quarantine. This helps LN to determine the relationship between the handling units and the disposition lines while creating quarantine IDs.

When sent to quarantine during production, lot or serial registration is required before the receipt is confirmed. When rejected and quarantined during warehouse inspection, lot or serial registration is required before the inspection results are processed.

Scrapping and rejecting handling units during warehouse inspection

In inspection, if part of a handling unit is rejected, the rejected quantity is taken out of the handling unit and handled anonymously. If quarantine handling is activated, for the rejected part in quarantine no handling unit will be present.

Handling units that are entirely scrapped in inspection are set to **Closed**. The items contained in these handling units are removed through an inventory adjustment order.

If part of a handling unit is scrapped during inspection and the remaining part is rejected, the scrapped part is removed from the handling unit and the rejected part is sent to quarantine anonymously. The handling unit is set to **Closed**.

Note

Partial scrapping is only allowed for bottom-level handling units.

Handling units and disposition lines

If handling units are present in quarantine, you can process or specify dispositions for the handling units or the entire quarantine ID. You cannot handle individual disposition lines, because a disposition line can be related to a part of a handling unit and processing a part of a handling unit is not allowed.

If you specify a disposition for a handling unit, the related disposition lines are updated. If the handling unit is a bottom level handling unit within a structure and covers part of a disposition line, the disposition line is split. A new disposition line is created with the quantity of the handling unit for which the disposition was specified.

Example

Handling units HU01, HU02, and HU03 are present for **Quarantine ID** 100011. HU01 is the top level handling unit, and handling units HU02 and HU03 are the bottom-level handling units in the structure. Handling units HU02 and HU03 each have a quantity of 10.

These handling units correspond with disposition line 100011/10, which has a quantity of 20.

If HU03 is given disposition **Scrap**, a new disposition line is created with quantity 10 = **Scrap**. The old disposition line still has **Awaiting Disposition**, but now with a quantity of 10.

If you reset HU01, handling units HU02 and HU03 obtain disposition **Awaiting Disposition** again. As a result, both disposition lines would obtain disposition **Awaiting Disposition**. Because both disposition lines would have identical dispositions and stock point details, these lines are consolidated into one disposition line, thus re-establishing the previous situation.

Specifying dispositions for handling unit structures

If a handling unit structure is present for a quarantine ID or a disposition line, you can specify a disposition for the top level handling unit or the child handling units.

If you specify a disposition for a handling unit, the child handling units of this handling unit with disposition **Awaiting Disposition** also obtain this disposition. This disposition is also displayed in the parent of this

handling unit. Handling units of the same level in the handling unit structure are not affected, these handling units retain their disposition.

The **Disposition** field of the top-level handling unit shows the latest disposition specified for one of the child handling units.

The disposition specified for a child handling unit is also showed for the top-level handling unit. If you then specify another disposition for another child handling unit, this disposition is also shown for the top-level handling unit.

If all child handling units have a disposition other than **Awaiting Disposition**, you can change the disposition of the top handling unit, but only into one of the dispositions specified for the child handling units. This does not affect the dispositions of the child handling units.

Note

Partial disposition of a bottom-level handling unit not allowed, for that purpose you must remove the handling unit and handle the disposition lines.

Example

Handling units HU01, HU02, HU03, and HU04 are present for **Quarantine ID** 100012. HU01 is the top level handling unit, and handling units HU01, HU02, HU03, and HU04 are the bottom-level handling units in the structure.

Initially, all handling units have disposition **Awaiting Disposition**. If you specify **Use As Is** for HU01, all child handling units obtain **Use As Is**. If you then specify **Return to Vendor** for HU03, HU01 and HU03 are given disposition **Return to Vendor**, the other handling units remain **Use As Is**.

If all handling units have disposition **Awaiting Disposition** and you specify **Use As Is** for HU02, only HU02 obtains disposition **Use As Is**, the other handling units of the structure remain **Awaiting Disposition**.

Reset disposition

If you reset a handling unit, this handling unit and the child handling units of this handling unit are reset to **Awaiting Disposition**. This disposition is also displayed in the parent of this handling unit. Handling units on the same level in the handling unit structure are not affected, these handling units retain their disposition.

Processing handling unit dispositions

If handling units are present in quarantine, you can process or specify dispositions for the handling units or the entire quarantine ID. You cannot handle individual disposition lines, because a disposition line can be related to a part of a handling unit and processing a part of a handling unit is not allowed.

For example, a disposition line is related to a part of a handling unit if for a quarantine ID one handling unit and multiple disposition lines are present. Each disposition line has one high volume serialized item and the handling unit contains all of the serialized items.

When processed, handling units with dispositions unequal to the disposition of the parent are unlinked from the handling unit structure. Also, if you process a part of a handling unit structure or an individual bottom-level handling unit, the processed handling units are unlinked from the handling unit structure.

The related disposition lines are also processed. If more than one handling unit is present for a disposition line and one of the handling units is processed, the disposition line is split.

Example

Disposition line A00010 has a quantity of 20 and has disposition **Scrap**. Disposition line A00010 is linked to handling units HU001 and HU002. Each handling unit has disposition **Scrap** and a quantity of 10.

When HU001 is processed, a new disposition line is added: A00020 with a quantity of 10 and disposition **Scrap**. When handling units are processed, the processing information is updated in the Handling Unit Process Quarantine (whwmd2173m000) session.

Use as is/no fault found

When handling units with disposition **Use As Is** or **No Fault Found** are processed, the handling units are directly stored in the warehouse and obtain status **In Stock** if no locations apply.

If locations apply, the handling unit obtains status **In Stock** if the inbound advice is put away. If handling units are not used in the warehouse, the handling unit obtains status **Closed** and the items are stored without handling units.

Scrap

A scrapped handling unit obtains status **Closed**. The items contained in the handling unit are removed through an adjustment order.

Return to vendor/Rework to existing or new specification

The statuses of handling units with dispositions **Rework (to Existing Specification)**, **Rework (to New Specification)**, or **Return to Vendor** remain **Quarantine** until the outbound advice is created for the outbound order lines of the purchase return order or production rework order.

When the handling units are advised, the status becomes **Allocated**. If the outbound advice is removed for some reason, the handling unit status is reset to **Quarantine**. If handling units are not used in the outbound process for the warehouse-item combination, the handling units are set to **Closed** and the outbound process is performed without handling units.

Reclassify

When processing handling units with disposition **Reclassify**, handling units with identical target items, disposition reasons, quarantine locations, and ownership are advised for the same transfer order line. When the handling units are advised, the status becomes **Allocated**.

Processing disposition orders of handling units to be returned or reworked

Handling units listed on disposition orders of type production rework or purchase return are reset to **Awaiting Disposition** if:

- The disposition order is cancelled.
- The handling units are set to **Not Shipped**.
- The order quantity is reduced.

If the entire handling unit quantity is reduced or set to **Not Shipped**, the handling unit is reset to **Awaiting Disposition**.

If part of the handling unit quantity is reduced or set to **Not Shipped**, the disposition of the handling unit does not change, but the disposed quantity of the handling unit is reduced accordingly, which is displayed in the **Disposition Quantity** field of the Quarantine Inventory Handling Units (whwmd2574m000) session.

When the disposition order is shipped, the handling unit is reset to **Awaiting Disposition** and contains the quantity that was not shipped.

If for a disposition order a handling unit containing a lot is partially not shipped, the handling unit is split when the outbound advice is generated.

The unaffected part is shipped, and the not-shipped part is put on a new handling unit with disposition **Awaiting Disposition**.

How to handle quarantine handling units

To specify dispositions and process quarantine handling units:

1. In the Quarantine Inventory Overview (whwmd2171m000) session, double-click the quarantine ID whose handling units you want to handle.

2. In the Quarantine Inventory (whwmd2671m000) session that opens, click the **Handling Units** tab.

3. In the **Handling Units** tab, select the relevant handling unit and open the **Handling Units Tree**.

4. In the **Handling Units Tree**, right-click the handling unit that you want to handle and select **Disposition** from the context menu.

5. Specify a disposition, a reason, and the other information as required.

6. Save the disposition if you want to process the disposition at a later stage.

7. Click **Process** to process the disposition lines with a disposition other than **Awaiting Disposition**.

Rework or return handling units

For handling units originating from purchase orders that were rejected and sent to quarantine during inbound inspection, the purchase order type, order series, buy-from and ship-from business partners are defaulted from the receipt line in the Disposition (whwmd2272m200) session.

For handling units rejected in outbound inspection, the buy-from and ship-from business partner is defaulted from the item-purchase data based on the item and item group priority.

Split handling units

Splitting disposition lines in the Split Quarantine Inventory Disposition (whwmd2272m100) session is not allowed if handling units are present. To split disposition lines, first remove the handling units.

Move handling units

You can use the Move Quarantine Inventory (whwmd2271m100) session to move entire unprocessed handling units to a different warehouse location. This is only allowed if you start this session from the **Handling Units Tree** or the Quarantine Inventory Handling Units (whwmd2574m000) session. While moving a handling unit, the related disposition lines are split if the handling unit quantity is lower than the disposition line quantity.

Moving disposition lines is not allowed if handling units are present, because a disposition line can be related to a part of a handling unit and LN does not support moving incomplete handling units.

Remove quarantine handling units

In the Quarantine Inventory Overview (whwmd2171m000) or the Quarantine Inventory (whwmd2671m000) session, you can remove a handling unit of a quarantine ID. Any child handling units are also removed.

Handling units are not removed if they are processed.

A child handling unit is unlinked from the parent handling unit when it is processed. These processed unlinked child handling units are not removed when the parent handling unit is removed.

If a handling unit is removed, the related disposition line is reset to **Awaiting Disposition**. If another disposition line with disposition **Awaiting Disposition** is present, the disposition lines are merged if the stock point details are identical.

Chapter 10
Handling Unit Allocations

10

To generate handling unit allocation change orders

In the Generate Handling Unit Allocation Change Order (whinh1220m100) session, you can change the allocation for handling units with status **In Stock**.

When you change the allocation, an allocation change order is created. The details of allocation change orders are displayed in the Allocation Change Orders (whinh1120m000) and Allocation Change Order (whinh1620m000) sessions.

To immediately process an allocation change order, you can use the Generate Handling Unit Allocation Change Order (whinh1220m100) session. To process an allocation change order at a later stage, you can use the Process Allocation Change Orders (whinh1220m000) session.

In the Allocation Change Order (whinh1620m000) session, the header section displays the selected handling unit. The lines section displays the child handling units if the child handling units have different allocations. For multi-item handling units, the allocations for each item are displayed in a separate line.

To change the allocation for a handling unit:

1. Select a handling unit in one of these sessions:
   - Handling Units (whwmd5130m000)
   - Handling Units (whwmd5630m000)
   - Compose Handling Units (whwmd5130m100)
   - The **Handling Unit Tree**, if starting from the Compose Handling Units (whwmd5130m100) session.

2. In the appropriate menu of these sessions, select the **Generate Handling Unit Allocation Change Order** option.

3. In the Generate Handling Unit Allocation Change Order (whinh1220m100) session, do either of the following:
   - In the **Sold-to Business Partner** field, specify the business partner to whom the handling unit must be allocated.

- Click **Select** to select a specification record from the Inventory by Specification (whwmd2519m000) session.

The selected specification data are displayed in the fields of the **To** section of the Generate Handling Unit Allocation Change Order (whinh1220m100) session.

Chapter 11
Handling Unit Setup

11

To set up handling units

To make the handling unit functionality meet the requirements of your organization, you must define some data as outlined in the following procedure. You can specify how handling units are used for particular items, warehouses, and/or business partners. For example, you can specify how items that go to a particular customer must be packed, or how items are stored in a particular warehouse.

Step 1: Common setup

In Common, define the following data:

- Masks for handling units. Optionally, you can define masks according to the serial-shipping container code (SSCC) standard for handling units.
- Packaging items that are used as handling units and/or auxiliary packing materials. Auxiliary packaging materials are included in package definitions.

Step 2: Parameter settings

In Warehousing, you must set various parameters.

1. In the Warehouse Master Data Parameters (whwmd0100s000) session, select the preferred settings for the following fields:
    - Select the **Handling Units in Use** check box to enable the use of handling units for the Warehousing package.
    - Select the mask that must be used to generate handling unit codes in the **Handling Unit Mask** field. This mask is the default mask for all handling units. On item and warehouse level, you can define more specific masks.
    - Select the number group for handling unit templates in the **Number Group for HU Template** field.
    - Select the series for handling unit templates in the **Series for HU Template** field.

2. Select the preferred option of the **Generate Handling Units Automatically from ASNs** option list of the Inventory Handling Parameters (whinh0100m000) session to enable automatic generation of handling units from ASNs for items that are not related to warehouses.

3. In the WMS Interface Parameters (whwmd2105m000) session, select the **Handling Units** check box to enable the use of handling units for integrated WMS systems.

Step 3: Warehousing master data setup

To set up warehousing master data, proceed as follows:

1. Define label layouts for handling units if you use labels to identify and/or process goods in the warehouse. For further information, see Label layout and printing.

2. Define package definitions to set up packing structures for items by means of handling units. For further information, see *Package definitions (p. 123)*, *The use of package definitions (p. 128)*, and *To define package definitions (p. 129)*.

3. Define handling unit data for items in the following fields of the Item - Warehousing (whwmd4600m000) session:

    a. In the **Package Definition** field, select the package definition that must be used to create handling units for the item.

    b. Select the **Handling Units in Use** check box to enable the use of handling units for the selected item.

    c. Select the **Handling Unit Version Controlled** check box to specify that version numbers must be maintained for handling units for which splitting is enabled.

    d. Select the **Log Version History** check box to specify that history records are generated for version-controlled handling units.

    e. Select the **Track Handling Unit Status** check box to enable history maintenance for each status change of a handling unit.

4. In the Item Data by Warehouse (whwmd2110s000) session, set the following controls for the use handling units for items related to warehouses:

    a. In the **Package Definition** field, select the package definition that must be used to create handling units for the item.

    b. Select the **Use Handling Units in** check box to enable the use of handling units for items in specific warehouses.

    c. Select the **Use Handling Unit in Receipt** check box to enable the use of handling units in receipts for items related to specific warehouses.

    d. Select the **Outbound Inspections** check box to enable the use of handling units in outbound inspections for items related to specific warehouses.

    e. Select the **Inbound Inspections** check box to enable the use of handling units in inbound inspections for items related to specific warehouses.

    f. Select the **Inventory** check box to enable the use of handling units in inventory for items related to specific warehouses.

    g. Select the **Shipments** check box to enable the use of handling units for shipment of items related to specific warehouses.

    h. In the **Creation ASN** field, specify how LN must generate handling units from ASNs that refer to items linked to selected warehouses.

5. Define handling unit data for warehouses in the following fields of the Warehouses (whwmd2500m000) session:

   a. Select the **Handling Units in Use** check box to enable the use of handling units for warehouses.

   b. Select the **Use Handling Unit in Receipt** check box to enable the use of handling units in receipts for specific warehouses.

   c. Select the **Use Handling Unit in Shipment** check box to enable the use of handling units in shipments for specific warehouses.

   d. Select the **Advise Alternative Package Definition Allowed** check box to enable advising incomplete package definitions for specific warehouses.

   e. Select the **Use Handling Unit in Inbound Inspection** check box to enable the use of handling units in inbound inspections for specific warehouses.

   f. Select the **Use Handling Unit in Inventory** check box to enable the use of handling units in inventory for specific warehouses.

   g. Select the **Use Handling Unit in Outbound Inspection** check box to enable the use of handling units in outbound approvals for specific warehouses.

   h. Select the **Use Handling Unit in Shipment** check box to enable the use of handling units for shipments for specific warehouses.

   i. In the **Generate Handling Units Automatically from ASNs** field, specify how LN must generate handling units from ASNs that refer to selected warehouses.

   j. In the **Generate Handling Unit Automatically during Picking** field, specify whether LN must generate handling units after the outbound advice is released for items that are issued from the current warehouse. To generate handling units, handling units must be in use for the item and the warehouse.

Step 4: Sales and purchase settings

You can specify that handling units are generated according to particular package definitions for goods that are received from specific suppliers and/or goods that must be shipped to specific customers. For this purpose, you must link the required package definitions to business partners in the following sessions:

- In the **Package Definition** field of the Items - Sales Business Partner (tdisa0510m000) session, select the package definition that includes the handling unit structure for specific items sold to specific customers.

- In the **Package Definition** field of the Items - Purchase Business Partner (tdipu0110m000) session, select the package definition that includes the handling unit structure for specific items purchased from specific suppliers.

- In the **Package Definition** field of the Purchase Contract Line Logistic Data (tdpur3102m000) session, select the package definition that includes the handling unit structure for specific items purchased from specific suppliers according to selected contracts.

Handling unit masks

Handling unit ID numbers are generated based on a handling unit <u>mask</u>. Masks allow you to provide the handling unit IDs with specific business partner related features such as supplier numbers.

You can specify these handling unit masks to generate handling unit ID numbers:

Mask	Session
Shipment Handling Unit Mask	Ship-to Business Partners (tccom4511m000)
Shipment Handling Unit Mask	Sold-to Business Partners (tccom4510m000)
Shipment Handling Unit Mask	Warehouses (whwmd2500m000)
Handling Unit Mask	Warehouse Master Data Parameters (whwmd0100s000)

These masks are used when handling units are generated in the inbound and outbound procedures.

Inbound/receipt procedure

1. The shipment handling unit mask defined for the <u>sold-to business partner</u> is used if the handling unit to be generated is allocated to a sold-to business partner through demand pegging.
2. The shipment handling unit mask defined for the receipt warehouse is used if:
   - The received goods are not allocated to a sold-to business partner or the handling unit mask is not defined for the sold-to business partner.
   - The **Shipments** check box is selected in the Item Data by Warehouse (whwmd2510m000) session.
3. The general handling unit mask defined in the Warehouse Master Data Parameters (whwmd0100s000) session is used if the **Shipments** check box is cleared, or if a shipment handling unit mask is not defined for the receipt warehouse.

Outbound procedure

1. The shipment handling unit mask defined for the <u>ship-to business partner</u> is used if a handling unit is generated for a shipment.
2. The shipment handling unit mask defined for the <u>sold-to business partner</u> is used if a shipment handling unit mask is not present for the ship-to business partner.
3. The shipment handling unit mask defined for the issuing warehouse is used if a handling unit mask is not defined for the sold-to business partner.

4. The general handling unit mask defined in the Warehouse Master Data Parameters (whwmd0100s000) session is used if the **Use Handling Unit in Shipment** check box is cleared, or if no shipment handling unit mask is defined for the receipt warehouse.

Different handling unit IDs in the Handling Units (whwmd5130m000) session

Handling unit IDs can be generated based on the internal handling unit mask for handling units in stock. The internal handling unit mask is defined in the **Internal Handling Unit Mask** field of the Warehouses (whwmd2500m000) session.

If such handling units are issued for a shipment, and a shipment handling unit mask is present, the handling unit ID based on the:

- Internal handling unit mask is displayed in the **Handling Unit** field of the Handling Units (whwmd5130m000) session.
- Shipment handling unit mask is displayed in the **Shipment Label** field of the Handling Units (whwmd5130m000) session.

In all other cases, the handling unit IDs in the **Handling Unit** field and the **Shipment Label** field, and the masks on which the IDs are based, are identical.

Generate or merge handling units for shipments during picking

The **Generate Handling Unit for Shipment Header during Picking** and **Consolidate Handling Units in one Shipment Line during Picking** check boxes in the Warehouses (whwmd2500m000) session serve to generate a handling unit structure for shipments or shipment lines. The following examples show how to set these check boxes to generate the preferred handling unit structure.

Outbound order line	Quantity	Handling unit
100034	1000	
Outbound advice		
360289	500	HU1
	300	HU2
	500	HU3

Release outbound advice 360289.

	Generate Handling Unit for Shipment Header during Picking		Consolidate Handling Units in one Shipment Line during Picking	
	Selected	**Cleared**	**Selected**	**Cleared**
1	X		X	
2		X	X	
3	X			X
4		X		X

For each combination of settings, the resulting handling unit structure is shown below.

1

Shipment	Handling unit	Quantity	Comment
454587	HU0	1000	Top level handling unit generated for the shipment header.
Shipment line	HU00	1000	Intermediate level handling unit generated for the shipment line.
453286	HU1	500	The handling units from the outbound advice are merged into one shipment line and have become child handling units of HU00.
	HU2	300	
	HU3	500	

The handling unit structure fully reflects the shipment structure.

2

Shipment	Handling unit	Quantity	Comment
454587			
Shipment line	HU0	1000	Top level handling unit generated for the shipment line.
453286	HU1	500	The handling units from the outbound advice merged into one shipment line and have become child handling units of HU0.
	HU2	300	
	HU3	500	

The handling unit structure fully reflects the shipment line structure.

3

Shipment	Handling unit	Quantity	Comment
454587	HU0	1000	Top level handling unit generated for the shipment header.
Shipment line			
453286	HU1	500	The handling units from the outbound advice have become child handling units of HU0. They are not merged. Instead, because the **Consolidate Handling Units in one Shipment Line during Picking** check box is cleared, for each handling unit a separate shipment line is generated.
453287	HU2	300	
453288	HU3	500	

4

Shipment	Handling unit	Quantity	Comment
454587			
Shipment line			
453286	HU1	500	For each handling unit from the outbound advice a separate shipment line is generated.
453287	HU2	300	
453288	HU3	500	

Flexible template - virtual handling units

The bottom-level node of a handling unit template can be virtual. This means that the quantity of bottom-level handling units and the quantity of items contained in them can vary, but the total item quantity of the bottom-level node cannot exceed the quantity of the parent node.

Consequently, the quantity of bottom-level handling units and items can differ every time handling units are generated based on the template during the shipment process. If the bottom-level node of a handling

unit template is virtual, LN selects the **Virtual** check box in the Handling Units (whwmd5130m000) session for the generated bottom-level handling units.

The advantage of using virtual handling units is that fewer handling unit templates are requited to create efficient handling unit structures for different ordered quantities, provided that the generated bottom-level handling units need not exactly reflect the handling units actually used.

Note

Restrictions such as multi-item and single reference apply to both virtual and nonvirtual nodes. See the example in *Sequencing (p. 61)*.

Setup

To set up virtual bottom-level handling units:

1. Define a variable <u>package definition</u>. See *To define package definitions (p. 129)*.
2. For the bottom-level node of the <u>handling unit template</u>, select the **Virtual Node** check box. Because the bottom node is virtual, specifying an item quantity and a packaging item quantity is not allowed.

Note

The **Virtual Node** check box is unavailable for validated package definitions. If the package definition is validated, you must undo the validation before you can select the **Virtual Node** check box.

Example of non-virtual template node

This handling unit template is defined for package definition PCKD10:

Parent Node	Node	Virtual Node	Packaging Item	Packaging Item Quantity	Item Quantity in Storage Unit	Allow Multi Item for Shipping
0	1		Pallet	1	0	Selected
1	2		Crate	2	0	Selected
2	3	Cleared	Box	6	120	Cleared

These outbound order lines are created:

Order	Order line	Item	Quantity	Package definition
SLS001	10	1011	20	PCKD10
	20	1012	30	
	30	1013	10	

Order	Order line	Item	Quantity	Package definition
SLS022	10	1011	20	PCKD10
	20	1012	20	
	30	1013	20	

For order SLS001, this handling unit structure is generated:

Level	Node	Handling unit	Multi-item	Item	Quantity
1	Pallet	HU001	Selected		
2	Crate	HU002	Selected		
3	Box	HU004	Cleared	1011	20
3	Box	HU005	Cleared	1012	20
3	Box	HU006	Cleared	1012	10
2	Crate	HU003	Selected		
3	Box	HU007	Cleared	1013	10

Because a Box cannot contain more than 20 items according to the template, item 1012 is put in two Boxes. The second crate and Box HU007 is created because a crate cannot contain more than three Boxes, and the Box level is single-item. In everyday practice, the picker is bound to put all boxes in one crate anyway.

For order SLS022, this handling unit structure is generated:

Level	Node	Handling unit	Multi-item	Item	Quantity
1	Pallet	HU008	Selected		
2	Crate	HU009	Selected		
3	Box	HU010	Cleared	1011	20
3	Box	HU011	Cleared	1012	20
3	Box	HU012	Cleared	1013	20

Example of virtual template node

If the handling unit template of package definition PCKD10 has a virtual bottom-level node, these handling unit structures are created for orders SLS001 and SLS022:

Level	Node	Handling unit	Multi-item	Item	Quantity
1	Pallet	HU013	Selected		
2	Crate	HU014	Selected		
3	Box	HU015	Cleared	1011	20
3	Box	HU016	Cleared	1012	30
3	Box	HU017	Cleared	1013	10

SLS001

Because the Box-level is virtual, LN can put as many items in a Box as required to build an efficient handling unit structure, as long as the maximum quantity allowed for the Crate node is not exceeded. Consequently, 30 items 1012 are all put in Box HU016 and all Boxes can be put in one Crate. Items 1011 and 1013 cannot be put together in one box because the Box level is single item.

Level	Node	Handling unit	Multi-item	Item	Quantity
1	Pallet	HU018	Selected		
2	Crate	HU019	Selected		
3	Box	HU020	Cleared	1011	20
3	Box	HU021	Cleared	1012	20
3	Box	HU022	Cleared	1013	20

SLS022

The use of a virtual bottom-level node results in a more efficient handling unit structure for SLS001, whereas the resulting structure for SLS022 is identical for both templates. If the virtual bottom level node is not used, an additional package definition is required to create equally efficient handling unit structures for both orders.

Packaging levels

A packaging level is an integral part of a fixed <u>package definition</u>.

To pack an item, you can use various packing materials. To pack an item such as a can opener, you can use a box, and then put the boxes with can openers on a pallet. Box and pallet are packing materials. Item, box, and pallet each represent a packaging level. Item is level one, box is level two, and pallet is level three. You can define various packaging levels for a fixed package definition.

Packaging levels are used for the following purposes:

- If <u>handling units</u> are used, to define the nodes and the relations between the nodes of a packing structure for a <u>handling unit template</u>.
- If handling units are not used, to define the way items are packed. For items stored in a particular warehouse, to specify whether handling units are used, you can select or clear the **Use Handling Units in** check box in the Item Data by Warehouse (whwmd2110s000) session. For specific items, to specify whether handling units are used, you can select or clear the **Handling Units in Use** check box in the Item - Warehousing (whwmd4600m000) session.

For each packaging level, you must specify the proportional number of items or packaging items.

Example A

- **Level 1**
  Can openers
- **Level 2**
  Box type A: contains 200 can openers
- **Level 3**
  Pallet type B: carries 100 boxes type A

To specify the proportional number of items or packaging materials for each packaging level, you must use storage units related to the packaging materials and the items, respectively.

For each packaging level, you must specify a storage unit. The lowest level is the base inventory unit for the item. Each higher level can contain the previous, lower, level. Note that for packaging levels you do not define specific items, but storage units referenced by various items.

Example B

For example, the lowest level has storage unit PCS for the item, the next level has storage unit BXA for the box, which contains 200 pieces, and for the highest level the storage unit is PLB for the pallet that contains 100 boxes.

Level	Storage unit	Storage unit description
1	PCS	Pieces; the storage unit for the item
2	BXA	Box type A: contains 200 PCS
3	PLB	Pallet type B: carries 20,000 PCS (100 boxes type A)

The storage unit at each level must be established in the unit set for the item. Each level must also have a conversion factor to the base unit of the item. Whenever a higher level is added, a check is performed to ensure that the conversion factor is not smaller than that of the previous level. For example, when the level 3 pallet with a conversion factor of 20,000 pieces is added to the level 2 box of 200 pieces, 20,000 is divided evenly by 200 to yield 100 boxes on a pallet.

When you link the package definition to an item, such as can openers in the previous example, which is described in Step 8 in *To define package definitions (p. 129)*, the conversion factors of the storage units defined for the packaging levels determine the number of packing materials and items for each level.

Packaging data

In addition to the unit that you define for a package definition level, the package levels of a fixed packaging definition include the following data:

- **Packaging Item**
  The packaging item used to pack the package. Packaging items can be received and stored in a warehouse like any other item. Packaging items can have an assigned location like a normal inventory item. Packaging items have a flag to indicate whether the items are reusable. Reusable packaging items can be returned to inventory after they have been emptied. Note that reusable packaging items can be physically stored in inventory, but they are not registered in inventory in LN.
- **External dimensions**
  The external dimensions of the package.
- **Weight**
  The **Weight** of the package.
- **Location Type**
  The pick or bulk location where the package is stored.
- **Package Type**
  The package type indicates whether material is stored internally or externally. Internally means that items or packing material is packed inside the package item. For example, boxes inside a larger box. If you put more boxes in the larger box, the overall volume of the larger box does not increase. Externally means items or packing material is put on top of the package item. For example, crates on a pallet. When you add crates, the volume of the pallet increases.

- **Exists for Partial Quantity**
  The partial quantity flag is used when picking orders. When a box is picked from a pallet, the pallet still exists in the location with the remaining quantity. Therefore, the pallet still exists for partial quantities. However, for particular types of boxes, when pieces are picked from the box, the box is discarded and the remaining pieces are represented as pieces. The box does not exist for partial quantities.
- **Shippable**
  Shippable

Multiple package definitions

Because items can exist in various package sizes, you can link multiple package definitions to an item. If the item in the previous example can also be stored in a box that contains 50 pieces, another fixed package definition can be created for this item. However, units that are used in a package definition on a level higher than one cannot be used in another package definition for the same item.

Example C

Level	Contents
1	pieces
2	BXB (a box of 50 pieces)
3	PLB (pallet of 400 BXB = 20,000 pieces)

Note

A faster method for creating package definitions for multiple items is using the variable package definition. For further information, see *To define package definitions (p. 129)*.

Default package definition

A default package definition is always allocated to an item in the Items - Warehousing (whwmd4500m000) session. Because a particular warehouse may handle the item with a different package definition, a default (possibly different) package definition is also provided in the Item Data by Warehouse (whwmd2110s000) session.

You can choose to assign a default package definition by business partner and item. This definition is used for a supplier who packages the item in a way that differs from other suppliers. When you purchase this item from this supplier, the package definition defaults to the one defined for this business partner and item. This default can be overridden in the Items - Purchase Business Partner (tdipu0110m000) session, if required.

For sales orders, a mandatory package definition can be selected in the Items - Sales Business Partner (tdisa0510m000) session. You cannot replace a mandatory package definition with another package definition, and the package definition is always mandatory for outbound order lines.

Relationship of packaging to inventory

Fixed package definitions have a relationship to inventory. If a location has an item stored in a base inventory unit called, for example, pieces, an inventory record and an inventory structure record is included for the pieces. This enables you to search the inventory for the various types of packaging. For example, if inventory is required by pallet, you can find the inventory. If inventory is required by pieces and the item is stored at a higher level of packaging, the inventory unit quantity is converted to the higher levels of packaging.

Level	Contents
1	pieces
2	BXB (a box of 50 pieces)
3	PLB (pallet of 400 BXB = 20,000 pieces)

For example, if you use the package definition from example C, a quantity of 45,505 pieces is converted into two full PLB pallets (400 pieces), 110 full BXB boxes (of 50 pieces), and five separate pieces.

Package ownership

Owners of pallets and containers want to get their own property back, and to be able to send their partners' property back to them, LN tracks the number of pallets and containers that have been received or shipped. Only re-usable packaging items can be tracked.

Re-usable packages are counted into and out of warehouses per business partner.

To set up automatic generation of handling units from ASNs

You can set up automatic generation of handling units from advance shipment notices (ASN) that include the following information:

- **Items not linked to any warehouse**
  ASNs that list items that are not linked to any warehouse. In the **Generate ASNs Automatically** field of the Inventory Handling Parameters (whinh0100m000) session, you can specify how LN must generate handling units from ASNs that refer to items not linked to any warehouses.

- **Warehouses listed on the ASN**
  In the **Generate Handling Units Automatically from ASNs** field of the Warehouses (whwmd2500m000) session, you can control automatic generation of handling units from inbound ASNs that list particular warehouses. If the warehouse, for which automatic generation of handling units is specified, is listed on an inbound ASN, handling units are generated for this ASN.

- **Items linked to one or more warehouses**
  ASNs that list items that are linked to a warehouse. In the **Creation ASN** field of the Item Data by Warehouse (whwmd2110s000) session, you can specify how LN must generate handling units from ASNs that refer to items linked to a particular warehouse.

- In the **Creation ASN** field of the Item Data by Warehouse (whwmd2110s000) session, you can control automatic generation of handling units from inbound ASNs for items that are linked to a particular warehouse. If an item/warehouse combination, for which automatic generation of handling units is specified, is listed on an inbound ASN, handling units are generated for this ASN.

Note

- The settings made in the Warehouses (whwmd2500m000) session and the Item Data by Warehouse (whwmd2110s000) session overrule the settings made in the Inventory Handling Parameters (whinh0100m000) session.

- In addition, the settings specified in the Item Data by Warehouse (whwmd2110s000) session overrule those made in the Warehouses (whwmd2500m000) session.

Example

In the Inventory Handling Parameters (whinh0100m000) session, the **Generate ASNs Automatically** field is set to **Always**.

The **Generate Handling Units Automatically from ASNs** field of the Warehouses (whwmd2500m000) session is set to **Never** for warehouse A.

As a result, LN generates no handling units for ASNs that list warehouse A.

However, if **Creation ASN** field of the Item Data by Warehouse (whwmd2110s000) session is set to **Handling Unit Received** for warehouse A and item X, LN generates handling units for ASNs that list warehouse A and item X.

Generate handling units from ASNs

You can generate handling units from advance shipment notices (ASNs) in the Shipment Notice (whinh3600m000) and/ or Shipment Notice Lines (whinh3101m000) sessions. LN allows you to generate handling units if the **Handling Units in Use** check box is selected in the Warehouse Master Data Parameters (whwmd0100s000) session.

When a packing structure with an **External Handling Unit** (the ID of the container provided by the business partner) is linked to the ASN line, LN generates a handling unit structure based on the parent-child relations between the **External Handling Unit** (s) and the **Parent External Handling Unit** (s).

The structure after generating the handling units:
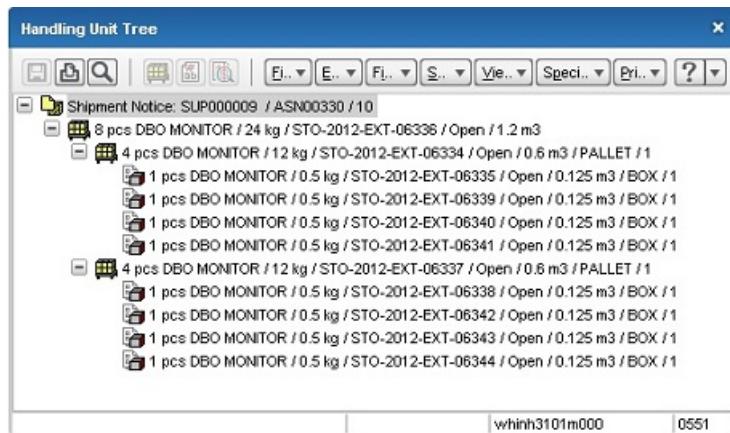
The handling unit structure if the individual boxes do not have handling unit codes and are not labeled:
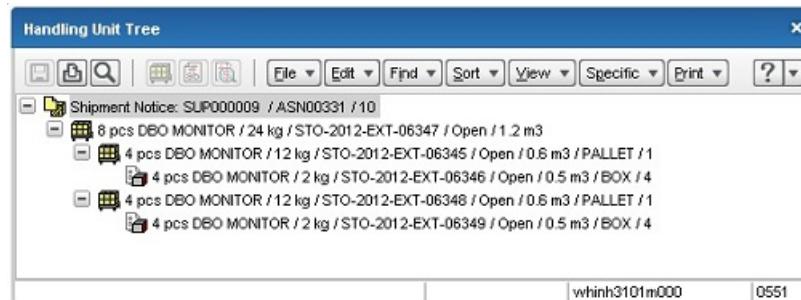
When the **Status** is set to **Scheduled**, the handling unit can be generated by LN based on the **Generate Handling Units Automatically from ASNs** field in the Inventory Handling Parameters (whinh0100m000) session.

After the handling unit is generated, the ASN can be received by:

- Using the Receive option in the Shipment Notices (whinh3600m000/whinh3100m000) session.
- Creating receipt header and use the Add Expected Shipments option.

- Creating receipt header and use the Receive option.

After linking the ASN (or handling unit of the ASN) to the receipt, the handling unit structure is also linked to the receipt line.

Chapter 12
Handling Unit Dimensions

12

Handling unit dimensions

The method used to calculate the dimensions of a handling unit is determined by the following factors:

- The use of packaging items
- If you use packaging items, the Package Type of the packaging item. A packaging item is either of type **Internal** or of type **External**.
- The presence of child handling units for the handling unit.

Note that the calculated results are default values, you can overwrite these values.

A handling unit can have a packaging item of either type. A parent handling unit with or without a packaging item of either type can have at least one level of child handling units with packaging items of either type.

Handling unit has internal packaging item

The following list shows how the dimensions of handling units with internal packaging items are calculated for handling units in various levels of a handling unit structure.

- **Parent has internal packaging item**
  If the parent has an internal packaging item, the dimensions of the parent handling unit are equal to those of the internal packaging item defined for the parent, as described in *Handling unit dimensions, example A (p. 114)*. In this example, the dimensions of the parent are equal to those of **Internal** packaging item of type Container. The gross weight is equal to the weight of the packaging items of the parent and the child handling units added with the aggregated weight of the items contained in the handling unit. The net weight is the weight of the items contained in the handling unit without packaging items.

- **Child handling unit or single structure handling unit has packaging item**
  If a child handling unit, such as the second level child handling units in example *Handling unit dimensions, example A (p. 114)*, or a handling unit without a parent or children, has an internal packaging item, the dimensions of the handling unit are equal to those of the internal packaging item defined for the handling unit. The gross weight of the handling unit is equal to the weight

of the packaging item and the items contained in the handling unit. The net weight is the weight of the items contained in the handling unit without packaging items.

- **Handling unit has more than one packaging item**
  If a handling unit has more than one internal packaging item, the dimensions of the handling unit are as follows:

  - The width of the handling unit is equal to the aggregated width of the internal packaging items. This means, that the packaging items lie in a row. LN does not provide any suggestion as to stacking.
  - The gross weight is equal to the aggregated weight of the packaging items and the items contained in the handling unit, the net weight is without the weight of the packaging items.
  - The other dimensions are equal to the dimensions of an individual packaging item.

  This calculation method is also used if the handling unit is a parent without a packaging item whose children have various packaging items. In such cases, the aggregated width, the aggregated weight, and the other dimensions become the dimensions of the parent. See *Handling unit dimensions, example B (p. 115)* for an example of how the dimensions are calculated.

- **Parent has no packaging item, children have different types of internal packaging items**
  If a parent handling unit has no packaging item, and the children have internal packaging items of different types, such as boxes of different sizes, for the parent, the dimensions are based on the dimensions of the packaging items of the child handling units. For information on how the dimensions are calculated, see *Handling unit dimensions, example C (p. 116)*.

Handling unit has external packaging item

For handling units with external packaging items, the dimensions of the handling unit are determined by the surface area of the external packaging item and the dimensions of the items carried by the packaging item. If the handling unit with the external packaging item is a parent, the children can have internal packaging items.

If the aggregated surface area of the items or the internal packaging items exceeds the surface area of the external packaging items, the items or internal packaging items must be stacked on the external packaging item. This impacts the height of the handling unit.

The depth and the width of the handling unit is equal to the width and the depth of the external packaging item. The height of the items or internal packaging items loaded on the external packaging item is added to the height of the external packaging item. To determine the height of the stacked items or internal packaging items on the external packaging item, LN calculates the height of the handling unit as follows:

1. Add the aggregated volume of items or internal packaging items to the volume of the external packaging items
2. Divide the result by the floor space of the external packaging items

For an example of how LN calculates the dimensions of handling units with external packaging items, see *Handling unit dimensions, example D (p. 118)*.

Parent has external packaging item, children have items of different heights

If the parent handling unit has an external packaging item and the children have items or internal packaging items with different heights, LN calculates the height of the handling unit as follows:

1. Divide the aggregated floor space of the internal packaging items, no matter the type of packaging item, by the floor space of the external packaging item

2. Multiply the result with the height of the internal packaging item with the greatest height

3. Add the result of step 2 to the height of the external packaging item

For an example of how LN calculates the dimensions of handling units with external packaging items, see *Handling unit dimensions, example E (p. 119)*.

> **Note**
>
> The calculated heights of handling units with external packaging items are not always the real heights of the handling units, but approximated heights. After all, if the boxes are not allowed to jut out from the edge of the pallet, the size of the boxes may require you to stack them higher than the surface areas of the pallet and the boxes would indicate.
>
> For example, if the surface area of your pallet is 1 square metre, and you have 10 boxes of 0.4 m * 0.25 m, only eight boxes would fit on the pallet without jutting out from the edge of the pallet. Because the space left on the pallet is insufficient, you must stack the remaining two boxes on top of the first layer of boxes.
>
> In particular, if you put boxes or items of different sizes on the pallet, LN only gives approximated heights, because LN uses the height of the boxes with the greatest height to calculate the height of the handling unit.

Handling units without packaging items

For handling units without packaging items, the dimensions are determined as follows:

- **Width**
  The aggregated width of the items included in the handling unit. Note that for parent handling units whose child handling units have different width values, the width of the child handling unit with the greatest width value is defaulted in this field.

- **Length**
  The depth of the item included in the handling unit. This value is the default value taken from the Item - Warehousing (whwmd4600m000) session. Note that for parent handling units whose child handling units have items with different depths, the default value in this field is the added depth value of one item of each of the child handling units.

- **Height**
  The height of the item included in the handling unit. This value is the default value taken from the Item - Warehousing (whwmd4600m000) session. Note that for parent handling units whose

child handling units have different heights, the height of the child handling unit with the greatest height value is defaulted in this field.

- ■ **Floor Space**
  The value of the **Length** field multiplied by the value of the **Width** field. For parent handling units whose child handling units contain different items, the default value in this field is the aggregated floor space of each of the child handling units.

- ■ **Volume**
  The value of the **Floor Space** field multiplied by the value of the **Height** field. For parent handling units whose child handling units contain different items, the default value in this field is the aggregated volume of each of the child handling units.

Handling unit dimensions, example A

This example describes the dimensions of a handling unit structure in which the parent has an internal packaging item.

A large container contains a few pallets, which in turn carry various boxes. In such cases, the parent has a user-defined internal packaging item of type, Container; and on the first child level, each child handling unit has a user-defined external packaging item of type, Pallet. On the second child level, each child handling unit has a user-defined packaging item of type, Box.

The dimensions of the packaging items are as follows:

Dimensions	Container	Pallet	Box
Width	2 m	1 m	0.25 m
Length	5 m	1 m	0.5 m
Height	2 m	0.2 m	0.2 m
Floor Space	10 m2	1 m2	0.125 m2
Volume	20 m3	0.2 m3	0.025 m3
Net Weight	250 kg	5 kg	100 gr

Therefore, a fully loaded container contains 20 pallets and 320 boxes. Each pallet contains four layers of eight boxes each, thus totalling 32 boxes per pallet. Because the floor space of the container accommodates 10 pallets, the pallets are piled up in two layers.

The weight of the container itself is 250 kg, the aggregated weight of the pallets is 20 * 5 = 100 kg, and the weight of the boxes is 3.2 kg. Therefore, the aggregated weight of the packaging items is 250 + 100 + 3.2 = 353.2 kg. Assuming the total weight of the items contained in the boxes is 1000kg, the gross weight of the parent handling unit is 353.2 + 1000 = 1353.2 kg.

Handling unit dimensions, example B

This example describes the dimensions of handling units within a handling unit structure in which the parent has no packaging item, and the children have various internal packaging items.

Parent handling unit HU00C has no packaging item. Handling unit HU00C has 12 child handling units, each of which has a user-defined internal packaging item of type Box.

The dimensions of the packaging items are as follows:

Dimensions	Box	Box A	Box B
Width	0.2 m	0.1 m	0.25 m
Length	0.5 m	0.25 m	0.5 m
Height	0.1 m	0.05 m	0.2 m
Floor Space	0.1 m2	0.025 m2	0.125 m2
Volume	0.01 m3	0.00125 m3	0.025 m3

In such cases, the dimensions are calculated as follows:

- **Width**
  For the parent, the aggregated width of the internal packaging items of the child handling units is calculated. The type of packaging item of the child handling units is Box, therefore the aggregated width of the packaging items of the child handling units is 12 * 0.2 m = 2.4 m2.

- **Length**
  For the parent, the depth value of the internal packaging item of an individual child handling unit is taken as the depth value. The depth value of internal packaging item Box is 0.5 m. Therefore, the depth value for the parent will be 0.5 m.

- **Height**
  For the parent, the height value of the internal packaging item of an individual child handling unit is taken as the height value. The height value of internal packaging item Box is 0.1 m. Therefore, the height value for the parent will be 0.1 m.

- **Floor Space**
  The aggregated floor space of the child handling units is taken as the floor space for the parent. In the example, the handling unit has 12 child handling units, therefore, the floor space for the parent is 12 * 0.1 m2 = 1.2 m2.

- **Volume**
  The aggregated volume of the child handling units is taken as the volume for the parent. In the example, the handling unit has 12 child handling units, therefore, the volume for the parent is 12 * 0.01 m3 = 0.12 m3.

Handling unit dimensions, example C

This example describes the dimensions of handling units within a handling unit structure in which the parent has no packaging item, and the children have different packaging items.

For parent handling unit HU00D, no packaging item is defined. Handling unit HU00D has 10 child handling units. Five child handling units have a user-defined internal packaging item of type Box A, and the other child handling units have user-defined internal packaging item Box B.

The dimensions of the packaging items are as follows:

Dimensions	Box A	Box B
Width	0.1 m	0.25 m
Length	0.25 m	0.5 m
Height	0.05 m	0.2 m
Floor Space	0.025 m2	0.125 m2
Volume	0.00125 m3	0.025 m3

In such cases, the dimensions are calculated as follows:

- **Width**
  The aggregated width of the internal packaging item with the largest width. In this example, Box B has a larger width, therefore, the aggregated width of Box B, 5 * 0.25 = 1.25, is taken as the width for the parent.

- **Length**
  For the parent, the depth value of each type of internal packaging item allocated to the children is added. If the depth of internal packaging item Box A is 0.25 and the depth of internal packaging item Box B is 0.5, for the parent handling unit the aggregated depth value is 0.75.

- **Height**
  For the parent, the height of the packaging item with the greatest height is taken as the height for the parent. If the height of internal packaging item Box A is 0.05 and the height of internal packaging item Box B is 0.2, the height for the parent is 0.2.

- **Floor Space**
  The aggregated floor space of each type of internal packaging item of the child handling units is taken as the floor space for the parent. In the example, the floor space for the parent is (5 * 0.025) + (5 * 0.125) = 0.75 m2.

- **Volume**
  The aggregated volume of the packaging items of the child handling units is taken as the volume for the parent. In the example, the volume for the parent is (5 * 0.00125) + (5 * 0.025) = 0.13125 m3.

- **Weight**
  The net weight is the aggregated weight of the items contained in the handling unit, and the gross weight is the aggregated weight of the items contained in the handling unit added with the aggregated weight of all packaging items present in the handling unit structure.

Handling unit dimensions, example D

This example shows how LN calculates the dimensions of handling units with external packaging items.

Example

The parent handling unit has a user-defined external packaging item called Pallet. The parent handling unit has one child level consisting of eight child handling units. Each child handling unit has a user-defined internal packaging item called Box.

The dimensions of the individual packaging items of the handling unit are as follows:

Dimensions	Pallet	Box
Width	1 m	0.5 m
Length	1 m	0.5 m
Height	0.2 m	0.5 m
Floor Space	1 m2	0.25 m2
Volume	0.2 m3	0.125 m3

Using the dimensions of the previous example, the dimensions of the parent including the child handling units are as follows:

Dimensions	Parent	Explanation
Width	1 m	This is the width of the external packaging item.
Length	1 m	This is the depth of the external packaging item.
Height	1.2 m	The surface areas of the pallet and the boxes determine whether the boxes must be stacked to fit on the pallet. The value in the **Height** field of the Handling Units (whwmd5130m000) session shows the height of the stacked boxes added with the height of the pallet. LN calculates the height of the handling unit as follows:

1. Add the aggregated volume of items or internal packaging items to the volume of the external packaging items

2. Divide the result by the floor space of the external packaging items

The volume of each individual internal packaging item is 0.125. The aggregated volume is therefore 8 * 0.125 = 1. The volume of the external packaging item is 0.2. This gives the following result: (1 + 0.2) / 1 = 1.2

Floor Space	1 m2	The value of the **Width** * the value of the **Length**.
Volume	1.2 m3	The value of the **Floor Space** * the value of the **Height**.
Net Weight		The gross weight is the aggregated weight of the items contained in the child handling units and the aggregated weight of the external packaging items of the parent and the internal packaging items (of either type) of the child handling units. The net weight is the aggregated weight of the items contained in the child handling units.

Handling unit dimensions, example E

This example shows how LN calculates the dimensions of handling units with external packaging items whose child handling units have internal packaging items of different types.

Example

The parent handling unit has a user-defined external packaging item called Pallet. The parent handling unit has one child level consisting of 25 child handling units. Five child handling unit have a user-defined internal packaging item called Box A and 20 child handling units have user-defined internal packaging item Box B. The dimensions of the individual packaging items of the handling unit are as follows:

Dimensions	Pallet	Box A	Box B
Width	1 m	0.5 m	0.25 m
Length	1 m	0.5 m	0.4 m
Height	0.2 m	0.5 m	0.3 m
Floor Space	1 m2	0.25 m2	0.1 m2
Volume	0.2 m3	0.125 m3	0.03 m3

Using the dimensions of the previous example, the dimensions of the parent including the child handling units are as follows:

Width

The width of the parent handling unit is equal to the width of the external packaging item Pallet, 1 m.

Length

The depth of the parent handling unit is equal to the depth of the external packaging item Pallet, 1 m.

Height

The height of the parent handling unit is 1.825 m. The surface areas of the pallet and the boxes determine whether the boxes must be stacked to fit on the pallet. The value in the **Height** field of the Handling Units (whwmd5130m000) session shows the height of the stacked boxes of both types added with the height of the pallet. If the pallet carries internal packaging items or items with different heights, LN uses the aggregated surface areas of both types of boxes, the surface area of the pallet, the height of the box or item with the greatest height to determine the dimensions of the handling unit. LN calculates the height of the handling unit as follows:

1. Divide the aggregated floor space of the internal packaging items, no matter the type of packaging item, by the floor space of the external packaging item
2. Multiply the result with the height of the internal packaging item with the greatest height
3. Add the result of step 2 to the height of the external packaging item

The aggregated floor space of Box A is 5 * 0.25 = 1.25. The aggregated floor space of Box B is 20 * 0.1 = 2. The aggregated floor space of Box A and Box B is 1.25 + 2 = 3.25. The surface area of the pallet is 1 m2. 3.25 / 1 = 3.25. In the example, the height of Box A is 0.5, which is greater than height 0.3 of Box B. Therefore, you must multiply 3.25 by 0.5, the result of which is 1.625. Finally, add this result to the height of the pallet: 1.625 + 0.2 = 1.825.

Net Weight

The gross weight is the aggregated weight of the items contained in the child handling units and the aggregated weight of the external packaging items of the parent and the internal packaging items (of either type) of the child handling units. The net weight is the aggregated weight of the items contained in the child handling units.

Chapter 13
Package Definitions

13

Package definitions

A <u>package definition</u> specifies how items must be packed. If you use <u>handling units</u>, the package definition determines the handling unit structure and the packaging details for the handling units used to pack the items. If you do not use handling units, the package definition determines the way items are packed.

Package definitions exist on two levels, a general level and an item level. The general level includes general information on how items are packed and how the packing is structured. The item-level package definition is linked to an item, and the information on the way items are packed and how the packing is structured is adjusted for the item, thus a general-level package definition can be used as a basic template for item-level package definitions. The item-level package definition is used to generate handling units for order lines, receipts, advice, approvals, or shipments. A package definition on both general level and item level includes the following elements:

- **Identification code**
  Package definitions are uniquely defined by means of the identification code.

- **Description**
  The description is a free text that can provide some easy reference to the package definition.

- **Package definition type**
  The package definition type determines how you can set up packaging structures for handling units and items.

- **Handling unit template**
  A handling unit template stores information as to the packing materials used and the way the packing is structured. The packing materials refer to handling units. If you use a package definition to generate handling units for items listed on a particular order, shipment, and so on, the handling units are generated according to the package definition structure and the packing information defined for the handling unit template of the package definition. This results in the creation of the actual <u>handling unit structures</u>. Basically, a handling unit template is a generic handling unit structure.

Package definition types

In LN, the following types of package definitions are available:

- Fixed package definitions
- Variable package definitions
- Mixed package definitions

You can use fixed package definitions with or without handling units. The variable and mixed types of package definitions are only available in combination with handling units.

Fixed package definitions

The fixed package definition is the only type of package definition that you can use with or without handling units. If you use handling units, the package definition determines the handling unit structure and the packaging information of the handling units used to pack the items. If you do not use handling units, the package definition determines the way the items are packed. A fixed package definition is used for the following types of items:

- Purchased items
- Manufactured items
- List items
- BOM items

Note

Fixed package definitions are not used on receipt lines if:

- Handling units are not used for the item on the receipt line.
- Either of the following applies:
  - The receipt is by component
  - The item is a low volume serialized item

A packing structure for a fixed package definition can include multiple packaging items, but only one type of tradeable item. A pallet cannot include (packing materials for) sour cream and yoghurt in addition to milk cartons, as shown in the following picture.
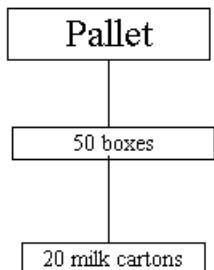
If handling units are used, a fixed package definition includes a handling unit template in which the number of packaging items and items is fixed.

The user uses storage units from Common to define the number of packaging items for each node. When a fixed package definition is linked to an item, the following takes place:

- LN uses the conversion factors of the storage units defined for each node to calculate the fixed number of packaging items for each node. For example, if the conversion factor for storage unit Pallet and storage unit Box is 50, a pallet has 50 boxes.
- The handling unit template of the package definition is copied to an item-level handling unit template. The user can modify this structure to adjust the structure for the specific item.

Fixed package definitions are useful if items are always packed in the same way.

Variable package definitions

A variable package definition is used to define handling unit structures for the following types of items:
- Purchased items
- Manufactured items
- List items
- BOM items

A handling unit structure of a variable package definition can include multiple packaging items, but only one type of tradeable item. To use the previous example, a pallet cannot include (packing materials for) sour cream and yoghurt in addition to milk. List items and BOM items can include various component items, but you cannot specify how component items are packed.

The relations between the nodes of the handling unit structure are user-definable. This means that, unlike fixed package definitions, you can specify the number of packing items per node both on general and item-level handling unit templates without referring to the storage units and conversion factors defined in Common. In addition, you can define various nodes with various packaging items for all nodes except the top node.

Example
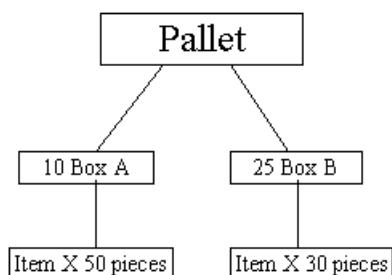
In this picture, box A and box B represent nodes 2 and 3, which are both on the second node level just below the top level. The pallet includes 10 boxes of type A and 25 boxes of type B. Box A contains 50 items X and box B contains 30 items X.

You can use the same variable package definition to define handling unit structures for individual items and add or delete nodes and specify several numbers of packaging items for the nodes. Therefore, this method is a more flexible way of defining package structures than the fixed package definition.

Variable package definitions are useful, for example, for items that are sold to various business partners with various packing requirements.

Example

Package definition Z consists of one pallet X, 15 boxes type A and 40 boxes type B. Package definition Z is linked to item 0001, item 0002, and item 0003.

- 150 items 0001 are packed in 3 boxes type A.
- 100 items 0002 are packed in 2 boxes type A.
- 300 items 0003 are packed in 10 boxes type A
- 400 items 0003 are packed in 40 boxes type B.

Mixed package definitions

Mixed package definitions are used to define handling unit structures that include more than one type of item.
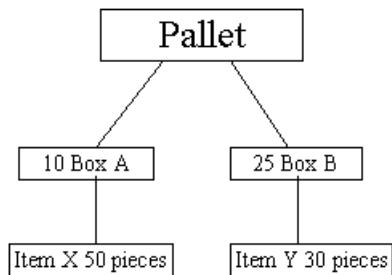
However, you can only link items to a mixed package definition on the general package definition level. You cannot define mixed package definitions on item level. Mixed package definitions are used to validate manually created free-style handling units. If you manually define handling units for multiple items listed on an order, you can validate the manually created handling unit setup against a mixed package definition that includes a handling unit template for those items and handling units. Validating is used to prevent mistakes from being made when you manually create handling units.

Handling unit templates

A handling unit template is one of the elements of a package definition. The handling unit template defines how handling units are used to pack particular items. A handling unit template includes a hierarchical structure that consists of several nodes that are related in a parent - child fashion. Each node represents a generic handling unit.

Example

For example, a fluid item such as milk is packed in cartons, the cartons are packed in boxes of twenty cartons each, and 50 boxes are placed on a pallet.
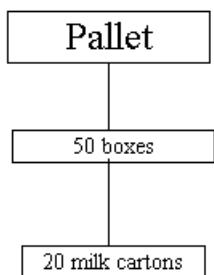
- **Top**
  The top node includes the whole structure. In the previous example, the pallet is the top node.
- **Parent**
  A node that ranks higher than another node. A parent node includes one or more children. In the previous example, the boxes are the parent nodes of the milk cartons. At the same time, the pallet (the top node) is the parent of the boxes, thus the boxes are the children of the pallet.
- **Child**
  A node that is linked to a parent. In the previous example, the milk cartons are the children of the boxes.

A node includes the following information:

- The parent node to which the node belongs (except for the top node, of course).
- The packing item that is used for the node. In the previous example, the packing item for the top node is pallet, and for the children of the top node the packing item is box.
- For package definitions of the variable and mixed type, the number of packing items used for the node. In the previous example, the number of packing items for the top node is one (one pallet), and for the second node the number is 50 (50 boxes per pallet). For fixed packaging definitions, the number of packaging items is determined in a different way.
- For variable and mixed package definitions, the number of items that the packaging item must contain. For variable and mixed package definitions, this number is displayed for both the general-level and the item-level handling unit template. For fixed packaging definitions, the number of items is only displayed for the item-level handling unit template.

- The node is labeled or unlabeled. Labeled means that for each packing item defined for the node, a label record is created. In this way, each existing packing item is uniquely identified. These labels can be printed. If the boxes with milk cartons from the previous example are labeled, each box obtains a label when handling units are generated for an order for milk cartons.
- Auxiliary packing material, such as sealing plastic that is used for the node.

The use of package definitions

You can use package definitions to generate handling units for items in the following warehouse flows:
- Receipt
- Shipping
- Storage

For further information on creating handling units based on package definitions or without package definitions during these flows, see *To maintain handling units (p. 17)* and *To generate handling units (p. 19)*.

In addition, you can use fixed package definitions to define packing structures for items without handling units and specify the inventory structure of an item. For further information on fixed, variable, and mixed package definitions, see *Package definitions (p. 123)*.

Receipt

You can use a package definition to generate actual handling unit structures at the moment goods are received. If you know how your suppliers pack the goods they send to you, you can define package definitions with handling unit templates that match your suppliers' packing structures, and link these package definitions to the corresponding item and ship-from business partners. For this purpose, you can use variable and fixed package definitions.

These package definitions will be defaulted on order lines and receipt lines originating from the suppliers. On the receipt line, you can change the default package definition as long as the receipt line is not confirmed. When you generate handling units for goods from these suppliers, the handling units are generated as defined in the packing definition.

Note

You can also select settings for automatic generation of handling units for items that are listed on advance shipment notices (ASN). For further information, see *To set up automatic generation of handling units from ASNs (p. 106)*.

Shipping

You can specify how the goods that go to a particular customer must be packed. If you know how a particular customer wants their goods packed, you can define a package definition with a matching

handling unit template and link the package definition to the relevant sales item and ship-to business partner. If an outbound line is created for the item and ship-to business partner, the package definition is defaulted on the outbound line. For this purpose, you can use variable and fixed package definitions.

Storage

You can use handling units to store items in a warehouse, and use a package definition to specify how the items are packed. For example, to store an item you can use the same handling units and package definition that were used to receive the item. If you use a fixed package definition for storage in inventory, the inventory structure of the items is defined, as well.

To define package definitions

To define package definitions, proceed as follows:

Step 1: Start session

Start the Package Definitions (whwmd4110m000) session. In this session, you must define the general-level package definition.

Step 2: Code and description

Enter the identification code and description of the package definition.

Step 3: Package definition type

Select the package definition type. See *Package definitions (p. 123)* on the available package definition types.

Step 4: Packaging levels

This step only applies to **Fixed** package definitions.

Define packaging levels for the package definition. To define packaging levels, select the package definition and start the Package Definition Levels (whwmd4520m000) session. You can access this session on the appropriate menu of the Package Definitions (whwmd4110m000) session. For further information on packaging levels, see *Packaging levels (p. 103)*.

Step 5: Handling unit template

For **Fixed** package definitions, skip this step if you do not use handling units.

Define the handling unit template for the package definition in the Handling Unit Templates (whwmd4160m000) session. You can access this session on the appropriate menu of the Package Definitions (whwmd4110m000) session.

Variable and mixed package definitions

For each node, enter the following information:

- The number of the parent node (this does not apply to the top node).
- The packaging item for the node. You can specify one packaging item for a node, for example, box.
- The number of packaging items. For example, if you specified packaging item box, you must specify how many boxes are used for the node.
- Auxiliary packaging, such as sealing plastics, in the Handling Unit Template Node - Auxiliary Packaging (whwmd4162m000) session. To start this session, select the node in the Handling Unit Templates (whwmd4160m000) session and on the <u>appropriate menu</u>, select **Auxiliary Packaging**.

  A handling unit template node can have multiple packaging items of one type, for example, 10 boxes type A, and multiple auxiliary packaging items, for example, 2 trays, one length of sealing plastics, and one cover.

- Select the **Labeled** check box. Labeled means that, for each packing item defined for the node, a handling unit is created. In this way, each existing packing item is uniquely identified. These labels can be printed. If the boxes with milk cartons from the first example in *Package definitions (p. 123)* are labeled, each box obtains a label when handling units are generated for an order for milk cartons. For further information on labels, see Label layout and printing.
- The item that is to be packed. This is applicable only to mixed package definitions. For further information, see *Package definitions (p. 123)*.
- The number of items that is to be packed in the packaging item in the parent node. You must only insert this number for the bottom node. For general-level handling unit templates, this is useful if you know that for all items for which the package definition is to be used, the same number will fit in the packaging item.

Fixed package definitions

If you define a fixed package definition, the information for the nodes is copied from the packaging levels. For further information on packaging levels, see *Packaging levels (p. 103)*. You cannot modify this information, but you can add the following information for each node:

- Auxiliary packaging information.
- Select the **Labeled** check box. Labeled means that for each packing item defined for the node, a handling unit is created. In this way, each existing packing item is uniquely identified. The top node is always labeled, you do not need to specify this. These labels can be printed. If the boxes with milk cartons from the example in *Package definitions (p. 123)* are labeled, each box obtains a label when handling units are generated for an order for milk cartons. For further information on labels, see Label layout and printing.

Step 6: Save and quit handling unit template

For **Fixed** package definitions, skip this step if you do not use handling units.

Save the general-level handling unit template and close the Handling Unit Templates (whwmd4160m000) session.

Step 7: Validate handling unit template

For **Fixed** package definitions, skip this step if you do not use handling units.

Return to the Package Definitions (whwmd4110m000) session to validate the general-level handling unit template. This step is the last step in the procedure to create general-level package definitions. After you have validated the template, you can no longer change the template, except for the auxiliary packaging and the packing instructions. To change a validated template, you must first use the **Undo Validate Package Definition** option on the appropriate menu. In the next step, you must link the package definition and thus the handling unit template to an item to create the item-level package definition.

Step 8: Define item-level package definition

Define the item-level package definition. In this step, you link the package definition to an item. To link a package definition to an item, select the item in the Items - Warehousing (whwmd4500m000) session and access the Item - Package Definitions (whwmd4130m000) session. You can access this session on the appropriate menu of the Items - Warehousing (whwmd4500m000) session. Note that you can link an item to various package definitions, this is useful if, for example, the item is sold to various business partners with various packing requirements.

Step 9: Adjust packaging levels for item

This step applies only to **Fixed** package definitions.

Adjust the packaging levels of the package definition that you are linking to the item. To adjust the packaging level information, access the Package Definition Levels (whwmd4520m000) session from the appropriate menu. For further information on packaging levels, see *Packaging levels (p. 103)*.

Step 10: Adjust handling unit template for item

Adjust the handling unit template of the package definition that you are linking to the item. Access the Handling Unit Templates (whwmd4160m000) session from the appropriate menu. You can add nodes and change nodes, as described in Steps 5 and 6.

Step 11: Validate handling unit template for item

For **Fixed** package definitions, skip this step if you do not use handling units.

Validate the handling unit template of the package definition that you are linking to the item. After you validate the template, you can no longer change the template. To change a validated template, you must first use the **Undo Validate Package Definition** option on the appropriate menu.

Step 12: Link package definition to business partner

In the Items - Sales Business Partner (tdisa0510m000) session and the Items - Purchase Business Partner (tdipu0110m000) session, you can link an item-level package definition to ship-to business partners or ship-from business partners. As a result, the package definition is defaulted on order lines listing the linked business partners and items. For further information, see *To maintain handling units (p. 17)* and *To generate handling units (p. 19)*.

When you define handling units for an order line, you can use the default package definition of the order line, use another package definition, or use no package definition. You cannot use mixed package definitions for this purpose. Note that this step is optional.

Note

You cannot delete item-level package definitions if an inventory is present that is stored in the package definition for the item. In addition, the package definition levels and handling unit templates on item level must be deleted before a package definition by item can be deleted.

List items, BOM items, and package definitions

Package definitions are used to define packaging structures for single items, list items, and BOM items. If a package definition is used for list items, you cannot specify how the components of the list items are packed. The kit is the lowest child node.

Example
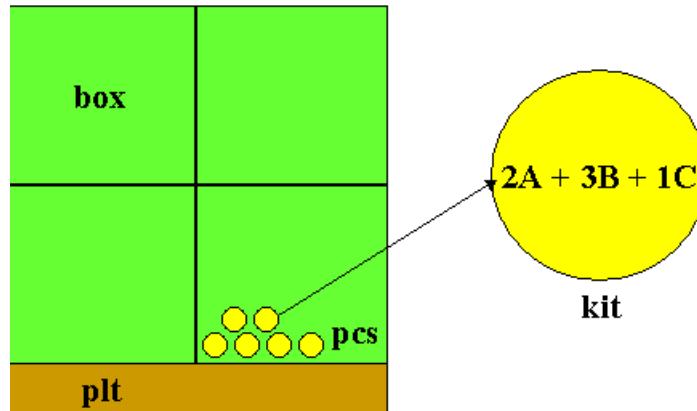
In this example, the kit consists of components 2A, 3B, and 1C.
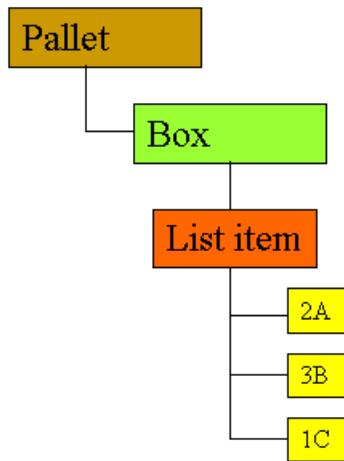
This illustrates the handling-unit tree structure of a list item. The component items 2A, 3B, and 1C are linked to the list item, which is their immediate parent.

Package definition binding

To ensure that picked items match the packing requirements of the order and to reduce relabeling, you can select the **Package Definition Binding** check box in the Outbound Order Lines (whinh2120m000) session.

Note

The setting of this check box is defaulted from the **Package Definition is Binding** check box in the Items - Sales Business Partner (tdisa0510m000) session or from the Sales Contract Line Logistic Data (tdsls3102m000) session if the related sales schedule is based on a sales contract.

If this check box is cleared, the picked handling unit structure is used for the shipment line.

If this check box is selected, and the picked handling unit structure does not match the package definition of the outbound order line, LN repacks the picked items.

When repacking, picked handling units that match the package definition of the outbound order line are reused if the matching handling unit is:

- A bottom-level handling unit
- Located on a handling unit level directly above:
  - The matching bottom level
  - Another matching level

Example 1

The handling unit structure of the items picked for an outbound order line consists of:
- A Pallet
- Two crates of type Crate001
- Two boxes of type Box002 for each crate

The package definition of the outbound order line specifies:
- A Container
- Two crates of type Crate001
- Two boxes of type Box002 for each crate

The crate and box levels are reused for the shipment line, because these levels match the package definition and meet the reuse criteria.

Example 2

The handling unit structure of the items picked for an outbound order line consists of:
- A Pallet
- Two crates of type Crate001
- Two boxes of type Box002 for each crate

The package definition of the outbound order line specifies:
- A Pallet
- Two crates of type Crate022
- Two boxes of type Box002 for each crate

The box level is reused for the shipment line, because this is the bottom level.

The matching Pallet level is not reused, because the Pallet level is not directly above another level that is reused (the crate level is not reused, because Crate001 does not match the handling unit template of the package definition).

Note

- The setting of the **Allow Updating Outbound Order Lines upto and including** field determines stage of the outbound procedure up to which you can select or clear the **Package Definition Binding** check box in the Outbound Order Lines (whinh2120m000) session.
- If the **Package Definition Binding** check box in the Outbound Order Lines (whinh2120m000) session is selected, the **Alternative Package Definition** and **Specific Packaging** options on the appropriate menu of the Shipment Lines (whinh4131m000) session are unavailable.

Package definition - binding or alternative allowed

You can use these options to determine the <u>handling unit structure</u> that is used to ship items in the outbound flow:

- The **Package Definition Binding** check box in the Outbound Order Lines (whinh2120m000) session
- The **Advise Alternative Package Definition Allowed** check box in the Item Data by Warehouse (whwmd2110s000) session

Each option works differently in terms of outbound advising and handling unit validation. Use the option that best suits the requirements of your organization.

Advise Alternative Package Definition Allowed

If the **Advise Alternative Package Definition Allowed** check box is cleared, only inventory packed in the specified package definition is advised. All other inventory of the ordered item is ignored for the outbound advice.

While in stock, handling units are sometimes repacked. When a user repacks inventory, LN does not check if the repacked inventory matches the <u>handling unit template</u> of the package definition specified for the inventory. Consequently, although the correct package definition is advised, the handling unit structure may not match the handling unit template.

If this check box is selected, the item can be advised from any inventory, regardless of the package definition used.

Package Definition Binding

If the **Package Definition Binding** check box is selected, any inventory (of the ordered item) with or without package definition can be advised. During shipment creation, the advised inventory is repacked according to the handling unit template of the package definition of the outbound order line. Consequently, the shipped items are always packed according to this handling unit template.

If this check box is cleared, the package definition of the outbound order line is a default value that the user can change.

Chapter 14
Multiple Stock Points in Handling Unit Template

14

Allowing multiple stock points for handling unit template

The **Allow Multi Stock Point for Shipping** check box in the Handling Unit Templates (whwmd4160m000) session is used to specify for a node level in a handling unit template whether a handling unit can contain multiple <u>stock points</u>. This applies to handling units that:

- Belong to this node level
- Are created during shipping or picking
- Contain items to which either of the following applies:
  - Low volume serialized or low volume lot controlled
  - The <u>outbound method</u> is <u>first in, first out (FIFO)</u> or <u>last in, first out (LIFO)</u>.

Allowing multiple stock points for one or more of the node levels of a handling unit template impacts the handling unit structures created based on the handling unit template. If allowed for bottom level handling units, this affects various procedures involved in maintaining and shipping handling units:

- **Lot and serial registration for handling units**
  For a shipment line with handling units containing low volume lot controlled and high volume serialized items, the serial registration in the Shipment Line Stock Point Details (whinh4133m000) session and the Handling Unit Stock Point Details (whwmd5136m000) session must be synchronized to allow setting a handling unit partially or entirely to **Not Shipped**. If serial registration is completed for the shipment line stock point details, lot and serial registration must also be completed in Handling Unit Stock Point Details (whwmd5136m000) session to set a bottom level handling unit to **Not Shipped**.

- **Set bottom-level handling units to Not Shipped**
  You can set an entire handling unit or a part of a handling unit to **Not Shipped** if the handling unit status is **Staged**. Use the **Set Not Shipped** command in the Handling Units (whwmd5130m000) session to set entire handling units to **Not Shipped**.

  To set part of a handling unit to **Not Shipped**, use the Handling Unit Stock Point Details (whwmd5136m000) session. This session is started from the Handling Units (whwmd5130m000) session or the **Handling Unit Tree**.

- **Shipment acceptance**
  For source acceptance, use the Handling Unit Stock Point Details (whwmd5136m000) session to accept or reject item quantities in bottom level handling units that contain multiple stock points.

- **Compose handling unit**
  You can move a handling unit to another parent handling unit if the new parent handling unit allows multiple stock points or if the stock point details of both handling units match.

  For example, handling unit A contains lot A. Handling unit B allows multiple stock points. In that case, you can move handling unit A to parent B. If handling unit B does not allow multiple stock points, but contains lot A, moving handling unit A to handling unit B is also allowed.

  If handling unit B does not allow multiple stock points, and contains lot C, moving handling unit A to handling unit B is not allowed. If handling unit B does not allow multiple stock points, and handling unit A contains multiple lots, moving handling unit A to handling unit B is not allowed.

- **Label printing**
  For handling unit structures, labels are printed for bottom-level handling units. If a bottom-level handling unit contains multiple stock points, the stock point information is not printed on the label. This is because the label field cannot contain more than one code. For example, if the handling unit contains three stock points and the label definition includes the Inventory Date field (lb.inv.date), which is a stock point detail, the application does not "know" which of the three inventory dates to print.

Allowing multiple stock points for handling unit template - examples

Allowing multiple stock point details for one or more of the node levels of a handling unit template impacts the handling unit structures created based on the handling unit template.

Allowing multiple stock points for a handling unit template is specified by node level. In the Handling Unit Templates (whwmd4160m000) session, the **Allow Multi Stock Point for Shipping** check box must be selected for the relevant node levels.

Multiple stock points not allowed in any node level

In this handling unit template, multiple stock points are not allowed in any of the node levels:

Parent node	Node	Packaging item	Packaging item quantity	Item quantity in storage unit	Allow multiple stock points for shipping check box
0	1	PALLET	1	0	Cleared
1	2	CRATE	10	0	Cleared
2	3	BOX	20	100	Cleared

For a shipment line, these stock point details are present in the Shipment Line Stock Point Details (whinh4133m000) session:

Shipment line	Sequence	Lot	Serial	Inventory date	Staged quantity
SHP000001/10	1	LOT001		10/10/2019 10:00	5
SHP000001/10	2	LOT002		10/10/2019 10:00	10

Creating handling units for this situation results in the following handling unit structure:
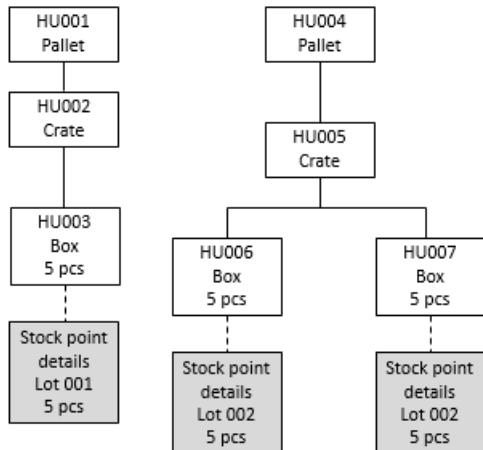
Because multiple stock points are not allowed for any of the node levels, multiple pallets and crates are required to contain the items of the shipment line.

Multiple stock points excluded from bottom level

A more compact handling unit structure can be accomplished if for the same template, only the bottom level handling units are excluded from multiple stock points:

Parent node	Node	Packaging item	Packaging item quantity	Item quantity in storage unit	Allow multiple stock points for shipping check box
0	1	PALLET	1	0	Selected
1	2	CRATE	10	0	Selected
2	3	BOX	20	100	Cleared

This templates results in the following handling unit structure if created for the shipment line of the previous example:
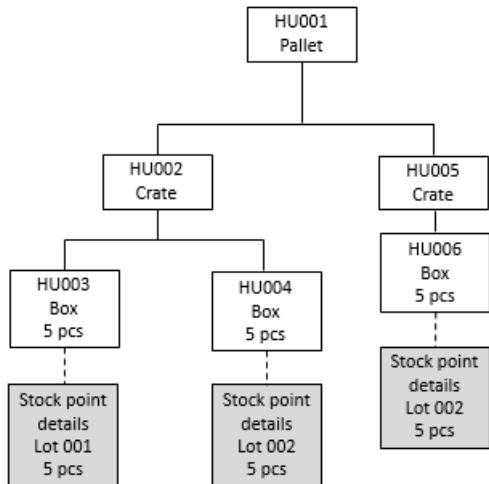
In this structure only one pallet is created, and HU002 of type Crate contains both lots. The second crate, HU005, was created because a crate cannot contain more than two boxes in this template.

Multiple stock points allowed in all node levels

In this handling unit template, multiple stock points are allowed in all node levels:

Parent node	Node	Packaging item	Packaging item quantity	Item quantity in storage unit	Allow multiple stock points for shipping check box
0	1	PALLET	1	0	Selected
1	2	CRATE	10	0	Selected
2	3	BOX	20	200	Selected

For a shipment line, these stock point details are present in the Shipment Line Stock Point Details (whinh4133m000) session:

Shipment line	Sequence	Lot	Serial	Inventory date	Staged quantity
SHP000001/10	1	LOT001		10/10/2019 10:00	5
SHP000001/10	2	LOT002		10/10/2019 10:00	10

For this template and these lot quantities, the following handling unit structure is created:
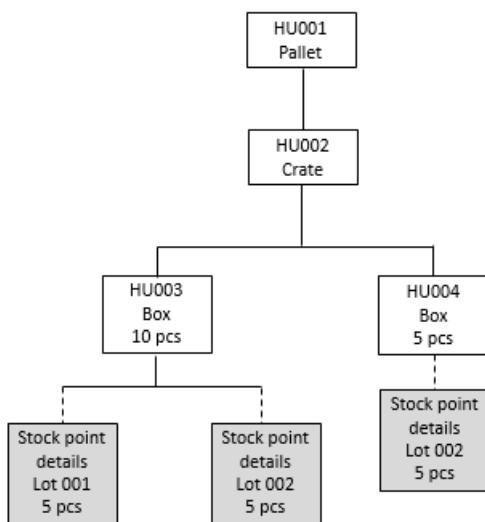
In this structure, only one pallet and one crate are needed to contain the items of the shipment line. Two boxes are required, because in this example the maximum capacity of a box is 10 pcs. Multiple handling unit stock point details are created for handling unit HU003. For handling unit HU003, the lot code is not displayed because multiple lots are present.

Consolidate stock points in shipment line not allowed

If the **Consolidate Stock Points in one Shipment Line** check box in the Inventory Handling Parameters (whinh0100m000) session is cleared, and an outbound order line includes two lots, a separate shipment line is created for each lot:

Shipment line	Sequence	Lot	Serial	Inventory date	Staged quantity
SHP000001/10	1	LOT001		10/10/2019 10:00	5
SHP000001/20	1	LOT002		10/10/2019 10:00	10

To create handling units for the shipment lines, this template is used:

Parent node	Node	Packaging item	Packaging item quantity	Item quantity in storage unit	Allow multiple stock points for shipping check box
0	1	PALLET	1	0	Selected
1	2	CRATE	10	0	Selected
2	3	BOX	20	300	Selected

This results in the following handling unit structure for the shipment:
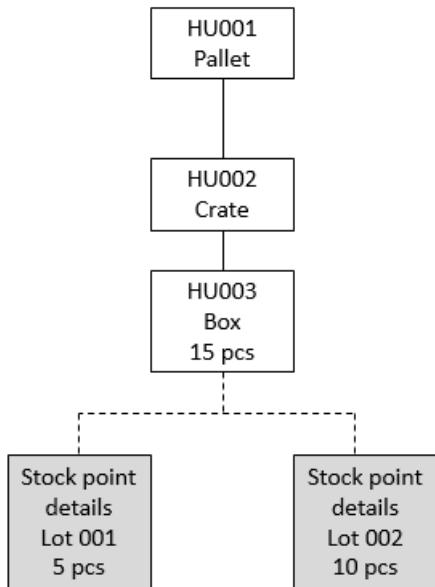
The upper levels can contain all of the shipment stock points. The bottom level handling units can also contain stock points from multiple shipment lines as long as the capacity is sufficient.

According to the template, the bottom level handling unit has sufficient capacity. Therefore, HU003 contains all stock points even though the stock points are not allowed to be consolidated in one shipment line. To allow handling units to contain stock points from multiple shipment lines, select the **Allow Multi Item for Shipping** check box in the Handling Unit Templates (whwmd4160m000) session.

To specify multiple stock points for handling unit template

The **Allow Multi Stock Point for Shipping** check box in the Handling Unit Templates (whwmd4160m000) session is used to determine whether multiple stock points are allowed for a node level in a handling unit template. If this check box is selected for the bottom level, bottom level handling units generated for shipment lines can contain items with different stock points.

This check box is applicable for handling units created for shipment lines containing items:

- That are low volume serialized or low volume lot-controlled
- Whose outbound method is first in, first out (FIFO) or last in, first out (LIFO)

For each stock point contained in a handling unit, a handling unit stock point detail line is created in the Handling Unit Stock Point Details (whwmd5136m000) session.

Allowing multiple stock points for one or more of the node levels of a handling unit template impacts the handling unit structures created based on the handling unit template.

Note

- Shipment lines created from <u>transfer orders</u> cannot contain bottom-level handling units with multiple stock point details, regardless of the setting of the **Allow Multi Stock Point for Shipping** check box for the handling unit template. This is because for receipts of handling units, multiple stock points are not supported.

  However, multiple stock points are allowed in the bottom-level handling units of the transfer-order shipment line if handling units are not allowed:
  - In the receiving warehouse.
  - According to the settings specified for the receiving warehouse in the Item Data by Warehouse (whwmd2110s000) session.

- To allow multiple stock points in bottom level handling units on shipment lines, the **Consolidate Stock Points in one Shipment Line** check box in the Inventory Handling Parameters (whinh0100m000) session must be selected in addition to the **Allow Multi Stock Point for Shipping** check box in the Handling Unit Templates (whwmd4160m000) session.

- The **Allow Multi Stock Point for Shipping** check box has no impact on the inbound flow. Consequently, multiple stock points are not allowed in inbound handling units.

Appendix A
Glossary

A

administrative shipment structure

The administrative structure is the arrangement of shipment headers and shipment lines.

advance shipment notice

A notification that a shipment has been sent. Advanced shipment notices are sent and received by means of EDI. You can receive advance shipment notices from your supplier informing you that goods are to arrive at your warehouse, and/or you can send advance shipment notices to your customers that the goods they ordered are about to be delivered.

Synonym: shipment notice

Abbreviation: ASN

advance shipping notice

A form of pre-invoicing. The customer receives an advance notification of details of a shipment that is on its way to the customer.

Acronym: ASN

allocation

The reservation of inventory against a demand prior to the outbound process.

You can allocate a quantity of inventory to a business partner or a particular demand order.

> **Note**
> The documentation sometimes states that a particular demand object, such as a sales order, is *allocated to* a business partner, order, or reference. That phrase actually means that LN must fill the demand object with *supply that was allocated to* that particular business partner, order or reference.

allocation change order

A commission to change the allocation of inventory.

appropriate menu

Commands are distributed across the **Views**, **References**, and **Actions** menus, or displayed as buttons. In previous LN and Web UI releases, these commands are located in the *Specific* menu.

ASN

See: *advance shipping notice (p. 145)*

ASN

See: *advance shipment notice (p. 145)*

associated line - handling unit

Handling units can be associated with:

- ASN lines
- Receipt lines
- Outbound advice lines
- Shipment lines
- Adjustment order lines
- Cycle counting order lines

bill of material (BOM)

A list of all parts, raw materials, and subassemblies that go into a manufactured item and show the quantity of each of the parts required to make the item. The BOM shows the single-level product structure of a manufactured item.

Business Object Document (BOD)

An XML message used to exchange data between enterprises or enterprise applications. The BOD is composed of a noun, which identifies the message content, and a verb, which identifies the action to be taken with the document. The unique combination of the Noun and the Verb forms the name of the BOD. For example, noun ReceiveDelivery combined with verb Sync results in BOD SyncReceiveDelivery.

by location

An outbound method that determines the physical outbound priority of a specific item. The inventory is issued from inventory based on the outbound priority of the locations. The inventory date will not be taken into account.

cross-docking

The process by which inbound goods are immediately taken from the receipt location to the staging location for issue. For example, this process is used to fulfill an existing sales order for which no inventory is available.

LN distinguishes the following three types of cross-docking:

- **Static**
  To initiate this type of cross-docking, you must generate a purchase order from a sales order in Sales.
- **Dynamic**
  This type of cross-docking, available in Warehousing, can be:
  - Based on inventory shortages.
  - Defined explicitly during receipt of goods.
  - Created on an ad hoc basis.
- **Direct Material Supply**
  You can use this type of cross-docking, available in Warehousing, to meet demand in a cluster of warehouses, and is based on:
  - Receipts
  - Inventory on hand

Note

You can maintain cross-dock orders that originate from Sales in the same way as cross-dock orders created in Warehousing, with the exception of the sales order/purchase order link, which you cannot change.

See: direct material supply

cross-dock order line

An inbound order line for which the goods must be cross-docked. Cross-dock order lines are used to fulfill cross-dock orders.

See: cross-dock order

FIFO

See: *first in, first out (FIFO) (p. 148)*

first in, first out (FIFO)

An inventory valuation method for accounting purposes. The assumption is that the oldest inventory value (first in) is the first to be used or sold (first out). However, this method assumes no necessary relationship with the actual physical movement of specific items.

FIFO can also be an outbound method that determines the physical outbound priority of a specific item. The oldest inventory is the first to be issued, taking into account the ordered packaging level, that is leading over the inventory date.

Example

A box containing 10 pieces is ordered and you have the following inventory:
- 5 pieces, receipt date 01-01
- 1 box containing 10 pieces, receipt date 05-01
- 1 box containing 10 pieces, receipt date 10-01
- 7 pieces, receipt date 15-01

If the outbound priority of the item is FIFO, the box with receipt date 05-01 is issued.

Abbreviation: FIFO

general-level package definition

A package definition that you can use for various items. You can link a general-level package definition to an item to adjust the package definition data for the item. In this way, you create an item-level package definition.

See: package definition, item-level package definition

handling unit

A uniquely identifiable physical unit that consists of packaging and contents. A handling unit can contain items. A handling unit has a structure of packaging materials used to pack items, or is a part of such a structure.

A handling unit includes the following attributes:
- Identification code
- Packaging item (optional)
- Quantity of packaging items (optional)

If you link an item to a handling unit, the item is packed by means of the handling unit. The packaging item refers to the type of container or other packing material of which the handling unit consists. For example, by defining a packaging item such as Wooden Crate for a handling unit, you specify that the handling unit is a wooden crate.

See: handling unit structure

handling unit structure

A description of the way items are packaged by means of handling units.

A handling unit structure includes any of the following elements:

- **Top**
  Handling unit that includes the entire structure, such as a pallet.
- **Parent**
  Handling unit that includes one or more children, such as a crate on a pallet.
- **Child**
  Handling unit that is linked to a parent, such as boxes that are packed in a crate.

handling unit template

One of the elements of a package definition. A handling unit template provides information on the packing materials that must be used to pack items and on the way the packaging materials are structured. The package structure is hierarchical and consists of several nodes that are related in a parent-child fashion. The packaging materials refer to handling units, each node represents a handling unit.

When handling units are generated for the items of a particular order, the handling units are created and structured as defined in the handling unit template of the package definition that is linked to the order.

inbound advice

A list generated by LN that indicates the location where received goods must be stored, taking into account storage conditions, blockings, and so on.

item

The raw materials, subassemblies, finished products, and tools that can be purchased, stored, manufactured, and sold.

An item can also represent a set of items handled as one kit, or which exist in multiple product variants.

You can also define nonphysical items, which are not retained in inventory but can be used to post costs or to invoice services to customers. The examples of nonphysical items:

- Cost items (for example, electricity)
- Service items
- Subcontracting services
- List items (menus/options)

label

A printed piece of paper with information about items, quantities, packaging items and so on. A label often contains bar codes to enable scanning.

last in, first out (LIFO)

An inventory valuation method for accounting purposes. The assumption is that the most recently received value item (last in) is the first to be used or sold (first out). However, this method assumes no necessary relationship with the actual physical movement of specific items.

LIFO can also be an outbound method that determines the physical outbound priority of a specific item. The newest inventory is the first to be issued, taking into account the ordered packaging level, that is leading over the inventory date.

Example

A box containing 10 pieces is ordered and you have the following inventory:
- 5 pieces, receipt date 01-01
- 1 box containing 10 pieces, receipt date 05-01
- 1 box containing 10 pieces, receipt date 10-01
- 7 pieces, receipt date 15-01

If the outbound priority of the item is LIFO, the box with receipt date 10-01 is issued.

Abbreviation: LIFO

LIFO

See: *last in, first out (LIFO) (p. 150)*

list item

A type of item that consists of multiple components. The components can also be managed and ordered separately. The type of list item (kit, menu, options, or accessories) indicates how the components are related.

List items are used to speed up the order-entry process. The order lines for a list item can contain main items or components.

location

A distinct place in a warehouse where goods are stored.

A warehouse can be divided into locations to manage the available space, and to locate the stored goods. Storage conditions and blocks can be applied to individual locations.

mask

A template that specifies the structure of an identification code. A mask is used to generate the identifier for a shift when it is generated through either the Update Calendar Working Hours (tcccp0226m000) session.

See: mask segment

outbound

The act of retrieving goods from a warehouse.

outbound advice

A list generated by LN that advises you the location and lot from which goods must be picked and possibly issued, taking into account factors such as blocked locations and the outbound method.

outbound method

The method by which LN determines the order of issuing items. The outbound method can be **LIFO** (last received items first), **FIFO** (oldest items first), or **By Location** (based on the warehouse location's outbound priority).

outbound-order line

A warehouse-order line that is used to issue goods from a warehouse.

An outbound-order line gives detailed information about planned issues and actual issues, for example:
- Item data.
- Ordered quantity.
- Warehouse from where the goods are issued.

package definition

A particular configuration of items and their packaging. A package definition for an item can, for example, be the following: a pallet contains 12 boxes and each box contains 4 pieces.

See: general-level package definition, item-level package definition

packaging item

The containers or supports that are used to hold and move goods within manufacturing, distribution processes, and, specifically, within the warehouse. For example: boxes, pallets.

packaging reference A

A package building criterion, which refers to the distribution zone or routing code.

packaging reference B

A package building criterion, which refers to the consumption point or point of destination.

packing list

A document that shows all shipments of a load.

picking list

A document that lists the material to be picked for manufacturing or shipping orders. This document is used by operating personnel to pick manufacturing or shipping orders.

See: picking

reference

A number that, if determined by Assembly Control, refers to a unique combination of line station, assembly kit, and parent serial number.

A number that, if determined by Purchase Control, refers to a unique purchase schedule call-off that is generated from Warehousing.

sales schedule

A timetable of planned supply of materials. Sales schedules support long-term sales with frequent deliveries. All requirements for the same item, sold-to business partner, ship-to business partner, and delivery parameter are stored in the same sales schedule.

serial-shipping container code (SSCC)

A code that is used to identify a handling unit. SSCC is a non-significant number with a fixed length (18 digits), which does not contain any classifying elements.

Abbreviation: SSCC

shipment notice

See: *advance shipment notice (p. 145)*

shipment procedure

A procedure that is carried out when a warehouse order or a shipment is processed for transportation. In a shipment procedure, you can specify which transport documents (packing list, packing slip, or Bill of Lading) must be printed when the shipment is transported. For each shipment, a shipment procedure is defined. If a shipment obtains the **Confirmed** status, the documents specified in the shipment procedure are printed.

ship-to business partner

The business partner to whom you ship the ordered goods. This usually represents a customer's distribution center or warehouse. The definition includes the default warehouse from which you send the goods, the carrier who carries out the transport, and the related sold-to business partner.

Synonym: ship-to customer

ship-to customer

See: *ship-to business partner (p. 152)*

sold-to business partner

The business partner who orders goods or services from your organization, who owns the configurations you maintain, or for whom you perform a project. Usually a customer's purchase department.

The agreement with the sold-to business partner can include:

- Default price and discount agreements
- Sales order defaults
- Delivery terms
- The related ship-to and invoice-to business partner

SSCC

See: *serial-shipping container code (SSCC) (p. 152)*

stock point

The smallest inventory level that can be registered in LN.

The stock point is defined by the following data:

- Warehouse
- Location: only if you have locations
- Item
- Inventory date: important if you work with LIFO or FIFO
- Lot: only if the item is low volume lot controlled

stock point details

The lot number, serial number, inventory date, and/or effectivity unit of an item.

transfer order

A type of warehousing order that is created to register inventory transactions from an issuing warehouse to a destination warehouse, or between two locations in a warehouse. A transfer order can be created manually or be generated by other packages or modules in LN. A transfer order has transaction type **Transfer**.

Synonym: warehouse transfer, warehousing transfer order

warehouse transfer, warehousing transfer order

See: *transfer order (p. 153)*

warehousing order type

A code that identifies the type of a warehousing order. The default warehousing procedure that you link to a warehousing order type determines how the warehousing orders to which the order type is allocated are processed in the warehouse, although you can modify the default procedure for individual warehousing orders or order lines.

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