



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.

Objectives

The objectives of this book are to describe the purpose of handling units, what you can accomplish using them, and how to set up and use them.

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 headstart.

Document summary

The first chapter, *Introduction*, describes the purpose and the general characteristics of handling units.

The following chapters describe handling unit structures, handling unit maintenance, warehousing procedures, and performing inbound and outbound movements for handling units.

The closing chapter deals with set up and parameters. This user guide is provided with a glossary list and an index, which you can find at the end of this book.

This book describes procedures that users carry out using handling units and provides some information on the underlying processes that LN carries out. The most important session windows and fields involved are discussed, but a full description of all software components is outside the scope of this book. For details, refer to the online Help.

How to read this document

This document was assembled from online Help topics. As a result, references to other sections in the manual are presented as shown in the following example:

For details, refer to *To maintain handling units*.

Please refer to the Table of Contents to locate the referred section.

Underlined terms indicate a link to a glossary definition. If you view this document online and you click on underlined text, you jump to the glossary definition at the end of this document.

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.

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Handling units

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

Structure

A handling unit has a structure of packing materials and items. A handling-unit structure 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. 12) and *Handling unit structures* (p. 11).

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. 47) and *Outbound procedures and handling units* (p. 49).

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. 35)*.

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.

Setup

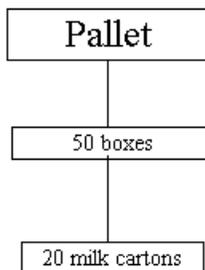
To make the handling unit functionality work in the preferred way, you must define some master data and set some parameters. You can specify how handling units are used for particular items, warehouses, and/or business partners. For more information, refer to *To set up handling units (p. 65)*.

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. 70).
- 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.

Package definitions

A package definition specifies how items must be packed. If you use handling units, 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 handling unit structures. 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:

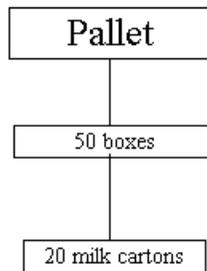
- Purchased items
- Manufactured items
- List items
- BOM items

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

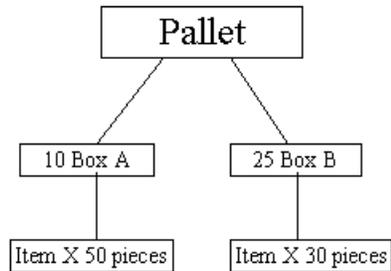
A variable package definition is used to define handling unit structures for the following types of items:

- 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.

Example

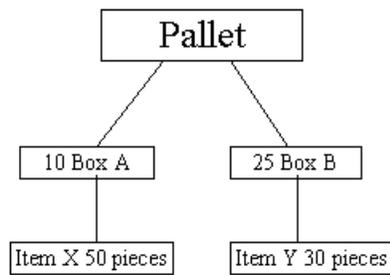
Package definition Z consists of one pallet X, 15 boxes type A and 40 boxes type B. Package definition Z is linked to item 0001, item 0002, and item 0003.

- 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.

Variable package definitions are useful, for example, for items that are sold to various business partners with various packing requirements.

Mixed package definitions

Mixed package definitions are used to define handling unit structures that include more than one type of item.



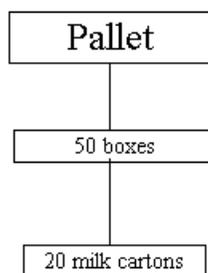
However, you can only link items to a mixed package definition on the general package definition level. You cannot define mixed package definitions on item level. Mixed package definitions are used to validate manually created free-style handling units. If you manually define handling units for multiple 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. 35) and *To generate handling units* (p. 34).

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. 12).

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. 74).

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.

Global Update of Handling Units

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 packaging 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/size of box or another pallet can be used. This means that a new packaging definition must be applied which is different from the one that is applied under normal conditions. The use of alternate packaging material means that the handling unit structure, which is already generated by LN when the pick is confirmed, must be changed.

To suit the needs of your business, LN allows you to do the following:

- Select an alternate packaging definition
- Compose a shipment line specific handling unit template (Specific Packaging)

The following options in the Shipment Lines (whinh4131m000) session > appropriate menu > **Handling Units** allow you to easily replace the packaging materials in the generated handling units:

- **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. 20)*.

LN disables both options if the following happens:

- The **Package Definition** field in the Shipment Lines (whinh4131m000) session is not of type **Variable** or empty.
- The status of the shipment line is not **Open**.
- The handling unit does not refer to inventory. The HU linked to the shipment line contains the 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 unit is not allowed when the following happens:
 - 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 must be in use in shipments.
 - The quantity **Not Shipped** in the Shipment Lines (whinh4131m000) session is greater than zero.
- You cannot see both the options if you do not select the **Handling Units in Use** check box in the Master Data Parameters (whwmd0100s000) session.

Shipment Line Specific Handling Unit Template

You can compose a shipment line specific packaging structure. The shipment line specific packaging structure is only applied to the concerning shipment line 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. LN supports this action by creating a shipment line specific handling unit template.

Note

To implement the Specific Packaging functionality, you must select the **Handling Units in Use** check box in the Master Data Parameters (whwmd0100s000) session.

Specific Packaging --> Shipment Line Specific Handling Unit Template

To replace specific packaging material, you can click appropriate option > **Handling Units > Specific Packaging** in the Shipment Lines (whinh4131m000) session. The Handling Unit Templates (whwmd4160m000) session starts. In this session you can define the shipment line specific handling unit template.

If case there is no pre-existing specific shipment line handling unit template, the following steps are carried out:

1. LN generates a new handling unit template ID.
2. LN defaults a new shipment line specific template. The defaulted template is copied from the following:
 - 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.

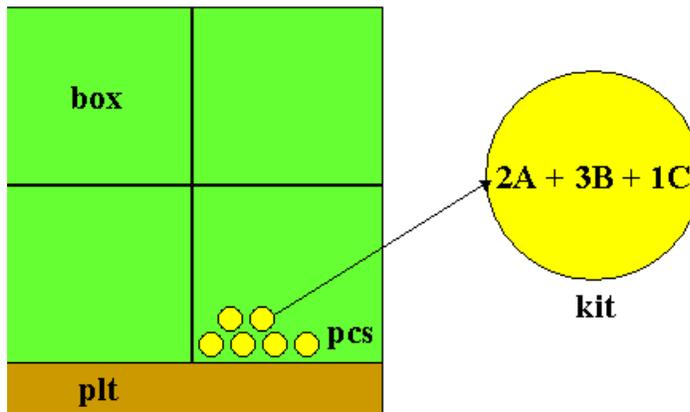
Note

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

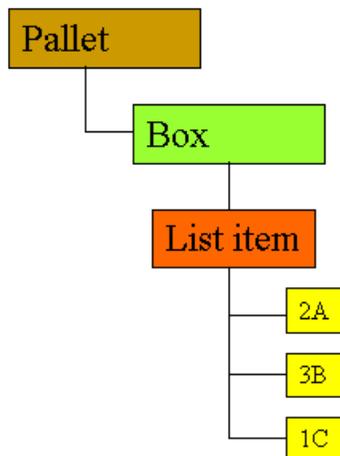
List items, BOM items, and package definitions

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.

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. 25)*. 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. 25)*, 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. 25)* 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. 27)*.

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. 28)*.

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. 29)*.

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.
- **Depth**
The depth of the item included in the handling unit. This value is the default value taken from the Item - Warehousing (whwmd4100s000) 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 (whwmd4100s000) 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 **Depth** 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	Contain- er	Pallet	Box
Width	2 m	1 m	0.25 m
Depth	5 m	1 m	0.5 m
Height	2 m	0.2 m	0.2 m
Floor Space	10 m ²	1 m ²	0.125 m ²
Volume	20 m ³	0.2 m ³	0.025 m ³
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
Depth	0.5 m	0.25 m	0.5 m
Height	0.1 m	0.05 m	0.2 m
Floor Space	0.1 m ²	0.025 m ²	0.125 m ²
Volume	0.01 m ³	0.00125 m ³	0.025 m ³

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 $12 * 0.2 \text{ m} = 2.4 \text{ m}^2$.
- **Depth**
 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 $12 * 0.1 \text{ m}^2 = 1.2 \text{ m}^2$.
- **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 $12 * 0.01 \text{ m}^3 = 0.12 \text{ m}^3$.

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
Depth	0.25 m	0.5 m
Height	0.05 m	0.2 m
Floor Space	0.025 m ²	0.125 m ²
Volume	0.00125 m ³	0.025 m ³

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.
- **Depth**
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
Depth	1 m	0.5 m
Height	0.2 m	0.5 m
Floor Space	1 m ²	0.25 m ²
Volume	0.2 m ³	0.125 m ³

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

Dimensions	Parent	Explanation
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Width	1 m	This is the width of the external packaging item.
Depth	1 m	This is the depth of the external packaging item.
Height	1.2 m	<p>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:</p> <ol style="list-style-type: none"> 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 <p>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: $(1 + 0.2) / 1 = 1.2$</p>
Floor Space	1 m ²	The value of the Width * the value of the Depth .
Volume	1.2 m ³	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
Depth	1 m	0.5 m	0.4 m
Height	0.2 m	0.5 m	0.3 m
Floor Space	1 m ²	0.25 m ²	0.1 m ²
Volume	0.2 m ³	0.125 m ³	0.03 m ³

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.

Depth

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.

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 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 **Rejected** status.
- The handling unit is ready for shipment and has the **Shipment 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.
- The handling unit is no longer in use and has the **Closed** 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* (p. 45) for the conditions that apply to the maintenance of handling units linked to shipments or shipment lines.

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. 65). 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. 74) and **Confirm 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 Receipt Headers (whinh3110m000)
- Warehouse Receipts (whinh3512m000)
- Receipt Lines (whinh3112s000)
- Shipment Notices (whinh3100m000)
- Shipment Notice - Lines (whinh3101m000)
- Inbound Advice (whinh3525m000)
- Warehouse Inspections (whinh3122m000)

Outbound

- Outbound Advice (whinh4525m000)
- Warehouse Inspections (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 the shipment process (p. 61)*.

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 **bill of material (BOM)** 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. 12)*, *To define package definitions (p. 67)*, 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.

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. 41)*.
- **Create handling unit structures**
You can use *Package definitions (p. 12)* to create handling unit structures or you can *Manually create handling units and handling unit structure for items (p. 43)* 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. 38)*
 - *Pack: to generate a handling unit for several items (p. 36)*
 - *Unlink: remove a child handling unit from a parent handling unit (p. 40)*
 - *Link: add a child handling unit to a parent handling unit (p. 40)*

- 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. 40)*. 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. 40)*.
- **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. 44)*.

Note that handling unit maintenance is subject to various conditions. For further information, see *Handling unit maintenance conditions (p. 33)*.

Pack: to generate a handling unit for several 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 **Shipment 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. 65)*.
 - 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. 38)*.

Create detail handling units

You can use the **Create Detail Handling Units** command on the appropriate 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 appropriate 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 appropriate 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.

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

You can use the **Unlink from Parent** command on the appropriate 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 appropriate 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 **Tree Structure** 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.

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

You can click **Link to Parent** on the appropriate 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. 40)*.
- 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. 38)*.
- 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. 33)*.

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 appropriate 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 is linked to the parent.

Tip

Use the **Tree Structure** 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.

Handling Unit Status	Changes
Closed	No changes
Rejected	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
Shipment 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.

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 [appropriate](#) 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 appropriate 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 several items* (p. 36). 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. 38).

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. 35).

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. 35) 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 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.

Conditions for shipment composition

Linking newly generated shipment lines to existing shipments is subject to the following conditions:

- The **Ship-from Type**, **Ship-from Code**, and **Ship-from Address** must match.
- **Ship-to Type**, **Ship-to Code**, and **Ship-to Address** must match.
- The statuses of the shipment lines and the parent shipments must be **Open**.
- The routes must match. If the routes do not match, a warning appears, but you can still move the shipment line to the other shipment.
- The delivery terms must match. If the delivery terms do not match, a warning appears, but you can still move the shipment line to the other shipment.
- The planned delivery date of the shipment line must be within the time frame of the shipment.

- The activities defined for the shipment procedures of the shipment line and the shipment must match.
- The carriers must match. If the carriers do not match, a warning appears, but you can still move the shipment line to the other shipment.

Note

These conditions also apply if you maintain handling units linked to shipments and shipment lines.

Linking existing shipment lines to other existing shipments is subject to the following conditions:

- The **Ship-from Type**, **Ship-from Code**, and **Ship-from Address** must match.
- **Ship-to Type**, **Ship-to Code**, and **Ship-to Address** must match.
- The statuses of the shipment lines and the parent shipments must be **Open**.
- The activities defined for the shipment procedures of the shipment line and the shipment must match.

Note

If one of the single order settings applies, the source shipment line and the destination shipment line must belong to the same warehousing order or order set. For more information, refer to Shipping structures.

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 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. For more information on inbound order lines, see *To handle warehousing orders*, and *How to receive goods*. For more information on the user-defined warehousing procedures, see *To define warehousing procedures*.

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. 34)* and *To maintain handling units (p. 35)*.

Warehouse inbound procedures

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. 65)*.

The warehousing procedures used to process handling units are identical to those used to process order lines. In LN, default inbound procedures are available that you can adjust to meet the requirements of various types of warehouses. You can choose the procedure steps that meet the requirements of your warehouse, but the advice and receipt steps are mandatory. The warehousing procedures that comprise the inbound flow are grouped into two main procedures, the **Receipt Procedure** and the **Inspection Procedure**. For more information on the LN warehousing procedures, see *To define warehousing procedures*.

Note

In this topic, the procedure steps, also called activities, of the inbound flow are discussed, but you can specify that some of these activities are omitted or performed automatically. For more information, refer to *To define warehousing procedures*.

Receipt Procedure

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. 55)*.

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. 58)*.

Step 3: Inspect handling unit

The inbound inspection procedure is one of the main inbound procedures, which is discussed in the following section, Inspection Procedure.

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. 60)*.

Inspection Procedure

In many warehouses, inspections are included in the inbound flow. Therefore, the inspection procedure is optional in LN. Handling units are inspected if inspections are specified for the item, supplier, or warehouse of the handling unit. At the inspection location, the handling units are checked. In some cases, the goods undergo various tests. After inspection, handling units can be:

- Approved
- Rejected
- Destroyed

Approved handling units are stored in the warehouse. For these handling units, an inbound advice is printed that lists the storage locations. After the inbound advice is printed, the handling units are moved to the storage locations in the warehouse as specified on the inbound advice. For more information, refer to *To advise inbound handling units (p. 58)* and *To store handling units (p. 60)*.

Rejected handling units are moved to a reject location, provided that your organization applies the reject functionality and uses reject locations. Handling units are not supported in reject locations. Therefore,

you must close the handling unit, because the goods included in the handling units are no longer processed through the handling units, but by item.

In the reject location, the items are accepted and stored in the warehouse, returned to the supplier, or deleted. For goods that are accepted and stored in the warehouse, you can create new handling units. Rejected items that are not destroyed, are kept in rejected inventory. For more information, refer to Rejected inventory and Handling Unit Status.

Handling units are booked as destroyed if they are destroyed as a result of testing or by some accident. The supplier must be paid for goods that are destroyed. For more information, refer to Handling Unit Status and *To inspect inbound handling units* (p. 59).

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. After the inspection is completed, the handling unit obtains the **In Stock** status.

Outbound procedures and 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 *To handle warehousing orders and Shipments and loads*.

Outbound warehouse processing is controlled by warehousing procedures. For more information, refer to *To define warehousing procedures*

Outbound warehousing procedures

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. 65).

The warehousing procedures used to process handling units are identical to those used to process order lines. In LN, default outbound procedures are available that you can adjust to meet the requirements of various types of warehouses. You can choose the procedure steps that meet the requirements of your warehouse, but the procedures to generate and release outbound advice are mandatory.

The warehousing procedures that comprise the outbound flow are grouped into two main procedures, the **Outbound Procedure** and the **Shipment Procedure**. For more information on the LN warehousing procedures, see *To define warehousing procedures*. For more information on the shipment procedure, refer to *Using handling units in the shipment process* (p. 61).

You can generate handling units for an order line when you create an outbound order line with the **Planned** or **Open** status, an outbound advice, an approval, or a shipment or 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 an outbound advice is generated for the order line. This procedure is described in *To generate handling units (p. 34)* and *To maintain handling units (p. 35)*. For more information on the **Planned** status, see Planned status for Warehousing order lines. For more information on the shipment procedure, see *Using handling units in the shipment process (p. 61)*.

Note

In this topic, all procedure steps, also called activities, of the outbound flow are discussed, but you can specify that some of these activities are omitted or performed automatically. For more information, refer to *To define warehousing procedures*.

Outbound procedure

Step 1: Generate outbound advice

To retrieve the handling units that contain the goods listed on the outbound order lines from the warehouse, an 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. 34)*.

Handling units for which an outbound advice is created obtain the **Allocated** status. In addition, LN generates shipment lines for the outbound order lines related to the handling unit and the outbound advice. For more information on outbound order lines and shipments, see *To handle warehousing orders and Shipments and loads*.

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. 60)*.

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** sub-menu on the appropriate menu of the Handling Units (whwmd5130m000) session.

If inspections are part of your outbound flow, the handling units are moved to an inspection location and the handling unit status becomes **To Be Inspected**. For more information, refer to the following step, "Inspection".

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**. For more information, refer to the following section, Shipment Procedure.

Step 5: Inspection

If inspections are included in the warehousing procedure for particular 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 are moved to a staging location. To approve a handling unit, proceed as follows:

1. Open the Handling Units (whwmd5130m000) session.
2. Open the appropriate menu.
3. Select the **Execute Outbound** sub-menu.
4. In the **Execute Outbound** sub-menu, select **Approve**.

After approval, the handling unit obtains the **Staged** status. For more information, refer to the following sections:

- Shipment Procedure
- *Using handling units in the shipment process (p. 61)*

You must set handling units and their contents to **Rejected** in LN if, for example, the goods are severely damaged during loading.

You must manually set rejected handling units to **Closed**, because these handling units no longer serve any practical purpose.

The items packed in the rejected handling unit are booked as destroyed and removed from the inventory. An adjustment order is created for the removed inventory. The shipment line created for the outbound order line related to the rejected handling unit is deleted.

For information on how to reject some of the items of a handling unit, or to reject child handling units, or to compose new handling unit structures, see *To maintain handling units (p. 35)*.

To reject a handling unit, proceed as follows:

1. Open the Handling Units (whwmd5130m000) session.
2. Open the appropriate menu.

3. Select the **Execute Outbound** sub-menu.
4. In the **Execute Outbound** sub-menu, select **Reject**.

You are prompted to enter a reason code to account for the removed inventory. After closing the reason code dialog box, the rejected handling unit obtains the **Rejected** status. To set a handling unit to **Closed**, select the **Close** option on the appropriate menu of the Handling Units (whwmd5130m000) session.

Shipment procedure

Step 1: Shipping

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

Step 2: 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 shipment lines to which the handling units are allocated obtain the **Confirmed** status and the outbound order lines to which the handling units are allocated obtain the **Shipped** status.

For more information on shipment 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 Receipts (whinh3512m000) session, you can use the **Receive (Easy Entry)** option on the appropriate menu to zoom to receive the handling unit. The handling unit is then set to **Receipt Open**.

Before loading handling units, repacking and/or recomposing handling unit structures can be required, this depends on the packing requirements for the delivery address. For more information, refer to *To maintain handling units (p. 35)* and *To set up handling units (p. 65)*.

To confirm handling units for shipment, select the **Confirm Shipment** option on the **Execute Outbound** sub-menu of the of the Handling Units (whwmd5130m000) session.

Step 3: 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 was insufficient to take all of the handling units, you can place the shipment of this handling unit on hold. To place a shipment on hold, proceed as follows:

1. Open the Handling Units (whwmd5130m000) session.
2. Open the appropriate menu.
3. Select the **Execute Outbound** sub-menu.
4. In the **Execute Outbound** sub-menu, 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. If you confirm the shipment that includes the handling unit that could not be loaded, LN performs the following actions:

- The handling unit obtains the **Set Not Shipped** setting.
- The handling unit is not shipped. 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 **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 automatically 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. 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

Performing Inbound and Outbound Transactions

5

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 advance shipment notice (ASN) 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 handling unit structure. 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 package definition 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. 17)* and *Package definitions (p. 12)*.

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. 74)*.

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. 17).

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 Receipt** from the **Execute Inbound** submenu or click the **Confirm Receipt** button on the toolbar. The handling unit is received in the warehouse and the status of the handling unit is set to **Received**.

Note

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 appropriate 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, for handling units that have no child handling units in the tree structure, a receipt line is created if a parent handling unit is received in the Warehouse Receipts (whinh3512m000) session.

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 Approvals and 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 inspect inbound handling units

In many warehouses, inspections are part of the inbound flow, for some or all of the goods that these warehouses receive.

In LN, handling units that must be inspected obtain an inbound advice that instructs the goods to be moved to an inspection location, and an inspection record is created in the Warehouse Inspections (whinh3122m000) session. To inspect entire handling units, you can process the inspection in the Handling Units (whwmd5130m000) session. If you want to inspect a few items from a handling unit, but not the entire handling unit, you must access the inspection record in the Warehouse Inspections (whinh3122m000) session and close the handling unit. After inspection, you can create new handling units for the approved items.

The inspection results in one of the following:

- The handling units are approved. Approved handling units are stored in the warehouse or cross-docked to a staging location. For the approved handling units, again an inbound advice is generated, this time listing the storage locations for the goods.
- The handling units are rejected. Rejected handling units are moved to a reject location. For further information, see Handling Unit Status and Rejected inventory. You can create new handling units for the goods that are accepted or returned to the supplier.
- The handling units are destroyed. The supplier must be paid for the goods included in the handling unit, because the goods are destroyed, for example, for testing purposes, or by some accident for which the supplier is not liable. Goods included in handling units that are destroyed are removed from inventory.

To inspect a handling unit, proceed as follows:

1. Start the Handling Units (whwmd5130m000) session.
2. Select the handling unit that you want to inspect. You can inspect handling units that have an advise for an inspection location.
3. Select the **Put Away** option from the **Execute Inbound** sub-menu of the Handling Units (whwmd5130m000) session. The handling unit obtains the **To Be Inspected** status.
4. To approve a handling unit, select the **Approve** option from the **Execute Inbound** sub-menu of the Handling Units (whwmd5130m000) session. The handling unit obtains the **Approved** status. The handling unit is approved, and the approval record is removed from the Warehouse Inspections (whinh3122m000) session.
5. To reject a handling unit, click **Reject** from the **Execute Inbound** sub-menu of the Handling Units (whwmd5130m000) session. You are prompted to enter a reason code. After you enter a reason code, the handling unit is moved to a reject location. The handling unit obtains the **Rejected** status. To close the handling unit, select the **Close** option on the LN menu. The quantity of the items included in the stored handling unit is still present in the inventory, therefore the quantity is shown in the **Quantity in Storage Unit** field of the Handling Units (whwmd5130m000) session.
6. To book a handling unit as destroyed, select the **Destroy** option from the **Execute Inbound** sub-menu of the Handling Units (whwmd5130m000) session. You are prompted to enter a

reason code. After you enter a reason code, an adjustment order is created for the handling unit. The handling unit obtains the **Rejected** status. The quantity of the items included in the stored handling unit is subtracted in the **Quantity in Storage Unit** field of the Handling Units (whwmd5130m000) session.

7. For handling units that are **Approved**, you must generate an inbound advice and, if included in the inbound flow, a storage list. For further information on how to generate an inbound advice and a storage list, see *To advise inbound handling units (p. 58)*.
8. After the inbound advice is generated for the approved handling unit, the handling unit obtains the **Advised** status, and you can store the handling unit in the warehouse. To store approved handling units, see *To store handling units (p. 60)*.

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 Receipt and 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 an outbound advice to be retrieved from the warehouse. A handling unit that is linked to an outbound advice has the **Allocated** status.

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 the shipment process

This topic describes the shipment processes that use handling units.

Handling units-important points

- 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. When you confirm a shipment by handling unit, the shipment lines can get partially confirmed. When a shipment is partially confirmed, the status of the confirmed handling unit (and its children) is set to **Shipped** and the status of the shipment line is set to **Confirming**. After all the handling units are confirmed, the shipment line is set to **Confirmed** status and LN can perform stock and financial updates.

- 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**.

For more information, refer to Shipment and load status.

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 only when the shipment line is in **Open** status.

Linking handling units to a shipment line

Select the **Consolidate Handling Units in one Shipment Line during Picking** check box in the Warehouse - Item (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 as '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 also modified, accordingly.

For more information, refer to *Outbound procedures and handling units* (p. 49).

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. The status of the confirmed handling units is set to **Shipped**. If all the shipment line handling units linked to a shipment line are not **Shipped**, the shipment line is set to **Confirming** status.

After all the shipment line handling units are set to **Shipped** status, the shipment line is set to **Shipped** status. After the shipment line is set to **Shipped** status, the inventory levels, stock, financial transactions, packaging material accounts and so on are updated.

For more information, refer to *Outbound procedures and handling units* (p. 49).

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

Confirm shipment by shipment line

When you confirm a shipment by shipment line and the handling units exist for the shipment line, the shipment line handling units which are not in the **Shipped** status are set to **Shipped** status.

It is not possible to reverse the following:

- Partially confirmed/confirmed shipment line
- Partially confirmed/confirmed handling unit

It is possible to reverse the following:

- Partially frozen/frozen shipment line
- Partially frozen/frozen 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 appropriate > **Remove Handling Unit**. 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.

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 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 in Use** 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. 12)*, *The use of package definitions (p. 17)*, and *To define package definitions (p. 67)*.
3. Define handling unit data for items in the following fields of the Item - Warehousing (whwmd4100s000) 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 Warehouse - Item (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 **Handling Units in Use** check box to enable the use of handling units for items in specific warehouses.
 - c. Select the **Use Handling Unit in Receipts** check box to enable the use of handling units in receipts for items related to specific warehouses.
 - d. Select the **Use Handling Unit in Outbound Inspection** check box to enable the use of handling units in outbound inspections for items related to specific warehouses.
 - e. Select the **Use Handling Unit in Inbound Inspection** check box to enable the use of handling units in inbound inspections for items related to specific warehouses.
 - f. Select the **Use Handling Unit in Inventory** check box to enable the use of handling units in inventory for items related to specific warehouses.
 - g. Select the **Use Handling Unit in Shipment** check box to enable the use of handling units for shipment of items related to specific warehouses.
 - h. In the **Generate Handling Units Automatically from ASNs** 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 **Use Handling Units in** 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 **Advise Incomplete Package Definitions** check box to enable advising incomplete package definitions for specific warehouses.
 - d. Select the **Inbound Inspections** check box to enable the use of handling units in inbound inspections for specific warehouses.
 - e. Select the **Inventory** check box to enable the use of handling units in inventory for specific warehouses.
 - f. Select the **Outbound Inspections** check box to enable the use of handling units in outbound approvals for specific warehouses.
 - g. Select the **Shipments** check box to enable the use of handling units for shipments for specific warehouses.
 - h. In the **Creation ASN** field, specify how LN must generate handling units from ASNs that refer to selected warehouses.
 - i. In the **Confirm 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 Item - 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.

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. 12)* 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. 70)*.

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.
- The number of packaging items.
- 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. 12)* 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. 12)*.
- 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.

- Auxiliary packaging, such as sealing plastics.

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. 70). 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. 12) 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. 70)*.

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 Item - 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. 35)* and *To generate handling units (p. 34)*.

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.

Packaging levels

A packaging level is an integral part of a fixed [package definition](#).

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 handling units are used, to define the nodes and the relations between the nodes of a packing structure for a handling unit template.
- 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 **Handling Units in Use** check box in the Warehouse - Item (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 (whwmd4100s000) 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. 67)*, 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)

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. 67).

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 Warehouse - Item (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 Item - 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 **Generate Handling Units Automatically during Creation ASN** field of the Warehouse - Item (whwmd2110s000) session, you can specify how LN must generate handling units from ASNs that refer to items linked to a particular warehouse.

- In the **Generate Handling Units Automatically during Creation ASN** field of the Warehouse - Item (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 Warehouse - Item (whwmd2110s000) session overrule the settings made in the Inventory Handling Parameters (whinh0100m000) session.
- In addition, the settings specified in the Warehouse - Item (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.

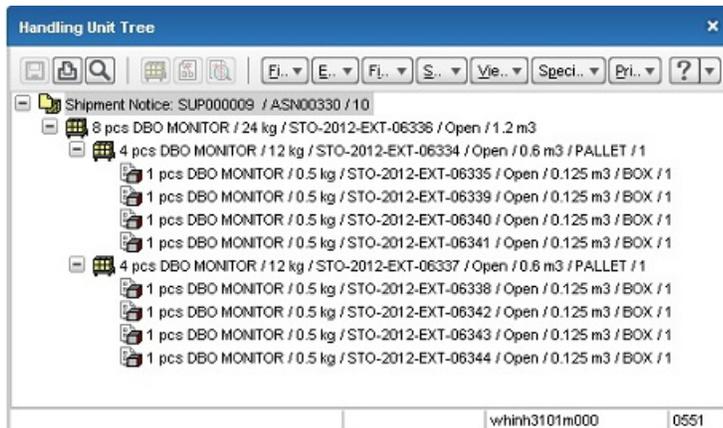
However, if **Generate Handling Units Automatically during Creation ASN** field of the Warehouse - Item (whwmd2110s000) session is set to **Handling Unit Received** for warehouse A and item X, LN generates handling units for ASNs that list warehouse A and item X.

Generate handling units from ASNs

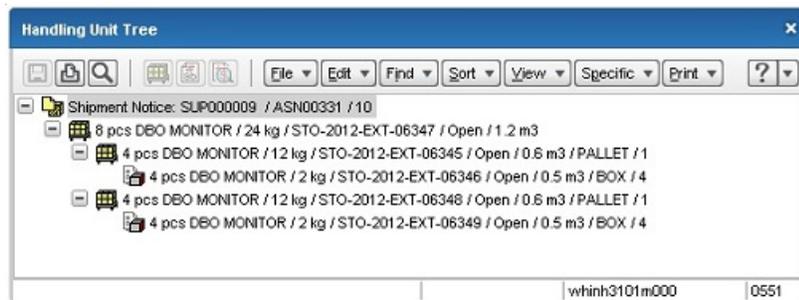
You can generate handling units from [advance shipment notices \(ASNs\)](#), in the Shipment Notice (whinh3600m000) and/ or Shipment Notice - Lines (whinh3101m000) sessions. LN allows you to generate handling units, only if the **Handling Units in Use** check box is selected in the Master Data Parameters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

When a packing structure with an **External Handling Unit** (the ID of the container provided by the business partner) defined, 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 **ASN 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.

Appendix A

Glossary



activity

A step in a warehousing procedure. An activity corresponds with a session of the Warehousing package. For example, the inbound activity Generate Inbound Advice is performed using the Generate Inbound Advice (whinh3201m000) session.

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

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 shipment notice* (p. 77)

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.

carrier

An organization that provides transport services. You can link a default carrier to both ship-to and ship-from business partners. In addition, you can print sales and purchase orders on a packing list, sorted by carrier.

For ordering and invoicing, you must define a carrier as a business partner.

Synonym: forwarding agent, Logistics Service Provider (LSP)

forwarding agent

See: *carrier* (p. 78)

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](#) registered in Warehousing and other handling units. 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 box on a pallet.
- **Child**
Handling unit that is linked to a parent, such as items that are packed in a box.

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

In LN, the raw materials, subassemblies, finished products, and tools that can be purchased, stored, manufactured, sold, and so on.

An item can also represent a set of items handled as one kit, or exist in multiple product variants.

You can also define nonphysical items, which are not held in inventory but can be used to post costs or to invoice services to customers. The following are 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.

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.

Logistics Service Provider (LSP)

See: *carrier* (p. 78)

mask

A template that specifies the structure of an identification code. The mask defines the total length of the identification code and the way the code is divided into mask segments.

See: mask segment

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.

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.

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

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. 77)*

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.

SSCC

See: *serial-shipping container code (SSCC) (p. 80)*

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. 81)*

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