



Infor LN Warehousing User Guide for Cross-Docking

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Publication Information

Document code	whcrossdockug (U8939)
Release	10.3 (10.3)
Publication date	January 28, 2020

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About this document

This guide provides an introduction to cross-docking and describes the cross-docking functions and setup.

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 set up serialized items*. To locate the referred section, please refer to the table of contents or use the index at the end of the document.

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.

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Dynamic cross-docking

In LN, dynamic cross-docking enables users to create cross-dock orders and cross-dock order lines at an ad hoc basis. Changes to the cross-dock order and cross-dock order lines, including cancelation, can be done at various moments in the *cross-docking process* (p. 11). LN can also automatically create cross-dock orders and/or a cross-dock order lines.

Pull system

Dynamic cross-docking supports a pull system. The cross-docking process is initiated by creating a cross-dock order for an outbound-order line. For this cross-dock order, cross-dock order lines can be created. The cross-dock order lines are basically inbound-order lines. The outbound order line serves as cross-dock order, while the inbound order lines serve as the cross-dock order lines. The outbound order lines and inbound order lines are linked to each other by creating cross-dock orders and cross-dock order lines. In this way, cross-docking is initiated from the outbound order line and the goods are pulled from the receipt location to the staging location. Users can also initiate cross-docking from the receipt line or inbound order line. However, a cross-dock order/outbound order line is required to link the inbound order line to.

Special scenarios

- One inbound order line can fulfill multiple cross-dock orders, that is, for a single inbound order line, multiple cross-dock order lines for multiple cross-dock orders can be created. (Example 1)
- Multiple inbound order lines can fulfill a single cross-dock order. (Example 2)

Example 1

Sales order line A, 100 pcs.; sales order line B, 75 pcs.; expected purchase order C, 200 pcs.

For sales order A, create cross-dock order #1 with a cross-dock order line for 100 pcs., corresponding with purchase order C.

For sales order B, create cross-dock order #2 with a cross-dock order line for 75 pcs., also corresponding with purchase order C.

Order	pcs.	Cross-dock Order	Cross-dock Order Line	pcs.	Purchase Order	pcs.
A	100	#1	#11	100	C	200
B	75	#2	#21	75	C	200

The 25 pcs. remaining will not be cross-docked.

Example 2

Sales order line A, 100 pcs.; expected purchase orders B, C and D, 40 pcs. each.

For sales order A, create a single cross-dock order for 100 pcs., with two cross-dock order lines for 40 pcs. each, and one cross-dock order line for 20 pcs.

Order	pcs.	Cross-dock Order	pcs.	Cross-dock Order Line	pcs.	Purchase Order	pcs.
A	100	#1	100	#11	40	B	40
				#12	40	C	40
				#13	20	D	40

The 20 pcs. remaining can either be linked to another cross-dock order, or will not be cross-docked.

Dynamic cross-docking with excess inventory

This topic explains the processing of the following when inventory is available:

- [Cross-dock order](#)
- [outbound advice](#)

After you create a cross-dock order, you can generate an outbound advice for the remaining part of the ordered quantity (the quantity for which cross-dock order is not generated). When you have to generate an outbound advice for the ordered quantity of an outbound order line, you must first cancel or partially

cancel the cross-dock order. You may want to generate an outbound advice because inventory becomes available due to the following reasons:

- Adjustment order
- Cycle counting
- Unblocking of inventory

The cross-dock order is automatically canceled (completely or partially) only if the **Cancel Cross-dock Orders when Inventory Can Be Advised** parameter is selected in the Inventory Handling Parameters (whinh0100m000) session.

Cross dock orders are automatically canceled or can be partially canceled based on the inventory availability. The possible scenarios are explained below:

- When there is no inventory available, then the related cross-dock order is not canceled.
- When there is inventory available for the outbound order line and there is a related cross-dock order without cross-dock order lines, the cross-dock order is canceled completely, if the value of the **Cancel Cross-dock Orders when Inventory Can Be Advised** parameter is **Open Cross-dock Orders** or **Open and Planned Cross-dock Orders**.

When sufficient inventory is not available to completely fulfill the ordered quantity, the requested cross-dock order quantity is decreased with the quantity that is needed to make the advice possible.

- When there is available inventory for an outbound order line and there is a related cross-dock order with cross-dock order lines, the cross-dock order is canceled partially if the value of the **Cancel Cross-dock Orders when Inventory Can Be Advised** parameter is **Open and Planned Cross-dock Orders**. When cross dock orders are canceled partially, the requested cross-dock order quantity is decreased to a quantity that is equal to the planned quantity of the cross-dock order.

Note The requested cross-dock order quantity cannot be decreased if it is equal to the total quantity of the cross-dock order lines, and no outbound advice can be generated.

When the value of the **Cancel Cross-dock Orders when Inventory Can Be Advised** parameter is **Never** or **Open Cross-dock Orders**, the cross-dock orders are not canceled

Note

LN cancels the cross dock orders when an outbound advice is generated. The automatic cancellation is not possible for outbound advice that are manually created or changed.

Cross-docking process

In Warehousing, cross-docking comprises the following steps:

Step 1: Creation of a cross-dock order

Cross-dock orders can be created manually, in batch, or generated automatically by LN:

- **Manually**
In the Cross-dock Orders (whinh6100m000) session, enter an outbound order line, the requested cross-dock quantity and unit. A cross-dock order ID is generated based on the number group and series. You can optionally enter a user priority and a staging location, to which the goods will be cross-docked.
- **In batch**
Use the Generate Cross-dock Orders and Cross-dock Order Lines (whinh6200m000) session to generate a range of cross-dock orders.
- **Automatically**
 - a. In the Inventory Handling Parameters (whinh0100m000) session and the Warehouses (whwmd2500m000) session, make sure the **Dynamic Cross-docking** check box is selected.
 - b. In the Warehouse - Item (whwmd2110s000) session, select either or both of the following check boxes:
 - **Generate Cross-dock Order when Releasing Order to Warehousing**
 - **Generate Cross-dock Order for Outbound Advice Shortage**

A newly created cross-dock order receives the status **Open**.

Step 2: Creation of cross-dock order lines

Cross-dock order lines can be created manually, in batch, or generated automatically by LN:

- **Manually**
In the Cross-dock Orders (whinh6100m000) session, on the appropriate menu, choose **Cross-dock Order Lines**. In the Cross-dock Order Lines (whinh6110m000) session, enter an inbound order line, the planned cross-dock quantity and unit.
- **In batch**
Use the Generate Cross-dock Orders and Cross-dock Order Lines (whinh6200m000) session to generate a range of cross-dock order lines.
- **Automatically**
 - a. In the Inventory Handling Parameters (whinh0100m000) session and the Warehouses (whwmd2500m000) session, make sure the **Dynamic Cross-docking** check box is selected.
 - b. In the Warehouse - Item (whwmd2110s000) session, select the **Generate Cross-dock Order Lines when Confirming Receipt** check box.

Step 3: Approving cross-dock order lines

Cross-dock order lines must be approved before inbound advice takes place; no cross-docking will be carried out for unapproved cross-dock order lines. You can approve cross-dock order lines manually, in a batch process, or automatically:

- **Manually**
 - To approve a single cross-dock order line, in the Cross-dock Order Lines (whinh6110m000) session, on the appropriate menu, choose **Change Status to**, and then **Approved**.
 - To approve *all* cross-dock order lines for a cross-dock order, in the Cross-dock Orders (whinh6100m000) session, select the appropriate cross-dock order and, on the appropriate menu, choose **Approve Cross-dock Order Lines**.
- **In batch**
Use the Approve Cross-dock Order Lines (whinh6210m100) session to approve a range of cross-dock order lines.
- **Automatically**
 - a. In the Inventory Handling Parameters (whinh0100m000) session and the Warehouses (whwmd2500m000) session, make sure the **Dynamic Cross-docking** check box is selected.
 - b. In the Warehouse - Item (whwmd2110s000) session, select the **Automatically Approve Cross-dock Order Lines** check box.

When a cross-dock order line is created and approved, the associated cross-dock order receives the status **Planned**.

Step 4: Processing cross-dock order lines

- **Receiving goods**
On the warehousing receiving side, users can initiate cross-docking by generating cross-dock order lines during confirmation of receipt lines, based on the **Generate Cross-dock Order Lines when Confirming Receipt** setting in the Warehouse - Item (whwmd2110s000) session.

Before confirm receipt takes place, however, users can overrule this setting by either selecting or clearing the **Cross-docking** check box in the Warehouse Receipts (whinh3512m000) session.

- **Inbound advice**

During generation of inbound advice, LN checks whether the receipt line must be cross-docked. If this is the case, the goods are advised for a staging location. If the **Quantity Planned to Cross-dock** is less than the received quantity, only part of the receipt line is advised for a staging location, while the remainder is advised for a bulk or pick location. If, based on the **Inspection** field of the receipt line, inspection is required, the goods are first advised for the inspection location. If inbound advice is created for the receipt line and no inspections are required, the cross-dock order line status will be set to **Advised**. If inspections must be carried out first, the **Advised** status will be assigned when goods are advised after inspections. If an inbound advice is generated for an inbound order line that is linked to more than one cross-dock order, the goods are first advised for the cross-dock order with the highest priority.

- **Inspections (inbound)**

During inspection goods can be approved, destroyed, or rejected.

- **Approving goods**

When goods are approved they are ready to be advised.

- **Destroying and/or rejecting goods**

If goods are destroyed or rejected, and the remaining quantity is not enough for cross-docking, the **Quantity Planned to Cross-dock** of the corresponding cross-dock order line is decreased. As a result, the cross-dock order requires some additional cross-dock order lines to compensate for this. If there are multiple cross-dock order lines for an inbound order line, the **Quantity Planned to Cross-dock** of the cross-dock order line corresponding to the cross-dock order with the lowest priority will be decreased first. If the **Quantity Planned to Cross-dock** of a cross-dock order line is completely destroyed and/or rejected, the cross-dock order line is canceled or closed. If the **Cross-docked Quantity** is greater than zero, it will be closed, otherwise canceled.

- **Approvals (outbound inspections)**

When a cross-dock order corresponds to an outbound order line for which approvals/outbound inspections are defined in the outbound procedure, these inspections are carried out during the inbound inspections of the corresponding inbound order lines/cross-dock order lines. This means that for an inbound order line with corresponding cross-dock orders lines, inbound inspections will take place if inbound and/or outbound inspections are required.

- **Put Away/Confirm Storage List**

The goods are put on the advised location. If this is a staging location, the goods were cross-docked. The **Cross-docked Quantity** of the cross-dock order line will be increased. The outbound advice procedure is completely skipped when cross-docking.

- **Shipment**

After the goods are put away, shipment and shipment lines are created. From here, the goods can be shipped. The cross-dock order receives the status **Closed** when the outbound order line receives the status **Shipped**. If nothing was cross-docked, the cross-dock order will receive the status **Canceled**.

Cross-docking settings

- The settings in the Inventory Handling Parameters (whinh0100m000) session are used as defaults for the corresponding settings in the Warehouses (whwmd2500m000) session.
- In turn, the settings in the Warehouses (whwmd2500m000) session are used as defaults for the corresponding settings in the Warehouse - Item (whwmd2110s000) session.
- Because LN only considers warehouse-item-specific settings, users can easily overrule general settings as required.

Important!

To use dynamic cross-docking at warehouse-item level (Warehouse - Item (whwmd2110s000) session, **Dynamic Cross-docking** check box), you must first select the corresponding check boxes in the Inventory Handling Parameters (whinh0100m000) and Warehouses (whwmd2500m000) sessions.

Cross-dock restrictions

Use the Cross-dock Restriction Definitions (whinh6150m000) session to define cross-dock restriction definitions.

Cross-dock priorities or planning priority rules

Use the Priority Definitions (whinh6120m000) session to define either cross-dock order priority definitions or planning priority rules.

Cross-dock order priority

LN assigns a priority to the cross-dock orders for an item. This priority indicates in which order cross-dock order lines must be generated for the cross-dock orders. First, cross-dock order lines will be created for cross-dock orders that have the highest priority. Next, the cross-dock order lines for cross-dock orders with subsequent priority will be generated.

The priority of a cross-dock order is determined by the user priority and the system priority which, in turn, is based on the cross-dock order priority definition.

Note

- Cross-dock order priority definitions are maintained using the following sessions:
 - Priority Definitions (whinh6120m000)
 - Cross-dock Order Priorities (whinh6121m000)
- Instead of cross-dock order priority definitions, you can also use planning priority rules. For more information, refer to *Planning priority rules* (p. 19).

Example 1

If, in the Cross-dock Order Priorities (whinh6121m000) session, the following priorities have been defined:

Priority	Field	Field Value	Sorting
10	Planned Delivery Date/ Time	-	Ascending
20	Order Priority	-	Ascending

...and three cross-dock orders are created for outbound order lines A, B and C, the system priority will be as follows:

Outbound Order Line	Planned Delivery Date	Order Priority	System Priority
A	April 11th 2006 05:00:00 PM	80	1
B	April 12th 2006 05:00:00 PM	9999	3
C	April 12th 2006 05:00:00 PM	100	2

Example 2

If, in the Cross-dock Order Priorities (whinh6121m000) session, the following priorities have been defined:

Priority	Field	Field Value	Sorting
1	Order Origin	Sales	Not Applicable
2	Order Origin	Service	Not Applicable
3	Order Origin	SFC Production	Not Applicable

...and three cross-dock orders are created for outbound order lines A, B and C, the system priority will be as follows:

Outbound Order Line	Order Origin	System Priority
A	Sales	1
B	Sales Schedule	3
C	SFC Production	2

Note

The cross-dock order for outbound order line B receives the lowest system priority, because no priority was assigned to the **Sales Schedule** order origin in the cross-dock order priority definition.

Example 3

If user priorities are added to Example 1, the resulting cross-dock order priority will be as follows:

Outbound Order Line	Planned Delivery Date	Order Priority	System Priority	User Priority	Cross-dock Order Priority
A	April 11th 2006 05:00:00 PM	80	1	2	3
B	April 12th 2006 05:00:00 PM	9999	3	1	2
C	April 12th 2006 05:00:00 PM	100	2	1	1

Note

The user priority is always taken into account before the system priority.

Planning priority rules

If you use direct material supply (DMS), you can define *planning priority rules* for cross-docking. These rules specify conditions that can be applied to a specific situation and a specific order, and result in a priority figure when applied to a specific order. Aggregating the priority figures of all applicable priority rules results in a planning priority, which in turn is used as the system priority.

If you use planning priority rules and create a new cross-dock order or update an existing cross-dock order, LN recalculates and updates the system priorities of all other cross-dock orders for the item and warehouse combination of the new or changed cross-dock order. Canceled cross-dock orders and closed cross-dock orders are then ignored.

Note

- For cross-dock orders of type **Direct Material Supply**, you can use only planning priority rules.
- In case of **Dynamic** cross-docking, you can use either planning priority rules or cross-dock order priority definitions.

For more information, refer to *Cross-dock order priority* (p. 15).

Defining planning priority rules

To set up planning priorities, take the following steps:

1. In the Priority Definitions (whinh6120m000) session, create a priority definition code and a description.
2. On the appropriate menu, click **Planning Priority Rules**.
3. In the Planning Priority Rules (whinh6122m000) session, create planning priority rules.

Note

- The number of rules is unlimited.
- Planning priority rules work according to a penalty system. You can define penalty points by rule. If a rule applies to a specific demand, the penalty points are assigned to that demand. The lesser penalty points a demand has, the higher its priority.

- Points can be assigned by means of a priority constant and by using a priority factor. The factor is first applied to the rule. Next, the constant is added to the resulting penalty points.
- If a rule has been defined for a specific field, but the rule does not apply to the demand, no penalty points are assigned. For example, a rule has been defined specifying that a demand will receive 10 points if that demand is not a rush order. No rule has been defined for a demand that is a rush order. As a result, if the demand is a rush order, the demand receives zero points. If the demand is not a rush order, the demand receives 10 points.
- If none of the rules applies to a specific demand instance, this demand receives the maximum number of penalty points, that is, the lowest priority.

Example

The following table shows an example of how you can specify planning priority rules.

Planning Priority Definition A								
Rule	Priority Field	Order Type	Field Value	From Value	To Value	Time Unit	Priority Factor	Priority Constant
1	Not Applicable	Forecast	--	--	--	--	--	200
2	Order Priority	Sales Order	--	0	10000	--	0	10
3	Order Priority	Sales Order	--	10001	999999	--	0	20
4	Order Priority	Not Applicable	--	0	999999	--	0	30
5	Rush Order	Not Applicable	No	--	--	--	--	100
6	Back Order	Not Applicable	No	--	--	--	--	20
7	Shipping Constraint	Sales Order	Order Complete	--	--	--	--	10
8	Shipping Constraint	Not Applicable	not specified	--	--	--	--	20

9	Customer Priority	Sales Order	--	0	99	--	1	0
10	Customer Priority	Not Applicable	--	0	99	--	0	50
11	Time Remaining	Planned Production Order	--	0	5	Days	0	10
12	Time Remaining	Planned Production Order	--	6	99	Days	1	5
13	Time Remaining	Not Applicable	--	0	99	Days	1	15
14	Lateness	Planned Production Order	--	0	99	Days	- 0.1	10
15	Lateness	Not Applicable	--	0	99	Days	- 0.1	15
16	Warehouse	Not Applicable	A	--	--	--	--	0
17	Warehouse	Not Applicable	not specified	--	--	--	--	10
18	Order Quantity	Not Applicable	--	0	1000	--	- 0.01	10

Note: "--" = not available

Explanation of **Priority Field** values:

- **Not Applicable**
LN only considers the order type. You can only set a priority constant.

- **Order Priority**
Rules 2 and 3 are defined for order priorities for sales orders. Rule 4 is for other order types. You can set a priority constant and a priority factor. The default value for both fields is zero.
- **Rush Order**
To assign zero priority to rush orders, define a priority constant for non-rush orders. However, to prevent that no rule applies, and a high planning priority figure (= low priority) results, Infor recommends that you also add a rule for rush orders.
- **Back Order**
To assign zero priority to back orders, define a priority constant for non-back orders. However, to prevent that no rule applies, and a high planning priority figure (= low priority) results, Infor recommends that you also add a rule for back orders.
- **Shipping Constraint**
To assign higher priority to specific shipping constraints, define higher priority constants for other shipping constraints.
- **Customer Priority**
To restrict the figures within the ranges to meaningful numbers, define priority factors between 0 and 1.
- **Time Remaining**
Use a mix of priority constants and factors to prioritize time remaining for various order types.
- **Lateness**
Because a greater lateness should translate to a higher priority, the priority factor must, in this case, be negative.
- **Warehouse**
Specify a warehouse to assign the warehouse a higher or lower priority than other warehouses.
- **Order Quantity**
Because greater order quantities usually receive higher priority, the priority factor here must also be negative.

Validating planning priority rules

Because rules can contradict each other, LN provides an option to validate the priority definition. You must validate a priority definition before you can use it. To make changes to a validated priority definition, you must first click the **Undo Validate** on the appropriate menu in the Priority Definitions (whinh6120m000) or the Planning Priority Rules (whinh6122m000) session.

Validation checks that are blocking:

- A higher order priority figure should result in a higher priority figure.
- A rush order usually results in a lower priority figure (higher priority) than no rush order.
- A greater time remaining usually results in a higher priority figure than less time remaining.
- A greater lateness usually results in a lower priority figure than shorter lateness.
- An overlap in defined ranges. This precludes the compilation of a priority.
- A gap in defined ranges. This precludes the compilation of a priority.

Validation checks that are not blocking:

- A back order usually results in a lower priority figure (higher priority) than no back order.
- Shipping constraints usually result in lower priority figures than no shipping constraints.
- Lateness usually has a lower priority figure than time remaining.
- A greater order quantity usually results in a lower priority figure.

Using planning priority rules

You can define priority definitions on various levels:

- In the Inventory Handling Parameters (whinh0100m000) session. The priority definition you specify here is the default for every warehouse.
- In the Warehouses (whwmd2500m000) session. The priority definition you specify here becomes the default for each new item linked to that warehouse.
- In the Warehouse - Item (whwmd2510m000) session.

When prioritizing a number of demand orders, LN first uses a planning priority definition from the warehouse-item level. If no priority definition is specified on this level, LN uses the definition as specified on warehouse level. If no priority definition exists on this level either, LN uses the definition as specified in the parameters session. If no definition exists here either, no prioritizing takes place. LN calculates planning priorities whenever you run DMS planning.

When LN prioritizes demand based on priority definitions, all demand data for a specific item in the relevant warehouses is gathered, and a planning priority is calculated for each demand instance.

Example

The following DMS example assumes that all demand is in the same warehouse-item combination, and for that reason use the same planning priority definition.

First, a number of orders with relevant attributes for the priority calculation is listed. Next, this section describes the calculation for each demand instance.

Demand

Nr.	Order Type	Order Priority	Rush Order	Back Order	Shipping Constraint	Customer Priority	Time Remaining	Lateness	Warehouse	Order Quantity
1	Forecast	-	-	-	-	-	20	-	A	50
2	Sales Order	5000	Yes	-	-	10	5	-	B	50

3	Sales Order	25000	-	Yes	-	20	2	-	B	100
4	Sales Order	10000	-	0	Order Complete	10	-	2	A	200
5	Service Order	20000	-	-	-	5	1	-	B	100
6	Service Order	5000	-	-	-	20	-	4	A	50
7	Planned Production Order	10000	-	-	-	-	2	-	A	100
8	Planned Production Order	20000	-	-	-	-	-	3	C	200

Based on the planning priority definition example, the following priorities are calculated:

Order/Demand								
Rule	1	2	3	4	5	6	7	8
1	200	-	-	-	-	-	-	-
2	-	10	-	10	-	-	-	-
3	-	-	20	-	-	-	-	-
4	-	-	-	-	30	30	30	30
5	100	-	100	100	100	100	100	100
6	20	20	-	20	20	20	20	20
7	-	-	-	10	-	-	-	-

8	20	20	20	-	20	20	20	20
9	-	10*1	20*1	10*1	-	-	-	-
10	50	-	-	-	50	50	50	50
11	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-
13	20*1+15	5*1+15	2*1+15	-	1*1+15	-	-	-
14	-	-	-	-	-	-	-	-0.1*3+10
15	-	-	-	-	-	-	-	-
16	0	-	-	0	-	0	0	0
17	-	10	10	-	10	-	-	10
18	-0.01*50 +10	-0.01*50 +10	-0.01*100 +10	-0.01*200 +10	-0.01*100 +10	-0.01*50 +10	-0.01*100 +10	-0.01*200 +10
Prior- ity	464	99	196	173	255	244	239	248

Based on these outcomes, available supply is distributed in the following order:

1. Order 2 (rush order)
2. Order 4 (overdue)
3. Order 3 (back order)
4. Order 7
5. Order 6 (overdue)
6. Order 8 (overdue)
7. Order 5
8. Order 1 (forecast)

Cross-docking time window

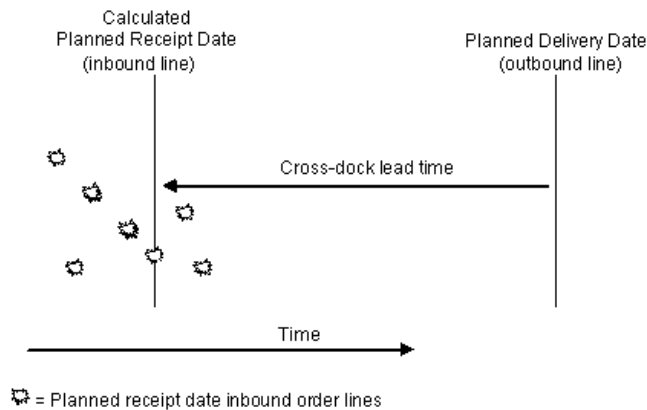
Cross-dock order lines that must be generated must be for inbound order lines that have a planned receipt date that tallies with the planned delivery date of the outbound order line, taking into account the cross-dock lead time that lies between these two dates. If the cross-dock lead-time is subtracted from the planned delivery date of the outbound order line, the result is the planned receipt date of inbound order lines that can be considered for linking to a cross-dock order.

Being expressed in seconds, an inbound order line's planned receipt date will never exactly match the planned delivery date of an outbound order line. Therefore, inbound order lines must be taken into account with a planned receipt date that is shortly before or after this calculated date. For this purpose, you can specify minimum and maximum time tolerances in the Generate Cross-dock Orders and Cross-dock Order Lines (whinh6200m000) session, which creates a *time window* for the planned receipt date. As a result, all inbound order lines that have a planned receipt date that is within this time window are taken into account for cross-dock order line creation.

If you set both the minimum and maximum time tolerances to zero, LN ignores the time window.

Example

The following figure shows lead-time calculation without a time window.

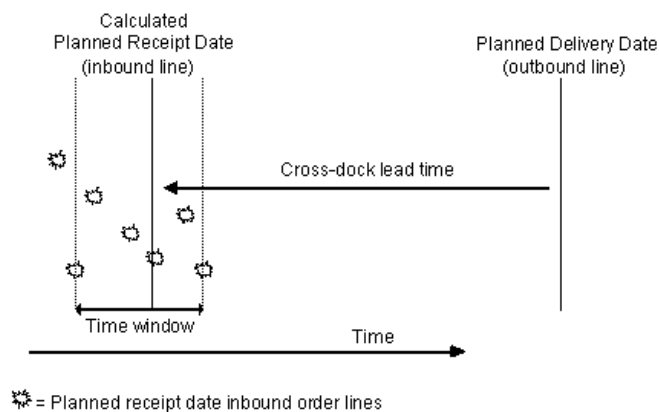


Explanation

- The cross-dock lead time is planned backward from the planned delivery date of the cross-dock order (= outbound order line) to obtain the calculated planned receipt date.
- The inbound order line that is received on this date/time (only one) is taken into account for creation of cross-dock order lines.

Example

The following figure shows lead-time calculation with a time window.



Explanation

- The vertical line to the left of the calculated planned receipt date indicates the minimum time tolerance, while the vertical line to the right of the calculated planned receipt date indicates the maximum time tolerance.

- In this case, other inbound order lines are taken into account as well for creation of cross-dock order lines. Some goods might be received before the calculated receipt date, others after the calculated receipt date:
 - Goods that will be received earlier can be cross-docked and shipped earlier, or will have to wait at the receiving or staging location to be shipped on the planned delivery date.
 - Goods that will be received after the calculated receipt date, but within the time window, will also be cross-docked for this cross-dock order. These goods are already too late for shipment, but still cross-docking is faster than in-bounding and out-bounding the goods.
- Inbound order lines with a planned receipt date that falls outside the time window will not be taken into account for this cross-dock order, but might be taken into account for another cross-dock order. This other cross-dock order is for another outbound order line that might have another planned delivery date. This results in another calculated planned receipt date and a shifted time window.

The order in which inbound order lines are linked to a cross-dock order is as follows:

1. Inbound order lines that were already received.
The time window is not taken into account.
2. Remaining inbound order lines.
These lines are linked according to their planned receipt dates. Inbound order lines with the earliest planned receipt dates will be linked first. Here, the time window is taken into account.

Note

- Your line of business determines how time tolerances are set. Best results will be achieved by trial and error.
- Time tolerances can be expressed in hours or days.

Force cross-docking range

Introduction

In the Warehouse - Item (whwmd2510m000) session, you can specify force cross-dock minimum and maximum quantities, which enable you to force cross-docking whenever a quantity is received that lies within the range specified.

Impact of force cross-docking

- If the force cross-dock minimum and maximum quantities are both set to zero, LN does not try to force cross-docking of the received quantity.
For DMS, this means that LN always first tries to supply from inventory if **DMS on Inventory** is set to **Receipt and Outbound**. If demand exceeds available inventory, LN cross-docks the received quantity to meet remaining demand.
- If you set the force cross-dock maximum quantity to the maximum and the force cross-dock minimum quantity to zero, LN always first tries to cross-dock the received goods.
For DMS, this means that first the received quantity is used to meet demand. If demand exceeds the received quantity, the remaining quantity is supplied from inventory, if **DMS on Inventory** is set to **Receipt and Outbound**.
The same applies when the force cross-dock maximum and minimum quantities are set to specific values, and the received quantity falls within this range.

Force cross-docking in a DMS environment

Depending on the force cross-dock quantities, LN first assigns either the received quantity or the on-hand quantity. The following examples assume that you specified a force cross-docking range of zero to 20.

Example 1

Item	X
Warehouse	WH1
Received Quantity	10 pcs.
Inventory on Hand	15 pcs.

The received quantity is 10 and, therefore, in the assumed range. As a result, the received quantity will be assigned first, and then the on-hand quantity. Distribution in the DMS session is as follows:

Priority	Date	Demand	WH	Short- age	Assigned Received Quantity	Assigned In- ventory
106	14-4-2005	Sales S4	2	2	2	
203	11-4-2005	Sales S1	1	10	8	2
205	13-4-2005	Sales S3	2	5		5
212	15-4-2005	Transfer T2	1	5		5
500	20-4-2005	Forecast F1	2	20		3

Example 2

Item	X
Warehouse	WH1
Received Quantity	25 pcs.
Inventory on Hand	15 pcs.

The received quantity is 25 and, therefore, outside the assumed range. As a result, the on-hand quantity will be assigned first, and then the received quantity. Distribution in the DMS session is as follows:

Priority	Date	Demand	WH	Short- age	Assigned Received Quantity	Assigned In- ventory
106	14-4-2005	Sales S4	2	2		2
203	11-4-2005	Sales S1	1	10		10
205	13-4-2005	Sales S3	2	5	2	3
212	15-4-2005	Transfer T2	1	5	5	
500	20-4-2005	Forecast F1	2	20	3	

The remaining received quantity is placed in stock.

Note

On occasion, all demand can be supplied from inventory and the entire received quantity is placed in stock.

Force cross-docking in a non-DMS environment

The force cross-docking range is closely linked to the cross-docking time fence and the setting of the **Generate Cross-dock Order Lines when Confirming Receipt** option, which is also defined in the Warehouse - Item (whwmd2510m000) session.

If you set a force cross-docking range, and the received quantity falls within this range, LN performs the following steps:

1. Tries to cross-dock the received goods as much as possible. LN looks for all demand (outbound order lines) for the received item in the warehouse where the goods are received.
LN first looks for open cross-dock orders for which cross-dock order lines can be created.
2. If goods remain to be cross-docked, LN then looks for outbound order lines that do not yet have a cross-dock order.
3. If one or more is found, LN sorts these lines according to the planning priorities or cross-dock order priorities used, and creates cross-dock orders and cross-dock order lines as required.
4. LN repeats these steps until the entire received quantity is processed or until no more demand can be found.

Note

- LN also performs the previous steps if the **Generate Cross-dock Order Lines when Confirming Receipt** check box is cleared.
- If the **Generate Cross-dock Order Lines when Confirming Receipt** check box is selected, and no force cross-docking range is set, LN still tries to create cross-dock order lines for existing cross-dock orders. However, LN will not create new cross-dock orders.
- If a time fence has been set, the restrictions imposed by the time fence must also be met.

Cross-dock restrictions

For cross-docking, you can define *restriction rules*. LN uses the set of rules included in a restriction definition to determine whether to create cross-dock orders. The rules are checked one after the other. If a valid condition is met, no cross-dock orders will be created. If no rule applies, LN permits the creation of cross-dock orders.

When trying to determine whether to create cross-dock orders, LN first uses a restriction definition from the warehouse-item level. If no restriction definition is specified on this level, LN uses the definition as specified on warehouse level. If no restriction definition exists on this level either, LN uses the definition as specified in the parameters session. If no restriction definition exists here either, this implies that no restrictions apply, and that the cross-dock order can be generated.

Note

- To maintain cross-dock restriction definitions, use the following sessions:
 - Cross-dock Restriction Definitions (whinh6150m000)
 - Cross-dock Restriction Rules (whinh6151m000)
- Cross-dock restrictions are taken into account regardless of the use of direct material supply (DMS).

Example

Cross-dock restriction definition: CDRD1

Rule	Order Origin	Order Type	Supply System	Shortage
------	--------------	------------	---------------	----------

1	Sales	SP1	Not Applicable	Not Applicable
2	Not Applicable		Order Controlled/ Single	No
3	Transfer		Not Applicable	Yes

Explanation

For the following orders, no cross-dock orders must be generated:

- Sales orders with order type SP1 and no shortage occurring.
- SFC production order with warehouse order type P01 and supply method **Order Controlled/Single**.
- Transfer order with order type T01 and a shortage occurring.

For the following orders, cross-dock orders can be generated:

- Sales order with order type SP2 and no shortage occurring.
- SFC production order with warehouse order type P01 and supply method **Order Controlled/Batch**.
- Transfer order with order type T01 and no shortage occurring.

Chapter 8

Impact of Cross-Docking Settings

8

Impact of cross-docking settings

Introduction

The impact of the cross-docking time fence, *force cross-docking range* (p. 31), and *cross-dock restrictions* (p. 35) depends on whether these settings are used in a DMS environment or a non-DMS environment.

Impact in a DMS environment

The following table summarizes the impact of cross-docking settings on receipts if you use **DMS upon Receipt**. The Result column describes what happens during a DMS run.

Setting:				Result
CR	FC	TF	RA	
N/A	N/A	N/A	Y	Cross-dock orders and cross-dock order lines cannot be generated if a cross-dock restriction is met.
N/A	Y	Y	N	Cross-dock orders and cross-dock order lines are only generated before inventory is used to supply demand, if the force cross-docking range and

				<p>the time fence are met.</p> <p>If demand remains after goods are supplied from inventory, cross-dock orders and cross-dock order lines are only generated if the time fence is met.</p>
N/A	Y	N	N	<p>Cross-dock orders and cross-dock order lines are only generated before inventory is used to supply demand, if the force cross-docking range is met.</p> <p>If demand remains after goods are supplied from inventory, cross-dock orders and cross-dock order lines are generated.</p>
N/A	N	Y	N	<p>Cross-dock orders and cross-dock order lines are only generated if the time fence is met.</p>
N/A	N	N	N	<p>In contrast with a non-DMS environment, cross-dock orders and cross-dock order lines are always generated.</p> <p>If demand remains after goods are supplied from inventory, cross-dock or-</p>

ders and cross-dock order lines are generated.

CR -	Generate Cross-dock Order Lines when Confirming Receipt (not applicable for DMS)
FC -	Force Cross-docking Range set: <ul style="list-style-type: none"> ■ Yes = Range is, for example, from 10 to 100. ■ No = Range is from zero to zero.
TF -	Cross-docking Time Fence set: <ul style="list-style-type: none"> ■ Yes = Minimum tolerance is, for example, 10 hours and maximum tolerance is 15 hours. ■ No = Minimum and maximum tolerance have value zero.
RA -	Restriction Definition set (Yes/No).

Impact in a non-DMS environment

The following table summarizes the impact of cross-docking settings on receipts of items that are *not DMS Supplied*, in combination with the **Generate Cross-dock Order Lines when Confirming Receipt** setting. The Result column describes what happens during confirm receipt (line).

Setting:				Result
CR	FC	TF	RA	
N/A	N/A	N/A	Y	Cross-dock orders and cross-dock order lines cannot be generated if a cross-dock restriction is met.
Y	Y	Y	N	Cross-dock orders are only generated if the force cross-docking range and the time fence are met. Cross-dock order lines are only generated during confirm receipt if the time fence is met.

Y	Y	N	N	Cross-dock orders are only generated if the force cross-docking range is met. Cross-dock order lines are always generated during confirm receipt.
Y	N	Y	N	No cross-dock orders are generated. Cross-dock order lines are only generated during confirm receipt if the time fence is met.
Y	N	N	N	No cross-dock orders are generated. Cross-dock order lines are always generated during confirm receipt.
N	Y	Y	N	Cross-dock orders and cross-dock order lines are only generated if the force cross-docking range and the time fence are met.
N	Y	N	N	Cross-dock orders and cross-dock order lines are only generated if the force cross-docking range is met.
N	N	Y	N	These settings are not possible.
N	N	N	N	In contrast with a DMS environment, no cross-dock orders or cross-dock order lines are generated.

CR -	Generate Cross-dock Order Lines when Confirming Receipt (Yes/No).
FC -	Force Cross-docking Range set: <ul style="list-style-type: none"> ■ Yes = Range is, for example, from 10 to 100. ■ No = Range is from zero to zero.
TF -	Cross-docking Time Fence set: <ul style="list-style-type: none"> ■ Yes = Minimum tolerance is, for example, 10 hours and maximum tolerance is 15 hours. ■ No = Minimum and maximum tolerance have value zero.
RA -	Restriction Definition set (Yes/No).

Chapter 9

Frequently Asked Questions

9

What happens if...

The following table describes what happens in various cross-docking situations.

What happens if...	Result
...the <u>inbound advice</u> is not part of the Receipt Procedure ?	The goods are immediately cross-docked after confirm receipt. <u>Cross-dock order lines</u> receive the status Staged when confirming the receipt.
...the put away or <u>storage list</u> is not part of the Receipt Procedure ?	The cross-dock order line receives the status Staged after the inbound advice is created (put away is done automatically).
...the order type does not include a Shipment Procedure (empty shipment procedure)?	The goods are automatically shipped after put away or confirm storage list. The <u>cross-dock order</u> receives the status Closed .
...the outbound order origin is SFC Production ?	<p>The outbound procedure will be skipped; the goods already leave the warehouse at the moment of put away inbound advice or confirm storage list.</p> <p>The cross-docking procedure will be even faster if the inbound procedure only involves the Receipts step. The goods will then immediately leave the warehouse when confirming the receipt line.</p>
...my warehouse is a non- <u>location</u> -controlled warehouse?	In this case, cross-docking is not meant to move the goods from a <u>receiving location</u> to a <u>staging location</u> . Instead, an inbound order line is just linked to an outbound order line by creating cross-dock orders and

cross-dock order lines. As a result, the Generate/Release Outbound Advice, Generate Picking List, and Confirm Pick List steps are skipped. This is an administrative action.

When the goods are received in the warehouse (confirm receipt), the goods are placed somewhere in the warehouse, but the cross-dock order line corresponding to the received inbound order line is cross-docked. The outbound order line corresponding to the cross-dock order is ready to be shipped. No outbound advice needs to be generated, and releasing and picking can be skipped. When the goods are shipped, the cross-dock order is closed. In short, cross-docking in a non-location-controlled warehouse comprises just two steps: Confirm Receipt (line) and Confirm Shipment (line). Additionally, inbound approvals can be done, as in location-controlled warehouses.

...my item is a non-location-controlled item?

The same applies as for a non-location-controlled warehouse.

...a released issue order is changed?

The corresponding cross-dock order will be canceled when a released issue order is changed. LN will handle the issue order as being released again, and will check the **Generate Cross-dock Order when Releasing Order to Warehousing** setting at warehouse-item level. If enabled, a new cross-dock order is created.

Note: You can only change an issue order, if no outbound advice has been generated yet, and, in case of cross-docking, if no inbound advice has been generated for the cross-dock order line(s).

...a released receipt order is changed?

When a line of type **Receipt** is changed (for example, a purchase order line), the related cross-dock order lines are canceled. No new cross-dock order lines are created.

...a back order is created?

After goods have been cross-docked and the corresponding outbound order line receives the status **Shipped**, the cross-dock order is closed or canceled. The **Requested Quantity to Cross-dock** of the cross-dock order can be:

- completely cross-docked,
- partly cross-docked,

- not cross-docked at all.

LN will not automatically create a new cross-dock order and cross-dock order lines for the back-order quantity. For a back-order, a new cross-dock order must be created manually, or, depending on the parameter settings, will be generated automatically:

- During release of the back-order to warehousing.
- During Generate Outbound Advice.

Note: A cross-dock order may also be never created again, because in the meantime goods can be taken out of the warehouse (from a bulk location or a pick location).

Troubleshooting

- *Cross-docking*
 - *I cannot enable cross-docking in the Warehouse - Item (whwmd2510m000) session. (p. 45)*
 - *I created a cross-dock order and a cross-dock order line, but received goods are still not cross-docked. Goods are in bounded instead. (p. 45)*
 - *I expected a cross-dock order to be created when releasing my order to warehousing, but this does not happen. (p. 46)*

Cross-docking

I cannot enable cross-docking in the Warehouse - Item (whwmd2510m000) session.

Make sure to select the **Dynamic Cross-docking** check boxes in the following sessions:

- Inventory Handling Parameters (whinh0100m000)
- Warehouses (whwmd2500m000)
- Items - Warehousing (whwmd4500m000)

I created a cross-dock order and a cross-dock order line, but received goods are still not cross-docked. Goods are in bounded instead.

The cross-dock order line must be approved before inbound advice. This can be done in several ways:

- Approve the order line manually in the Cross-dock Order Lines (whinh6110m000) session.
- Approve the order line using the Approve Cross-dock Order Lines (whinh6210m100) session.
- Select the **Automatically Approve Cross-dock Order Lines** check box in the Warehouse - Item (whwmd2510m000) session.

The following also applies:

- Specific outbound lot must match inbound lot, when using lots in inventory.

- Outbound and inbound effectivity unit must match.
- Specific outbound serial must match inbound serial, when using serials in inventory.
- Inbound package definition must match outbound package definition, if package definition has been defined on the outbound line.
- Is the **Unit Binding** check box selected in the Outbound Order Lines (whinh2120m000) session?

I expected a cross-dock order to be created when releasing my order to warehousing, but this does not happen.

In the Warehouse - Item (whwmd2510m000) session, check the following settings and fields:

- **Dynamic Cross-docking**
- **Generate Cross-dock Order when Releasing Order to Warehousing**
If set to **Never**, no cross-dock order will be created anyhow. If set to **When Time Phased Inventory Shortage**, there might be enough time-phased inventory, so no cross-dock order will be created.
- **Minimum Cross-dock Quantity/ Maximum Cross-dock Quantity**
If the expected cross-dock quantity lies outside these boundaries, no cross-dock order will be created. **Note:** this also applies if the maximum cross-dock quantity is zero!

If you are trying to cross-dock lots not in inventory or serials not in inventory, in the Default Order Types by Origin (whinh0120m000) session, check the following setting:

- **Create Shipment**
If set to **Never** for your order type/origin/ship from/ship to combination, no cross-dock order will be created. To enable this, select **Always** or **Cross-docking Lot/Serial**.

Appendix A

Glossary

A

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.

backorder

An unfilled customer order, or partial delivery at a later date. A demand for an item whose inventory is insufficient to satisfy demand.

bulk location

The location used mainly for large inbound quantities and/or containers and to indicate from which pick locations can be replenished.

See: [pick location](#)

cross-docking

The process by which inbound goods are immediately taken from the receipt location to the staging location for issue. For example, this process is used to fulfill an existing sales order for which no inventory is available.

LN distinguishes the following three types of cross-docking:

- **Static**
To initiate this type of cross-docking, you must generate a purchase order from a sales order in Sales.
- **Dynamic**
This type of cross-docking, available in Warehousing, can be:
 - Based on inventory shortages.
 - Defined explicitly during receipt of goods.
 - Created on an ad hoc basis.
- **Direct Material Supply**
You can use this type of cross-docking, available in Warehousing, to meet demand in a cluster of warehouses, and is based on:
 - Receipts
 - Inventory on hand

Note

You can maintain cross-dock orders that originate from Sales in the same way as cross-dock orders created in Warehousing, with the exception of the sales order/purchase order link, which you cannot change.

See: [direct material supply](#)

cross-dock lead time

The time interval, defined in hours or days, between receiving the goods on the receiving location until the moment the goods leave the warehouse from the staging location. It includes the normal waiting times on the receiving location and/or staging location, and inspection time.

Note

You can define cross-dock lead times for warehouses and/or item-warehouse combinations.

cross-dock order

An outbound order line for which the goods must be cross-docked. A cross-dock order can be fulfilled by creating cross-dock order lines for it.

See: [cross-dock order line](#)

cross-dock order line

An inbound order line for which the goods must be cross-docked. Cross-dock order lines are used to fulfill cross-dock orders.

See: [cross-dock order](#)

cross-dock order priority definition

A user-defined set of priorities assigned to one or more LN table fields. LN uses the cross-dock order priority definition to generate the cross-dock order system priority.

Note

- You can use cross-dock order priority definitions for **Dynamic** cross-docking only.
- Instead of cross-dock order priority definitions, and dependent on a parameter setting, you can apply planning priority rules to **Dynamic** cross-docking.

See: [system priority](#), [planning priority rule](#)

cross-dock restriction definition

A user-defined set of rules that LN uses to determine whether to create cross-dock orders. The rules are checked one after the other. If a valid condition is met, no cross-dock orders will be created. If no rule applies, LN permits creation of cross-dock orders. Cross-dock restriction rules are taken into account regardless of the use of direct material supply.

See: [cross-docking](#), [direct material supply](#)

direct material supply

A supply method in which (pending) receipts and available inventory on hand are used to meet high-priority demand within a user-specific cluster of warehouses. This supply method can be run either automatically, interactively, or manually, using the Direct Material Supply Distribution (whinh6130m000) session.

Abbreviation: DMS

See: [cross-docking](#), warehouse supply structure

DMS

See: *direct material supply* (p. 49)

effectivity unit

A reference number, for example a sales order line or a project deliverable line, that is used to model deviations for a unit effective item.

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.

inbound-order line

A warehousing-order line used for the inbound of goods. An inbound-order line gives detailed information about planned receipts and actual receipts.

For example:

- Item data
- Ordered quantity
- Warehouse and location of receipt

issue

The transaction type that is used to withdraw goods from inventory.

location

A distinct place in a warehouse where goods are stored.

A warehouse can be divided into locations to manage the available space, and to locate the stored goods. Storage conditions and blocks can be applied to individual locations.

outbound advice

A list generated by LN that advises you the location and lot from which goods must be picked and possibly issued, taking into account factors such as blocked locations and the outbound method.

outbound-order line

A warehouse-order line that is used to issue goods from a warehouse.

An outbound-order line gives detailed information about planned issues and actual issues, for example:

- Item data.
- Ordered quantity.
- Warehouse from where the goods are issued.

package definition

A particular configuration of items and their packaging. A package definition for an item can, for example, be the following: a pallet contains 12 boxes and each box contains 4 pieces.

See: general-level package definition, item-level package definition

picking

The process of withdrawing from inventory the components to make the products or the finished goods to be shipped to a customer.

pick location

The inventory location designated for order picking purposes. A pick location is mainly used for the outbound of small quantities and/or containers that can be replenished by bulk locations.

See: [bulk location](#)

planning priority rule

A user-defined condition that you can apply to a specific situation and a specific order, and that results in a priority figure when applied to a specific order. Aggregating the priority figures of all applicable priority rules results in a planning priority, which in turn is used as the system priority.

Note

- For cross-dock orders of type **Direct Material Supply**, you can only use planning priority rules.
- In case of **Dynamic** cross-docking, you can use either planning priority rules or cross-dock order priority definitions.

See: [cross-docking](#), [cross-dock order priority definition](#), [system priority](#)

receipt

The physical acceptance of an item into a warehouse. A receipt registers: received quantity, receipt date, packing-slip data, inspection data, and so on.

receiving location

The location in which the received goods are placed while they await the generation of an inbound advice.

See: [inbound advice](#)

staging location

A shipping dock in the warehouse where items are held just before they are placed on any means of transport for shipment.

storage list

The document that states the warehouse or locations where goods are to be stored. A storage list is used by warehouse personnel to place the received items in the right location within the warehouse.

system priority

A priority that is based on the planning priority rules or the cross-dock order priorities. LN uses the system priority along with the user priority to determine a cross-dock order's priority. LN generates cross-dock order lines and, during inbound advice, advise cross-dock order lines for cross-dock orders with the highest priority first.

Note

- If you use planning priority rules, in case of **Direct Material Supply** and, optionally, in case of **Dynamic** cross-docking, the system priority of generated cross-dock orders matches the planning priority.
- For cross-dock orders of type **Direct Material Supply**, the system priority is used as default value for the user priority.
- The user priority is taken into account before the system priority.

See: [user priority](#), [cross-dock order priority definition](#), [planning priority rule](#), [direct material supply](#)

user priority

A priority that is entered by the user. LN uses the user priority along with the system priority to determine a cross-dock order's priority. LN will generate cross-dock order lines and, during inbound advice, advise cross-dock order lines for cross-dock orders with the highest priority first.

Note

The user priority is taken into account before the system priority.

See: [system priority](#), [direct material supply](#)

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