Infor LN Freight User Guide

Important Notices

Trademark Acknowledgements

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About this document

This document introduces the Freight package and describes the setup and use freight orders, freight planning, and freight subcontracting.

Intended audience

This book is intended for those who want to learn how to use Freight and to set up this package 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 chapters of this book that deal with master data and parameter settings.

Assumed knowledge

Familiarity with the business processes involved in planning, executing, and/or subcontracting the transportation of inbound and outbound goods, and general knowledge of the LN functionality will help you understand this book. In addition, Freight training courses are available to give you a headstart.

References

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

- ***User Guide for Warehousing Procedures***
  Use this guide to understand the setup and the use of warehousing procedures.
- ***User Guide for the Inbound Goods Flow (U9788 US)***
  Use this guide to understand the setup and the processes of the inbound goods flow.
- ***User Guide for the Outbound and Shipments Goods Flows (U9794 US)***
  Use this guide to understand the setup and the processes of the outbound and shipment goods flows.

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Chapter 1
Overview

1

Freight

You can use Freight to plan or subcontract the transportation of inbound and outbound goods, which helps you select the most cost-effective way to get goods in and out of the site at the correct times.

Functionality

For this purpose, Freight offers the following functionality:

- **Freight order control**
  A freight order is, essentially, a commission to transport a particular number of goods. To plan the transportation of goods, and to subcontract the transportation of goods with or without transport planning, Freight must know which goods to transport. This information is provided by freight orders. Therefore, subcontracting and transport planning are based on freight orders. Freight creates freight orders from originating orders or users create freight orders manually in Freight. An originating order is an order from which a freight order is created, such as a purchase order or a sales order.
- **Transport planning**
  In Freight, transport planning is called load building. Load building is the process of creating load plans for a group of freight orders. A load plan is, essentially, a transport plan. A load plan provides you with information such as:
  - Details about the goods to be transported
  - Loading and unloading addresses, dates, and times
  - The carrier that is to carry out transportation
  - Transport costs
- **Subcontracting**
  Subcontracting is the process of offering freight orders to an external carrier for transportation. You can create load plans for the freight orders and offer the planned loads to a carrier, or you can offer groups of freight orders called clusters for which no load building is performed. Freight order clustering is one of the main processes within the subcontracting functionality.

- **Carrier selection**
  While performing transport planning and/or freight order clustering, LN also looks for the most cost-effective and efficient carrier services. Carriers are selected by means of various criteria, such as prices, terms of delivery, the available types of transport of the carriers (can the carrier provide the appropriate type of transportation to transport the goods listed on the freight orders?), routes, and so on.
- **Transport costing**
  During transport planning and/or freight order subcontracting, the freight costs are also calculated. Freight costs are the costs of transportation of particular consignments of goods that an organization must pay to the carrier that actually carries out the transportation. Freight cost calculation is based on factors such as the quantities of the goods, the rates of the selected carriers, the type of transportation required, and so on.
- **Transport rating**
  Freight rates are maintained in freight rate books in Common. To determine the transportation costs of, for example, a freight order line, Freight retrieves the freight rate from freight rate books defined in the Pricing module of Common. To find the correct freight rate book, LN uses freight rate matrices. A freight rate matrix is a group of attributes and values that serve as selection criteria for a rate book. If the matrix attributes match the properties of a freight order line, the rate book associated with the freight matrix is used to calculate the transport costs for the freight order line.
- **Invoicing**
  Most organizations have agreements with their customers and suppliers on how much they can charge for transportation: the full amount they had to pay to the carrier that carried out the transportation, some special rate, or no charge at all. In Freight, the amount for freight costs invoiced to the business partner is determined by the invoicing method defined for the business partner. For further information, see *Invoicing methods (p. 151)*.

Positioning of Freight Management

Freight is primarily intended for various types of companies that subcontract transportation to selected carriers, but Freight also supports companies that run their own fleet. Although this package does not focus on fleet management matters, such as fuel control, or the maintenance and costs of self-owned fleets, you can define such fleets and plan transportation for individual means of transport. Freight also supports centralized planning and subcontracting for organizations that work in a multi-site environment.

Business environment

Typically, Freight is used by an organization's traffic or logistics department, which is the department that deals with transportation for inbound and outbound goods.

Shipping office

In Freight, the traffic or logistics department is referred to as shipping office. The shipping office's activities include transportation planning and hiring carriers for inbound and/or outbound transportation.

Some companies do not hire external carriers, but instead leave all their transportation to their own forwarding service. Companies that hire external carriers may or may not plan the transportation for these carriers.

Planning groups

In the shipping office, individual planners are, usually, responsible for transportation of specific types of goods or areas that require specific handling.

In large organizations, the shipping office is often subdivided into several groups. These groups, rather than individual planners, deal with particular types of goods or areas that require specific handling. For example, one group can deal with overseas transport and another with domestic transport by road. In Freight, these groups are referred to as planning groups.

Multiple shipping offices

Very large organizations can have more than one shipping office. In these cases, each shipping office is usually responsible for the transportation of goods for particular groups of warehouses.

Multi-site environment

Various organizations, and not only the larger ones, work in a multi-site environment. This means, that transport is carried out or initiated in various sites. Such organizations require centralized planning and/or subcontracting for at least part of their transportation, which implies that the shipping office of one site performs planning and/or subcontracting on behalf of one or more other sites within the organization.

Chapter 2
Introducing freight orders

2

Freight Order Control

Freight orders provide information about goods that are to be transported, and as such provide major input to transport planning and subcontracting. The main purpose of the Freight Order Control module is to maintain freight orders, and to keep track of freight orders in the course of their life cycle, both before and after their transportation has been planned and executed, or before and after they have been subcontracted.

Each stage that a freight order goes through is indicated by means of a status. Changes to orders occur frequently, for example if a customer changes the quantity on his order. If transport planning has already been carried out for a freight order whose quantity is changed, the order may have to be replanned. Freight supports changing, deleting, and replanning of freight orders.

Freight orders are typically created automatically or manually from the following types of orders:

- Sales orders
- Planned distribution orders
- Warehouse orders
- Purchase orders

Whenever an order of any of these types is created, a freight order can be generated or manually created by the user. This depends on parameter settings.

If LN is not set to create freight orders automatically, you can create freight orders by batch in the Freight Order Control module. To create freight orders by batch, you must select a range of originating orders and start up the batch process. You can also manually create freight orders that are not related to an originating order.

Chapter 3
Creating freight orders

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To create freight orders

After the shipping office receives a sales order, purchase order, or other order that requires transportation, it creates a freight order that lists the goods on this order. The shipping office then uses the freight order to plan the transportation of the goods. In fact, transport planning is based on the freight order.

Usually, a shipping office receives numerous originating orders to be processed at the same time. Some of the items on the originating order can be put on freight orders that already exist. This is the case if the origin addresses, the destination addresses, the dates, and the times correspond.

In LN, freight orders are created automatically or batch-wise from the following types of orders:

- Sales orders
- Purchase orders
- Warehouse orders
- Planned distribution orders (from Enterprise Planning).

A freight order is generated in either of these situations:

- When an order of any of the above order types is created and saved.
- When a user specifies a batch of orders of any of the above order types to be processed and activates the batch process.

You can also manually create freight orders.

Automatic creation of freight orders

You can set automatic creation of freight orders in the following locations:

- **Sales orders**
  You can set automatic creation of freight orders from sales orders in the Sales Order Type - Activities (tdsls0560m000) session, in which you can specify that freight orders are automatically created for sales orders of a particular **Sales Order Type**.

  However, if a record for a given item and business partner combination is created in the Items - Sales Business Partner (tdisa0510m000) session, to enable automatic creation of freight

orders for this combination, you must also select the **Generate Freight Order from Sales** check box in the Items - Sales Business Partner (tdisa0510m000) session.

In addition, for individual sales order lines, the **Generate Freight Order from Sales** check box in the Sales Order Lines (tdsls4101m000) session and, if line details exist, in the Sales Order Planned Delivery Lines (tdsls4101m100) session, must be selected. This check box is selected by default if automatic generation of freight orders is specified for the sales order type.

- **Purchase orders**
  You can set automatic creation of freight orders from purchase orders in the Purchase Order Type - Activities (tdpur0560m000) session, in which you can specify that freight orders are automatically created for purchase orders of a particular **Purchase Order Type**.

  However, if a record for a given item and business partner combination is created in the Items - Purchase Business Partner (tdipu0110m000) session, to enable automatic creation of freight orders for this combination, you must also select the **Generate Freight Orders from Purchase** check box in the Items - Purchase Business Partner (tdipu0110m000) session.

  In addition, for individual purchase order lines, the **Generate Freight Orders from Purchase** check box must be selected in the Purchase Order Lines (tdpur4101m000) session, and, if line details exist, in the Purchase Order Line Details (tdpur4101m200) session. This check box is selected by default if automatic generation of freight orders is specified for the purchase order type.

  For direct delivery purchase orders generated from a service order, the setting that triggers the generation of a freight order is defaulted from the originating service order.

- **Maintenance sales orders**
  Generation of freight orders from maintenance sales orders is set in the Maintenance Sales Order - Part Lines (tsmsc1110m000) session.
- **Warehouse orders**
  Automatic creation of freight orders from warehouse orders is set in the Warehousing Order Types (whinh0110m000) session. However, if the **Generate Freight Order from Warehousing** check box is cleared on the inbound or outbound warehousing order line, no freight order is generated.
- **Enterprise planning orders**
  Automatic creation of freight orders from enterprise planning orders is set in the Planning Parameters (cprpd0100m000) session.

Batch-wise creation of freight orders

If LN is not set to automatic creation of freight orders, you can generate freight orders by batch in the following sessions:

- **Generate Freight Orders (fmfoc1234m000)**
  In this session, you can select a range of sales orders, purchase orders, or other orders and generate freight orders from these orders.

- **Generate Freight Orders (tdpur4220m000)**
  In this session, you can select a range of purchase orders and generate freight orders from these orders.
- **Generate Freight Orders (tdsls4222m000)**
  In this session, you can select a range of sales orders and generate freight orders from these orders.

Note

To enable batch-wise creation of freight orders, the **Generate Freight Orders from Purchase** check box must be selected in the originating order lines. In addition, generating freight orders must be specified as a non-automatic activity in the Sales Order Type - Activities (tdsls0560m000) session for the relevant sales order types, and in the Purchase Order Type - Activities (tdpur0560m000) session for the relevant purchase order types.

In addition, if a record for a given item and business partner combination is created in the Items - Purchase Business Partner (tdipu0110m000) session, to enable batch-wise creation of freight orders for this combination, the **Generate Freight Orders from Purchase** check box must be selected in the Items - Purchase Business Partner (tdipu0110m000) session.

Likewise, if a record for a given item and business partner combination is created in the Items - Sales Business Partner (tdisa0510m000) session, to enable batch-wise creation of freight orders for this combination, the **Generate Freight Order from Sales** check box must be selected in the Items - Sales Business Partner (tdisa0510m000) session.

For information on how to generate freight orders from batches of warehousing orders, see *Generate freight orders for warehousing orders (p. 29)* and Generating freight orders for direct delivery sales orders.

Batch-wise and automatically created freight orders

In LN, all orders include items, delivery dates and times, ship-from or ship-to names and addresses, and so on.

Essentially, a freight order that is generated in a batch or created automatically, is a copy of the relevant information (such as items, delivery dates/times, and addresses) from the originating order and some specific freight related data added by Freight.

In the Freight master data, users can define specific freight related data for items and addresses. If an originating order has items and/or addresses, for example, for which freight related data is defined, the freight related data is added to the freight order that is generated from the originating order.

Example

A user can allocate a property such as transport type: cold storage to the item deep frozen fish chunk. Whenever a freight order is generated from an originating order for deep frozen fish chunks, the transport type cold storage is added to the item on the freight order line.

However, the order lines of the originating order can be added to different freight orders. For example, if freight order FO1 is created from sales order 1, most of the order lines of sales order 1 go into FO1. However, certain order lines from sales order 1 can be added to the existing freight orders FO2 and FO3. This can happen if the origins, destinations, times, and dates overlap.

Manually created freight orders

In Freight you can manually create freight orders in the Freight Orders (fmfoc2100m000) session.

If you manually create a freight order, you can enter the relevant order heading and order line data yourself. For example:

- Names
- Addresses
- Dates
- Times
- Items
- Order/order line grouping criteria

Note

If you are primarily interested in planning data such as loading and unloading dates, routes and freight costs without updates on the progress of the goods through warehouse processing, you can use manually created freight orders to perform Freight load building on a stand-alone basis.

Loads and shipments resulting from manually created freight orders provide you with an overview of the loading and unloading dates, routes, freight costs, and so on, without updates on their progress through warehouse processing. If you require warehouse processing updates in addition to planning and freight cost data, you must base load building on freight orders that are based on originating orders.

The reason is, that to process loads and shipments, and to update Freight on the progress of load and shipment processing through the warehouse, Warehousing needs warehouse orders for the freight orders on which the loads and shipments are based, but you cannot create warehousing orders for manually created freight orders in LN.

A warehouse order is generated when the originating order of a freight order is released to Warehousing. Manually created freight orders have no originating orders, and therefore, these orders cannot be released to Warehousing. Similarly, loads and shipments based on freight orders, whose originating orders are not released to Warehousing, cannot be processed in Warehousing.

Single-shipment freight orders

Single-shipment freight orders are generated if:

- The freight order is generated from a warehousing order with a warehousing order type for which the **Single Order per Shipment** check box is selected.
- The freight order is generated from a sales order whose order type is associated with a warehousing order type for which the **Single Order per Shipment** check box is selected.

- The freight order is generated from a sales order whose order type is not associated with a warehousing order type, but the **Single Order per Shipment** check box is selected for the default warehousing order type of the sales order. You can define default warehousing order types in the Default Order Types by Origin (whinh0120m000) session.

For all other instances of freight orders being generated from originating orders, this check box is greyed out and the value is taken from the **Single Shipment Order** check box in the Freight Order Type - Defaults (fmfmd0165m000) session.

For manually created freight orders, you can select or clear the **Single Order per Shipment** check box if the freight order is not yet processed.

Note

- Freight order generation might fail due to improper master data setup. See:
  - *The use of transport means groups (p. 196)*
  - *The use of addresses in Freight Management (p. 184)*
  - *The use of transport types (p. 195)*
  - *The use of route plans (p. 186)*
  - *To define and use areas in Freight (p. 188)*
- Loads and shipments based on freight orders, whose originating orders have no warehousing orders, cannot be processed in Warehousing. This means, Warehousing cannot confirm or close such loads and shipments. However, you can use loads and shipments without warehouse processing to obtain an overview of the possible planning data and the freight costs.

Freight order types by order origin and shipping office

For each combination of order origin, shipping office and originating order type, you can specify a freight order type. The purpose is to determine the freight order type that a freight order must obtain when the freight order is created from an originating order of the origin, originating order type and shipping office that you specify in this session. Note that if you do not use shipping office matrices, the shipping offices that you select must be linked to the warehouse allocated to the originating order.

Example

A typical combination can be as follows:

- **Order origin**
  Sales
- **Shipping office**
  Europe Road
- **Sales order type**
  Standard Sales
- **Freight order type**
  Standard Road

As a result, when LN creates a freight order for a sales order that has sales order type Standard Sales, the freight order type of the freight order will be Standard Road. If freight order type Standard Road has default values, these default values are automatically added to the freight order.

Allocation of freight order types to freight orders

Freight order types are allocated to freight orders in the following ways:

- In the Freight Order Types by Order Origin (fmfmd0166m000) session, you can define freight order types for combinations of order origins, originating order types, and shipping offices. In this way, a **Freight Order Type** and the freight default values (if defined), are allocated to a freight order when the freight order is created from the specified **Order Origin** and **Origin Order Type**, and the specified **Shipping Office** is allocated to the freight order.
- In the Freight Order Control Parameters (fmfoc0100m000) session, you can enter a default **Freight Order Type**. This default **Freight Order Type** is allocated to new freight orders, but this default **Freight Order Type** is overruled by a **Freight Order Type** defined for a combination of **Order Origin**, **Shipping Office**, and **Origin Order Type**.
- In the Freight Orders (fmfoc2100m000) session, you can enter a **Freight Order Type** in the **Freight Order Type** field.

Chapter 4
Maintaining freight orders

4

Freight order maintenance

Users can maintain freight orders in the Freight Orders (fmfoc2100m000) session, and freight order lines in the Freight Order Lines (fmfoc2101m000) session.

Various default values for freight orders and freight order lines are controlled in the Freight Order Types (fmfmd0160m000) session and the Freight Order Control Parameters (fmfoc0100m000) session.

Modifying freight orders

If the freight related data in originating orders is modified, the changes are reflected in the related freight orders, freight order lines, and/or cluster lines if the status permits changes. This can result in new freight orders, or changes in the existing freight orders. For further information on freight order statuses, refer to *Freight order statuses (p. 35)*.

If a field in an order line of an originating order, such as quantity, is changed, this change is automatically copied to the corresponding freight order line.

Changes to data in the originating order that affect the freight order header, such as the planned receipt date, can lead to the following results:

- LN checks if any existing freight order header matches the change. If a matching freight order header is found, LN creates a new freight order line from the changed originating order line and adds it to the matching freight order header. The old freight order line, in which the information from the originating order line before the change was stored, is deleted. If this was the only line of the "old" freight order, the old freight order header is deleted.
- If no matching freight order header is found, LN creates a new freight order and the changed information from the originating order line is added. The old freight order where the originating order line was stored before the change, is deleted.
- If shipment lines are created for a freight order line, the shipment lines are deleted when the freight order line is changed.
- If a deleted freight order was included in a load plan, the corresponding shipments and loads are also deleted.

- For information on the impact on clusters and cluster lines, see *How freight order and originating order changes affect clusters (p. 137)*

Freight order data can only be updated before loads are processed in Warehousing. If freight orders are updated, load building must be rerun to reflect the changes. After loads receive the **In Progress** status and are ready for further processing, no changes can be made to freight orders or originating orders, but see the following note. For further information on when you can update clustered freight orders, see *To change freight order clusters (p. 129)*.

Note

If quantities of loads, shipments, and warehousing orders are changed in Warehousing, these changes are reflected in the related freight order lines.

Deleting freight orders

Freight orders are deleted if their originating orders are deleted.

You can also delete freight orders in the originating order if you clear the Generate Freight Order check box in the originating order line session, which you can do if you do not need particular freight orders for load building or clustering. For further information, see *To delete freight orders from the originating order (p. 28)*.

In Freight, freight orders can be deleted if the status is less than **In Progress** or if the status is **Closed**. In addition, a freight order header cannot be deleted until all the order lines are deleted.

To delete freight orders from the originating order

In Order Management, Enterprise Planning, and Warehousing, you can delete freight orders to make these orders unavailable for freight planning as follows:

- Delete freight orders originating from sales orders by clearing the **Generate Freight Order from Sales** check box in the Sales Order Lines (tdsls4101m000) session. You can clear this check box before the sales order is released to Warehousing.
- Delete freight orders originating from purchase orders by clearing the **Generate Freight Orders from Purchase** check box in the Purchase Order Line Details (tdpur4101m200) session. You can clear this check box before the purchase order is released to Warehousing.
- Delete freight orders originating from manually created inbound warehousing order lines by clearing the **Generate Freight Order from Warehousing** check box in the Inbound Order Lines (whinh2110m000) session.
- For manually created outbound order lines, you can clear the **Generate Freight Order from Warehousing** check box in the Outbound Order Lines (whinh2120m000) session. You can clear this check box before the warehousing order is in progress. A warehousing order is in progress if the status is higher than **Open**. For warehousing orders that are not manually created, you cannot clear the **Generate Freight Order from Warehousing** check box.

Note

In the Planned Orders (cprrp1100m000) session, if you delete a planned distribution order, freight orders with status **Expected** for the planned distribution order are also deleted. To delete a planned distribution order in the Planned Orders (cprrp1100m000) session, in the **Edit**, select Delete.

Generate freight orders for warehousing orders

In some situations, you may want to create a freight order for an originating order even if freight order creation was not specified for this order. For example, this can happen in the following cases:

- You released a sales order or a purchase order to Warehousing without selecting the Generate Freight Order check box for the originating order, while freight order creation is not specified for the **Warehousing Order Type** of the warehousing order generated for the sales order or the purchase order.
- A warehousing transfer order was generated by Project while the relevant **Warehousing Order Type** did not specify that a freight order must be created.

In these cases, you can still create freight orders in the Generate Freight Orders (fmfoc1234m000) session. In this session, you can generate freight orders for the warehousing orders related to the originating orders. For this purpose, you must select the **Warehousing** order origin and specify the relevant range of warehousing orders.

If you generate freight orders for a range of warehousing orders in this way, you overrule the setting of the **Generate Freight Order from Warehousing** check box, which is cleared, so that no freight orders are created, on the warehouse order lines. This setting is determined by the **Warehousing Order Type** of the warehousing orders. If the warehousing order types specify that freight orders be created, the problem would not have existed because freight orders would have been created when the warehouse orders are saved. If the **Warehousing Order Type** specifies that no freight orders be created, you must create freight orders by means of the Generate Freight Orders (fmfoc1234m000) session just mentioned.

This does not apply to the **Sales**, **Purchase**, or **Enterprise Planning** order origins, because you can change the selection of the **Generate Freight Order from Sales** or the **Generate Freight Orders from Purchase** check box on the originating order line before the originating order is released to Warehousing. When you release orders of these origins to Warehousing, you can generate freight orders for the warehousing orders of these orders. Enterprise Planning orders are not taken into account, because you can overrule the freight order creation setting when the Enterprise Planning order is transferred to a warehousing order.

When you start up the generation of freight orders for the warehousing orders that match the selection criteria that you specified in the Generate Freight Orders (fmfoc1234m000) session, LN takes the following steps:

1. Check whether any of the warehouse orders are in progress. A warehousing order is in progress if the status is not equal to **Open**. Warehouse orders that are in progress are skipped. A message is given on the error report that no freight order is generated for these warehouse orders because of the status.

2. If no freight order exists for any of the warehouse orders, a freight order is generated for the warehousing orders. The freight order is stored on the inbound or outbound order lines. If the origin of the warehousing orders is **Sales** or **Purchase**, the linked information of the sales or purchase orders is updated.
3. The generated freight order is printed on the success report.
4. If a freight order with the **Ignored** status exists for any of the warehousing orders, the status of the freight orders is changed back from **Ignored** to **Expected**. A message is displayed on the success report saying that the status of this freight order has been changed.

Late and early execution of transport

In Freight, you can change the earliest/latest load or unload dates for freight orders that are linked to an originating order to enable the lines of the freight orders to be planned at an earlier or later date. This functionality is useful if, for example, the items for a freight order are not available at the time the order must be shipped. By the time the item is available, the latest load date can have elapsed.

If you change the default earliest and latest loading and unloading dates and times of a manually created freight order, make sure that the earliest unloading date and time is later than the earliest loading date and time augmented with the transportation time of the goods. If the earliest and latest loading and unloading dates and times are not entered correctly, an error message appears.

You can change the earliest/latest load or unload dates for freight orders with lines that can still be planned or clustered. For clustering, this applies to freight orders that have freight order lines with the **Expected**, **Actual**, or **In Progress** status. For load building, this applies to freight orders that have lines with the **Expected**, **Planned**, or **Actual** status.

The earliest/latest load or unload dates are changed in the Freight Orders (fmfoc2100m000) session. If you change any of these dates, a message appears that warns you that the change you are making will affect all related freight order lines that can be planned, replanned, or clustered.

If you change the earliest/latest load or unload dates for freight order lines that have the **Planned** status or the **Clustered** status, these freight order lines must be planned or clustered again. For freight order lines that are planned, replanning is carried out in accordance with the setting of the **Update Actual Load Data** field in the Freight Planning Parameters (fmlbd0100m000) session. Cluster lines must be reclustered manually.

Ignore freight order lines

In some situations, freight orders must be excluded from load building.

In Freight, you can exclude freight orders from load building in by setting the freight order to **Ignored** by means of the **Set to Ignored** command on the appropriate menu of the Freight Order Lines (fmfoc2101m000) session. You can use the **Set to Ignored** command if the freight order cannot be

deleted at the originating order. For more information, refer to *To delete freight orders from the originating order (p. 28)*.

If a freight order line is set to **Ignored**, this information is passed on to the Freight Order Line Status Overview (fmfoc2601m000) session. You can access the Freight Order Line Status Overview (fmfoc2601m000) session by selecting the **Freight Details** option on the appropriate menu on the line section of the Sales Order (tdsls4100m900) session, or the **Freight Details** option of the Purchase Order Lines (tdpur4101m000) session. For originating outbound warehousing order lines, this information is displayed in the Outbound Order Lines (whinh2120m000) session. For inbound order lines, this information is displayed on the Inbound Order Lines (whinh2110m000) session.

Availability of the **Set to Ignored** command

The availability of the **Set to Ignored** command is subject to various conditions that relate to the status of the freight order lines and the relations of the freight order lines to freight order clusters, load plans, and so on.

To set freight order lines to **Ignored**, the freight order lines must meet the following conditions:

Expected freight order lines

You can set freight order lines with the **Expected** status to **Ignored**. If the freight order lines are related to a freight order cluster with a status lower than **Subcontracted**, the related freight order cluster line is deleted. If the status of the freight order cluster is **Actual**, the **Cluster Changed** check box is selected. If the cluster has cluster lines with the **Ignored** status, you must delete these cluster lines before you can set the freight order lines to **Ignored**.

Planned or **Actual** freight order lines

If **Planned** or **Actual** freight order lines are related to shipment lines with the **Ignored** status, you must delete these shipment lines before you can set the freight order lines to **Ignored**.

Freight order lines that you cannot set to **Ignored**

You cannot set freight order lines to **Ignored** if one or more of the following conditions applies:

- **Status**
  You cannot set freight order lines to **Ignored** if their status is higher than **Actual**.
- **Subcontracted cluster or load**
  You cannot set freight order lines to **Ignored** if they are included in freight order clusters whose status is **Subcontracted**. In addition, you cannot set **Actual** freight order lines to **Ignored** that are included in a load whose status is **Subcontracted**.

Remove **Ignored** freight order lines

You can remove **Ignored** freight order lines in the Remove Freight Orders (fmfoc2200m000) session, but the freight order lines must not be removed as long as the related warehousing orders are still in progress, because otherwise you cannot see that the freight order line is **Ignored**.

You can remove **Ignored** freight order lines if the following conditions apply to the **Ignored** freight order lines:

- A warehousing order is related to the **Ignored** freight order lines.
- The related outbound order lines must have the **Shipped** status.
- The related inbound order lines must have a final receipt.

Freight order date modification

The shipment of goods to customers or warehouses can be delayed due to stock shortages, transport capacity issues or problems at the receiving side. When freight orders are delayed, the planned load/unload dates and the tolerance dates are no longer applicable.

It is rare that all the lines in a freight order are delayed. Most often, some freight order lines are successfully shipped and others are delayed, due to inventory shortages. To process these freight orders or lines at a later stage, you can adjust the following:

- Loading/unloading dates
- Tolerances

When you adjust the dates (**Planned Load Date** or **Planned Unload Date**) and tolerances (**Earliest Load Date** and **Earliest Unload Date**; **Latest Load Date** and **Latest Unload Date**), the LN planning engine retrieves the affected order lines and includes the order lines in a new freight plan that is scheduled to be executed at a later date.

To maintain dates or tolerances on individual freight order lines

To view the list of delayed freight order lines, open the Freight Order Lines (fmfoc2101m000) or the Freight Order Lines (fmfoc2101m100) session. Click appropriate > **View** > **View Overdue Lines Only**.

All the delayed freight order lines with the following status are displayed:

- **Expected**
- **Planned**
- **Actual**

You can modify the planned load/unload dates and/or the tolerance dates only for order lines with the **Expected**, **Planned**, and **Actual** status.

When you modify the **Planned Load Date**, the tolerance dates are calculated automatically, based on the original tolerance agreements. To calculate the **Planned Unload Date**, click *Calculate*. The related tolerance dates are calculated automatically.

When you modify the **Planned Unload Date**, the tolerance dates are calculated automatically, based on the original tolerance agreements. To calculate the **Planned Load Date**, click *Calculate*. The related tolerance dates are calculated automatically.

Note

If the dates on a freight order line are moved to a future date and afterwards the tolerance dates on the order header are modified, the date adjustment on the order line holds and is not impacted by the tolerance change on the order header.

To maintain tolerances on individual freight orders

For a freight order, you can only modify the *Tolerance dates (**Earliest Load Date** and **Earliest Unload Date**; **Latest Load Date** and **Latest Unload Date**)* on the header. The tolerance dates of the freight order lines with the **Expected**, **Planned**, and **Actual** status are modified.

Collective change of dates or tolerances on freight orders

You can modify the planned load and unload dates and tolerance dates for a range of freight orders and order lines using the Change Planned Load/Unload Date (fmfoc2201m000) session.

The session can be started as a stand-alone session, or from the appropriate menu of the following sessions:

- Freight Order Lines (fmfoc2101m000)
- Freight Order Lines (fmfoc2101m100)
- Freight Orders (fmfoc2100m000)
- Freight Order (fmfoc2100m100)

If you change a planned loading or unloading date in the Change Planned Load/Unload Date (fmfoc2201m000) session, the other planned dates and the tolerances are automatically recalculated based on the distances defined for the addresses in Freight. For example, if you change the planned loading date, the other dates are recalculated based on the distances between the ship-rom and ship-to distances specified for the freight orders and freight order lines within the selection. The distances are defined in the Addresses - Freight Management (fmfmd0110m000) session.

Chapter 5
Freight order status

5

Freight order statuses

After a freight order is created, the freight order will go through several stages until the goods have reached their destinations and have been paid for. These stages include both inbound and outbound goods transports. LN uses freight order statuses to show the stage that a freight order or freight order line is going through.

The sources of status updates

For outbound transports, the goods listed on freight orders are picked up in your warehouse, loaded onto a truck or other means of transport, and unloaded at the customer's warehouse. For inbound transports, the goods are picked up from the supplier and brought to your warehouse, where the goods are unloaded and stored.

If loads and shipments are created from a freight order, the progress of the loads and shipments through warehouse processing is reflected in the freight order status.

Because some of the stages that a freight order goes through take place in the warehouse, various freight order statuses are generated for the originating warehousing order in Warehousing and passed on to the freight order. For more information, refer to To define warehousing procedures and To define warehousing order types.

To monitor the progress of a freight order, you can view the freight order status. The status of a freight order is displayed in the Freight Orders (fmfoc2100m000) session. Both freight order headers and freight order lines have statuses. Freight order line statuses are displayed in the Freight Order Lines (fmfoc2101m000) session.

Warehouse Management updates freight orders that are not planned or actual

Sometimes, freight orders that have not been planned, or freight orders related to load plans that are not set to **Actual** are nevertheless processed in the warehouse, provided that the originating orders of these freight orders are released to Warehousing.

If an originating order is released to Warehousing, one or more warehousing orders are generated for the originating order, and Warehousing generates loads and shipments for these warehousing orders. (Warehousing can create loads and shipments, but the planning functionality is limited.)

From these Warehousing loads and shipments, Freight creates loads and shipments, adding extra information, such as freight costs. When these loads and shipments are processed in the warehouse, the related freight orders are updated.

How LN passes on status changes to freight order lines and headers

The status of a freight order line is changed when the status of the shipment lines related to the freight order line is changed. When the statuses of all freight order lines of a freight order are changed, the status of the freight order is changed. However, the **In Progress** status is an exception to this rule. If a freight order line obtains the **In Progress** status, this status is automatically passed on to the entire freight order.

Updates without status change

The following updates to freight orders do not affect the freight order status.

Order blocking

Originating orders can be blocked. If an originating order is blocked, the corresponding freight order is blocked as well.

Quantities

If quantities of loads, shipments, and warehousing orders are changed in Warehousing, these changes are reflected in the related freight order lines.

Status overview

The freight order status determines whether you can change or delete a freight order, as described in the following freight order status overview.

Note

The process to allocate freight order statuses differs for freight orders for which load building is carried out or that are available for load building, and freight orders that are clustered or are available for freight order clustering. If relevant, these differences are discussed for each status in the following status overview. Freight orders that are available for load building cannot be used for clustering and vice versa. For more information, refer to *The load planning attribute (p. 173)* and *Subcontracting (p. 121)*.

Expected

This status is the initial status of a freight order. You can make changes to the freight order header or the freight order lines without any consequences. In addition, changes in any originating orders, such as purchase orders, sales orders, or enterprise planning orders, are implemented in the freight order.

Planned

The **Planned** status is only allocated to freight orders that you plan by means of the load building engine. When transport planning is carried out for a freight order in Freight, shipments and loads are created from the freight order. The freight order, and the loads and shipments created from the freight order obtain the **Planned** status.

You can use the load building engine to create shipments and loads, or you can create shipments and loads manually and link freight orders to them. You can carry out planning more than once for a freight order using various planning algorithms to find out which algorithm provides you with the best results, but the freight order's status remains **Planned** until one of the shipment lines linked to the order lines of the freight order obtains the **Actual** status.

If all the loads and shipments created from a freight order line that has the **Planned** status are deleted, the status of the freight order changes back to **Expected**.

Freight order headers or the freight order lines that have the **Planned** status can be changed, and changes in any originating orders will be implemented in the freight orders or freight order lines. However, such changes affect the load plans on which these freight orders are based. For more information, refer to *Replan separately or include in Planned freight orders (p. 80)* and *Load plan, load, and shipment maintenance (p. 97)*.

Actual

Freight orders that are planned by means of the load building engine can obtain the **Actual** status. Freight order clusters (cluster headers) can also obtain the **Actual** status.

- **Planned freight orders**
  The **Actual** status indicates that a load plan will be actually used to transport the goods listed on the shipment lines included in the load plan. If a load plan is made **Actual**, the loads, shipments, and shipment lines of the plan obtain the **Actual** status. The freight order lines and related freight orders on which the load plan is based also receive the **Actual** status.

  The **Update Actual Load Data** parameter in the Freight Planning Parameters (fmlbd0100m000) session enables you to specify how Freight deals with changes in freight orders that have the **Actual** status. For more information, refer to *To replan changed Actual freight orders (p. 79)*.

  To manually change an **Actual** freight order, you must cancel the **Actual** status of the load plan related to the freight order. For this purpose, use the **Undo Actualize** command on the appropriate menu of the Plans (fmlbd0110m000) session.

  If the **Actual** status of load plan is cancelled, the status of all related loads, shipments, and shipment lines changes back to the **Planned** status. In turn, the freight order lines and freight orders on which the load plan was based also receive the **Planned** status again.

- **Clustered freight orders**
  Freight order clusters do not obtain the **Actual** status from the load building engine. The **Actual** status for clusters is provided using the clustering functionality. The **Actual** status indicates that the cluster is finalized and ready to be offered to a carrier. The user decides when a cluster is ready for actualization. For more information, refer to *Cluster and cluster line status overview (p. 139)*.

In Progress

The **In Progress** status is given to freight orders, freight order lines, and cluster lines for which inbound and outbound processing in Warehousing has started. This takes place in the following cases:

- Freight orders, freight order lines and freight order cluster lines whose related warehousing order lines are being prepared for inbound or outbound transport in Warehousing.
- Freight orders and freight order lines whose related Freight loads and shipments are prepared for inbound or outbound processing in Warehousing.

If a freight order line obtains the **In Progress** status, this status is automatically passed on to the entire freight order.

Freight order lines that have the **In Progress** status cannot be changed in Freight.

Confirmed

In Warehousing, the **Confirmed** status is used to indicate that outbound goods are loaded and ready to leave the warehouse. For inbound goods transports, the **Confirmed** status is not used.

As soon as outbound shipment lines, shipments, and loads have received the **Confirmed** status in Warehousing, the **Confirmed** status is passed on to Freight.

If the **Automatically Change from 'Confirmed' to 'Shipped'** check box in the Freight Planning Parameters (fmlbd0100m000) session is cleared, this status appears in the following sessions:

- Loads (fmlbd4100m000)
- Shipments (fmlbd3100m000)
- Shipment Lines (fmlbd3150m000)

In addition, the freight order lines and freight order headers related to the loads and shipments obtain the **Confirmed** status.

If the **Automatically Change from 'Confirmed' to 'Shipped'** check box in the Freight Planning Parameters (fmlbd0100m000) session is selected, the **Confirmed** status does not appear in Freight.

The **Confirmed** status is not passed on to freight order headers or lines that are clustered, to cluster lines, or to freight order lines that are available for clustering. The reason is that if you do not perform transport planning, you are not interested in knowing whether the goods are ready to leave the warehouse. What you do want to know is whether or not the goods have left the warehouse, which is indicated by the **Shipped** status.

Shipped

The **Shipped** status is used to indicate that outbound goods have left the warehouse and are on their way to the customer, or that inbound goods have left the supplier's warehouse and are on their way to your warehouse.

The **Shipped** status is passed on from Warehousing to Freight for freight orders/order lines in the following way:

- **Load building**
  Outbound loads and shipments that have received the **Confirmed** status in Warehousing are given the **Shipped** status in Freight. This status is applied automatically if the **Automatically Change from 'Confirmed' to 'Shipped'** check box in the Freight Planning Parameters (fmlbd0100m000) session is selected. If this check box is cleared, you can convert the Warehousing **Confirmed** status to **Shipped** in the Confirm Delivery / Receipt (fmlbd3252m000) session. The **Shipped** status is passed on from the loads and shipments to the freight orders on which the loads and shipments are based.

  When inbound advance shipment notices are received in Freight, which is performed by means of EDI, for example, the related shipments and loads obtain the **Shipped** status. This status is passed on to the freight order headers and lines on which the loads and shipments are based.

- **Clustering**
  Outbound freight order headers, freight order lines, and cluster lines automatically receive the **Shipped** status if all goods of the related warehousing orders are loaded, have left the warehouse, and are set to **Shipped** in Warehousing. Inbound freight order headers, freight order lines, and cluster lines are set to **Shipped** when inbound advance shipment notices are received in Freight, for example by means of EDI. If no EDI relation is set up with the supplier, the user sets the inbound cluster lines or freight order lines to **Shipped** when the user is notified by the carrier that the goods have left the supplier's warehouse.

Completed

The **Completed** status is allocated to freight orders/lines when the goods have reached their destination. For outbound goods, this is when the goods have been delivered at the customer's. For inbound goods, this is when the goods have been received in the warehouse.

- **Load building**
  Inbound warehousing order lines, loads, and shipments obtain the **Received** status in Warehousing when they are unloaded and being processed in the warehouse. When inbound loads and shipments obtain the **Received** status in Warehousing, the freight orders and freight order lines on which these loads and shipments are based receive the **Completed** status in Freight.

  Freight orders based on outbound loads and shipments receive the **Completed** status after the loads and shipments are set to **Completed** in the Confirm Delivery / Receipt (fmlbd3252m000) session.

- **Clustering**
  Inbound freight order cluster lines, freight order headers, and freight order lines obtain the **Completed** status if the related warehousing orders are set to Final Receipt in Warehousing.

  For outbound freight order headers, freight order lines, and cluster lines you can use the Confirm Delivery / Receipt (fmlbd3252m000) session to set the status to **Completed** when the carrier informs you that the goods of the cluster are delivered at the customer's.

Closed

When the invoicing procedure is completed in the Accounts Payable module of Financials, the status changes to **Closed**.

Ignored

For more information, refer to *Ignore freight order lines (p. 30)*.

Chapter 6
To set up freight order control

6

Freight order grouping

To plan the transportation of goods listed on freight orders or to subcontract freight orders, LN subdivides the freight orders into groups that share the same properties. Such properties are, for example:

- Addresses
- Delivery dates and times
- Item properties
- Routes
- Special transport conditions (cold storage, livestock transport, and so on)

When freight orders are grouped to create loads and shipments or freight order clusters, the first step is to group freight order headers by shipping office. Then, when a number of freight orders are allocated to a shipping office, the freight order lines of these freight orders are grouped into the planning groups defined for this shipping office. The groups of linked freight order lines and planning groups are used by the load building engine to build shipments and loads, or by the clustering engine to create freight order clusters, respectively.

To group freight order headers by shipping office

Shipping offices are linked to freight orders according to the criteria of the shipping office matrices defined in the Shipping Office Matrix Definition (fmfoc1130m000) session and the Shipping Office Matrix (fmfoc1140m000) session. If none of the matrices apply, or if you do not use shipping office matrices to allocate shipping offices to freight orders, LN selects a shipping office from the Warehouses by Shipping Office (fmfmd0185m000) session. In this session, shipping offices are linked to warehouses. How this works is described in the following example.

Example

Sales order SO1 is delivered from warehouse WH1. WH1 is linked to shipping office SHO1. When freight order FO1 is generated from sales order SO1, shipping office SHO1 is linked to freight order FO1.

For information on using shipping office matrices and/or shipping offices linked to warehouses, see *To set up freight order grouping control (p. 43)*.

Note

If you manually create a freight order, you must enter a shipping office.

To group freight order lines by planning group

The groups of linked freight orders and shipping office can be quite large and varied, because they may include large quantities of different items. Therefore, the groups must be subdivided further to serve as a useful basis for transportation planning. To achieve this, the order lines of these groups are grouped by planning group.

A planning group is used to group freight order lines. A planning group is linked to a shipping office. More than one planning group can be linked to a shipping office. Planning groups are defined in the Planning Groups (fmfoc0150m000) session. In the Planning Group - Shipping Office (fmfoc1100m000) session, planning groups are linked to shipping offices.

Note

Only authorized users are enabled to use planning groups and shipping offices to build shipments and loads. Authorizations are given for combinations of shipping offices and planning groups in the Users by Shipping Office and Planning Group (fmfoc1105m000) session.

A planning group has a number of grouping criteria. These criteria refer to the data entered on freight order headers and freight order lines. Order lines that match the criteria of a planning group are subdivided into that particular planning group. If a planning group has a header criterion (such as an address or a business partner), freight order lines linked to headers that match the criterion are allocated to that planning group.

Example

Suppose the freight orders FO1 and FO2 are allocated to shipping office A. Shipping office A has the planning groups PL1 and PL2. If the freight order lines of FO1 match the criteria of PL1, they are allocated to PL1. If the freight order lines of FO2 match the criteria of PL2, they are allocated to PL2. The order lines of a freight order may not all go to the same planning group. Suppose FO1 has order lines A, B, and C. C matches the criteria of PL1, so C goes to PL1. A and B match the criteria of PL2, so they go to PL2. For further information on freight order grouping, refer to *Example of freight order grouping without shipping office matrix (p. 46)*.

Planning group criteria are defined in plan matrices. For further information on plan matrices, refer to *Plan matrices and matrix definitions (p. 45)*.

A shipping office can have a number of planning groups. Freight orders are grouped by shipping office. The freight order lines of each group of linked freight orders and shipping offices are grouped by planning group. The order lines in each planning group are used to build shipments and loads. It depends on the planning algorithm used and the quantities listed in the order lines, how many shipments and loads are built from each group of order lines by planning group.

To set up freight order grouping control

The most efficient way to set up the data that controls the way freight orders are grouped by **Shipping Office** and freight order lines are grouped by **Planning Group** is as follows:

1. Define shipping offices in the Shipping Offices (fmfmd0180m000) session.
2. Link warehouses to shipping offices in the Warehouses by Shipping Office (fmfmd0185m000) session. This step is not mandatory. For more information, refer to Group freight orders by means of shipping office matrices and/or warehouses.
3. Define planning groups in the Planning Groups (fmfoc0150m000) session.
4. Link planning groups to shipping offices in the Planning Group - Shipping Office (fmfoc1100m000) session.
5. Set login codes in the Users by Shipping Office and Planning Group (fmfoc1105m000) session.
6. Define shipping office matrix definitions in the Shipping Office Matrix Definition (fmfoc1130m000) session. This step is not mandatory. For more information, refer to Group freight orders by means of shipping office matrices and/or warehouses.
7. Define shipping office matrices in the Shipping Office Matrix (fmfoc1140m000) session. This step is not mandatory. For more information, refer to Group freight orders by means of shipping office matrices and/or warehouses.
8. Define the entities responsible for freight planning in the Internal Freight Responsibilities (tcitr2130m000) session. The shipping office linked to the responsible entities defined in this session are used in the freight order creation and freight planning process. The shipping offices are linked to the responsible entities by the shipping office matrices defined in the previous steps.
9. Define matrix definitions in the Plan Matrix Definitions (fmfoc1110m000) session.
10. Define planning group priorities by linking matrix definitions to shipping offices in the Plan Matrix Definitions by Shipping Office (fmfoc1115m000) session.
11. Define plan matrices in the Plan Matrix (fmfoc1120m000) session.

Group freight orders by means of shipping office matrices and/or warehouses

To group freight order headers by shipping office, you can perform the following setup:

- Set up freight order matrices to determine the shipping office that must be allocated to freight orders.
- Link shipping offices to warehouses
- Do both

A shipping office matrix provides more criteria to select a shipping office for freight order headers than the warehouse-by-shipping-office links defined in the Warehouses by Shipping Office (fmfmd0185m000) session. For more information, refer to *Shipping office matrices (p. 44)*.

If you use both shipping office matrices and shipping offices linked to warehouses to select shipping offices, shipping offices are first allocated by means of shipping office matrices. If the shipping office matrix searches are without results, shipping offices are allocated by means of warehouse-by-shipping office links defined in the Warehouses by Shipping Office (fmfmd0185m000) session.

Note that if you use Freight in a multicompany setup, you must define shipping office matrices and shipping office matrix definitions. For freight orders used in direct deliveries, you must also use shipping office matrices to select a shipping office. For more information, refer to *To use Freight Management for direct deliveries (p. 159)*.

Shipping office matrices

A shipping office matrix is used to link shipping offices to freight orders. If the attribute values of the shipping office matrix match the values of an originating order of a freight order, the shipping office linked to the shipping office matrix is linked to the freight order. The attributes of a shipping office matrix refer to the attributes of originating orders of freight orders. If there is no match, the shipping office linked to the warehouse of the originating order is linked to the freight order. You can link shipping offices to warehouses in the Warehouses by Shipping Office (fmfmd0185m000) session.

A shipping office matrix consists of:

- **Matrix header**
  Shipping office matrix identification code
- **Matrix Sequence**
- Attributes
- **Matrix details**
  Attribute values
- Shipping office

To define a shipping office matrix:

Step 1: Define matrix header

To define a shipping office matrix header, proceed as follows:

1. In the Shipping Office Matrix Definition (fmfoc1130m000) session, enter the shipping office matrix identification code.
2. Define the **Matrix Sequence**.
3. Save the data you just entered.
4. Double-click the row that comprises the data you just entered.
5. In the **Matrix Segments** group box of the details session that appears, select the attributes that you want to use for the current matrix. After you select an attribute in the first list, the second list becomes available, from which you can select the second attribute. You can select up to six attributes.
6. Select the **Active** check box to specify that the shipping office matrix is currently available.

7. Save the data and close the details session. You have now finished defining the shipping office matrix header.

Step 2: Define matrix details

To define shipping office matrix details, you must link a shipping office and define matrix attribute values for the attributes that you selected in step 5 of the previous procedure. To link a shipping office to the matrix and define the matrix attribute values, proceed as follows:

1. In the Shipping Office Matrix (fmfoc1140m000) session, click 🗋.
2. In the **Shipping Office Matrix** field, zoom to the Shipping Office Matrix Definition (fmfoc1130m000) session and select the shipping office matrix header you just defined.
3. In the **Shipping Office** field, zoom to the Shipping Offices (fmfmd0180m000) session to select the shipping office that you want to link to the shipping office matrix.
4. Define the required values for the matrix attribute fields. You can only define values for the available matrix attribute fields. In the Shipping Office Matrix Definition (fmfoc1130m000) session, you specified the attributes that must be used for the current matrix. See list item 5 of the previous step.

Note

Ensure that you carry out the procedure to define a shipping office matrix in the above order. If you do not define the matrix header details in the Shipping Office Matrix Definition (fmfoc1130m000) session first, the values of the matrix segments remain **Not Applicable**.

Plan matrices and matrix definitions

When a freight order is allocated to a shipping office, the order lines of the freight order are allocated to the planning groups of the shipping office. To determine the planning group for a freight order line, plan matrices are used.

Plan matrix

A plan matrix consists, essentially, of a planning group and a group of attributes and attribute values that serve as selection criteria for planning groups. The attributes are defined in an entity called **Plan Matrix Definition**. To add matrix attributes to a plan matrix, you must select the relevant matrix definition for the plan matrix.

When a freight order line matches the matrix attributes and values of a plan matrix, the freight order line is allocated to the planning group of the plan matrix.

Plan matrices are defined in the Plan Matrix (fmfoc1120m000) session. To define a plan matrix, proceed as follows:

1. Define a matrix definition that includes the relevant attributes

2. Select the matrix definition
3. Select a planning group
4. Enter values for the attributes of the selected matrix definition

Matrix definitions

The attributes that serve as selection criteria for planning groups are defined in matrix definitions. Matrix definitions are defined in the Plan Matrix Definitions (fmfoc1110m000) session.

To define a matrix definition, you can select up to six attributes. These attributes can be business partner information, carriers, or Freight master data, such as transport types, service levels, and so on.

In the matrix definition, you cannot enter values for the attributes. Matrix attribute values are entered in the Plan Matrix (fmfoc1120m000) session. In the Plan Matrix (fmfoc1120m000) session, you select a matrix definition and enter a value for each attribute of the selected matrix definition. For further information, see *Example of freight order grouping without shipping office matrix (p. 46)*.

Planning group priorities

If a freight order line matches the criteria of more than one planning group, the freight order line goes to the planning group with the highest priority. Planning group priorities are set in the Plan Matrix Definitions by Shipping Office (fmfoc1115m000) session. In the Plan Matrix Definitions by Shipping Office (fmfoc1115m000) session, you can set priorities of the matrix definitions used in the plan matrices for the planning groups of a shipping office.

Default planning group

In the Planning Group - Shipping Office (fmfoc1100m000) session, you can define a **Default Planning Group**. If a freight order line matches none of the plan matrices of the planning groups defined for a shipping office, the default planning group is allocated to the freight order line.

Example

If matrix definition A has priority 1 and matrix definition A is used in plan matrix X for planning group Y, planning group Y has priority 1.

Example of freight order grouping without shipping office matrix

Shipping office New York 1 handles transport planning for all goods issued and received by Warehouse New York 1. For transport planning to run smoothly, freight orders are automatically created from sales orders, and if a sales order lists goods that are issued by Warehouse New York 1, the freight order generated from the sales order is automatically allocated to Shipping office New York 1.

Shipping office New York 1 operates two planning groups: Planning group HMAT and planning group RMAT. Planning group HMAT has two planners, who plan transportation for hazardous materials. Planning group RMAT has five planners, who deal with regular, non-specialist goods transports.

If a freight order lists hazardous materials, transportation is handled by planning group HMAT, and if the goods are non-hazardous, planning is handled by planning group RMAT. If an order lists both hazardous and non-hazardous goods, the hazardous goods are planned by planning group HMAT and the non-hazardous goods by planning group RMAT.

In LN, this organizational structure can be supported in various ways. The following data setup is one way in which you can support such structures:

1. In the Shipping Offices (fmfmd0180m000) session, define Shipping Office New York 1.
   a. In the Items - Sales (tdisa0501m000) session, link items that are stored in Warehouse New York 1 to Warehouse New York 1.
2. In the Warehouses by Shipping Office (fmfmd0185m000) session, link Warehouse New York 1 to Shipping Office New York 1.
3. In the Transport Means Groups (fmfmd0150m000) session, define the transport means groups HMAT and RMAT. Transport means group HMAT must include special safety trucks for the transportation of hazardous materials, and RMAT must include regular, non-conditioned accommodation for regular goods transports. Note that instead of transport means groups, you can also use transport types to accomplish this setup. It depends on how you categorize means of transport into transport means groups and transport types. For further information, see *The use of transport means groups (p. 196)* and *The use of transport types (p. 195)*.
4. In the Items - Freight Management (fmfmd1100m000) session, link transport means group HMAT to items that are classified as hazardous materials, and link transport means group RMAT to regular items without any special classification.
5. In the Planning Groups (fmfoc0150m000) session, define the planning groups HMAT and RMAT.
6. In the Planning Group - Shipping Office (fmfoc1100m000) session, link planning group HMAT and planning group RMAT to Shipping Office New York 1.
7. In the Plan Matrix Definitions (fmfoc1110m000) session, define the following matrix definitions: HMAT and RMAT, and select matrix attribute Transport Means Group for both matrix definitions.
8. In the Plan Matrix Definitions by Shipping Office (fmfoc1115m000) session, link both matrix definitions to Shipping Office New York 1. The priority sequence numbers that you set for these matrix definitions are of no consequence, because no freight order lines will match both attributes, as is made clear in the next point.
9. In the Plan Matrix (fmfoc1120m000) session, define the following two plan matrices:
   a. Plan matrix 1: Select matrix definition HMAT and planning group HMAT, and select transport means group HMAT.
   b. Plan matrix 2: Select matrix definition RMAT and planning group RMAT, and select transport means group RMAT.

Chapter 7
Load building

7

Introducing load building

Load building is the core functionality of Freight. The primary purpose of load building is to plan the transportation of goods from your warehouse to the customer, from your supplier to your warehouse, or from a supplier directly to your customer, in the most efficient and cost-effective manner. Alternatively, you can employ this functionality for goods movements between your warehouses, or from warehouse to production environment and vice versa.

Freight orders

Load building is based on freight orders. To plan the transportation of a particular number of goods, you must select the freight orders and freight order lines on which these goods are listed and start up the load building engine. The result is a load plan for the selected freight orders and freight order lines that consists of a number of loads and shipments.

Planning methods and planning options

The load building engine offers various planning options and three basic *Planning methods (p. 56)*.

You can create various load plans from the same freight orders, each time using a different planning method and/or different planning options, to see which method or options provide the best result.

Setup

To optimize planning results, set up your master data along the following lines:

1. Make sure carriers are entered for freight orders during freight order creation (both manually and automatically).
2. Define appropriate master data, such as addresses, transport means groups, route plans, and so on.
3. Define carriers and transport means groups with specified transport categories.
4. Define carriers and transport categories for standard routes and route plans.

In this way, you prevent the load building engine from selecting undesirable carrier or transport means group combinations, such as transport by ship where you need trucks.

Create required capacity overviews

Before you start load building, you can generate required loading capacity overviews for a given period of time. Required capacity overviews are based on the aggregated volumes and weights listed on freight orders existing in LN over a time span specified by the user. Required capacity overviews can help you, for example, to anticipate sudden rises in required loading capacity.

To generate general capacity overviews, open the Generate Rough Planning (fmrpg1200m000) session.

Plan Board

In addition to the Generate Plan (fmlbd0280m000) session, you can use the Plan Board (fmlbd0215m000) session to create load plans. The Plan Board (fmlbd0215m000) session provides an intuitive graphical interface that you can use to create and maintain load plans.

You can access the Plan Board (fmlbd0215m000) session from the appropriate menu of these sessions:

- Plans (fmlbd0110m000)
- Loads (fmlbd4100m000)
- Freight Orders (fmfoc2100m000)
- Freight Order Lines (fmfoc2101m000)
- Freight Order Lines to Be Replanned (fmlbd0120m000)

For more information, refer to *To create load plans using the Plan Board (fmlbd0215m000) (p. 74)*

Load Plan Gantt Chart

The Load Plan Gantt Chart (fmlbd0710m000) session is used to generate a timeline overview of selected loads and shipments as well as a resource capacity overview.

Hand over the load plan to Warehouse Management

After you create a load plan, the load plan must be carried out. This means that the goods must be collected in the warehouse and loaded onto a truck or other vehicle on the date and time specified in the load plan, or, in case of incoming goods, receipt procedures must be started up.

The normal procedure to carry out a load plan is to pass on the load plan to Warehousing. To pass on a load plan to Warehousing, you must make the load plan actual. The load plan then obtains the **Actual** status. For further information on load and shipment handling in Warehousing, see Shipments and loads.

Important!

In direct delivery scenarios, however, warehouses and Warehousing are not involved. For further information, see *To use Freight Management for direct deliveries (p. 159)*.

Planning data and warehouse updates

If you are primarily interested in planning data such as loading and unloading dates, routes, and freight costs, you can use manually created freight orders to perform Freight load building on a stand-alone basis.

If you require warehouse processing updates in addition to planning and freight cost data, to create load plans, you must use freight orders that are based on originating orders.

The reason is, that Warehousing needs warehousing orders to process the loads and shipments and to update Freight on the progress, but in LN, you cannot create warehousing orders for manually created freight orders.

A warehouse order is generated when the originating order of a freight order is released to Warehousing. Manually created freight orders have no originating orders, and therefore, these orders cannot be released to Warehousing.

Similarly, loads and shipments based on freight orders, whose originating orders are not released to Warehousing, cannot be processed in Warehousing.

Load plan, load, and shipment statuses

In Warehousing, the progress of load plan processing is expressed in various statuses. This process-progress information is passed on from Warehousing to Freight. Freight, in turn, checks this information and displays its own statuses to express the various stages of completion of loads, shipments, and freight orders. For more information, refer to *Load plan, load, and shipment statuses (p. 100)* and *Freight order statuses (p. 35)*.

Note

For direct deliveries, warehouses and Warehousing are not involved. Freight orders based on direct delivery sales orders and purchase orders are only updated from Order Management. For direct deliveries, the full freight planning functionality is available. For more information, refer to *To use Freight Management for direct deliveries (p. 159)*.

Shipment building in Freight

The following shipment building criteria are present in Freight:

- **Unique Shipment Reference per Shipment**
- **Single Shipment Reference per Shipment**
- **Single Delivery Point per Shipment**
- **Single Order per Load**
- **Single Ship-To Code per Load**
- **Delivery Point**
- **Single Customer Order per Shipment**

Note

If the **Ship-from Type** is not a **Warehouse**, the delivery point and shipment reference are not available as shipment building criteria.

To create freight orders

When LN creates freight order, the shipment/load building parameters are retrieved from the Warehousing Order Types (whinh0110m000) session. The freight orders determine the load/shipment building criteria. The shipment/load building parameters are retrieved from the freight order line and used for selecting or creating shipments for the freight order line.

When freight orders originate from packages other than Sales Control or Service, the warehousing order contains the link to the freight order. Therefore, a warehousing order is always present. When the freight order originated from Sales Control or Service, the freight order may have been planned before a warehousing order is created. In this case, LN determines the warehousing order type, and the freight order takes the shipment building criteria from this warehousing order type.

The impact on the load building process

LN plans the loads based on shipment building parameters specified in the Warehousing Order Types (whinh0110m000) session, and the same are passed to the freight order line. The shipment and load building parameters are retrieved from the freight order line and used for selecting or creating shipments for the freight order line. The first step is to find an existing shipment that can be used to ship the goods. When an existing shipment is not found, new shipments or loads are created.

Chapter 8
Creating load plans

8

To create load plans

Load building is the core functionality of Freight. The load building engine is used to create load plans. For further general information on the load building functionality, see *Introducing load building (p. 49)*.

To create load a load plan, take the following steps:

Step 1: Start the Generate Plan (fmlbd0280m000) session

You can start the Generate Plan (fmlbd0280m000) session from the following locations:

- The Freight Planning menu, which you can select from the Freight menu in the Web Browser.
- The **Generate Plan** option on the appropriate menu menu of these sessions:
  - Plan Board (fmlbd0215m000)
  - Freight Orders (fmfoc2100m000)
  - Freight Order Lines (fmfoc2101m000)
  - Plans (fmlbd0110m000)
  - Freight Order Lines to Be Replanned (fmlbd0120m000)

For the latter sessions, the **Generate Plan** option is only available for freight orders whose status is lower than **In Progress**.

You must perform all of the following steps in the Generate Plan (fmlbd0280m000) session.

Step 2: Add to existing plan?

Select the **Add to Existing Plan** check box if the freight orders for which you want to create loads and shipments must be added to an existing load plan. In the **Plan** field, select or enter the load plan to which the new loads and shipments that you are going to create must be added.

Step 3: Select planning method

Select the **Planning Algorithm** that you want to use to create your load plan. For further information, see *Planning methods (p. 56)*.

Step 4: Select freight orders and freight order lines on which to base your load plan

To select the freight orders and freight order lines for which you want to create the load plan, proceed as follows:

1. Select the **Shipping Office** of the freight orders on which you want to base your load plan. The freight orders of a load plan must belong to the same **Shipping Office**. To perform load building, the user must be authorized to use the selected shipping office.
2. Select the **Planning Group** of the freight order lines on which you want to base your load plan. To perform load building, the user must be authorized to use the selected planning group. As described in *Freight order grouping (p. 41)*, a shipping office can have more than one planning group. The freight order lines of the freight orders that are allocated to the shipping office can be allocated to any of the planning groups of the shipping office. Your load plan will only be based on freight order lines that are allocated to the planning group that you select in the Generate Plan (fmlbd0280m000) session.
3. Select the range of freight orders on which you want to base your load plan. You can select from the freight orders that belong to the selected shipping office. By default, the range of freight orders is set to all freight orders. This means, that LN selects all freight orders of the selected shipping office and planning group to create the load plan.
4. Select **Freight Order** lines. If you selected one freight order in the previous step, you can specify the freight order lines of the freight order that you want to plan. By default, the range of freight order lines is set to all freight order lines.

   Note
   You can perform load building for freight order lines if the freight order lines meet the following criteria:
   - The **Load Planning** check box is selected for the freight order lines or for the entities that are linked to the freight order lines, such as transport types, transport means groups, and so on.
   - The freight order lines are not blocked.
   - The freight order line status is **Expected**, **Planned**, or **Actual**.
   - The latest load date of the freight order lines is later than the LN system date.
   - The loading and unloading addresses are available according to their calendar in the period defined by the loading and unloading time windows.
5. Optionally, select a range of route plans or standard routes to create a load plan for the freight order lines to which the selected route plans or standard routes are assigned.

   In the Assign Standard Route / Route Plan to Freight Order Lines (fmfoc2280m000) session, you can assign route plans or standard routes to freight order lines.

   Creating load plans for specific route plans or standard routes saves time, because these load plans only include the freight order lines to which the specified route plans or standard routes are assigned. Planning based on limited data volume saves system performance and makes the planning engine go faster.
6. Select the **Status** range of the freight orders on which to base the load plan. Freight orders with statuses within the selected range are included in the load plan. You can select the

Expected, **Planned**, and **Actual** statuses. By default, the range of **Status** in these fields is from **Expected** to **Actual**.

7. Select **Planned Load Date** and **Planned Unload Date**. Freight orders with load dates and unload dates within the selected range are included in the load plan. By default, the planned load date and planned unload date ranges are set to all dates in these fields.

Step 5: Select planning options

The following planning options are available:

- **Replanning of Freight Orders**
  For further information, see *To replan changed Actual freight orders (p. 79)* and *Replan separately or include in Planned freight orders (p. 80)*.
- **Shipment Planned Dates Based On**
  For further information, see *To use the planned date determiner options (p. 58)*.
- **Carrier/LSP Selection Criterion**
  This field enables you to specify whether the load building engine must search for the fastest, the cheapest, or the shortest option for transporting the goods listed in the loads and shipments of the load plan. Shortest means that the carrier that travels the shortest distance to deliver the goods to the unloading addresses will be selected. For further information, see **Carrier/LSP Selection Criterion**.
- **FM Leading Load Plan**
  If you select this option, changes made by Warehousing to loads and shipments created by Freight are checked by Freight. For example, if Warehousing wants to move a shipment created by Freight to another load, Freight performs a check on several data of the load and the shipment, such as the loading capacity of the transport means group of the load, whether the transport type of the load and the shipment match, and so on.
- **Allow Means of Transport in Multiple Plans**
  For further information, see *Means of transport selection (p. 81)*.
- **Calculate Additional Costs**
  If you select this option, additional costs are calculated if additional costs apply to any of the freight orders of the selected freight order range. For further information, see *To allocate additional costs (p. 117)*.
- **Detailed Planning Log**
  If you select this option, additional information about the load plan is generated while the load plan is created. This information includes details of the steps taken by the load building engine to create the plan, and any errors that took place during this process. The planning log messages are grouped by combined freight order.
- **Reports**
  If you select this option, a standard report on the load plan is generated.

Step 6: Start the load building process

After you select freight orders and additional options, click **Generate** to start the load building process.

Planning methods

Load Building uses the following planning methods, or planning algorithms:

Direct Shipping

A shipment is transported directly from the start address to the end address. A load has only one shipment. If the available means of transport cannot carry the entire shipment, the shipment is divided over various vehicles. Order lines can be combined in a shipment if the addresses and the dates match. Each shipment created from the selected freight orders and freight order lines is put in a separate load.

The **Direct Shipping** algorithm can be useful if huge quantities of a particular item are specified in one order line.

Consolidation

This method combines shipments that travel a particular standard route or partially travel this route, into one load. If the shipments cannot be carried in one load, the load building engine creates the required number of loads. If no standard route is specified on the freight order lines for which the load plan is created, the load building engine looks for a standard route that covers the addresses of the freight orders for which the load plan is created. If more than one suitable standard route is found, the load building selects the standard route and carrier with the cheapest, fastest or shortest route according to the **Carrier/LSP Selection Criterion** set in the Generate Plan (fmlbd0280m000) session.

Example

One truck travels from Amsterdam to Geneva via Paris. The standard route includes the following cities: Amsterdam - Paris - Geneva. The execution frequency of the standard route is once a day, every day of the week.

Freight orders FO001 and FO002 require transportation along the standard route. The goods listed on FO001 go from Amsterdam to Paris, and those on FO002 from Paris to Geneva. The load date of FO001 and FO002 is September 10, 2003, and their latest unload date is September 12, 2003, 9:00 AM. FO001 and FO002 can be consolidated to create the following:

- Shipments: Amsterdam-Paris and Paris-Geneva.
- Load: Amsterdam-Geneva.

If no standard route exists for the addresses of the freight orders from which you create a load plan using the consolidation planning method, the order lines are planned as direct shipments. Standard routes are not mandatory, but if you define standard routes and use the consolidation planning method, you can create loads and shipments, as shown in the previous example.

Pooling

Multiple fixed addresses, such as distribution centers, ports, and so on, are visited. The transport route usually consists of several legs. At one of the legs, shipments travel the same way and are pooled

together to go to their destination or to a distribution point. At the distribution point, the shipments are reallocated to various means of transport to be taken to their final destination.

Example

A shipment of 50 bicycles is sent from Amsterdam to New York, another shipment of 50 goes from Amsterdam to Philadelphia, and a third shipment of 20 bicycles goes from Amsterdam to Pittsburgh. The first leg of the transport route is from Amsterdam to Rotterdam. Rotterdam is the pooling point, where the bicycles are loaded aboard a ship. At the distribution point in New York, they are unloaded from the ship and reloaded onto trucks that take them to their respective final destinations in New York, Philadelphia, and Pittsburgh.

Route plans

The pooling method uses route plans to create loads and shipments. If the pooling planning method is used, and no route plan is specified on the freight orders for which the load plan is created, the load building engine looks for a route plan that covers the addresses of the freight orders for which the load plan is created. If more than one suitable route plan is found, the load building selects the route plan with the cheapest, fastest or shortest route according to the **Carrier/LSP Selection Criterion** set in the Generate Plan (fmlbd0280m000) session.

Shipments that have route plans whose main legs are identical, are pooled at the main leg. Route plans are linked to addresses. Addresses are defined in the Addresses (tccom4530m000) session. In the previous example, the leg Amsterdam-Rotterdam is the advance leg and Rotterdam-New York is the main leg. New York - Philadelphia and New York - Pittsburgh are the beyond legs. For the beyond legs, the shipments can be combined in separate loads as direct shipments, as in the previous example.

When the addresses of an originating order are covered by a route plan, the route plan will be added to the freight order header and defaulted to the freight order lines. Freight orders with identical route plans are combined into shipments and loads.

Standard routes for route plan legs

Standard routes can be defined for route plan legs if the addresses of the legs are included in the standard route. If New York - Philadelphia - Pittsburgh would be a standard route, the shipments would not necessarily have to be reallocated to separate loads in separate trucks, but the shipments could be loaded as one load into one large truck that travels the standard route.

Note

For the best planning results, you are recommended to enter carriers for freight orders, and/or define carrier and transport means group combinations with specified transport categories, and define carriers and transport categories for standard routes and route plans. In this way, you prevent the load building engine from selecting undesirable carrier and transport means group combinations, such as transport by ship where you need trucks.

To use the planned date determiner options

The loading and unloading dates and times calculated for shipments are based on the planned load/unload dates and the loading and unloading time windows of the freight orders on which the load plan is based. The planned dates and the time windows of the freight orders, in turn, are created manually or are derived from the planned dates of the originating orders.

When load building is carried out, stops are created from the addresses of the freight orders on which the load plan is based.

If the time windows of the freight order are large, which signifies a surplus of time between the earliest and the latest load or unload date, the planned dates calculated for the shipments can differ considerably from the planned dates of the originating orders.

To prevent the load building engine from calculating undesirable planned shipment dates, the following planned date determining options are available to control the way planned loading and unloading dates are calculated for shipments. You can access these options in the Generate Plan (fmlbd0280m000) session:

- **Earliest of Possible Dates**
  The planned dates of the shipment are equal to the earliest possible loading and unloading dates defined in the stop. Use this option if you want the shipment to be delivered or received as soon as possible.
- **Latest of Possible Dates**
  The planned dates of the shipment are equal to the latest possible loading and unloading dates defined in the stop. Use this option if you want to postpone delivery or receipt of the shipment as long as possible, for example, to enable the use of transport capacity for rush orders.
- **Minimum of Planned Unload Dates**
  The calculation of the planned dates of the shipment is based on the earliest planned unload dates of the original orders. Load dates are calculated by subtracting the travelling times from the unload dates. If you use this option, all shipments are delivered or received on or before the planned unload date of the originating orders. If, however, large load date tolerances are used, the shipments might not be delivered or received at the earliest possible date.
- **Average of Planned Unload Dates**
  The calculation of the planned dates of the shipment is based on the average date of the planned unload dates of the original orders. All order lines are equally taken into account at all stops to determine the average date. As a result, some of the shipments are delivered somewhat later than the planned unload dates of the originating orders.

Note

- If the **Minimum of Planned Unload Dates** or the **Average of Planned Unload Dates** are outside the time windows of the freight orders, the nearest time window border is taken as the minimum or average date. The planned dates for shipments must be within the time windows. The following example shows a situation in which a **Minimum of Planned Unload Dates** is outside the time windows of one of the freight orders in a shipment.

- If a load plan is replanned or when new order lines are added to a load plan, the same planned date determining option is used as the one used for the original plan. When planning is initiated from an external source, such as the graphical plan board, you can use the **Average of Planned Unload Dates** option to calculate the planned shipment dates.

Example

Shipment A includes freight orders 1 and 2. The unloading time window for freight order 1 is October 4, 2005, 09:00 - 12:00 and the planned unload date is October 4, 2005, 10:00. For freight order 2, the unloading time window is October 4, 2005, 11:00 - 13:00 and the planned unload date is October 4, 2005, 12:30. The planned unloading date/time 10:00 is outside time window of freight order 2. Therefore, the nearest time window border, which is 11:00, is taken as the minimum planned unload date.

Examples of the use of the planned date determiner options

The following data are used to show in greater detail how each of the planned date determiner options work:

Order line	From-address	To-address	Planned load date	Planned unload date
1	A	C	08:30	17:10
2	A	B	08:45	12:05
3	B	C	12:40	17:35

Stops are created during load building. The creation of stops is an intermediate stage of the load building process. The creation of shipments is based on stop data.

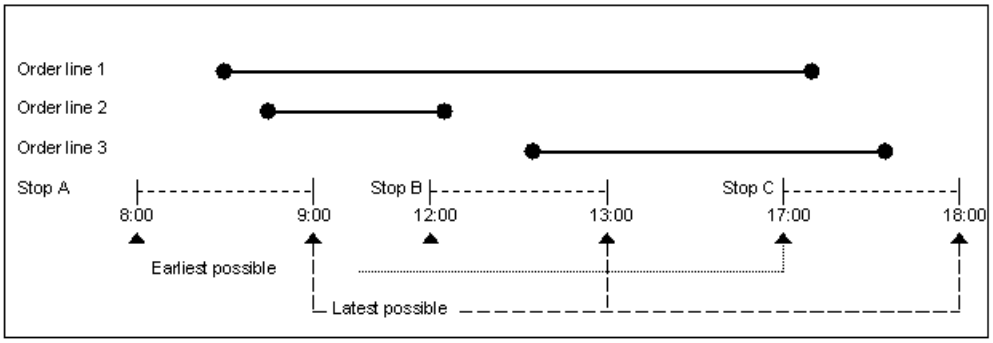
Stop at address	Minimum load date	Maximum load date	Travel time to stop
A	08:00	09:00	-
B	12:00	13:00	04:00
C	17:00	18:00	05:00

The minimum and maximum load dates of the stops (time windows) are derived from the earliest and latest load dates of all the order lines in the stop. The calendars of the carrier and the addresses are also taken into account.

In this example, the loading, unloading, and waiting times are included in the travel times.

Earliest and latest possible date

The earliest possible dates and latest possible dates are equal to the time window borders. The time window borders are the minimum and maximum load and unload dates of the stops. No further date calculation is required.



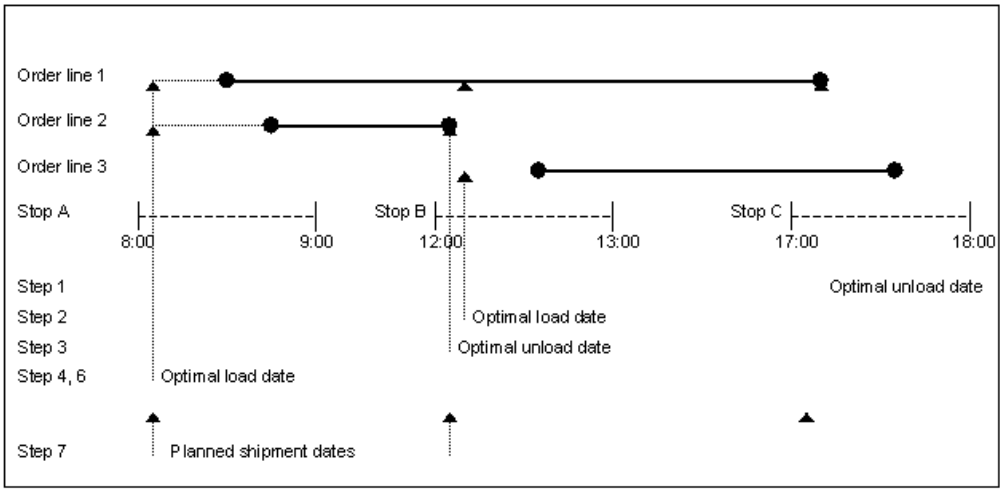
If you select the **Earliest of Possible Dates** option, planned shipment dates are equal to the minimum load and unload dates of a stop.

If you select the **Latest of Possible Dates** option, the planned shipment dates are equal to the maximum load and unload dates of a stop.

Minimum of planned unload dates

To determine the minimum of planned unload dates, the planned unload dates of all order lines in the route are taken into account. Freight takes the following steps to determine the minimum of planned unload dates:

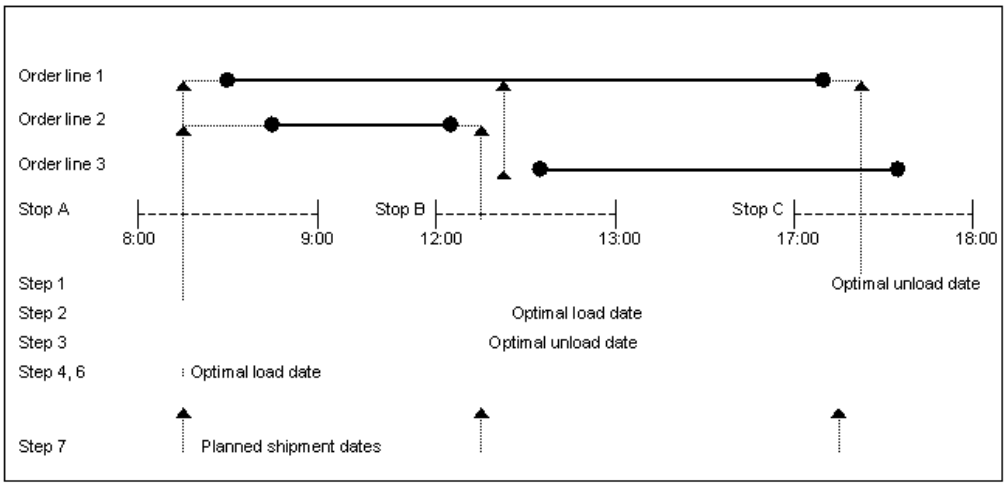
1. Determine the minimum of the planned unload dates of the order lines of the last unload stop. This will be the optimal unload date for this stop. In this example, the last unload stop is stop C. If the optimal date is not inside the time window, the optimal date is equal to the nearest window border. The optimal unload date at stop C is the minimum of 17:10 and 17:35 = 17:10.
2. Calculate back the optimal load date for the preceding stop. In this example, the preceding stop is stop B. Note that an actual load stop is not present if no goods are loaded at that stop. The optimal load date at stop B is 17:10 – 5:00 travel time = 12:10.
3. Calculate the next minimum of planned unload dates of the order lines in the stop. Now, the optimal load dates of order lines that must be loaded (or that are already loaded) are included in the calculation to determine the minimum of planned unload dates. In this stop, order line B's planned unload date is 12:05. The optimal unload date at stop B is the minimum of 12:10 and 12:05 = 12:05.
4. Calculate back the optimal load date for the preceding stop. The optimal load date at stop A is 12:05 – 4:00 travel time = 08:05.
5. Repeat Steps 3 and 4 until the first stop is reached.
6. At the first stop, the optimal load date is the planned load date for the shipment. The planned load date of the shipment is the optimal date = 08:05.
7. Starting from the first planned load date, calculate the optimal dates for all stops. These dates will be the planned load and unload dates for the shipments. The remaining shipment dates are calculated using the travel times = 12:05, 17:05.



Average of planned unload dates

To determine the average of planned unload dates, the planned unload dates of all order lines in the route are taken into account. Freight carries out the following steps to calculate the average of planned unload dates:

1. Determine the average of the planned unload dates of the order lines of the last unload stop. This will be the optimal unload date for that stop. (If the optimal date is not inside the time window, the optimal date is equal to the nearest window border). The optimal unload date at stop C is the average of 17:10 and 17:35 = 17:22.
2. Calculate back the optimal load date for the preceding stop. Note that an actual load stop is not present if no goods are loaded at that stop. The optimal load date at stop B is 17:22 (the optimal unload date at stop C) – 5:00 travel time = 12:22.
3. Calculate the next average of planned unload dates of the order lines in the stop to determine the optimal unload date. In this calculation, the following data are included:
   - The planned unload dates of the stop.
   - The optimal load date of the stop (calculated in step 2).
   - The order lines in the same load that are loaded at a previous stop and unloaded at a later stop. These stops obtain the value of the optimal load date calculated in step 2. In this example, order line 1 is not loaded or unloaded at stop B and receives the optimal load date value of 12:22. The reason for this is because, to match the unload date at the next stop, order line 1 must start at the same load date. The optimal unload date of stop B is the average of 2 * 12.22 and 12.05 = 12.16.
4. Calculate back the optimal load date for the preceding stop. The optimal load date at stop A is 12:16 – 4:00 Travel time = 08:16.
5. Repeat Steps 3 and 4 until the first stop is reached.
6. At the first stop, stop A, the optimal load date is the planned load date for the shipment.
7. Starting from the first planned load date, 08:16, calculate the optimal dates for all stops. These dates will be the planned load and unload dates for the shipments. The remaining shipment dates are calculated using the travel times = 12:16 and 17:16.



Overview of the planned shipment dates for each planned date determiner option

Planned date determiner	Shipment	Order line	From-address	To- address	Planned load date	Plnd unload date	Plnd load dte of order	Plnd unload dte of order
Earliest Possible Date	SHIP 1	1	A	C	08:00	17:00	08:30	17:10
	SHIP 2	2	A	B	08:00	12:00	08:45	12:05
	SHIP 3	3	B	C	12:00	17:00	12:40	17:35
Latest possible date	SHIP 1	1	A	C	09:00	18:00	08:30	17:10
	SHIP 2	2	A	B	09:00	13:00	08:45	12:05
	SHIP 3	3	B	C	13:00	18:00	12:40	17:35
Minimum of planned unload dates	SHIP 1	1	A	C	08:05	17:05	08:30	17:10
	SHIP 2	2	A	B	08:05	12:05	08:45	12:05
	SHIP 3	3	B	C	12:05	17:05	12:40	17:35

Average of planned un-load dates	SHIP 1	1	A	C	17:16	17:16	08:30	17:10
	SHIP 2	2	A	B	12:16	12:16	08:45	12:05
	SHIP 3	3	B	C	17:16	17:16	12:40	17:35

Chapter 9
Processes involved in load building

9

The load building process

The load building process entails the creation of load plans from a range of freight order lines selected by the user. You can start up the load building process in the Generate Plan (fmlbd0280m000) session. The procedure to create load plans, and which planning options to use, is described in *To create load plans (p. 53)*. The current topic describes the process that takes place after you click **Generate** in the Generate Plan (fmlbd0280m000) session.

The load building engine takes the following steps to create load plans:

- **Combine freight order lines**
  The freight order lines for which you create your load plan are grouped by various attributes, such as load/unload addresses and time windows. Each group of matching freight order lines becomes a combined freight order.
- **Perform planning method-specific steps**
  For each planning method, the load building engine performs one or more specific steps. For more information, refer to Specific steps per planning method.
- **Create stops and trips**
  Loading and unloading stops are created from the load/unload addresses of the combined freight orders. Carriers and transport means groups or transport means combinations are selected to visit the stops, and the stops are grouped by trip. A trip is a group of stops that is travelled by a specific transport means group or transport means combination of one specific carrier.
- **Combining Stops by Route Plan / Standard Route**
  After the stops are created in the previous step *Create stops and trips*, LN combines the stops that use the same route plan / standard route. After the stops are combined based on same route plan / standard route, the load building process of LN determines the ideal transport means group / transport means combination for these combined stops within a specific time frame/freight plan.

  If the transport means group (TMG)/ transport means combination (TMC) selected by the LN in the previous step *Create stops and trips* is different than the TMG/TMC that is selected by the LN after the stops are combined based on same route plan / standard route, and the execution of the combined stops is cheaper, the stops created in the previous step *Create*

stops and trips are removed, and LN creates new stops based on the data of the combined stops.

When the TMG/TMC selected in the previous step *Create stops and trips*, and the TMG/TMC selected by LN after the stops are combined based on same route plan / standard route are identical, no changes are made to the stops.

- **Create loads and shipments**
  The load building engine creates loads and shipments from the stops and trips created in the previous step. For each trip, a load is created and for the underlying loading and unloading stops, the load building engine creates shipments. For information on allocation of individual means of transport to loads, see *Means of transport selection (p. 81)* and *Means of transport manually selected for freight order lines (p. 83)*.

Combined freight orders, stops, and trips are intermediate data that are only used to analyze the eventual results of the planning process, the loads and shipments.

Note

Freight cost calculation takes place during the creation of stops and trips, and the creation of loads and shipments. For more information, refer to Freight cost calculation in this topic.

To combine freight order lines

The freight order lines that you selected in the Generate Plan (fmlbd0280m000) session to create your load plan are grouped into combined freight orders.

A combined freight order includes all freight order lines that go to or go from the same addresses within the same time period, and that share the same values of the following attributes:

- Ship-from address, ship-from type, and ship-from code
- Ship-to address, ship-to type, and ship-to code
- Carrier
- Carrier binding check box selected/cleared
- Transport means group
- Transport means combination

  For planning purposes, either a transport means group or a transport means combination is attached to a freight order line. For further information, see *Multiple means of transport by load (p. 86)*.
- Means of transport
- Transport type
- Combination code
- Route
- Route plan
- Standard route
- Service level
- Additional rate units of the piece type
- Additional rate units of the volume, length, or area type

- Single shipment

Various combined freight orders can be created on which to base a load plan, depending on how many of the freight order lines have matching attribute values.

- **Ship-from/ship-to address, type, and code**
  The ship-from and ship-to codes and types of the address data must match, because the calendars must be identical for all the freight order lines of the combined order. The service level and the additional rate units are used to retrieve the freight rates for the combined orders.

- **Carrier/carrier binding**
  When freight order lines have identical carriers, freight order lines with preferred carriers are not combined with freight order lines with binding carriers.

  A preferred carrier is a carrier that is selected on the freight order line, and a binding carrier is selected on the freight order line with the **Carrier/LSPBinding** option selected.

  If freight order lines with preferred carriers and binding carriers were combined, and the loading capacity of the carriers would be insufficient to accommodate the freight order lines with binding carriers and those with preferred carriers, the load building engine would be unable to create shipments. To avoid this, freight order lines with preferred carriers and binding carriers are not combined. In this way, the loading capacity is more likely to be sufficient for freight order lines with binding carriers. For freight order lines with preferred carriers, another carrier can be searched if the loading capacity is insufficient. Freight order lines for which no carrier is selected are combined separately.

- **Route plan and standard route**
  Freight orders with route plans or freight order lines with standard routes are not combined with freight orders without route plans or standard routes. For freight order lines without standard routes or freight orders without route plans, you must use the pooling or consolidation planning algorithm to find a standard route or route plan.

- **Time windows**
  For freight order lines to be combined, their time windows must match, or at least overlap. When freight order lines are combined, the time windows are adjusted to suite all freight order lines of the combined freight order. As a result, however, there is a chance that freight orders with large time windows cannot be planned if these orders are grouped into a combined order with a narrow time window, for which no carrier is available.

- **Single shipment**
  Order lines of single shipment freight orders cannot be combined with freight order lines for which the **SingleShipment** option is not selected.

  Freight order lines of single shipment freight orders are only combined with freight order lines that belong to the same freight order header. If the other freight order attributes do not match, new combined freight orders are created, but again only with freight order lines from the same freight order header.

Specific steps per planning method

After the combined freight orders are created, the load building engine performs one or more specific steps for each planning method:

Direct Shipping

If the direct shipping planning algorithm is used to create the load plan, the load building engine carries out the following steps before creating stops and trips:

- Select carrier.
- Select transport means group or transport means combination.

Note

The selection of the best carrier is controlled by the carrier selection criterion selected in the Generate Plan (fmlbd0280m000) session. When replanning is carried out, the carrier selection criterion of the load plan controls the selection of the carrier.

Consolidation

If the consolidation planning algorithm is used to create the load plan, the load building engine takes the following steps before creating stops and trips:

1. **Select standard route**
   The load building engine selects a standard route that includes the addresses of the combined freight orders, but if the load building engine cannot find a matching standard route, the load plan is planned using the direct shipping planning method.

   If a standard route was selected on the freight orders from which the combined freight orders were derived, the load building engine uses this standard route. If this standard route cannot be used, no other standard route is selected and the combined freight order is planned using the direct shipping planning algorithm.

   In addition, if a standard route is linked to the route of the freight order lines included in the combined orders, the load building engine uses this standard route. If this standard route cannot be used, no other standard route is selected and the combined freight order is planned using the direct shipping planning algorithm. A route attached to a freight order line is derived from the originating order.

   For more information, refer to *The use of standard routes (p. 184)*.

2. **Select carrier and transport means group/transport means combination**
   If no carrier or transport means group/transport means combination is linked to the standard route, the load building engine selects a carrier and a transport means group or transport means combination. The selection of the best carrier and standard route is controlled by the carrier selection criterion defined in the Generate Plan (fmlbd0280m000) session.

Pooling

If the pooling planning algorithm is used to create the load plan, the load building engine takes the following steps before creating stops and trips:

- Select route plan
- Select carrier
- Select transport means group

Select a route plan, carrier, and transport means group or transport means combination for the combined freight orders. To be selected, a route plan must match the addresses of the freight orders for which the load plan is created. The selection of a route plan, a carrier, and a transport means group or transport means combination is controlled by the carrier selection criterion defined in the Generate Plan (fmlbd0280m000) session. If a route plan is defined for the freight orders included in a combined freight order, or if a route plan is attached to the route of the freight orders of the combined order, this route plan is used.

Create stops and trips

Stops and trips are created from the combined freight orders created in the first step.

A stop includes the addresses and time windows for loading and unloading. A stop line includes the items that must be transported, and the identification of the freight order line from which the stop line originates.

A trip is a combination of loading and unloading stops in a route that are travelled by a specific carrier and transport means group or transport means combination. If no binding carrier or preferred carrier was specified on the freight orders or order lines, the carrier is selected from the carriers attached to the shipping office and the planning group of the freight orders and freight order lines for which the load plan is created.

The selected planning method determines whether multiple trips and stops can be created for a combined freight order.

Direct Shipping

If the direct shipping planning algorithm is used to create the load plan, the load building engine carries out the following procedure to create stops and trips:

1. The load building engine creates a loading stop and an unloading stop in one trip for each combined freight order. If the combined freight order has a route plan or a standard route, the route plan or standard route is used to create the trips and stops, which can result in multiple stops and trips being created for the combined order.
2. The load building engine first tries to add stop lines to existing stops. If the load building engine finds no matching stops, the load building engine creates new stops. However, single-shipment combined orders are not added to existing stops, but for such orders the load building engine creates new trips.

Note

If a route plan is specified on any of the freight orders, or a route plan and/or a standard route is specified on any of the freight order lines, the load building engine will use the specified route plan and/or standard route. The selected route plan and standard routes of the route plan legs are used to create direct shipments for all the route plan legs.

Consolidation

If the consolidation planning algorithm is used to create the load plan, the load building engine takes the following steps to create stops and trips:

1. **Add stop lines to stops with matching addresses and load/unload dates**
   To create stops and trips for the combined freight orders, the load building engine first tries to add stop lines to existing stops in the standard route if the addresses and the loading and unloading dates match.
2. **Add stop lines to stops within time windows**
   If no stop lines are found that meet this criteria, the load building engine tries to add the stop lines to existing trips if the loading and unloading dates fit in the time windows of the existing trips.
3. **Create new stops and trip**
   New stops and a new trip are created if no matching trip is found.

Note

Single-shipment combined orders are planned using the direct shipment planning algorithm. If a combined freight order has a route plan, the load building engine uses this route plan to create stops and trips, and thus applies the pooling algorithm.

Pooling

If the pooling planning algorithm is used to create the load plan, the load building engine takes the following steps to create stops and trips:

1. The load building engine creates stops and trips for each leg of the route plan. Route plan legs can include standard routes. In such cases, the standard route is used to create the trips. If a route plan leg has no standard route, the load building engine adds the stops and stop lines to existing stops and trips. If no matching stops and trips are found, the load building engine creates new stops and a new trip. For this route plan leg, the combined freight order is then planned using the direct shipment planning method.

   For more information, refer to *The use of route plans (p. 186)*.
2. If the load building engine cannot find a suitable route plan, the load building engine looks for a standard route. If a standard route is defined for the freight orders from which the combined freight order is derived, the load building engine uses this standard route, and the combined freight order is planned using the consolidation planning method. If the standard route cannot be used, or if no standard route is found, the combined freight order is planned using the direct shipping planning algorithm.

Note

Single-shipment combined orders are planned using the direct shipment planning algorithm. The selected route plan and standard routes of the route plan legs are used to create direct shipments for all the route plan legs. Trips created from combined orders of the single shipment type are not combined with other trips, regardless of the planning algorithm used.

Create loads and shipments

The load building engine creates loads and shipments from stops and trips. If the **Check TMG and TMC Availability** check box in the Freight Planning Parameters (fmlbd0100m000) session is selected, the capacity of the transport means groups of the carriers is taken into account at this stage. If transport means combinations are used, the capacity of the transport means groups of the vehicle types of the transport means groups is considered.

1. Shipment lines are created from stop lines. First, the load building engine tries to add shipment lines to existing shipments and loads in the same trip. If the loading capacity of the transport means group of the carrier is insufficient, the load building engine tries to add shipment lines to loads and shipments in other matching trips. If no matching trips exist, new loads and shipments must be created.
2. For a newly created shipment, the load building engine determines the required loading capacity. The available loading capacity is derived from the available number of vehicles of the transport means groups or transport means combinations linked to the carrier of the stop.

   If the carrier has insufficient capacity and the carrier is binding, the shipment, and the underlying freight order lines, cannot be planned.

   If a freight order line cannot be transported in one means of transport and the shipment is not allowed to be split up, the freight order line cannot be planned. The **Split Shipments during planning** field in the Freight Planning Parameters (fmlbd0100m000) session controls shipment splitting.

   If the carrier is not binding and the carrier has insufficient capacity, the load building engine selects another transport means group or transport means combination and/or carrier. This process is repeated until all the goods of the freight order line are planned.

   For each means of transport, or for the means of transport of each transport means combination, the load building engine creates a new load, shipment, and shipment line if the goods of the freight order line cannot be included in an existing shipment. If a freight order line does not fit entirely in a means of transport of a transport means group or transport means combination, the freight order line is divided over several loads, shipments, and shipment lines.

   If a trip is part of a route plan and a specific carrier is defined for the route plan legs, no other carrier is selected if the carrier has insufficient capacity. In such cases, the carrier is regarded as binding and the freight order lines of the trip cannot be planned.

Single shipment trips

Single shipment trips, created from combined freight orders with single shipment freight orders or freight order lines, are not combined with other loads and shipments.

Binding carriers

Shipments and loads are first created from trips with binding carriers. If load and shipments were created first for trips with preferred carriers and trips without specified carriers, the carrier capacity can be used up before the trips with binding carriers are planned. Next, shipments and loads are created from trips with preferred carriers, and finally, shipments and loads are created from trips without specified carriers.

Freight cost calculation

Freight costs are calculated twice during the load building process. The first time, freight costs are calculated for the combined freight orders using various carrier and transport means combination or carrier and transport means group combinations. To calculate the freight costs, freight rates are retrieved from Pricing.

The additional costs are also calculated if the user selects this option in the Generate Plan (fmlbd0280m000) session. Freight order lines with different service levels and additional rate units are not inserted in the same combined freight order.

Additional rate units of the volume, length, or area type are converted to the units defined in the Freight master data units and combined. The freight rates are then retrieved for the master data units. Freight order lines with additional rate units of the piece type are not combined, and freight rates are retrieved separately for each unit of this type. The reason for this is because conversion between units and unit sets of different items is not always possible. For example, if one item is ordered in boxes and another item is ordered in pallets, and both items have different inventory units. As a result, a rate based on a single unit cannot be retrieved.

When shipments and loads are created, the freight costs are calculated again for the loads and shipments. The reason is, that when combined freight orders can be put together in loads and shipments, the larger quantities for each transport can lead to even greater cost-effectiveness of the load plan. For more information, refer to *Calculation of estimated freight costs (p. 105)*.

To enable freight cost calculation, you must select the **Transport Costing** check box in the Freight Rates and Costs Parameters (fmfrc0100m000) session.

Using the default transport means group or transport means combination

When combining freight orders and calculating freight costs for a given number of freight order lines, the load building engine first looks for a transport means group (unless a transport means combination is specified for the freight order lines). If the load building engine finds no transport means group, the default transport means group defined for the carrier is taken. If no default transport means group is defined, the load building engine looks for a transport means combination. If not found, the default transport means combination defined for the carrier is taken.

Chapter 10
The plan board

10

Overview of the Plan Board (fmlbd0215m000) session

The Plan Board (fmlbd0215m000) session provides an intuitive graphical interface that you can use to create and maintain load plans.

This table shows the panes of the plan board and the session referred to by each pane:

Pane	Objects displayed	Refers to session
Freight Orders	Freight orders	Freight Order Lines (fm-foc2101m100)
Plans	Load plans	Plans (fmlbd0110m100)
Loads and Shipments	Loads, shipments, shipment lines, and shipment BOM lines of the plan selected in the Plans pane.	Loads and Shipments (fmlbd3150m200)

Shipping office and planning group

The Plan Board (fmlbd0215m000) session shows the freight orders and the load plans for a shipping office and planning group combination. Initially, this is the default shipping office and planning group specified for the logged on user in the User Profile (fmfmd1620m000) session.

To change the shipping office and planning group, select Change Planning Group on the appropriate menu of the Freight Orders pane. The changed shipping office and planning group are displayed in the status bar. The changed shipping office and planning group are updated to the Plan Board (fmlbd0215m000) session.

Create load plans

You can create load plans for all freight orders, with statuses ranging from **Expected** to **Actual**, that are allocated to the default shipping office and planning group or to the shipping office and planning group selected by the user. See *To create load plans using the Plan Board (fmlbd0215m000) (p. 74)*.

Modify load plans

You can modify the load plans created from the freight orders that are related to the selected shipping office and planning group. You can change load plan data, for example, by making a plan **Actual** or by recalculating the freight costs for the load plan. You can also change the contents of a load plan, for example, by adding, deleting, or moving loads, shipments, and shipment lines. See *To modify load plans using the Plan Board (fmlbd0215m000) (p. 75)* and *Load composition - moving objects (p. 77)*.

Adjust the layout of the Loads and Shipments pane

Various options are available to adjust the layout of the Loads and Shipments pane.

On the View menu, you can use these options to select the load, shipment, and shipment line fields that must be displayed in the graphical representation of the selected load plan:

- Load
- Shipment
- Shipment Line

On the View menu, use the Set Utilization Filter option to filter the loads and shipments displayed in the Loads and Shipments pane by capacity utilization.

If the **Use Tree Colors** check box is selected in the User Profile (fmfmd1620m000) session, each object has a different color based in its status.

To create load plans using the Plan Board (fmlbd0215m000)

The Plan Board (fmlbd0215m000) session provides a graphical interface that is used to create and maintain load plans.

1. Select the freight orders on which the load plan is to be based from the Freight Orders pane.
2. On the appropriate menu of the Freight Orders pane, select Generate Plan.
3. In the Generate Plan (fmlbd0280m000) session, specify the settings as required.
4. Click **Generate**.

The load structure of the generated plan is displayed in the Loads and Shipments pane and the code of the plan is displayed in the Plans pane.

You can create various load plans for the same (group of) freight order(s), each time using a different planning algorithm and use the plan that best suits your requirements. To use a load plan, you must set the status of the load plan to **Actual**.

Various options are available to modify plans. See *Load composition - moving objects (p. 77)* and *To modify load plans using the Plan Board (fmlbd0215m000) (p. 75)*.

To modify load plans using the Plan Board (fmlbd0215m000)

In the Plan Board (fmlbd0215m000) session, you can make changes to the following objects:

- Load plans
- Loads
- Shipment
- Shipment lines
- Freight order lines

For these objects, you can perform activities such as move, add, or delete, but you can also change the details of the object.

Move object

To move objects in the Loads and Shipments pane, for example, to move a shipment to another load, See *Load composition - moving objects (p. 77)*.

Copy object

To copy an object, select the object and select the duplicate icon on the toolbar. This option is available in each pane of the Plan Board (fmlbd0215m000) session.

Change object details

To change the details of an object in the Loads and Shipments pane, you must access the relevant maintenance session. For example, to change the details of a shipment, right-click the shipment and select Details in the context menu to start the Shipments (fmlbd3100m000) session.

The options on the context menu are also available on the Specific menu.

Add shipment line, shipment, or load

1. In the Loads and Shipments pane, right-click the load, shipment, or shipment line to which you want to add the object.

2. Select the available Add option in the context menu.

For example, to add a shipment to a load, right-click the load in the Loads and Shipments pane, and select Add a New Shipment on the context menu. In the Shipments (fmlbd3100m000) session, specify the required shipment data.

The load data is defaulted from the selected load. After saving the new shipment in the Shipments (fmlbd3100m000) session, the shipment is displayed in the Loads and Shipments pane.

Add freight order line to plan

To add a freight order line to the plan displayed in the Loads and Shipments pane, drag the freight order line from the Freight Orders pane to the Loads and Shipments pane. This adds the freight order line to the plan and launches the replanning process for the freight order line. See *Replan separately or include in Planned freight orders (p. 80)*.

Delete object

To delete an object, click the object and select the delete icon on the toolbar. This option is available in each pane of the Plan Board (fmlbd0215m000) session.

If an object is deleted, this can result in recalculation of the freight costs of the load structure from which the object is deleted. This is similar to freight cost recalculation of the originating object after an object is moved. See *Load composition - moving objects (p. 77)*.

Note

You can only delete load plans without loads, shipments, and shipment lines. See *Load plan, load, and shipment maintenance (p. 97)*.

Remove shipment line from plan

To remove a shipment line from a load plan, drag the shipment line from the Load and Shipments pane to the Freight Orders pane.

Make load plan Actual

To make a load plan Actual, highlight the load plan in the Plans pane and from the appropriate menu, click Actualize Plan.

Calculate freight costs

If you change a load plan, for example by adding or removing shipments, you can consider recalculating the freight costs for the load plan. To calculate the freight costs for a load plan, right-click the load plan and select Calculate Freight Costs on the context menu.

You can also calculate the freight costs of loads, shipments, and shipment lines.

Load composition - moving objects

These options are available to adjust the load structure of a load plan:

Option	Available in session
Drag and drop functionality	Plan Board (fmlbd0215m000)
Form command **Move Load**	■ Plan Board (fmlbd0215m000) ■ Loads (fmlbd4100m000)
Form command **Move Shipment**	■ Plan Board (fmlbd0215m000) ■ Shipments (fmlbd3100m000)
Form command **Move Shipment Line**	■ Plan Board (fmlbd0215m000) ■ Shipment Lines (fmlbd3150m000)

The move options are available in the appropriate menu of the sessions listed in the table.

Using the options, you can move these objects:

- Load to a different plan
- Shipment to a different:
  - Load
  - Plan
- Shipment lines to a different:
  - Shipment
  - Load
  - Plan

In the Plan Board (fmlbd0215m000), you can also drag and drop these objects:

- Shipment lines to the Freight Orders pane. This removes the shipment line from the plan.
- Freight order line to the plan displayed in the Loads and Shipments pane. This adds the freight order line to the plan and launches the replanning process for the freight order line. See *Replan separately or include in Planned freight orders (p. 80)*.

Consequences

If you move a shipment to a different plan without specifying a load, a new load is generated. If you move a shipment line to a different plan without specifying a shipment or a load, a new shipment and a new load are generated.

For loads, shipments, and shipment lines with a status of **Actual**, the changed shipping structures are updated to the Planned Loads/Shipments (whinh4180m000) session. Loads, shipments, and shipment lines with a status of **Planned** are not updated to this session, because **Planned** shipping structures are not yet present in the Planned Loads/Shipments (whinh4180m000) session.

Moving objects can cause the freight costs of the originating load and the destination load to be recalculated or redistributed. See *Calculation of estimated freight costs (p. 105)*.

Conditions

You can move objects that have a status of **Planned** or **Actual**. This applies to the originating object, the object that you move, and the destination object.

Moving objects with a status **In Progress** is not allowed, because this would affect the outbound advices and the load structures in Warehousing.

You can move a load to a load plan whose shipping office or planning group is different from the shipping office or planning group of the load.

You cannot move shipments or shipment lines to a load with a different shipping office or planning group than the shipping office or planning group of the load.

You can move a shipment line to another shipment only if the loading and unloading addresses of the originating shipment and the destination shipment match.

Note

Any errors occurring resulting from moving objects are displayed in the Error Messages log. You can access this session by clicking the exclamation mark icon in the status bar.

Chapter 11
Replanning

11

To replan changed Actual freight orders

The **Update Actual Load Data** field in the Freight Planning Parameters (fmlbd0100m000) session enables you to specify how Freight deals with load building after changes are made in freight orders that have the **Actual** status.

In the **Update Actual Load Data** field, the following settings are available:

- **Not Allowed**
  You cannot replan **Actual** freight orders or order lines, because users cannot change freight orders, freight order lines, or originating orders of freight order lines that are **Actual**. If a user attempts to make a change, an error message appears.
- **Manual Replanning**
  Freight order lines that have been changed can be replanned manually. If a freight order line is changed, LN inserts the changed freight order line in the Freight Order Lines to Be Replanned (fmlbd0120m000) session. In the Freight Order Lines to Be Replanned (fmlbd0120m000) session, you can select the changed freight order line and access the Generate Plan (fmlbd0280m000) session from the appropriate menu.

  A freight order can be changed in the Freight Order Lines (fmfoc2101m000) session. A freight order line is also changed if the originating order line is changed. If the originating order header is changed in such a way that it affects the originating order line and the related freight order line, the freight order line is also changed. This is the case if, for example, the planned delivery date on the originating order header is changed.

  After a freight order line is changed, any shipment lines related to the freight order line are deleted, and the freight order line is inserted in the Freight Order Lines to Be Replanned (fmlbd0120m000) session. The changed freight order line receives the Planned status again, and the user can replan the order line.
- **Automatic Replanning**
  If an order is changed that is already part of an actual plan, the related shipment lines are removed from the plan. The changed freight order line is replanned automatically and does not appear in the Freight Order Lines to Be Replanned (fmlbd0120m000) session. If you cannot replan, you cannot change the order.

Note

- A changed freight order line can be inserted in a different or a new freight order. As a result, the freight order number and the position number can also have changed.
- The setting of the **Replanning of Freight Orders** parameter determines how changed freight order lines are replanned if the **Automatic Replanning** or the **Manual Replanning** setting is applied.

Replan separately or include in Planned freight orders

The **Replanning of Freight Orders** parameter in the Freight Planning Parameters (fmlbd0100m000) session controls the way in which the changed freight order lines are replanned. In the Generate Plan (fmlbd0280m000) session, you can select the load plan in which the changed freight order lines must be included.

In the **Replanning of Freight Orders** parameter, these options are available:

- **Replan Freight Order Lines Separately**
  New shipment lines are created for the freight order lines that are replanned. The new shipment lines are added to existing loads and shipments of the load plan if they match with the existing loads and shipments. If the new shipment lines do not match, new shipments and loads must be created for the replanned freight order lines.

  When changed freight order lines are replanned separately, a new carrier can be selected. As a result, the load plan in which the replanned freight order lines are included, can be less cost-effective. On the other hand, the impact on the load plan is minimal. This could be useful for **Actual** load plans.
- **Combine with Planned Freight Orders**
  The freight order lines that must be replanned, are matched with freight order lines that are already included in the load plan, and for these combined lines replanning is carried out. As a result, new shipment lines are created. If the new shipment lines match existing shipments, these new lines are inserted in the existing shipments. If not, new shipments and/or loads must be created. If the freight order lines that must be replanned match many of the freight order lines already included in the plan, this planning option can have a significant impact on the plan.

Note

Some of the shipments of an **Actual** load plan can have obtained the **In Progress** status. Freight order lines that must be replanned cannot be matched with freight order lines that are related to shipments with the **In Progress** status. In such cases, combined planning cannot be performed.

Chapter 12
Planning input

12

Means of transport selection

Freight enables transport planning for individual means of transport. This functionality supports transport planning for organizations that run their own fleet, but it can also plan for means of transport that are not self-owned.

When load building is carried out for a range of freight orders, available means of transport are scheduled for the load created from the selected freight orders. If no means of transport have been defined, loads are created without allocating specific means of transport. If insufficient means of transport are available , the available means of transport are scheduled for the first loads created for the freight orders, and no means of transport are scheduled for the following loads. In such cases, Freight does not display a warning that no means of transport will be assigned.

Means of transport are first assigned to loads with the longest trip time (from start date to end date). If loads have identical trip times, the load with the earliest start date is taken. This helps you avoid multiple means of transport being assigned to a large number of short trips. If several means of transport were to be assigned to numerous short trips, no available means of transport might be left for the longer trips.

After you carry out load building, you can manually change or assign means of transport to loads.

Actual load plans

When a load plan is made **Actual**, LN checks if the means of transport in the load plan are still available. A means of transport can become unavailable because the means of transport was allocated to another load plan that was made **Actual** earlier, or the calendar might have changed (different availability hours).

If the means of transport is no longer available, an error message appears. In such cases, you must select another available means of transport. If no available means of transport is left, you can carry out planning without means of transport. In that case, you must remove the means of transport from the loads.

Planned loads

If you manually change the means of transport on a planned load, the availability of the means of transport is checked. If the changed means of transport is not available, a warning to that effect is displayed.

Expired loads

If a load plan is set to **Expired**, the means of transport allocated to the loads of this plan become available again for other plans, provided that the availability criteria are met.

Note

Load building works in a different way for means of transport entered manually in the **Means of Transport** field in the Freight Order Lines (fmfoc2101m000) session.

Means of Transport availability criteria

To be scheduled for a load, a means of transport must be available. The availability of a means of transport is displayed on the means of transport calendar. This calendar appears in the Means of Transport Calendar (fmlbd0560m000) session. The means of transport calendar shows data from the actual calendar used for the means of transport and the unavailability resulting from the means of transport being scheduled for particular loads.

The availability or unavailability of a means of transport is determined by the following criteria:

- A means of transport must be available according to the actual calendar selected for the means of transport. If no actual calendar is defined for the means of transport, the calendar of the business partner of the carrier associated with the means of transport, or the company calendar can be selected for the means of transport.
- Means of transport are first assigned to loads with the longest trip time (from start date to end date). If loads have identical trip times, the load with the earliest start date is taken. This helps you avoid multiple means of transport being assigned to a large number of short trips. If several means of transport were to be assigned to numerous short trips, no available means of transport may be left for the longer trips.
- The means of transport's carrier and transport means group or transport means combination must be the same as those selected for the load.
- A means of transport is not available if it already exists on a load in the same load plan during the same time period.
- A means of transport is available for more than one load in a load plan if the loads do not overlap.
- If a means of transport exists in an **Actual** load plan during a specific period, the means of transport is not available for any other load plans during the same period.
- A means of transport is available for a load plan if the **Allow Means of Transport in Multiple Plans** check box is selected for this load plan , and the means of transport already exists in another plan that is not yet made **Actual** during the same time period (so if the means of transport exists for **Planned** loads in other plans, the means of transport is available). If a

means of transport can be planned in multiple plans, the means of transport that are used least in the existing plans are selected first. This option enables the user to avoid conflicts that arise when the same means of transport are assigned to multiple plans that will all be made **Actual**. Only one load plan can be made **Actual**. For the other load plans, you must select another means of transport.

- A means of transport is not available for a load plan if the **Allow Means of Transport in Multiple Plans** check box is not selected for this load plan, and the means of transport already exists in another load plan that is not yet made **Actual** during the same time period. Note that, if you generate a large number of alternative load plans, from which you will use and make **Actual** only one, you can run out of available means of transport.
- A means of transport is only available if it can travel from a previous load's unloading address to a following load's loading address in time. This applies to all loads in the same load plan and for all **Actual** loads in any other load plan to which the means of transport is assigned.

Means of transport manually selected for freight order lines

You can select a means of transport for a freight order line in the **Means of Transport** field in the Freight Order Lines (fmfoc2101m000) session. When means of transport are selected for freight order lines, loads cannot be created without assigning a means of transport to the load created for the freight order line. The load building engine must assign the means of transport from the freight order line, or a means of transport of the transport means group to which the means of transport belongs.

Note

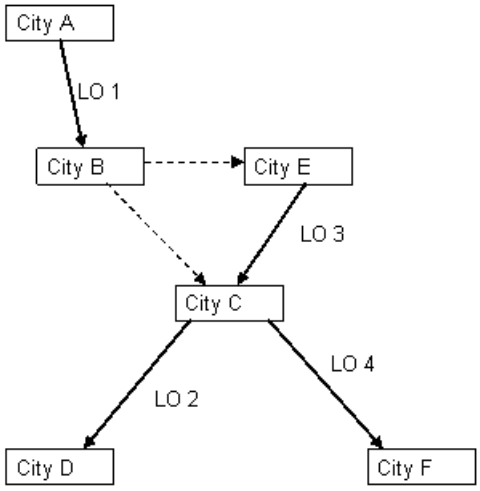
If a transport means combination is selected for a freight order line, you cannot select a means of transport for the freight order line. Instead, the means of transport attached to the transport means combination will be used for load building. For further information, see *Multiple means of transport by load (p. 86)*.

Selecting a means of transport for a freight order line can have the following consequences for load building:

- If the selected means of transport or another means of transport of the same transport means group is not available for the load, load building cannot be carried out for the freight order.
- If the ordered quantity of the freight order line exceeds the capacity of the means of transport selected for the freight order line, the freight order line cannot be planned. The reason for this is that more than one load must be created for the freight order, whereas a means of transport cannot carry more than one load.

Example of means of transport selection

The following diagram shows the loading and unloading addresses and the loads that are used in this example.



In the following tables, MOT is the abbreviation of means of transport.

Loads after Planning

Plan	Load	From- address	To- address	Start date	End date	MOT	Actual
P01	L01	City A	City B	08:30	11:00		No
P02	L02	City C	City D	12:00	14:00		No
P03	L03	City E	City C	11:30	12:00		No
	L04	City C	City F	12:30	15:00	M100	No

The distance between city B and city E is 50 km.

The distance between city B and city C is 75 km.

Means of Transport

MOT	Calendar	Average speed of TMG (km/hr)
M100	CAL01	60
M200	CAL02	90

The means of transport have the same carrier and transport means group as the loads.

CAL01: Available from 9:00 – 17:00.

CAL02: Available from 8:00 – 18:00.

Assign means of transport to loads

To assign means of transport to loads, the following procedure is carried out:

1. Load L01: M100 is not available at 8:30 according to Calendar CAL01. M200 is available from 8:30 –11:00 according to Calendar CAL02.
2. Plan P01 is made **Actual**.
3. Load L02: M100 is already assigned to L04 from 12:30 – 15:00. M200 is still available from 11:00 – 18:00. M200 can also travel the distance from City B (end address L01) to City C (start address L02) in 00:50 (75 km / 90 km/hr).
4. Plan P02 is made **Actual**.
5. Load L03: Both M100 and M200 are available from 11:30 – 12.00. Because M100 is already present in Plan P03, M200 is tried first. M200 also loads in City C at 12:00. This is no problem because this is the same time as the end date of L03 at the same address. If M200 is planned for L03, it must be able to reach City E at 11:30 from City B because of the earlier Load L01. M200 has 00:30 available between City B and City E. M200 needs 00:33 (50 km / 90 km/hr) to travel the distance and cannot reach City E in time. M100 is now used.
6. Plan P03 is not yet made **Actual**.

Loads after assigning means of transport

Plan	Load	From- address	To- address	Start date	End date	MOT	Actual
P01	L01	City A	City B	08:30	11:00	M200	Yes
P02	L02	City C	City D	12:00	14:00	M200	Yes

P03	L03	City E	City C	11:30	12:00	M100	No
	L04	City C	City F	12:30	15:00	M100	No

Means of transport calendar

MOT	Start date	End date	Load	Availability reason
M100	17:00	09:00		Actual calendar
	11:30	12:00	L03	Planned load
	12:30	15:00	L04	Planned load
	17:00	09:00		Actual calendar
M200	18:00	08:00		Actual calendar
	08:30	11:00	L01	Actual load
	11:10	12:00		Travel time
	12:00	14:00	L02	Actual load
	18:00	08:00		Actual calendar

Multiple means of transport by load

Consignments of goods are often transported by segmented means of transport, for example, a truck-and-trailer combination, or a locomotive that pulls several cars. In such cases, you may want to perform freight planning for some, or perhaps all of the segments that make up the means of transport.

In Freight, for each freight order line, you can specify whether transportation is to be performed by individual means of transport or segmented means of transport.

If you choose individual means of transport, you can add a transport means group to the freight order line. If you attach a means of transport to the freight order lines, Freight will try to allocate this means of transport to the load that results from the load building process. For more information, refer to *The use of transport means groups (p. 196)*, *Means of transport selection (p. 81)*, and *Freight order grouping (p. 41)*.

If you opt for segmented means of transport, you can add a transport means combination to the freight order line. A transport means combination can include various individual means of transport, this depends

on the way you set up your transport means combinations. As a result, Freight can allocate more than one means of transport to each load that results from the load building process.

Note

You can attach either a transport means group or a transport means combination to a freight order line, both is not possible.

If you do not insert a transport means group or a transport means combination on a freight order line, the load building engine selects a transport means group or a transport means combination based on your setup data. The load building engine first looks for a suitable transport means group. If no transport means group is found, the default transport means group defined for the carrier is taken. If no default transport means group is defined, the load building engine looks for a transport means combination. If not found, the default transport means combination defined for the carrier is taken. For further information on the load building engine, see *The load building process (p. 65)*.

Transport means combinations are also available for freight order clustering. A transport means combination is one of the criteria used to generate freight order clusters.

Transport means combinations

A transport means combination constitutes a combination of vehicles; it consists of various segments. For example, a truck-and-trailer combination, or a locomotive that pulls several cars. To specify the segments that make up the transport means combination, you must attach vehicle types and/or means of transport.

Vehicle types

A vehicle type refers to an anonymous, that is, not uniquely identifiable, type of vehicle. For each vehicle type, you must specify the number of vehicles that is used for the transport means combination. For example, if the combined means of transport consists of a locomotive and five cars, for vehicle type CAR, you must insert 5, and for vehicle type LOC, you must insert 1.

Means of transport

A means of transport refers to a uniquely identifiable vehicle for which Freight can perform availability checking during load building. To define a uniquely identifiable segment, you must add a means of transport and a vehicle type to the transport means combination. For example, if the combined means of transport consists of a locomotive and five cars, and you want to enable availability checking for the locomotive, you can insert means of transport LOCOMOTIVE AX00023 and vehicle type LOC for the locomotive. For more information, refer to To set up transport means combinations.

You can add several means of transport to a transport means combination. Thus Freight can plan transportation for more than one means of transport to transport a load.

To set up transport means combinations

To set up transport means combinations, proceed as follows:

1. In the Combination Codes (fmfmd0120m000) session, define combination codes.
2. In the Transport Types (fmfmd0140m000) session, define transport types.
3. In the Means of Transport (fmfmd0155m000) session, define means of transport and in the Means of Transport Calendar (fmlbd0560m000), set up the calendar for means of transport.
4. In the Transport Means Groups (fmfmd0150m000) session, define transport means groups.
5. In the Vehicle Types (fmfmd0147m000) session, define vehicle types.
6. In the Transport Means Combination (fmfmd0642m000) session, define transport means combinations.
7. In the Vehicle Types and Means of Transport by Transport Means Combination (fmfmd0148m000) session, add vehicle types and means of transport that belong to a transport means combination.

   To define an anonymous segment for a transport means combination, you must add a vehicle type and the number of vehicles of this vehicle type. For example, if the combined means of transport consists of a locomotive and five cars, for vehicle type CAR, you must insert 5 in the **Number of Vehicles** field.

   To define a uniquely identifiable segment, you must add a means of transport and a vehicle type. The number of vehicles for a uniquely identifiable segment cannot be more than one.
8. In the Transport Means Combinations by Carrier/LSP (fmfmd0144m000) session, define the transport means combinations that are available for carriers.
9. In the Freight Planning Parameters (fmlbd0100m000) session, select or clear the **Check TMG and TMC Availability** check box to specify whether or not the loading capacity and the availability of means of transport or transport means combinations must be checked during load building.

Execution frequencies for standard routes

An execution frequency is the frequency with which a standard route is carried out by the carrier. The number you enter in the **Execution Frequency** field in the Standard Routes (fmlbd0150m000) session is the period, expressed in days, in which the service is run once. For example: enter five if the carrier travels the standard route once in five days, enter one if the service is run once every day.

The standard route is traveled as from the **Start Date** entered in the Standard Routes (fmlbd0150m000) session. If you enter 2 in the **Execution Frequency** field, the first time the service is run is on the **Start Date**, and the second time is two days after the **Start Date**.

Note

You cannot maintain execution frequencies of more than once a day in the Standard Routes (fmlbd0150m000) session. If the service is run more than once on particular days, you can enter the

execution times for those days in the Dates and Times by Standard Route (fmlbd0155m000) session. For example, if the standard route is travelled at 10:45 and 16:00 on Monday, August 21st, 2002, enter 8/21/2002 10:45 and 8/21/2002 16:00 in the Dates and Times by Standard Route (fmlbd0155m000) session. You can also run the Assign Standard Route Dates and Times (fmlbd0255m000) session twice, each with a different start time.

The exact standard route execution dates are calculated in the Assign Standard Route Dates and Times (fmlbd0255m000) session. If you defined an execution frequency of once per three days in the Standard Routes (fmlbd0150m000) session, you can calculate the dates on which the standard route is run. In the Assign Standard Route Dates and Times (fmlbd0255m000) session, you specify a date range and start up the calculation process. If a standard route has a frequency of more than once a day, you can also use the Assign Standard Route Dates and Times (fmlbd0255m000) session to calculate the execution dates and times. If the service is run twice a day, for example, enter this session twice, each time setting the same range of days, but with a different time.

When the calculation is finished, the resulting dates are displayed in the Dates and Times by Standard Route (fmlbd0155m000) session. In this session, you can manually maintain the calculated dates and times for the current standard route. For example, you can enter any deviations from the normal execution frequency in the Dates and Times by Standard Route (fmlbd0155m000) session. For example, if the normal execution frequency is once every three days, and in one particular week the carrier makes one extra trip, you enter the date of the extra trip in the Dates and Times by Standard Route (fmlbd0155m000) session.

Delivery note setup in Freight Management

A delivery note is one of the shipping documents optionally created when the shipment procedure is carried out. Parameter settings control if and how the delivery note functionality is used.

If the delivery note functionality is used, Freight adds the following delivery note attributes to the criteria used to group freight orders for freight planning or freight order clustering purposes:

- **Motive of Transport**
- **Delivery Code**

In this way, clusters created from freight orders are grouped by delivery note, and shipments created from freight orders are grouped by delivery note and load. A load can contain more than one group of shipments-by-delivery-note, but a delivery note cannot refer to more than one load. If more than one load is needed to contain the shipments, for each additional load, a new delivery note is created.

Delivery codes and motives of transport are entered on originating orders and passed on to freight orders, or defaulted on the freight order from the Freight Order Type - Defaults (fmfmd0165m000) session if not entered on the originating orders. You can also manually enter these attributes on freight orders.

Delivery notes are created and maintained in Warehousing. For further information, see Delivery notes.

To make sure that delivery codes and motives of transport are used to select freight orders for freight planning or freight order clustering in the preferred way, take the following steps:

Step 1: Define default values for freight order types

In the Freight Order Type - Defaults (fmfmd0165m000) session, you can define default delivery codes and motives of transport for freight order types. What you accomplish in this way, is that a delivery code or motive of transport is defaulted on a freight order that is created for a particular type of originating order if the user did not enter a delivery code or motive of transport on the originating order. LN then passes on the delivery code or motive of transport to the shipment, the load, and the delivery note created from the freight order.

Step 2: Define plan matrix

In the Plan Matrix (fmfoc1120m000) session, you can define delivery codes and motives of transport as criteria to retrieve planning groups for freight order lines.

Step 3: Define shipping office matrix

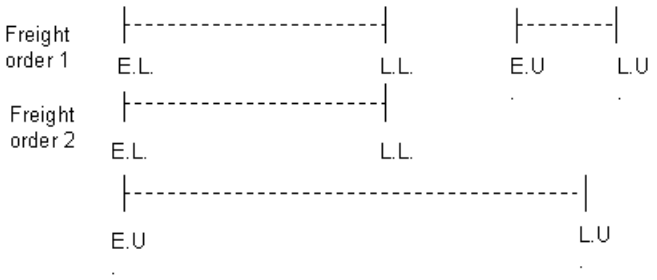
In the Shipping Office Matrix (fmfoc1140m000) session, you can define delivery codes and motives of transport as criteria to retrieve shipping offices for freight orders. For further information, see *Freight order grouping (p. 41)* and *The use of shipping offices and planning groups (p. 183)*.

Loading/unloading dates of manually created freight orders

For manually created freight orders, the system date and time is taken as the default planned, earliest, and latest loading and unloading dates/times.

If you change the default earliest and latest loading and unloading dates/times of a manually created freight order, the earliest unloading date/time must be later than the earliest loading date/time augmented with the transportation time of the goods. If the earliest and latest loading and unloading dates/times are not entered correctly, an error message is displayed.

Example



Legend

E.L	Earliest load date
L.L.	Latest load date
E.U.	Earliest unload date
L.U.	Latest Unload date

For freight order 1, the time gap between L.L and E.U is more than the travelling time required to cover the distance between the ship-from and the ship-to location, so even if transportation starts at the latest possible date, the goods on the freight order reach their destination before the E.U.

For freight order 2, the time windows overlap, so if transportation starts at any date in the load time window, the goods can arrive at the destination between the E.U and the L.U.

If the earliest and latest loading and unloading dates/times are not entered correctly, an error message is displayed.

Late and early execution of transport

In Freight, you can change the earliest/latest load or unload dates for freight orders that are linked to an originating order to enable the lines of the freight orders to be planned at an earlier or later date. This functionality is useful if, for example, the items for a freight order are not available at the time the order must be shipped. By the time the item is available, the latest load date can have elapsed.

If you change the default earliest and latest loading and unloading dates and times of a manually created freight order, make sure that the earliest unloading date and time is later than the earliest loading date and time augmented with the transportation time of the goods. If the earliest and latest loading and unloading dates and times are not entered correctly, an error message appears.

You can change the earliest/latest load or unload dates for freight orders with lines that can still be planned or clustered. For clustering, this applies to freight orders that have freight order lines with the **Expected**, **Actual**, or **In Progress** status. For load building, this applies to freight orders that have lines with the **Expected**, **Planned**, or **Actual** status.

The earliest/latest load or unload dates are changed in the Freight Orders (fmfoc2100m000) session. If you change any of these dates, a message appears that warns you that the change you are making will affect all related freight order lines that can be planned, replanned, or clustered.

If you change the earliest/latest load or unload dates for freight order lines that have the **Planned** status or the **Clustered** status, these freight order lines must be planned or clustered again. For freight order lines that are planned, replanning is carried out in accordance with the setting of the **Update Actual Load Data** field in the Freight Planning Parameters (fmlbd0100m000) session. Cluster lines must be reclustered manually.

Piece units used in load building and loading capacity checks

In addition to various other criteria, Freight uses the following types of units to perform load building and rough planning:

- piece units
- Units of measure: Surface area, weight, and/or volume
- A combination of piece units and units of measure

To plan transportation, many types of logistics providers prefer piece units such as pallets, boxes, or so-called loading meters, sometimes without wanting to be bothered with the volume, surface area, or even weight of the goods involved.

For example, a carrier specialized in palletized transport will often be interested in capacity details expressed in pallet places or loading meters, whereas a carrier with a tanker fleet will mainly be interested in volumes. Most bulk carriers, on the other hand, prefer weights. Combinations of unit types, such as piece unit and weight, are also used in various logistics environments.

To use piece units, they are allocated to items and transport means groups. If you link a piece unit to an item, you can only use transport means groups with identical piece units or piece units related through conversion factors to perform load building or rough planning. The use of piece units is optional, use them if your logistics environment requires you to do so.

Setup

In the Freight Master Data Parameters (fmfmd0100m000) session, you can define default units of measure for Freight. To define piece units for load building and rough planning, proceed as follows:

1. In the Units (tcmcs0101m000) session, define the required piece units. If you use various piece units that are to be used in the same loads and shipments, make sure that you define conversion factors between the piece units. For example, if you define piece units such as pallets and boxes and a pallet must contain a given number of boxes, define conversion factors for the boxes and the pallets. For further information, see Defining units and To use conversion factors.
2. In the Items - Freight Management (fmfmd1100m000) session, select the item to which you want to link the piece unit.

   Note that in the Items - Freight Defaults (fmfmd1101m000) session, you can also link a default piece unit to items of particular item types that belong to particular item groups.
3. In the **Piece Unit** field of the Items - Freight Management (fmfmd1100m000) session, select the piece unit that you want to link to the item. After you select the piece unit, the **Pieces** field becomes available. Note that a conversion factor between the inventory unit of the item and the piece unit must exist.
4. In the **Pieces** field, enter the portion of the piece unit taken up by one item. For example, if the piece unit is a box that can contain 10 items, enter 0.1 The **Units per Piece** field will show the reverse proportion, that is, 10 instead of 0.1.
5. If required, to indicate that other units are not used in load building and rough planning for the item, do not change the default value 0 in the other item dimension fields of the Items - Freight Management (fmfmd1100m000) session.

   *Make sure that this does not conflict with the **Cost Allocation Based On** parameter. For example, if the value is 0 for the weight unit and cost allocation is based on weight, cost allocation is not available for the current item. Therefore, if you are only using piece units, to enable cost allocation you must set the **Cost Allocation Based On** parameter to **Distance**.*
6. Repeat steps 2-5 for any other items to which you want to link piece units.
7. In the Transport Means Groups (fmfmd0150m000) session, select the transport means group to which you want to link the piece unit.
8. **Piece Unit** field of the Transport Means Groups (fmfmd0150m000) session, select the piece unit that you want to link to the item.
9. In the **Capacity in Pieces** field, enter the number of piece units that an individual means of transport of the selected transport means group can contain.

As a result, the transport means group is available to perform load building and rough planning based on the selected units, that is, to create load plans and capacity reports for items that have the same units as the transport means group, or items that have units for which conversion factors with the transport means group's units are defined.

10. Repeat steps 7-9 for any other transport means group to which you want to link piece units.

Lead time calculations for originating orders

For originating orders, you can use the Freight lead time calculation engine to calculate the transportation time of items linked to sold-to or buy-from business partners. This engine is enabled if Freight is implemented, and the **Generate Freight Order from Sales** check box is selected in the Sales Order Lines (tdsls4101m000) session, or the **Generate Freight Orders from Purchase** check box is selected in the Purchase Order Lines (tdpur4101m000) session.

Depending on the type of originating order, the transportation time is the planned delivery date or the planned receipt date of the goods listed on the order. To use the lead time calculation engine, click **Calculate** next to the **Planned Delivery Date** field in the Sales Order Lines (tdsls4101m000) session or the Items - Purchase Business Partner (tdipu0110m000) session.

While Freight Load Building is used for detailed transportation planning, you can use lead time calculation at originating order level to immediately receive a fair estimate of the transportation lead time of an order. The lead times calculated at originating order level may differ from the lead times calculated by Load Building.

The accuracy of the results produced by the transport lead time calculation engine, largely depends on the data which it is fed. The calculation engine uses the following data:

- Origin address
- Destination address
- Freight service level
- Carrier
- Route

Of this data, the origin and destination addresses are mandatory, these addresses are always provided to the calculation engine.

The carrier and the **Freight Service Level** can either be entered in the originating order or order line or defined for the item of the order in the Items - Freight Management (fmfmd1100m000) session. For further information, see *The use of items in Freight Management (p. 171)* and *The use of freight services levels (p. 200)*.

The other data is only entered in the originating order or order line.

If a carrier or a freight service level exists in both the originating order and in the Items - Freight Management (fmfmd1100m000) session, the carrier or freight service level of the originating order has priority.

If no carrier exists for the originating order, order line, or item, the calculation engine can nevertheless find a carrier, as long as a transport means group, a transport type, or a combination code is defined for the item of the order in the Items - Freight Management (fmfmd1100m000) session. In such cases, the calculation engine looks for a carrier that matches the transport means group of the item. For further information, see *The use of transport types (p. 195)*, *The use of combination codes (p. 200)*, and *The use of transport means groups (p. 196)*.

If no transport means group exists for the item, the calculation engine looks for a transport means group that matches the combination code or transport type of the item, and then looks for a carrier that is linked to the transport means group.

If more than one carrier is linked to the transport means group, it selects the carrier for which the transport means group is defined as the default transport means group.

For each combination of data given, the lead time calculation engine produces the following results (remember that the origin and destination addresses are always given because they are mandatory):

- **Origin and destination addresses**
  If only the origin and destination addresses of the originating order are given to the lead time calculation engine, the time maintained in either the Distance Table by City (tccom4137s000) session or the Distance Table by ZIP Code/Postal Code (tccom4138s000) session is returned as the transport lead time.
- **Freight service level, origin and destination addresses**
  If the **Freight Service Level** is given in addition to the origin and destination addresses, the lead time maintained in the Freight Service Levels (fmfmd0170m000) session is returned as the transport lead time. You can enter the **Freight Service Level** in the originating sales or purchase order line, or define the **Freight Service Level** for the item in the Items - Freight Management (fmfmd1100m000) session.
- **Carrier, origin and destination addresses**
  If the **Carrier/LSP** and the origin and destination addresses are given, the transportation lead time is calculated by dividing the travelling time between the origin and destination addresses by the average speed of the transport means group of the carrier.

  If more than one transport means group is linked to the carrier, the lead time calculation search sequence for transport means groups is as follows:
  - The transport means group defined for the item in the Items - Freight Management (fmfmd1100m000) session is returned.
  - The transport means group that matches the combination code or the transport type defined for the item in the Items - Freight Management (fmfmd1100m000) session is returned.

    If more than one transport means group matches these values, the default transport means group of the carrier is returned if the transport means group matches the combination-code or transport-type values.

    If the default transport means group of the carrier does not meet these values, the transport means group with the slowest average speed is returned. This is based on the assumption that the slowest transport means group is the cheapest.

(Carrier-rate information from LN Pricing is outside the scope of the transport lead time calculation engine.) If more than one carrier has the lowest average speed, the calculation engine selects the first one it encounters in the database.

- **Route, origin and destination addresses**
  If the **Route** is given in addition to the origin and destination addresses, the transport lead time calculation engine first looks for route plans and then for standard routes with matching routes and addresses. If more than one matching route plan or standard route is found, the standard route is selected as specified in the Freight Planning Parameters (fmlbd0100m000) session (cheapest, fastest, or shortest), and route plans have priority over standard routes. If the calculation engine still finds more than one route plan, it selects the first one it encounters in the database. For further information, see *The use of route plans (p. 186)* and *The use of standard routes (p. 184)*.

- **Route, carrier, origin and destination addresses**
  If the route, the carrier, and the origin and destination addresses are given, the transport lead time calculation engine first looks for route plans and then for standard routes with matching routes, carriers, and addresses.

  If more than one matching route plan or standard route is found, the calculation engine selects the route plan or standard route with a transport means group that matches the transport means group of the carrier.

  If the calculation engine still finds more than one route plan or standard route, the standard route is selected as specified in the Freight Planning Parameters (fmlbd0100m000) session (cheapest, fastest, or shortest), and route plans have priority over standard routes.

  If the calculation engine still finds more than one route plan, the calculation engine selects the first plan it encounters in the database.

Note

- The calculated travelling times are offset against the calendar of the carrier.
- Address lead times and load/unload date tolerances are added to the calculated lead times. For each loading address, loading time and waiting time for loading is added. For each unloading address, time for unloading and waiting time for unloading is added.

  Address lead times, waiting times for loading/unloading, and load/unload date tolerances are defined in the Addresses - Freight Management (fmfmd0110m000) session. For further information, see *Address lead times (p. 179)* and *Load and unload date/time tolerances (p. 180)*.

Chapter 13
Planning output

13

Load plan, load, and shipment maintenance

In the Load Building module, you can maintain load plans, loads, and shipments. Load plans, loads, and shipments created by the load building engine in the Generate Plan (fmlbd0280m000) session are stored and maintained in the Plans (fmlbd0110m000) session, the Loads (fmlbd4100m000) session, and the Shipments (fmlbd3100m000) session. In these sessions, you can also manually create load plans, loads, and shipments.

Note

Although typically Freight must perform transport planning because of its advanced planning functionality, Warehousing can change the shipments and loads created by Freight, or replace them with loads and shipments of its own. Warehousing might be required to change or replace loads or shipments if unexpected situations arise, such as damage to the goods, insufficient transport capacity, and so on.

Shipments and loads based on freight orders that have been created from originating orders cannot be processed in Warehousing if the originating orders have not been released to Warehousing. Loads and shipments based on manually created freight orders cannot be processed by Warehousing either. The reason for this is because warehousing orders cannot be created from manual freight orders and to process loads and shipments, Warehousing requires warehousing orders.

Load plans

Load plans are maintained in the Plans (fmlbd0110m000) session. In this session, you can manually create new plans, modify existing plans and change the plan status to **Actual** or **Expired**.

If you change a load plan to **Actual**, the loads and shipments belonging to the load plan also become **Actual**. Load plans that have been made **Actual** are passed on to Warehousing for further processing. You can make load plans **Actual** if you select **Actualize Plan** from the appropriate menu in the Plans (fmlbd0110m000) session.

You can change an **Actual** load plans after selecting the **Undo Actualize** option. This option is available on the appropriate menu of the Plans (fmlbd0110m000) session.

If you set a load plan to **Expired**, the load plan cannot be used for transportation planning. You can make a load plan **Expired** in the Plans (fmlbd0110m000) session.

You can delete a load plan if the load plan is empty. A load plan is emptied after the loads and shipments attached to the load plan are deleted. You can also manually create empty load plans.

If a load plan is **Planned**, you can change the settings of these check boxes of the load plan:

- **Carrier/LSP Selection Criterion**
- **Calculate Additional Costs**
- **Expired**
- **Means of Transport in Multiple Plans**

You can use the Clear Plans (fmlbd0205m000) session or the Plan Board (fmlbd0215m000) session to delete load plans.

Loads

Loads are maintained in the Loads (fmlbd4100m000) session. In this session, you can manually create new loads, modify existing loads, and change the status of **Confirmed** loads to **Shipped** or **Completed**. In addition, you can calculate the freight costs of a load in this session.

Loads with statuses ranging from **Actual** to **Shipped** are deleted if Warehousing sets these loads to **Replaced** or **Ignored**. For further information, refer to *Load plan, load, and shipment statuses (p. 100)*. If load building or replanning is carried out for a load whose shipment lines are changed or deleted, the load is deleted. If you manually change or delete the shipment lines of a load, the load is kept. If the **Update Actual Load Data** field is set to **Manual Replanning** or **Automatic Replanning**, this also applies to **Actual** loads. For further information on changes made to freight order lines and replanning, refer to *Freight order maintenance (p. 27)* and *Load and unload date/time tolerances (p. 180)*.

You can delete loads manually if the status of the loads is not beyond **Actual**. If you delete a load manually, a warning appears if shipments and shipment lines are attached to the load. You can ignore the warning and delete the load. The shipments and shipment lines are also deleted.

You can also delete empty loads that are created manually.

You can change loads manually if the status of the loads is not beyond **Actual**. The following load data can be changed:

- **Route Plan**
- **Standard Route**
- **Carrier/LSP**
- **Standard Route**
- **Carrier Tracking Number**
- **Transport Means Group**
- **Means of Transport**
- **Estimated Freight Cost**
- **Invoice-from Business Partner**
- **Invoice-from Business Partner**
- **Payment Method**

Note

You must not change this data if the **Payment Method** and the **Transport Type** related to the carriers, route plans, and standard routes of the load do not match the **Payment Method** and the **Transport Type** of the carriers, standard routes, and route plans related to the other loads of the load plan. In addition, the addresses of the standard route of the load must be within the address range of the standard routes of the other loads of the plan.

Shipments

Shipments are maintained in the Shipments (fmlbd3100m000) session and shipment lines are maintained in the Shipment Lines (fmlbd3150m000) session.

A shipment consists of a shipment header and one or more shipment lines. A shipment heading consists of some general information, such as the delivery date and the names and addresses of the ship-from and ship-to business partners.

In the Shipments (fmlbd3100m000) session, you can manually create new shipments and modify or delete existing shipments. However, the extent to which you can modify a shipment depends on the shipment status. If the rating level is set to shipments at carrier level in the Carriers/LSP by Shipping Office and Planning Group (fmfrc0160m000) session, you can calculate the freight costs of a shipment in this session.

Shipments are deleted under the same conditions and circumstances as those described for loads.

If the status of a shipment is not beyond **Actual**, you can change the planned load and unload date. If the changed planned unload date of the shipment is outside the loading or unloading time window of the corresponding load, the time window of the load is adjusted. You can also change the freight costs of the shipment.

Shipment lines

A shipment line includes an item, several properties of the item, such as the quantity, the price, the aggregated weight, dimensions, and so on.

Component item lines for items that consist of one or more component items are added to the shipment lines when the load plan is made **Actual**. Load building is based on main item data, and real life shipping data is based on component item information.

In the Shipment Lines (fmlbd3150m000) session, you can manually create new shipment lines and modify or delete existing shipments. However, the extent to which you can modify a shipment depends on the shipment status.

Shipment lines are deleted under the same conditions and circumstances as those described for loads.

If the status of a shipment line is not beyond **Actual**, you can link another freight order or freight order line to the shipment line. However, the **Payment Method** and the **Transport Type** of the new freight order or order line must match the **Payment Method** and the **Transport Type** of the freight order or freight order line that you are replacing, or it must have no **Payment Method** and **Transport Type**. In addition, the departure and destination addresses must be identical or must be within the route plan or

standard route. You can also change the aggregated dimensions of the item and the freight costs of the shipment line.

Note

Completed load plans and loads are set to **Closed** when the carrier invoice is approved in the Accounts Payable module of Financials. The related shipments and shipment lines are automatically set to **Closed** as well. **Closed** shipments and shipment lines can only be deleted if the corresponding load is deleted.

Load plan, load, and shipment statuses

Load plans, loads, and shipments go through various stages ranging from creation through execution to completion. For each of these stages, the load plans, loads, and shipments are given several statuses to indicate their progress.

Load plans are created for both incoming and outgoing goods transports. If your organization buys goods from a supplier, your organization can organize the transportation of the purchased goods by agreement with the supplier. As a result, the loads and shipments planned for the supplier are incoming goods for your organization's warehouse. When your organization sells goods to a customer, your organization plans the outgoing loads and shipments that go to the customer.

Load plans, loads, and shipments can obtain the following statuses:

Planned

The initial status of load plans, loads, and shipments created by the load building engine is **Planned**. If you create a load or a load plan manually, the initial status is also **Planned**. All changes that you make to planned load plans, loads, and shipments, either manually or by replanning using the load building engine, do not alter the status of these load plans, shipments, or loads. Only if you make a load plan **Actual**, the status of the shipments and loads of that load plan changes to **Actual**.

Actual

If you have created a load plan that you want to process in Warehousing, you must make the plan **Actual**. Actual load plans are transferred to Warehousing, where the inbound or outbound procedures are started. The goods can be collected in the warehouse and loaded onto a truck (or other means of transport), or, in case of incoming goods, receipt procedures can be started. For further information about the loads and shipments in Warehousing, see Shipments and loads.

When you make a load plan **Actual**, the freight orders on which the load plan is based and the loads and shipments of the load plan also receive the **Actual** status.

If the freight orders on which a load plan is based have changed, you receive a warning when you want to make the load plan **Actual**. This warning instructs you to replan the load plan, which means make a new load plan for the freight orders, or to replan only the freight order lines that have been changed. Replanning entails deleting the shipment lines related to the changed freight order lines and re-run the

planning engine for the changed freight order lines. The setting of the **Update Actual Load Data** field and the **Replanning of Freight Orders** field in the Freight Planning Parameters (fmlbd0100m000) session control the way in which replanning is carried out.

Note

To change an **Actual** load plan, you must select the **Undo Actualize** option first. This option is available on the appropriate menu of the Plans (fmlbd0110m000) session.

Shipments and loads based on freight orders that have been created from originating orders cannot be made **Actual** if the originating orders have not been released to Warehousing.

In Progress

If the warehouse has started the shipping procedures to process the loads and shipments of a load plan, the load plan receives the **In Progress** status; you can no longer delete the load plan.

If processing is started for one of the shipment lines of the load plan, the status of the shipment line is changed to **In Progress**. Shipment lines that have obtained the **In Progress** status cannot be changed in Freight.

Confirmed

When outbound loads and shipments are actually loaded onto a truck or other means of transport in the warehouse, the loads and shipments are confirmed in Warehousing. The shipments and loads receive the **Confirmed** status in Warehousing.

The **Confirmed** status is passed on to Freight as well, if the **Automatically Change from 'Confirmed' to 'Shipped'** check box in the Freight Planning Parameters (fmlbd0100m000) session is cleared. In that case, the **Confirmed** status appears in the following sessions:

- Loads (fmlbd4100m000)
- Shipments (fmlbd3100m000)
- Shipment Lines (fmlbd3150m000)

If the quantities of loads and shipments are changed in Warehousing, these changes are reflected in the shipments and loads after they are confirmed.

Shipped

After shipments and loads leave the warehouse, they receive the **Shipped** status in Warehousing. This status is passed on to Freight. If the **Automatically Change from 'Confirmed' to 'Shipped'** check box is selected in the Freight Planning Parameters (fmlbd0100m000) session, shipments and loads that are **Confirmed** receive the **Shipped** status automatically in Freight. In the Confirm Delivery / Receipt (fmlbd3252m000) session, you can give the **Shipped** status to loads and shipments that have been confirmed in Warehousing if the **Automatically Change from 'Confirmed' to 'Shipped'** check box is cleared in the Freight Planning Parameters (fmlbd0100m000) session.

When inbound advance shipment notices are received in Warehousing and passed on to Freight, the related inbound shipments and loads obtain the **Shipped** status.

If you work without advance shipment notices, you can manually set shipment and loads to **Shipped** in the Confirm Delivery / Receipt (fmlbd3252m000) session when the supplier notifies you of the arriving shipments and loads. You can access the Confirm Delivery / Receipt (fmlbd3252m000) session on the appropriate menu of the Loads (fmlbd4100m000) session and the Shipments (fmlbd3100m000) session.

Completed

If outgoing shipments and loads have reached their destination and are ready for invoicing, they receive the **Completed** status. You can set loads and shipments to **Completed** in the Confirm Delivery / Receipt (fmlbd3252m000) session, which you can access on the appropriate menu of the Loads (fmlbd4100m000) session and the Shipments (fmlbd3100m000) session.

When inbound loads and shipments have the **Received** status and the receipt is set to final in Warehousing, the loads and shipments obtain the **Completed** status in Freight.

Closed

If the carrier invoice and the invoice to the customer have been paid and approved in Financials, you can set the shipments and loads to **Closed** in the Close Loads / Freight Order Clusters (fmlbd4200m000) session.

Ignored and **Replaced**

If a load or shipment receives the **Ignored** status in Warehousing, the load or shipment and the shipment lines are set to **Ignored** in Freight. If a shipment or a load has received the **Replaced** status in Warehousing, the load or shipment and the shipment lines are set to **Ignored** in Freight. Based on the data of the new load or shipment with which the shipment or load is replaced in Warehousing, a new load or shipment is generated in Freight. For further information on the **Ignored** and **Replaced** statuses in Warehousing, see Possible values.

You can also set redundant shipment lines to **Ignored** in Freight. For further information on how to set shipment lines to **Ignored**, see Set to Ignored.

Note

The loads and shipments of a load plan can have different statuses. This depends on the progress they make through the warehouse and transportation processes. For example, a shipment of a consolidated load can be delivered earlier than the other shipments of the load because the delivery address of the shipment was the first delivery address of the standard route that was traveled.

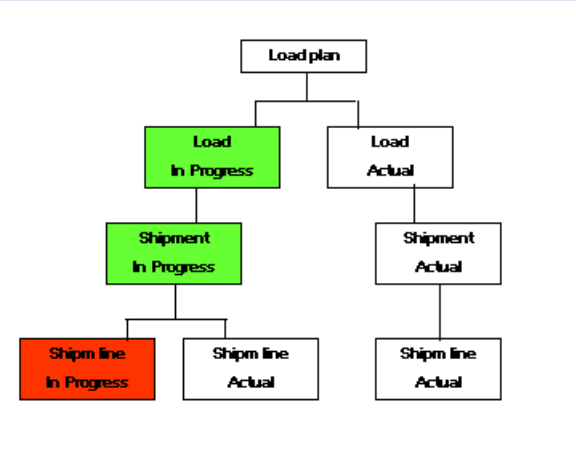
To statuses ranging from **Confirmed** to **Completed**, the following rules apply:

- The status of a shipment changes when the status of all the shipment lines of the shipment have changed.
- Similarly, the status of a load changes when all the shipments of the load have changed.

A load plan can only be **Actual** or **Expired**.

To loads and shipments with the **Actual** status, the following rule applies:

If one of the shipment lines of a load plan is set to **In Progress**, the parent shipment and load are set to **In Progress**. The other shipment lines, shipments, and loads are not affected, as you can see in the following diagram.



In the Planned Loads/Shipments (whinh4180m000) session, you can view the shipments and loads of load plans that are processed in Warehousing. To access the Planned Loads/Shipments (whinh4180m000) session, you can select the **Planned Loads / Shipments** option from the appropriate menu of the Plans (fmlbd0110m000) session. The information that appears in the Planned Loads/Shipments (whinh4180m000) session includes the status and the origin of the loads and shipments. Loads and shipments can be created by Freight and Warehousing.

Chapter 14
Freight costs

14

Calculation of estimated freight costs

For loads and shipments, Freight calculates the estimated freight costs of loads and shipments during load building. For freight order clusters, Freight calculates the estimated freight costs during freight order clustering.

The Freight calculation engine is also used to calculate estimated freight costs for individual order lines of these types:

- Sales order
- Sales quotation
- Freight order

For information on freight cost revenue calculation for order lines or quotation lines, refer to *Freight cost revenue calculation at order line entry (p. 147)*. The current topic deals with estimated freight cost calculation during load building and freight order clustering.

The calculation engine is automatically activated when the load building process or the freight order clustering process is carried out.

Note

To enable freight cost calculation, you must select the **Transport Costing** check box in the Freight Rates and Costs Parameters (fmfrc0100m000) session.

The calculation engine calculates the freight costs of the loads and shipments while they are created by the load building engine, or calculates the freight costs of the freight order clusters during the clustering process.

The freight cost calculation process

1. For loads and shipments, the calculation engine checks if rating must be based on shipments or loads. If rating must be based on shipments, the calculated costs of the shipments of a load are added to calculate the costs of a load.

   If rating must be based on loads, the costs of the load are divided by the shipments based on the setting of the **Cost Allocation Based On** field in the Freight Rates and Costs Parameters (fmfrc0100m000) session to arrive at the costs per shipment.

   For clusters, rating is based on clusters. (Because the rate basis is not shipment or load, the calculation engine bases the rating on clusters.)

   The estimated costs of the freight order cluster are divided over the individual freight order lines, based on the setting of the **Cost Allocation Based On** field in the Freight Rates and Costs Parameters (fmfrc0100m000) session.

2. The calculation engine determines the rate basis number for the shipment, load, or cluster. If the values defined for the rate basis number match those of the cluster, shipment, or load, the rate basis number is allocated to the cluster, shipment, or load.
3. The rate basis number and several other shipment, load, or cluster attributes, such as carriers or service levels, are passed on to Pricing, which uses this information to retrieve the appropriate carrier rate. See *Freight rate retrieval (p. 116)*.
4. The costs are calculated with the rate retrieved from Pricing, the travelling distance derived from the ship-from and ship-to addresses, and the total quantities of the goods to be transported.

Freight cost recalculation

In the Freight Rates and Costs Parameters (fmfrc0100m000) session, the settings of these parameters control freight cost recalculation:

- **Recalculation of Freight Costs**
- **Recalculate Load Costs until Status**

If value **Automatic** is selected for field **Recalculation of Freight Costs**, freight costs are automatically recalculated for loads, clusters, and shipments each time they are manually changed. The calculation continues until the loads, clusters, and shipments have reached the status preceding the status that is specified in the **Recalculate Load Costs until Status** field.

If value **Interactive** is selected, the user must confirm whether to proceed before freight cost calculation is performed.

Manual recalculation is always allowed. To manually recalculate freight costs for loads, shipments, or clusters after the load building process or the clustering process is carried out, you can activate the calculation process in the Calculate Freight Costs (fmfrc0240m000) session.

Recalculation can be useful for various reasons, such as after a recent change of the rates in the freight rate books. Before you activate the calculation process, you must select the plans, loads, shipments, or freight order clusters for which to calculate the estimated freight costs.

The Calculate Freight Costs (fmfrc0240m000) session is available on the appropriate menu of the relevant sessions. The calculation engine uses the carrier rates to determine the estimated freight costs.

Freight cost redistribution

If freight costs are recalculated or changed manually, the changed freight costs are proportionally redistributed among the shipments and shipment lines of a load. If the freight costs are recalculated or changed for a shipment line, the costs are added up for the shipment and the load.

See *Negative freight costs (p. 109)* for examples of the ways in which changed freight costs, including any negative freight costs, are redistributed within load structures.

Freight costs are also redistributed if recalculation is not allowed according to the parameter settings and the structure of a load is changed. For example, a shipment is moved to a different load. In this case, the structures of the originating load and the load to which the shipment is moved have changed and therefore, the freight costs are redistributed for both loads.

Example

For loads L1 and L2, the freight costs are distributed based on weight. Shipment S12 is moved from load L1 to load L2. The total freight costs are USD 12000 for load L1 and USD 1000 for load L2.

Both loads have status **Actual** and in the Freight Rates and Costs Parameters (fmfrc0100m000) session, parameter **Recalculate Load Costs until Status** is set to **Actual** and parameter **Recalculation of Freight Costs** is set to **Automatic**. Consequently, freight cost recalculation is not allowed for loads L1 and L2. If these parameter settings apply and the status of loads L1 and L2 is **Planned**, both recalculation and redistribution is performed.

The table shows the shipment structure and the freight cost of each shipment of load L1 before and after shipment S11 has been moved to load L2. After the move, the freight costs of load L1 have been redistributed to shipment S12.

Before move			After move		
	Freight costs/ USD	**Weight/ Unit**		**Freight costs**	**Weight**
Load L1	12000		Load L1	12000	
Shipment S11	4000	1000 KGS			
Shipment S12	8000	2000 KGS	Shipment S12	12000	2000 KGS

Load L1

The table shows the shipment structure and the freight cost of each shipment of load L2 before and after shipment S11 has been moved to load L2. After the move, the freight costs of load L2 have been redistributed to shipments S11, S21, and S22.

Before move			After move		
	Freight costs/USD	**Weight/ Unit**		**Freight costs**	**Weight**
Load L2	1000			1000	
			Shipment S11	*500*	*1000 KGS*
Shipment S21	200	200 KGS		100	200 KGS
Shipment S22	800	800 KGS		400	800 KGS

Load L2

All shipments removed from load

If you remove all shipments from a load, for example by moving the shipments to other loads, LN reduces the costs of the load to 0.00. In such cases, LN does not change the total costs for the relevant plan but redistributes the costs over the loads, shipments, and shipment lines of the plan.

Negative freight costs

You can specify negative freight costs for loads, shipments, and shipment lines. For example, if a customer is overcharged for a shipment, you can compensate the customer by charging a negative freight cost amount for the next shipment.

Redistribute manually changed freight costs

If the freight costs are changed for a load, the changed freight costs, including any negative freight costs, are proportionally distributed among the shipments and shipment lines of the load. If the freight costs are changed for a shipment line, the costs are added up for the shipment and the load.

The formula to redistribute manually changed freight costs:

```
Current value of object / total value of same level objects * cost increase
 of
higher level object
```

In the formula, only absolute numbers are used. Object refers to load, shipment, or shipment line.

If the freight costs of a load are changed to zero, the freight costs of the shipments and shipment lines of the load also become zero.

Negative freight costs - example 1

Load A includes a shipment line with negative freight costs. The freight costs of load A are increased by USD 100.

Object level	Object	Original freight costs	Increased freight costs	Increased by
1	Load A	500	600	100
2	Shipment 1	250	300	50
2	Shipment 2	250	300	50
3	Shipment 1, line 10	125	150	25
3	Shipment 1, line 20	125	150	25
3	Shipment 2, line 10	300	342.86	42,86
3	Shipment 2, line 20	- 50	-42.86	7.14

The USD 100 increase of Load A is proportionally distributed between both shipments. This is calculated as follows: 250 / 500 * USD 100 = USD 50. USD 250 is the amount of the original freight costs of each shipment. USD 500 is the original value of the load, which is the higher level object. The load is increased by USD 100. Each shipment is increased by USD 50.

For the shipment lines of Shipment 1 the cost increase is calculated as follows: 125 / 250 * 50 = 25.

USD 125 is the original freight cost amount of each shipment line of Shipment 1. USD 250 is the original value of the shipment. The shipment is increased by USD 50. Each shipment line is increased by USD 25.

Shipment 2, line 10: 300 / (300 + 50) * 50 = 42.86.

USD 300 is the original freight cost amount of shipment line 10. USD 350 (= 300 + 50) is the total amount of the shipment lines of Shipment 2. The shipment is increased by USD 50. Shipment line 10 is increased by USD 42.86.

Shipment 2, line 20: 50 / (300 + 50) * 50 = 7.14

USD 50 is the original freight cost amount of shipment line 20. USD 350 (= 300 + 50) is the total amount of the shipment lines of Shipment 2. The shipment is increased by USD 50. USD 7.14 is the amount by which shipment line 10 is increased.

Negative freight costs - example 2

Load A includes a shipment line with negative freight costs. The freight costs of load A are decreased by USD 100.

Object level	Object	Original freight costs	Decreased freight costs	Decreased by
1	Load A	500	400	100
2	Shipment 1	250	200	50
2	Shipment 2	250	200	50
3	Shipment 1, line 10	125	100	25
3	Shipment 1, line 20	125	100	25
3	Shipment 2, line 10	300	257.14	42,86
3	Shipment 2, line 20	- 50	-57.14	7.14

The USD 100 decrease of Load A is proportionally distributed between both shipments. This is calculated as follows: 250 / 500 * USD 100 = USD 50. USD 250 is the amount of the original freight costs of each shipment. USD 500 is the original value of the load, which is the higher level object. The load is decreased by USD 100. Each shipment is decreased by USD 50.

For the shipment lines of Shipment 1 the cost decrease is calculated as follows: 125 / 250 * 50 = 25.

USD 125 is the original freight cost amount of each shipment line of Shipment 1. USD 250 is the original value of the shipment. The shipment is decreased by USD 50. Each shipment line is decreased by USD 25.

Shipment 2, line 10: 300 / (300 + 50) * 50 = 42.86.

USD 300 is the original freight cost amount of shipment line 10. USD 350 (= 300 + 50) is the original amount of the shipment lines of Shipment 2. The shipment is decreased by USD 50. Shipment line 10 is decreased by USD 42.86.

Shipment 2, line 20: 50 / (300 + 50) * 50 = 7.14

USD 50 is the original freight cost amount of shipment line 20. USD 350 (= 300 + 50) is the original amount of the shipment lines of Shipment 2. The shipment is decreased by USD 50. Shipment line 10 is decreased by USD 7.14.

Negative freight costs - example 3

The total freight costs for Load A are zero. One of the shipment lines has negative freight costs, which is compensated by another shipment line with positive freight costs. The total freight costs of load A are increased by USD 100.

Object level	Object	Original freight costs	Increased freight costs	Increased by
1	Load A	0	100	100
2	Shipment 1	0	50	50
2	Shipment 2	0	50	50
3	Shipment 1, line 10	0	25	25
3	Shipment 1, line 20	0	25	25
3	Shipment 2, line 10	50	75	25
3	Shipment 2, line 20	- 50	-25	25
3	Shipment 2, line 30	0	0	0

The USD 100 increase of Load A is proportionally distributed among both shipments, with USD 50 for each shipment. Similarly, for each shipment line of Shipment 1 the freight costs are increased by USD 25.

Shipment 2, line 10: 50 / (50 + 50) * 50 = 25.

USD 50 is the original freight cost amount of shipment line 10. USD 100 (= 50 + 50) is the original amount of the shipment lines of Shipment 2. The shipment is increased by USD 50. Shipment line 10 is increased by USD 25.

Shipment 2, line 20: 50 / (50 + 50) * 50 = 25

For line 20, the freight cost increase is also USD 25. This amount is added to the original value of USD -50, which results in the new amount of USD -25.

Shipment 2, line 30: 0 / (50 + 50) * 50 = 0

Negative freight costs - example 4

The total freight costs for Load A are zero. One of the shipment lines has negative freight costs, which is compensated by another shipment line with positive freight costs. The total freight costs of load A are decreased by USD 100.

Object level	Object	Original freight costs	Decreased freight costs	Decreased by
1	Load A	0	-100	100
2	Shipment 1	0	-50	50
2	Shipment 2	0	-50	50
3	Shipment 1, line 10	0	-25	25
3	Shipment 1, line 20	0	-25	25
3	Shipment 2, line 10	50	25	25
3	Shipment 2, line 20	- 50	-75	25
3	Shipment 2, line 30	0	0	0

The USD 100 decrease of Load A is proportionally distributed among both shipments, USD 50 for each shipment. Similarly, for each shipment line of Shipment 1 the freight costs are decreased by USD 25.

Shipment 2, line 10: 50 / (50 + 50) * 50 = 25.

USD 50 is the original freight cost amount of shipment line 10. USD 100 (= 50 + 50) is the original amount of the shipment lines of Shipment 2. The shipment is decreased by USD 50. Shipment line 10 is decreased by USD 25.

Shipment 2, line 20: 50 / (50 + 50) * 50 = 25

For line 20, the freight cost decrease is also USD 25. This amount is subtracted from the original value of USD -50, which results in the new amount of USD -75.

Shipment 2, line 30: 0 / (50 + 50) * 50 = 0

Negative freight costs - example 5

The total freight costs for Load A are USD -25. The total freight costs of load A are increased by USD 100.

Object level	Object	Original freight costs	Increased freight costs	Increased by
1	Load A	-25	75	100
2	Shipment 1	25	58.33	33.33
2	Shipment 2	-50	16.67	66.67
3	Shipment 1, line 10	25	58.33	33.33
3	Shipment 1, line 20	0	0	0
3	Shipment 2, line 10	-25	8.34	33.34
3	Shipment 2, line 20	- 25	8.33	33.33

The USD 100 increase of Load A is proportionally distributed among both shipments.

The original freight cost amount for Shipment 1 is USD 25.

To determine the part of the total increase to be allocated to Shipment 1, the original freight costs of Shipment 1 are divided by the added original freight costs of both shipments and multiplied with the total increase for the load:

25 / (25 + 50) * 100 = 33.33

For Shipment 2, the outcome is 50 / (25 +50) * 100 = 66.67

To determine the part of the total increase to be allocated to line 10 of Shipment 1, the original freight costs of line 10 are divided by the total original freight costs of Shipment 1 and multiplied with the total increase for Shipment 1:

25 / (25 + 0) * 33.33 = 33.33

For line 20 of Shipment 1, the outcome is 0: 0 / (25 + 0) * 33.33 = 0.

For shipment line 10 of Shipment 2, the increase is:

25 / (25 + 25) * 66.67 = 33.34

For line 20, the increase is USD 33.33. For the last shipment line of a shipment, the calculation is not performed, but instead the calculated amounts for the other shipment lines is added up and subtracted from the total freight cost increase for the shipment:

66.67 - 33.34 = 33.33

Negative freight costs - example 6

The total freight costs for Load A are USD 25. The total freight costs of load A are decreased by USD 100.

Object level	Object	Original freight costs	Decreased freight costs	Decreased by
1	Load A	25	-75	100
2	Shipment 1	-25	-58.33	33.33
2	Shipment 2	50	-16.67	66.67
3	Shipment 1, line 10	-25	-58.33	33.33
3	Shipment 1, line 20	0	0	0
3	Shipment 2, line 10	25	-8.34	33.34
3	Shipment 2, line 20	25	-8.33	33.33

The USD 100 decrease of Load A is proportionally distributed among both shipments.

The original freight cost amount for Shipment 1 is USD -25.

To determine the part of the total decrease to be allocated to Shipment 1, the original freight costs of Shipment 1 are divided by the added original freight costs of both shipments and multiplied with the total decrease for the load:

25 / (25 + 50) * 100 = 33.33

For Shipment 2, the outcome is 50 / (50 + 25) * 100 = 66.67

To determine the part of the total decrease to be allocated to line 10 of Shipment 1, the original freight costs of line 10 are divided by the total original freight costs of Shipment 1 and multiplied with the total decrease for Shipment 1:

25 / (25 + 0) * 33.333 = 33.33

For line 20 of Shipment 1, the outcome is 0: 0 / (25 + 0) * 33.33 = 0.

For line 10 of Shipment 2, the decrease is:

25 / (25 + 25) * 66.67 = 33.34

For line 20, the decrease is USD 33.33. For the last shipment line of a shipment, the calculation is not performed, but instead the calculated amounts for the other shipment lines is added up and subtracted from the total freight cost increase for the shipment:

66.67 - 33.33 = 33.33

Freight rate retrieval

In Pricing, freight rates are stored to calculate the transportation costs of items listed on:

- Freight order lines
- Freight order clusters
- Sales order lines
- Sales quotation lines
- Loads
- Shipments

To determine the transportation costs of, for example, a sales order line, LN retrieves the freight rate from freight rate books. To find the correct freight rate book, LN uses freight rate matrices.

Retrieval of the freight rate matrix is based on these fields:

- The **Invoicing Method** selected on the order header or in the Invoice-to Business Partner (tccom4112s000) session. If the invoicing method is **Client Rates**, client rates are searched for. If the invoicing method is **Freight Costs** or **Freight Costs (Update Allowed)**, carrier rates are searched for. If the invoicing method is set to **Not Applicable**, no freight rates are searched for.
- The **Carrier Freight Rate Control** and **Client Freight Rate Control** parameters in the Pricing Parameters (tdpcg0100m000) session, which can be set to **First Rate** or **Lowest Rate**.

To retrieve freight rates from a freight rate matrix, LN searches for valid freight rate books in the freight rate matrices for which a matrix priority is defined. LN searches the freight rate matrices for a matrix definition and matrix attributes that match the properties of the sales order line, shipment, freight order cluster, etc. Note that all of the matrix attributes must match the properties of the sales order line, freight order cluster, shipment, etc. When found, the freight rate book of the freight rate matrix, in which the matrix definition and the matrix attributes are stored, is used to calculate the transportation costs of the sales order line.

Note

For loads and shipments, freight rates from more than one freight rate book can be used to calculate the freight costs. This depends on the properties of the loads or shipments involved.

To allocate additional costs

To use additional cost calculation, you must select the **Calculate Additional Costs** check box in the Calculate Freight Costs (fmfrc0240m000) session. The criteria for shipment lines and cluster lines to be charged with extra costs and the amounts are maintained in additional cost sets. If a shipment line or a cluster line matches the criteria of an additional cost set, extra charges are added to the shipment line or cluster line.

An additional cost set consists of a code and a description. To each additional cost set, you must link one or more selection criteria and one or more cost items. In the cost items, the actual additional cost amounts are stored.

Additional cost sets are defined in the Additional Cost Sets (fmfrc2110m000) session. Selection criteria are linked to additional cost sets in the Additional Cost Sets by Carrier/LSP, Item and Address (fmfrc2120m000) session. Cost items are defined and linked to additional cost sets in the Items by Additional Cost Set (fmfrc2150m000) session.

Selection criterion

An additional cost set has any or all of the following selection criteria:

- Carrier
- Ship-from address
- Ship-to address
- Item. In this case, the item is not a cost item, but an item to be transported.

If the selection criteria of an additional cost set matches one of the properties of a shipment line or a cluster line, the cost items of the additional cost set can be used to add extra costs to the shipment line or cluster line.

Example

Additional cost set	Selection criteria	
Set A	Carrier:	Road Express, Inc.
Set B	Ship-to address:	Denver
Set C	Item:	Computer
Set D	Carrier:	Southern Airways
	Item:	Frozen shark-fins

Shipment or cluster lines that are transported by Road Express, Inc are charged with the additional costs defined in Set A. Shipment or cluster lines that go to Denver are charged with the additional costs defined in Set B. Shipment lines or cluster lines that are transported by Southern Airways and that contain frozen shark-fins are charged with the additional costs defined in Set D.

Cost items

An additional cost set includes at least one cost item. A cost item includes the following elements:

- Cost amount. The cost amount of the item is defined in the Items - Freight Management (fmfmd1100m000) session.
- Item property on which the additional costs are based.
- Upper and lower limits for the item property. You can define one of the following item properties for a cost item:
  - **Quantity**
  - **Weight**
  - **Volume**
  - **Floor Space**
  - **Freight Value**

For each of these properties, you can define an **Upper Limit** and a **Lower Limit** to set the range within which the additional cost amount applies. When an item on a shipment line or cluster line matches the item property and the limits of the item property, the cost amount of the cost item is added to the shipment line or cluster line.

Example

Additional cost set A consists of the following cost items:

Cost item	Description	Cost base	Lower limit	Upper limit	Cost amount
1	Packaging cost	Weight	10 kg	20 kg	EUR 10
2	Packaging cost	Weight	21 kg	40 kg	EUR 15
3	Insurance	Freight value	USD 50	USD 150	EUR 10

The selection criterion of cost set A, as shown in the first example, is carrier Road Express, Inc. If a cluster line has carrier Road Express, Inc., the calculation engine checks the cost items of cost set A to see if the cost items match the properties of the cluster line. If, for example, the weight of the goods listed on the cluster line is between 10 kg and 20 kg, the cost amount of EUR 10 defined for cost item 1 is added to the cluster line.

Brief outline of the additional cost allocation process

The process of additional cost allocation includes the following steps:

1. The calculation engine selects the additional cost set whose selection criteria match the corresponding properties of a particular shipment line or cluster line.
2. Of the selected additional cost set, the calculation engine selects the cost item whose cost base and upper/lower limits match the properties of the item on the shipment line or cluster line.
3. The costs defined for the selected cost item are added to the costs of the shipment line or cluster line.

Note

If more than one additional cost set matches a particular shipment line or cluster line, all matching additional cost sets are used to add additional costs to the shipment line or cluster line. If more than one cost item matches the properties of a shipment line or cluster line, the cost amounts of all matching cost items are added to the shipment line or cluster line. As a result, the cost amounts of several cost items from several additional cost sets can be added to a shipment line or cluster line.

Chapter 15
Introducing Subcontracting

15

Subcontracting

Subcontracting is the process of offering freight orders to an external carrier for transportation. You can create load plans for the freight orders and offer the planned loads to a carrier, or you can offer clustered freight order lines for which no load building is performed.

- **Offer planned loads**
  To offer planned loads to a carrier, you must create load plans for the freight orders that you offer. To create load plans, you must use load building, which is the transport planning functionality of Freight. The planned loads are then offered to a carrier. The carrier must carry out the transportation of the loads according to the load plans.
- **Offer clustered freight order lines**
  To offer clustered freight order lines, you create one or more freight order clusters and offer the clusters to a carrier. A freight order cluster is a group of freight order lines that is selected on specific criteria. Load building is not carried out for freight order clusters. Instead, the carriers perform the transport planning themselves.

Carrier selection

To select a carrier, you can run the LN carrier selection process, or simply enter a carrier for the freight orders that you want to subcontract. Freight selects the carriers to whom the freight orders are to be subcontracted during the load building process or the freight order clustering process. However, during the clustering process, Freight skips carrier selection if a suitable carrier is entered on the freight order.

Freight cost calculation

In addition, LN makes an estimate of the freight costs of the orders that you subcontract to the carrier during the load building process or the clustering process. The estimated freight costs can be used to match the invoice that the carrier sends.

Subcontracting instructions

For both the planned loads and the freight order clusters, you can print subcontracting instructions. The subcontracting instructions constitute the subcontracting order.

Business scenarios

Subcontracting can be set up to fit in with various business scenarios. These scenarios can range from organizations that subcontract all of their transport to external carriers to organizations that plan and transport their regular goods transports themselves, but subcontract exceptional transports that require special transport conditions and/or special means of transport.

Chapter 16
Clustering loads and freight orders

16

To subcontract planned loads

To subcontract planned loads to a carrier, proceed as follows:

Step 1:

Start the Print Subcontracting Instructions (fmfoc3410m000) session.

Step 2:

In the Print Subcontracting Instructions (fmfoc3410m000), select the **Load** option.

Step 3:

Select the loads for which you want to print subcontracting instructions using the selection criteria and the printing options as explained in Print Subcontracting Instructions (fmfoc3410m000).

Step 4:

Click Print.

You can print pro forma versions of the subcontracting instructions first. After both parties have agreed upon the instructions, you can print the final version. You can reprint the final version as often as you want, but you cannot change the contents of the final version. When the final instructions are printed for a load, the **Subcontracted** check box on the load is selected. Final subcontracting instructions can only be printed for a load that has at least the **Actual** status.

EDI Messages

If an EDI relation is set up with the buy-from business partner of the carrier, an EDI message is generated to notify the carrier of the subcontracting order when the final version of the subcontracting instructions is printed. An EDI message can be generated for a load with shipments and shipment lines and for a freight order cluster with freight order cluster lines.

To subcontract freight order clusters

To subcontract the transport planning and the transportation of particular goods to a carrier, you must carry out the following procedure.

Step 1: Generate freight order clusters

The first step of the subcontracting procedure is generating freight order clusters. To generate a freight order cluster, you must select the freight order lines that you want to subcontract and run the batch process that groups these freight order lines into freight order clusters.

Freight order clusters are generated in the Generate Freight Order Clusters (fmfoc3200m000) session. For further information on how to select the freight order lines that you want to cluster and run the freight order clustering batch process, see Generate Freight Order Clusters (fmfoc3200m000).

Freight order line conditions for clustering

For a freight order line to be subcontracted, the following conditions must be met:

- The **LoadPlanning** check box must be cleared in the Freight Order Lines (fmfoc2101m000) session. Whether this check box is selected or cleared can be controlled in various ways. For further information, see *The load planning attribute (p. 173)* and *To set up subcontracting (p. 143)*.
- The status of the freight order line can be **Expected** or **In Progress**. For further information on freight order line statuses, see *Freight order statuses (p. 35)*.
- The freight order line cannot be grouped in another cluster, regardless of the cluster status.
- To start up the clustering process, the user must be authorized for the shipping office and planning group of the freight order line.

To be clustered, a freight order line must meet all of these conditions. Freight order lines that could not be clustered in a particular clustering batch-process run are listed in a report. Reports are run if the **Reports** check box is selected in the Generate Freight Order Clusters (fmfoc3200m000) session.

Step 2: Actualize freight order clusters

When a freight order cluster is finalized, you can actualize the cluster to indicate that the cluster is ready to be offered to the carrier and the subcontracting order can be printed.

To actualize a freight order cluster, a carrier and a transport means group must be entered for the cluster. Carriers and transport means groups can be added to the freight order clusters as follows:

- Carriers and transport means groups are inserted in the freight order or freight order lines on which the clusters are based.
- Carriers and transport means groups are selected during the freight order clustering process.
- Carriers and transport means groups are manually inserted in the freight order clusters after the freight order clustering process.

Freight order clusters are actualized in the Actualize Freight Order Clusters (fmfoc3210m000) session. If a freight order line related to a cluster line has a Bill of Materials (BOM), the components are added to the cluster line when the cluster is made **Actual**.

Before you print the final version of the subcontracting instructions for a cluster (see next step), LN recommends that you use the **Undo Actualize** option and rerun the clustering process to include any new freight order lines in the cluster, and to remove changed freight order lines from the cluster.

Changes in the originating orders and order lines result in new freight orders and/or freight order lines being created if, after the changes, the freight order lines no longer match the properties of the cluster. New freight order lines are not clustered, and changed freight order lines are removed from the cluster. To include the most recent freight order lines in the subcontracting order, you must rerun the clustering process. The **Cluster Changed** check box indicates whether cluster lines have been added or removed, and does not provide information on new freight order lines that have not yet been clustered. For further information, see *How freight order and originating order changes affect clusters (p. 137)*.

Step 3: Print subcontracting instructions

For freight order clusters that have the **Actual** status, you can print subcontracting instructions in the Print Subcontracting Instructions (fmfoc3410m000) session. Subcontracting instructions constitute the subcontracting order for the carrier. Optionally, you can print a **Pro Forma** version before you print the **Final** version. You can print the **Pro Forma** version as often as you want.

After the last details of the subcontracting order have been agreed upon with the carrier, you can print the **Final** version. When the **Final** version is printed, the freight order cluster receives the **Subcontracted** status. As with **Pro Forma** versions, you can also reprint the **Final** version as often as you want, but you cannot change the contents of the **Final** version for the same clusters.

For **Subcontracted** clusters, LN creates the financial transactions and the information is sent to the Accounts Payable module of Financials.

EDI Messages

If an EDI relation is set up with buy-from business partner of the carrier, an EDI message is generated to notify the carrier of the subcontracting order when the final version of the subcontracting instructions is printed. An EDI message can be generated for a load with shipments and shipment lines and for a freight order cluster with freight order cluster lines.

Creating freight order line clusters

After you select the freight order lines that you want to cluster and start up the clustering process in the Generate Freight Order Clusters (fmfoc3200m000) session, LN takes the following steps to cluster the freight order lines:

Step 1: Group freight order lines

To create freight order clusters for the batch of freight order lines that you selected for subcontracting, LN first groups freight order lines with matching properties into clusters. The grouping process is carried out as follows:

1. Each freight order line, for which the **SingleShipment** check box is selected is grouped into a single freight order cluster.
2. Freight order lines that belong to a freight order header for which the **SingleShipment** check box is selected are grouped into a cluster.
3. LN checks whether freight order lines in the current batch match the properties of clusters created previously that have the **Clustered** status. If so, the freight order lines are added to the previously created clusters.
4. LN creates clusters for the remaining freight order lines. The number of clusters that LN can create from a batch of freight order lines depends on the properties of the freight order lines of the batch. Freight order lines are grouped into a cluster if the following properties match:
   - Ship-from and ship-to addresses
   - Ship-from and ship-to companies, sites, codes, and types. **Note**: These clustering criteria are not used if the **Cluster by Address** check box is selected in the Generate Freight Order Clusters (fmfoc3200m000) session. See *Clustering by address (p. 128)*.
   - Time windows, which do not require an exact match, but must at least overlap.

All freight order lines that you selected for subcontracting belong to the same shipping office and planning group, for **Planning Group** and **Shipping Office** are mandatory criteria in the Generate Freight Order Clusters (fmfoc3200m000) session.

The following properties are not always defined for freight order lines, but if the properties are defined, these properties must also match:

- Carrier
- Transport means group
- Transport type
- Service level
- Terms of Delivery
- Additional rate unit

Step 2: Select carrier and transport means group for clusters created in Step 1

After the freight order lines are grouped into clusters, LN selects a carrier and a transport means group for each of the generated clusters according to the selected carrier selection criterion in the Generate Freight Order Clusters (fmfoc3200m000) session. For further information on the carrier selection criterion, see Generate Freight Order Clusters (fmfoc3200m000).

Based on the carrier selection criterion, carriers are selected from the carriers defined for the shipping office and planning group of the freight orders that are clustered and the carriers defined for the transport means group selected for the freight orders.

Carriers are linked to shipping offices and planning groups in the Carriers/LSP by Shipping Office and Planning Group (fmfrc0160m000) session.

If a carrier and/or a transport means group were manually entered for the freight order lines of a particular cluster, LN does not replace this carrier and/or transport means group. However, if required, you can change the carrier and/or transport means group after the clustering process is finished. For further information, see *To change freight order clusters (p. 129)*.

When LN selects a carrier and transport means group, the calendar of the carrier is not checked, nor is the loading capacity of the transport means group or the available number of vehicles for the carrier. The reason is that these are planning considerations, and planning-related matters are left to the carrier to whom the freight orders are subcontracted.

If LN cannot find a suitable carrier, the cluster is created without a carrier and transport means group. In these types of cases, you can manually enter a carrier and transport means group for the cluster.

Step 3: Calculate freight costs for clusters created in Step 1

The last step of the clustering process is calculating the freight costs for the clusters. If you selected the **Calculate Additional Costs** check box, additional costs are calculated if additional costs apply to any of the freight order lines of the clusters. For further information, see *Calculation of estimated freight costs (p. 105)* and *To allocate additional costs (p. 117)*

Summary of the clustering process

- In Step 1 , freight order lines are grouped into clusters.
- The clusters created in Step 1 are provided with a carrier and transport means group in Step 2.
- In Step 3, the freight costs, and, if applicable, the additional costs are calculated for the clusters. The new clusters receive the **Clustered** status. For further information on cluster statuses, see *Cluster and cluster line status overview (p. 139)*.

Note

Before you set a cluster to **Actual**, you must rerun the clustering process to include any new freight order lines in the subcontracting order. Changes in the originating orders and order lines can result in new freight orders and/or freight order lines being created. New freight order lines are not clustered. If you want to include the most recent freight order lines in the subcontracting order, you must rerun the clustering process. For further information, see *How freight order and originating order changes affect clusters (p. 137)*

Clustering by address

To limit the number of freight order clusters generated for a group of freight order lines, you can select the **Cluster by Address** check box in the Generate Freight Order Clusters (fmfoc3200m000) session to cluster freight order lines by ship-from and ship-to address.

If freight order lines are clustered by ship-from and ship-to address, these clustering criteria are not used:

- **Ship-from Company**
- **Ship-from Site**
- **Ship-From Type**
- **Ship-From Code**
- **Ship-to Company**
- **Ship-to Site**
- **Ship-to Code**
- **Ship-to Type**

Clustering by address prevents multiple freight order clusters from being created for freight order lines with identical addresses but different ship-from or ship-to warehouses.

For example, if five warehouses with identical addresses are specified on multiple freight order lines, these freight order lines are grouped into five clusters if this check box is cleared, and one cluster if this check box is selected.

Printing subcontracting instructions

Subcontracting instructions are printed in the Print Subcontracting Instructions (fmfoc3410m000) session.

You can print subcontracting instructions for ranges of **Actual** freight order line clusters or loads for which the load status ranges from **Actual** to **Completed**. The instructions are listed by freight order cluster and planned load date. The subcontracting instructions constitute the actual subcontracting order.

You can print **Pro Forma** or **Final** versions of subcontracting instructions. You can print the **Pro Forma** version and reprint the **Final** version as often as you want. When the **Final** version is printed for a cluster, the freight order line cluster is completed and receives the **Subcontracted** status. When the **Final** version is printed for a load, the **Subcontracted** check box is selected for the load.

If an EDI relation is set up with the carrier, an EDI message to notify the carrier of the subcontracting order is generated if you print the **Final** version of the subcontracting instructions. If you reprint the subcontracting instructions, generating EDI messages is optional.

To print subcontracting instructions, you must first indicate whether the subcontracting instructions must be printed for loads or Actual freight order clusters. Next, you must enter the criteria to select the loads or shipments for which you want to print subcontracting instructions.

Chapter 17
Maintaining clusters

17

To change freight order clusters

In each stage of its life cycle, a freight order cluster can frequently be changed for various reasons. For example, the carrier has informed you that they are not available, in which case you must change the carrier for the cluster. Or, new freight order lines have been created because the customer has ordered more goods, so you must rerun the clustering process to cluster the new freight order lines. Depending on the properties of the new freight order lines, you can add the properties to the cluster, or you can create a new cluster.

You can manually change some data in the cluster header and the cluster lines. To add new freight order lines to a cluster, you must rerun the clustering process using the same selection criteria.

Changes in originating orders and/or freight orders related to clusters are updated in the cluster if the properties of the changed freight order lines still match the cluster. If the properties do not match, a new cluster is created.

If the freight order line related to the cluster line has a warehousing order line, changes made to the cluster line in the warehouse, such as changes in the quantity of the cluster line when the line is shipped, are updated by Warehousing. If a cluster line is not related to a warehousing order line, you can set the cluster line to **Shipped** or **Completed** in the Confirm Delivery / Receipt (fmlbd3252m000) session.

Confirm delivery/receipt for clusters

In Freight, you can set the status of batches of cluster lines to **Shipped** or **Completed**. This option has been introduced to enable you to indicate the progress through warehousing and transport for cluster lines that are not linked to Warehousing. For cluster lines that are linked to Warehousing, some of the steps through warehousing and transport are updated by Warehousing, and some are updated by the user in this session.

Note

In this session, you can only process clusters and cluster lines that have at least the **Actual** status.

Cluster lines related to freight orders created manually

A cluster line related to a manually created freight order line is not linked to Warehousing. In this session, to indicate that the goods of a cluster line that is not linked to Warehousing have been loaded onto a truck or other vehicle and have left the warehouse, you must set the status to **Shipped**. To indicate that the goods have reached their destination, you must set the status to **Completed**.

If you change the status of a freight order cluster line, which is not linked to Warehousing, the status of the relevant freight order line is also changed. If such a cluster line's status is changed to **Shipped**, the **Shipped Quantity** field and the shipped capacity fields of the cluster line are filled by default with the values from the **Planned Quantity** field and the planned capacity fields. If a cluster line's status is changed to **Completed**, the **Delivered Quantity** field and the delivered capacity fields of the cluster line are filled by default with the values from the **Shipped Quantity** field and the shipped capacity fields. In neither case are user entries overwritten. If required, you can manually change the values in these fields.

Cluster lines related to freight orders created from originating orders

A cluster line is linked to Warehousing if the cluster line is related to a freight order line that has an originating order.

Outbound transport

If the goods on the originating order are transported from a warehouse defined in Warehousing to a business partner, the transport is outbound. The outbound steps range from **In Progress**, **Shipped**, **Completed** to **Closed**.

Status	Related activities
In Progress	Outbound procedures are started in Warehousing for the warehousing order related to the cluster lines and freight order lines. Warehousing updates this status on the freight order lines and the cluster lines.
Shipped	If all goods of the warehousing orders are loaded onto a truck or other vehicle and have left the warehouse, the warehousing orders and order lines obtain the **Shipped** status in Warehousing. The Warehousing **Shipped** status is automatically passed on to the related freight order lines and cluster lines in Freight.
Completed	You can use the Confirm Delivery / Receipt (fmlbd3252m000) session to set the status to

	Completed when the goods of the cluster are delivered at the customer, when the carrier has provided you with this information
Closed	When the transportation has been paid for, the status is set to **Closed**. This status is updated from Financials.

Inbound transport

If the goods on the order are transported from a business partner to a warehouse defined in Warehousing, the transport is inbound. The inbound steps range from **Shipped**, **Completed** to **Closed**.

Status	Related activities
Shipped	You can use the Confirm Delivery / Receipt (fmlbd3252m000) session to set the status to **Shipped** to indicate that an inbound order line has left the supplier's warehouse, if this information is know from the carrier. This status can also be set when the advanced shipment notice (ASN) is received.
Completed	Warehousing, individual warehousing order lines that are received in the warehouse are set to Received. If all the orderliness of a warehousing order have obtained the **Received** status, the warehousing order including the order lines obtain the **Final Receipt** status. If a warehousing order has obtained the **Final Receipt** status, the **Completed** status is automatically passed on to the related freight order lines and cluster lines in Freight.
Closed	When the transportation has been paid for, the status is set to **Closed**. This status is updated from Financials.

Manual changes to cluster data

The cluster status determines the changes that you can manually insert in freight order clusters and cluster lines.

Clustered

After a freight order cluster is generated, you can manually change the cluster header information in the following fields:

- **Carrier**
  This field shows the carrier that LN found during the clustering process, or that was entered for the freight order lines related to the current cluster. You can change the carrier in this field if you want to subcontract the cluster to a carrier other than the one found by LN or entered on the corresponding freight order lines. This field is empty if LN cannot find a suitable carrier, or if no carrier was entered manually on the freight order lines from which the cluster was generated. In such cases, you can manually enter a carrier. This also applies to binding carriers. A binding carrier is a carrier entered on a freight order line that LN cannot override during the load building or clustering process. To insert a binding carrier, enter a carrier and select the **Carrier/LSPBinding** check box in the Freight Order Lines (fmfoc2101m000) session.
- **Transport means group**
  This field shows the transport means group that LN found during the clustering process, or that was entered for the freight order lines related to the current cluster. You can change the transport means group in this field if you want the cluster to be transported by means of a transport means group other than the one found by LN or entered on the corresponding freight order lines. This field is empty if LN cannot find a suitable transport means group, or if no transport means group was entered manually on the freight order lines from which the cluster was generated. In such cases, you can manually enter a transport means group.
- **Planned load date**
  The default value in this field is taken from the freight order lines related to the cluster. If a different date is known from the carrier, you can enter the new date in this field.
- **Planned unload date**
  The default value in this field is taken from the freight order lines related to the cluster. If a different date is known from the carrier, you can enter the new date in this field.
- **Planned distance**
  The planned distance is taken from the freight order lines related to the cluster. If a different distance is known from the carrier, you can enter the new distance in this field.
- **Estimated freight costs**
  The estimated freight costs are calculated during the clustering process, if freight rates are maintained for the carrier selected or entered for the cluster. If required, you can manually change the estimated freight costs, or recalculate the estimated freight costs. To recalculate the freight costs, click the relevant option on the appropriate menu.

- **Calculate additional cost option**
  You can select or clear this check box for clusters with the **Clustered** status. For example, if you calculated the additional costs, but later on agree with the carrier not to pay any additional costs, you can clear this check box and recalculate the freight costs.
- **Freight all kinds**
  If the carrier is changed, changing this field might also be required. Freight all kinds is a special freight cost rating agreement with the carrier. If the carrier and the transport requestor agree on rating according to Freight all kinds, the official freight classes of the items will be substituted by the Freight all kinds agreement. In LN, **Freight All Kinds** is defined as special freight class.
- **Carrier pro number**
  If the carrier is changed, changing this field might also be required. The **Carrier Tracking Number** is the number given by the carrier to identify the load. The carrier uses this number to track the load.
- **Calculate tax**
  You can select this option if tax must be calculated. Changing the setting of this check box might be required if a different carrier is selected.
- **Tax country**
  Changing the setting of this check box might be required if a different carrier is selected.
- **Cluster text**
  In this field, you can add some general information about the cluster.

To change cluster line information

For a cluster line, you can change the following information:

- **Planned load date of the line, not the header**
  The default value in this field is taken from the freight order lines related to the cluster. If a different date is known from the carrier, you can enter the new date in this field.
- **Planned unload date of the line, not the header**
  The default value in this field is taken from the freight order lines related to the cluster. If a different date is known from the carrier, you can enter the new date in this field.
- **Actual load date**
  If the freight order line related to the cluster line has a warehousing order line, the actual load date is filled by Warehousing with the actual shipping or receipt date. If the freight order line related to the cluster line has no warehousing order line, the actual load date is filled with the date on which the status of the cluster line was changed to **Shipped** or **Completed** in the Confirm Delivery / Receipt (fmlbd3252m000) session. You can also manually enter a date, or change the date generated by LN.
- **Actual unload date**
  If the freight order line related to the cluster line has a warehousing order line, the actual unload date is filled by Warehousing with the actual shipping or receipt date. If the freight order line related to the cluster line has no warehousing order line, the actual load date is filled with the date on which the status of the cluster line was changed to **Shipped** or **Completed** in the Confirm Delivery / Receipt (fmlbd3252m000) session. You can also manually enter a date, or change the date generated by LN.

- **Shipped quantity**
  If the freight order line related to the cluster line has a warehousing order line, the shipped quantity is filled by Warehousing with the shipped or received quantity. If the freight order line related to the cluster line has no warehousing order line, the shipped quantity is filled with the planned quantity. You can also manually enter a quantity, or change the quantity generated by LN.
- **Delivered quantity**
  If the freight order line related to the cluster line has a warehousing order line, the delivered quantity is filled by Warehousing with the shipped or received quantity. If the freight order line related to the cluster line has no warehousing order line, the shipped quantity is filled with the planned quantity. You can also manually enter a quantity, or change the quantity generated by LN.
- **Damaged quantity**
  Usually, this quantity is filled when the goods have been delivered and any information on damaged goods is known from the carrier.
- **Shipped capacity**
  The shipped capacity is derived from the shipped quantity.
- **Delivered capacity**
  The delivered capacity is derived from the shipped quantity.
- **Planned additional rate quantities**
  The additional rate quantity for the item before transportation has taken place. The default value in this field is taken from the freight order line related to the cluster line.
- **Shipped additional rate quantities**
  As a rule, you must enter this figure when the shipped quantity is known from the carrier. If the freight order line related to the cluster line has a warehousing order line, the shipped additional rate quantity is filled by Warehousing with the shipped or received quantity. If the freight order line related to the cluster line has no warehousing order line, the shipped additional rate quantity is filled with the planned quantity. You can also manually enter a quantity, or change the quantity generated by LN.
- **The Recalculate for Invoice Amount check box**
  For more information, refer to Freight Invoicing Information (fmfri0110m000).
- **Estimated freight costs**
  For example, if no freight rates are maintained for a particular carrier, you might want to enter freight costs manually.
- **To change freight order line information**
  You cannot change freight order line information such as planned quantity and capacity, service level, or delivery terms, on the freight order cluster or cluster line. This type of change is made on the corresponding freight order line or originating order line.

To add lines to a cluster

To add freight order lines to a cluster with the **Clustered** status, you must cluster the new freight order lines first. Freight order lines whose properties match those of the cluster lines of the cluster will be added to the cluster. For freight order lines whose properties do not match, a new cluster is generated.

You can manually add additional cost lines to a cluster.

Delete clusters and cluster lines

You can delete individual cluster lines from a cluster, or the entire freight order cluster including all cluster lines. Freight order lines corresponding to cluster lines that are deleted can be clustered again.

Actual

When you decide to make a cluster **Actual**, most of the cluster data are definite and changes are less likely to be made, except for information such as actually shipped quantities and capacities or actual costs. Nevertheless, in the interest of caution, ERP enables you to manually change the same data for **Actual** clusters as for **Clustered** clusters.

For a cluster that has the **Actual** status, you cannot rerun the clustering process to add freight order lines. If you want to add cluster lines to an **Actual** cluster, you must use the **Undo Actualize** option to set the cluster's status back to **Clustered** and then rerun the clustering process. However, if the **Actual** cluster includes lines that have the **Shipped** or **Completed** status, you cannot use the **Undo Actualize** option. In such cases, you must generate a new cluster for the new freight order lines.

If a cluster status is reverted to **Clustered**, the cluster lines for the component items of a Bill of Materials (BOM) are removed from the cluster line.

Subcontracted

If a cluster has the **Subcontracted** status, you can no longer change the cluster, the cluster lines, the corresponding freight order lines, or the originating order lines, except for the actual data. The actual data constitute the following information:

- Actual distance
- Shipped quantities
- Delivered quantities
- Damaged quantities
- Actual load and unload dates
- Actual freight costs (these are updated when the invoice from the carrier is approved in the Accounts Payable module of Financials.)

You can also set **Subcontracted** cluster lines to **Ignored**. For further information, see *Ignore cluster lines (p. 137)*.

Updates from Warehousing for cluster lines

Cluster lines are updated by Warehousing if the warehousing order lines linked to the freight order lines corresponding with the cluster lines are updated.

Cluster line received in the warehouse

An inbound cluster line that is received in the warehouse obtains the **Completed** status. Warehousing updates the quantity of the received cluster line in the **Delivered Quantity** field of the cluster line in the Freight Order Cluster Lines (fmfoc3101m000) session. This quantity can differ from the planned quantity for various reasons, for example because of damage during transport. The capacity of the delivered goods is updated in the delivered capacity fields of this session.

Shipped

An outbound cluster line that is loaded onto a truck or other vehicle and has left the warehouse, obtains the **Shipped** status. Warehousing updates the quantity of the cluster line in the Shipped Quantity field of the Freight Order Cluster Lines (fmfoc3101m000) session. Like delivered quantities, shipped quantities can differ from the planned quantities for various reasons, for example due to damage during loading or transport. The capacity of the delivered goods is updated in the delivered capacity fields of this session.

Update unload dates

For inbound cluster lines, Warehousing updates the actual unload dates in the **Unload Date** field in the **Actual Dates** group box of the Freight Order Cluster Lines (fmfoc3101m000) session.

Update load dates

For outbound cluster lines, Warehousing updates the actual load dates in the **Load Date** field in the **Actual Dates** group box of the Freight Order Cluster Lines (fmfoc3101m000) session.

Change carrier

If Warehousing wants to ship a cluster line with a carrier other than the carrier of the cluster line, a new cluster with the **Actual** status is created in Freight listing the cluster line. This can happen if, for example, the carrier that was to transport the cluster line turns out to be unavailable at the last moment. If the cluster line belongs to a subcontracted cluster, Warehousing cannot arrange a different carrier for the cluster line unless the cluster line is set to **Ignored** first.

Manual updates or updates by other packages

Some updates are inserted manually by the user or are passed on by other packages

Damaged Quantity

If any of the goods were damaged during transport, delivery, or receipt in the warehouse, you can manually enter the quantity of the goods that were damaged in the **Damaged Quantity** field of the Freight Order Cluster Lines (fmfoc3101m000) session. This field is not updated from Warehousing.

Freight costs

The freight costs are updated when the invoice from the carrier is approved in the Accounts Payable module of Financials.

For further information on cluster lines that are not linked to Warehousing, see *Confirm delivery/receipt for clusters (p. 129)*.

Ignore cluster lines

You can manually set the cluster lines of a cluster with the **Subcontracted** status to **Ignored**. This option is used to disengage cluster lines from a **Subcontracted** cluster. **Ignored** cluster lines do not belong to a cluster anymore. The related freight order lines can be clustered again. This option is used, for example, if Warehousing wants to ship cluster lines of a **Subcontracted** cluster with a carrier other than the one selected for the cluster. For the freight order lines related to the **Ignored** cluster lines, a new cluster can be created listing the carrier required by Warehousing. To set a cluster line to **Ignored**, proceed as follows:

1. In the Freight Order Cluster Lines (fmfoc3101m000) session, select the cluster line that you want to set to **Ignored**.
2. On the **Actions** menu, click **Set to Ignored**.
3. In the dialog box that appears, click **OK**.

You can manually delete **Ignored** cluster lines from the cluster. If all cluster lines of a cluster are set to **Ignored**, you can delete the entire cluster.

How freight order and originating order changes affect clusters

In practice, the originating orders of freight orders are changed frequently. Originating sales orders are changed if the customer wants more goods, less goods, or different goods, or wants the goods delivered on a different date. Similarly, originating purchase orders are changed if your organization’s requirements from the supplier change.

If an originating order is changed, the corresponding freight order is also changed or deleted.

If order header data, such as the planned delivery date, on the originating order of a freight order is changed, the freight order is deleted and replaced with a new freight order that has the new delivery date. The lines of the deleted freight order are also deleted and replaced or, if a freight order exists with a matching delivery date, the lines are allocated to the freight order with the matching delivery date.

If order line data, such as the quantities are changed on the originating order lines, the corresponding freight order lines and cluster lines are changed accordingly.

If the data, such as the transport means group, of a freight order line related to a cluster line is changed, the related cluster line is removed from its cluster and added to a cluster that match the properties of the changed cluster line. If no matching cluster exists, a new cluster is created for the cluster line.

ERP deletes cluster/cluster lines

Cluster lines related to deleted freight order lines are also deleted if the cluster lines belong to a **Clustered**, **Actual**, or **Closed** cluster. If a cluster has no cluster lines left, the entire cluster is deleted. If cluster lines of **Actual** clusters are deleted, the **Cluster Changed** check box is selected for the cluster, in which case you are advised to check the cluster contents and consider rerunning the clustering process.

Freight order lines that are allocated to another freight order with matching data are not clustered.

ERP changes cluster lines

If order line data, such as the item, is changed on an originating order, the item of the corresponding freight order line and the related cluster line is changed accordingly.

Clusters and cluster lines with the Clustered status

If the data, such as the transport means group, of a freight order line related to a cluster line is changed, the related cluster line is removed from its cluster and added to a cluster that match the properties of the changed cluster line. If no matching cluster exists, a new cluster is created for the cluster line.

Clusters and cluster lines with the Actual status

If a cluster line of an **Actual** cluster is changed, the cluster line is removed from its cluster and added to an **Actual** cluster that match the properties of the changed cluster line. If the **Actual** cluster is changed, the **Cluster Changed** check box is selected for the cluster. If no **Actual** cluster matches the properties of the changed cluster line, the cluster line is added to a Clustered cluster with matching properties. If no matching **Clustered** cluster exists, a new **Actual** cluster is created for the cluster line.

If a **Clustered**, **Actual**, or **Subcontracted** cluster is changed, LN recalculates the freight costs according to the setting of the **Recalculation of Freight Costs** parameter in the Freight Rates and Costs Parameters (fmfrc0100m000) session.

After a cluster line is added or removed from a cluster, the loading and unloading time windows are recalculated for the cluster.

Chapter 18
Cluster status

18

Cluster and cluster line status overview

Cluster headers and cluster lines have various sets of statuses. Cluster header statuses indicate the progress of the cluster during the freight order cluster subcontracting process. Cluster header statuses are displayed in the Freight Order Clusters (fmfoc3100m000) session. Cluster line statuses have the same status as the corresponding freight order lines. Cluster line statuses are displayed in the Freight Order Cluster Lines (fmfoc3101m000) session. These statuses indicate the progress during inbound or outbound warehouse processing and transport. In a technical sense, cluster header statuses and cluster line statuses bear no relation to each other.

Note

Freight order lines with the **Planned** status are planned using the load building engine. Freight order lines that are planned by the load building engine, or are available for load building, cannot be used for freight order line clustering. A freight order line is available for load building if the **LoadPlanning** check box is selected. For further information, see *The load planning attribute (p. 173)*.

In practice, the following status combinations between cluster headers and cluster lines can exist:

	Status	
Freight order line	**Cluster line**	**Cluster header**
Expected	None	None
	Expected	**Clustered**
		Actual

If an **Expected** freight order line is not clustered, no cluster line or cluster header exists for the freight order line. If the **Expected** freight order line is clustered, a cluster line with the same status exists. The

cluster header of this cluster line can be **Clustered** or **Actual**. This depends on the progress of the subcontracting process.

In Progress	None	None
	In Progress	**Clustered**
		Actual
		Subcontracted

If a freight order line with the **In Progress** status is not clustered, no cluster line or cluster header exists for the freight order line. If the freight order line with the **In Progress** status is clustered, a cluster line with the same status exists. The cluster header of this cluster line can be **Clustered**, **Actual**, or **Subcontracted**; this depends on the progress of the subcontracting process.

Shipped	**Shipped**	**Actual**
		Subcontracted

Usually, by the time a freight order line and the corresponding cluster line is **Shipped**, the subcontracting process is nearing its completion. Most clusters have reached the **Subcontracted** stage.

Completed	**Completed**	**Subcontracted**
		Closed
Closed	**Closed**	**Closed**

The following table explains the meaning of freight order line/cluster line and cluster header statuses:

Freight order line/cluster line status	Description
Expected	The initial status. Receipt or delivery warehousing procedures have not yet started.
In Progress	Warehousing procedures have started.
Shipped	For outbound lines, the goods have been loaded and have left your warehouse. For inbound goods,

	the goods have been loaded and have left the supplier's warehouse.
Completed	For inbound lines, the goods have been received and stored in the warehouse. The related warehousing order lines have obtained the **Received** status. For outbound lines, the goods have reached their destination, and the related warehousing order lines are set to **Completed** Warehousing, which in turn updates Freight. Cluster lines or freight order lines that are not linked to Warehousing can be set to **Shipped** or **Completed** in the Confirm Delivery / Receipt (fmlbd3252m000) session.
Closed	If the invoicing procedure has been completed, the status changes to **Closed**.

Cluster header statuses

Status	Explanation
Clustered	The initial status of a cluster. This status is allocated automatically when the cluster is created. Freight order clusters and cluster lines with the **Clustered** status can be deleted. Clusters can be deleted manually. Cluster lines can be removed manually from the cluster. Freight order cluster lines are removed from the cluster by LN if the underlying freight order line is deleted or if the properties of the freight order line are changed, so that the freight order line no longer matches the other lines of the cluster.
Actual	A cluster receives the **Actual** status when the cluster is finalized and ready to be offered to a carrier. The user decides when a cluster is ready for actualization. Clusters are actualized by batch in the Actualize Freight Order Clusters (fmfoc3210m000) session. A freight order cluster line is removed from a cluster with the **Actual** status if the underlying freight order line is deleted, or if at least one of the properties is changed, so that the freight order line no longer matches the other lines of the cluster. In such cases, the **Cluster Changed**

	check box in the Freight Order Clusters (fm-foc3100m000) session is automatically selected.
Subcontracted	A cluster receives the **Subcontracted** status when the final version of the subcontracting instructions has been printed. You can only print subcontracting instructions for clusters that have the **Actual** status.
Closed	A cluster receives the **Closed** status after the goods have reached their destination and the invoice from the carrier has been paid. Freight order clusters and cluster lines that have the **Closed** status can be deleted.

Chapter 19
Subcontracting setup

19

To set up subcontracting

You can set up the subcontracting functionality in the way that best suits the requirements of your organization. The following guidelines and examples show how subcontracting can fit in with various business scenarios.

General guidelines

You can use freight orders for either freight order line clustering or load building. If load building is enabled for a freight order, the freight order cannot be used for freight order line clustering. Alternately, a freight order for which load building is disabled can only be used for freight order line clustering. If you use freight order line clustering for all freight orders, you cannot use load building. Loads created using the Freight load building functionality can be subcontracted. You can print subcontracting instructions for loads if the load status ranges from Actual to Completed.

The following are the basic ways in which you can set up freight order subcontracting. The scenarios discussed later show how you can fine-tune the setup to meet the requirements of specific business scenarios.

- **Use freight order line clustering for all freight orders**
  If you set up subcontracting in this way, load planning is disabled for all freight orders, therefore, you can only subcontract clustered, unplanned freight orders.
- **Use freight order line clustering for freight orders with particular properties**
  For example, you can contract out transport planning and execution for freight orders that require special transport types or transport conditions. For these freight orders, load building is disabled. This means, that for other freight orders you can use load building and subcontract the planned loads.
- **Use subcontracting for planned loads only**
  As a result, freight order clustering is disabled for all freight orders. You can only subcontract planned loads.
- **No subcontracting**
  You enable load building for all freight orders, but do not use the option to print subcontracting instructions for the planned loads.

Scenarios

The following scenarios describe how you can set up freight order subcontracting for shippers who do not use transport planning and shippers who plan part of their goods transports themselves.

The shipper does not use transport planning

In general, you can distinguish the following business scenarios for shippers who do not use transport planning. Each of these scenarios has its own setup requirements.

The shipper works with one carrier or logistics provider

The shipper is not involved in the planning and execution of transport. For transport planning and execution, the shipper has a contract or partnership with a single carrier or logistic service provider, who handles all his transport related requirements.

For this scenario, you can, for example, clear the **Load Planning** check box for the freight order types that you define to make all freight orders available for freight order subcontracting. Because only one carrier exists to whom freight orders are subcontracted, carrier selection by LN is not required. For subcontracting purposes, you only need to maintain one carrier.

You can also consider defining a default carrier in the Freight Order Control Parameters (fmfoc0100m000) session, which will be the default carrier for all new freight orders, or define a default carrier for the freight order types that you define.

If freight cost calculation and carrier invoice matching is not required, you can clear the **Transport Costing** check box in the Freight Rates and Costs Parameters (fmfrc0100m000) session, and you do not have to maintain carrier rate books in the Pricing module of Order Management.

The shipper selects from a list of preferred carriers

Again, the shipper is not involved in the planning and execution of transportation but, to efficiently subcontract freight orders, the shipper wants to make a selection from a list of carriers to find the most suitable and cheapest carrier. In such cases, the shipper must make an estimate of the freight costs prior to transportation and check the carrier’s invoice. This will help the shipper to keep a tab on freight costs and the degree of efficiency with which transport is carried out.

For this scenario, you can also clear the **Load Planning** check box for the freight order types that you define to make all freight orders available for freight order subcontracting. Because carrier selection and freight cost calculation are required, you must maintain a list of suitable carriers and carrier rate books in the Pricing module of Order Management.

The shippers plan part of their transports themselves

For shippers who plan part of their goods transports, you can distinguish the following business scenarios. As in the previous scenarios, these scenarios have a number of specific setup requirements.

The shippers plan regular transports, but subcontract transport planning of exceptional transport orders to a fixed carrier

The shippers plan most of the transport activities themselves, possibly because transportation is carried out by his own fleet or dedicated carrier, or because they simply want to be in complete control of the planning and execution of regular transport activities, most likely related to the shippers' core business. The more exceptional transport activities are not included in the transport planning, but are subcontracted as freight orders to a fixed carrier, parcel delivery company, or LSP. Freight cost estimation and invoice matching of the subcontracted orders are required.

In this environment, only particular types of goods, that most likely require special transport conditions or special means of transport, are subcontracted to a fixed carrier. This means that freight orders on which such types of goods are listed must be available for subcontracting. To accomplish this, you can define transport means groups or transport types for which you clear the **Load Planning** check box. You can add these transport types and/or transport means groups to items in the Items - Freight Management (fmfmd1100m000) session.

The shippers select the carriers

The shippers plan, and possibly carry out, regular transport, but exceptional transport orders are subcontracted to different carriers, which are selected on the basis of specific criteria. Freight cost estimation and invoice matching of the subcontracted orders is required.

The subcontracting setup for this environment is much the same as for the previous environment. The main difference is that the carrier who is to carry out the transport planning and the transport is selected from a list. Therefore, defining transport means groups and transport types for which the **Load Planning** check box is cleared will also do the job in this scenario. To enable carrier selection freight cost estimation, and invoice matching, carrier rate maintenance for the carriers maintained for subcontracting is required.

Chapter 20
Invoicing

20

Freight cost revenue calculation at order line entry

Freight calculates the estimated freight costs of loads and shipments during load building, or freight order clusters during freight order clustering, but you can also calculate freight costs for individual freight order lines before load building or clustering takes place, or for individual sales order lines or sales quotation lines before freight order lines are created.

Freight cost revenues are revenues that result from the freight cost amounts that you charge your customers or suppliers with for transportation. For example, if you hired a carrier to transport goods to your customer, you can charge your customer for freight costs. The amount you charge your customer with can be equal to the amount you paid to the carrier, or some client rate.

Freight order lines

For freight order lines, to calculate freight cost revenues, you can click **Calculate** in the **Amount** group box in the Freight Invoicing Information (fmfri0110m000) session before loads, shipments, or freight order clusters are created. However, this calculation is subject to the following conditions:

- The invoicing method must be **Client Rates**.
- Freight costs must not be calculated for the originating sales order line, or if they are, the **Freight Amount Binding** check box should not be selected.

For invoicing methods other than **Client Rates**, the invoice amount is updated with the freight costs from the carrier invoice, possibly with a mark-up.

If freight cost revenue calculation takes place at freight order line entry, the following process takes place:

1. If no carrier is specified for the freight order line, Freight searches for the carriers linked to the planning group to which the freight order line belongs.
2. If Freight finds a carrier from the planning group, the corresponding client rate is picked up from Pricing.

Sales order lines and sales quotation lines

For sales order lines and quotation lines, freight cost revenue calculation can be carried out before the corresponding freight order lines are created.

When freight cost revenue calculation takes place from a sales order line or sales quotation line, Freight checks the relevant data, such as the item, service level, and the loading/unloading dates and times against planning group criteria to find a matching planning group. This process is similar to grouping freight orders in planning groups.

When a planning group is found, Freight selects a carrier from the planning group and picks up the corresponding freight rate from Pricing. If the invoicing method defined for the invoice-to business partner is **Client Rates**, the **Client Rates** defined in Pricing are searched. If the invoicing method is **Freight Costs** or **Freight Costs (Update Allowed)**, the carrier rates defined in Pricing are searched.

If the invoicing method is **Not Applicable**, no freight rates are searched.

Note

For freight order lines, sales order lines, and sales quotation lines, carriers and corresponding freight rates are selected according to the **Rate and Carrier/LSP Selection at Order Line** parameter setting in the Freight Rates and Costs Parameters (fmfrc0100m000) session.

The invoicing process

Organizations often arrange the transportation of the goods they sell to their customers. Often, they also arrange for the transportation of the goods they buy from their suppliers. In both cases, organizations usually subcontract the transportation of these goods to a carrier.

The organizations must pay the carrier for the transportation of the goods. To be compensated for the freight costs that they must pay to the carrier, organizations can send an invoice to the customer or the supplier. In Freight Invoicing, invoices can be created for external business partners. For internal business partners, freight invoices are created in the Intercompany Trade module. For more information, refer to *Internal and external freight invoicing (p. 153)*.

Most organizations have agreements with their customers and suppliers on how much they can charge for transportation: the full amount they had to pay to the carrier, some special rate, or no charge at all. In Freight, the amount for freight costs invoiced to the business partner is determined by the invoicing method defined for the business partner. For further information, see *Invoicing methods (p. 151)*.

Invoices for freight costs are based on freight orders. To create invoices, the invoicing information of these orders must be released to Invoicing. In Invoicing, the invoices are created and sent to the business partners.

To release sales and freight order information to Invoicing

The release of sales-order invoicing data can be carried out in Sales. When a sales invoice is released to Invoicing with the calculated amount on the sales order (detail) line, LN can release the freight invoice to Invoicing as well. Invoicing then combines the order invoice with the freight invoice and sends a single invoice.

For LN to release the freight invoice information together with the sales invoicing information, select the **Include Freight Costs** check box in the Release Sales Orders/Schedules to Invoicing (tdsls4247m000) session. Otherwise, you must release the freight information by means of the Release to Invoicing (fmfri0210m000) session or the Freight Invoicing Information (fmfri0110m000) session.

If a freight order has been generated for a sales order, the freight order can be released before the originating sales order. In such cases, Sales creates an invoice for the price of the goods sold, and Freight creates an invoice for the freight costs.

Note

You cannot release invoicing data directly for orders of other origins, but you can release invoicing information from the freight order that is created from the these orders. The reason for this is that no invoicing option exists for these orders.

Freight invoicing handled by Freight or Service

Freight invoicing can be handled by Freight or by Service.

If handled by Service, the invoicing status in the Freight Invoicing Information (fmfri0110m000) session is **Not Applicable**. For more information, refer to Possible values

To release freight orders to Invoicing

For freight orders to be released to Invoicing, the status of the freight orders must at least be **Shipped**. This enables freight cost recalculation if the shipped quantity differs from the ordered quantity. For further information on freight cost recalculation, see **Recalculate for Shipment Differences**. In addition, freight orders with statuses lower than **Shipped** are more likely to be cancelled or changed, therefore, invoicing these types of orders can be pointless.

Freight orders can be released by batch in the Release to Invoicing (fmfri0210m000) session. Alternatively, you can release individual freight order lines to Invoicing in the Freight Invoicing Information (fmfri0110m000) session.

Invoicing based on Freight Costs or Client Rates

If invoicing is initiated from a freight order, you can release the freight order for invoicing when the status of the freight order is **Shipped** or higher than **Shipped**. A freight order receives the **Shipped** status:

- After the loads and shipments created from the freight order have received the **Shipped** status.
- The warehousing order related to the freight order has received the **Shipped** status.

Invoicing based on Freight Costs (update allowed)

If differences occur between the freight cost amount invoiced to the business partner and the transportation costs actually incurred, this invoicing method enables you to send another invoice to the business partner charging them with the difference.

Invoicing based on carrier invoice

If invoicing is based on a carrier invoice, you can charge the business partner with the difference between the freight-cost amount invoiced before the carrier invoice was known and the carrier invoice amount.

After the invoice of the carrier has been received and approved in the Accounts Payable module, LN passes on the actual freight costs from the carrier invoice to Freight and updates the shipments and loads or the freight order clusters with the actual freight costs. LN also updates the freight orders, from which the loads, shipments, or clusters originate, with the actual costs. For this purpose, the actual costs of the shipments and loads or clusters are divided among the freight orders on which the shipments and loads or clusters are based.

To specify that invoicing is based on a carrier invoice:

- For loads, select the **Carrier/LSP Invoice** check box in the Loads (fmlbd4100m000) session.
- For freight order clusters, select the **Carrier/LSP Invoice** check box in the Freight Order Clusters (fmfoc3100m000) session.

Invoicing based on estimated costs made final

If invoicing is not based on a carrier invoice, for example, because your organization performs goods transports itself, you can also invoice your business partner with updated transport cost amounts if, after you sent the transport cost invoice to the customer, the transport costs actually incurred turned out to be different from those invoiced.

To update freight costs if invoicing is not based on a carrier invoice, change the amounts on the shipments or clusters as needed and on the appropriate menu of either the Freight Order Clusters (fmfoc3100m000) session or the Loads (fmlbd4100m000) session, click **Set Actual Cost**--> **Final**. Note that this option is available if the status of the load or cluster is **Completed**. For more information, refer to Final.

To specify that invoicing is not based on a carrier invoice, in either the Freight Order Clusters (fmfoc3100m000) session or the Loads (fmlbd4100m000) session, clear the **Carrier/LSP Invoice** check box.

Release updated freight costs to Invoicing

After the user sets the estimated costs to Final, or after the freight costs are updated with the carrier invoice amount from the Accounts Payable module, you must release the updated freight costs to Invoicing, where the updated freight costs will be further processed and invoiced to the business partner.

In Invoicing, the actual costs are further processed and invoices are created and sent to the business partner.

Note that the updated actual costs are only released to Invoicing if the difference with any previously released freight costs is greater than the difference specified in the Freight Invoicing Parameters (fmfri0100m000) session. In the Freight Invoicing Parameters (fmfri0100m000) session, you can specify these margins in the **If greater than** field and the **If amount greater than** field.

Note

If the invoicing methods **Freight Costs** and **Freight Costs (Update Allowed)** apply, internal business partners are always invoiced with the actual freight costs. Cost-plus and additional costs are two different concepts. Additional costs are extra services the carrier has carried out for which you must pay.

A mark-up on the carrier costs is added to the invoice if the **Additional Percentage** check box or the **Additional Amount** check box is selected in the Invoice-to Business Partner (tccom4112s000) session.

Invoicing methods

The following invoicing methods can be used to determine the amount invoiced to business partners for freight charges:

- **Freight Costs**
  Freight costs are transportation costs based on the carrier rates maintained in Pricing and the most recent information available on the quantities, volumes, and/or weights of the goods that are prepared for transportation, that are being transported, or that actually have been transported. The height of the freight cost amount invoiced to the business partner depends on the moment the freight cost calculation is carried out.

  If the freight costs are calculated before goods are prepared for transportation, the freight costs are based on the total ordered quantity, weight, and/or volume of the goods that must be transported. During loading, transportation or transfer, changes can be made to these quantities, weights or volumes due to damage to the goods, insufficient transport capacity, and so on.

  If freight costs are calculated during any of these stages of the transportation cycle, the amount can differ from the freight cost amount calculated before transportation took place. If the freight costs are calculated after transportation has taken place, the freight cost amount is equal to the actual freight costs made. This is the amount that the carrier will charge for transport services.

- **Freight Costs (Update Allowed)**
  The freight costs are based on the carrier rates maintained in Pricing, which is the same as for the **Freight Costs** invoicing method.

  If differences occur between the freight cost amount invoiced to the business partner and the transportation costs actually incurred, this invoicing method enables you to send another invoice to the business partner charging him with the difference.

The following scenarios exist in which the business partner can be invoiced with updated transport costs:

- **Invoicing based on carrier invoice**
  If the freight costs have been calculated and invoiced to the customer before the invoice from the carrier has been received, and the amount invoiced to the customer differs from the amount of the carrier invoice, you can charge the customer with the difference.
- **Invoicing based on estimated costs made final**
  If the freight costs have been calculated and invoiced to the customer before the actually incurred freight costs are known, and the amount invoiced to the customer differs from the actually incurred amount, you can charge the customer with the difference.

Whether you can invoice the business partner for the difference between the invoiced transport costs and the transport costs actually incurred, is controlled by parameter settings: if the difference is greater than a given percentage and amount, the customer is invoiced with the difference. You can set these parameters in the **If greater than** field and the **If amount greater than** field of the Freight Invoicing Parameters (fmfri0100m000) session.

- **Client Rates**
  Client rates are freight rates agreed on with an organization's business partners. These rates are maintained in the client freight rate books in Pricing.
- **Not Applicable**
  No invoicing.

Note

- For the invoicing methods **Freight Costs** and **Freight Costs (Update Allowed)**, the actual and estimated freight cost can be augmented with costs-plus. Cost-plus means that you place a mark-up on the carrier costs to reach the amount with which you invoice the business partner.
- In the Invoice-to Business Partner (tccom4112s000) session, you can define the following fields if you want LN to add a cost-plus amount or a cost plus percentage to the invoice:
  - **Additional Percentage**
    The percentage with which the freight invoice amount must be increased.
  - **Additional Amount**
    The amount with which the freight invoice amount must be increased.
- Cost-plus and additional costs are two different concepts. Additional costs are extra services the carrier has carried out for which you must pay.
- The invoicing methods, with or without costs-plus, can be specified on business-partner level in the Invoice-to Business Partner (tccom4112s000) session and in the Sold-to Business Partner (tccom4110s000) session. You can also select these options in individual sales orders, purchase orders, and freight order lines. For freight order lines, these options are available in the Freight Invoicing Information (fmfri0110m000) session. In this way, you can overrule the settings made at business-partner level for individual orders.
- For internal business partners, freight invoices are created in the Intercompany Trade module. For more information, refer to *Internal and external freight invoicing (p. 153)*.

Internal and external freight invoicing

In the Freight Invoicing module, freight invoices can be created for both internal and external business partners.

External business partners are the customers or suppliers on whose behalf the transportation costs are incurred. Business partners are maintained in Common. Suppliers and customers are maintained as buy-from business partners and sold-to business partners. Invoices are sent to the invoice-to business partners of the sold-to and buy-from business partners.

Internal business partners are departments in larger organizations that can be invoiced internally. In large organizations, the shipping office arranges transportation on behalf of internal business partners such as:

- sales offices
- purchase offices
- service departments
- warehouses

The shipping office receives the invoice from the carrier. In turn, the shipping office invoices the sales office, the warehouse, the service department, or the purchase office internally to be compensated for the carrier charges incurred.

In Common, shipping offices, service departments, sales offices, and purchase offices are maintained as departments. To enable invoices to be created for the internal business partners related to the departments, relations must be defined between the departments. Relationships are defined in the Intercompany Trade module of Common.

To create an internal invoicing relationship between two departments, two relationships must be defined.

The first relationship indicates whether the from-entity (department) or the to-entity is responsible for paying the transportation costs. This relationship is defined in the Internal Freight Responsibilities (tcitr2130m000) session.

The second relationship is between the shipping office and the responsible entity of the first relationship. The shipping office in this relation is the shipping office linked to the responsible entity of the first relationship. This relationship is defined in the Intercompany Trade Relationship (tcitr2600m000) session.

In Freight, shipping offices are linked to warehouses and - through the originating order types - to other entities.

If the responsible entity of the first relationship is also responsible in the second relationship, an internal invoice must be created.

Example

Relationship 1 Internal Freight Responsibilities (tcitr2130m000)

From-entity	To-entity	Responsible entity

Warehouse	Sales office	Sales office

Relationship 2 Intercompany Trade Relationship (tcitr2600m000)

From-entity	To-entity	Responsible entity
Shipping office	Sales office	Sales office

The responsible entity in relationships 1 and 2 is the entity that pays for the freight costs, which is the entity to which the internal invoice is sent.

Recalculation of invoice amount for shipment differences

The **Recalculate for Shipment Differences** parameter controls the way freight invoice amounts of freight order lines are recalculated. Freight invoice amounts may have to be recalculated if the shipped quantity of goods is less than the ordered quantity for which the freight invoice amount is calculated, or if an over-delivery has occurred.

During loading, transporting, and unloading, the quantity of the goods that must be transported can change due to a variety of reasons, such as damage during loading or insufficient transport capacity. Similarly, over-deliveries may occur. For example, if a customer orders 14 pieces of a given article and the article is delivered in boxes containing 15 pieces. In all such cases, an organization must be enabled to recalculate invoice amounts.

The following recalculation settings are available:

- Automatic.
- Manual.

Automatic

*If the invoicing method is **Client Rates**:*

The **Invoice Amount** is automatically recalculated.

*If the invoicing method is **Freight Costs** or **Freight Costs (Update Allowed)**:*

The estimated costs of the load or shipment created from the freight order line are automatically recalculated, and the **Invoice Amount** field in the Freight Invoicing Information (fmfri0110m000) session is updated.

Manual

*If the invoicing method is **Client Rates**:*

The **RecalculateInvoice Amount** check box of the Freight Invoicing Information (fmfri0110m000) session is automatically selected. Therefore, for the best results you must recalculate the invoice amount, but you can choose to manually change the invoice amount or not to change the invoice amount.

*If the invoicing method is **Freight Costs** or **Freight Costs (Update Allowed)**:*

The **Recalculate for Invoice Amount** check box in the shipment line is selected, and this triggers the selection of the **RecalculateInvoice Amount** check box of the Freight Invoicing Information (fmfri0110m000) session.

If the **Invoice Amount Binding** check box of the Freight Invoicing Information (fmfri0110m000) session is selected, the parameter value is ignored. Recalculation is not possible in this case.

Chapter 21
Inventory commitments in Freight Management

21

Inventory commitments in Freight

In the Generate Inventory Commitment (fmfoc2210m000) session, you can generate or cancel inventory commitments for selected ranges of freight orders, freight order clusters, loads, or shipments. The purpose is to make sure that the inventory is available when the actual shipping starts.

When you generate or cancel inventory commitments, the inventory is actually committed or canceled for the originating orders of the selected freight orders, freight order clusters, loads, or shipments.

The inventory is committed first to the freight order lines and shipments lines with the earliest planned load date.

You can generate inventory commitments for freight orders before a load plan or a freight order cluster is created.

If you generate inventory commitments for freight orders, freight order clusters, loads, or shipments, and a freight order line has the **Actual** status, which means that there is an actual plan, only the committed inventory of the shipment lines of the actual plan are updated. If there is no actual plan, all shipments lines in all plans are updated with the committed inventory.

You cannot generate or cancel inventory commitments for originating orders for which outbound advice is created.

In the Generate Plan (fmlbd0280m000) session, you can select the **Plan with Committed Inventory Only** check box to build load plans based on committed inventory.

Prerequisites

To generate inventory commitments:

- Originating orders for the freight orders must exist.

- The **Planned Delivery Date** option must be selected in the **Generate Inventory Commitment based on** field in the Inventory Planning Parameters (whinp0100m000) session *in the originating company*.
- The **Batch** option or the **Order Line Entry** option must be selected in the **Commitment Policy** field of the Item - Sales (tdisa0601m000) session.

The latter two prerequisites ensure that inventory commitments are generated for the originating order lines.

Interaction of inventory commitment updates in Infor LN

When inventory commitments are generated in the Generate Inventory Commitment (fmfoc2210m000) session, the inventory commitments in Warehousing and the committed quantities on the originating sales order lines of the selected freight orders, freight order clusters, loads, or shipments are updated. Inventory commitments for other order origins are not updated.

If commitments are generated from packages other than Freight, only the inventory commitments in Warehousing are updated, but not the related freight order lines and shipment lines.

Inventory commitments that are decreased or canceled in the Inventory Commitments (whinp2100m000) and Cancel Inventory Commitment (whinp2204m000) sessions are updated on the related shipment lines and freight order lines. If they are increased in the Inventory Commitments (whinp2100m000) session, they are not updated on the related shipment lines and freight order lines.

Generate freight order clusters for committed inventory only

In the Generate Freight Order Clusters (fmfoc3200m000) session, you can generate freight order clusters exclusively for freight order lines with committed inventory. For this purpose, the **Cluster with Committed Inventory Only** check box must be selected.

Chapter 22
To use Freight Management for direct deliveries

22

To use Freight Management for direct deliveries

To use Freight to plan or cluster direct deliveries, freight orders are generated from purchase orders that are linked to direct delivery sales orders or service orders.

Since the goods are directly transported from the buy-from business partner to the sold-to business partner in direct deliveries, the warehouses defined in LN are not involved. Therefore, the freight orders, clusters, loads, and shipments are not updated from Warehousing, but only from the direct delivery sales order and related purchase order in Order Management.

Freight orders

For a freight order used for direct deliveries the originating order is a purchase order, and the related order is a sales order or a service order.

Because warehouses are not involved in direct deliveries, the shipping office is selected by means of a shipping office matrix definition without a warehouse.

Freight related data is copied from the purchase order line or the related sales order or service order line to the freight order (line).

For example, the buy-from business partner information and the planned unload date is copied from the purchase order, and the sold-to business partner information and the planned load date is copied from the direct delivery sales order. If the purchase order is initiated from a service order, data such as the buy-from business partner, planned unload date, and required quantity is defaulted from the service order.

The carrier, carrier binding setting, service level, and route is defaulted from sales order or the service order, because agreements made with the customer should never be ignored. If this information is not present on the sales order or service order, this information is taken from the purchase order.

For further details on the data that is copied from the purchase order line or the related sales order line to the freight order (line), refer to the field help of the Freight Orders (fmfoc2100m000) session, the Freight Order (fmfoc2100m100) session, and the Freight Order Lines (fmfoc2101m000) session.

Note

If for a sales order the **Delivery Type** was set to **Direct Delivery** after a freight order was generated, this freight order is deleted. A new freight order is generated after the purchase order generated from the direct delivery sales order is approved.

The direct delivery sales order - Freight Management procedure

After a sales order of type direct delivery is created and approved, a purchase order or a purchase order advice is generated, the latter is determined by parameter settings.

Approving the purchase order causes a freight order to be generated. The freight order includes data copied from the purchase order and the related sales order.

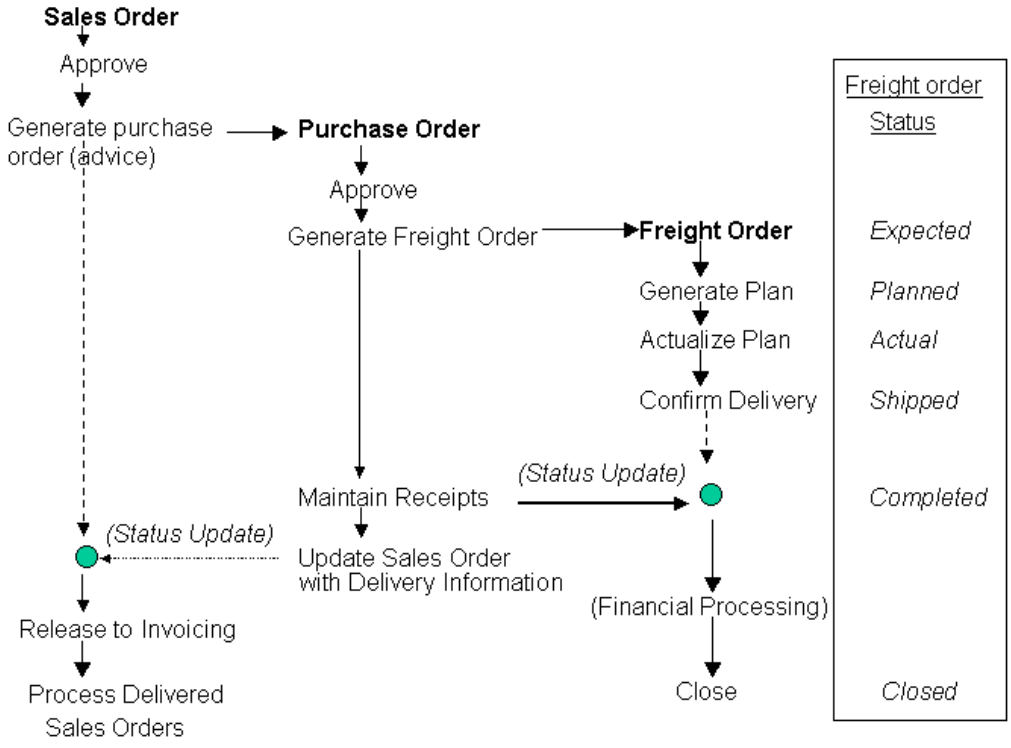
Next, a load plan or, as the case may be, a freight order cluster is created and actualized based on the freight order. Optionally, the delivery is confirmed in Freight after a notification from the supplier that the goods are ready for shipment.

The following activity will be recording the receipt of the goods at the customer’s, which automatically registers the completion of the transport. Next, the freight invoicing procedure and financial processing are executed, which enables the freight order to be closed. Finally, the loads or freight order clusters are closed.

Note

If no actual plan, loads, and shipments exist and no carrier is known yet, a carrier must be defined when the purchase receipts are created. This is primarily done for freight cost calculation purposes.

The following diagram outlines the direct delivery sales order - Freight Management procedure:



The direct delivery service order - Freight Management procedure

After a service order of type direct delivery is created and approved, a purchase order or a purchase order advice is generated, the latter is determined by parameter settings.

Approving the purchase order causes a freight order to be generated. The setting that determines that a freight order is generated is defaulted from the service order. The freight order includes data copied from the purchase order and the related sales order.

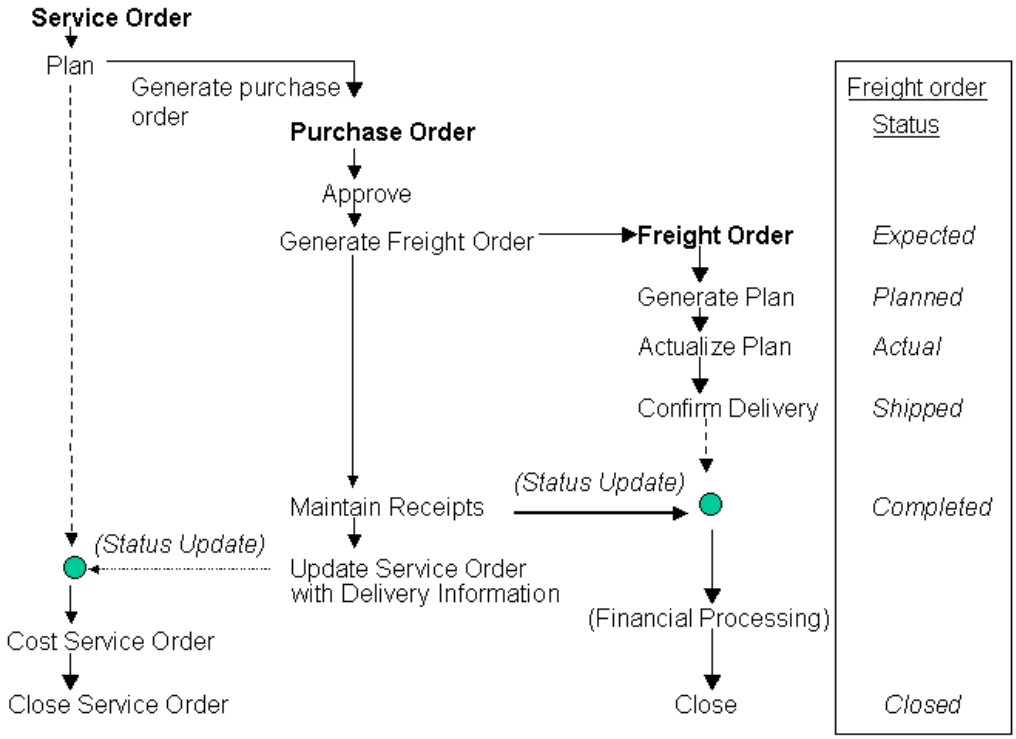
Next, a load plan or, as the case may be, a freight order cluster is created and actualized based on the freight order. Optionally, the delivery is confirmed in Freight after a notification from the supplier that the goods are ready for shipment.

The following activity will be recording the receipt of the goods at the customer's, which automatically registers the completion of the transport. Next, the freight invoicing procedure and financial processing are executed, which enables the freight order to be closed. Finally, the loads or freight order clusters are closed.

Note

If no actual plan, loads, and shipments exist and no carrier is known yet, a carrier must be defined when the purchase receipts are created. This is primarily done for freight cost calculation purposes.

The following diagram outlines the direct delivery service order - Freight Management procedure:



Advance Shipment Notice (ASN)

The use of incoming ASNs has some impact on the direct delivery procedure. If an ASN from the supplier with status Scheduled Manually, which indicates that the goods are ready for shipment, is recorded in LN, the freight order status is updated from **Actual** to **Shipped**.

In the Shipment Notices (whinh3100m000) session, you use the ASN to register the receipt of the goods at the customer's by means of the **Receive Direct Delivery Lines** option. This causes the next freight order status update, from **Shipped** to **Completed**.

Freight invoicing for direct deliveries

If a direct delivery is initiated from a service order, freight invoicing is either handled by Freight or Service. If a direct delivery is initiated from sales, freight invoicing is performed as described in *The invoicing process (p. 148)*

Freight invoicing can take place both internally and externally.

External invoicing

You can invoice the sold-to business partner, that is, the customer who receives the goods, or the buy-from business partner for the transportation of the goods.

- **Invoice buy-from business partner**
  To determine that the bill for the freight services must go to the supplier, the **Invoice External Business Partner** check box must be selected in the Purchase Orders (tdpur4100m000) session.
- **Invoice sold-to business partner**
  To determine that the freight services related to the direct delivery are invoiced to the customer, the **Invoice for Freight** check box must be selected in the Sales Order Lines (tdsls4101m000) session if sales initiated the direct delivery, or, if the direct delivery is initiated by the service office, **By Service** or **By Freight Management** must be selected in the **Invoice for Freight** field of the Service Order Estimated Material Costs (tssoc2120m000) session.

Internal invoicing

The shipping office can invoice the sales office responsible for handling and processing the sales order, the purchase office responsible for the purchase order, or the service office that initiated the service order.

In the Intercompany Trade module, you can set up the following relationships:

- **Order invoice relation**
  This is the invoice relation between the purchase office and the service office or the purchase office and the sales office. For this relationship, in the Internal Freight Responsibilities (tcitr2130m000) session, you can determine the party that is to pay for the freight costs. Defining this relation is not mandatory. If you do not define this relationship, by default, for direct deliveries, the purchase office is to pay for the freight costs.
- **Internal freight invoicing relation**
  This relationship defined in the Intercompany Trade Relationship (tcitr2600m000) session. It defines the invoicing relation between the shipping office and the party that is to pay the freight costs according to the previous relation, or the default party, that is, the purchase office, if the previous relation is not defined.

Chapter 23
Freight Management in multicompany environments

23

Freight Management in multicompany environments

In multicompany environments, freight orders can be generated from originating orders created in various logistic companies. The freight orders are planned or clustered and executed in one or more designated freight planning companies. When the freight order generation process is performed, the freight orders are allocated to a freight planning company.

Actual loads and shipments are sent to the originating companies where Warehousing can execute them. The actual shipping information is then sent back to the freight planning company. In the freight planning company, the loads can be completed and closed.

Most freight master data is shared across the logistic companies within the multicompany setup. All freight planning and executing information is only available in the freight planning company, this is the company of the freight order.

The freight planning company can be any logistic company in the multicompany structure. If any information is requested for a freight order line from an originating company, LN automatically displays or returns the required information from the freight planning company of the freight order line.

Similarly, if a process in Freight requires information from or sends information to the originating company, LN automatically goes to the originating company.

Freight supports these multicompany scenarios:

- **Centralized transportation planning**
  All originating orders from multiple logistic companies are planned and executed in a single central freight planning company.
- **Centralized and local transportation planning**
  The majority of originating orders from multiple logistic companies are planned and executed in a central freight planning company. Other originating orders are planned and executed in the local logistic companies. The local logistic companies are freight planning companies as well in this scenario. You can setup as many central freight planning companies as required.

- **Multicompany warehouse transfers**
  Goods are transferred from a warehouse in one company to a warehouse in another company. In this scenario, not more than three logistical companies can be involved:
  - The company of the from-warehouse where the originating warehouse order creates the freight order. The from-warehouse ships the goods based on the freight planning.
  - The freight planning company, which plans and executes the transport between the warehouses.
  - The company of the to-warehouse, which receives the goods and sends actual receipt information to the freight planning company.

In multicompany environments, the Freight processes work as follows:

- **Create or generate freight order**
  Freight orders can be generated for orders in other LN packages. When a freight order is generated, Freight selects a shipping office based on the originating order attributes. The freight planning company defined for the shipping office determines the company in which the freight order will be created, and in which it can be planned and executed. For more information, refer to *Freight order grouping (p. 41)*.
- **Generate load plan and freight order cluster**
  The load building and freight order clustering processes are performed in the freight planning company, for these processes there is no difference between multicompany and single-company environments. For more information, refer to *Freight order grouping (p. 41)*, *Introducing load building (p. 49)*, and *Creating freight order line clusters (p. 125)*.
- **Actualize load plan or freight order cluster**
  For more information, refer to *Actualize load plan or freight order cluster in multicompany environments (p. 167)*
- **Subcontracting**
  The subcontracting process is performed in the freight planning company, for this process there is no difference between multicompany and single-company environments. For more information, refer to *Subcontracting (p. 121)*.
- **Receive or confirm shipments in Warehousing**
  If a warehousing order line exists for a freight order line, shipments and loads are present in the Planned Loads/Shipments (whinh4180m000) session in Warehousing. These loads and shipments are created by Freight if the freight order line has status **Actual**, or by Warehousing if the freight order line is not yet actual.

  If inbound or outbound shipments are confirmed in Warehousing, this information is updated via the Planned Loads/Shipments (whinh4180m000) session to the freight order clusters, loads, and shipments in the freight planning company. The loads and shipments in the freight planning company are the counterparts of the shipments and loads in the Planned Loads/Shipments (whinh4180m000) session, see Planned Loads/Shipments (whinh4180m000) for further information.

- **Close loads**
  This process is performed in the freight planning company, for this process there is no difference between multicompany and single-company environments. For more information, refer to *Freight order statuses (p. 35)* and *Load plan, load, and shipment statuses (p. 100)*.
- **Calculate freight invoice amount for sales**
  When the freight invoice amount is calculated on a sales order line, the freight planning company is not yet known because a freight order is not yet created for the sales order line. In this case, a shipping office must be selected during the calculation process. Selecting a shipping office is performed in the same way as during freight order generation. The calculation of the invoice amounts takes place in the freight planning company of the selected shipping office. For more information, refer to *Freight cost revenue calculation at order line entry (p. 147)*
- **Freight invoicing**
  Carrier invoicing takes place in the freight planning company. Client invoicing takes place in the originating company of the freight order line when the freight order line is released to invoicing. For more information, refer to *The invoicing process (p. 148)*
- **Multicompany warehouse transfer**
  For more information, refer to *Multicompany warehouse transfer (p. 168)*
- **Lead time calculations**
  This process takes place in the current company. For lead times in Freight, this is the freight planning company, for lead times in other LN packages, this is the current logistic company of the user. As freight master data is shared across companies, this should not lead to different results in different logistic companies.
- **Other integrations**
  For more information, refer to *Integrations in multicompany environments (p. 168)*

Actualize load plan or freight order cluster in multicompany environments

When a load plan is actualized, the loads and shipments are updated in the Planned Loads/Shipments (whinh4180m000) session in Warehousing. Warehousing can use the planned loads and shipments to plan warehouse activities. Freight must update the planned load and shipment data in the originating company of the freight order lines that belong to the shipment lines in the loads and shipments stored in Freight. A single load can contain freight order lines from multiple originating companies. For multicompany warehouse transfers, the planned load and shipment data in the Planned Loads/Shipments (whinh4180m000) session in both the originating company and the related company are updated. This process is similar to freight order clustering.

Multicompany warehouse transfer

For multicompany warehouse transfers, only the from-warehouse order can generate a freight order line. The freight order line is planned in the freight planning company. When the plan is actualized, the planned loads and shipments are created in the Planned Loads/Shipments (whinh4180m000) session for both the from-warehouse company and the to-warehouse company.

The from- and to-warehouse can plan their activities based on the planned loads and shipments. When the shipments are confirmed in the from-warehouse, the load in the freight planning company is updated with the shipping information. Confirming a load to status **Shipped** is an optional, parameter based, step in Freight. When the load is received in the to-warehouse, the load in the freight planning company is updated with actual receipt information and set to status **Completed**.

Integrations in multicompany environments

For integrations in which LN tables are not shared, general rules determine how LN works in a multicompany Freight situation.

If a request for information reaches Freight, LN switches to the correct freight planning company and retrieves the required information. Likewise, if information must be updated in Freight, the correct freight planning company is selected in the process.

For example:

- Update changes of the purchase or sales order line to the existing freight order line.
- Update the **In Progress** status in Freight if the originating order is in progress in Warehousing.
- Perform Freight capacity checks when composing loads or shipments in Warehousing.
- Print orders with deviations in shipment dates from Purchase Control or Sales Control.
- Display freight details from Purchase Control or Sales Control.

If Freight requires additional information for a freight order line, LN switches to the correct originating company to retrieve the required information. Likewise, if information must be updated in the originating company, Freight must select the correct originating company in the process.

For example:

- Starting Warehousing sessions from Freight.
- Starting Purchase Control or Sales Control sessions from Freight.

Limitations in multicompany Freight Management

The following limitations occur in the multicompany functionality for Freight

Generate freight order

Freight orders are initiated by originating orders such as sales or purchase orders. Therefore, the Generate Freight Orders (fmfoc1234m000) session must be run in the logistic company of the originating orders. Freight orders are then generated for orders in the current logistic company.

Means of transport calendar

If you use means of transport in a multicompany setup, you must define a calendar for the means of transport or the carrier. If no calendar is defined, as a rule, the company calendar is used. As each company can have its own calendar, the results depend on the freight planning company. As means of transport calendars are shared, using the means of transport calendar in another freight planning company will result in an update with the company calendar of that freight planning company. This might lead to unexpected results.

Chapter 24
General master data

24

The use of items in Freight Management

When sales orders, purchase orders, planned distribution orders, or warehouse orders require transportation, freight orders are created from these orders. Freight orders are created automatically, per batch, or sometimes manually. During this process, the freight orders are provided with specific freight related information.

Among other things, the items on the freight orders are provided with data that refers to:

- **Physical characteristics**
  This includes their shape, size, or weight.
- **Special properties**
  For example, toxic materials, foodstuffs, or livestock. Special properties are defined by adding transportation master data such as combination codes, transport types, and transport means groups to items.
- **Rating features**
  These include information such as speedy delivery, normal delivery, and so on.

This information is defined in the Items - Freight Management (fmfmd1100m000) session and in the Items - Freight Defaults (fmfmd1101m000) session of the Freight Master Data module.

Freight uses this information to determine the proper type of transportation for these items and to group the orders that list these items into shipments and loads.

To define freight related information for items, proceed as follows:

1. Define default data for items in the Items - Freight Defaults (fmfmd1101m000) session. Defining item default data includes the following steps:
   a. Select an item type and an item group.
   b. Specify values for the available freight attributes related to the selected item type and an item group.
2. Define freight related data for individual items in the Items - Freight Management (fmfmd1100m000) session. In this session, you define freight default data for individual items.

If you define freight defaults for a combination of item type and item group, these default values default for items with matching item types and item groups. Whenever this type of item is entered on a freight order, the default values appear on the freight order line where the item is listed.

Similarly, if a freight order is created that lists an item for which individual freight related data are defined, the freight related data appears on the freight order line that lists the item.

Note

- You can maintain freight related data for combinations of business partners and items in the Items - Ship-from/to Business Partner (fmfmd2100m000) session.
- You can overwrite freight default data for individual items in the Items - Freight Management (fmfmd1100m000) session. In the Freight Order Lines (fmfoc2101m000) session, you can overwrite freight defaults in freight order lines.

Stack factor

The factor by which the surface area of the item is divided. If the stack factor is 10, the surface area of the item is divided by 10. The stack factor of an item indicates the number of items of roughly the same surface area that you can pile on top of the item. On an item with stack factor 10, you can stack nine items with more or less the same surface area. The stack factor provides an estimate, and not the real surface area. For example, for an item with stack factor 10, 1/10th of its actual surface area is calculated as the surface area that the item uses up of the loading capacity of the vehicle in which it is transported. It is assumed that nine other items of roughly the same size will be stacked on top of the item.

The use of freight order types

A **Freight Order Type** is a code that is used for the following purposes:

- To classify freight orders
- To provide freight orders with default values
- To determine the planning group for the freight order lines of the freight orders to which the freight order type is allocated.

To classify freight orders

In the **Description** of a **Freight Order Type**, you can provide some information about the freight orders to which it is allocated, such as the **Order Origin** of the freight orders or the type of goods listed on the freight orders.

To provide freight orders with default values

In the Freight Order Types (fmfmd0160m000) session, you can define default values for freight order types. When a freight order type is allocated to a freight order, the default values of the freight order type are added to the freight order. In the Freight Order Type - Defaults (fmfmd0165m000) session, you can define default values for a freight order type. To define a default value, select the relevant attribute and enter the required value. The following attributes are available:

- **Shipping Office**. This applies only to manually created freight orders. For freight orders generated from originating orders, the **Shipping Office** is determined by the warehouse of the originating order or the order type of the originating order. For further information, see *Freight order types by order origin and shipping office (p. 25)* and *Freight order grouping (p. 41)*.
- **Delivery Terms**
- **Carrier/LSP**
- **Freight Service Level**
- **Single Shipment Order**

Note

Terms of delivery, carriers, and service levels can also be used as matrix attributes to determine the planning group of the freight order lines of a freight order.

To determine the planning group for the order lines of a freight order

A **Freight Order Type** can be used as a matrix attribute to determine the planning group of the order lines of the freight order to which it is allocated. For further information, refer to *Plan matrices and matrix definitions (p. 45)*.

The load planning attribute

To subcontract freight order lines to a carrier for transportation, you can create load plans for the freight order lines and offer the planned loads to the carrier, or you can offer clustered freight order lines for which no load building is performed. In Freight, you can either use load building or freight order line clustering to subcontract a particular freight order line.

To indicate whether a freight order line is available for freight order line clustering or load building, the load planning attribute has been introduced. This attribute is a check box labeled **Load Planning**. This check box is available for various entities, such as Transport Types, Transport Means Groups, and so on, as you can see in the following sections of this topic. If you select this check box for any of these entities, freight order lines referenced by these entities are available for load building. If this check box is cleared, the associated freight order lines are available for freight order line clustering. The load planning attribute is added to the following sessions. For each of the following sessions, the impact of the load planning attribute is described.

Freight order Type Defaults (fmfmd0165m000)

If the **Load Planning** check box is selected for the default values of a particular freight order type, freight orders and freight order lines that have this freight order type are available for load building. If this check box is cleared, the associated freight orders and freight order lines are available for freight order line clustering. In this way, you can establish that freight orders with particular properties, which are defined as freight order type default values, must be clustered, and freight orders without these properties must be planned.

Transport Types (fmfmd0140m000)

If the **Load Planning** check box is selected for a particular transport type, freight order lines linked to this transport type are available for load building. If this check box is cleared, the associated freight order lines are available for freight order line clustering. In this way, you can accomplish that freight order lines that require particular transport conditions must be clustered, and others must be planned.

Transport Means Group (fmfmd0150m000)

If the **Load Planning** check box is selected for a particular transport means group, freight order lines that have this transport means group are available for load building. If this check box is cleared, the associated freight order lines are available for freight order line clustering. In this way, you can accomplish that freight order lines that require particular means of transport and/or transport conditions must be clustered, and all other types of freight order lines must be planned.

Freight Orders (fmfmd2100m000)

If the **LoadPlanning** check box is selected for a particular freight order, the freight order lines of this order are available for load planning. If this check box is cleared, the freight order lines are available for freight order line clustering.

Freight Order Lines (fmfmd2101m000)

If the **LoadPlanning** check box is selected for a particular freight order line, the freight order line is available for load planning. If this check box is cleared, the freight order line is available for freight order line clustering.

Zones

Freight rates are based on distances and zones, and a few other optional elements, such as weight, service level, or carrier. The distances are defined by the distances entered in the Freight Rate Books (tdpcg0150m000) session of Pricing and by the zones defined in Freight.

Zones

A zone includes these elements:

- **Zone identification**
  The code and description of the zone.
- **Zone type**
  The type of zone, which can be set to **ZIP**, **City**, or **Distance**.
- **Carrier**
  Carriers can use their own zone system, on which they base their rates. You can specify a carrier to indicate that a zone is only used by that particular carrier.
- **Zone information**
  The details, such as the origin and destination countries, zip code ranges, cities, or distances, that make up the zone. The **Zone Type** of a **Zone** determines the type of zone information of which a zone consists.
  - Zones by zip
  - Zones by city
  - Zones by distance

How to define zones

1. In the Zones by Zone Type and Carrier/LSP (fmfrc1110m000) session, define the following data:
   a. The **Zone Type**. To select a **Zone Type**, click the New Group button on the toolbar.
   b. The **Carrier/LSP**, if required.
   c. The code and the description of the **Zone**. To add a code and a description, click the New Record button on the toolbar.
2. Start the Zones by ZIP (fmfrc1120m000) session, the Zones by City (fmfrc1130m000) session, or the Zones by Distance (fmfrc1140m000) session to enter the relevant zone information.

The use of zones

Zones by **ZIP**, by **City**, and by **Distance** are used to define freight rates. In the Freight Rate Books (tdpcg0150m000) session, the code of a zone is linked to a freight amount. As a result, all goods transports that take place in regions that are within the zip code ranges, the city ranges, or the distance defined for the zone, have the same basic rate. The other factors that make up the freight rate, such as basic weight or carrier must also apply.

Note

You cannot select zone codes of the **Distance** type in the Freight Rate Books (tdpcg0150m000) session. To define a freight rate by **Distance** in the Freight Rate Books (tdpcg0150m000) session, you must manually enter a distance and the pertaining freight amount. LN links the manually specified distance to the corresponding zone by **Distance** defined in Common.

Rate basis numbers and rate books

A rate basis number in LN is a code that represents a combination of one or more of the following attributes:

- Freight class
- Transport means group
- Transport type
- Planning group

You can use rate basis numbers to determine the carrier rates for the following entities:

- Shipments
- Loads
- Freight order clusters
- Sales order lines
- Sales quotation lines

During freight cost calculation, a rate basis number is allocated to a shipment, cluster, and so on, if the attributes of the shipment, cluster, and so on, match those defined for the rate basis number.

In the Pricing module, carrier freight rate books are linked to rate basis numbers. If the attribute values of the rate basis number match a shipment or a cluster, and so on, the rate basis number is allocated to the shipment or cluster and the freight rate book associated to the rate basis number is used to calculate the freight costs for the shipment or cluster.

In addition to rate basis numbers, other attributes, such as freight service levels and carriers, can also be used to retrieve freight rates to calculate the freight costs loads, clusters, and so on. A carrier rate book can include various properties, in addition to rate basis numbers, that are used to retrieve carrier freight rates.

Carrier selection and cost calculation in Warehousing

For business scenarios where freight costing and invoicing is based on the actual shipment built in Warehousing, LN allows you to calculate freight costs for the shipment and to select the best carrier and transport means group or transport means combination.

In these scenarios, the shipments are not created by in the Generate Plan (fmlbd0280m000) session in Freight, but by Warehousing. These shipments are the actual shipments issued from the warehouse. The warehouse shipments are passed on to the Freight package after the shipment is confirmed in Warehousing. After the warehouse shipments are received in Freight, the freight loads and shipments are created and the freight costs can be invoiced to the customers.

For details, refer to the online Help of

- The **Rate and Carrier/LSP Selection at Warehouse Shipment** field in the Freight Rates and Costs Parameters (fmfrc0100m000) session.

- The **Estimated Freight Costs**, Select Carrier/LSP, and Log Select Carrier/LSP fields in the Loads (whinh4140m000) session.

Chapter 25
Date and time master data

25

Address lead times

Address lead times are the loading and unloading lead times at addresses. Address lead times are included in load building.

Loading and unloading lead time is the time required for loading and unloading at a particular address, added with the waiting time for loading and unloading, and the loading and unloading tolerances. Loading and unloading tolerances are defined for individual addresses in the Addresses - Freight Management (fmfmd0110m000) session. Default loading and unloading tolerances are defined in the Freight Order Control Parameters (fmfoc0100m000) session.

Within the time span determined by the tolerances, you can fine-tune the planned load and unload dates by means of the planned date determiner. For further information on the planned date determiner, refer to *To use the planned date determiner options (p. 58)*.

The calendars of the addresses are used in address lead time calculation as well. This helps avoid planning loading or unloading activities at times no one is available at the addresses.

Address lead times include the following elements:

Lead times

- **Waiting Time for Loading**
- **Time for Loading**
- **Waiting Time for Unloading**
- **Time for Unloading**

Tolerances

- **Earliest Load Date**
- **Latest Load Date**
- **Earliest Unload Date**
- **Latest Unload Date**
- **Loading During Calendar Time Window**
- **Unloading During Calendar Time Window**

If, because of the lead times, a carrier cannot deliver on time, a different carrier, with possibly a different transport means group or transport means combination, is chosen. This can result in higher transportation costs. In the Freight Planning Parameters (fmlbd0100m000) session, the following criteria for carrier, route plan, and standard route selection are available in the **Carrier/LSP Selection Criterion** field:

- Cheapest
- Fastest
- Shortest

Load and unload date/time tolerances

Default loading and unloading date/time tolerances are used to maintain agreements between business partners on limits within which the tolerances can exceed planned load and unload dates. Business partners usually maintain such agreements because in practice, you cannot always meet planned loading or unloading dates and times. In addition, loading and unloading date/time tolerances enable the business partners to combine orders that would otherwise have to be transported separately.

In LN, loading and unloading date/time tolerances provide the scope to combine freight orders that would otherwise have to be transported separately. Without such tolerances, even minor load/unload time differences between freight orders that should actually be grouped, will cause LN to treat these orders as separate orders that cannot be combined. Because date and time entries, which are recorded in Coordinated Universal Time (UTC), are detailed down to minutes, it would be difficult to combine freight orders at all without tolerances.

You can enter general default loading and unloading date/time tolerances in the Freight Order Control Parameters (fmfoc0100m000) session, and default loading and unloading date/time tolerances for individual addresses in the Addresses - Freight Management (fmfmd0110m000) session. If tolerances are defined for the ship-from and the ship-to addresses of a freight order, and the **Use Tolerances** check box is selected in the Addresses - Freight Management (fmfmd0110m000) session, the tolerances defined for the ship-from and ship-to addresses of the freight order are used. If the **Use Tolerances** check box is cleared, the tolerances defined in the Freight Order Control Parameters (fmfoc0100m000) session are used.

When LN creates a freight order, the planned delivery and receipt dates of the originating order are taken as the planned load and unload dates.

For manually created freight orders, the LN date/time is taken as the default planned loading date/time. The default planned unloading date/time is calculated as follows:

LN date/time + service level or transportation time + calendars of ship-from/ship-to addresses.

The transportation time of the service level is used if a service level is defined for the freight order. If not, the transportation time is calculated from the average speed defined for the relevant transport means groups and the distance in the **Distance** field of the **Length** group box in the Distance Table by City (tccom4537m000) session or the distance in the **Distance** field of the **Length** group box in the Distance Table by ZIP Code/Postal Code (tccom4538m000) session of the Common.

The default earliest and latest loading and unloading dates/times are derived from the planned loading and unloading dates/times according to the calendars of the ship-from and ship-to addresses on the freight order and the tolerances defined in the Addresses - Freight Management (fmfmd0110m000) session, or the tolerances defined in the Freight Order Control Parameters (fmfoc0100m000) session.

To define loading and unloading date/time tolerances

In both the Addresses - Freight Management (fmfmd0110m000) session and the Freight Order Control Parameters (fmfoc0100m000) session, you can define the following tolerances:

- Earliest load and unload tolerances.
- Latest load and unload tolerances.

You can enter a quantity and a user-definable time unit in the tolerance fields, which enables LN to determine the earliest and latest loading and unloading dates/times automatically. The earliest and latest dates/times are calculated as follows:

Earliest load date = planned load date - earliest load date tolerance

Latest load date = planned load date + latest load date tolerance

Earliest unload date = planned unload date - earliest unload date tolerance

Latest unload date = planned unload date + latest unload date tolerance

In addition, the calendar of the ship-from address is taken into account for loading dates/times. For unloading dates/times, the calendar of the ship-to address is taken into account. If no calendar is defined for these addresses, the company calendar is referred to.

The earliest and latest loading and unloading dates/times are displayed in the earliest and latest loading and unloading date fields of the Freight Orders (fmfoc2100m000) session.

Calendar time-windows

You can either use the earliest and latest loading/unloading options or the calendar time-window options to define loading or unloading date/time tolerances. Calendar time-window means the opening hours of a ship-from or ship-to address. As a result, if, for example, you select the **Loading During Calendar Time Window** option, loading and unloading can take place anytime during the opening hours of the ship-from or ship-to addresses. The opening hours are defined in the calendars of the ship-from and ship-to addresses. If no calendar is defined for these addresses, the company calendar is referred to. You can select the **Loading During Calendar Time Window** option for individual loading or unloading addresses in the Addresses - Freight Management (fmfmd0110m000) session, or generically for all addresses in the Freight Order Control Parameters (fmfoc0100m000) session.

Example of default loading and unloading date/time calculation

The planned load date/time of a freight order is 02/17/2004 08:00, which is taken as default from the planned delivery date of the originating sales order. The planned unload date/time is 02/17/2004 20:00, which is taken as default from the planned receipt date of the originating sales order. The opening hours of the ship-from address are 07:00 to 18:00. The opening hours of the ship-to address are 06:00 to 18:00. These opening hours are stored in the calendars of the ship-from address and the ship-to address.

The **Earliest Load Date Tolerance** is four hours. This would imply that loading could start at 04:00 (planned load time 08:00 minus four hours). However, the ship-from address is not open until 07:00. Therefore, LN plans one hour of the **Earliest Load Date Tolerance** (07:00 to 08:00) on the same day and the three remaining hours on the previous day. As a result, the earliest load date in the freight order is 02/16 2004 15:00 (18:00 minus three hours).

The **Latest Load Date Tolerance** is also four hours. This means, that loading should be finished by 12:00. According to the calendar, 12:00 is well within the opening hours, so the latest load date in the freight order is set at 02/17 2004 12:00.

The **Earliest Unload Date Tolerance** is five hours. This implies, that unloading can start at 15:00. This is well before the ship-to address is closed, so the earliest unload date for the freight order is 17/02 2004 15:00. Note that if the **Earliest Unload Date Tolerance** was less than two hours, unloading could not take place on the same day.

The **Latest Unload Date Tolerance** is also five hours. This would mean, that unloading could be finished by 01:00 the next day. Because the unloading dock does not open until 06:00 according to the calendar of the ship-to address, the latest unload date for the freight order is set at 02/18/2004 11:00 (06:00 plus five hours).

Chapter 26
Route and address master data

26

The use of shipping offices and planning groups

The shipping office and planning group entities play a key role in freight order grouping and load building.

Business environment

In most organizations, shipping offices are responsible for the planning or subcontracting of transportation of goods listed on orders. As a rule, each shipping office is responsible for the transportation of orders that originate from a particular warehouse or group of warehouses. Usually, each warehouse stores particular types of goods, or goods that require special handling.

Setup

In LN, this situation is reflected by the ability to link the warehouse entities to shipping office entities. One or more warehouses can be linked to a shipping office. A shipping office can have various warehouses, but a warehouse can only be linked to one shipping office. In addition, each sales order, purchase order, or planned distribution order created in LN is linked to a warehouse. This is performed to indicate the warehouse where the goods listed on the order come from, or are to be delivered to, and to group the freight orders.

Important!

For direct deliveries, however, the goods originate from external suppliers and go directly to customers without going through your warehouse. Therefore, there is no link between the shipping office and warehouses, or originating orders and warehouses in the direct delivery situation. This situation is modeled by means of shipping matrices that have no warehouses as selection criteria.

Outline of the freight order and freight order line grouping process

To perform load building or freight order clustering, freight orders are first grouped by shipping office. Freight order grouping is based on shipping office matrices that provide various criteria to select shipping offices. If no suitable matrix is available, the shipping office is selected based on the warehouses linked

to shipping offices in the Warehouses by Shipping Office (fmfmd0185m000) session. For direct deliveries, shipping office matrices are used that have no warehouses as selection criteria.

Then, when a number of freight orders are allocated to a shipping office, the freight order lines of these freight orders are grouped into the planning groups defined for this shipping office. The groups of linked freight order lines and planning groups are used by the load building engine to build shipments and loads.

The use of addresses in Freight Management

The addresses maintained in Freight originate from Common. You can add specific freight related data to each address, including:

- Areas
- Shipment procedures
- Lead times, including load and unload date/time tolerances
- Distances between addresses, which you can define in the following sessions:
  - Distance Table by City (tccom4137s000)
  - Distance Table by ZIP Code/Postal Code (tccom4138s000)

The addresses maintained in Freight are used for the following purposes:

- To indicate the ship-to or ship-from address on freight orders.
- To provide, by means of the specific Freight data, some information about the ship-to or ship-from address on freight orders, such as lead times.
- To group freight orders as a preparatory step for transportation planning and/or freight order clustering.
- Transportation planning
- Transport costing

LN uses the address lead times and the distances between the addresses for transport planning and transport costing.

The use of standard routes

A standard route is a fixed route that is traveled with a particular frequency, such as a truck that visits delivery addresses according to a fixed schedule, a rail service, or a boat service. Usually, transportation via standard routes costs less than travel via non-fixed routes.

A standard route covers a range of addresses and provides some details about the route, such as the execution frequency of the route, the carrier, and the transport means group of the means of transport that travel the standard route. Most of these standard route details are user-defined.

The ranges of addresses are defined by zip codes or by areas. Zip codes for standard routes are defined in the ZIP Codes by Standard Route (fmlbd0151m000) session and areas for standard routes are defined in the Areas by Standard Route (fmlbd0152m000) session. You can define execution frequencies for standard routes in the Standard Routes (fmlbd0150m000) session and in the Dates and Times by Standard Route (fmlbd0155m000) session. You can access these sessions on the appropriate menu of the Standard Routes (fmlbd0150m000) session.

In the Standard Routes (fmlbd0150m000) session, you can add the following route details to the standard route:

- Transport category
- Carrier
- Transport means combination
- Transport means group
- Route
- *Execution frequencies for standard routes (p. 88)*

Standard routes are used in the consolidation and pooling planning algorithms. The pooling algorithm uses route plans. Route plan legs can use standard routes.

A shipment or a load is allocated to a standard route if:

- The times and addresses of the shipment or load match the time frame and geographical frame (defined by areas or zip codes) of the standard route.
- The route details of the shipment or load match those of the standard route.

If more than one standard route matches these criteria for a given shipment or load, the load building engine selects the most cost-effective standard route according to the standard-route selection criterion specified in the Freight Planning Parameters (fmlbd0100m000) session. If you enter different standard routes in the freight order lines of a freight order, the load building engine builds a separate load for each standard route.

Standard routes are not mandatory, but if you use the consolidation planning method, you can create loads and shipments as shown in the example in *Planning methods (p. 56)*.

Carrier selection by standard route

If large numbers of carriers are available in LN to perform transportation for standard routes, selecting a carrier for a standard route during load building may take relatively long.

To limit the number of available carriers, and thus to speed up the planning process, for each standard route you can specify the available carriers in the Carrier/TMG/TMC by Standard Route (fmlbd0153m000) session. This session is available if the **Carrier/TMG/TMC by Standard Route** check box is selected in the Freight Planning Parameters (fmlbd0100m000) session.

If one or more carriers, transport means groups, or transport means combinations are specified in the Carrier/TMG/TMC by Standard Route (fmlbd0153m000) session, in the Standard Routes (fmlbd0150m000) session, these fields are made blank and unavailable:

- **Carrier/LSP**
- **Transport Means Group**

- **Transport Means Combination**

The use of route plans

A route plan is a network of loading and unloading addresses, one of which is a pooling point. A route plan can consist of more than one leg. Route plan legs are defined in the Route Plan Legs (fmfoc1151m000) session, which you can start from the appropriate menu of the Route Plans (fmfoc1150m000) session.

Route plans are linked to addresses. Addresses are defined in the Addresses (tccom4530m000) session.

If you use the pooling algorithm, the load building engine uses the carrier selection criterion field setting to look for a route plan that has addresses that match the addresses of the freight order. For this purpose, the load building engine checks carriers to find route plans that are linked to the carriers. The load building engine then uses the route plan to determine the loads and shipments.

You can also manually add a route plan to a freight order or freight order line. If you enter a route plan in the freight order header, the route plan is taken as the default value in the freight order lines. You can overwrite a default route plan in a freight order line. The load building engine uses the route plan entered in a freight order line to create a load plan, regardless of the planning algorithm used.

If a freight order has a route, all route plans defined for the route are considered in the route plan selection.

If you enter various route plans in the freight order lines of a freight order, the load building engine builds a separate load for each route plan. Therefore, if you want the load building engine to calculate the most cost-effective and efficient route, the **Route Plan** field in the freight order lines must be left empty. If you want to use a specific route plan regardless of any route plan that the load building engine can return, you must manually enter a route plan in the freight order lines.

Route plans are also used as freight order grouping criteria, you can include route plans in a plan matrix.

Route plan legs

Advance, main, and beyond legs are used in multi-modal routes, where the pooling planning algorithm is used.

The advance leg is the first part of the route where goods are picked up and transported to a pooling point, such as an airport, a train station, or a port.

The main leg starts at that pooling point and ends at the intermediate destination. The intermediate destination is a distribution center. At the pooling point, the goods from the advance leg are loaded into an aircraft, ship, train, or truck, and brought to the distribution center.

The beyond leg spans the intermediate destination and the final destination. At the intermediate destination, the goods are transferred from the airplane to trucks to bring the goods to their final destination.

A route plan can consist of more than one advance leg and beyond leg, but one main leg.

Example

Some goods must be transported from Amsterdam to Hyderabad, and another lot from The Hague to Hyderabad along the following routes:

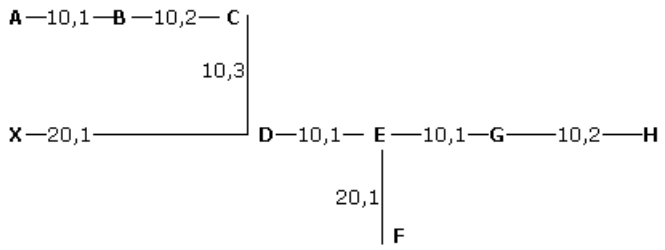
Amsterdam - Rotterdam - Bombay - Hyderabad and The Hague - Rotterdam - Bombay - Hyderabad. In this case, the legs would be defined as follows:

Advance: Amsterdam to Rotterdam and The Hague to Rotterdam (by truck). Main: Rotterdam to Bombay (by aircraft). Beyond: Bombay to Hyderabad (by truck).

Note that in this example, the route plan has two advance legs.

Leg identification: lines and sequence numbers

Legs are identified by line numbers and sequence numbers. A route plan has one main leg and can have multiple advance and/or beyond legs. The advance and beyond legs of a route plan may or may not be in line, as is shown in the following diagram. Legs that are in line can be given the same line number, but must have different sequence numbers. For advance and beyond legs, lines that are not in line must have different line numbers.



Legend

- A - X: cities, of which D and E are ports.
- 10, 1: line number, sequence number

A to B, B to C, and C to D are advance legs. These advance legs are in line. Therefore, you can give these legs the same line numbers and ascending sequence numbers. In the diagram, the line number is 10 and the sequence numbers are 1, 2, and 3.

X to D is another advance leg, but it has a different starting point and follows a different route to reach D. This leg has line number 20 and sequence number 1.

D to E is the main leg. Goods travel by sea from D to E. The line number is 10 and the sequence number is 1. Because there is only one main leg, the sequence and line numbers are not important.

E to G, and G to H are beyond legs. These legs are in line. Therefore, you can give these legs the same line numbers and ascending sequence numbers. In the diagram, the line number is 10 and the sequence numbers are 1 and 2. E to F is another beyond leg, but it follows a different route and has a different destination. In the diagram it has line number 20 and sequence number 1.

Carrier selection by route plan

If large numbers of carriers are available in LN to perform transportation for route plans, selecting a carrier for a route plan during load building may take relatively long.

To limit the number of available carriers, and thus to speed up the planning process, for each route plan you can specify the available carriers in the Carrier/TMG/TMC by Route Plan (fmfoc1153m000) session. This session is available if the **Carrier/TMG/TMC by Route Plan** check box is selected in the Freight Planning Parameters (fmlbd0100m000) session.

If one or more carriers, transport means groups, or transport means combinations are specified in the Carrier/TMG/TMC by Route Plan (fmfoc1153m000) session, in the Route Plan Legs (fmfoc1151m000) session, these fields are made blank and unavailable:

- **Carrier/LSP**
- **Transport Means Group**
- **Transport Means Combination**

Route plans and standard routes by shipping office and planning group

If the **Route Plans by Shipping Office and Planning Group** and the **Standard Routes by Shipping Office and Planning Group** check boxes are selected in the Freight Planning Parameters (fmlbd0100m000) session, the Route Plans by Shipping Office and Planning Group (fmfoc1152m000) and Standard Routes by Shipping Office and Planning Group (fmlbd0156m000) sessions are available in the Route Plans and Standard Routes tabs of the Shipping Office (fmfmd0680m000) session.

In the Route Plans by Shipping Office and Planning Group (fmfoc1152m000) and the Standard Routes by Shipping Office and Planning Group (fmlbd0156m000) sessions, you must link route plans and standard routes to shipping office and planning group combinations. During load building, only the route plans or standard routes linked to a shipping office and planning group combination are used to create load plans. This limits the number of standard routes and route plans that the load building engine has to select from, which speeds up the load building process.

To define and use areas in Freight

In Freight, an area is made up of a number of addresses that share the same **Area** entity. Areas are defined in the Areas (tcmcs0145m000) session.

You can use areas for the following purposes:

- To define the addresses included in a standard route.
- To serve as a planning group criterion for freight order lines.

To define an area

To define an area, you must access the Addresses - Freight Management (fmfmd0110m000) session and to each address that you want to include in the area, you add an area code from the Areas (tcmcs0145m000) session.

Example

To define a sales district in central London, define an **Area** titled LSW in the Areas (tcmcs0145m000) session.

In the Addresses - Freight Management (fmfmd0110m000) session, select the customer addresses that are located in the sales district, for example:

- 86, Brompton Road, London SW3 1ER
- 220, Fulham Rd, Chelsea, London SW10 9NB
- 201 New Kings Road, London SW6 4SR

To each of these addresses, add the **Area** LSW.

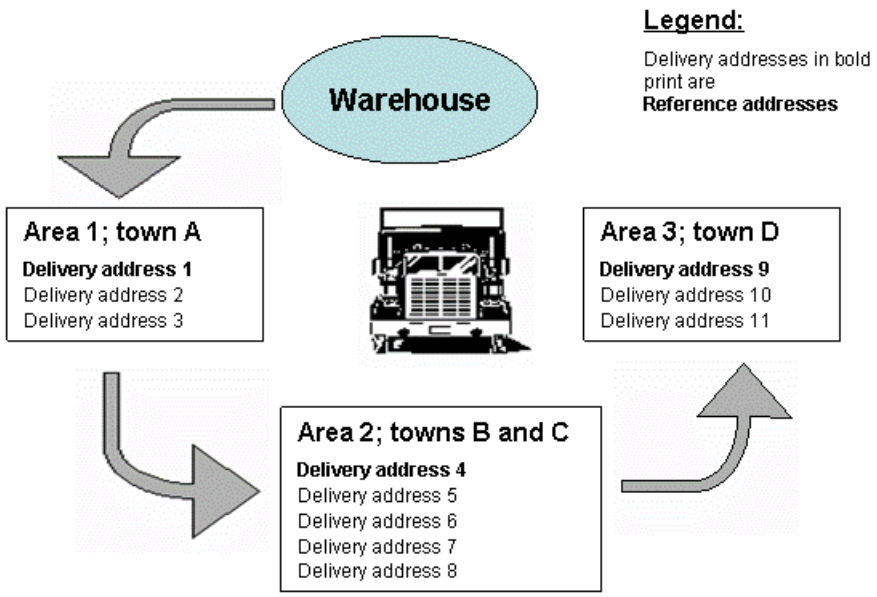
To use areas to define standard route addresses

You can use **Area** or ZIP code ranges to define the addresses of a standard route. If you use areas to define the addresses of a standard route, the standard route usually consists of multiple areas.

An area of a standard route includes a number of addresses, such as delivery addresses, as in the previous example.

Freight planning and freight cost calculation is not carried out for the addresses within an area that is included in a standard route. The idea is, that the distances between the addresses within the area are so short, that freight planning and freight cost calculation is irrelevant. Freight planning and freight cost calculation is performed for the distances between the **Reference Address** of the areas of a standard route.

Example of using areas in a standard route



The standard route in this example is travelled by a truck delivering stereo equipment to retailers once every three weeks. Transport costs are charged for the distances between the warehouse and the reference addresses. There is no charge for distances travelled inside the areas.

For example, a delivery to delivery address 7 in Area 2 is charged for the distance between the warehouse and the reference address of Area 1, added with the distance between the reference address of Area 1 and the reference address of Area 2. The same amount would be charged for a delivery to delivery address 5 in Area 2. Deliveries to the delivery addresses in Area 1 would be charged for the distance between the warehouse and the reference address of Area 1. Deliveries to the delivery addresses of Area 3 would be charged for the distances between the warehouse and the reference address of Area 1, added with the distance between the reference address of Area 1 and the reference address of Area 2, and the distance between the reference address of Area 2 and the reference address of Area 3.

How to define areas in standard routes

To use **Area** to define standard route addresses, proceed as follows:

1. Define an area in the Addresses - Freight Management (fmfmd0110m000) session by adding an **Area** to the addresses that are covered by the standard route.
2. In the Areas by Standard Route (fmlbd0152m000) session, add the area to the standard route.
3. Select the **Reference Address** for the area.
4. Repeat these steps for any following area that you want to define for the standard route.

In the Areas by Standard Route (fmlbd0152m000) session, you can specify the order in which the areas are visited.

To use areas as planning group criteria for freight order lines

To use an area as a selection criterion for a planning group, you must use the area as an attribute in the plan matrix of the planning group and add the area to each loading or unloading address that you want to allocate to the planning group. If the area of a loading or unloading address of a freight order line matches the area of the planning group, the freight order line is allocated to the planning group.

Example

Shipping office New York 1 handles transport planning for all goods issued and received by Warehouse New York 1. For transport planning to run smoothly, freight orders are automatically created from sales orders, and if a sales order lists goods issued by Warehouse New York 1, the freight order generated from the sales order is automatically allocated to Shipping office New York 1. To handle transport planning to Europe, Shipping office New York 1 operates two planning groups: Planning Group EU deals with EU countries, and Planning Group Non-EU deals with non-EU countries.

When a sales order is created for a customer in Europe for goods that are stored in Warehouse New York 1, a freight order is generated and automatically allocated to Shipping office New York 1. If the customer is located in a EU country, transportation is handled by Planning Group EU, and if the customer is located outside the EU, planning is handled by Planning Group Non-EU.

Note

As is described previously, freight cost calculation and transport planning are not carried out for the addresses inside an area. For very large regions with long distances between the loading and unloading addresses, such as those described in the previous example, it is unlikely that there is no charge for transport costs. Neither is it likely that you can do without transport planning. In these cases, you can use areas to define planning group criteria, but to define standard routes, use zip code ranges. In this way, you can set up a rate structure for large regions. ZIP code ranges are defined in the ZIP Codes by Standard Route (fmlbd0151m000) session.

To combine the two uses of areas

You can also combine the two uses of areas. In that case, freight order lines that travel addresses defined in the area of a standard route are allocated to the planning group linked to the same area. For example, Planning Group CLD (Central London) deals with transportation to retailers located in the central London area. These retailers are visited once every two weeks along a fixed route.

Note

If transport costs are charged and if transport planning is required for transport between the addresses of the region, you cannot use an area both for planning group allocation and standard route definition.

Defining distances

You can define geographical distances in varying degrees of detail:

- You can specify distance between two specific zip codes.
- You can specify distance between two states or zip code ranges.

Distance table by city

You can specify the distance by city or by state. When searching for the distance by city, the search sequence defined in the table is:

From	To	Comment
country, state, city	country, state, city	
country, state, city	country, state, city	calculates the reverse distance if you enter only the **To** field.
country, state, city	country, state	
country, state, city	country, state	calculates the reverse distance if you enter only the **To** field.
country, state	country, state, city	
country, state	country, state, city	calculates the reverse distance if you enter only the **To** field.
country, state	country, state	
country, state	country, state	calculates the reverse distance if you enter only the **To** field.

Note

You cannot specify only the country in the **From** and **To** fields. You must enter one of the following:

- State
- City

State - From	State – To

Mandatory when the country entered in the **From** field has states defined for it.	Mandatory when the country specified in the **To** field has states defined for it.
Mandatory when city is not specified in the **From** field.	Mandatory when city is not specified in the **To** field.

City – From	City – To
Mandatory when state is not specified in the **From** field.	Mandatory when state is not defined in the **To** field.

Distance table by zip code/postal code

To search for distance by zip code/postal code you can enter a specific code or can specify a range of zip codes/postal codes. LN

The codes are prioritized in the following sequence:

1. Specific zip code/postal code.
2. Range of zip codes/postal codes.

Chapter 27
Transportation master data

27

The use of transport types

A transport type is a code that refers to transport conditions and transport properties.

You can use transport types for the following purposes:

- To ensure that items are transported by means of transport with appropriate transport conditions. For example, frozen foodstuffs must be transported in cold storage trucks, airplanes with cold storage compartments, and so on. To achieve this, you must add a relevant user-defined transport type code to items that require cold storage. You must also add this transport types to the transport means groups to which the means of transport belong that will transport the item.
- To determine the costs of transportation for items. A transport type can be used as selection criteria for freight rate books. If a freight order line has an item with a transport type that matches the transport type associated with a freight rate book, the freight rate book is used to determine the transportation costs of the freight order line. For further information on transport rating, see *Calculation of estimated freight costs (p. 105)*.
- To determine the planning group of the freight order lines to which they are allocated. A transport type can be used as a selection criterion of a plan matrix. For further information, see *Plan matrices and matrix definitions (p. 45)*.

To make this work, you must link transport types to the following data entities:

- **Combination codes**
  You can add a combination code to a transport type. As a result, the transport type is only available for items with the same combination code as the one defined for the transport type.
- **Transport means groups**
  For further information, see *The use of transport means groups (p. 196)*.
- **Items**
  If you link a transport type to items, you ensure that the load building engine only combines order lines with items with identical transport types. You can link transport types to items in the Items - Freight Management (fmfmd1100m000) session.

- **Matrix definitions and plan matrices**
  A transport type can be used as a matrix attribute to determine the planning group for freight order lines to which the transport type is allocated. If a transport type is used as a matrix attribute in a plan matrix, freight order lines with matching transport types are grouped into the planning group specified in the plan matrix.

Adding a combination code to a transport type

If transport type A has combination code B, then an item with a combination code other than B cannot be transported in any means of transport that has transport type A.

Alternatively, suppose you do not want seafood products to be transported together with ice cream in the same refrigerated truck. In that case, you can provide items of both types of products with the same user-defined transport type, such as CLD for cold storage, and provide ice cream items with a user-defined combination code such as ICR, and seafood product items with a combination code such as SEA.

The use of transport means groups

A transport means group is a classification that subdivides means of transport into groups, such as:

- Vans
- Trucks
- Container ships
- Cargo aircraft

For each group, you can define properties such as:

- The average speed
- The loading capacity

Each means of transport defined in Freight belongs to a transport means group.

Transport means groups are used to group items on freight order lines into shipments and loads or freight order clusters, and to determine the costs of transportation.

Example

Transport means group: Vans. Means of transport: Van with license number XX333444

You can link transport means groups to the following entities to ensure that freight orders and freight order lines are grouped in the preferred way:

- **Combination codes**
  If you link a combination code to a transport means group, only items with the same combination code can be transported by the transport means group. An item with a different combination code or without a combination code cannot be transported by the transport means group.

- **Transport types**
  You can use transport types to identify the type of transport of transport means groups. In addition, a transport means group with a given transport type is unavailable for the transportation of items with other transport types. You can link transport types to transport means groups in the Transport Means Groups (fmfmd0150m000) session.
- **Carriers**
  You can link a transport means group to a carrier to indicate that a carrier can offer the services of means of transport that belong the transport means group. The load building engine uses this information to check whether a carrier has the required transport means group and the loading capacity to carry out the transportation of a given load.
- **Vehicle Type**
  You can link a transport means group to a vehicle type to add transport means group properties, such as loading capacity and average speed, to the vehicle type.
- **Means of transport**
  The individual means of transport maintained in Freight must belong to a transport means group. You can define a transport means group for a means of transport in the Means of Transport (fmfmd0155m000) session.
- **Items**
  You can link a transport means group to an item that is linked to a business partner in the Items - Ship-from/to Business Partner (fmfmd2100m000) session. As a result, items linked to the specified business partner can be transported with the specified transport means group.
- **Freight order lines**
  You can manually add a transport means group to a freight order line in the Freight Order Lines (fmfoc2101m000) session. Freight order lines with the same transport means group are put together in loads. You can overwrite any existing value.
- **Loads**
  You can manually enter a transport means group for a load in the Loads (fmlbd4100m000) session. You can overwrite any existing value.
- **Plan matrices**
  If a transport means group is used as a matrix attribute in a plan matrix, freight order lines for which the same transport means group is specified are subdivided into the planning group specified in the plan matrix.
- **Rough planning**
  You can include transport means groups in rough planning selection ranges in the Generate Rough Planning (fmrpg1200m000) session.
- **Rate basis number attributes**
  A transport means group is also used to determine the costs of transportation of items. The transport means group serves as a criterion to determine the rate basis number for items. The rate basis number, in turn, is linked to freight rate books that are stored in the Pricing module.
- **Freight order control parameters**
  The transport means group specified in the Freight Order Control Parameters (fmfoc0100m000) session is taken as the default value on freight order lines.

Multiple means of transport by load

Consignments of goods are often transported by segmented means of transport, for example, a truck-and-trailer combination, or a locomotive that pulls several cars. In such cases, you may want to perform freight planning for some, or perhaps all of the segments that make up the means of transport.

In Freight, for each freight order line, you can specify whether transportation is to be performed by individual means of transport or segmented means of transport.

If you choose individual means of transport, you can add a transport means group to the freight order line. If you attach a means of transport to the freight order lines, Freight will try to allocate this means of transport to the load that results from the load building process. For more information, refer to *The use of transport means groups (p. 196)*, *Means of transport selection (p. 81)*, and *Freight order grouping (p. 41)*.

If you opt for segmented means of transport, you can add a transport means combination to the freight order line. A transport means combination can include various individual means of transport, this depends on the way you set up your transport means combinations. As a result, Freight can allocate more than one means of transport to each load that results from the load building process.

Note

You can attach either a transport means group or a transport means combination to a freight order line, both is not possible.

If you do not insert a transport means group or a transport means combination on a freight order line, the load building engine selects a transport means group or a transport means combination based on your setup data. The load building engine first looks for a suitable transport means group. If no transport means group is found, the default transport means group defined for the carrier is taken. If no default transport means group is defined, the load building engine looks for a transport means combination. If not found, the default transport means combination defined for the carrier is taken. For further information on the load building engine, see *The load building process (p. 65)*.

Transport means combinations are also available for freight order clustering. A transport means combination is one of the criteria used to generate freight order clusters.

Transport means combinations

A transport means combination constitutes a combination of vehicles; it consists of various segments. For example, a truck-and-trailer combination, or a locomotive that pulls several cars. To specify the segments that make up the transport means combination, you must attach vehicle types and/or means of transport.

Vehicle types

A vehicle type refers to an anonymous, that is, not uniquely identifiable, type of vehicle. For each vehicle type, you must specify the number of vehicles that is used for the transport means combination. For

example, if the combined means of transport consists of a locomotive and five cars, for vehicle type CAR, you must insert 5, and for vehicle type LOC, you must insert 1.

Means of transport

A means of transport refers to a uniquely identifiable vehicle for which Freight can perform availability checking during load building. To define a uniquely identifiable segment, you must add a means of transport and a vehicle type to the transport means combination. For example, if the combined means of transport consists of a locomotive and five cars, and you want to enable availability checking for the locomotive, you can insert means of transport LOCOMOTIVE AX00023 and vehicle type LOC for the locomotive. For more information, refer to To set up transport means combinations.

You can add several means of transport to a transport means combination. Thus Freight can plan transportation for more than one means of transport to transport a load.

To set up transport means combinations

To set up transport means combinations, proceed as follows:

1. In the Combination Codes (fmfmd0120m000) session, define combination codes.
2. In the Transport Types (fmfmd0140m000) session, define transport types.
3. In the Means of Transport (fmfmd0155m000) session, define means of transport and in the Means of Transport Calendar (fmlbd0560m000), set up the calendar for means of transport.
4. In the Transport Means Groups (fmfmd0150m000) session, define transport means groups.
5. In the Vehicle Types (fmfmd0147m000) session, define vehicle types.
6. In the Transport Means Combination (fmfmd0642m000) session, define transport means combinations.
7. In the Vehicle Types and Means of Transport by Transport Means Combination (fmfmd0148m000) session, add vehicle types and means of transport that belong to a transport means combination.

   To define an anonymous segment for a transport means combination, you must add a vehicle type and the number of vehicles of this vehicle type. For example, if the combined means of transport consists of a locomotive and five cars, for vehicle type CAR, you must insert 5 in the **Number of Vehicles** field.

   To define a uniquely identifiable segment, you must add a means of transport and a vehicle type. The number of vehicles for a uniquely identifiable segment cannot be more than one.
8. In the Transport Means Combinations by Carrier/LSP (fmfmd0144m000) session, define the transport means combinations that are available for carriers.
9. In the Freight Planning Parameters (fmlbd0100m000) session, select or clear the **Check TMG and TMC Availability** check box to specify whether or not the loading capacity and the availability of means of transport or transport means combinations must be checked during load building.

The use of combination codes

You can use combination codes are used to prevent the load building and freight order clustering engines from creating loads and clusters, respectively, for undesirable combinations of items. For example, foodstuffs must never be put in a load that also carries toxic materials. To achieve this, you provide foodstuffs with a user-defined combination code, such as EAT, for example, and toxic materials with a user-defined combination code such as TOX.

Items with identical combination codes can be put together in a load. Items without combination codes can be combined with other items without combination codes, but items with different combination codes cannot be put together.

You can also use a combination code as a criterion to group freight order lines by planning group. For that purpose, you can define a combination code as an attribute for a plan matrix. For further information, see *Plan matrices and matrix definitions (p. 45)*.

For freight order grouping and load building purposes, you can link a combination code to the following entities:

- **Items**
  If you link a combination code to an item, the load building engine puts the item in shipments and loads with items that have the same combination code. You can link a combination code to an item in the Items - Freight Management (fmfmd1100m000) session.
- **Transport types**
  For further information, see *The use of transport types (p. 195)*.
- **Transport means groups**
  For further information, see *The use of transport means groups (p. 196)*.

The use of freight services levels

A **Freight Service Level**, or simply service level, is an entity that is used to express the duration of transportation, for example, delivery within twelve hours or round the clock express.

Freight service levels are added to freight orders, freight order lines, and shipments in the following ways:

- Through freight order types. A **Freight Service Level** is one of the default attributes of a **Freight Order Type**.
- Through items. In the Items - Freight Management (fmfmd1100m000) session, you can define a **Freight Service Level** for an item. If the item for which a **Time Unit** is defined is entered on a freight order line, the **Freight Service Level** is also added.
- From originating orders. Freight service levels are added to the following types of originating order lines: sales order lines, sales quotation lines, and purchase order lines.
- Manually.

A **Freight Service Level** can be used for the following purposes:

- Freight order grouping
- Rough planning
- Determining freight rates
- Transport lead time calculation

More details about these purposes are provided in the following sections.

Freight order grouping

You can group items by ship-from or ship-to business partner if the items are always transported from or to one particular business partner. You can add a freight service level to any combination of item and ship-from or ship-to business partner in the Items - Ship-from/to Business Partner (fmfmd2100m000) session. As a result, if an item is put on a freight order line, the business partner and the freight service level are automatically added.

To use freight service levels for basic planning, you can include freight service levels in the plan matrix of a planning group in the Plan Matrix (fmfoc1120m000) session. As a result, freight order lines with matching freight service levels are grouped into the same planning group.

Rough planning

You can also use freight service levels as selection criteria for rough planning in the Generate Rough Planning (fmrpg1200m000) session, if you include a range of freight service levels in the rough planning selection.

To determine freight rates

A freight service level is one of the factors that determine the freight rates to calculate the transportation costs of items listed on:

- Freight order lines
- Sales order lines
- Quotation lines
- Loads
- Shipments
- Freight order clusters

The faster the delivery, the higher the freight rate. The Pricing module maintains freight rates for a combination of attributes, one of which is the freight service level. When Freight calculates the freight costs of an order, a load, or a shipment, the appropriate rates are retrieved from the Pricing module.

Transport lead time calculation

When you create an originating order, you can calculate the transportation lead time of the items on the order. Freight service levels can be used as factors in this lead time calculation process.

The use of freight classes

A freight class is the classification of an item in terms of:

- Product density (weight per square foot).
- Stowage (size, weight, and shape).
- Handling.
- Liability (the item's value).

Freight classes are mainly used in the United States.

In addition to item classification, freight classes are used for the following purposes:

- To determine freight rates.
- To determine the planning group for a freight order line.

For these purposes, you can link a freight class to an item in the Items - Freight Management (fmfmd1100m000) session, and to a freight order line in the Freight Order Lines (fmfoc2101m000) session.

To determine freight rates

To determine the freight rate that must be used to calculate the freight costs for a freight order line, sales order line, sales quotation line, or sales contract line, you can link a freight class to rate basis numbers in the Rate Basis Numbers by Attributes (fmfrc0120m000) session.

To determine planning groups for freight order lines

To determine the planning group for a freight order line, you can use a freight class as an attribute of a matrix definition.

The use of volume and weight classes

A volume class is allocated to a range of volumes, for example, from 1 gal to 10 gal. Volume classes can be used to determine the planning group of freight order lines.

A weight class is allocated to a range of weights, for example, from 10 lbs. to 50 lbs.

A class code is a code used to identify volume classes and weight classes.

A volume class or weight class consists of the following components:

- Range with from and to values
- Class code
- Description

You can maintain the from and to values in the Weight and Volume Classes (fmfmd0190m000) session, and the class codes and descriptions in the Class Codes (fmfmd0195m000) session.

You can use volume and weight classes to determine the planning group to which freight order lines must be allocated. For example, if the weight of the item listed on a freight order line matches the weight class defined in the plan matrix of planning group A, the freight order line is allocated to planning group A.

Volume and weight classes can also serve as factors to determine the choice of carrier that is to transport particular goods. For example, a carrier transports the goods on freight order lines of a particular weight class, because this weight class and the carrier are included in the same plan matrix.

Chapter 28
Parameters

28

Freight parameter overview

Each of the main functional areas in Freight uses its own parameters settings. The parameters of each functional area are grouped in a separate session. The following parameter groups are available:

- **FMD - Master data**
  The default measuring units that are referenced by most functional areas of Freight. You can define master data parameters in the Freight Master Data Parameters (fmfmd0100m000) session.
- **FOC - Freight order control parameters**
  Freight order control parameters include settings for freight order, freight order line, and freight order cluster maintenance. You can define freight order control parameters in the Freight Order Control Parameters (fmfoc0100m000) session.
- **LBD - Load building parameters**
  Load building parameters control the way the load building engine works. You can define load building parameters in the Freight Planning Parameters (fmlbd0100m000) session.
- **FRC - freight rates and costs parameters**
  Freight rates and costs parameters include settings for freight cost calculations for load building and freight order clustering. You can define freight rates and costs parameters in the Freight Rates and Costs Parameters (fmfrc0100m000) session.
- **FRI - Freight invoicing parameters**
  Freight invoicing parameters control the way invoice amounts are calculated for shipments, loads, and freight order clusters. You can define freight invoicing parameters in the Freight Invoicing Parameters (fmfri0100m000) session.

Appendix A
Glossary

A

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. 207)*

calendar

A set of definitions, that are used to build a list of calendar working hours. A calendar is identified by a calendar code and availability type combination.

carrier

An organization that provides transport services. To use a carrier for load building, freight order clustering, transport cost calculation, and invoicing, you must define the carrier both as a carrier and a buy-from business partner in Common.

Synonym: forwarding agent, Logistics Service Provider (LSP), Third Party Logistics (3PL), Packaging Service Provider (PSP)

carrier rate

A freight rate used by a carrier to calculate the transportation costs of a given number of goods.

client rate

A freight rate agreed upon by a customer and a supplier.

combination code

A code that refers to the main properties of an item as they relate to transportation, such as:

- Foodstuffs
- Refrigerated goods
- Toxic materials

Combination codes are used to prevent the planning engine from creating loads or shipments from undesirable combinations of items. For example, foodstuffs must never be put in a shipment that also carries toxic materials. To achieve this, you provide foodstuffs with a combination code such as EAT, and toxic materials with a combination code such as TOX.

combined freight order

An entity that groups freight order lines which have a few attributes and attribute values in common, such as load/unload addresses, time windows, and so on. Combined freight orders are created by the load building engine as part of the load building process. The load building engine uses combined freight orders to create stops and trips, which in turn are used to build loads and shipments. A combined freight order is an intermediate piece of data, which provides no planning information, but you can use combined freight orders to analyze how a load plan was created.

consolidation

A planning method, also called planning algorithm, where shipments that go on a particular standard route, or partially travel this standard route, are put together and given as one load to the carrier. If the shipments cannot be carried in one load, the Load Building module of Freight creates the required number of loads.

cost item

An administrative item that is used to post extra costs to an order. Extra costs are, for example, accounting expenses, clearance charges, design costs, and freight expenses.

Cost items are not used for production and cannot be held in inventory. They are also referred to as expense items.

delivery code

A reason code that indicates who is to pay for the transportation of the goods.

delivery note

A transport document that provides information on a consignment contained in one truck (or other vehicle) and refers to an order or a set of orders for one consignee at a delivery address. If the truck load contains shipments for various business partners, the load includes more than one delivery note. The information on a delivery note includes the delivery date and address, the customer's name, the contents of the consignment, and so on. In Italy, a delivery note is a legally required document, where it used to be called BAM (Bolla Accompagnamento Merci). Currently it is called DDT (Documento di Trasporto). In Portugal and Spain delivery notes are also used, but there they do not have the same legal status as in Italy.

department

A company's organizational unit that carries out a specific set of tasks, for example, a sales office or a purchase office. Departments are assigned number groups for the orders they issue. The department's enterprise unit determines the financial company to which the financial transactions that the department generates are posted.

forwarding agent

See: *carrier (p. 207)*

Freight costs

The estimated transport costs of shipments and loads. The estimated freight costs are based on the carrier rates maintained in Pricing, and the most recent information available on the quantities, volumes, and/or weights of the goods to be transported. During loading, transportation, or transfer changes can be made to the quantities, weights, or volumes of the goods.

freight order

A commission to transport a particular number of goods. A freight order includes an order header and one or more order lines.

A freight order header includes some general information, such as the delivery date and the name and address of the customer who is to receive the goods listed on the freight order.

A freight order line includes an item to be transported and some details about the item, such as the quantity and the dimensions.

freight order type

A code used to identify and group freight orders.

freight rate

A rate that is used to calculate transportation costs for items listed on loads, shipments, and the following types of orders:

- Freight orders
- Sales orders
- Sales quotations

Freight rates are defined in freight rate books in Pricing. A freight rate is defined by distance, weight, and various other attributes.

Example

Weight	Rating method	Service level	Amount	Distance
100 kg	Distance	Express delivery	USD 150	50 km

freight rate book

An entity in which you can store freight rate information that is valid for a given period of time.

A freight rate book includes the following elements:

- A freight rate book header, which contains the code, rating method, distance unit, and free distance.
- One or more freight rate book lines, which contain the freight rates for a combination of attributes such as carrier and service level.

The freight rates specified in a freight rate book are subject to a minimum or maximum weight, distance, or additional rate value.

inventory commitment

The reservation of inventory for an order without taking into account the physical storage of the goods within the warehouse. Previously referred to as *hard allocation*.

invoice-to business partner

The business partner to which you send invoices. This usually represents a customer's accounts payable department. The definition includes the default currency and exchange rate, invoicing method and frequency, information about the customer's credit limit, the terms and method of payment, and the related pay-by business partner.

item group

A group of items with similar characteristics. Each item belongs to a particular item group. The item group is used in combination with the item type to set up item defaults.

item type

A classification of items used to identify if the item is, for example, a generic item, a service item, or an equipment item. Depending on the item's type, certain functions will only apply to that item.

leg

Part of a route plan. For each leg you can specify a separate transport category, transport means group, and/or carrier.

The following types of transport legs exist:

- **Advance**
- **Main**
- **Beyond**

load

The largest consignment for which Freight plans transportation. A load contains a number of goods that are transported by a means of transport that belongs to a transport means group travelling to a given destination on a given date/time via a specific route. A load can contain more than one shipment, for example if the consolidation planning algorithm is used.

load building

The freight planning engine of Freight. The load building engine groups goods that require transportation into shipments and loads.

Load date/time tolerance

The acceptable deviation of a freight order's planned load date/time. The deviation is expressed in user-definable time units.

load plan

The identification of a structure of shipments and loads created for one or more freight orders. The shipments and loads show the transport planning details, such as planned loading and unloading dates and addresses, of the freight orders for which transportation planning is generated. You can use the load building engine to create a load plan. If you select a range of freight orders and start up the load building engine, the freight orders are grouped into shipments and loads. The resulting shipments and loads form a load plan. You can also create load plans manually.

Synonym: plan

Logistics Service Provider (LSP)

See: *carrier (p. 207)*

matrix attributes

A list of elements used to define a price, discount, promotion, or freight rate. The group of matrix attributes is identified by a matrix definition and type.

Imagine you are a furniture vendor and you decide to maintain your sales prices based on two elements:

- The specific item you sell.
- The way to handle payments.

In this case, the matrix type is **Sales Price**, the matrix definition is Furni (this name is user-definable), and the matrix attributes are **Item** and **Payment Method**.

In the Pricing matrix, you specify the values for the matrix attributes.

matrix definition

Defines the group of elements (matrix attributes) that a Pricing matrix uses to determine a price, discount, promotion, or freight rate.

Imagine you are a furniture vendor and you decide to maintain your sales prices based on two elements:

- The specific item you sell.
- The way to handle payments.

In this case, the matrix type is **Sales Price**, the matrix definition is Furni (this name is user-definable), and the matrix attributes are **Item** and **Payment Method**.

matrix priority

For a matrix type, the order in which matrix definitions are searched for.

means of transport

An individual identifiable means of transport used for freight planning and freight order clustering, such as:

- Truck
- Airplane

For load building and freight order clustering purposes, Freight checks the availability of individual means of transport, if specified for a load or a freight order line.

motive of transport

A reason code that indicates why transportation takes place, for example, Repair, Sales, Transfer, and so on.

originating order

The order from which an order is created. For example, if a warehousing order is created from a sales order, the sales order is the originating order of the warehousing order.

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.

Packaging Service Provider (PSP)

See: *carrier (p. 207)*

piece unit

The basic unit used to indicate the loading capacity of a means of transport. For example, loading metre. If a truck has a capacity of 15 loading metres, and an item is 0.01 loading metres, the truck can hold 1,500 items. Other examples: pallet, crate, or box. In the latter cases, the loading unit is also the unit or type of container used to load the means of transport, which can be defined as handling units. See also handling unit.

Piece units are used in load building and loading capacity requirement checks.

plan

See: *load plan (p. 211)*

plan matrix

A set of attributes and values used as selection criteria for a planning group.

For example, a plan matrix can include the following values:

- Transport means group: TNK (tankers).
- Ship-to business partner: Tradex PLC.

These characteristics are used to allocate freight order lines to planning groups. If the values defined in the plan matrix of a given planning group match values of particular freight order lines, these freight order lines are allocated to the planning group.

planning algorithm

A planning method used to plan for the transportation of goods. Goods listed on freight order lines are grouped into shipments. Shipments, in turn, are grouped into loads. A planning method determines how shipments and loads are built.

In Freight, the following planning methods are available:

- **Consolidation**.
- **Pooling**
- **Direct Shipping**

Synonym: planning method

planning group

An entity that is used to group freight order lines into shipments and loads or freight order clusters.

Each freight order line is allocated to a planning group. Freight order lines with different planning groups cannot be in the same shipment, load, or freight order cluster. For example, all goods destined for Belgium are subdivided into planning group Belgium.

From a hierarchical perspective, the planning group is one level below the shipping office. A shipping office has one or more planning groups. Freight orders are grouped into shipping offices, the underlying freight order lines are grouped into the planning groups of the shipping office.

planning method

See: *planning algorithm (p. 213)*

pooling

Pooling is a planning method, also called planning algorithm, in which multiple fixed addresses, such as distribution centers, ports, and so on, covered by a route plan, are visited. In such cases, the transport route usually consists of several legs.

At one of the legs, shipments travel the same way and are pooled together to go to their destination or to a distribution point. At the distribution point, the shipments are reallocated to different means of transport to be taken to their final destination.

Example

50 bicycles go from Amsterdam to New York, another 50 go from Amsterdam to Philadelphia, and a third lot of 20 bicycles goes from Amsterdam to Pittsburgh. The first leg is from Amsterdam to Rotterdam by truck. Rotterdam is the pooling point, where the bicycles are loaded aboard a ship. In New York, they are unloaded and loaded in trucks that take them to their respective final destinations in New York, Pittsburgh, and Philadelphia.

purchase office

A department in your organization that is responsible for buying the materials and services required by your organization. You assign number groups to the purchase office.

rate basis number

A code in LN representing a combination of a freight class, transport means group, transport type, and/or planning group.

In Freight, rate basis numbers are used to determine the carrier rates for the following entities:

- Shipments
- Loads
- Sales order lines
- Sales quotation lines

A rate basis number is allocated to a shipment, load, order line, or quotation line if the freight class, transport means group, transport type and/or planning group of the shipment or load match those defined for the rate basis number.

In Pricing, freight rate books are linked to rate basis numbers. A rate basis number allocated to a shipment, load, and so on, will in turn point to a freight rate book from where freight rates can be picked up.

rough planning

A module in Freight that provides estimates of both available transport capacity and required transport capacity in a given period of time. Using Rough Planning, those responsible for freight planning can see how much transport capacity is available to them, how much they need, and, if necessary, arrange additional capacity from their carriers.

route

Line of travel from your warehouses to the ship-to or ship-from business partner's warehouse and vice versa. Use routes to group business partners that are located in the same area or along one convenient route.

You can arrange addresses by routes to print picking lists and shipping notes sorted by route.

route plan

A network of loading and unloading addresses, one of which is a pooling point. A route plan is usually defined for routes that involve multi-modal transport. A route plan consists of one or more legs. Each leg, or part of the route, can be handled differently depending on the specified transport category and transport means group.

sales office

A department that is identified in the company business model to manage the business partner's sales relations. The sales office is used to identify the locations that are responsible for the organization's sales activities.

service department

A department that consists of one or more persons and/or machines with identical capabilities, that can be considered as one unit for the purposes of service and maintenance planning.

shipment

The smallest consignment for which Freight plans transportation. A shipment is an identifiable part of a load, and contains a number of goods that are transported to a given destination on a given date/time via a specific route.

shipment notice

See: *advance shipment notice (p. 207)*

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.

shipping office

A department that is responsible for the organization of transportation for one or more warehouses. When goods are moved from or to a warehouse, the responsible shipping office plans the transportation of these goods or subcontracts the transportation of the goods. In direct delivery scenarios, the shipping office provides planning or transport subcontracting services for external suppliers or customers.

In Freight, a shipping office plays a key role in load building and freight order clustering. Freight orders are grouped by shipping office. The groups of freight orders by shipping office are used by the load building engine to build shipments and loads, or by the freight order clustering engine to build freight order clusters.

standard route

A standard route is a fixed route that is traveled with a particular frequency, such as a truck that visits delivery and/or loading addresses according to a fixed schedule, a rail service, or a boat service. Usually, transportation via standard routes costs less than travel via non-fixed routes. For example, you can define a route like Amsterdam via Rotterdam to Antwerp that is run once a day.

stop

A loading and/or unloading activity at an address. This activity is created from the loading and unloading addresses of a combined freight order. Stops are created by the load building engine as part of the load building process. The load building engine uses stops to create shipments. A stop is an intermediate piece of data, which provides no planning information, but you can use stops to analyze how a load plan was created.

stop line

An entity listing the items to be loaded or unloaded at a stop address.

subcontracting instructions

Subcontracting instructions constitute the subcontracting order for a carrier. The subcontracting instructions list the goods for which the carrier is to carry out the transportation.

Third Party Logistics (3PL)

See: *carrier (p. 207)*

time window

The time span between a minimum and a maximum date. Usually, the minimum or maximum date is a loading or unloading date.

transport means combination

A combined means of transport that consists of various vehicle types and/or means of transport which jointly transport a load. If a transport means combination includes more than one means of transport, Freight can perform load building for more than one means of transport per load. Transport means combinations are also used in freight order clustering. A transport means combination shows the combined means of transport that is to transport the goods listed on a freight order cluster.

transport means group

A classification used to group means of transport, such as:

- Vans
- Trucks
- Container ships
- Cargo aircraft

For each group, properties are defined, such as:

- The average speed
- The loading capacity

Each means of transport defined in Freight belongs to a transport means group. For example, transport means group: Vans, means of transport: van with licence number XX333444 .

transport type

A code that refers to special properties of a means of transport, or of a transport means group, such as:

- Cold storage
- Armored; high security

Transport types are used in the load building and freight order clustering engines of the Freight package. The main purpose of Transport types is to ensure that items are transported by a means of transport that has particular properties. Transport types are also used as a criterion to determine the costs of transportation.

trip

A unique identification of a group of stops.

vehicle type

A reference to a particular type of vehicle, such as tractor, trailer, container, and so on.

A vehicle type has various properties, such as:

- With or without loading capacity
- Self-propelled

warehouse

A place for storing goods. For each warehouse, you can enter address data and data relating to its type.

zone

A distance or a geographical area. Zones are used to define freight rates. To define a freight rate, the geographical area defined by the zone is linked to a freight amount in Pricing. Thus the freight rate is used to calculate the transportation costs of goods transports that take place in the area defined by the zone. In other words, all goods transports within the area go for the same rate, provided that the other factors that make up the rate, such as basic weight or carrier, apply.

The following types of zones are available:

- **ZIP**
- **City**
- **Distance**
- **Not Applicable**
- **Note**: The **Zone type** is not used to define freight rates in Pricing.

zone by city

A zone of the **City** type. Zones of this type are defined by an origin city in an origin country and a destination city in a destination country. For each zone, you can define several origin country/city and destination country/city combinations.

Example

Zone ZC1 Origin country: The Netherlands. Origin city: Amsterdam. Destination country: The Netherlands. Destination city: Rotterdam.

Zone ZC2 Origin country: United Kingdom. Origin city: London. Destination country: Belgium. Destination city: Antwerp.

Zone ZC3 Origin country: The Netherlands. Origin city: Amsterdam. Destination country: The Netherlands. Destination city: The Hague. Origin country: The Netherlands. Origin city: Amsterdam. Destination country: The Netherlands. Destination city: Utrecht.

zone by distance

A zone of the **Distance** type. A **Zone** of this type consists of a distance.

Example

ZD1 100 Kilometres

ZD2 500 Kilometres

ZD3 1000 Kilometres

zone by zip

A zone of the **ZIP** type. A zone of this type consists of a geographical area that is defined by one or more origin areas and one or more destination areas. The origin area consists of an origin country and an origin area. The destination area consists of a destination country and a destination area. Both the origin and the destination areas (which bear no relation to the areas defined in Common) are defined by ranges of **ZIP** codes. The places in between the origin and destination areas are included in the zone.

Example

Zone ZC1: Origin country: The Netherlands. Origin area: zip codes 1000 AA to 1050 ZZ (Amsterdam and surrounding area). Destination country: The Netherlands. Destination area: 3100 AA to 3145 ZZ (Rotterdam and surrounding area).

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