

User's Guide for Clusters

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Publication Information

Document code: U8730A US

Release: Infor ERP LN 6.1 Enterprise Planning

Publication date: July 08

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About this Guide

This document describes how to use the cluster concept in the Enterprise Planning package of Infor ERP LN. A cluster represents a geographical area.

Enterprise Planning plans the fulfillment of required items at a cluster through careful balance of three sources of supply:

- Local production
- Local purchasing
- Transfer from other clusters (distribution)

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The internal network in companies is becoming increasingly complex. Forecasting, sales, inventory planning, order acceptance, and inventory replenishment can take place in and between every entity of that network. Among these entities are:

- Production sites
- The head office
- Regional distribution center
- Decentralized sales offices

Enterprise Planning supports all of these business procedures for various entities, using the cluster concept. A cluster represents a geographical area. For each item, you can define several plan items, one for each cluster, and a non-clustered item that is not linked to any cluster, as shown in the following example:

- Clusters: A, B, C
- Item: RAL END 1
- Plan items:
 - A / RAL END 1
 - B / RAL END 1
 - C / RAL END 1
 - - / RAL END 1 (non-clustered item)

Functionally, a non-clustered plan item is no different than a clustered plan item. The non-clustered plan item simply represents one of the geographical areas. If a logistical company has only one location, you do not have to define any clusters and can simply use non-clustered plan items for that one location.

To support planning by location, the planning process takes the requirements and supply strategies for each plan item into account separately. In addition, each clustered plan item, as well as the non-clustered plan item, has a unique item order plan view and (optionally) item master plan view that enables you to evaluate all requirements and supplies.

Note: The cluster concept is only used in Enterprise Planning. The other packages in Infor ERP LN, such as Warehousing, Order Management, and Manufacturing, do not use clusters. This document describes the consequences of this setup, along with the concept and use of clusters in Infor ERP LN Enterprise Planning.

To enabling planning by item and warehouse

A cluster is a group of one or more warehouses in a particular geographical area. You can plan an item by cluster (geographical area). To enable this, you can set up multiple plan items for one item. You always define one plan item without a cluster indication and multiple plan items with a cluster indication. From now on, a plan item with a cluster will be called a clustered plan item, and the plan item without cluster will be called the non-clustered plan item.

The planning functions that ERP LN supports for each item and cluster are described later.

The picture below depicts the cluster-item combination concepts:

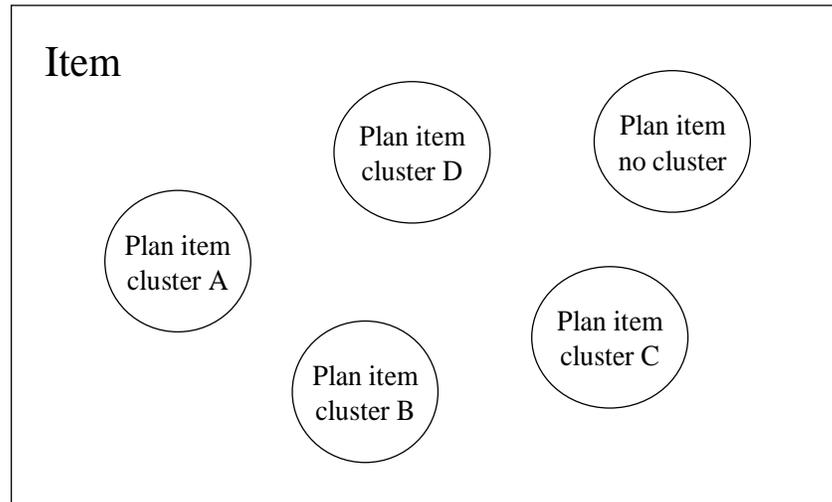


Figure 2-1: Multiple plan items per item

You can set up distribution relationships between the clustered and non-clustered plan items. This setup supports distribution requirements planning (DRP) in Enterprise Planning on individual warehouses as well as on a more aggregated level, such as a group of warehouses in one cluster. To perform DRP on planning level, you must use clusters. You can define distribution relationships in all directions, even from a clustered item to the non-clustered item.

Support for Distribution Requirements Planning (DRP)

The following figure illustrates how the cluster concept supports Distribution Requirements Planning (DRP):

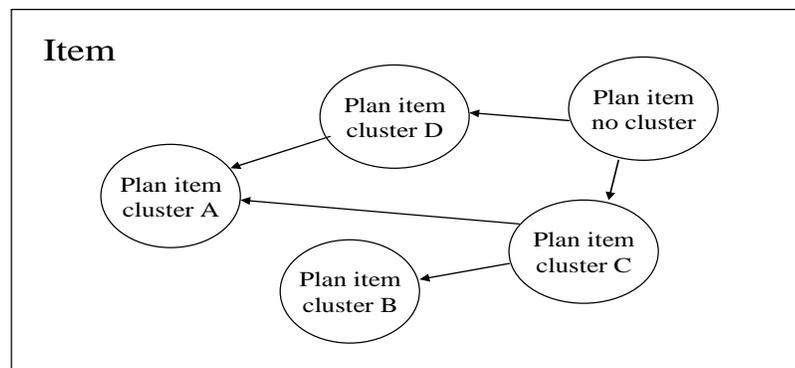


Figure 2-2: Distribution relationships to support DRP

Cycles

You can also define distribution relationships from a clustered plan item to a non-clustered plan item. However, no cycles are permitted in these relationships. If you run the Compute phase numbers (cprpd6200m000) session, ERP LN automatically checks the supplying relationships and detects and reports any loops (cycles) in the structure.

The following figure provides an example of a cycle in the supplying relationships:

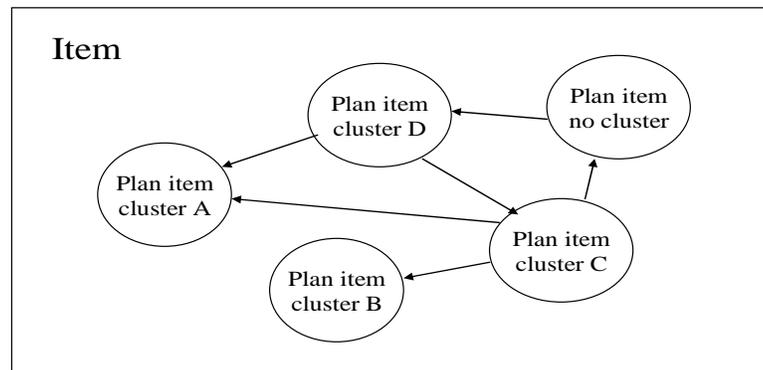


Figure 2-3: Cycles in the distribution structure

The following relationships constitute a cycle, which continually generates dependent demand:

- The non-clustered plan item and cluster D
- Clusters D and C
- Cluster C and the non-clustered plan item

Local production and purchasing

The plan items in the clusters can be supplied not only by distribution, but also through purchase and production. In this way, you can, for example, plan local purchasing in a cluster (geographical area). You can also plan supply from multiple sources.

Example

Eighty percent of an item's required quantity is supplied by distribution from the central warehouse to the cluster (regional distribution center), and twenty percent of the item's required quantity is purchased locally by the cluster.

The following figure shows the sourcing possibilities for clustered plan items:

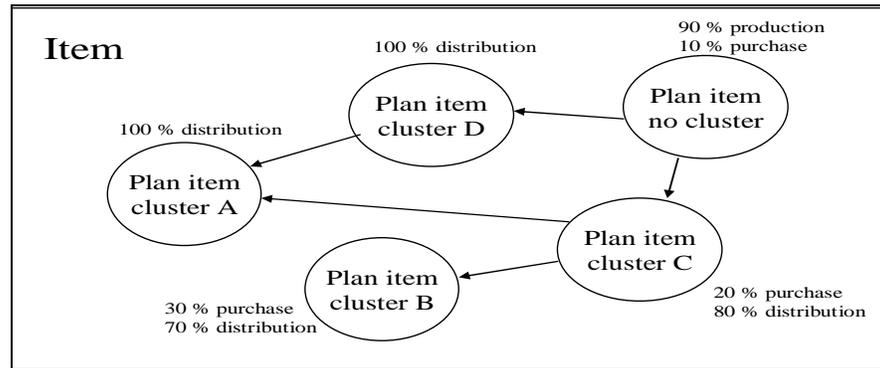


Figure 2-4: Multi-sourcing on clustered items

You cannot use the source production for more than one of the clustered and non-clustered items because only one bill of material and routing for each item is available, as described later in this document.

Local master-plan functionality

Master-plan functionality enables you to perform forecasting and inventory planning. To enable you to perform these activities not only on the central level, on non-clustered items, but also decentralized, on clustered items, Infor ERP LN provides master-plan functionality for clustered items. Aggregation and disaggregation of forecasts, plans, and orders between the central office and the regional distribution centers and sales offices is also enabled through the use of master plans.

Of course, master plan maintenance is not mandatory for clustered items. Available-to-promise information (ATP), in that case, is still available for clustered plan items, because you can obtain ATP information without a master plan.

The use of a master plan which supports forecasting and inventory planning on clustered items is depicted below:

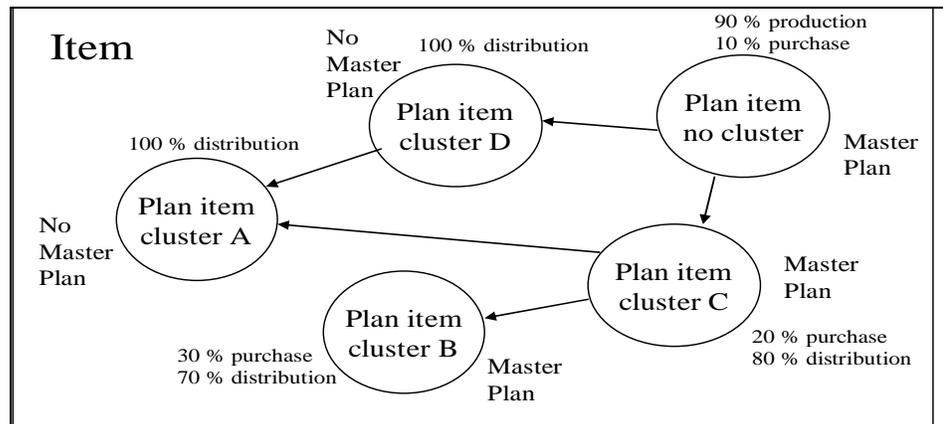


Figure 2-5: Master-plan functionality for clustered item

Note: You can maintain a master plan for an item without using master-based planning. Master-based planning is based on the bill of critical materials and the bill of critical capacities. You can use order-based planning instead of master-based planning.

Cluster of warehouses

A cluster represents a geographical area that contains one or more warehouses or a company entity, such as a production site, regional distribution center, or sales office.

You can define clusters in the Clusters (tcomm1135m000) session. The cluster is connected to the warehouses that are part of the cluster.

To link a warehouse to a cluster, use the Warehouses (tcomm1112m000) session. A cluster can also include warehouses for which the **Include in Enterprise Planning** check box is cleared. During the order planning and master planning, ERP LN ignores the stock transactions of these warehouses. You can use this, for example, to designate warehouses for rejected goods.



Figure 3-1: Warehouses (tcomm1112m000)

Note: The **Default Warehouse for the Cluster** check box is not related to the default warehouse on the plan item. This check box is introduced only for copying purposes between clusters.

Clustered plan item

The cluster is one of the segments in the plan item code. Therefore, every clustered plan item has its own planning parameters. You define a plan item's planning parameters in the Items-Planning (cprpd1100m000) session.

The screenshot displays the SAP 'Items - Planning' (cprpd1100m000) window, specifically the 'General' tab. The 'Plan Item' field is set to 'USA' and the 'Description' is 'René - end item 1'. Under 'General Data', the 'Plan Item Type' is 'Item', 'Plan Level' is '1', 'Default Supply Source' is 'Distribution', 'Actual Source' is 'Distribution', 'Default Warehouse' is 'NY' (new york), 'Calendar of Default EU' is 'COMPANY' (Company), and 'Planner' and 'Fixed Delivery Type' are empty. The 'General Parameters' section has 'Maintain Master Plan' checked, while 'Dependent Demand Forecast' and 'Central Multi Site Planning' are unchecked. The 'Inventory' section shows 'Inventory on Hand' at 0.0000 pcs and 'Safety Stock' at 10.0000 pcs. The status bar at the bottom indicates 'Modify cprpd1100m000 570'.

Figure 3-2: Items – Planning (cprpd1100m000), General tab

In this example, you can see:

- **Cluster:** USA
- **Plan Item:** USA RAL END1
- **Default Warehouse:** NY

Default warehouses for plan items

If a single cluster contains multiple warehouses, the planning is always aggregated to one default warehouse for a plan item.

The following figure provides an illustration of this type of aggregation:

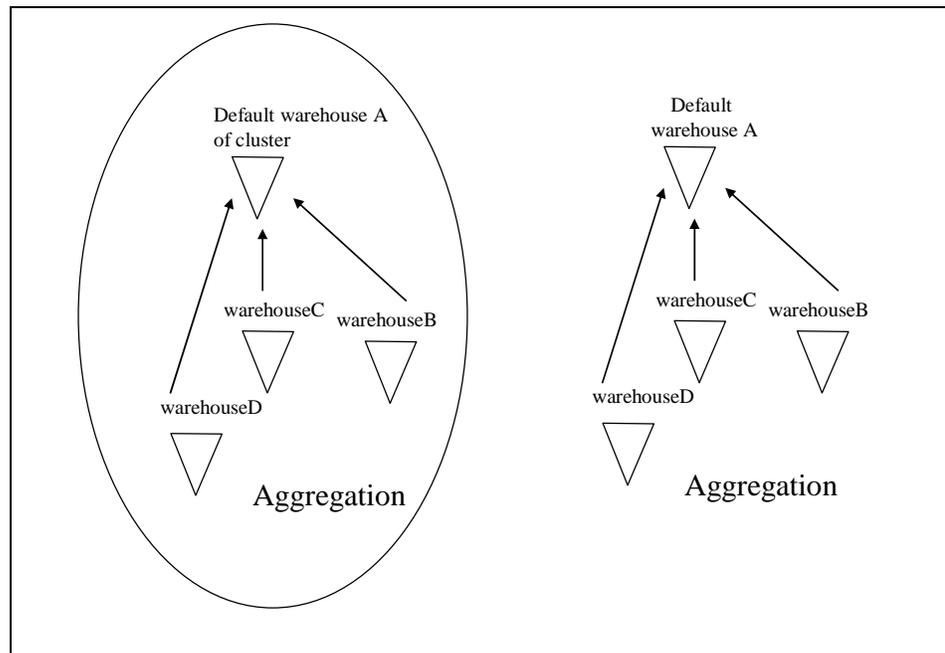


Figure 3-3: Default warehouses for planning

The default warehouse for both clustered and non-clustered plan items is defined in the Items-Planning (cprpd1100m000) session. The inventory and requirements (demand) are automatically aggregated to the default warehouse. The planning always supplies to this default warehouse, based on the aggregated quantities.

Supply source for clustered items

A clustered plan item can be supplied by distribution, purchase, or production. You can also define multi-sourcing strategies. The following sections describe each supply source.

Distribution

If the default supply source is **Distribution**, the clustered plan item is replenished from warehouses in other clusters. To set up distribution planning (DRP), you must define supplying relationships between the clusters

(warehouses). ERP LN's DRP functionality uses these relationships to generate planned distribution orders to supply the cluster.

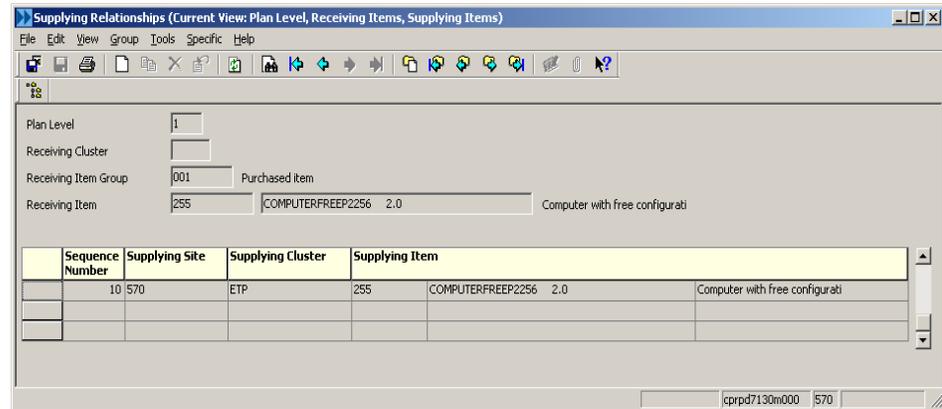


Figure 3-4: Supplying Relations (cprpd7130m000)

Note: You do not define supplying relationships on warehouse level, but on cluster level, as shown in the previous example. You do not need supplying relationships on warehouse level, because Enterprise Planning always plans on the same default warehouse per cluster, as well as on the same default warehouse for the non-clustered item.

Purchase

If the actual supply source is set to **Purchase**, external suppliers supply the clustered plan item. This setup is called local purchasing. To set up purchase planning, you must use the following sessions:

- Item - Purchase (tdipu0101m000)
- Item - Purchase Business Partner (tdipu0110m000)
- Supply Strategy (cprpd7120m000).

The cluster segment is only applicable in Enterprise Planning. Therefore, all the clustered plan items use the same purchase data and item purchase business partner information. The supply strategy is optional and you can define a supply strategy for each cluster. This strategy determines the priority rules for the selection of suppliers during the planning run.

Production

If you set the default supply source to **Production**, production orders supply the clustered plan item. To set up production planning, the following sessions are the most important sessions:

- Bill of Material (BOM) (tibom1110m000)
- Routing Operations (tirou1102m000)

non-clustered item and the clustered items. You can set up the high level sourcing strategy by cluster.

Netting

ERP LN nets a clustered plan item in the exact same way as a non-clustered plan item. Enterprise Planning calculates the net requirements on the basis of the gross requirements, the on-hand stock, and the firm supply. Next, Enterprise Planning generates supply for the net requirements.

You can leave a warehouse in a cluster out of the order planning and the master planning. To exclude a warehouse from the order planning and the master-planning, clear the **Include in Enterprise Planning** check box in the Warehouses (tcmcs0503m000) session.

Distribution planning

Distribution Requirements Planning (DRP) balances the requirements in the distribution channels with supply by using planned distribution orders. You can plan distribution in all directions:

- From non-clustered plan item to clustered plan item
- From clustered plan item to non-clustered plan item
- Between clustered plan items

You set up the distribution relationships in the Supplying Relationships session. Various business cases are supported.

The following sections provide some basic DRP examples.

Example 1: DRP from central to decentralized warehouses

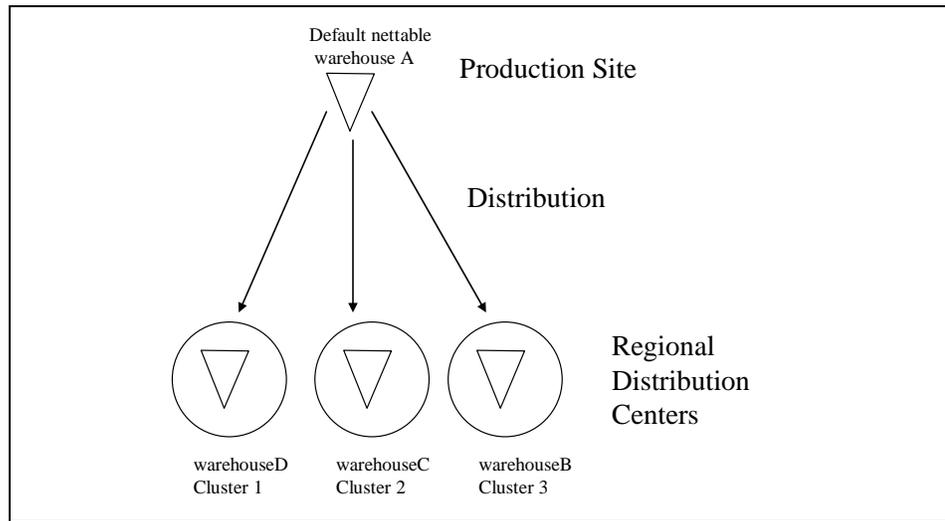


Figure 4-1 DRP from central to decentralized warehouses

In this example, the regional distribution centers perform the sales order acceptance. The netted requirements that originate from these sales orders are aggregated to the central production site. The production site then replenishes the regional distribution centers. Although clusters are not used in sales orders, the item/warehouse combination of the sales order line is traced to the correct cluster in Enterprise Planning.

Example 2: Multilevel DRP from central to decentralized warehouses

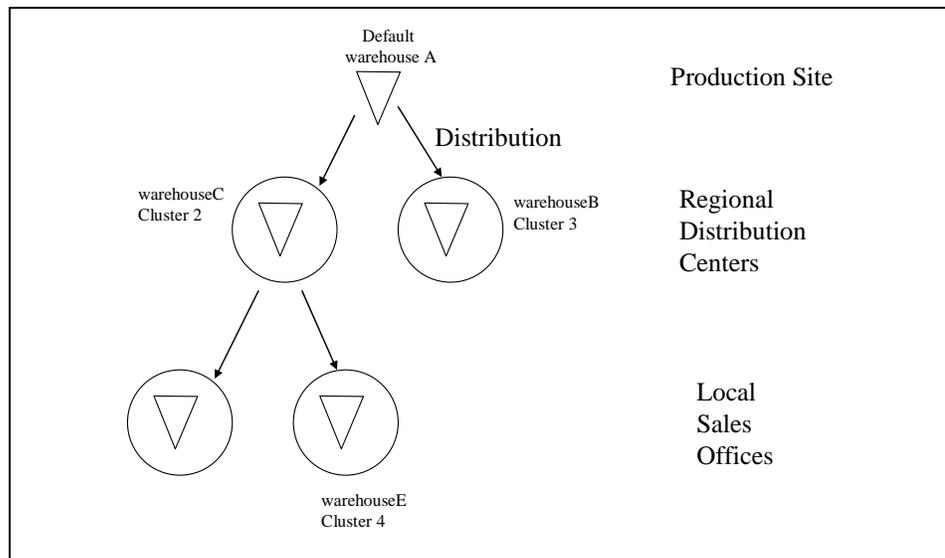


Figure 4-2: Multilevel DRP from central to decentralized warehouses

In this example, the local sales offices perform the sales order acceptance. The planning process aggregates the requirements through the distribution channel to the central production site. If necessary, the production site replenishes the regional distribution centers. Subsequently, these regional distribution centers replenish the local sales offices.

Purchase planning

The purchase planning process for clustered items is identical to that of the non-clustered items, because these items share item purchase business partner information. Only the supply strategy can be defined separately for a clustered item. However, to select suppliers based on the cluster (local purchasing), you can use the warehouse on the Ship-from role of the business partner. If you entered a particular warehouse here for a supplier, that supplier can only deliver goods to this warehouse. As a result, the purchase planning process takes that supplier into account only when a plan item passes for which the default warehouse equals the warehouse on the Ship-from role.

The following example further describes the purchase planning.

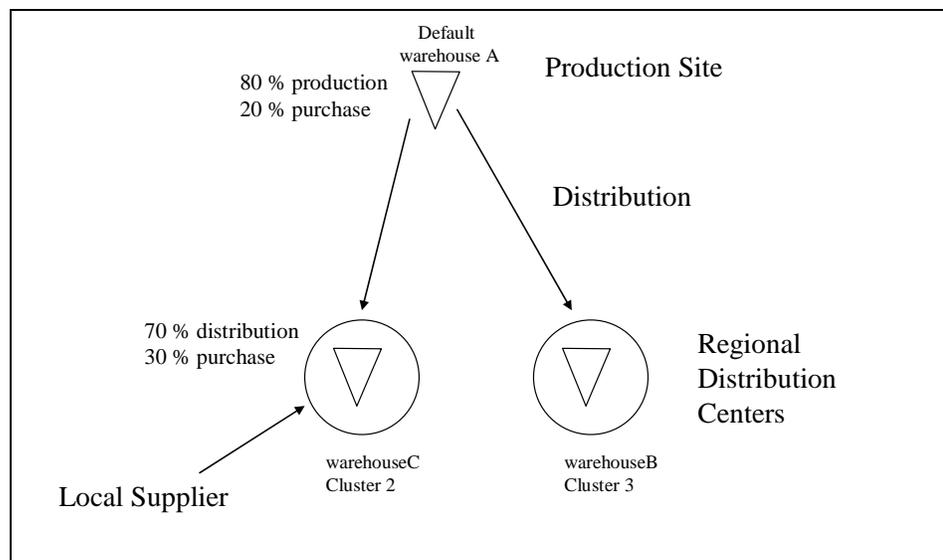


Figure 4-3: Local purchasing on a cluster

In this example, the item is for 70 percent supplied to cluster two by means of distribution from the central production site. However, the cluster also purchases the same item locally (30 percent of supply). A sourcing strategy is defined for this item. You can also purchase the item centrally from another supplier. You can model this with the following setup:

In the Items – Planning (cprpd1100m000) session, set the following fields:

Setup for local purchasing (Plan items)

Field	Non-clustered item	Clustered item
Plan Item	JOSCOM	USA JOSCOM
Cluster	(None)	USA
Default Supply Source	Production/Purchase	Distribution
Default Warehouse	DUB (Dublin)	NY (New York)

In the Ship-from Business Partners (tccom4121s000) session, which you can access from the Business Partners (tccom4500m000) session, set the following fields:

Setup for local purchasing (Suppliers)

Field	Supplier for USA	Supplier for non-clustered warehouse
Supplier	SUP000002	SUP000003
Warehouse	NY (New York)	DUB (Dublin)

According to these settings, supplier SUP000002 can only deliver to the cluster and warehouse in New York. Supplier SUP000003 only delivers to the warehouse in Dublin. If a sales order is accepted in the New York sales office, the planning run automatically includes only the suppliers that have the New York warehouse connected, and suppliers that do not have any warehouse connected. In this case, the planning run takes only SUP000002 into account to plan the clustered item USA_JOSCOM. The planning run selects clustered warehouse NY for the planned purchase order. You can transfer the planned purchase orders to the purchase department. The goods are then received on the clustered warehouse.

Production planning

If the default supply source of a clustered item is **Production**, the planning run creates planned production orders for the clustered item and the clustered warehouse. However, the explosion of materials and operations proceeds according to the general bill of material and routing. For master planning, the planning process uses the general bill of critical material and bill

of critical capacities to explode dependent demand to critical materials and capacities.

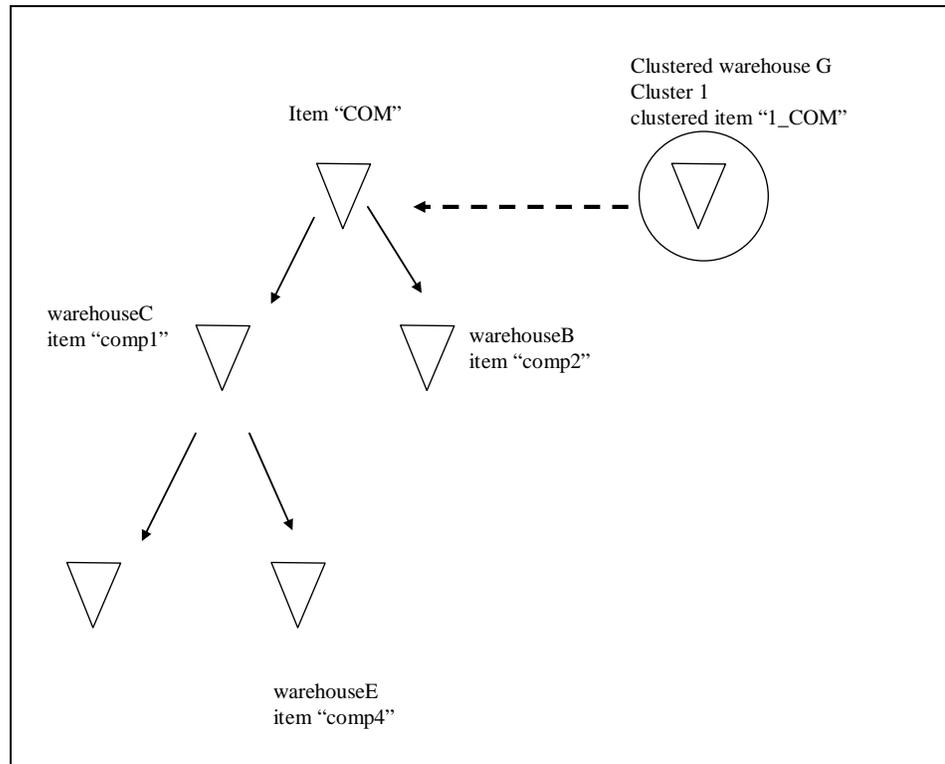


Figure 4-4: Explosion clustered item via general BOM

A clustered item does not have a unique (critical) bill of material or (critical) routing. ERP LN creates the planned production order for the clustered item and the clustered warehouse. You can transfer this planned production order to the Shop Floor Control (SFC) module. The clustered warehouse receives the finished product. ERP LN aggregates all the inventory transactions to the clustered item.

Clustered components in the bill of material

The bills of material of two items that are manufactured in two different production sites can contain the same component item and you might want to purchase that component from different suppliers, depending on the manufactured item for which you use the component.

To model that situation, you can use the following setup:

- Define a cluster for each production site.
- Define the component as clustered plan items in the Items – Planning (cprpd1100m000) session: one clustered plan item for each cluster. You

specify one of the warehouses linked to the cluster as the clustered item's default warehouse.

- In the Bill of Material (tibom1110m000) session, on the BOM line for the component, enter the same warehouse as the default warehouse of the clustered plan item.
- In the Ship-to Business Partner (tccom4121s000) session, link the component's local supplier to the same warehouse.

If you run the planning process, ERP LN automatically selects the correct supplier for each clustered plan item.

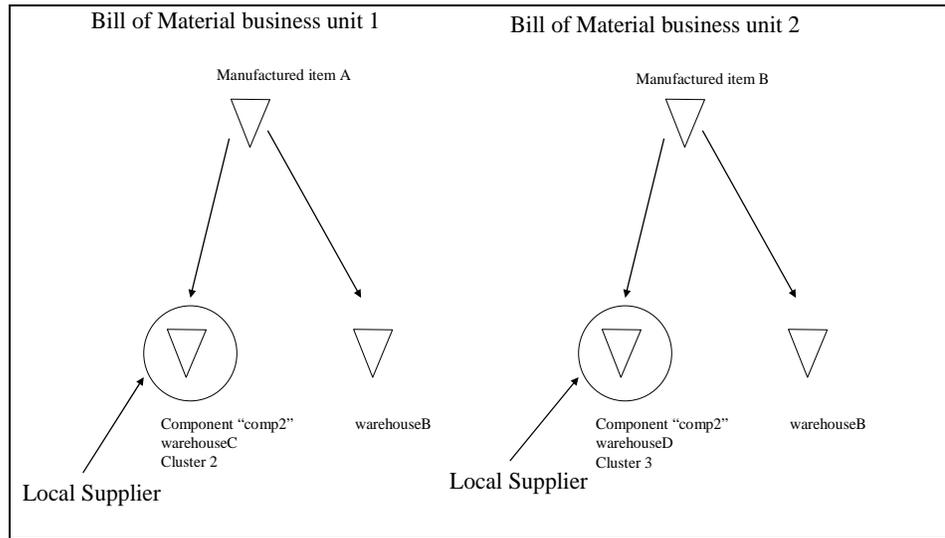


Figure 4-5: Local purchasing of components

A single mechanism supports several similar business cases.

Chapter 5

Distribution Within a Cluster

5

As discussed in Chapter 3, “Master data for clusters,” Enterprise Planning always plans the demand and supply on a clustered plan item’s default warehouse. As a result, even if you enter one of the other clustered warehouses on a sales order line, Infor ERP LN generates the planned order for the default warehouse, which is the level on which Enterprise Planning operates.

For movement of goods inside a cluster, from one warehouse to another, you must use Infor Warehouse Management. That package’s supply systems generate warehouse transfers directly on execution level. The available supply systems for replenishing the shop floor in the Shop Floor Control (SFC) module are:

- Time Phased Order Point (TPOP)
 - Order Controlled/Single
 - KANBAN
-

Chapter 6

Available to Promise for Clustered Items

6

For clustered items, you can use three types of available-to-promise functionality:

- standard CTP
- channel CTP
- family CTP

Refer to the ATP and CTP document for detailed information on Capable-to-Promise functionality.

You must set up a plan item's available-to-promise functionality in the **Items – Planning (cprpd1100m000)** session, on the **CTP** tab.

For clustered items, the use of component and capacity CTP is restricted. Only one of the clustered plan items and non-clustered plan items can be supplied by means of the source production. If multiple clusters have the source production, the capable-to-promise functionality produces erroneous results, because the system promises the same capacity and components to multiple orders: once for each cluster. This happens because a clustered item cannot have a unique bill of material, bill of critical material, routing operations, or bill of critical operations.

If Enterprise Planning reserves and checks capacity CTP on a clustered item, the same capacity can be promised to multiple orders: once for the clustered item, and once for the non-clustered item.

No functionality for disaggregating distribution orders to a clustered item, channel is available. Therefore, ERP LN does not calculate the channel ATP automatically, if the clustered item has the source Distribution. For these clustered items, you must manually enter a quantity in the **Allowed Demand** field to maintain the channel ATP in the channel master plan.

Clusters represent one or more warehouses in a particular geographical area. Therefore, you can think of cluster as separate entities in a company, such as a production site, a regional distribution center, or a local sales office.

You can set up plan items for each cluster, called clustered plan items. These plan items provide allow you to plan per item-cluster combination. The clustered plan item can be supplied via distribution, purchase, and production. However, for purchase and production the functionality is limited.

The planning process is always performed on the aggregated level of the default warehouse of the cluster. You must use the available supply systems in Infor Warehouse Management control the replenishment of the other warehouses in the cluster.

For order acceptance of clustered items, you can apply standard ATP, component and capacity CTP, family CTP, and channel CTP. However, the use of component and capacity CTP is limited, because a clustered item does not have a unique bill of (critical) materials and capacities.
