

# Catalog Management

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## Concepts Guide

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## An Overview of Catalogs

Catalogs are hierarchies of items, organized into groups for different purposes. Selling and Fulfillment Foundation supports the following types of catalogs:

- ◆ Master Catalog
- ◆ Selling Catalog
- ◆ Active Selling Catalog

### Master Catalog

The master catalog is a hierarchy of items, organized into groups for ease of item maintenance. It is created by default when a catalog organization is defined. Typically, the hierarchical structure of the master catalog is flat or has little depth. This structure facilitates item maintenance. The master catalog and the items within it are usually maintained by the catalog organization. However, in some cases, a subcatalog organization may be authorized to manage parts of the master catalog.

**Note:** Only one master catalog can exist for a catalog organization.

### Selling Catalog

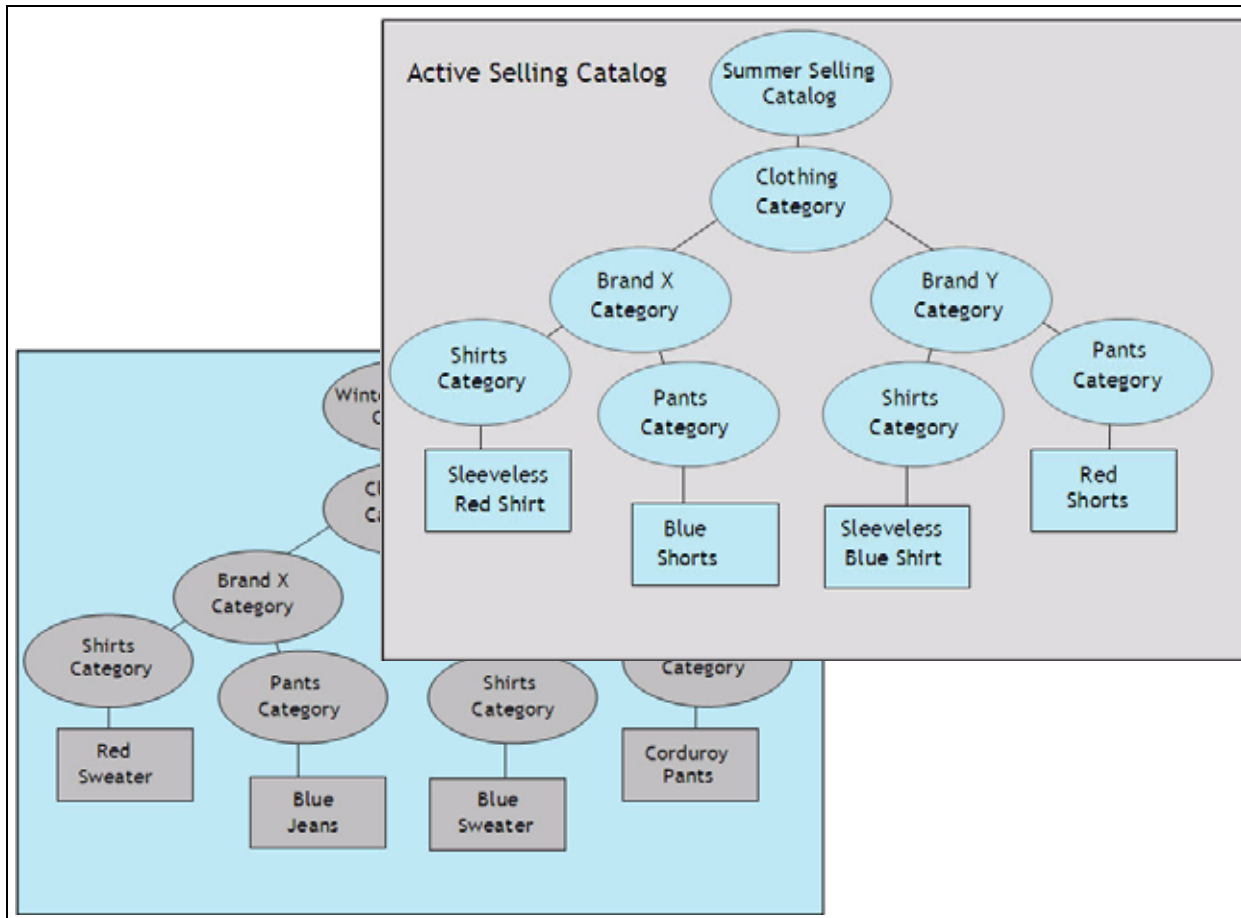
A selling catalog is a hierarchy of item groups that are organized to facilitate item sales. Typically, a selling catalog is displayed to customers as a Web channel catalog. Therefore, the structure of the selling catalog is usually deep, with multiple layers. This structure enhances customers' ability to locate and buy items. A business may define only one selling catalog, for example, a business may use the master catalog for item maintenance and also designate it as the selling catalog. However, businesses typically define several selling catalogs, such as seasonal catalogs for fall, winter, summer, and spring sales.

**Note:** Only one selling catalog can be active at a time.

### Active Selling Catalog

Organizations can define any number of selling catalogs. However, only one selling catalog can be active at a time. The active selling catalog is used by a business as its Web channel catalog.

For example, in the following figure, the summer selling catalog can be designated as the active selling catalog during the summer months, and the winter selling catalog can be designated as the active selling catalog during the winter months.



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## Categories

Catalogs are organized into groups of items called categories, which enable your catalog to classify an entire item set in a number of different hierarchical and searchable groupings. After defining the categories for a catalog, you can add items and assign attributes to the categories. The previous figure shows a master catalog, the winter and summer selling catalogs, and the categories that make up each catalog.

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## Kit Items

A kit item is an individual item comprising various components. For example, a computer is a kit item, and items such as monitor, keyboard, mouse, and other peripherals are its components.

Kit items can be of three types:

- ◆ Physical Kits
- ◆ Dynamic Physical Kits
- ◆ Bundles

### Physical Kit

A physical kit is maintained as a single item and is not disintegrated into components. It is considered a finished product at a node or at the time of dispatch. For example, a cellular phone with its battery and handset is a preconfigured physical kit.

Physical kits can be of the preconfigured type, such as a cellular phone. For example, a seller may configure a laptop with a 250 GB hard drive, 3 GB RAM, and a CD-RW/DVD-RW drive, and sell the laptop as a single item. Because the laptop comprises different components that cannot be sold separately, the laptop is a physical kit.

The inventory for a physical kit is maintained at the kit item (parent) level.

### Dynamic Physical Kit

A dynamic physical kit comprises various components. A decision about which components have to be shipped is decided at the time of creating an order. For example, a buyer may place an order for a computer, including the components. The buyer might want the CPU, monitor, keyboard, and mouse, but not the speakers. This forms a dynamos physical kit. The inventory for this is maintained at the kit item (parent) level.

### Bundle

A bundle is a kit item that consists of many components. A bundle's components can be products, provided services, physical kits, or other bundles. However, a delivery service cannot be a component of a bundle.

The inventory for a bundle is maintained at the component level. Inventory tags can be given to a bundle, but they are ignored by the application.



The item Bedroom Set, which includes the components Bed Set, Dress Set, Entertainment Set, and so on, is an example of a bundle. The Bed Set, Dresser Set, and Entertainment Set can in turn, be individual bundles by themselves.

#### Bed room set

- Bed Set (1)
  - Mattress (1)
  - Bed (1)
    - Head Board (1)
    - Foot Board (1)
- Dresser Set (1)
  - Mirror (1)
  - Dresser (1)
- Entertainment Set

## Models, Configurable Items, and Preconfigured Items

In addition to physical kits, dynamic physical kits, and bundles, other item types exist that overlap or share these kit types. In the Business Center Visual Modeler application, you can create a model that defines all the configurable options available for an item. After creating a model item, you can associate it to the corresponding bundle item. Like a bundle item, a model item can be a kit that consists of multiple components.

If an item is configurable, a customer can build that item in the Sterling Web application based on the associated model. You can also define preconfigurations of a configurable item in the Business Center application, and customers can later select from these preconfigurations and modify preconfigurations for which an order has been placed.

When you reconfigure a preconfigured item, that item is replaced with the configurable item associated to the model used. Any time that you reconfigure items, pricing can be affected.

For more information about defining models, see the *Visual Modeler Application Guide*.

---

## Item Associations

There are five types of associations that can be made between product items:

- ◆ Cross-Sell
- ◆ Up-Sell
- ◆ Supersession
- ◆ Alternative
- ◆ Competitive

All association types, except supersession, allow you to associate items to other items, to categories of items, and to queries of items. Supersession supports only item-to-item associations. For example, you can create a query to retrieve all the laptops with 120 GB hard drives, and then define an up-sell to associate smaller laptops with the queried laptops.

### Cross-Sell

A cross-sell promotes an add-on or accessory item that, when combined with the primary item, makes a “better” package.

Let us, for example, assume that there is a shirt in your inventory that matches a pair of shoes. When you create the shoes item in the catalog, you associate the shirt as a cross-sell. This way, when the customer orders the shoes, it is possible to notify them about the matching shirt.

### Up-Sell

An up-sell promotes a more powerful or higher-level item.

Let us, for example, presume that your inventory has a certain model of running shoe that is available in two versions, inexpensive and expensive. When you create a catalog item for the inexpensive shoes you associate the more expensive shoes as an up-sell. When a customer tries to order the inexpensive shoes, it is possible to notify them about the expensive option.

### Supersession

Setting up a supersession association provides the ability to recognize that an ordered item can be superseded by a chain of items. An item is superseded when its effective date becomes obsolete. Typically, obsolete items are not offered to customers who perform a regular search of your business’s Web site. However, if a customer performs an advanced search, looking specifically for obsolete items, he is offered the next item in the chain of supersession. Additionally, if an item becomes unavailable, such as an item that has sold out, the system tries to order the next item in the chain of supersession.

A chain of supersession can include as many items as you want. However, you should not specify more than one chain of supersession per item. For example, you can configure item A to be superseded by item B, which in turn can be superseded by item C; however, you cannot specify that both items B and C should

directly supersede item A. When configuring supersession, ensure that you specify similar items that are comparably-priced, such as different versions of software.

Let us, for example, presume that in your catalog, you have an automotive part that is sold under a new model number each year. You configure supersession for the part (Part A is superseded by Part B). Part A is now obsolete. If a customer searches your Web site for the part, the system does not display results for the search.

However, if the customer performs an advanced search that specifically includes obsolete parts, the system informs the customer that Part A is obsolete and offers the customer Part B because it supersedes Part A.

Let us consider a similar scenario where Part A is sold out and is no longer available. Without supersession, a customer who tries to buy Part A may be told that it is not available, even though it is available as Part B. However, if supersession is configured, the system offers Part B to the customer.

## Preferred Substitutes

A preferred substitute is an item that should be fulfilled first, prior to fulfilling the original item. The system verifies and fulfills the order by shipping the preferred substitute item even when the original item is available. For example, if an order is placed for Item1, but Item2 is the preferred substitute, Item2 is depleted prior to shipping Item1. The ratio between the preferred substitute and the original item should always be 1.

When a preferred substitute is available, the order is scheduled completely against that preferred substitute. Although partial scheduling against the preferred substitute or the original item is not possible, partial procurement is allowed when preferred substitutes are not available.

**Note:** Preferred substitutes have limitations such as:

- Invoicing is done based on the original dimensions of the item.
- Tag-controlled items cannot use preferred substitutes.
- The product or service associations of the original item is used.
- The capacity of the original item is used.
- Routing is done based on the original dimensions of the item.

## Alternative

An alternative association provides the ability to choose an item that is very similar to the original as an alternative. The system prompts a customer to confirm the alternative item before it is ordered.

Let us, for example, presume that in your inventory you have a popular brand of shoe that sells out quickly. Your inventory also has other comparable brands of shoes that are popular but do not sell as much. When you create a catalog item for the popular brand of shoes, you associate the other brands as alternatives. When a customer orders the popular brand of shoes and if that brand is not in stock, the system provides the customer with the option of buying the alternate brand of shoes. However, only after the customer confirms that the alternative brand is acceptable does the order get placed.

## Competitive

Competitive association involves associating similar items from different manufacturers. You can also use this association to track products from competitors.

For example, if a store sells a basketball shoe made by Company X, they might also offer buyers a similar basketball shoe made by Company Y.

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## Product Services: Delivery Services and Provided Services

In addition to shipped products, Catalog Management™ provides the capability to manage delivery services and provided services.

Shipped products are physical products that are purchased and shipped to a customer, for example, a piano.

*Delivery Services* are billable services that are directly associated with a product in a sales order or a return order, for example, the delivery of a high-definition television. Stand-alone delivery service lines can also be created, and if required, associated with a product at a later time.

*Provided Services* are billable services that are offered to enhance the life or usability of a product associated with a sales order or a return order, for example, fabric protection for a sofa or installation service for a home theater system.

Delivery Services and Provided Services are also defined as items by the catalog organization and are available to all the organizations that share that catalog organization.

Each service item is assigned a service type. Service types are used to identify the capacity UOM for the service items. Delivery Service Types can be used to compute additional capacity. In addition, service levels are used to indicate the complexity of the assigned service type.

For each service, a list of valid service options are also created as items and associated to the respective service item.

Besides setting up Delivery and Provided Service items, the catalog must also include the definition of the list of delivery and provided service items available for products. This association can be set up either at any level within an Item Classification hierarchy or at an individual product item level.

As with item associations, you can also have product, provided, and delivery services.

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## Containers

Catalog Management provides the capability to manage *containers* that can hold items.

Within Catalog Management, containers are defined as items for a catalog organization and are available to all the organizations sharing that catalog organization. By defining containers as items, containers can be managed in the same ways that items can. Like other items, containers can consist of components, and can be kit items.

Containerization is a process that assigns items to containers based on the algorithms defined in the corresponding organization. Defining a container involves defining one or more of the following attributes that are used in containerization:

- ◆ Physical characteristics, such the container's volume and the weight that it can hold.
- ◆ Container capacity based on item classification
- ◆ Containerization categories
- ◆ Buyer of the items being containerized

### Physical Characteristics

The physical characteristics that you specify for a container are used to determine its basic physical capabilities. If you specify that a container can carry a weight of up to 20 kilos, and the item you are shipping weighs 50 kilos, this container cannot be used. If multiple items are being containerized, the container's volume determines if it can hold all the items.

**Note:** Some of the items that are being containerized may be in boxes or have regular shapes, such as books. This simplifies the calculations about whether a container can successfully hold them.

### Capacity by Item Classification

Some items may be irregular in shape, such as soccer balls, or can be compressed when packed, such as sweatshirts. To accommodate items such as these, you can establish classifications to determine the number of items that can be placed in the container.

For example, if you are selling sporting goods, create classifications for the various types of balls you sell, small, average, and large. You can then assign these classifications to the corresponding items as shown in the following table.

---

| Classification | Product   |
|----------------|---|
| Small          | Ping-pong balls, racquet balls, children's super-bouncy balls |
| Average        | Soccer balls, basketballs, footballs                          |
| Large          | Yoga exercise balls, medicine balls                           |

---

When creating an item description for a container, you can use the following classifications to indicate the quantity that the container can hold for each classification, shown in the following table.

| <b>Classification</b> | <b>Quantity Can Hold This Quantity</b> |
|-----------------------|--|
| Small                 | 300                                    |
| Average               | 75                                     |
| Large                 | 8                                      |

## **Containerization Categories**

You can also establish various containerization categories, and then specify that containers can accept only the items that are in that categorization category. This enables you to ensure the following:

- ◆ Associating hazardous materials with appropriate containers
- ◆ Ensuring that products containing liquids are packed in waterproof containers
- ◆ Shipping certain items using premium packaging

## **Buyer**

You can also indicate that a container should be used only for specific buyers. This indication will be based on your knowledge about buyer's requirements. This may include size restrictions in the buyer's facilities, special packaging requirements, or providing containers marked with a special logo.

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## Items with Variations

An item with variations is a grouping of items that have similar characteristics and are displayed as a single item in product search results. This grouping is useful when limiting the individual items that are returned during a product search.

For example, if you are searching a catalog for a polo-shirt, you usually receive a match that includes three styles (short-sleeve, long-sleeve, active) along with the colors and sizes in which each style is offered. However, for an item with variations, the initial search result returns only the styles available. Color and size selection are available after the style is selected, limiting the number of results returned by the initial search.

This can be accomplished by creating an item with variations and children items for each product. The following table shows an item with variations and probable child items it could have.

---

| <b>Item with Variations</b> | <b>Children Items</b>                  |
|-----------------------------|--|
| Short-sleeved<br>Polo Shirt | Small, Red, short-sleeved polo shirt   |
|                             | Medium, Red, short-sleeved polo shirt  |
|                             | Large, Red, short-sleeved polo shirt   |
|                             | Small, Blue, short-sleeved polo shirt  |
|                             | Medium, Blue, short-sleeved polo shirt |
|                             | Large, Blue, short-sleeved polo shirt  |

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Child items of an item with variations are automatically assigned to the same category or classification to which the parent item is assigned.



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## Assets

Asset is the term used to describe an electronic media file that you can associate with a business object. Assets can be of many kinds, URLs, datasheets, image files, sound files, and text files. Typically, they are digitally-based objects that reside in the system. You can assign assets to items, catalogs, categories, attributes, and attribute allowed values. When a customer accesses a business object with an associated asset, the asset is also displayed. For example, if you assign image files to items that are sold from an online catalog, customers can view the pictures of items they intend to buy.

---

## Defining Attributes

Attributes are characteristics or specifications that define the corresponding system entities. For example, a computer's attributes may include:

- ◆ Type of CPU
- ◆ Hard drive size in GB
- ◆ Number of USB ports

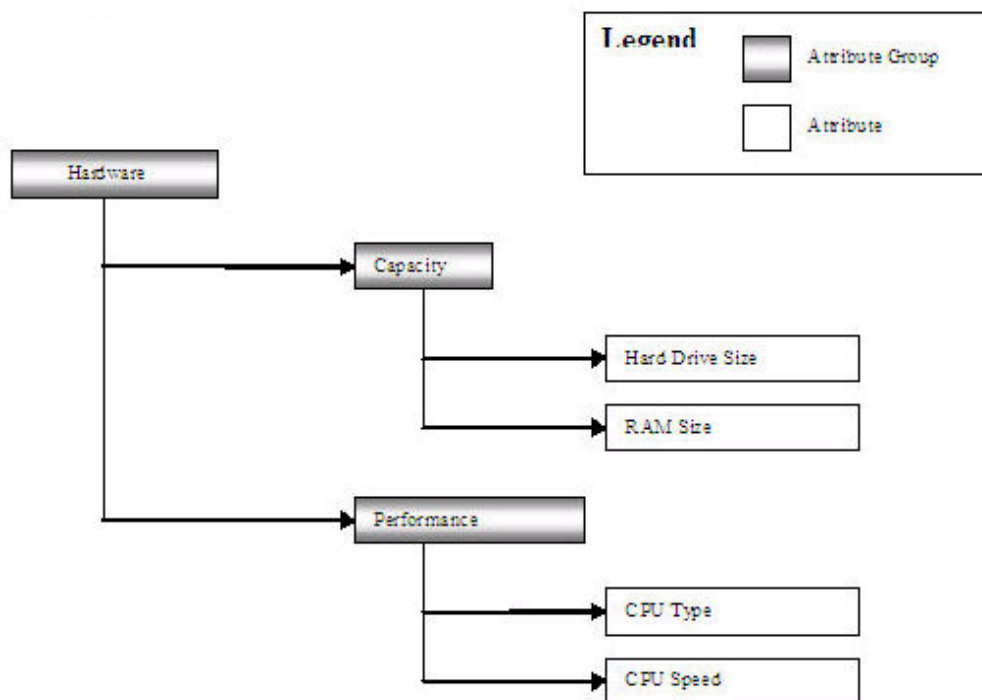
You can define a set of allowed values for attributes; for example, in the context of the CPU type, you can define the allowed values as AMD, Celeron, and Pentium.

Enterprises create and manage system attributes by first defining the following master attribute data:

- ◆ Attribute domains
- ◆ Attribute groups
- ◆ Attributes and allowed attribute values.

**Note:** You assign attributes and derived attributes to categories, but you cannot assign values to derived attributes. Only the decimal and integer data type is supported as a valid value for derived attributes.

The following figure depicts a branch of a typical attribute domain, in this case, the item attribute domain.



## Attribute Domains

An attribute domain is a hierarchy of attribute groups that contain similar types of attributes. For example, the item attribute domain contains groups of item attributes.

**Note:** The Selling and Fulfillment Foundation supports only the item attribute domain, which is automatically created when a catalog organization is defined.

## Attribute Groups

An attribute group is a set of related attributes that share a common purpose. For example, you can define an attribute group called Performance that contains Performance-related attributes for different types of items. You can then assign CPU Speed and CPU Type as Performance attributes of Computers and Acceleration as a Performance attribute of Toy Cars.

Multiple levels of attribute groups allow you to easily manage large numbers of attributes by prioritizing and organizing attributes. If the business in the example provided in the previous paragraph wants to emphasize its computer-related products, CPU Speed and CPU Type can be listed higher in the attribute group's hierarchical tree than Acceleration, the Toy Car-related attribute.

## Attributes

Attributes can be defined as characteristics of system entities. For example, CPU Speed and Ram Size can be defined as computer attributes. The Selling and Fulfillment Foundation supports the following attributes:

- ◆ Attributes with valid values
- ◆ Derived attributes
- ◆ Attributes by Reference

### Attributes with Valid Values

The Selling and Fulfillment Foundation enables you to define attributes with the following data types:

- ◆ Text defines the attribute as a text value. Text properties can be defined either as free-form text or as a defined list of values, such as small, medium, and large. You can configure multiple values for an attribute and a maximum character length for free-form text. You can also specify a default value.
- ◆ Boolean defines the attribute as a Y/N value. You can also specify a default value of Y or N.
- ◆ Decimal and Integer defines the attribute as a numerical value in decimal or integer format. You can specify a range of allowed numbers, such as 60-180, allow any number or a range of incremental values. For example, you can define a range of allowed values for the Hard Drive Size attribute in increments of 60 GB, such as 60 GB, 120 GB, 180 GB and so on. You can also configure a default value and a multiple list of values.

## Derived attributes

Derived attributes are attributes that represent a specific aspect of another attribute. You can define multiple derived attributes for an attribute and assign these derived attributes to different categories. For example, you can define two derived attributes called Dimension Range and associate them with the Dimension attributes in the TVs and Computers category. When an online customer searches for TVs, the system calculates the dimension range for each TV, based on the TV's dimensions, and displays the TVs in the appropriate ranges. Online customers can locate 32-inch TVs in the 32-35 inch range and 40-inch TVs in the 40-50 inch range.

**Note:** You assign attributes and derived attributes to categories but cannot assign values to derived attributes.

Only the decimal and integer data type is supported as a valid value for derived attributes.

## Attributes by Reference

Attribute management allows you to dynamically create and assign attributes without extending database tables. However, in some cases, you may want to use attributes that reference database fields, such as the yfs\_item table. In this case, the assigned values of the attribute are extracted from the corresponding field in the database table. For example, if an attribute called Lead Time refers to the Lead Time field in the yfs\_item table, the value for the item attribute information is taken from the Lead Time field in the yfs\_item table.

---

## Item Attribute Management

Item attribute management enables you to create and manage attributes for items and categories. Item attribute management involves the following processes:

- ◆ Defining attribute groups, attributes, and allowed attribute values.

**Note:** The item attribute domain is automatically created when you define a catalog organization. Only one attribute domain is supported by a catalog organization. For information about defining attributes, attribute groups, and allowed attribute values, refer to [Defining Attributes](#).

- ◆ Assigning attributes to categories and classifications
- ◆ Assigning values for category and item attributes

### Assigning Attributes to Categories and Classifications

After configuring master data for item-related attributes, assign these attributes to categories and classifications. When you assign an attribute to a category, the attribute is inherited by child categories, classifications, and items within the categories. Inherited attributes allow you to easily assign attributes to large numbers of items. For example, if you assign the Hard Drive Size attribute to the Computer category, the categories and item listed in the following table inherit the Hard Drive Size attribute.

---

| Computer Category   |                                    |
|---------------------|------------------------------------|
| Laptop Category     | Inherits Hard Drive Size Attribute |
| XBZ Laptop Category | Inherits Hard Drive Size Attribute |
| XBZ-X51 Item        | Inherits Hard Drive Size Attribute |

---

**Note:** Categories managed by subcatalog organizations do not inherit attributes and attribute values from the catalog organization.

When assigning attributes to categories and classifications, you can also define usages for attributes, such as attributes for filtering or comparing items. For example, by defining Port Type as a filterable attribute and Port Type, Hard Drive Size, and CPU Type as specification attributes, customers can search a business organization's Web site for computers by Port Type and view a computer's Port Type, Hard Drive Size, and CPU Type on the specifications page.

You can assign the following usages to an attribute:

- ◆ Searching specifies that this attribute is used for searches.
- ◆ Filtering specifies that this attribute is used to narrow the search results on a business' Web site.
- ◆ Specifications specifies that this attribute is displayed as an item specification on the business' Web site.
- ◆ Distinct Attribute specifies that this attribute is used to define Items with Variations.

## Assigning Values for Category and Item Attributes

After attributes are assigned to categories and classifications, you can assign values to attributes at the category and item levels. When you assign a value to an attribute in a category, the value is inherited by attributes in child categories, classifications, and items in those categories. For example, if you assign 240 GB as a value for Hard Drive Size in the Laptop category, all Laptop subcategories and items in those categories inherit 240 GB as the value for Hard Drive Size.

However if a child category has already assigned the attribute's values, the child category does not inherit the parent category's attribute values.

You can modify inherited attribute values at the following levels:

- ◆ Category
- ◆ Item

### Modifying Inherited Attribute Values at the Category Level

If you modify inherited attribute values in a child category, the child category becomes the owner of the attribute values. The attribute value is no longer defined by the parent category. For example, if the color attribute in the Shirts category inherits the values red, blue, and orange from its parent category, Clothing, and you change the attribute values at the Shirts category level to pink and purple, the categorization provided in the following table is true

| Categories/Child Categories/Items | Assigned Attribute Values         | Inherited Attribute Values                            |
|-----------------------------------|-----------------------------------|---|
| Clothing category                 | Red, Blue, Orange                 |   |
| Pants category                    |                                   | Inherits red, blue, and orange from Clothing category |
| Pants item                        |                                   | Inherits red, blue, and orange from Pants category    |
| Shirts category                   | Changes values to pink and purple |   |
| Shirt item                        |                                   | Inherits pink and purple from Shirts category         |

In this example, the color attribute no longer inherits any values from the Clothing category after the color attribute is modified at the Shirts category level. You added the colors pink and purple at the Shirts category level. Therefore, the values for the color attribute are defined at the Shirts category level as pink and purple.

If you then add the color green at the Clothing category level, the categorization provided in the following table is true:

| <b>Categories/Child Categories/Items</b> | <b>Assigned Attribute Values</b> | <b>Inherited Attribute Values</b>                            |
|--|----------------------------------|--|
| Clothing category                        | Red, Blue, Orange, Green         |  |
| Pants category                           |                                  | Inherits red, blue, orange, and green from Clothing category |
| Pants item                               |                                  | Inherits red, blue, orange, and green from Pants category    |
| Shirts category                          | Pink and purple                  |  |
| Shirt item                               |                                  | Inherits pink and purple from Shirts category.               |

### Modifying Inherited Attribute Values at the Item Level

You can modify item attribute values that an item inherits from a parent category. However, the category continues to own the attribute values. If you change the attribute value at the parent category level after modifying the child item attribute value, the item inherits the attribute value from the parent category.

For example, if a color attribute for the Shirt item inherits the values red, blue, and orange from the Shirts category and then you change the attribute at the item level by adding the value pink, the attribute value for the Shirt item is redefined as the values red, blue, orange, and pink. If you then modify the Color attribute at the Shirts category level by adding the value purple, the categorization provided in the following table is true:

| <b>Category/Item</b> | <b>Assigned Attribute Values</b> | <b>Inherited Attribute Values</b>                              |
|----------------------|----------------------------------|--|
| Shirts Category      | Red, blue, orange, and purple    |  |
| Shirts item          |                                  | Red, blue, orange, and purple. Pink is assigned at item level. |

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## Defining Catalog and Subcatalog Organizations

Typically, a catalog organization defines an item master that is shared with the other organizations in a participant model. The item master is defined in only one catalog, called the master catalog, eliminating the need of other organizations to create their own item definition. However, in some business scenarios, you may want to authorize an organization, other than the catalog organization, to maintain a portion of the master catalog. Although enterprises can share the master catalog, in some cases a catalog organization may want to extend the master catalog to other enterprises, allowing them to manage categories within the catalog.

Additionally, the catalog organization can allow some enterprises to access categories in the master catalog. The Selling and Fulfillment Foundation provides the following configurations for catalog management:

The catalog organization is an enterprise that maintains the master catalog and defines other enterprises as subcatalog organizations. The catalog organization authorizes subcatalog organizations to manage the categories within the master catalog and defines seller entitlements that grant or restrict other organizations' access to categories within the master catalog. Depending on an organization's seller entitlements, the organization may be able to view or sell catalog items that are maintained by the catalog organization or other organizations.

Subcatalog organizations are enterprises that refer to a catalog organization as their catalog organization. If a vendor or seller is an enterprise, it can be set up as a subcatalog organization. Subcatalog organizations can perform the following functions:

- ◆ Manage categories within the master catalog
- ◆ Manage items within categories in the master catalog
- ◆ Assign catalog organization attributes to subcatalog categories and items
- ◆ Assign items from the master catalog to the subcatalog organization's categories

**Note:** By default, subcatalog organizations can view all items in the catalog organization's catalog. If you want to restrict the items that subcatalog organizations can view, you must configure seller entitlements for the subcatalog organizations. Ensure that all items in the catalog are assigned to categories because seller entitlements rules are configured and assigned by category.



## Managing categories within the Master Catalog

Catalog organizations can authorize subcatalog organizations to manage the categories within the master catalog. However, only one subcatalog organization can manage a category. For example, a catalog organization may define a Memory category in the catalog and authorize XYZ-Vendor, the subcatalog organization, to manage the XYZ-Vendor category under the Memory category. Only XYZ-Vendor can add items to the XYZ-Vendor category and create subcategories under XYZ-Vendor.

## Managing Items within Categories in the Master Catalog

If the catalog organization has authorized a subcatalog organization to manage a category, the subcatalog organization is responsible for creating, assigning, and maintaining items within the authorized category. A subcatalog's items cannot be edited by the catalog organization or another subcatalog organization, and the subcatalog's items are unique within the catalog. After a subcatalog organization assigns an item to a category or creates an item or category, the subcatalog organization owns that item or category.

## Assigning Catalog Organization Attributes to Subcatalog Categories

A subcatalog organization can assign attributes of the catalog organization to its own categories. Child categories that are managed by the subcatalog organization inherit these assigned attributes. If a catalog organization assigns attributes to a category containing subcategories that are managed by a subcatalog organization, the subcatalog's categories do not inherit the attributes.

Additionally, a subcatalog organization can assign attribute values to its own categories and items. Child categories and items inherit these assigned attribute values. However, a subcatalog organization cannot assign attribute values to categories and items managed by the catalog organization. These assigned attribute values are not inherited by items that are managed by the catalog organization.

For example, if the subcatalog organization XYZ-Retail assigns the Size attribute values to its XYZ-Retail clothing category and the XYZ-Retail clothing category contains items managed by the catalog organization, the Size attribute values are assigned only to the items managed by XYZ-Retail. The Size attribute values are not assigned to the items managed by the catalog organization.

## Assigning Items from the Master Catalog to the Subcatalog's Categories

A subcatalog organization can assign items from the master catalog to its own categories. The catalog organization must configure seller entitlements for the subcatalog organization before the subcatalog organization can access categories in the master catalog. With the appropriate entitlements, a subcatalog organization can sell items that are created and maintained by the catalog organization and other subcatalog organizations.

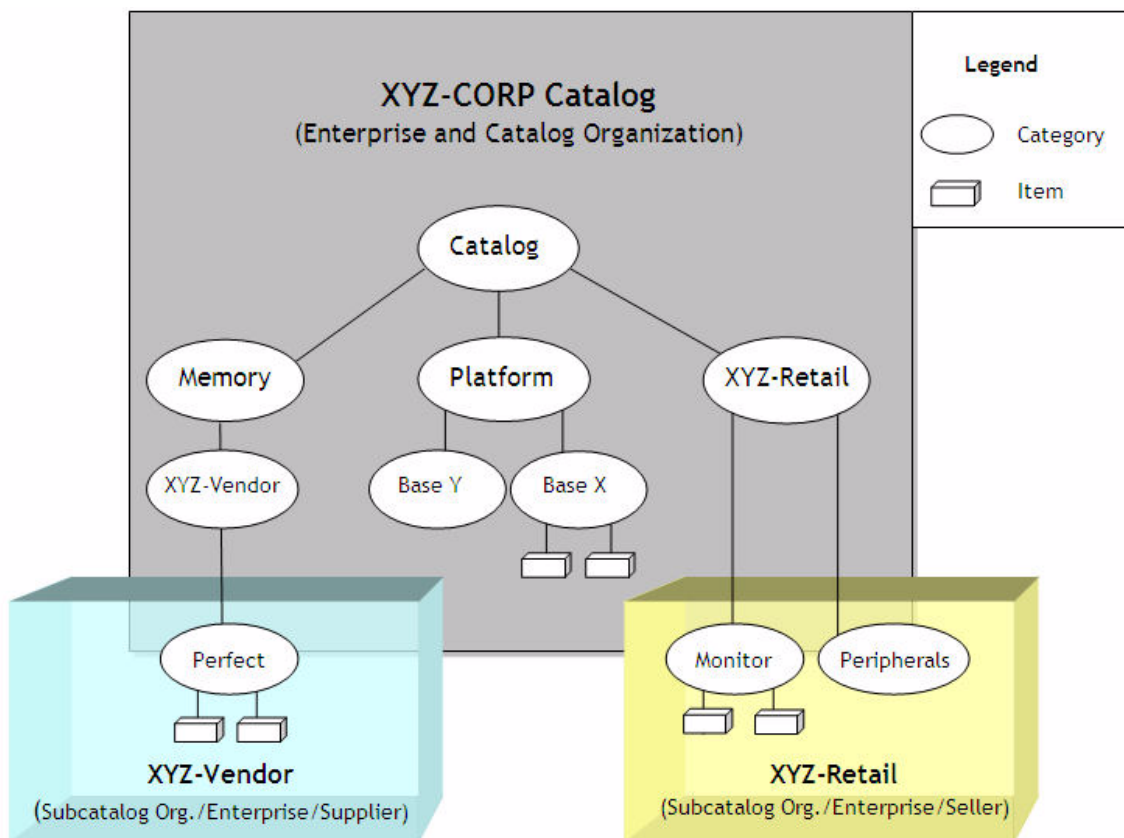
## Subcatalog Organization: An Example

XYZ-CORP is an enterprise and a catalog organization that maintains items, such as processors, motherboards, and chipsets. It defines the following subcatalog organizations:

- ◆ XYZ-Vendor, an enterprise and supplier of XYZ-CORP, makes memory chips. XYZ-CORP creates the XYZ-Vendor category in the catalog and authorizes XYZ-Vendor to extend the catalog by managing the XYZ-Vendor category. XYZ-Vendor adds its own items to the XYZ-Vendor category and is responsible for managing the XYZ-Vendor category and the items within it. Additionally, XYZ-Vendor is authorized to create and manage categories within the XYZ-Vendor category, such as the Perfect category.
- ◆ XYZ-Retail, an enterprise and seller of some XYZ-CORP items, primarily sells computer hardware. XYZ-CORP defines seller entitlements that allow XYZ-Retail to access the Memory and Platform categories in the master catalog. XYZ-Retail can assign items from the Memory and Platform categories and their subcategories to its own categories. This includes items from the XYZ-Vendor category, the Perfect category, the Base Y category, and the Base X category.

Additionally, XYZ-CORP allows XYZ-Retail to extend the catalog by granting XYZ-Retail authority to manage the XYZ-Retail category. XYZ-Retail is responsible for managing the XYZ-Retail category, its subcategories, and the items contained within them.

The following graphic shows the subcatalog example.



## Categories and Items that XYZ-Retail Can Sell

In the previous example, XYZ-CORP defines seller entitlements that allow XYZ-Retail to sell items under the Memory and Platform categories. The Memory category contains the XYZ-Vendor category, which is maintained by XYZ-Vendor, and the Perfect subcategory, which is also maintained by XYZ-Vendor. The Platform category contains the Base X and Base Y categories, which are maintained by XYZ-CORP. In the example, XYZ-Retail is entitled to sell items from categories maintained by XYZ-CORP, XYZ-Vendor, and XYZ-Retail.

If the Base X category contains the items BaseX-1 and BaseX-2, the Perfect category contains the items SDRAM and SODIMM, and the Monitor category contains the items LCD Fine and LCD Better, XYZ-Retail can sell items from the categories listed below:

Memory category

- ◆ XYZ-Vendor category
- ◆ Perfect category, including the items SDRAM and SODIMM

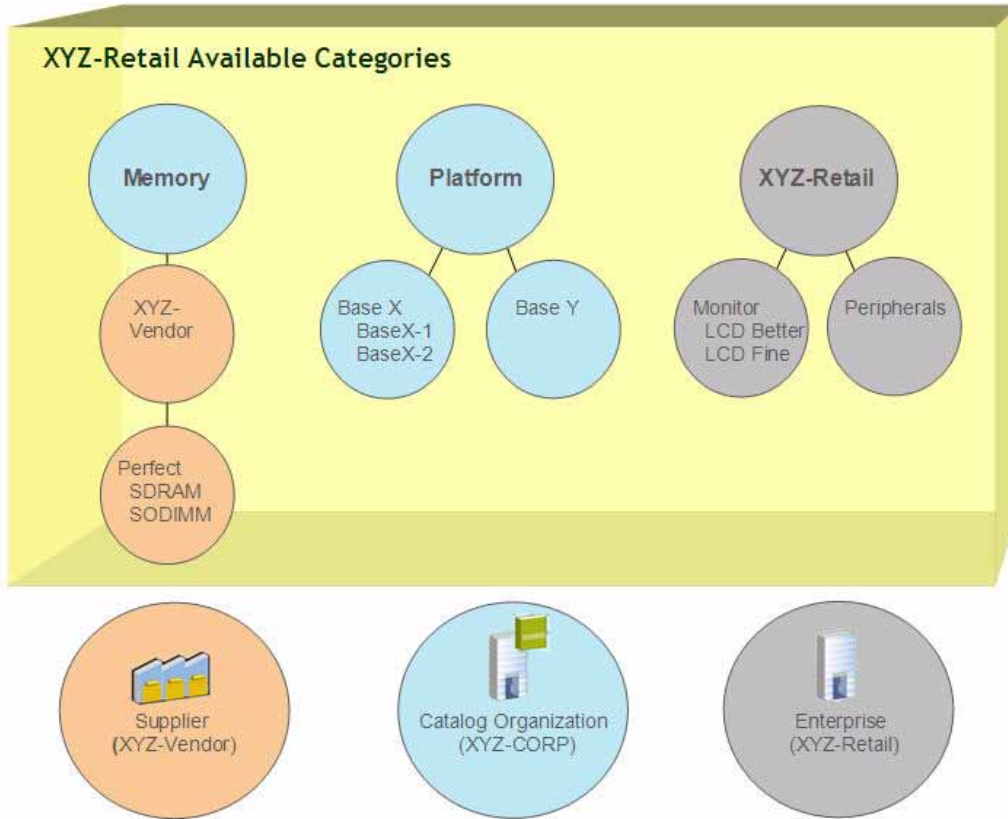
Platform category

- ◆ Base X category, including the items BaseX-1 and BaseX-2
- ◆ Base Y category

XYZ-Retail category

- ◆ Monitor category, including the items LCD Fine and LCD Better
- ◆ Peripherals category

The following figure demonstrates the above example.



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## Guidelines for Defining Subcatalog Organizations

A catalog organization defines subcatalog organizations by performing the following tasks:

- ◆ Defining enterprises as subcatalog organizations of the catalog organization. To specify an organization as a subcatalog organization, the organization must be configured as an enterprise, and the catalog organization must be specified as its catalog organization.
- ◆ Authorizing subcatalog organizations to manage categories in the master catalog. Subcatalog organizations are responsible for maintaining the assigned categories.
- ◆ Defining seller entitlements for subcatalog organizations. Seller entitlements determine the categories in the master catalog to which subcatalog organizations have access. If you are extending the catalog to a subcatalog organization and want other subcatalog organizations to be entitled to access its categories, you must also configure seller entitlements for the other subcatalog organizations. Catalog organizations are entitled to access all master catalog categories.

In addition to seller entitlements configured by the catalog organization, a subcatalog organization can set up customer entitlements that determine the items the subcatalog organization's customers can buy.

Seller entitlements determine what a subcatalog organization can sell and customer entitlements determine what customers can buy. The catalog organization assigns seller entitlements to subcatalog organizations; the catalog organization and subcatalog organizations assign customer entitlements to their customers.

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## **Seller Entitlements and Customer Entitlements**

Entitlements enable organizations to manage access to items for buying and selling purposes. The Selling and Fulfillment Foundation provides the following entitlements:

- ◆ Seller Entitlements
- ◆ Customer Entitlements

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## Seller Entitlements

Enterprises define seller entitlements that grant and restrict other organizations' access to categories in the catalog. For example, an enterprise allows a supplier to manage the Brand-X category in the catalog. The enterprise defines seller entitlements for the organization's competitor restricting the competitor from viewing the Brand-X category. Additionally, the enterprise may define seller entitlements for another organization allowing it to view and sell items from the Brand-X category.

Only enterprises that are catalog organizations can define seller entitlements. Moreover, they can define seller entitlements only for enterprises and sellers that have specified the corresponding catalog organization as their catalog organization. Seller entitlements are defined by configuring the following:

- ◆ Seller Entitlement Rules
- ◆ Organization Assignments

### Seller Entitlement Rules

Seller entitlement rules specify the categories that can be assigned to organizations under seller entitlements. Categories from the master catalog can be specified under seller entitlement rules. A seller entitlement contains one or more seller entitlement rules that collectively define the list of categories for the entitlement. To define a rule, start with no categories and then add seller entitlement rules to include categories; or start with all categories and add seller entitlement rules to exclude categories.

### Seller Entitlement Rule Precedence

The Selling and Fulfillment Foundation executes seller entitlement rules in a specified order, with the last rule taking precedence over the first rule. For example, you may define a seller entitlement called Computers by starting with no categories in your catalog and then adding a rule that includes the Computers category. If you add another rule that excludes the Laptop category, all desktop computers, except for laptops, are selected for the Computers entitlement.

### Assigning Organizations to Entitlements

Organizations are assigned to seller entitlement rules in seller entitlements. Only organizations that specify the catalog organization as their catalog organization can be assigned in a seller entitlement.

Organizations can have multiple seller entitlements. When this occurs, the organization is entitled to access all categories specified under the combined entitlements. If one seller entitlement allows access to categories that are restricted by another seller entitlement, the organization is entitled to all the specified categories, including the categories that are restricted by the second seller entitlement.

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## Customer Entitlements

Customer entitlements allow enterprises to define the items their customers can buy. For example, an enterprise may restrict a customer from buying items under its Computers category but allow the customer to buy items under its TVs category.

Customer entitlements are defined by configuring the following:

- ◆ Customer Entitlement Strategy
- ◆ Customer Entitlement Rules
- ◆ Customer Assignments

## Customer Entitlement Strategy

Customer entitlement strategy allows enterprises to specify rules for enforcing customer entitlements. Customer entitlement strategies can be categorized as follows:

- ◆ Customers can access only the items that are assigned to them in customer entitlements.
- ◆ Customers can access only the items that are assigned to them in pricelists.
- ◆ Customers can access only the items that are assigned to them in both pricelists and customer entitlements.
- ◆ Customers can access all items regardless of pricelists and customer entitlements.

## Customer Entitlement Rules

Customer entitlement rules specify items that are assigned to customers in customer entitlements. Only items from the online catalog can be specified under customer entitlement rules. An organization can define its own customer entitlement rules or inherit customer entitlement rules from another enterprise. For information about inheriting enterprise-level rules from another enterprise, refer to the *Selling and Fulfillment Foundation: Application Platform Configuration Guide*.

A customer entitlement contains one or more customer entitlement rules that collectively define the list of items for the entitlement. To define a rule, start with no categories and then add customer entitlement rules to include items; or start with all items in your online catalog and add customer entitlement rules to exclude items. Items can be included by categories of items or by item attributes. Individual items should only be used to exclude a small set of items.

**Note:** You cannot use derived, computed, or reference attributes in customer entitlement rules.



## Customer Entitlement Rule Precedence

The Selling and Fulfillment Foundation executes customer entitlement rules in a specified order, with the last rule taking precedence over the first specified rule. For example, you may define a customer entitlement called TVs by first adding a customer entitlement rule that includes all TVs brands in the TV category and then add another rule that excludes Brand-X TVs. The last specified customer entitlement rule takes precedence; in this example, customers assigned to the TVs customer entitlement can access all TV brands except Brand-X TVs.

## Assign Customers to Entitlements

Customers are assigned to entitlement rules either directly or dynamically. The Selling and Fulfillment Foundation provides the following dynamic customer assignments:

- ◆ Vertical customers, such as education and government customers.
- ◆ Relationship Type, customers such as resellers and distributors.
- ◆ Customer Level, such as platinum and gold customers.
- ◆ Region, determined by mapping the customer's address to a region defined in the Region Schema.

When dynamic assignments are specified, customers belonging to the specified groups are assigned to the corresponding customer entitlement. For example, if you select the platinum membership level for a customer assignment, all platinum-level customers are assigned to that customer entitlement.

A customer can have multiple customer entitlements. When this occurs, the customer is entitled to all the items specified by the combined entitlements. If one customer entitlement includes items that are excluded by another customer entitlement, the customer is entitled to all the specified items, including the items that are excluded by the second customer entitlement.

## Direct Assignment

You can specify that an enterprise must allow only direct assignments for a customer. If a customer is assigned directly and dynamically to different entitlements, only direct assignment is allowed. For example, if a B2C customer is directly assigned to the TVs customer entitlement and dynamically assigned to the Computers customer entitlement, the customer is entitled to only the items specified in the TVs entitlement. However, if you do not specify Use Direct Assignment if Exists, the customer is entitled to all the items specified under the TVs and Computers customer entitlements.

## Seller Entitlements and Customer Entitlements: An Example

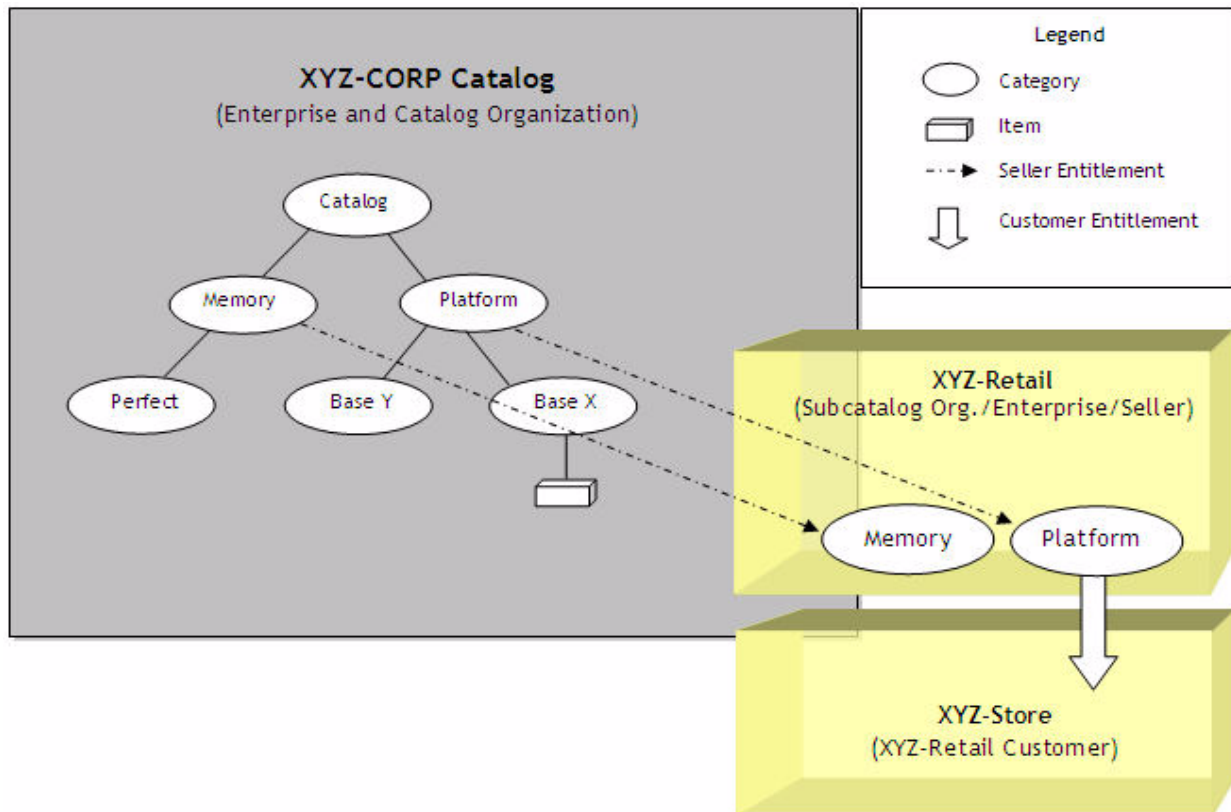
Seller entitlements allow a catalog organization to control other organizations' access to categories in the master catalog. Depending on its seller entitlements, an organization may be able to view categories managed by the catalog organization or another organization; or, an organization may be restricted from viewing a competitor's categories in the catalog. Additionally, an organization may be entitled to sell items from specified categories in the catalog.

Customer entitlements allow an enterprise to define items its customers can buy. If seller entitlements allow an enterprise to sell catalog items that are managed by the catalog organization or another organization, the enterprise can sell those items to its customers by defining customer entitlements for its customers.

In the following figure, XYZ-CORP is an enterprise and catalog organization that allows XYZ-Retail, a XYZ-CORP subcatalog organization, to sell items from the catalog. XYZ-CORP uses seller entitlements to specify that XYZ-Retail can sell items from the Memory and Platform categories. In this example, XYZ-Retail sells items from the Memory and Platform categories, which XYZ-CORP manages.

Additionally, XYZ-Retail does not inherit customer entitlement rules from XYZ-CORP. In this case, XYZ-Retail defines its own customer entitlements, which determine the items XYZ-Retail's customers can buy. However, XYZ-Retail can only entitle its customers to buy items that XYZ-Retail is entitled to sell. If XYZ-Retail specifies the Platform category in a customer entitlement for its customer XYZ-Store, XYZ-Store can buy items from the Platform category, but not from the Memory category.

The following graphic shows the seller and customer entitlement example.





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## An Overview of Catalog Search

Selling and Fulfillment Foundation provides the Apache Lucene open source search engine library for conducting fast and accurate searches. The Lucene search engine enables catalog organizations to create one searchable index file for each locale from the data that is available in the Selling and Fulfillment Foundation database. This index file and a user query, which is defined by customer-provided search criteria, return search results in a filtered, easy-to-navigate format.

Additionally, the Lucene query parser simplifies the process of entering search criteria by providing operators and terms to refine search results.

**Note:** For more information about the Lucene open source search engine library and query parser, see the Lucene Web site:

<http://lucene.apache.org>

Catalog search consists of the following processes:

- ◆ Catalog index building
- ◆ Catalog searching

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## Catalog Index Building

The Lucene searchable index file contains denormalized item data that has been extracted from the Selling and Fulfillment Foundation database. The index file stores all the item data that is required for performing fast, scalable searches. Additionally, the index file is stored on the server, further enhancing the performance of the search. For example, if a customer searches for red shirts, the Lucene search engine uses the index file to quickly locate all the item information pertaining to shirts with the attribute value of red.

The Create Catalog Index time-triggered transaction builds an index file for each supported locale. The transaction can be configured to perform the following tasks:

- ◆ Build a full or incremental index file for each locale
- ◆ Run scheduled index builds or enable user-initiated index builds
- ◆ Activate the index

The transaction refers to an XML configuration file for instructions about building the index file. The default index file configuration includes item data about attributes, categories, pricing information, entitlement rules, and assets (Selling and Fulfillment Foundation provides only the HTML format for asset type by default.)

**Note:** You can customize catalog search by extending the corresponding XML configuration file. For example, Selling and Fulfillment Foundation provides only the US-English locale by default. However, you can add a locale, such as Canada-French, by extending the XML configuration file. Data from external sources can be added to the index file by extending the XML configuration file and by providing a custom implementation of the appropriate user exit. You can also add asset types. For more information about customizing item search, see the *Selling and Fulfillment Foundation: Extending the Database Guide*.

If any changes are made in the database to the attributes of entities that are defined in the catalog search XML configuration file, the catalog index must be rebuilt, either incrementally or fully. For example, you must rebuild the index after adding or deleting individual items in entitlement rules. Additionally, the index must be fully rebuilt when there is a pricelist assignment for anonymous or all customers removed.

**Note:** Based on our findings, in scenarios where more than a third of the items in the catalog have changed, you may want to perform a full index build.

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## Searching the Catalog

After the index file is built, customers can search an organization's active selling catalog by specifying search criteria. Customers can either enter arbitrary terms, such as Laptop Computer, as search criteria, or enter item attributes based on categories, to locate specific items.

Advanced search enables customers to specify item fields and values as search criteria. Advanced search also supports the Lucence query parser. Customers can use special Lucene operators and terms, such as wildcards (#, \*), to refine their search.

**Note:** For more information about the Lucene terms and operators that are supported, see:

[http://lucene.apache.org/java/2\\_4\\_0/queryparsersyntax.html](http://lucene.apache.org/java/2_4_0/queryparsersyntax.html)

Search results return a list of items that match the query formed from the search criteria. Typically, item information is retrieved from the Selling and Fulfillment Foundation database. However, information for external attributes is retrieved directly from the index. Information for internal attributes can also be retrieved from the index by setting an attribute's Store value to Y in the extended XML configuration file. After information is retrieved, it is displayed to the customer. The results also display a list of attributes and categories that match the query and the number of matching items for each attribute and category.

**Note:** See information pertaining to the searchCatalogIndex API in the *Selling and Fulfillment Foundation: Javadocs*

Selling and Fulfillment Foundation uses Ehcache functionality and SearchIndexCache for storing pre-search results of items within categories and filtered attributes in the catalog for search index. For information about the out-of-the-box Ehcache functionality provided by Sterling Commerce, refer to the *Selling and Fulfillment Foundation: Properties Guide*. For detailed information about Ehcache functionality and how you can configure the elements and settings to enhance your cache for catalog search index, see <http://ehcache.org/>

**Note:** If the application server is not shut down gracefully, the Ehcache files must be cleaned up manually before restarting the application server.

**Note:** The cache is loaded independently for each application server. In some cases, if you are using multiple application servers, different users who are logged into different application servers may not get the same search results when a new index is activated.

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## Catalog Index Building: Guidelines

A catalog organization must build an index of the items in the Selling and Fulfillment Foundation database before customers can run a catalog search. To set up index building, perform the following tasks:

- ◆ Configure the Create Catalog Index time-triggered transaction
- ◆ Specify a location for storing index files

In addition to these mandatory configuration tasks, administrators have the option of configuring synonyms that enable customers to perform a search based on related terms. You can also customize the search configuration by extending the catalog search XML configuration file. For example, if you want the search to support additional locales, extend the catalog search XML configuration file.

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