4

The Inventory System

Inventory management is a vital part of any retail business, whether it's a traditional brick-and-mortar shop or an online Web site. Inventory management provides you with critical information about the condition of your products, such as whether you are low on stock and your inventory needs to be replenished. Inventory management also provides your customers with accurate information, letting them know when items are out-of-stock, back-ordered, or pre-orderable. Failure to provide your customers with this information puts you at risk of losing future business. Inventory management also gives you insight into which products are selling well and which products are not. This information allows you to make better business decisions on how to market your products, and whether or not to carry them.

Previous versions of Commerce Server to 2007 did not have an out-of-the-box inventory system. Instead, developers were either required to customize and extend the catalog schema, as well as write custom processes to track inventory levels, or develop their own processes for integrating into a line-of-business (LOB) inventory system.

Commerce Server has made significant advances with regards to inventory management, and has an out-of-the-box Inventory System capable of providing the following functionality:

- Real-time inventory management for product catalogs
- Full integration into the Catalog System and Orders System
- Integration into LOB systems through the Commerce Server BizTalk adapters

This chapter discusses the concept of inventory management in Commerce Server. Specifically, this chapter discusses:

- Understanding the Inventory System
    - o The relationship between the Inventory and Catalog Systems
    - o The Inventory System features
    - o The inventory schema
    - o Inventory site resources
- Building the Inventory System
    - o Creating the Inventory Catalog
    - o Common Inventory Scenarios
- External inventory sources

At the conclusion of this chapter, you should understand the Inventory System and how it relates to other Commerce Server Systems, be able to build and define your inventory catalogs, and integrate inventory in Commerce Server to external inventory sources.

Understanding the Inventory System

Keeping track of inventory is vitally important for any successful retail enterprise. Inventory systems let you know when it is time to stock up on items that are running low and can also prevent you from overselling products and then having to inform customers that their items are either unavailable or must be backordered. Inventory systems can provide insight into which products are selling well and which products are selling poorly. With this information you can make intelligent decisions on how to maximize your sales and make your Web site more effective.

In previous versions of Commerce Server it was a challenge to incorporate real-time inventory management into your Web site. Keeping the inventory levels synchronized to the product catalog required a great deal of effort and custom software development. Many custom solutions require the product catalog schema to be extended so that it can accommodate inventory information and modifications to the basket pipeline to check the inventory levels of the product added to the basket. This in and of itself is a challenge; more complex tasks, such as configuring items as back-orderable or pre-orderable, are levels of magnitude more complex to develop.

Fortunately, the Inventory System available in Commerce Server is specifically designed to integrate with the Catalog System, and provides an excellent solution for all the stake holders of your Web site, including customers, business users, Web site administrators, and software developers. Customers benefit from a much richer integration into the product catalog, allowing them to know if items are in stock, pre-orderable, or back-orderable. Customers can also filter products by those in stock, allowing them to ignore items that are currently unavailable (assuming you have developed this capability through the Inventory APIs). Business users benefit by having a far more robust and reliable method of coupling the inventory and product catalogs, as well as gaining insight into inventory levels and trends. Web site administrators benefit by easy import and export functionality, as well as synchronization to external LOB applications. Software developers benefit from all of the above, as well as a rich API layer that has methods for searching, browsing, and viewing the details of the inventory catalog, as well as sophisticated search options.

It is important to fully understand the role that the Inventory System plays within Commerce Server, and how it works together with product catalog to allow you to manage your inventory.

The Relationship between the Inventory and Catalog Systems

Before diving into the features of the Inventory System, you should take the time to understand the relationship between the Inventory and Catalog Systems. The Inventory System consists of inventory catalogs, much as the Catalog System consists of product catalogs. These inventory catalogs contain information about products and product variants that are stored in the product catalogs. As such, inventory catalogs can store inventory information for one or more product catalogs. Moreover, these product catalogs can be both base and virtual catalogs. Consider the following examples in Figure 4-1.
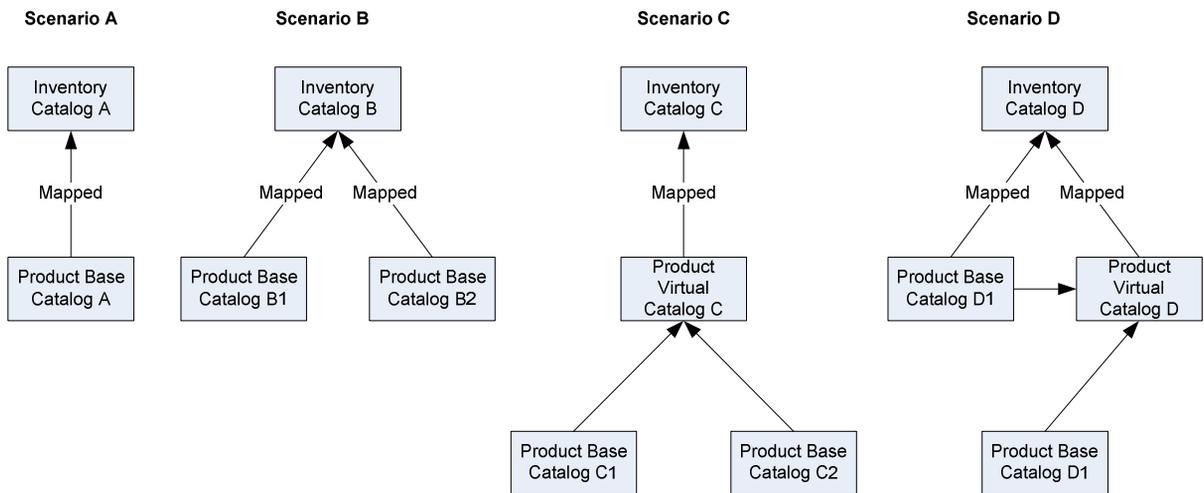
Figure 4-1

Scenario A describes a straightforward relationship between an inventory catalog and a product catalog. In this scenario, an inventory catalog has been defined and one product catalog added to it. When a product catalog is added to an inventory catalog it is considered to be mapped to the inventory catalog. Scenario B is similar to Scenario A, except that two product catalogs are mapped to the inventory catalog. Consequently, the inventory catalog contains inventory information for product and product variants stored in both catalogs.

As previously mentioned, virtual catalogs can also be mapped to inventory catalogs. Consider scenario C, in which the virtual catalog is the aggregation of two base catalogs. In this scenario, the virtual catalog is mapped to the inventory catalog. Consequently, the two base catalogs do not contain any inventory information. Instead, the inventory information is specific to the virtual catalog. Mapping virtual catalogs to an inventory catalog is a very powerful way to manage the inventory for aggregated base catalogs with specific pricing rules. For example, you could create a virtual catalog that gave preferred customers 15% off of various products and map it to an inventory catalog that limits the total quantity of these discounted products to 50.

The final scenario shows a more advanced set of relationships. In scenario D there are two base catalogs and one virtual catalog. The virtual catalog aggregates the products and product variants in both of the base catalogs and may apply special pricing. The virtual catalog and one of the base catalogs are mapped to the inventory catalog, while the second base catalog is not mapped to the inventory catalog. As a result, the mapped base catalog has the ability to track its own inventory, while the non-mapped base catalog cannot. The virtual catalog is able to track its own inventory on the products and product variants aggregated from both of the base catalogs. These four scenarios demonstrate the flexibility of the Inventory System, and how it can be used for a number of different and unique situations.

Inventory Systems Features

The Inventory System in Commerce Server comes with many important features that aid in the real-time management of inventory for items in your catalog. These features allow you to do the following:

- Display real-time inventory conditions of your products and product variants, including in stock, out-of-stock, back-ordered, or pre-orderable.
- Filter products and product variants listings to show only those products that are currently available in stock.
- Decrement inventory levels when orders are processed.
- Receive notifications when inventory levels reach an out-of-stock threshold.
- Integrate inventory levels with LOB applications.
- Gain insight into how well products and product variants are selling.

As the Inventory System deals with physical items that can be sold, it is common to refer to items as a stock-keeping unit (SKU) rather than a product or product variant. A SKU is a unique identifier that enables a product to be tracked for inventory purposes.

Inventory Conditions

There are two primary inventory conditions that exist for your SKUs: in stock and out-of-stock. When a SKU is in stock your customers should be able to purchase it normally, with each processed order decrementing the inventory total for the SKU. When a product is out-of-stock, however, special handling conditions may apply.

The easiest way to handle out-of-stock inventory is to not show it on the Web site, thereby preventing customers from purchasing the SKU. While this is a simple way to handle out-of-stock inventory, it is probably not an acceptable solution for most online Web sites. Instead, many Web sites prefer to display out-of-stock inventory as back-ordered. Back-ordered indicates that the SKU is temporarily out-of-stock. Typically a back-order availability date is also displayed with the SKU, indicating the earliest date that the back-ordered SKU is available. It is possible to still allow the customer to purchase back-ordered SKUs and indicate to the customer that the order cannot be fulfilled until the inventory has been replenished.

In addition to the back-ordered inventory status, a SKU may be listed as pre-orderable. A Web site may want to list a SKU as pre-orderable, indicating that the SKU is not in stock and is not available until a future availability date. Marking SKUs as pre-orderable is a popular way to satisfy the demands of customers that want to purchase popular items before they are available. Allowing the pre-order of SKUs is quite popular in the book publishing industry, and is how many books end up as best sellers before they are even published.

If a SKU is both pre-orderable and back-ordered, the Inventory System first uses the associated pre-order limit to satisfy purchases. Once this limit has been exceeded, the back-order limit is then applied. Once both the pre-order and back-order limits have been exhausted, the SKU is then considered out-of-stock and no available for purchase.
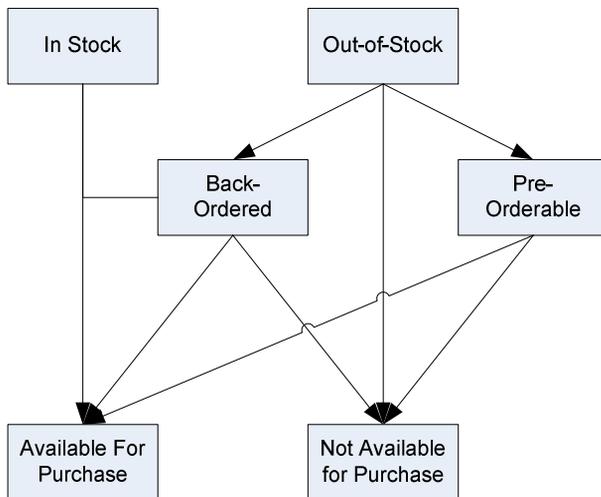

Figure 4-2

Figure 4-2 shows the possible purchasing conditions that can exist for SKUs in the Inventory System. If an item is in stock, then it is available for purchase. If an item is out-of-stock, then it is either not available for purchase, back-orderable, or pre-orderable. It is important to recognize that while the Inventory System may have various conditions attached to SKUs (such as back-ordered or pre-orderable) the Web site itself must manage these conditions appropriately. Unless you use the Starter Site, your Web site will not automatically associate these purchasing states to the SKUs. You have to develop your Web site to respond in this fashion, through the Inventory APIs.

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Integration into the Orders System

The Inventory System is able to work directly with the Orders System so that inventory levels remain accurate and the customer's orders are processed appropriately. The interaction between these two systems is through the use of two pipeline components: CheckInventory and UpdateInventory.

The CheckInventory pipeline component is part of the Basket pipeline and checks the inventory status for SKUs in the customer's basket. This component will return information to the Web site that indicates the current condition of the SKU. Based on the condition of the SKU, the Web site can then render the customer's basket appropriately.

The UpdateInventory pipeline component is part of the Checkout pipeline, and checks the inventory status for SKUs and updates the SKU quantities in the Inventory System. In addition to updating inventory quantities for the SKUs, this component also handles out-of-stock conditions. If there are multiple SKUs currently being processed, and one is out-of-stock and is not back-orderable or pre-orderable, the other SKUs are not processed.

Both the CheckInventory and UpdateInventory pipeline components have the ability to return warnings and errors through the pipeline. The Web site can then respond to these warnings and errors appropriately.

Additional Inventory Features

The Inventory System also includes the following features:

- Inventory APIs. The Inventory APIs allow developers to directly interact with the Inventory System.

- Imports and exports of data. Inventory data can be imported and exported either using the Catalog Manager or by directly using the Inventory APIs.

- Bulk updates and deletions. With bulk updates and deletions, you have the ability to update or delete multiple SKUs in the inventory catalog from a single operation.

- Transactional operations. All operations performed during an import or an export can be run in a transaction, so that any errors that occur cause the entire operation to roll-back.

- Integration into LOB systems through BizTalk adapters. The Commerce Server BizTalk adapters allow you to integrate the Inventory System with other LOB systems.

- Full text search. All metadata associated with the Inventory System can be searched and queried along with metadata from the Catalog System.

While the Inventory System has a rich set of inventory management functions, it may not satisfy the inventory needs of all companies. The Inventory System for Commerce Server is an extension of the Catalog System designed to provide real-time management of inventory. Consequently, the Commerce Server Inventory System does not provide any warehousing, manufacturing, or logistical information about the inventory. If your company has these types of requirements you will need to weigh the benefits of using a third party application or extending and customizing the Inventory System. In some situations it may be best to purchase a 3rd party application to manage and control these processes, and utilize the BizTalk adapters to integrate it into Commerce Server.

The Inventory Schema

Just as the Catalog System has a schema used as a template to define the product catalog, so too does the Inventory System have a schema used to define an inventory catalog. There are two types of inventory metadata: Inventory Catalog Metadata, and Inventory Stock-Keeping Unit (SKU) Metadata.

- Inventory Catalog Metadata: This metadata is similar to catalog metadata, except that it pertains to the Inventory System. This metadata includes the catalog name, date created, description, and the last modified date.

- Inventory Stock-Keeping Unit (SKU) Metadata: The SKU is the unique identifier for a product, and allows a product to be tracked for inventory purposes. See Table 4-1 for detailed SKU metadata properties.

Property Name	Property Description
Backorder Availability date	The backorder availability date property is the earliest date when the back-ordered SKU is available for shipping.
Backorder Limit	The backorder limit property defines a limit for the number of SKUs that can be back-ordered. This value must be below the stockout threshold, and is used to prevent overselling and the inability to fulfill orders. If an item is pre-orderable and back-orderable, the pre-order limit is applied before the back-order limit.
Backorderable	The backorderable property is used to indicate that a SKU can be back-ordered. This is applied when the onhand quantity is less than the stockout threshold. A SKU is backordered when it has already been selling and gone out-of-stock. If the SKU has not been selling and is out-of-stock, it is considered pre-orderable.
Backordered Quantity	The backordered quantity property indicates the number of units that have been back-ordered for a particular SKU. This property is maintained by the system.
Catalog Name	The catalog name property indicates the inventory catalog used to store SKU information.
Excess Onhand Quantity	The excess onhand quantity property indicates the total quantity of SKUs above which the inventory is in excess. This property can be used to indicate that there's too much inventory for a particular SKU.
Last Modified	The last modified property indicates the last time a modification was made to the SKU. This property is maintained by the system.
Last Restocked	The last restocked property indicates the date when the inventory for a SKU was last restocked.
Memo	The memo property is a repository for notes or comments about the SKU.
Onhand Quantity	The onhand quantity property indicates the quantity of a SKU in inventory that is available to be sold.
Preorder Availability Date	The preorder availability date indicates the earliest date when the pre-ordered SKU will be available for shipping.
Preorder Limit	The preorder limit property defines a limit for the number of SKUs that can be pre-ordered. This value must be below the stockout threshold, and is used to prevent overselling and the inability to fulfill orders. If an item is pre-orderable and back-orderable, the pre-order limit is applied before the back-order limit.
Preorderable	The preorderable property is used to indicate that a SKU can be pre-ordered.
Preordered Quantity	The preordered quantity property indicates the number of units that have been pre-ordered for a particular SKU. This property is maintained by the system.
Reorder Point	The reorder point property is used to indicate when the inventory should be replenished for a particular SKU if the onhand quantity falls below the specified value.
Status	The status property is used to determine the condition of the inventory. There are three statuses: Disabled, Ignored, and Enabled. If the status is disabled, then the inventory SKU condition is considered out-of-stock and

	unavailable. If the status is ignored, then the inventory condition is considered in stock but unavailable. If the status is enabled, then the inventory condition is can either be in stock, pre-ordered, back-ordered or out-of-stock, depending on the values specified in other SKU properties. See Figure 4-4 for more information.
Stockout Threshold	The stockout threshold property defines the lowest quantity of items that must be available for a SKU to be considered in stock.
Target Quantity	The target quantity property is the amount of inventory you want to have available before reordering the SKU. This value should be set based on observed buying patterns.
Unit Of Measure	The unit of measure property defines the meaning of the unit value for a SKU.

Table 4-1

All of the properties listed in Table 4-1 work together to drive the functionality of the Inventory System. It is important to again reiterate that it's not enough to simply set these values and expect that your Web site will automatically work the way it should. The Web site must use the Inventory APIs to drive the functionality.

Inventory Site Resources

In addition to metadata stored about the Inventory System, Commerce Server also has inventory settings stored as site resources. Site resources are entities that provide functionality to a specific Commerce Server site. These settings can be viewed and modified through the Commerce Server Manager (see Figure 4-3). Inventory site resources override properties defined within the Inventory System metadata.

The inventory site resources include the following:

- Display Backordered Items. This resource is used to indicate whether or not backordered SKUs are displayed on the Web site. If the value is -1 (True), then backordered SKUs are displayed on the Web site, whereas a value of 0 (False) indicates that backordered SKUs are not displayed on the Web site.

- Display Out of Stock Items. This resource is used to indicate whether or not out-of-stock SKUs are displayed on the Web site. If the value is -1 (True), then out-of-stock SKUs are displayed on the Web site, whereas a value of 0 (False) indicates that out-of-stock SKUs are not displayed on the Web site.

- Display Preordered Items. This resource is used to indicate whether or not pre-ordered SKUs are displayed on the Web site. If the value is -1 (True), then pre-ordered SKUs are displayed on the Web site, whereas a value of 0 (False) indicates that pre-ordered SKUs are not displayed on the Web site.

- Ignore missing Skus. This resource is used to indicate whether products that are missing SKUs are treated as in stock or out-of-stock. A product or product variant may be missing a SKU if the inventory metadata has not yet been defined for the product or product variant. If the value is -1 (True), then products or product variants missing SKUs are treated as in stock, whereas a value of 0 (False) indicates that products or product variants missing SKUs are treated as out-of-stock.

- Inventory Database. This resource is used to store the inventory database connection string. This connection string must be unique across all Commerce Server sites.

- Record Inventory Deltas. This resource is used to indicate whether or not to record quantity decrements and increments when buyers purchase items or return items on the Web site. If the value is -1 (True), then increments and decrements are recorded, whereas a value of 0 (False) indicates increments and decrements are not recorded.

- Stock Handling. This resource is used to indicate whether or not there is special handling associated to SKUs. Special handling includes back-orders and pre-orders. A value of 0 (False) indicates that there is no special handling, and that SKUs cannot be back-ordered or pre-ordered. A value of 1 (True) indicates that there is special handling, and that SKUs can be back-ordered and pre-ordered. This setting overrides the Backorderable and Preorderable metadata settings associated with the Inventory System.

- Use stockout threshold for floor. This resource is used to indicate whether to use a global value for the stockout threshold or to identify the stockout threshold individually for each SKU. A value of 0 (False) indicates that the stockout threshold for all SKUs is overridden to be 0. A value of -1 (True) indicates that the stockout threshold defined for the SKU (i.e. the floor value) is used.
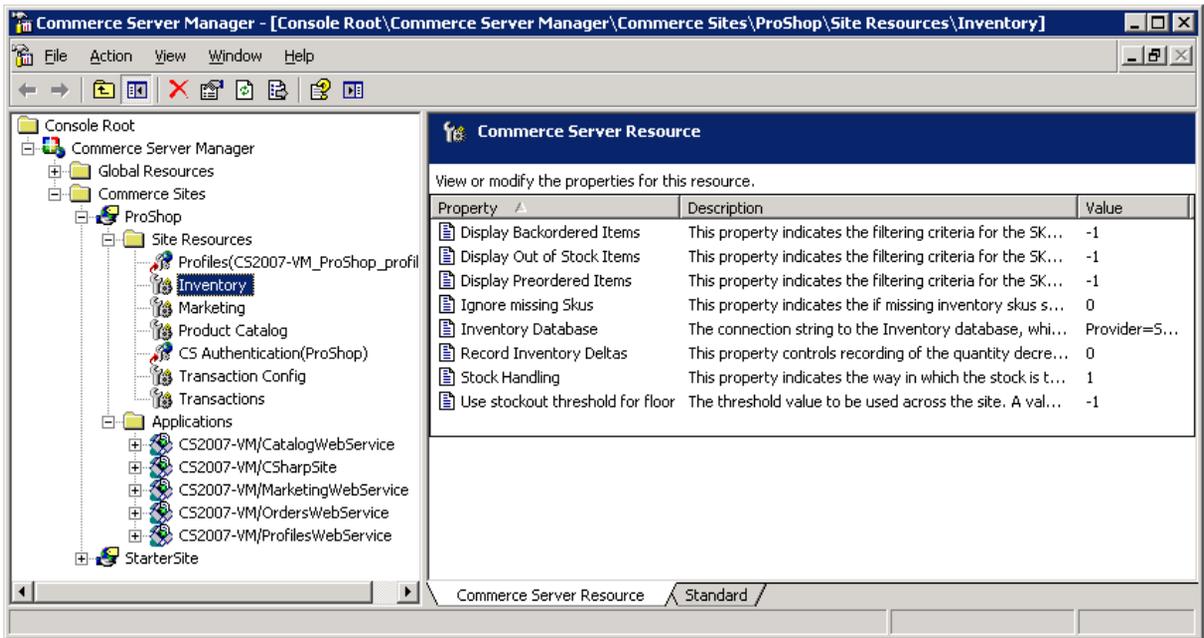

Figure 4-3

Figure 4-3 shows the Inventory System site resources that are modified through the Commerce Server Manager.

Determining the condition of the SKU is an important concept to understand. The condition of a SKU could be out-of-stock, in stock, back-ordered, or pre-ordered. Settings from both the Inventory System metadata, as well as Inventory Site Resources, are used in determining the condition of a SKU. This model is depicted in Figure 4-4.
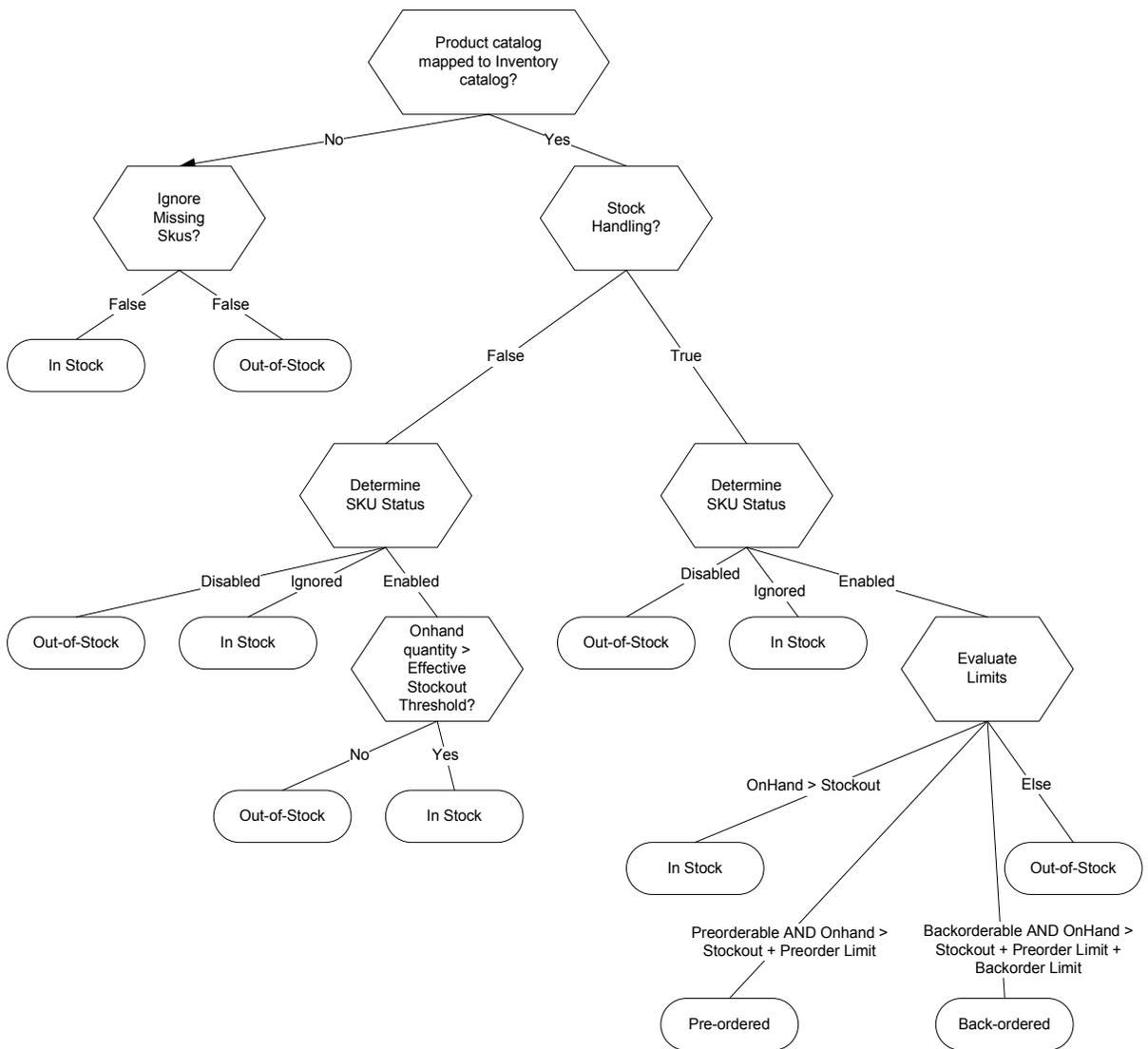
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Product catalog mapped to Inventory catalog?

No — Ignore Missing Skus?
- False — In Stock
- False — Out-of-Stock

Yes — Stock Handling?

False — Determine SKU Status
- Disabled — Out-of-Stock
- Ignored — In Stock
- Enabled — Onhand quantity > Effective Stockout Threshold?
  - No — Out-of-Stock
  - Yes — In Stock

True — Determine SKU Status
- Disabled — Out-of-Stock
- Ignored — In Stock
- Enabled — Evaluate Limits
  - OnHand > Stockout — In Stock
  - Preorderable AND Onhand > Stockout + Preorder Limit — Pre-ordered
  - Backorderable AND OnHand > Stockout + Preorder Limit + Backorder Limit — Back-ordered
  - Else — Out-of-Stock

Figure 4-4

The first aspect that is evaluated is whether or not the product catalog is mapped to an inventory catalog. If not, then the site resource setting for "Ignore missing Skus" is evaluated to see how the lack of an inventory catalog should be handled. If the value is false, then the SKU is considered to be in stock. If the value is true, then the SKU is considered to be out-of-stock. If the product catalog is mapped to an inventory catalog, then the "Stock Handling" resource setting is evaluated to see if special handling rules are applied.

If the "Stock Handling" value is false, then the SKU "Status" property is evaluated. If the status is disabled, then the SKU is considered out-of-stock. If the status is ignored, then the SKU is considered in stock. If the status is enabled, then the onhand quantity is compared to the effective stockout threshold. If the onhand quantity is greater than the effective stockout threshold, the SKU is considered in stock. If the onhand quantity is less than or equal to the effective stockout threshold, the SKU is considered out-of-stock.

If the "Stock Handling" resource setting is true, then the process is the same for the disabled and ignored statuses. If the status is enabled, then the special handling rules are evaluated. If the onhand quantity is greater than the effective stockout threshold, then the SKU is considered in stock. If the SKU is pre-orderable and the onhand quantity is greater than the effective stockout threshold and the pre-order limit, then the SKU is considered pre-orderable. If the SKU is back-ordered and the onhand quantity is greater than the effective

stockout threshold, the pre-order limit, and the back-order limit, then the SKU is considered back-ordered. Otherwise, the SKU is considered out-of-stock.

This example serves as an excellent example of how the Inventory System metadata and site resources work together to manage inventory in Commerce Server. The various settings and configurations allow for a great deal of flexibility and control over how the Commerce Server inventory processes operate.

Building the Inventory Catalog

Creating the Inventory Catalog

The process of creating the inventory catalog is straightforward and relies on the same tools used to create product catalogs. Before you create the inventory catalog, however, take the time to determine if your inventory needs require any changes to the inventory schema. Is there additional information that you would like to store along with your inventory data that the default schema doesn't support? For instance, would you like to store information about the inventory's location in the warehouse? Maybe, in addition to naming your inventory catalogs, you want to store the unique identifiers used by your partners to help identify the catalogs. There are many difference scenarios that may justify changing the inventory and adding additional metadata to the inventory schema. Make sure to take the time to think these scenarios through before you begin to extend the inventory schema, although it is possible to add additional metadata to the schema at a later time.

Extending the Inventory Metadata

Extending the inventory schema is no different from extending the catalog or property schemas. The first step is to define a property definition to define the data you want to store along with your inventory data. Once the property definition has been defined, you can then add the new definition to either the inventory catalog metadata, thereby extending the descriptive data related to the inventory catalog, or to the inventory SKU metadata, thereby extending the descriptive data related to inventory SKUs.

The golf pro shop requires that our inventory catalog has an inventory unique identifier associated with the inventory catalog. This unique identifier is passed along with exports to trading partners, so that the trading partners know which inventory catalog they received. Additionally, all SKUs must have a warehouse location number that relates to the SKUs location in the warehouse. To accomplish this, you must first create two new property definitions: Inventory Catalog Id, and Warehouse Location. These two property definitions should have the following characteristics:

Property	Inventory Catalog Id	Warehouse Location
Property Name	InventoryCatalogId	Warehouse Location
Display Name	Inventory Catalog Id	Warehouse Location
Data Type	Text	Text
Multilingual	False	False
Display On Site	False	False
Specification Searchable	False	False
Free Text Searchable	False	False
Minimum Length	0	0
Maximum Length	128	128
Assign To All Product Types	False	False
Store For Data Analysis	False	False

Display In Products List	False	False
Is Required	True	True
Default Value		
Display as Base Property	True	True

Table 4-2

When defining property definitions for the inventory catalog and inventory SKU metadata, make sure you do not select the Multilingual property. If the Multilingual property is set to True then the property definition will not be available for selection within the inventory catalog and inventory SKU metadata. This is because the inventory catalog and SKUs have no concept of multilingual values, and are specifically excluded.

Now that the two property definitions have been defined, you must associate each of them as metadata to the appropriate entity. To assign the Inventory Catalog Id to the Inventory Catalog Metadata, you can use the Catalog and Inventory Schema Manager.

1. Click Start > All Programs > Microsoft Commerce Server > Catalog and Inventory Schema Manager.

2. Under the Task pane, click Edit Inventory Catalog Metadata. This will open the Edit Inventory Catalog Metadata screen.

(Continued on the next page)

3. Select "Inventory Catalog Id" from the Available Properties list, and click the Add button. This will assign the property to the assigned properties list (see Figure 4-5).
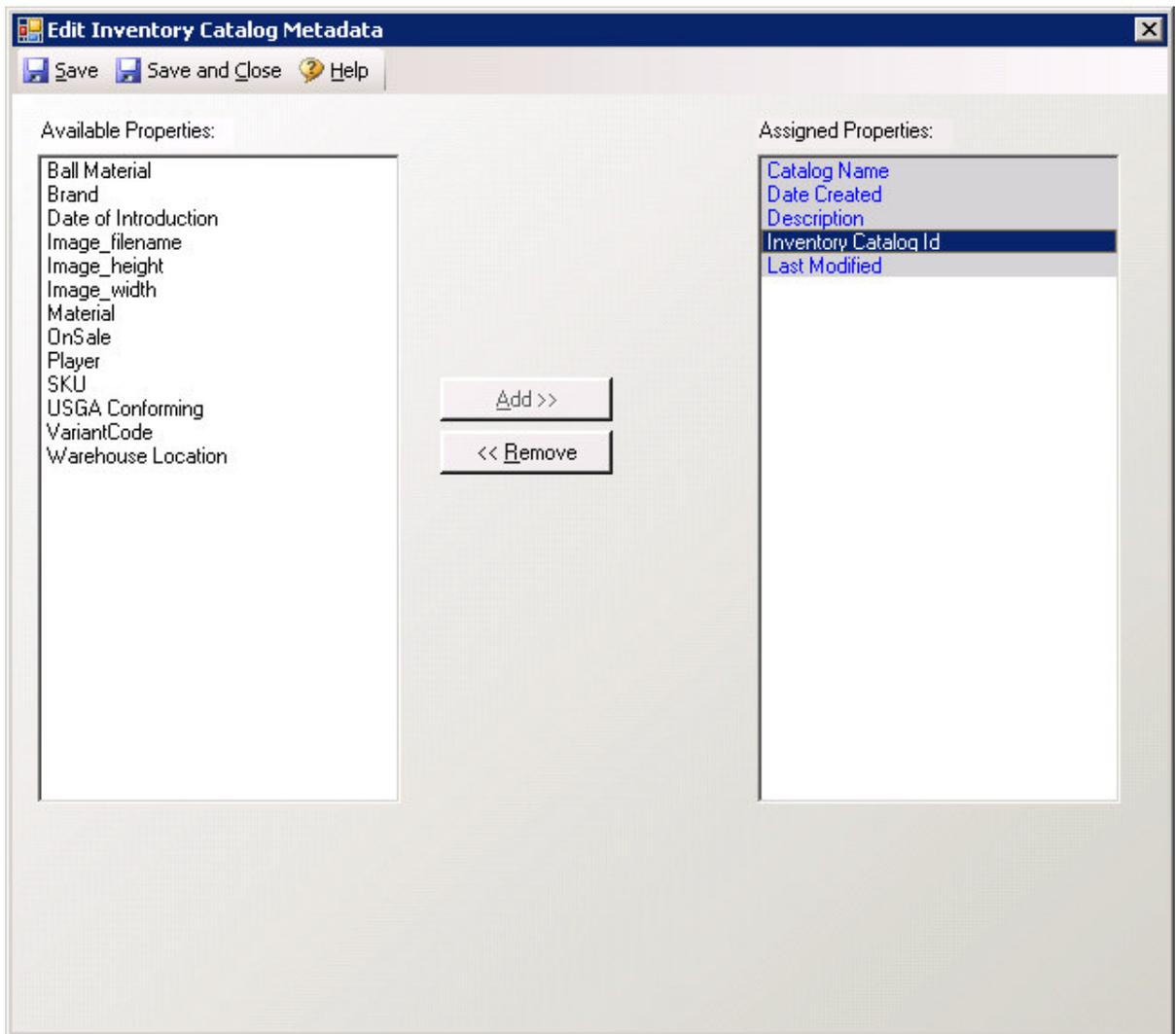

Figure 4-5

4. Click the Save and Close button to finish.

The process for extending the inventory SKU metadata to include the Warehouse Location is similar to extending the inventory catalog metadata, except that you click the Edit Inventory SKU Metadata from the task pane and then add the Warehouse Location to the Assigned Properties list box (see Figure 4-6).
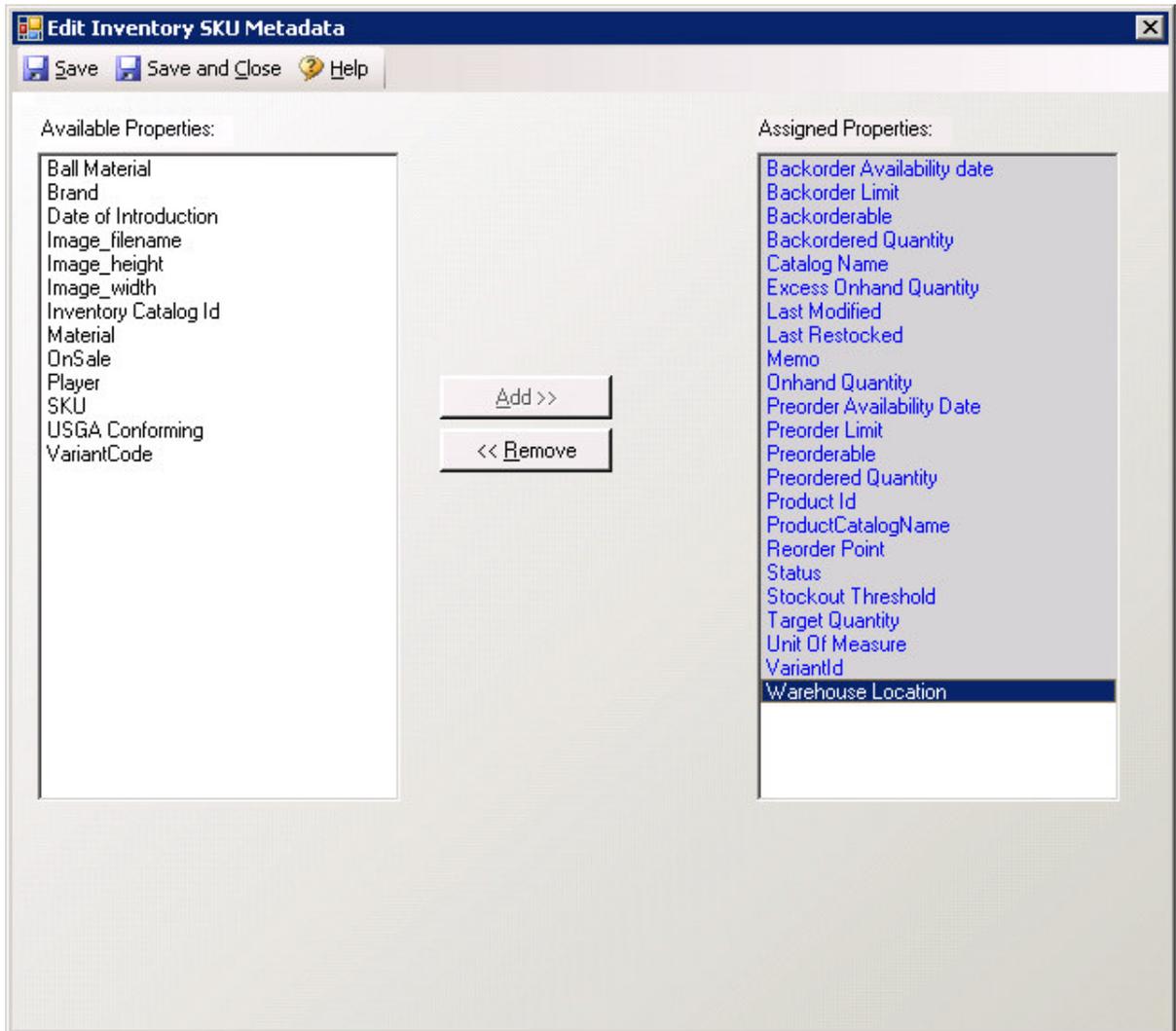

Figure 4-6

Now that the inventory catalog schema has been extended, you can create your inventory catalog. Since the two property definitions were created with the Display as Base Property set to True, these property definitions will display as base properties for the inventory catalog and the inventory SKU screens rather than custom properties.

Creating an Inventory Catalog

The process of creating an inventory catalog is straightforward and relatively simple. Inventory catalogs are created through the Catalog Manager, and then product catalogs are mapped to them. A product catalog can only be mapped to one inventory catalog, but an inventory catalog can have many product catalogs.

The pro golf shop requires only one inventory catalog, but both the base and virtual product catalogs must be mapped to the inventory catalog. The reason both catalogs are mapped is that inventory quantity must be allocated for both the online retail customers and the trading partners.

A default inventory catalog already exists, called Default. This catalog cannot be deleted, and will be used for the golf pro shop inventory catalog.

To create the inventory catalog, you can use the Catalog Manager.

1.   Click Start > All Programs > Microsoft Commerce Server > Catalog Manager.

2.   Under the View pane, click Inventory Catalogs. After you have selected the inventory catalogs view, the Task pane will update to show tasks specific to inventory catalogs.

3.   Double-click the Default inventory catalog. This will open the inventory catalog properties window.

4.   The Base Properties tab is selected by default (Figure 4-7). Since we added the Inventory Catalog Id property definition to the Inventory Catalog Metadata, and it is a required property, you must specify a value. Note that this property is on the base properties tab, rather than the custom properties tab. This is because the Display as Base Property value was set to True on the property definition. If it had been set to False, this property would be on the custom properties tab.
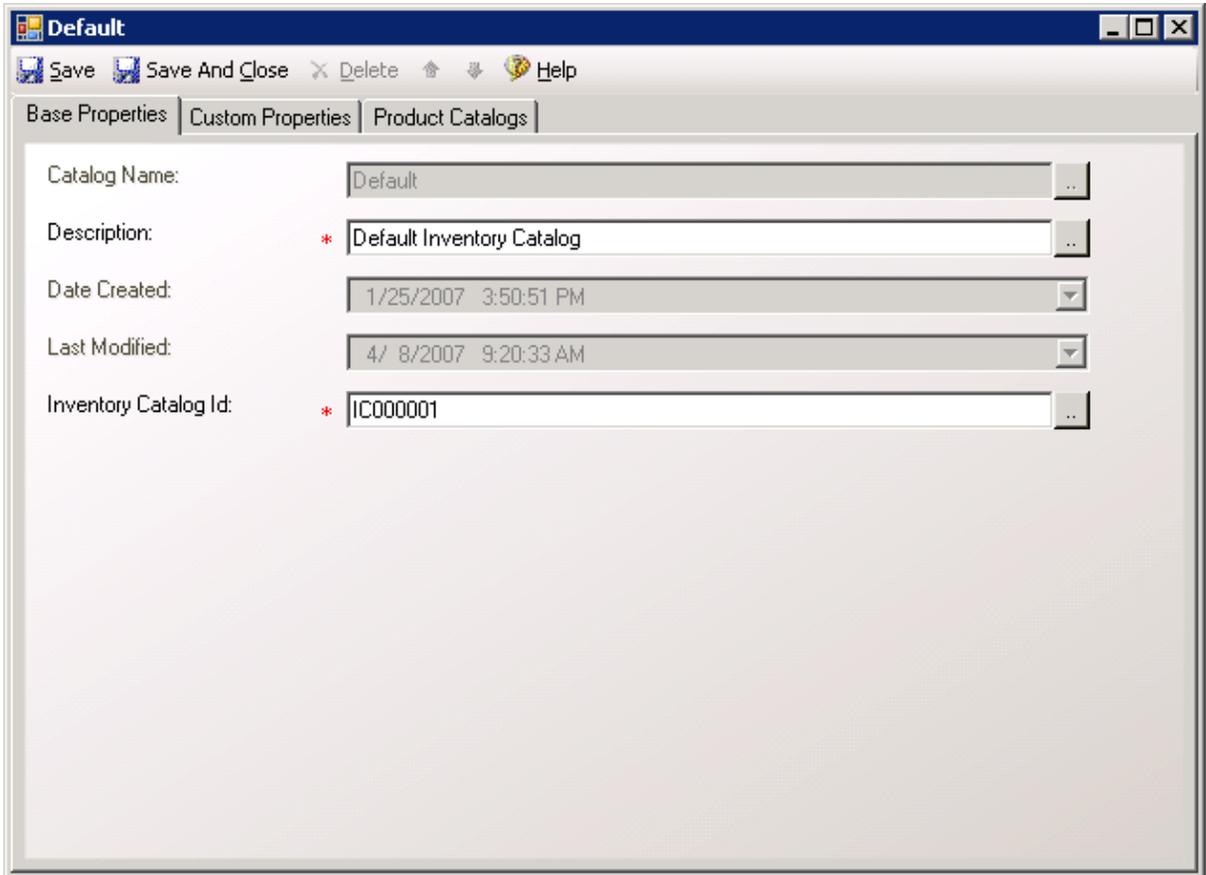

Figure 4-7

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5. Click the Product Catalogs tab (Figure 4-8). By default, no product catalogs have been added to the default inventory catalog. To add our catalogs, click the Add Catalog button.
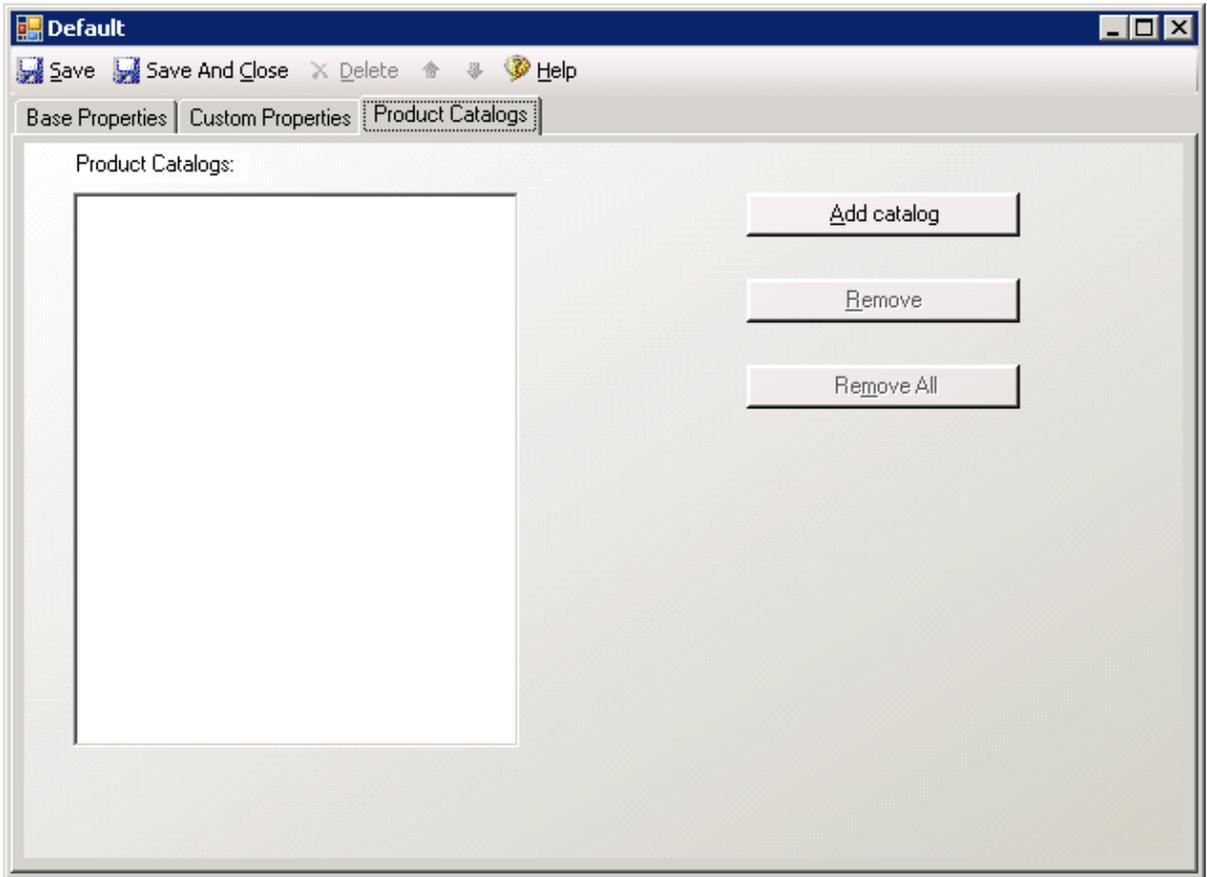

Figure 4-8

(Continued on the next page)

6. The Product Catalogs screen will list all the available product catalogs that can be added to this inventory catalog (Figure 4-9). Since a product catalog can only be mapped to one inventory catalog only unmapped product catalogs are displayed. Either select both the ProShopCatalog and TradingPartnerCatalog, or click the Select All button. Click the OK button to continue.
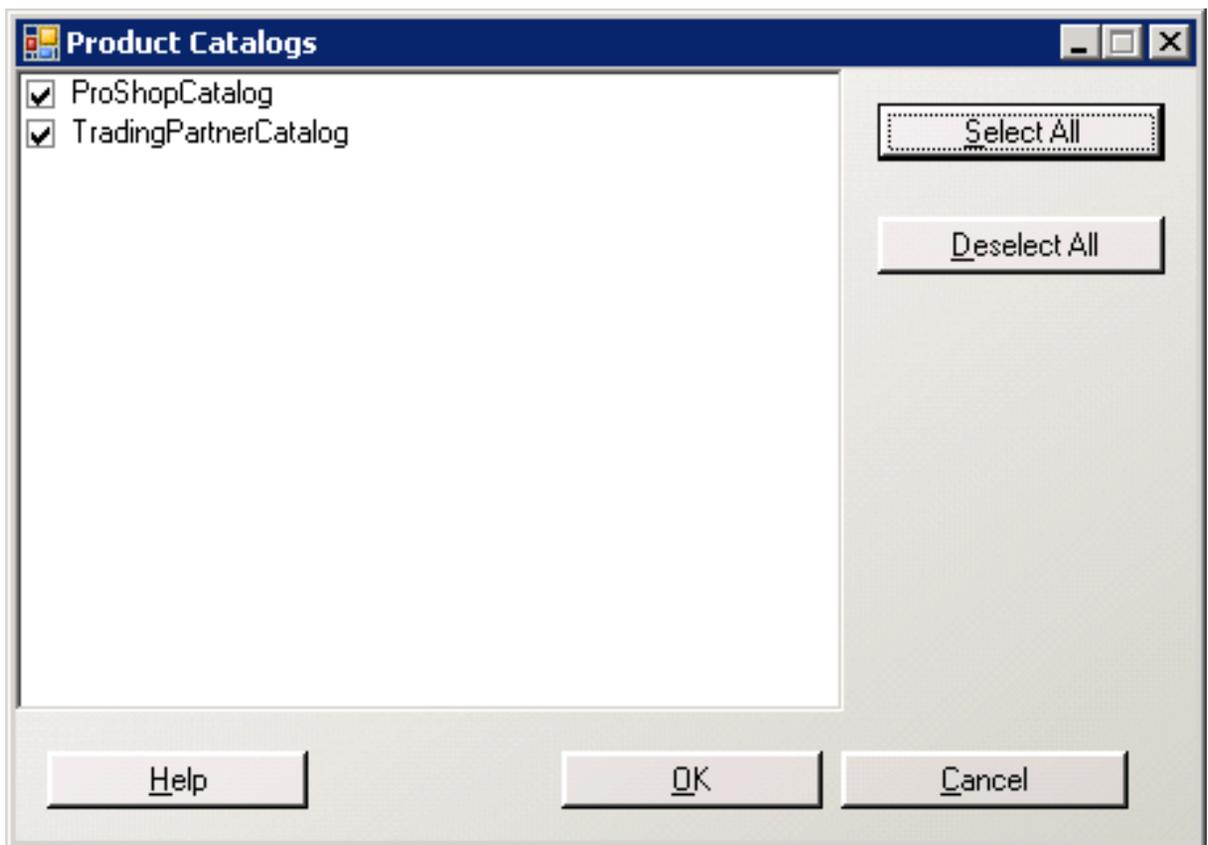
Figure 4-9

7. Click the Save And Close button to finish.

Once a product catalog has been mapped to an inventory catalog, inventory data can now be associated to your products or product variants.

Adding Inventory to SKUs

Now that the product catalogs have been mapped to an inventory catalog, inventory data must be added to the SKUs. The SKU can either be a product or product variant, depending on how the catalog was defined. If a Variant Id was specified when the product catalog was created then inventory information resides at the product variant level. If a Variant Id was not specified when the product catalog was created then the inventory information resides at the product level.

The golf pro shop has product variants, and consequently inventory information must be entered for each of the product variants. To add inventory information to the pro shop product variants, you must use the Catalog Manager.

1. Click Start > All Programs > Microsoft Commerce Server > Catalog Manager.

2. Under the View pane, click Catalogs. After you have selected the catalogs view, the Catalogs tree view pane will display all the product catalogs.

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3. In the Catalogs tree view pane, expand the ProShopCatalog catalog, the Golf Clubs category, and select the Drivers category.

4. Double-click the "Calloway FT-5 Driver" from the Category and Product Details list. This will open the product properties screen.

5. Now that the product catalog has been mapped to an inventory catalog, a new tab called Variant Inventory Properties is. Select the Variant Inventory Properties tab.

6. On the Variant Inventory Property tab (Figure 4-10) you will see a grid that contains all the variants in rows and all the inventory SKU metadata as columns (Figure 4-10). For a non-product variant catalog this tab is called Inventory Properties (Figure 4-11). By default four inventory SKU properties are required: Status, Onhand Quantity, Stockout Threshold, and Warehouse Location (the property definition you added to the inventory SKU metadata). Enter values for each of the variants. Make sure to set the status to Enabled, the onhand quantity greater than 0, and the stockout threshold to 1 (indicating that there must be at least one SKU available to be considered in stock).
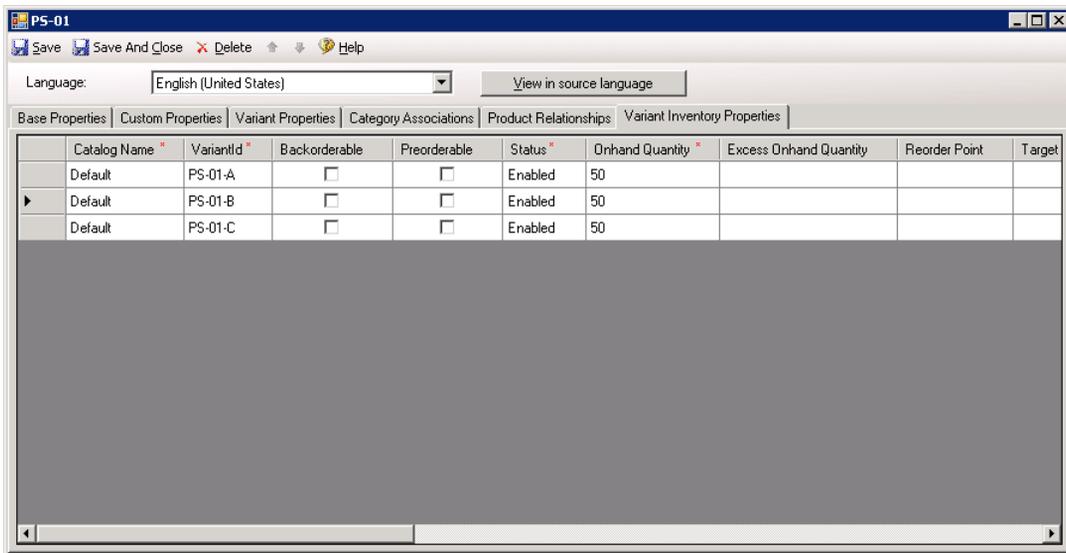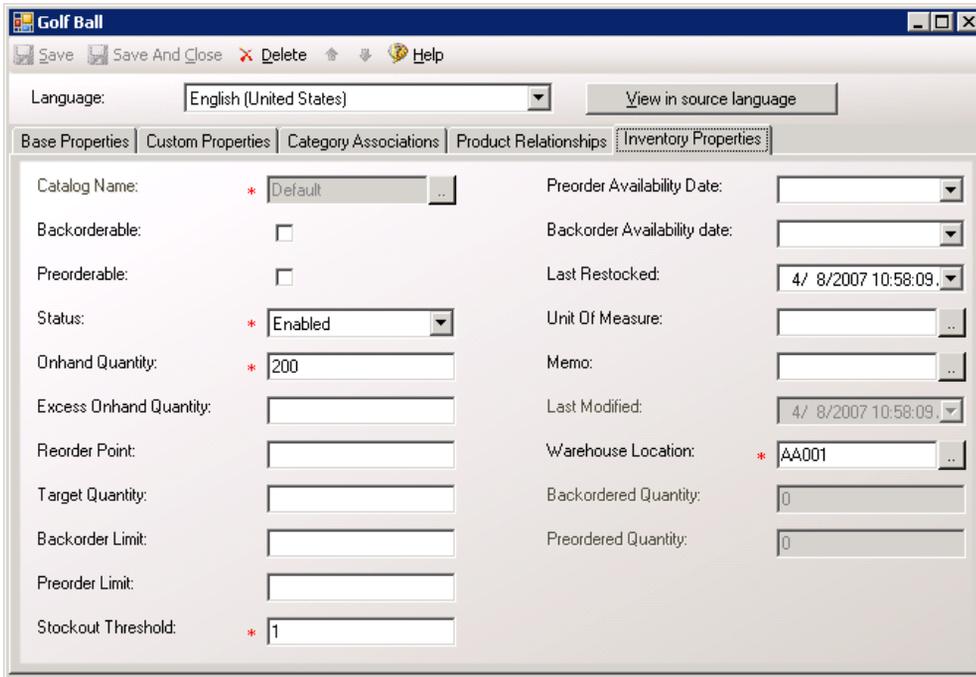

Figure 4-10

Figure 4-11

7.   Once all the inventory information has been added to the product variants, click Save And Close to finish.

Now that inventory exists for the product variants on the golf pro shop, you could actually begin to sell your products online (assuming you have already developed the Web site). Since inventory exists for products, such as golf club drivers, they are considered in stock and can be purchased. For most online Web sites, however, you will probably want to turn on some special inventory handling, such as inventory back-ordering and pre-ordering.

Common Inventory Scenarios

There are a couple of scenarios that are common enough to justify a discussion on how to set them up in the Inventory System. Among these scenarios are:

*   Configuring SKUs to be back-orderable
*   Configuring SKUs to be pre-orderable

Configuring your Web site to allow your customers to purchase back-ordered SKUs and pre-order unavailable SKUs increases your ability to maximize sales. Rather than having to wait for inventory levels to be replenished, you can continue to market and sell out-of-stock or unreleased inventory. Customers expect and demand this functionality, and if you are unable to satisfy these demands you risk losing your customers.

Configuring SKUs to be Back-Orderable

Giving your customers the ability to back-order inventory adds rich functionality and flexibility to your Web site. Fortunately, setting up this process is both straightforward and simple. For the golf pro shop, you want make sure that the product variants can continue to be purchased even if they have run out-of-stock. Consequently, you must configure the site to allow back-ordered inventory.

In order to define the product variants as back-orderable, you must use the Commerce Server Manager and the Catalog Manager.

1. Click Start > All Programs > Microsoft Commerce Server > Commerce Server Manager.

2. Under Commerce Sites expand the ProShop site, then expand Site Resources. Under Site Resources select Inventory. The Inventory resources will display in the Commerce Server Resource window.

3. Right-click the Stock Handling resource and click Properties. This will open the Stock Handling Properties screen.

4. Change the Selected Property Value from 0 to 1 (Figure 4-12). This indicates that the Commerce Site uses special handling for SKUs, and will otherwise prevent back-orderable products from being reported as out-of-stock.
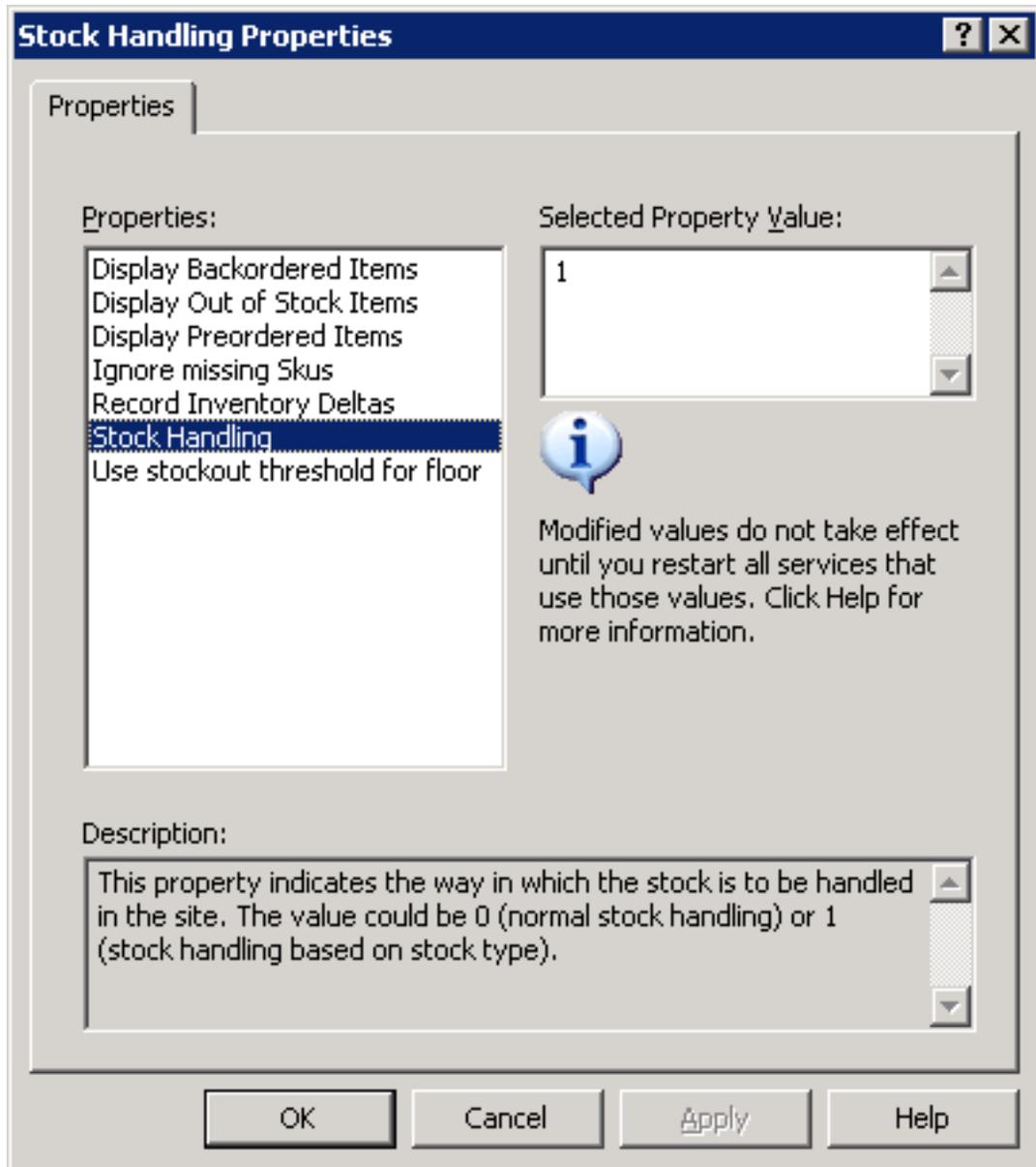

Figure 4-12

5. Now that you have specified that the site uses special handling for SKUs you must also tell the site to display back-ordered SKUs (this is set to True by default). Click the Display Backordered Items property and change the value from 0 (False) to -1 (True). Click the OK button when finished. Close the Commerce Server Manager.

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6.   You must now set the appropriate inventory SKU properties to allow your product or product variants to be back-orderable. Click Start > All Programs > Microsoft Commerce Server > Commerce Server Manager.

7.   In the Catalogs tree view pane, expand the ProShopCatalog catalog, the Golf Clubs category, and select the Drivers category.

8.   Double-click the "Calloway FT-5 Driver" from the Category and Product Details list (or any available product). This will open the product properties screen.

9.   Click the Variant Inventory Properties tab (the Inventory Properties tab if the catalog does not have product variants). In order to make the product variants associated with this driver back-orderable, you must specify two properties: Backorderable and Backorder Limit. Click the Backorderable check box for each variant, and define a positive value for the Backorder Limit. Unless these two properties are defined, the product or product variant will not function as a back-orderable SKU on the Web site. To provide more information for customers, you may also want to specify the Backorder Availability date.

10. Once you have specified the Backorderable and Backorder Limit for the product variants click Save And Close to finish.

Configuring SKUs to be Pre-Orderable

The process for defining a SKU as pre-orderable is very similar to defining a SKU as back-orderable. In order to define the product variants as pre-orderable, you must use the Commerce Server Manager and the Catalog Manager.

1.   Click Start > All Programs > Microsoft Commerce Server > Commerce Server Manager.

2.   Under Commerce Sites expand the ProShop site, and then expand Site Resources. Under Site Resources select Inventory. The Inventory resources will display in the Commerce Server Resource window.

3.   Right-click the Stock Handling resource and click Properties. This will open the Stock Handling Properties screen.

4.   Change the Selected Property Value from 0 to 1. This indicates that the Commerce Site uses special handling for SKUs, and will otherwise prevent pre-orderable products from being reported as out-of-stock.

5.   Now that you have specified that the site uses special handling for SKUs you must also tell the site to display pre-ordered SKUs (this is set to True by default). Click the Display Preordered Items property and change the value from 0 (False) to -1 (True). Click the OK button when finished. Close the Commerce Server Manager.

6.   You must now set the appropriate inventory SKU properties to allow your product or product variants to be pre-orderable. Click Start > All Programs > Microsoft Commerce Server > Commerce Server Manager.

7.   In the Catalogs tree view pane, expand the ProShopCatalog catalog, the Golf Clubs category, and select the Drivers category.

8.   Double-click the "Calloway FT-5 Driver" from the Category and Product Details list (or any available product). This will open the product properties screen.

9.   Click the Variant Inventory Properties tab (the Inventory Properties tab if the catalog does not have product variants). In order to make the product variants associated with this driver pre-orderable, you must specify two properties: Preorderable, Preorder Limit, and Preorder Availability date. Click the Preorderable check box for each variant, define a positive value for the Preorder Limit, and set a Preorder Availability date for the future.

10. Once you have specified the Preorderable, Preorder Limit, and Preorder Availability Date for the product variants click Save And Close to finish.

Remember that Commerce Server will first exhaust the pre-order limit before moving onto the back-order limit.

For efficiencies sake, it would probably be best to define the back-orderable and pre-orderable settings when you first configure your products or product variants. Consequently, make sure to add your product catalog to your

inventory catalog immediately after creating the product catalog. This way the inventory SKU properties are available from the very beginning.

External Inventory Sources

In most large-scale Commerce Server solutions the Inventory System will likely work in parallel with an external LOB application. If the solution requires real-time inventory management, then the BizTalk Server 2006 adapters for Commerce Server can be used to keep both systems up-to-date and working synchronously. If the solution doesn't require real-time inventory, then export and import process can be utilized to keep both systems synchronized.

Through either the BizTalk inventory adapter or import processes, it is possible to aggregate multiple external inventory sources into a consolidated inventory catalog. This can be a very efficient way to combine inventory data together that would otherwise be disparate and unrelated, so that the Website has a coherent depiction of inventory levels.

The BizTalk Server Inventory Adapter

Utilizing the BizTalk adapters for Commerce Server, you can provide relatively easy integration between Commerce Server, BizTalk Server, and a warehousing LOB application. The inventory adapter defines a specific XML format that is exchanged between Commerce Server and BizTalk Server, so that inventory data can then be transferred between BizTalk Server and the warehousing LOB inventory system.

Exporting and Importing Inventory Catalogs

As with most tasks in the Inventory System, exporting and importing inventory catalog is very similar to exporting or importing product catalogs. Exporting and importing inventory catalogs is used to keep inventory synchronized either with a trading partner or a LOB system. Unlike inventory data exchange via the BizTalk 2006 adapters, exporting and importing inventory catalog data is not a real-time solution, and should only be used if it is not critical to transfer real-time information concerning the condition of the inventory.

Inventory catalog exports and imports is most often accomplished by using the Catalog Manager, although the Inventory APIs can also be used directly to export and import data. The inventory catalog can be exported in full, incrementally, or based on an expression. If advanced options are specified, you can select whether or not to include inventory catalog schema data, as well as choose whether or not to export deleted or blank values. Furthermore, specific inventory catalog and SKU metadata can be chosen to be excluded or included in the export.

Inventory catalogs can be imported either incrementally, which will update an existing inventory catalog, or in full, which replaces the entire inventory catalog. Additionally, you can choose to import, validate, or validate and import inventory catalog data. If advanced options are specified, you can select the inventory catalog(s) you want to import, import schema changes, transact the import process, and choose specific inventory catalog and SKU metadata to be excluded or included in the import.

Summary

The inclusion of the Inventory System into the Commerce Server product provides a comprehensive inventory management system that is capable of providing real-time inventory conditions to customers and partners. Inventory catalogs are created to represent inventory levels for products and product variants contained within product catalogs. Product catalogs that are added to an inventory catalog are mapped to the inventory catalog, and can only be mapped to one inventory catalog at a time. Multiple product catalogs, including both base and virtual product catalogs, can be mapped to a single inventory catalog. Within the context of the Inventory System, products and product variants are referred to as stock-keeping units (SKUs), as they represent physical items that exist in inventory.

Inventory catalogs are tightly coupled to product catalogs, and are similarly extendable and modifiable. The inventory catalog and inventory SKU metadata can be extended to contain custom information about the inventory catalog and SKUs. The Inventory System can provide real-time reporting of inventory conditions, indicating the inventory is in stock, out-of-stock, back-ordered, or pre-ordered. Additionally, the Inventory System provides thresholds to warn administrators if stock levels are running low and need to be replenished.

The Inventory System can integrate with external LOB applications, such as warehousing applications, either through the BizTalk Server adapters or the export and import processes. The export and import processes can run either through the Catalog Manager or directly by the Inventory APIs.