Product Options for eCommerce

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Introduction to Shopatron

Shopatron is an eCommerce service provider focused on providing consumer shopping convenience across many manufacturers. Online shoppers demand convenience in two ways:

1. They want to research and purchase product on the Web sites of the brands they trust.
2. Whenever possible, they want to get product quickly and locally.

With these two needs in mind, Shopatron developed the Coex Freedom order exchange.

Coex Freedom allows orders placed on the Web sites of branded manufacturers to be matched to the closest stocking retail location, for in-store pickup or shipment. This allows shoppers to purchase directly from their favorite brands, but still to benefit from the convenience and expertise of local retailers.

Coex Freedom provides shoppers with freedom-of-choice in determining how they would like online orders fulfilled. Parcel shipment, same-day in-store pickup, express delivery, home delivery, installation and freight delivery - Coex Freedom supports all of these consumer delivery experiences.

Shopatron was founded in 2001 and the first version of the Coex order exchange was released in 2002. Today, Shopatron provides two versions of Coex: Coex Freedom for branded manufacturers and Coex Private for multi-channel retailers.

Shopatron's mission is to provide the leading eCommerce order exchange. By focusing on delivering convenience to consumers, Shopatron creates significant business value for manufacturers and retailers.

Shopatron's North American headquarters are located in San Luis Obispo, California, situated on the Pacific Coast midway between San Francisco and Los Angeles. Shopatron's European headquarters are located in Swindon, United Kingdom.

Introduction to Products in eCommerce

Shopatron supports a wide variety of eCommerce sites for our clients. Shopatron's clients range from Brooks Running (http://www.brooksrunning.com/) to Spy Optic (http://www.spyoptic.com/) to Panasonic (http://www2.panasonic.com/). In fact, our system supports over 500 different manufacturers in over 15 industries.

Shopatron's system is built as a multi-tenant system. This means that all the different requirements for our varied clients must be supported by a single data model (http://msdn.microsoft.com/en-us/library/aa479086.aspx). The varied requirements must be supported by generalizing our platform and features, and providing ways to control our system features.

All of our customers organize their product offerings into catalogs. A manufacturer will have one or more catalogs. Catalogs represent variations in the target market, where each catalog typically focuses on a single market segment. Some catalogs will differ based on the product line being offered. Other catalogs differ based on the target country, and thus support products in different languages and currencies. Further details of catalogs will be discussed later in this document.

Product is the central concept in eCommerce. Everything sold on our sites are variations of products. Shopatron supports a wide variety of manufacturers and each one views their products in slightly different terms.

There are many attributes to products. In the most simplistic view, products have a name and price. However, this is just the beginning and this is where specific manufacturers start to diverge.

Product options are a challenging area of the products domain. Product options are used to select variations of a product. For example, a given shoe could be available in sizes 6 through 12 and in red and blue. Both size and color can be represented as options for the particular shoe.

For this project we will focus on products and options for products. We will cover some of the other details of products but in less detail.

Products

The fundamental attribute of a product is its name. The product name is a simple label given by the manufacturer to the product. A secondary label is the product description. The description is specific to the product and is used to describe the attributes of the product to the consumer.

Product name and description are language dependent. These labels can change when viewing the product for specific languages. For example, take a look at these two Shopatron stores: http://www.shopatron.com/product/part_number=2225/574.1 and http://www.ernieballstore.fr/product/part_number=P02225/574.2
The language of the site is typically driven by the market the site is targeting. A site built for the US will typically only support English. A site built for Canada will usually support both English and French. Sites targeting Europe as a whole will need to support many different languages.

Manufacturers usually have a systematic way of identifying their products. Typically, this is called the SKU (Stock Keeping Unit). Each SKU should identify a single product. For example, SKU 1100361D identifies a pair of shoes on the Brooks running site (http://www.brooksrunning.com/prod.php?k=123205&p=1100361D).

The last essential attribute is price. The price for a product determines the cost to the consumer. The price is dependent on the currency of the customer shopping on the site. For example, http://www.ridedna.com/ has supports two currencies, US Dollar and Canadian Dollar. Each product on the DNA site is available in both US and Canadian dollars. Like language, the currency needed on a site is determined by the market being targeted. In the example above, Ride DNA targets north American markets.

Options

Product options add a new level of complexity. Options are used to describe variations of the product in a concise form. The number of options needed and how the options are used depend heavily on the type of product and the manufacturer. The following sections describe the attributes of options and the ways they effect products.

First and foremost, each option has a name and a value. The name is the label displayed to the customer. The value is a string that can be used by the manufacturer as an abbreviation for the option.

There can be multiple sets of options for each product. For example, a product can have a size and color. Size and color would be treated as two separate sets of options, where each set has list of possible values.

For the purposes of this project, we will consider a maximum option depth of 2. This means that a

product can only have options with a dependency tree of max depth of 1. This means one option may be dependent on another (see the dependent/independent section below), but the dependent option cannot have further dependents of its own.

Price additions

Sometimes specific options cost more for the manufacture than others. Many times the difference is minimal, and the manufacturer chooses to not pass the cost on the the consumer. However, there are times where this is not true.

For example: http://www.toklat.com/dyn_prod.php?p=91-012&k=81662 some of the fabrics used in the horse hood cost more than others, and require an additional charge to the customer.

Like the product's normal price, the option price is currency dependent. If a product is available in multiple currencies, the price additions must also reflect the current currency.

Price additions are always specified in fixed currency amounts rather than percentage or relative cost based measures. In the example listed above, the price additions are $10 and $20. The fixed price additions can be specified as both positive and negative numbers. A negative number implies a price discount for that particular option.

Price additions are also cumulative when there are multiple levels of options on the product. If a shoe had a price addition of $10 for an extra wide size and a price addition of $50 for the gold color, the total price addition for the extra wide gold shoe is $60.

Default selection

The options for a product may be required or may be optional. The consumer must select required options prior to purchasing the product. Optional options can be ignored by the consumer without effecting the order, typically because the option describes an optional add-on.

There are two setting of interest when presenting product options to the customer. First, it must be decided if a selection from a set of options is required for that product. Then, if the option is required we must set which option setting is the default value if there is going to be a default value.

Dependent/independent

A product can have many separate sets of options. For example: http://www.brooksrunning.com/prod.php?k=123205&p=1100361D the Glycerin running shoe has two option sets. The option sets allow the consumer to select their desired color and their desired shoe size. These sets are ordered (i.e. Color will always come first) and the contents of the set are ordered (i.e. size options will always display in increasing numerical order).

There are two possible types of relationships between option sets; dependent and independent. Independent option sets are allowed to vary freely. The consumer is allowed to pick from both sets without the selection in one effecting the selection choices in the other.

Dependent option sets are more involved. Dependent option sets are set as dependent on specific values of another option set. (For an example, see https://www.shopatron.com/product/part_number=IC757-IC761/660.0 where the shoe color determines the sizes available). This creates a tree of options, where each option in the parent set determines the values for the child set.

For the purpose of this project, we are limiting the depth of the option dependency to a max depth of

two. This limits choices to “shoes in size x in color y.” This does not allow a third level of dependency for the lace color, for example.

Language variance

Language was already discussed in the product section and it carries over into the options. Just as the product name and description can change with the language on the site, the option name displayed to the customer can change with the language of the site.

Currency variance

Currency was also discussed in the product section. Currency effects options when the option changes the product price. The currency of the option price change must vary when a product is available in multiple currencies. Therefore, options that change the product price must support currency specific values.

Catalogs

Catalogs add an additional challenge to Shopatron's system. Manufacturers often have multiple, overlapping lists of products in the form of catalogs. An example of two catalogs for a clothing manufacturer would be a 2008 clothing line and a 2009 clothing line. Manufacturers may have many catalogs.

Catalogs server primarily as a grouping mechanism for products. A secondary function of catalogs is to limit how the customer sees the products. A catalog is limited to a single currency and a limited set of languages. Therefore, to see a product available in multiple currencies it must be listed in a separate catalog for each currency. It is expected that all products within a catalog will have data for the catalog's currency and for the catalog's languages.

Catalogs also have a name, which labels the product set. This makes it easier for the manufacturer to maintain the list of products associated to each catalog.

We must stress that products are not catalog specific. A single product may be available for purchase in two catalogs at the same time. However, the catalog will present the product in the limited set of languages configured for the catalog. The catalog serves as a way to group products products. A change to the product information will reflect in all catalogs that contain the product.

Of note, a consumer never views products outside the context of a single catalog. At the time a product is being displayed or purchased, we know exactly what language and currency is in use at that time.

Purchasing

So far, this document has described the data backing a product. The next step is enabling a consumer to purchase the product. Purchasing the product means that the system must enforce that all the required product options have been selected. Once a purchase has been made, the system must be able to list the product information used at the time of the order while also allowing the product information to be updated for new purchases.

Before the customer can place an order, they must shop for the products they want. This process starts with the customer navigating to a single catalog. If the catalog is available in multiple languages, the customer must also select the language with which they wish to view the catalog.

Shopping Cart

Once the shopper identifies a product they wish to purchase, they add the item to the shopping cart. Adding the item to the shopping cart enforces that the required options have been selected. Once the item has been added to the cart, the shopper can return to browsing for products. The shopping cart represents a list of items with desired quantities.

Orders

The shopper transitions to a customer once the shopper is ready to purchase the items in the shopping cart. The customer is either identified as existing or created by the order purchase process. The purchase process then creates an order and associates the order to the customer. The order is created as a snapshot of the product information. The details of each product for that must be frozen at the time of the order so the details of the order do not change. In this way, the manufacturer can continue to update the product information and prices without impacting previous orders.

Attributes

This document describes an overview of how the various pieces of an eCommerce application fit together. This has been a high level view, and does not delve into the details of some of the ancillary portions of the system. For completeness, the following tables list the basic attributes not discussed above but expected for a Manufacturer, Catalog, Customer, and Order.

Manufacturer

- Name
- Address (street address, city, state, country, zip)
- Description

Catalog

- Name

Customer

- First and Last Name
- Shipping Address (street address, city, state, country, zip)
- Billing Address (street address, city, state, country, zip)

Order

- Time of purchase
- Shipping address (street address, city, state, country, zip)