**IBM**

# Strategies for online merchandising

*IBM Net.Commerce and IBM Catalog Architect*

e-business

**Abstract**
**Success in e-commerce depends on the execution of Web-based strategies to expand your customer base, increase sales and reduce costs—all at the same time. Such strategies depend on highly accurate product data for electronic catalogs and additional information (also called meta-data) required to flexibly merchandise, sell and support products and services online. Creating and maintaining electronic catalogs gets increasingly challenging as the number of SKUs, product features and special catalogs increases; there's a huge volume of data to be managed, and meta-data for products, categories and customers needs to support merchandising. Effective merchandising tactics such as customized sales assistance, parametric search, up- and cross-selling, personalization and special offers all rely on the ability to link products with other products, with selling strategies or with shopper interests.**

**IBM® Catalog Architect is a high-performance, user-friendly way to gather, organize and update product information for sophisticated, dynamic e-commerce sites using IBM Net.Commerce as a foundation. Catalog Architect is included when the user purchases Net.Commerce PRO and is an optional purchase for Net.Commerce START. With Catalog Architect, multiple product managers can work on their own product areas in parallel. They can import product detail from other systems or add batches of new products quickly using a familiar spreadsheet interface and built-in feature inheritance. With Catalog Architect, the Web administrator can manage the entire base of product information and enhance it with meta-data to support merchandising strategies. Catalog Architect enables product managers to spend more time merchandising and less time on information maintenance.**

## Executive overview

The Internet is changing the basis of competition for companies of all sizes. While many successful formulas for e-business development now exist, most are based on one of the following strategies: Web entrepreneurship, virtual build-out and operations improvement. This report explains how each strategy relies not only on a great Web site but on high quality, system-ready information about products and the merchandising programs that drive sales. IBM Catalog Architect is a powerful tool to organize, refine and manage the data required to grow your e-commerce business, whatever strategies you employ.

## Internet business development strategies

Web entrepreneurship is all about transforming an industry—without using brick and mortar. The core business development concept is to build a massive online customer base to gain economies of scale through educating buyers to use online services and transactions. The MicroAge x-Source business-to-business procurement service, Borders Books and Music, and e-Chemicals are a few examples.

Virtual build-out means expanding nationally or globally—beyond the limits of brick and mortar. The core concept is to transform an actual in-store experience into a Web experience available to anyone, anywhere. For practitioners of virtual build-out, the Web may supplement or be used in place of a catalog and telephone order expansion strategy. REI, an outdoors outfitter in the Pacific Northwest, is using the Web to reach hiking and camping enthusiasts across the country. Its online stores sell as much as its largest regional stores—and in-store sales have not been impacted.

Operations improvement is targeted toward increasing the profit margins of an existing national or global business. The core concept is to replace the costs of sales and support staff, paper order processing, and brick-and-mortar operations with customer self-service, automated sales, delivery and support services on the Web. Goodyear, for example, has saved millions of dollars in its dealer channel by using Web process automation to drive costs out of the sales process. Banks, financial firms, wholesalers and distributors, retailers, insurers, and even colleges and universities are pursuing Web-based operations improvement strategies to increase profits and enhance customer service.

You need to seriously consider strategies like Web entrepreneurship, virtual build-out and operations improvement to ensure you capture market share before your competitors do.

**The challenge: content management**

These e-business development strategies rely on automation of product and service presentation, selection and purchasing; execution of merchandising plans such as cross-selling and special offers; and online delivery of customer support. Achieving such automation and simultaneous cost control requires absolutely accurate data. Inaccurate data translates into unhappy customers and decreased profits. So, attaining consistent, reliable data is critical to your e-commerce success. And creating and maintaining reliable data requires effective content management.

There are two kinds of data—data about the products and services, such as name, description, features and specifications. And there's meta-data, which is used to sell, deliver and support your products, like recommended accessories for cross-selling, and taxable code and shipping weight to generate online invoices.

As detailed later in the report, many companies have data and meta-data that are not in a form that supports full, cost-effective automation. The product data has inconsistencies and the meta-data exists as human procedures in multiple locations, or files in computer systems separated from the product data, requiring interpretation by people.

A further complication for companies intent on expanding e-business revenues and profits is that in the rush to establish an e-commerce operation, many have relied on runtime Web tools to do the preliminary buildtime data preparation. The result is that they have to spend enormous effort with their Web site design tools in reworking data and meta-data every time they enhance their merchandising programs.

In fact, online merchandising presents a range of content management challenges that aren't easily managed with traditional product data preparation methods. Here are a few examples:

- Effective online merchandising requires an array of techniques such as product locators, problem solving wizards and customer relationship tools to deliver engaging online experiences. These techniques rely on product and shopper classification methods that require new meta-data at the product item, category and even shopper level. Maintaining these attributes expands data preparation work.

- Companies are learning that effective use of such techniques requires much cleaner and more consistent product information than appears in most catalogs or in the underlying databases.

- The recognized need to keep e-commerce sites fresh and attractive requires more frequent updates. Consequently, the product information and catalog design teams find themselves working continuously on the online catalogs (instead of periodically as on paper catalogs), and they need more efficient, group-friendly product information maintenance tools.

- The cross-industry trend towards faster product development and shorter product life cycles means there are more product item adds, changes and deletes than ever before. Many merchandising managers want a way to exploit the electronic product information that manufacturers have already prepared.

### The solution: IBM Catalog Architect
In helping a variety of companies develop and execute e-commerce projects, IBM looked closely at this content management challenge and developed IBM Catalog Architect. IBM Catalog Architect is designed to gather, enhance and manage the data and meta-data needed to execute successful e-business strategies such as Web entrepreneurship, virtual build-out and operations improvement . As your product catalog grows beyond a few thousand items and your merchandising programs become more sophisticated, Catalog Architect becomes indispensable for competing effectively on the Web.

Catalog Architect deals with content management head-on. It is an end-user tool that exploits the logical relationships between product information items and the catalog. It performs much of the laborious, time-intensive cross-checking that your staff performs. It's easy to use, employing a spreadsheet interface that is far faster than forms to prepare and maintain product data . Catalog Architect can import product data from legacy and database systems, transforming it for continuing enhancement and export to Net.Commerce. It can even generate the SKUs and product attributes needed for massive product adds.

As explained in the balance of the paper, Catalog Architect offers a whole new realm of merchandising possibilities for your e-commerce business. Read on to learn about some effective merchandising and online selling strategies and how Catalog Architect dramatically reduces the effort required to gather and maintain the product information and meta-data you require.

**Online merchandising strategies**
Building a profitable and scalable e-commerce business requires flexible merchandising and an effective infrastructure. Flexible merchandising—delivering value and quality in meeting customer needs—is covered in this section. Effective infrastructure—building efficient processes to create the information required for flexible merchandising—is covered in the next section.

*Flexible merchandising*
The keys to effective online merchandising are simple: the site and sales process should be interesting, dynamic and appealing, and most important, relevant to each shopper. Relevance means having the flexibility to provide a range of merchandising techniques to suit the needs of different shoppers, or the same shopper in different buying situations. Here is a collection of flexible merchandising strategies used on e-commerce sites— product locators, problem-solving techniques and customer relationship tools.

*Product locators*

Product locators help buyers find the products they need, often by using both a classification scheme and a search mechanism. Products need to be classified so buyers can locate them on your site easily. The efficient way is to incorporate classification data into the product detail and let e-commerce tools generate the Web pages as needed (as explained later in this paper). The alternative is to laboriously paste the product data into Web page templates at the desired locations—and re-paste if the site design changes. The following are some product locater strategies enabled by product classification data.

- *Categories.* Many e-commerce sites organize products by category—beginning with a broad classification, like clothing, and narrowing in steps, like outerwear, until individual items, such as mountain parkas, are reached. This metaphor organizes products in a familiar way, like paper catalogs, and buyers click through Web pages to reach real products.

- *Visual catalog.* An electronic components supplier provides a visual catalog that makes it easy to navigate by inspecting a tree of products and selecting items that look like the ones needed. This metaphor, which can be developed with Net.Commerce custom templates, helps the occasional buyer who doesn't know industry terminology. The supplier also provides search tools for frequent buyers that use full-text descriptions, product codes or competitors' product codes.

- *Parametric comparison.* A PC accessories reseller lets the buyer pick product models and accessories from pull-down menus and then presents a table of items that match. Then, the buyer can compare specifications of individual items against each other and select which to buy. This metaphor, available with the Net.Commerce PRO, creates virtual mini-catalogs on the fly to suit buyer requirements.

- *Table of contents*. More sites are adding table of contents features to supplement the other access methods. Some sites have multiple tables of contents that include products, services and online information. Each entry jumps to a page of items or a visual catalog.

*Problem-solving techniques*
Locating products is one thing, making the sale is another. Problem solving—matching the right products to the customer's need—increases the chance of closing the sale and bolstering volume. Successful matching requires linking product uses to needs. The following are some problem-solving techniques made possible by product usage attributes.

- *Questions and answers.* A technical products reseller provides a question-and-answer interface that leads the buyer through a dialogue governed by an expert system. This metaphor, available in Net.Commerce PRO, helps the buyer clarify the requirement and identify candidate solutions at the same time. Such expert systems require linkage of recommended solutions to specific products. The reseller could also provide search tools for text descriptions, model names and product codes.

- *Up- and cross-selling.* Sites are beginning to add up-selling and cross-selling capabili ties to enhance per-sale revenues. Up-selling offers more capable (and more costly) versions of a product. Cross-selling offers a complementary product to be purchased at the same time to expand the range of problems solved. Up- and cross-selling require links between models with varying levels of capacity and features, and links to products with complementary uses.

- *Accessorization.* Some sites focus on providing all items needed for specific uses, problems or applications. For example, road warriors who want a portable printer may also need specific cables, batteries, power supplies, replacement print cartridges, ink tanks, special types of papers, helper applications, portable scanners and even online access to clip art—all items that can be classified as "for use with" the portable printer.

*Customer relationship tools*
The customer relationship data, such as product preferences, past purchases and demographics, can help shape merchandising strategies, if the relationship information is recorded in data attributes. The efficient way to employ customer relationship data is to accumulate preferences and purchase history on an ongoing basis in a customer profile—and ensure that this data can be linked with product detail for subsequent promotions. This approach is being adopted by increasing numbers of retailers and direct marketers for their customer loyalty programs.

Or, you can analyze past sales data and classify customers after the fact. This is difficult if product descriptions are the usual haphazard abbreviations shown on invoices. The following merchandising techniques can be based on linkage of customer relationship attributes to product information.

- *Customer preferences.* Keeping a record of preferences can enhance your relationship with customers in many ways. For example, maintaining the customer's preferred payment method reduces form fill-in at payment time. Size, color, texture, style, genre, lifestyle and language preferences can simplify the purchasing process and enhance sales for clothing, housewares, sports gear, music, books, periodicals and other goods. Customer preferences need to tie back to category or item level attributes to work effectively.

- *Past purchases.* Records of past customer purchases, especially equipment, can enhance sales opportunities for extended warranties, supplies, maintenance, upgrades and add-ons. Past purchases of supply items can drive seasonal or customer-specific promotions. Leveraging purchases data is straightforward if the product codes used in recording the original sale are accurate and meaningful.

- *Contracts.* Much business purchasing is done under supply contracts. Contracts can be administered systematically online if discounted items are explicitly listed in the contract (in other words, a contract-specific version of the catalog is prepared). Tiered discounts are often based on purchase volumes by commodity class, which requires accurate classification of product items.

- *Customization/Personalization.* Meeting customer-specific requirements can cement your relationships. Customization requires data fields at the item level, carrying them through the order process. Business-to-consumer examples include storing measure ments for make-to-order clothing and custom-fit bicycles in a profile, and enabling custom selections of music on CDs. Business-to-business examples include storing specifications for make-to-order servers, routers, lab equipment and specialty chemi cals in a profile, and enabling custom configuration of personal computers and servers.

Product locators, problem-solving techniques, selling strategies and customer relation-ship tools all rely on attributes to associate products with one another, with merchandising techniques and with customer groups. Until recently, it has been difficult to rapidly deploy new merchandising strategies because of the need to add new attribute fields and update existing field values for catalog entries.

As described in the balance of this report, IBM Catalog Architect dramatically simplifies maintenance of product information of all kinds. It enables you to add new meta-data attributes to support effective merchandising. When you add new merchandising techniques to the e-commerce site, IBM Catalog Architect helps you prepare the product and meta-data information needed to work with the merchandising technique. Interfacing directly with Net.Commerce, Catalog Architect also allows you to export enhanced product information for use in other systems, such as desktop publishing (to produce conventional catalogs) and CD-ROM publishing (to produce CD catalogs). Catalog Architect makes it possible to create a more effective infrastructure for product information management.

## Effective infrastructure

Today, in most e-commerce operations, information about products is handled separately from information about merchandising of products. This limits the flexibility of online merchandising programs and the speed with which they can be changed. This section reviews catalog preparation challenges, presents the requirements for an effective infrastructure and identifies how Catalog Architect enables a quantum leap forward in the infrastructure for product and merchandising information preparation and management.

*Catalog preparation challenges*
Today's usual process for catalog data preparation isn't suitable for e-commerce businesses in the following scenarios:

- There are many SKUs and types of products.
- There are complex product features and attributes.
- There is a high occurrence of adds, changes and deletes.
- There are special catalogs produced.
- There are multiple merchandising strategies employed.

The fundamental challenge is that virtually all product information systems are designed around fielded records and use redundant field values for each item. Consequently, the same meaning is often expressed in different ways: Dark Red, Drk Red, drk rd; or fourteen inches, 14 inches, 14 in., 14". People handle such variations well, but automated merchandising strategies don't. So, when a company imports its product database into its e-commerce catalog and tries to employ automated merchandising, the results can be unsatisfactory for customers and unrewarding for the business.

## Product information management requirements

As explained later, Catalog Architect eliminates redundancy and puts the catalog designer in charge of the values used to express product attributes. The following table identifies some problems with today's current process and points out requirements for more effective product information management through Catalog Architect.

| Catalog Preparation Challenges | Information Management Requirements |
|---|---|
| More Internet business means that more of the catalog needs to be online—more SKUs, descriptions, codes, graphics, multimedia.<br><br>(Putting just best-sellers on your Web site actually inconveniences the best customers because they aren't able to acquire everything they need online.) | Ability to mass-import and manage vast amounts of information, quickly and conveniently. |
| Product information often resides on multiple systems, with different data formats, classification schemes and abbreviation styles. This stymies automated merchandising tools which rely on exact match to locate and compare products. | Processes to clean and refine old data—to identify inconsistencies and readily correct then for e-commerce use.<br>Need tools to organize, visualize, cross-check and test product information. |
| New product adds, deletes and changes often come in batches—a different supplier, your company makes an acquisition or divestiture, or a new product is announced. | Rapid data entry, efficient mass update, generate prospective SKUs and revise them systematically or on exception basis. |
| Manufacturers already know what they want resellers to say about their products—why do we have to key it into our catalog system? | Support the information supply chain (from manufacturer to wholesaler to retailer to end customer).<br>Enable suppliers to create their own product information remotely and relay it to the reseller to be merged into the catalog. |
| Merchandising programs, especially for the Web, are evolving faster than direct mail campaigns ever did—making it hard for IT to keep up with changes. | Need tool to swiftly adjust data design to support new merchandising campaigns, especially additional product attributes that tie to product locators, problem-solving techniques and customer relationship tools. |
| Multiple product managers need to work individually on their product lines as well as together on special offers and campaigns without getting in each other's way. | Tools should be group-enabled so that many people can work together on the same base of information at the same time. |
| Many e-commerce solutions are hard to integrate with existing systems. As a result, the company maintains several product databases in parallel: for the Web, for printed catalogs, for order entry, for inventory. | Tool should support multiple export streams and feed multiple systems. |

## Catalog Architect 3.1 features

Catalog Architect features work together to improve the efficiency of the product information maintenance process. The integrated approach taken by IBM in designing Catalog Architect delivers a higher level of performance and convenience than can be achieved with any subset of the features.

*Designing the Information*

The foundation of Catalog Architect is object-oriented data management. The catalog designer can create a category tree that organizes all the attributes and allowed values for products in advance of loading or generating product information. As shown below, the tree is multileveled and uses inheritance to enforce data definitions and instantiation to create product groups and particular SKUs.
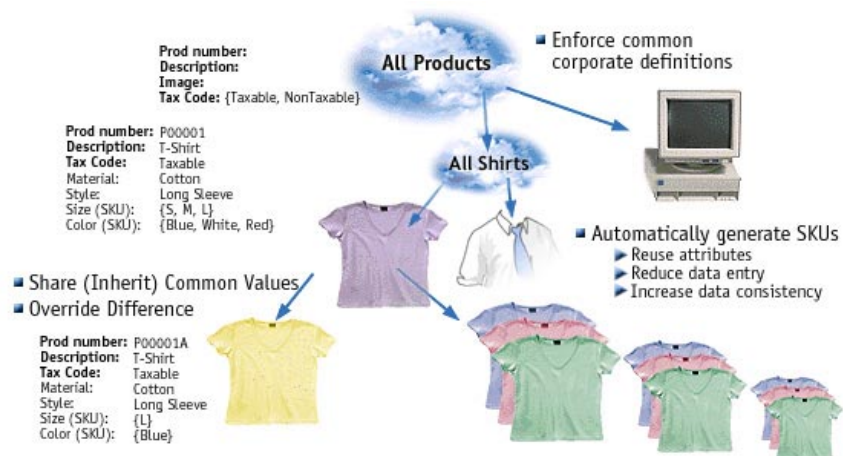


*Figure 1. Information design in IBM Catalog Architect*

For example, the designer can specify that at the all-product level, each item has basic attributes for product number, description, image and taxable code and merchandising attributes including catalogs, accessories, cross-sell and customize. Furthermore, the designer can constrain attribute values, so that only {taxable or non-taxable} are valid entries.

The designer can specify that for the t-shirt product group, each item has the same attributes as all products, but also has attributes for material, style, size and color. For dress-shirt products, even more attributes might be needed: neck size, collar type, arm length, cuff type. Again, the designer can constrain attribute values. The product manager for the t-shirt product group can fill in the merchandising attributes once specific catalog issues and promotions are planned. Plans might include:

- Put t-shirts into the Spring, Summer and Sport catalogs
- Use the accessorize merchandising technique to offer the decal kit
- Use the cross-sell merchandising technique to offer sweatshirts
- Use the customize merchandising technique to offer monogramming

By working at the product group level, the product manager can implement merchandising and promotion strategies much more efficiently than at the SKU level.

*Object-oriented data management*
Catalog Architect object-oriented data management provides many advantages:

- Data consistency is increased because the possible valid entries are determined in advance.
- The data entry task changes from keying in words or codes to selecting words or codes for the item.
- Information is reused because values determined higher in the tree apply (are inherited down) to subordinate items.
- It becomes practical to generate SKUs automatically—based on predetermined, valid entries for multiple attributes, like size and color.

## Structuring the catalog

The Catalog Architect category tree view of a product catalog is a powerful, yet familiar tool.
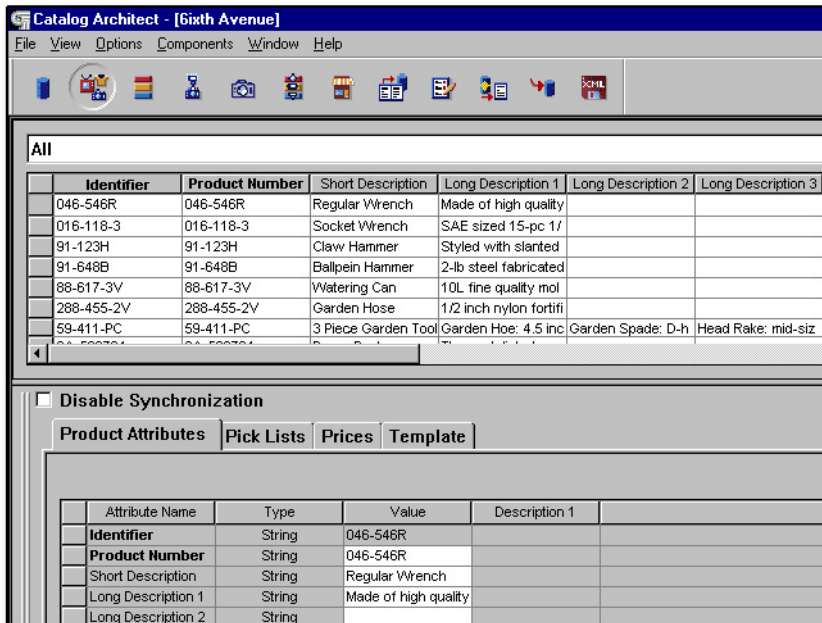


*Figure 2. Partial screenshot of Catalog Architect's category tree view*

The category tree resembles a hierarchical view of folders, sub-folders and files on a personal computer's hard disk. The category tree view enables the product manager, who understands the product line and the intended merchandising strategies, to structure the category hierarchies and define the attributes needed to support how the products are organized in the catalog and how the planned merchandising techniques call forth the products. Technical knowledge isn't required. Catalog Architect is intuitive and marketplace-oriented.

*Visual control of merchandising tactics*

With the category tree view, the product manager can build the categorization hierarchies, visually manipulate the categories and create multiple categorization schemes. This last capability makes it easy to support as many product locators, problem-solving techniques or customer relationship tools as may be needed for the target customer groups and purchasing scenarios.

## Managing the catalog

Catalog Architect supports multiple catalogs and multiple merchants. Simply by assigning attributes, you can control which products appear in different catalogs and which products are sold by different merchants. This capability makes it easy to establish and manage catalogs and stores for Net.Commerce malls. In all, Catalog Architect makes it easier to operate special stores devoted to particular groups of buyers through use of attributes and control of attribute values.

Product managers have control of catalog and item data such as:

- Repositories of similar products or product groups
- Product information, like descriptions, categories and attributes
- SKU information (instantiated products)
- Prices, including multiple prices
- Assignment of products and items to categories
- Assignment of templates to products and categories
- Assignment of stores to products and categories

*Data entry*

Once the information design is completed, the product manager can go onto other merchandising tasks. The data preparation analysts can use the Catalog Architect spreadsheet view to handle the work of adding individual SKUs, or groups of SKUs (perhaps associated with a new material, color or other attribute value).

Adding SKUs for a new color t-shirt is a simple task. Select one of the existing t-shirt SKUs as a model, "clone" it, enter the new SKU numbers, select the new color and size codes. The other attributes such as description, material and price are either inherited from the generic t-shirt object at the product group level or were copied when the clone was made. The spreadsheet also makes it easy to revise product information imported from other systems or Net.Commerce.
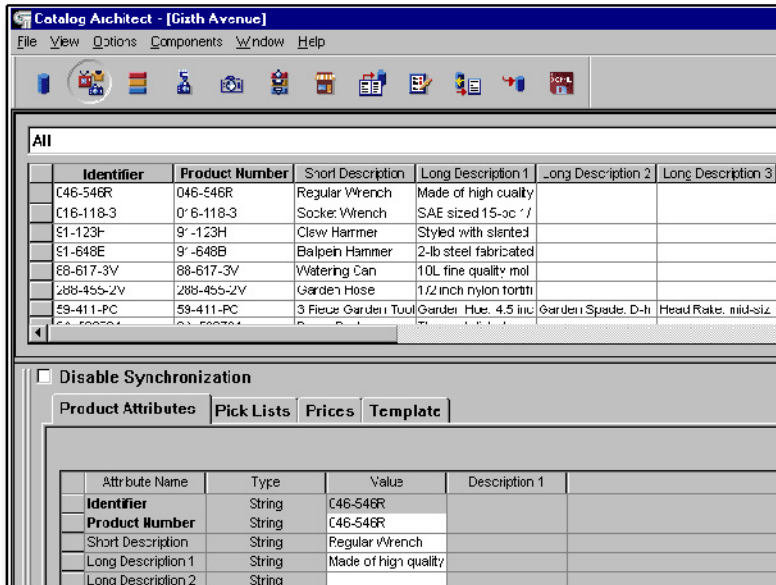
*Figure 3. Partial screenshot of Catalog Architect spreadsheet view.*

*Data import and migration*
It's easy to get product information into Catalog Architect from other systems. The first step is to define the format of the incoming data records and indicate which attributes in the catalog will be populated from which field. The imported data may have values that conflict with the predefined attribute values. Conflicting values can be identified automatically using the report card feature (see below) or through inspection on the spreadsheet. Two utilities handle data import:

- Text import utility. Catalog Architect includes a utility to import text files from other applications. Since data management applications normally can export text records, it is easy to move data assets from multiple systems into Catalog Architect.

- Net.Commerce migration utility. Catalog Architect understands the Net.Commerce catalog format. It's easy to migrate existing Net.Commerce catalogs into Catalog Architect where they can be cross-checked and enhanced.

*Data evaluation, cleanup and editing*
The Catalog Architect report card tool performs a variety of evaluation functions and lists the exceptions and differences:

- Looks for missing values
- Checks spelling and numbers
- Cross-checks interdependent items
- Compares the actual data values in all or part of a catalog against the predefined data values
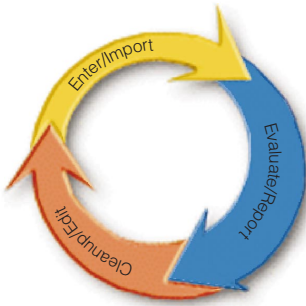
Using the report card is a cyclical process of importing and entering data; evaluating and reporting inconsistencies; and cleaning and editing the data. Suppose that a hundred new SKUs were created to support a new group of products, or a hundred records from a legacy product master file were imported to support sale of supply items. The data preparation analyst would likely examine the new SKUs in the spreadsheet and perform already-known changes, such as making color and dimension values consistent. Then, the analyst runs the report card tool and finds spelling errors in the description field and duplicate records that were in the original database. The analyst corrects these errors and reruns the report card until all is clean.

## Publishing the catalog

Catalog Architect prepares the cleaned data for Net.Commerce. The data preparation analyst performs the collate step, which produces a load file that Net.Commerce can import quickly. The load file is then transferred to the Net.Commerce staging server where it is loaded into the Net.Commerce database.

*Fast page generation in Net.Commerce*
Net.Commerce uses the codes in the records in the load file to associate generic and SKU-level product items to the Net.Commerce templates for product categories and shopping pages. As soon as testers start using the Net.Commerce staging server, Net.Commerce creates the Web pages buyers will see and caches those pages for rapid service.

Net.Commerce also uses the codes in the records to associate product items to multiple stores in a Net.Commerce mall (if a mall was established).

After the latest versions of the catalog are tested on the Net.Commerce staging server,

Net.Commerce procedures can be used to update the production server from the staging server.

*Supporting workgroups*
An e-commerce business can use multiple Catalog Architect workstations. One for hard goods, another for soft goods, and so on—typically, one workstation per product manager. Net.Commerce can accept load files from multiple Catalog Architect workstations.

*Building an information supply chain*
Businesses have the option of installing Catalog Architect workstations at their suppliers' offices and working with them to establish an information supply chain—saving time and money by reusing the supplier's product information as well as reselling the supplier's products. The suppliers would use Catalog Architect to prepare product information including descriptions and dimensions, and transmit the files to the reseller to be incorporated into the full electronic catalog. The supplier is better able to describe the product and the reseller only needs to add the necessary merchandising information to achieve a faster time to market.

## Benefits of Catalog Architect 3.1
Catalog Architect offers important operational and business benefits.

*Operational benefits*
Catalog Architect separates buildtime from the runtime. The buildtime focuses on the enter/import, evaluate/report, cleanup/edit cycle, and is optimized for data management that yields correct, complete, consistent and current product information.

The runtime focuses on the collate and publish process which yields product information in a form that can be swiftly absorbed by Net.Commerce. Net.Commerce, then, is engineered for scalability, supporting large numbers of concurrent browsers and transactions.

Together, Catalog Architect and Net.Commerce make it possible to enhance product information and to prepare new merchandising plans, and then execute them quickly.

Catalog Architect enables multiple product managers to work in parallel—collaborating where needed—to produce outstanding product information for Net.Commerce sites.

*Business benefits*
IBM Catalog Architect is unique in its ability to support the three parallel streams of Web functionality: presentation (what buyers see in their Web browsers), information about products (SKU codes, product descriptions, prices) and business logic (controlling which merchandising strategies apply when selling to different buyers).

Catalog Architect provides the content management tools needed to cost-effectively support multiple merchandising strategies for at leading edge business-to-business and business-to-consumer e-commerce sites.

Catalog Architect:

- Speeds up and rationalizes the product information preparation process
- Reduces catalog lifecycle costs
- Helps ensure correct, complete, consistent and current product information in Net.Commerce product catalogs
- Provides a convenient and efficient way to control which merchandising strategies will be used with the various product groups, and what catalogs and Net.Commerce online stores the products will appear in
- Supports export and file transfer of finished catalogs to other media, such as desktop publishing and CD-ROM publishing

The bottom line is that for companies who have large product information bases, complex product features or who use sophisticated merchandising techniques, Catalog Architect can play an important role in increasing top-line sales, reducing costs and improving the bottom line.

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