IBM

IBM InfoSphere Master Data Management Server for Product Information Management Version 6.0

Technical white paper

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Introduction

Leading organizations are breaking down their information silos to gain control of their most important and commonly shared enterprise information assets. These initiatives are based on master data management (MDM), a practice designed to achieve and maintain a single version of truth across the enterprise. Product information management (PIM), an element of MDM, establishes a single repository for products and services that can be used to address strategic business initiatives throughout an organization.

Creating a complete and consistent PIM solution requires addressing different data requirements across existing systems, aligning implementations with existing business processes and workflows, establishing appropriate role-based access and offering business users easy, intuitive access to the system. However, organizations deploying PIM must ensure that their implementation leverages existing data models and business processes and integrates into their existing systems landscape. The solution must also adapt to the continuing needs of the business—allowing the data model, the business processes and the systems they integrate with to change as requirements evolve or as the business grows.

IBM provides these fundamental foundation elements through IBM® InfoSphere™ Master Data Management Server for Product Information Management. One of the IBM MDM offerings, InfoSphere MDM Server for PIM is designed to be implemented in a wide range of industries and can be

optimized for an organization's particular business needs. The latest version, InfoSphere MDM Server for PIM Version 6.0, includes a host of new features that help ease the integration of PIM into enterprise systems, capture broader collaborative business processes within the system and rapidly deliver value from PIM implementations.

InfoSphere MDM Server for PIM: A functional overview

Organizations face growing demands on their product and service information. Consumers want more information as they increasingly make buying decisions based solely on product information as opposed to physical interaction with the product. Tradesmen demand access to detailed information on mobile devices at their work location. Producers are catering to consumer demand by introducing new, differentiated products and services at a faster rate. And governments are requiring that the vital information about offered products and services is managed with due diligence.

These pressures have been increased by the often-conflicting requirements of current and future system landscapes, as well as increasing merger and acquisition activity that adds integration (business and system) pressures. In such environments, there are five key requirements for a PIM system: a flexible data model, business processes that can quickly adapt to changing needs, the ability to manage multiple hierarchies, the ability to connect to disparate systems and a granular and easily extensible security model.

InfoSphere MDM Server for PIM meets these requirements by enabling companies to create a single, up-to-date repository of product and service information that can be used throughout their organization for strategic business initiatives (see Figure 1). Organizations using InfoSphere MDM Server for PIM can benefit from its robust features, including:

* *Intuitive out-of-the-box user interfaces (UIs)*
* *Business process collaboration tools*
* *Data aggregation and syndication capabilities*
* *Granular access privileges*
* *Flexible data model and hierarchy management*
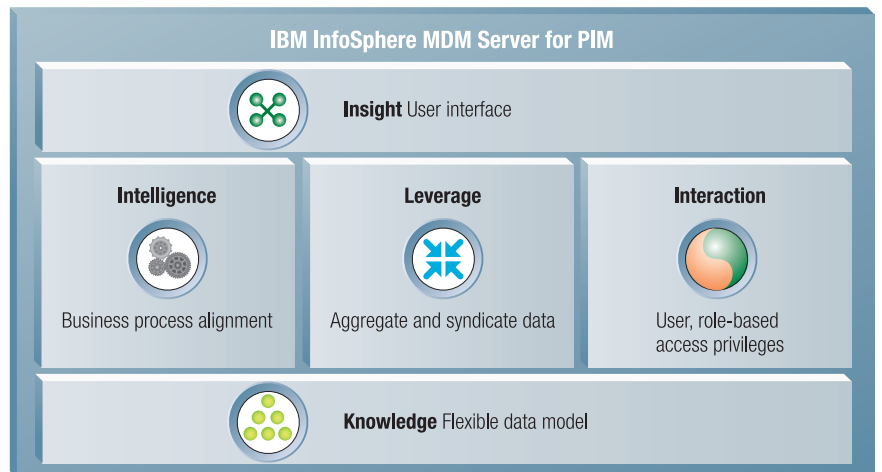* *Service Oriented Architecture (SOA) capabilities*

Figure 1: InfoSphere MDM Server for PIM combines a flexible data model with powerful features to enable business insights.

Developing a flexible data model

Just as no one business model fits every business within an industry, no one data model will fit every organization. Successful execution of a PIM strategy requires the ability to adapt as the organization changes over time and data model requirements evolve. The organization may grow organically into new product and service areas, or may need to integrate the systems, products and services of a merger or acquisition.

Organizations considering a PIM system must anticipate these demands and develop a system that can meet them quickly and with minimal expense. InfoSphere MDM Server for PIM fulfills these requirements by abstracting the underlying physical database representation from the data model. This separation delivers the data model flexibility that organizations demand while simultaneously allowing them to take advantage of the latest database technologies.

InfoSphere MDM Server for PIM offers several features that help organizations create data models that make intuitive sense to business end users—the key players in managing master product data. InfoSphere MDM Server for PIM includes native entities that would traditionally be found when managing product and services data, such as catalog, hierarchy, category and

Glossary of PIM terms

Data model: *A representation of business and data requirements, designed using catalogs, hierarchies and lookup tables. The fields within each are further defined using specifications (specs).*

Catalog: *A collection of items related to each other via a business context. Catalogs are containers for items and can be associated with any number of hierarchies. For example, the Spring Print Catalog is a collection of just the print catalog products from the spring collection. It could have its own hierarchy to organize the products within the print catalog and will have only the fields that apply to the print medium or channel.*

Hierarchy (or category hierarchy, category tree or taxonomy): *A hierarchy is comprised of categories and the relationships between them. Typically used to organize browsing or navigation, categories are like folders that can contain products or other categories.*

item. In addition, users can create and define entities for their specific needs as defined by business processes. For example, they may create a Spring Print Catalog comprising a limited set of products, a hierarchy specific to the print organization of the products and the data tailored for the print format. This flexible approach can translate into lower change management costs and encourages faster user adoption.

Finally, as business requirements change and grow, updating or adding to data models should not require large development efforts. InfoSphere MDM Server for PIM data models can be easily extended and modified compared to systems without a data model abstraction from the database.

IBM MDM Server for PIM includes features that address several segments of a PIM strategy, including catalog management, hierarchy management, category management, item management, location hierarchies and localization. These features allow information to be tailored for specific audiences and compiled logically to help enhance productivity and analysis.

Catalog management

A catalog holds a set of products or services, represented as items. Catalogs are also used to represent product offerings within a channel, to either a certain market or customer. They can present not just a specific set of products or services, but also encapsulate the entire experience, from browsing and organization via tailored hierarchies to additional required

fields and content or imaging tailored for that particular channel, market or customer (see Figure 2). Organizations may have multiple catalogs, depending on how their products and services are browsed and used and how closely related the products are.

Figure 2: A catalog holds a specific set of products or services, represented as items.

Catalogs are essential organizational tools, but businesses need to selectively give users access according to their job function, role or other business parameter. Without these tools, organizational productivity and security can be at risk.

The InfoSphere MDM Server for PIM security model allows filtering on multiple dimensions. With category-level security, users' default views can be set to their specific department or category, preventing them from viewing, altering or launching processes on departments or categories for which they have not been granted access.

InfoSphere MDM Server for PIM also allows system-level restriction of any field, helping businesses keep sensitive data secure. For example, visibility into sensitive fields, such as cost price, could be restricted to only the buyer who owns that product and finance personnel. To further improve security, organizations can assign the rights to edit a given field to a specific user or job role, and make those editing rights subject to a set of preconditions or actions as part of a larger business process.

Presenting information in a productive format is just as important as security and access control. InfoSphere MDM Server for PIM allows end users to see the information relevant to their job and function in a layout that is productive and meaningful to them. For example, organizations operating in

multiple countries, languages, locales and currencies can improve productivity by assigning users to a particular set of languages (users can also designate primary and secondary preferred languages). Users can then search, browse and view entirely in their language, currencies and units of measures, in addition to seeing tailored marketing messages for the products in their market.

Hierarchy management

In large enterprises, hierarchies suffer from the same symptoms and problems as products and services. There may be multiple hierarchies by which to organize and browse products and services, such as product type, an organizational hierarchy, a departmental hierarchy, a Web hierarchy, enterprise resource planning (ERP) hierarchies and other system hierarchies. Existing systems often manage just a fragment of a hierarchy, so compiling a complete picture is a manual exercise requiring significant reconciliation and data cleansing. Processes to maintain corporate-wide, global hierarchies often do not exist, much less systems that could represent a hierarchy in a visually appealing manner.

In InfoSphere MDM Server for PIM, hierarchies benefit from the same features and functions that apply to products and services. By supporting all data types for a category, all details describing a category can be captured. Just as products require different fields depending on type (a television might need

a "Screen Size" field while a radio needs "Number of Pre-set Stations"), so do categories (see Figure 3). Therefore, a single category can have fields that differ from other categories, applied according to the category type and using the same underlying spec construct as products and services.
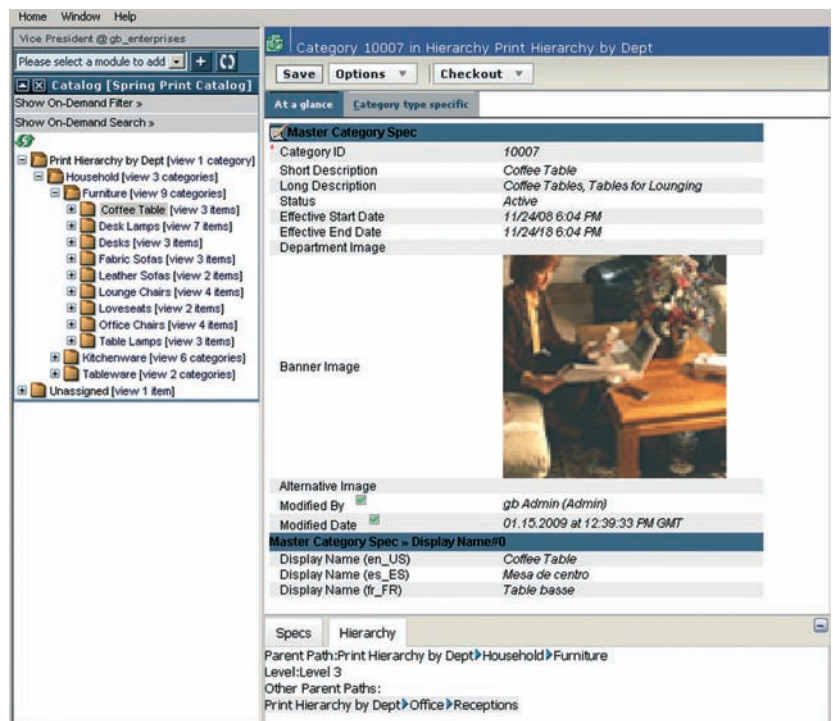

Figure 3: A hierarchy can contain the complete information of a category, including rich assets.

Categories can also participate in workflows. Through this extended category functionality, InfoSphere MDM Server for PIM helps organizations tailor their hierarchies to specific needs and manage them with the same ease and precision they experience when managing products and services.

Category management

Organizing and updating products and services is another important dimension of enterprise-wide information management. A user should be able to browse to a product or service via multiple routes and still get the same information. If a change is made to the product or service, it should be reflected everywhere that item appears.

Products and services may also need to be organized in several ways. For example, a country with only a subset of the products and services could have a very different browsing structure. Furthermore, within a particular market there could be different ways to organize the products depending on the channel to market, such as a separate organization for the Web site and the print catalog.

All of these processes are enabled (or hindered) by the category management tools available to an organization. Therefore, robust category management capabilities are vital to a successful PIM implementation. In InfoSphere MDM Server for PIM, products and services (modeled via catalogs) are independent of categories and hierarchies. This allows a product or service to be mapped to multiple categories within a given hierarchy or simultaneously be mapped to other categories in other hierarchies. Because catalogs and hierarchies are independent, the same hierarchy can be used to organize multiple sets of products or services.

Item management

The InfoSphere MDM Server for PIM item management functionality captures a 360-degree view of a product or service. Therefore, an item in a catalog captures all attributes of the product or service, such as the key go-to-market information, rich assets such as PDFs or images, data required to drive operational and supply chain systems, relationships to other products or services and mappings to categories in multiple hierarchies. Because these structures reflect the way individual organizations view their products and services, the resulting data model is closely aligned with the business.

In InfoSphere MDM Server for PIM, item attributes can come from two sources:

- *Catalog primary spec (global or common attributes): These are the attributes that all items belonging to a catalog must have. Typically, they tend to be attributes requiring global visibility, such as Name, Part Number, GTIN and Short Description. These attributes are defined as the catalog's primary spec and are associated with every item in the catalog.*

- *Item secondary spec (item category attributes): These are attributes that an item acquires by virtue of its relationship with a category. For example, all items under a category called "Televisions" may need to have an attribute called "Screen Size," but the Screen Size attribute may not have relevance for other categories. Such attributes are defined via specs that can be associated to a specific category within the category hierarchy.*

InfoSphere MDM Server for PIM can accommodate many attributes and handle a wide variety of data types including String, Number and Integer, Currencies, Lookup Tables, Dates and Times, Flags, Images, Documents and other binary assets. It also supports complex attribute structures, such as a hierarchy of attributes (i.e., an address composed of a number, street name, city, state and postcode) and multiple instances of attribute values (i.e., recurring field or groups of fields, such as a contact having multiple phone numbers).

Lookup tables are another useful InfoSphere MDM Server for PIM feature. With lookup tables, meaningful text can be displayed to users in drop-down menus while also allowing selection by an internal or external system code, or by some additional description. For example, users see "Contiguous U.S.A." in the drop-down menu, but can also select it by choosing "U.S.A. except Alaska and Hawaii" or "48 states," or by the ERP system code "48USA." When faced with larger tables, users can also search to find the appropriate value.

Location hierarchy management

Large manufacturers and retailers can gain competitive advantage by micro-merchandising and managing location-specific data more effectively. But location-specific data can multiply quickly, becoming a data management challenge. Consider managing 10 location-specific attributes across 100 locations for 20,000 items; this alone amounts to managing 20 million attributes!

InfoSphere MDM Server for PIM helps control this data explosion. Now, when a user defines an attribute of a product, service or supplier specific to the region, country, market/cluster or store level, all locations below that level inherit the attribute. For example, a materials price set at the market level will be inherited by every store in that market, and can be overridden for exceptions if necessary. This facilitates access to reliable information and helps dramatically reduce the data management maintenance burden.

Localization

For organizations operating in many countries, creating product and services offerings tailored to the local market is a critical requirement. This goes beyond creating country-specific catalogs to customizing the product information and selecting available products and services.

To support this customization, InfoSphere MDM Server for PIM stores all information in the Unicode character set, enabling the capture of information in any language. Information such as marketing or technical data may need to be altered for the local market, translated, reviewed and approved. InfoSphere MDM Server for PIM enables relevant fields to be designated as target market–specific, allowing them to contain an additional local market–specific value. It also contains country-specific formats and displays for numbers, currency and units of measures.

However, it is not just the information that needs to be managed in multiple languages and formats—the UI also needs to be available in the user's language. InfoSphere MDM Server for PIM native UI is presented in 11 global languages, and everything from the hierarchy used to browse the products and services to a field's label can be localized into multiple languages. Users can view data side by side in multiple languages to review or perform translations.

Integration

Data aggregation and syndication

A master data repository's value lies in its ability to integrate with other enterprise systems. InfoSphere MDM Server for PIM is architected to be easy to deploy in heterogeneous environments. It supports commonly used communication protocols, including MQ, Java™ Message Service (JMS), HTTP, FTP and SOAP, as well as multiple data formats including XML, CSV and Microsoft® Excel®. While supporting future requirements, this flexibility also helps ensure that InfoSphere MDM Server for PIM will have minimal impact on existing systems and, in most cases, will work with files already available.

In addition to integrating point-to-point with inbound and outbound source systems, InfoSphere MDM Server for PIM can integrate with middleware technologies from IBM and a variety of providers, such as Microsoft BizTalk®, SAP Exchange Infrastructure (SAP XI), TIBCO and Software AG webMethods.

InfoSphere MDM Server for PIM natively supports deltas for aggregation as well as syndication. It supports inbound and outbound deltas for items and categories, both at an entity level (i.e., receiving or sending data for only products that have changed) and at an attribute level (i.e., receiving or sending data for only the field that has changed within a product).

Many organizations require aggregations to initiate or perform part of a business process, and InfoSphere MDM Server for PIM accomplishes this for full or delta incoming data. It can also syndicate data as part of the business process to interact with target systems.

As with the other administration functionality, data aggregations and syndications can be configured via the administration UI. The consoles give an at-a-glance view of current activity, while wizards help to configure a new aggregation or syndication by guiding the administrator through tasks ranging from file transfer and field mappings to setting up a schedule.

Scheduler
Administrators can use the InfoSphere MDM Server for PIM platform's built-in scheduler to easily schedule recurring jobs. InfoSphere MDM Server for PIM also works with external schedulers that manage enterprise-wide job choreography. The scheduler console provides information on both ongoing and past activity, and allows users to inspect performance characteristics and logs.

SOA

InfoSphere MDM Server for PIM supports an SOA environment via inbound and outbound Web services. Different business functions can be offered as services to accept and respond to requests across a network or via the Web. These Web services can be written in the InfoSphere MDM Server for PIM scripting language or in Java.

Business process collaboration

Enabling collaboration in the creation and maintenance of the product information is a key function of a PIM system. InfoSphere MDM Server for PIM provides a comprehensive, out-of-the-box workflow capability that is highly scalable and configurable.

Enable faster product creations and updates

In addition to a 360-degree view of the product, InfoSphere MDM Server for PIM enables 360-degree collaboration on the product—bringing all parts of the organization into a single system with the comprehensiveness and checks and balances to help ensure speed, quality and accountability. Administrators can define as many workflows as necessary to represent the different business processes the system must support (see Figure 4).
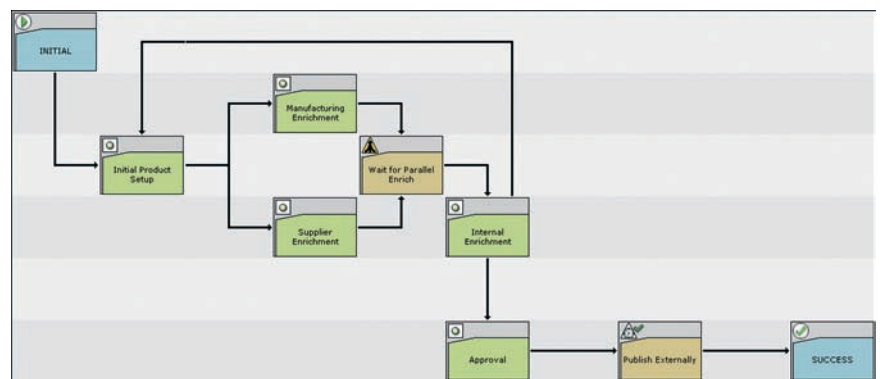

Figure 4: In InfoSphere MDM Server for PIM, a business process can include multiple workflows to promote efficiency and accountability.

Alerts can be used to drive users into the system, notifying them when a task awaits their attention. The system can also escalate tasks or warn the user if a task is not dealt with in a timely manner. Escalation can be configured as a step-level duration or deadline, one relative to the deadline for the process or a trigger for a "fast track" process managed by a team lead. When time is short or deadlines change, InfoSphere MDM Server for PIM allows a structured implementation of exceptional processes.

A core feature of the workflows is the parallel processing capability, which allows multiple users to work on different parts of the product at the same time. Working on the product in parallel can dramatically shorten product creation and update processes.

In addition, with InfoSphere MDM Server for PIM, a product can actually participate in multiple workflows at the same time. There can be as many workflows as there are independent functional areas; for example, an imaging update can happen while the product is being introduced into a new country.

Teaming

True 360-degree collaboration on a product requires additional teaming capabilities. InfoSphere MDM Server for PIM users can take ownership of a particular task—an essential capability when a team shares a common task list (see Figure 5). One key feature is the ability to create a team lead per process, giving them the ability to reassign tasks.
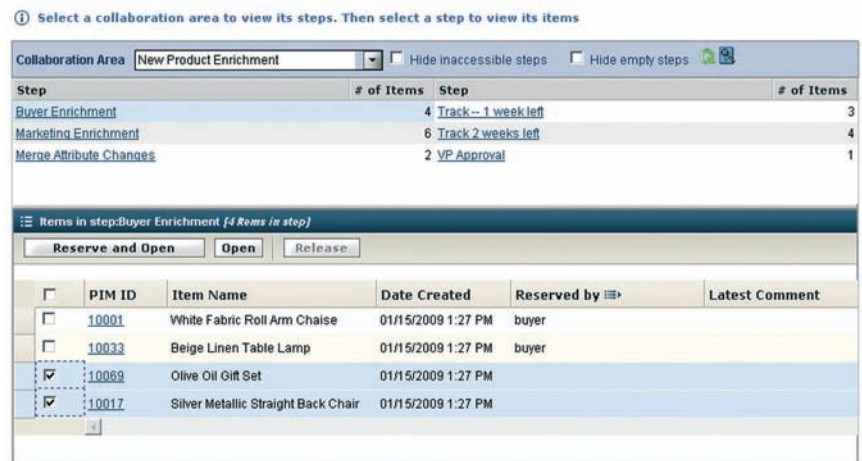

Figure 5: The collaboration features of InfoSphere MDM Server for PIM include task listings; in this screenshot, the user is taking ownership of two tasks.

Users can also approve or reject a portion of the work and send it for revision with comments. Data that is being authored and reviewed is restricted to the collaboration workspace until all approvals are complete—only then is it released to affect published, live product data.

Two other features necessary for effective teaming are auditing and visibility. Auditing provides accountability of who changed what, when and with what comments. The UI highlights the differences and how they were made. Visibility features track where the product is in the process, who has taken ownership of it and how long has it been there. For both of these features, InfoSphere MDM Server for PIM provides out-of-the-box functionality from a platform and end-user perspective.

Facilitate data quality

Workflows in InfoSphere MDM Server for PIM are highly integrated with its flexible and extensive data model, helping to ensure that users enter the correct data. Available business rules, including data types, validations, drop-down menus, units of measures, currencies and precisions, can be applied during the workflow process. Not only are users restricted to "what they need to see" and "how they need to see" the data to do their job, but they are further restricted to "what they need to do." Data can be organized to suit their job, while the validation rules can be configured to help ensure that a minimum data set is acquired and that it meets the business validations (see Figure 6).
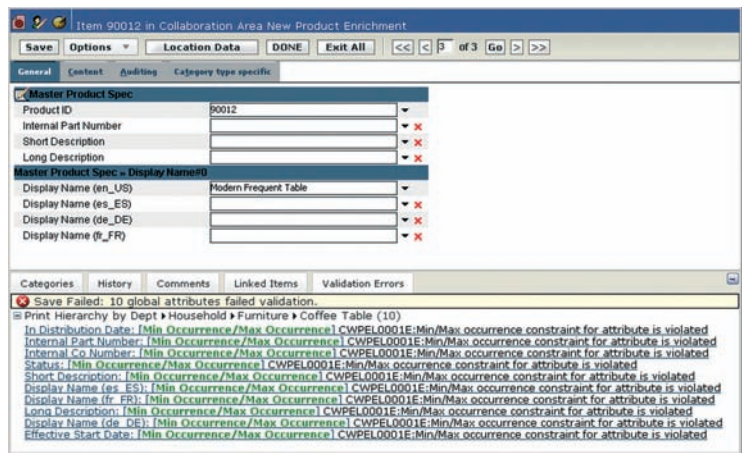

Figure 6: Validation rules can be applied to help ensure that acquired data meets business validations.

Deploy a comprehensive workflow platform

When configuring a workflow, different types of steps can be created; some require human action or attention (such as approval or edit steps) and some are automatic, triggering internal or external system actions. Using the InfoSphere MDM Server for PIM platform's comprehensive workflow capability, it is possible to publish state or data to external systems and provide visibility into an end-to-end intersystem process.

Data model flexibility is preserved and enhanced with the capability to alter business processes as the organizational needs or implementation footprint grows. Tightly integrating the workflow engine inside the PIM system allows it to accommodate the growth of the business into a new product type: New data requirements can be modeled, a role or workflow step can be introduced to manage new data requirements and the workflow can be linked to the data model for the new product type. Finally, users can be mapped to new roles, enabling them to create and manage the data for the new product type.

Workflows can also be applied to all other entities, because categories and their relationship and organization are integral parts of a PIM system. All of the capabilities described above for products exist for categories as well.

Custom tools

The InfoSphere MDM Server for PIM UI can be extended to adapt to an organization's business needs. All native business entities exposed through the standard UI are also exposed through application programming interfaces (APIs) so administrators can build custom UI screens, step-by-step process wizards and utilities.

User interfaces

Native user interface

InfoSphere MDM Server for PIM offers a thin-client UI based entirely on HTML and JavaScript™, which enables quick user access from anywhere in the world and helps businesses avoid the deployment pains of specialized clients and upgrades. Within its light footprint, InfoSphere MDM Server for PIM uses the latest Web technologies to deliver a sophisticated and rich user experience.

The out-of-the-box native UI is dynamic, adapting to the configurations in the data model, access controls and workflow, and incorporates user settings and preferences to help users reduce implementation time (see Figure 7).
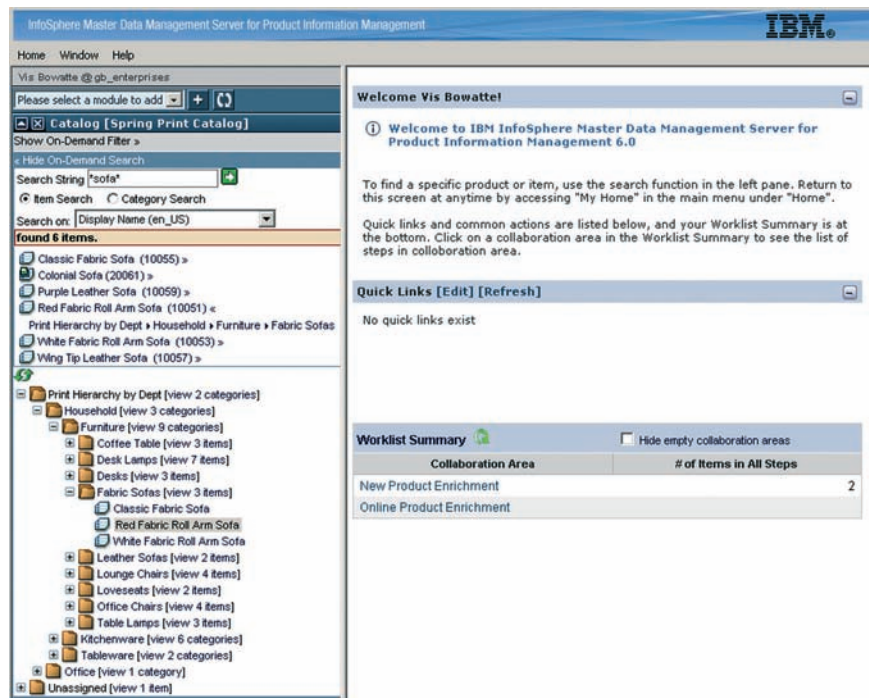
Figure 7: The InfoSphere MDM Server for PIM out-of-the-box user interface can be adapted to the workflow and user settings.

InfoSphere MDM Server for PIM Version 6.0 introduces several new screens that are also available as samples. Customers who wish to create their own user experience can do so by leveraging these and the comprehensive Java API.

The final UI will reflect your configuration of the business process, data model and validations. The ability to extensively configure InfoSphere MDM Server for PIM can help greatly accelerate the time to value of the PIM implementation.

IBM WebSphere Portal Server Integration

In addition to the native UI, InfoSphere MDM Server for PIM also integrates with IBM WebSphere® Portal Server. Sample portlets are available to include processes and data from InfoSphere MDM Server for PIM as part of a larger portal experience.

Access privileges and security

The InfoSphere MDM Server for PIM security model is many-to-many, allowing for very granular control as well as maximum reuse of access rights. On one side, a user can belong to multiple roles. Roles define system-level access for administration functions, which do not depend on the object or container involved. This helps make it easy to define very specific user roles, such as just reviewing system jobs and initiating or invoking predefined system jobs.

Objects that require different access for different user groups are divided into Access Control Groups (ACGs). The intersection of the ACG and the role defines the access privileges for that role. These are permissions such as the ability to view products, search products and perform imports. Because a user can belong to multiple roles, it is possible for a single user to derive view access to a set of products from a "view only" role, but gain access to initiate business processes via another "launch processes" role.

Programming logic

InfoSphere MDM Server for PIM can be extensively configured through programming, from business rules and validation rules to import, export and report jobs. Administrators can also present InfoSphere MDM Server for PIM functionality as Web services, making it easy to integrate the solution as part of an enterprise-wide SOA.

Scripting language

The InfoSphere MDM Server for PIM scripting language is very similar to JavaScript, which helps implementers quickly configure the solution. With a comprehensive library of more than 900 operations that provides access to all InfoSphere MDM Server for PIM objects, the scripting language is ideally suited for fast implementations.

Java API

In Version 6.0, InfoSphere MDM Server for PIM introduced a comprehensive Java API that exceeds the capabilities available via scripting. The Java APIs are composed of more than 1,000 operations over 230 interfaces in 30 components or modules. Developers can access all underlying objects via Java APIs, so business logic can be implemented in Java and any standard Java integrated development environment can be used for its development and testing. Additionally, this allows for reuse of any existing Java business logic.

Performance and scalability

Key features that power the high performance, scalability and reliability of InfoSphere MDM Server for PIM include:

- *Standards-based application composed of Java Platform, Enterprise Edition (Java EE) and Java Platform, Standard Edition (Java SE) components*
- *Support for application server clustering*
- *High user concurrency*
- *Large data and batch processing capacity*
- *Graphical user interface (GUI) optimized for the power user*

InfoSphere MDM Server for PIM supports both vertical and horizontal clustering. Because it is standards-based, it also enables deployment of various database optimizations and technologies.

Conclusion

Collaboration between enterprise departments, systems and employees has never been more important in this age of real-time, always-on communications and commerce. Without a single source of trusted data about products, services and customers, however, decision makers cannot be sure that the information they are using is the most up-to-date, accurate version.

InfoSphere MDM Server for PIM Version 6.0 offers several features that help organizations manage ever-changing enterprise data. Its comprehensive workflow capability helps accelerate the process of creating a new data model and business process, linking the two and mapping users to their roles in the process. InfoSphere MDM Server for PIM provides users with a 360-degree view of products, services and hierarchies, and supports enterprise-wide collaboration on them. The security model provides role-based, granular access with multiple dimensions of control. The user experience and all other managed information can be configured for both the user type and the target market—an especially valuable feature for companies operating in global markets.

Together, these capabilities help make InfoSphere MDM Server for PIM Version 6.0 a highly scalable and reliable product information management platform. It can be quickly adapted to your business, allowing you to represent, organize and manage business objects and deliver trusted information to all systems.

For more information

For more information about InfoSphere MDM Server for PIM Version 6.0, please contact your IBM representative or visit **ibm.com**/software/data/infosphere/ mdm_server_pim

Additionally, IBM Global Financing can tailor financing solutions to your specific IT needs. For more information on great rates, flexible payment plans and loans and asset buyback and disposal, visit **ibm.com**/financing

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