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WHITE PAPER

Managing Master Data for Business Performance Management: The Issues and Hyperion's Solution

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IDC OPINION

Master data management (MDM) is not a new problem. But the management of shared data (such as organizational, customer, product, supplier lists and hierarchies) is receiving renewed attention in the marketplace. New technology solutions are appearing as master data, reference data, or hierarchy management. Consider the following in assessing your organization's requirements:

- Master data management goes beyond data quality, but is affected by and can affect data quality. Ensure that standards and responsibilities for data quality are in place.
- There are multiple scenarios where master data management issues arise. Ensure that the scenarios present in your organization can be addressed by the specific solution you are evaluating.
- Focus on what processes will need to change as you move from managing master data via separate systems to managing master data via a central server. Ensure that you have addressed collaborative roles and responsibilities across lines of business and IT in support of this change. There is much work to be done, but the benefits to the organization can be significant.

IN THIS WHITE PAPER

This white paper defines master data management and explores the various scenarios where this issue is gaining attention both from IT and business managers. The challenge for organizations is to align business roles with responsibilities for management of specific master data domains, with IT providing the technical support for the underlying data resources and data models.

SITUATION OVERVIEW

What is Master Data and Why is it Important to Management?

Master data is data that is *shared* across systems (such as lists or hierarchies of customers, suppliers, accounts, or organizational units) and is used to classify and define transactional data. For example, a company may record the transaction of selling Product A to Customer X on 1/1/06 for $100. Taken as a whole, this is a single piece of transaction data. However, embedded in the transaction are various elements of master data – Product A and Customer X – that help define the transaction and can be used to "slice and dice" the data for reporting purposes.

Master data is driven by business changes, for example a company adds a new product line; in contrast, transaction data is a record of business events, such as the actual sales of the new product line. Master data is required both for transactional systems that run business operations as well as reporting and analytics systems that provide information about the business.

- *Transactional/Operational Systems:* For an operational system to be able to capture and update transactions, the referenced master data must already be in place. For example, an order detail record refers back to the overall order and the product ordered, via an identifier or key. The order record, in turn, would refer back to the customer.
  - Properly maintained master data on products and customers is required to ensure the integrity of such an order management system.
  - By extension, a customer's score based on value to the organization and/or risk of churn could be maintained as an attribute of the master data. This score could be read by the operational system to trigger a specific offer.
- *Reporting/Analytic Systems:* From a reporting or dimensional modeling perspective, master data refers to the dimensions or hierarchies around which metrics are organized or attributed, rather than the facts or measurements themselves. For example, revenues, costs, and profits are the facts, while time period, location, customer or supplier are dimensions. A consistent view of master data is required for each of the following and more:
  - Business performance management (BPM) reporting (e.g. variance from profit or revenue plan by product, customer, account). Since these reports are based on information from multiple systems, the master data must be consistent and up–to-date for the reporting to be accurate.
  - Reporting systems by their nature require complex aggregation schemes (hierarchies) to facilitate the various ways that companies analyze performance. These hierarchies will differ across reporting applications based on business purpose – budgeting and forecasting applications will have different hierarchy and master data needs than operational reporting

systems. A central point of control and visibility into master data hierarchies is crucial for consistent reporting and proper performance analysis.

- Compliance reporting which requires consistent master data (e.g. Basel II reports on operational risk).

Common Misconceptions about Master Data

We can better understand what master data is by stating what it is not. To this end, consider the following common misconceptions.

1. *Master data management is a new problem.*

   - No, it's been with us for a long time; but new initiatives leveraging enterprise-wide data for business performance management and compliance make it a priority today.

2. *Master data is equivalent to metadata.*

   - Not true; metadata is technical information about data (such as data types and field names), whereas master data is information that represents different views of the business (such as business entities or product lines). For example, companies with multiple implementations of the same ERP application have an issue with master data management, because *master data* is managed separately in each implementation. Yet, in such cases, the *metadata* across every instance of the application is the same.

3. *A data warehouse solves master data management issues.*

   - Not so; a data warehouse brings together *data* from multiple systems. But historical reporting may be problematic if the changes to master data over time (such as changes to an organizational or product hierarchy) are not managed as versions. Earlier states of the hierarchies may need to be recreated within a report. In addition, the traditional data warehouse represents one-way integration – bringing together data from multiple sources into a single target. A data warehouse is not set up for the bi-directional integration required of a master data management server, synchronizing master data changes back to the participating operational systems.

4. *Managing master data is equivalent to ensuring data quality.*

   - No, data quality is a necessary component of master data management, but master data management goes further. Managing master data centrally requires bringing in master data from multiple sources to a single point. Data quality procedures can be called in to eliminate duplicates and correct errors. But master data management and maintenance requires additional work. Should the product hierarchy be restructured? Should the sales territories be rearranged? Should we eliminate several products produced by subsidiaries because other products are close enough in function? These questions require collaborative decisions and go beyond data quality issues.

5. *Enterprise application suites solve the problem by providing a single point of master data management.*

   - The proliferation of ERP, CRM, and analytic systems require a dedicated management focus to standardize master data across applications. Even the broadest enterprise application suite cannot provide full coverage of master data, especially master data related to detailed industry-specific operations and analytics.

Why is Master Data Management Especially Important Now?

Managing shared master data is not a new problem, but there are several reasons why the issue has become more visible recently. A global organization is likely to confront several of the following scenarios:

- *Synchronizing master data across multiple instances of an enterprise application*: Global companies may have multiple implementations of the same enterprise application suite – requiring the single point of management for master data to occur outside the suite. Some organizations will look to the suite vendor to solve this problem via an added master data management layer, while other organizations will prefer a solution from an independent provider.

- *Coordinating master data management during an application migration:* With the increase in mergers and acquisitions (both among corporations generally and among enterprise application providers in particular), migration is once again becoming a significant concern. Since master or reference data is most often managed within an application (needed for the capturing of transactions), the transfer of master data between applications is required. But during the transition period, old and new systems operate in parallel, requiring synchronization of master data until the final cutover is achieved. Hence, the coordination of master data management across heterogeneous systems is needed.

- *Compliance and performance management reporting across multiple analytic systems:* For consistent reporting, master data management (often called *hierarchy management*) is required for coordinating and rationalizing disparate dimensional models or hierarchies across systems. This is critical for business performance management. New compliance initiatives, notably Sarbanes-Oxley 404 and Basel II reporting of operational risk, add even greater urgency to this requirement. Providing consistent master data and keeping an audit log of master data changes are critical for ensuring reporting integrity and accuracy across the organization.

These industry trends give new visibility to a long-standing problem: the need to manage master data across applications from a central point, rather than inside a specific application.

Processes and Requirements for Master Data Management

Master data management is a process, which can be supported by technology. Let's examine the tasks for properly managing and maintaining master data in order to assess the requirements for a master data management software solution.

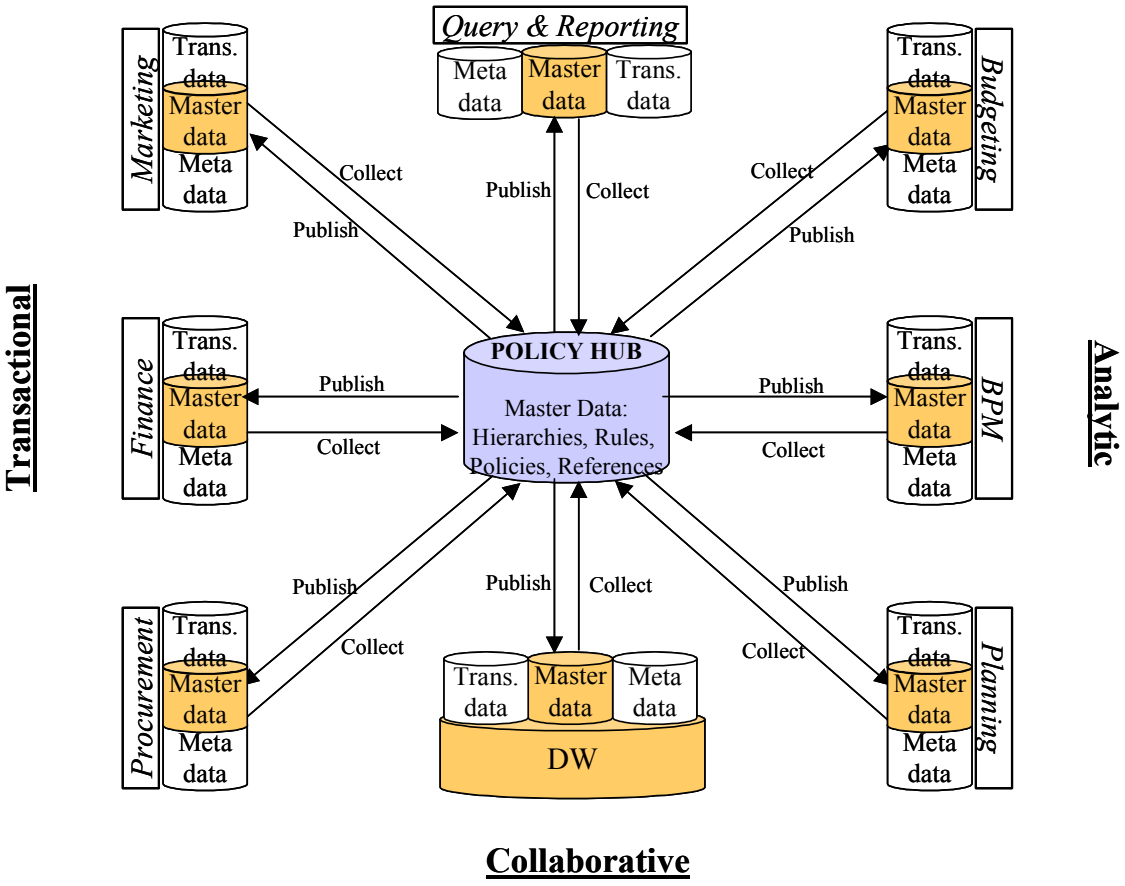
Managing Master Data via a Policy Hub

Figure 1 shows the master data management process graphically, expressed in terms of IDC's concept of a master data policy hub. The policy hub for master data management collects master data from participating analytical and transactional systems. Collaborative applications run on the central policy hub to coordinate decisions among team members on master data policies. The standard master data is published to each participating system (transactional and analytical) so that they are synchronized with the hub.

What is an example of a policy or business rule that can be managed as master data? Not all policies can be managed in this way, but some rules can be expressed as master data or attributes of master data. For example, a company needs to maintain a list of products or organizational units organized as a hierarchy. One policy defines which product or organizational unit belongs to which group within the hierarchy. These policies change over time, due to changes in the business such as a reorganization, a merger, or an acquisition. Another policy could assign one tax code to accounts below a specific level of the hierarchy and another tax code to accounts above this level. Such a policy can be defined and maintained as an attribute of the master data. Another example of a policy is allowing only certain levels within a hierarchy to be included in forecasting.

FIGURE 1

Managing Master Data via a Policy Hub



Source: IDC, 2005

Steps in the Process for Managing and Maintaining Master Data

Well-defined procedures for managing and maintaining master data are needed, following the flow depicted in Figure 1:

1. Assign business responsibility for each master data domain such as products, customers, suppliers, organizational structure. Taking responsibility is a continuing commitment for maintaining high quality master data for those systems that need access to this shared resource.

2. Extract master data for a domain from separate operational and reporting systems to a central server – a *policy hub* in IDC's terminology.

3. Apply data quality standards, such as de-duplication and matching of master data records, to get a clean set of master data for the domain.

4. Reconcile and rationalize the master data records. This process entails setting policies pertaining to an optimal product hierarchy, organizational structure, or preferred supplier list. The goal is to develop a canonical master data list for the domain.

5. Synchronize participating operational and reporting systems with the centrally managed, canonical master data. (In effect, this is the translation of the centrally managed policies into the "language" of each participating system to ensure consistency across systems.)

6. Monitor changes or updates to master data in each participating system. Then repeat the preceding steps for ongoing maintenance of master data. Over time, with the centralization of master data management responsibilities, the origination of master data changes moves from the participating systems to the master data management hub or server. This central resource serves as the ultimate system of record for enterprise master data.

Requirements for a Master Data Management Solution

Master data management software (either a generic platform for managing any type of master data or a domain-specific master data solution) must support or streamline each of these. The following capabilities or features correspond to the six steps of the master data management process:

1. Support for definition of roles with access rights enforced depending on the responsibilities assigned for that role in the master data management process.

2. ETL (extract-transform-load) capabilities for extracting master data/reference data files or tables from multiple sources and loading the data into the master data repository.

3. Data cleansing capabilities for de-duplication and matching of master data records.

4. A collaborative platform for coordinating decisions on master data reconciliation and rationalization. The platform should be supported by standards, if available, or via industry knowledge of a master data domain. An example is a standard product hierarchy for a particular industry.

5. Data synchronization and replication support for applying changes established in a central server to each consuming application. Incremental change support is important for performance reasons, especially where there are large master data sets and targets distributed across a wide area network.

6. Version control at the central policy hub combined with change monitoring across all of the participating systems. This is needed in order to track changes to master data over time. The central server must have the ability to recreate a prior state for historical reporting, as well as be able to support "what-if" modeling to project a contemplated future state.

Hyperion's Master Data Management Server

Having defined both business and IT requirements for managing master data, what does a commercial software solution built specifically to address MDM entail? Hyperion MDM Server is one of the commercially available products that enable organizations to automate the otherwise manual MDM process.

Hyperion MDM Server is a software application that acts as a central server (what IDC calls a "policy hub") for managing master data changes for various source systems including transactional and analytic applications as well as data warehouses and business performance management applications. It enables reconciliation and synchronization of master data across different target systems.

Hyperion MDM Server is open to supporting a wide range of both Hyperion and non-Hyperion source and target systems. In fact, as highlighted in the two case studies below, there is nothing inherent in the product to prevent it from 'communicating' with any other transactional or analytic applications, provided that a certain level of configuration is done at the point of implementation. The product enables the use of standards-based integration techniques using, for example, web services.

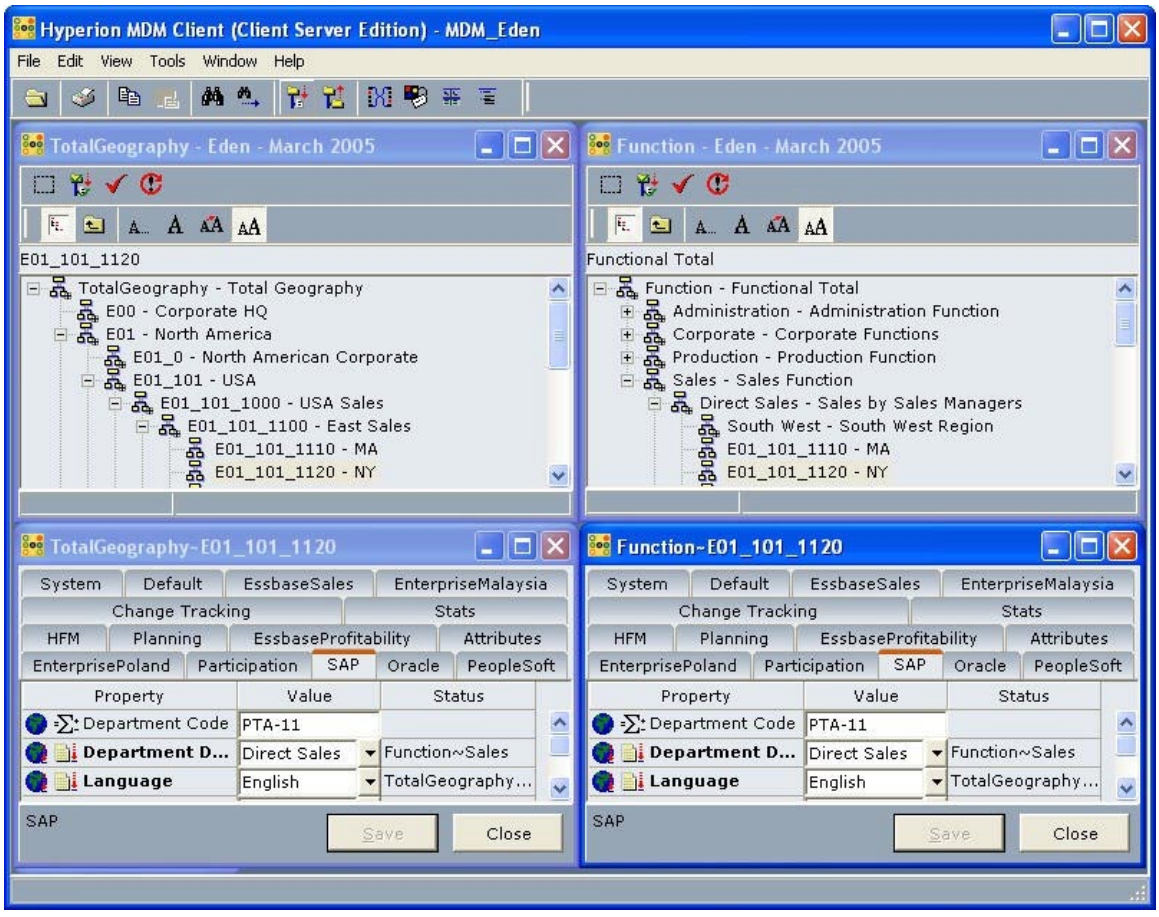
Hyperion MDM Server is available either as a full or thin client product that supports a multi-user collaborative environment for viewing, updating, and managing master data. Some of its primary features include:

- Auditing and version control using the built-in transaction log. This feature allows organizations to track all changes, retain historical, current, and planned versions of the master data and perform comparative analysis and rollbacks on this master data.
- Applying and enforcing business policies through a rules engine that includes a library of configurable master data rules.
- Support for enterprise-wide master data attributes. Hyperion MDM Server includes the ability to derive attributes based on inheritance and configurable calculations.
- Dimensional and full attribute support for Essbase cubes, including formulas, dynamic calculations, user-defined attributes, etc. In addition, Hyperion MDM Server's dimension management capabilities greatly simplify the implementation of drill-through to relational and hybrid analysis using Essbase Integration Services (EIS).
- Complete dimensional and master data support for Hyperion Financial Management (HFM), Hyperion Planning, Hyperion Strategic Finance, and Hyperion Performance Suite.

A sample screen view of Hyperion MDM Server is shown in Figure 2. Here we see an example of how Hyperion MDM Server supports alternate hierarchies – geographic (upper left window) and functional (upper right window). The two bottom windows show the attributes of the "NY" node in each hierarchy. The reason alternate hierarchies are often implemented is because each system may require its own reporting structure. For example, SAP may need a geographic version of the "business entity" hierarchy, while Oracle may require a functional one. Likewise, each system may need its own set of attributes, represented by the tabs in the bottom two windows.

FIGURE 2

Sample Screen View of Hyperion MDM



Note: Screen shot provided by Hyperion Solutions at the request of IDC. Data shown in the screen shot is sample data not specific to either case study example discussed in this paper.

Source: Hyperion Solutions, 2005

In evaluating the benefits and challenges associated with MDM, IDC conducted interviews with companies in financial services, transportation, high tech, consumer packaged goods, healthcare, energy and retail companies. In other words, MDM is not an industry specific issue, nor is it confined to the realm of the finance department. In fact, organizations from different industries and of different sizes all face similar business and IT issues regarding the ongoing management of master data.

Common characteristics and benefits of MDM projects included:

- Recognition of the MDM problem as an operational issue. For those questioning the need to automate the MDM process consider the following statistic at many organizations. It is common to associate master data changes with major organizational changes such as mergers and acquisitions or reorganizations. However, operational changes affecting master data occur on a daily basis. A common variable across all interviews was the large number of transactions performed in a MDM environment on a monthly basis. 2,000 - 20,000 change transactions were typical. The resulting complexity requires either dedicated IT and business staff resources or an automated solution. For most companies the former option is cost prohibitive.

- Enabling Business – IT collaboration in the MDM process. Most organizations had the goal of relieving IT from the role of sole MDM administrator. Instead, organizations relied on IT for initial implementation and on-going control, while enabling business users to perform master data management changes. The resulting collaboration between business and IT optimizes existing resources based on their respective strengths.

- Streamlining, synchronizing, and automating previously manual MDM processes. Organizations saw reductions in the cost of maintaining multiple repositories of master data and the centralization and simplification of management of business rules and hierarchies. Most frequently cited benefits included improved reporting accuracy and data integrity, faster reporting cycles, staff reallocation and establishment of controls for complying with industry regulations.

- Rapid return on investment. Interestingly, a common theme at most organizations was a lack of the requirement of a hard financial ROI calculation. One organization realized increased productivity that they quantified as a reduction of 2 full time employees – attributable to replacing a former manual process with an automated process for updating and synchronizing master data. Other organizations simply mentioned that "the benefits are so obvious that going through the effort of a formal ROI evaluation would be a waste of time."

The following sections highlight just two of such cases from National City Corporation and Mentor Graphics.

CASE STUDIES

National City Corporation

National City Corporation, headquartered in Cleveland, Ohio, is one of the nation's largest financial holding companies with assets of more than $139 billion. The company operates through an extensive banking network primarily in mid-western states. Its core businesses include commercial and retail banking, mortgage financing and servicing, consumer finance and asset management.

The finance department at National City serves the reporting and analytic needs of internal line of business managers. Some of the typical needs of this broad user base include general ledger reporting and profitability analysis. As in most organizations, National City has source and target applications from a number of software vendors as well as internally developed applications.

This heterogeneous applications environment, including Hyperion Essbase, Oracle Financial Services Application (OFSA) and GEAC General Ledger, is enhanced by having a central server for synchronizing and coordinating changes to master data initiated by business units or the finance department itself. Typical master data changes that occur on a regular basis include adding new cost centers, adding new accounts or properties, changing account hierarchy structures and updating Hyperion Essbase cube outlines.

Prior to the adoption of Hyperion MDM, administrators of each of the finance applications handled changes to master data individually. The process of managing master data included end users sending forms to any of the three application support groups. Inputting theses changes into three different systems was a duplication of effort. Sometimes the interpretation of the change request could lead to the request being input differently into each system.

In adopting Hyperion MDM, National City was looking for a solution to automate and synchronize the MDM process. However, it didn't just rely on the software. National City also instituted a new business process for managing master data. Today the company has a fixed monthly master data update/change schedule. If the treasury group needs to create a new GL account, the change is supplied to the Hyperion MDM administrators and loaded into the MDM server from which the change is propagated into target systems such as the GEAC GL, Oracle OFSA as well as Essbase cubes. Recently this functionality was extended to maintenance for Hyperion Reports.

Over the last two years National City has seen several strategic and tactical benefits from the MDM solution:

- Hyperion MDM has enabled National City to have more customized hierarchies, which enable more flexibility in reporting. Rebuilding of cubes with different hierarchies has been streamlined to the point where it's now possible to provide decision makers with multiple hierarchies for viewing their data.

- Centralization of the MDM process and elimination of redundant efforts has allowed the MDM administrative staff to nearly double the amount of changes that they are able to process.

- The history retained in the Hyperion MDM transaction log is used not only for managerial reporting, but also to support compliance with government regulations. For example, for the purposes of complying with Sarbanes-Oxley 404, auditors can rely on the MDM solution as one of the primary controls used for hierarchy management because National City keeps a running history of all master data changes.

- An additional benefit to automated MDM has been improved consistency in hierarchy management across multiple financial reporting systems.

- National City is also managing certain business policies and Essbase scripting via specific attributes (i.e. business rules and policies) attached to the various master data hierarchies. For example, assignment of tax types to account levels where everyone within a given group has a specific tax rate or everyone below a certain level on a hierarchy tree needs a specific tax property. These properties are then utilized by Essbase calc scripts to perform income tax calculations for reporting purposes.

Mentor Graphics

Mentor Graphics provides software and hardware design solutions in electronic design automation (EDA) that enable companies to develop electronic products. Headquartered in Wilsonville, Oregon, Mentor Graphics was founded in 1981. In 2004 the company reported revenues of over $700 million and currently employs approximately 3,850 people worldwide.

Like many organizations, Mentor Graphics has an applications architecture composed of solutions from several software vendors. Historically each of these applications maintained its own master data and the company lacked a consistent change management process for updating all its systems' master data in unison. Inconsistent and unsynchronized master data in turn affected consistency and timeliness of company-wide reporting and analytic applications.

To provide the necessary support to its decision makers throughout the company by eliminating master data inconsistencies, Mentor Graphics acquired Hyperion MDM Server. The company first deployed the MDM solution in sales management, for maintenance of sales channel and commissions business rules hierarchies. Following the successful initial project, Mentor Graphics expanded the types of master data managed within Hyperion MDM to cost center, statutory and management reporting, budget and forecasting and product hierarchies.

Today, Hyperion MDM is used as a centralized server to publish master data to several heterogeneous systems including Hyperion Essbase and analytic applications built on Essbase, SAP for sales order processing, Callidus for commission management, and an Oracle data warehouse. For example, when a new account manager is hired, Hyperion MDM is used to create a record of the new person. The

MDM administrator then exports or publishes all the master data associated with the new record to automatically update the master data of target systems such as SAP or Callidus.

As with most software solutions, automation is not completely "out-of-the-box." Mentor Graphics wrote certain ETL routines for integrating master data between the MDM and target applications. However, this was a one-time implementation step that provided subsequent automation of the process.

Mentor Graphics is also managing business rules and policies attached to the various master data hierarchies within Hyperion MDM. Examples of such policies include approval hierarchies for assigning specific managers to approve new forecasts or assignment of a finance manager to a specific cost center.

In addition to synchronizing master data among operational applications, Hyperion MDM streamlines the uniform and synchronized re-building of Essbase cubes for analytic applications. Mentor Graphics usually updates their Essbase cubes twice a day. However, it's not uncommon to update cubes every four hours during end of quarter periods. For example, if a cost center is linked to many hierarchies and is somehow altered, all hierarchies are updated simultaneously.

From a tactical perspective, Mentor Graphics has a single, central MDM hub. However, given the distributed nature of the organizations, there are regional MDM administrators in each of several geographical regions. In effect, the company does centralized management with localized administration without target system administrators having to worry about master data changes.

> "Hyperion MDM also serves an important part in a broader effort to maintain data quality by providing data validation rules," said Jan-Willem Beldman, head of analytic applications and data quality at Mentor Graphics. Beldman notes that "it's also a component that links applications, databases, ETL and data quality software."

In addition to streamlining the MDM process in support of ongoing reporting needs, Beldman also emphasizes the value that MDM brings to version control of various enterprise hierarchies. With Hyperion MDM, the company is able to store and view past, current and future (planned) hierarchical structures. This functionality allows decision makers to evaluate proposed cost center mergers, sales territory reassignments or other similar planning exercises.

CHALLENGES/OPPORTUNITIES

Master data management is a challenging, long-standing problem. But recent attention to business performance management and compliance represent a new opportunity to deal with the issue in a way that can improve both information accuracy and organizational agility.

The fact that multiple terms are used to describe the same problem (master data, reference data, hierarchies) does not help matters. But the first hurdle is getting the relevant stakeholders to understand the issues, whether they are on the business or

IT side. Then it's important for the team to recognize that addressing the problem requires attention to people and process before dealing with the technology. This was confirmed by each organization that IDC interviewed. After all, master data issues arose because there were divided responsibilities for managing information in each domain. These responsibilities must be clarified so that a new coordinated process can be established.

Technology then must support this process. At this early stage in the market for master data management solutions, generic platforms are beginning to emerge to address any and all master data domains. If the development of this market follows the normal pattern, vertical- or domain-specific aids (such as links to popular applications) will follow.

No dedicated MDM solution is available today that is complete in its ability to support all the steps of the process outlined in this paper. The organizations interviewed who had used the Razza Solutions technology that forms the basis of Hyperion's MDM Server needed to combine the MDM Server with other technologies, such as data quality, ETL, and scheduling. But each organization recognized benefits, providing a level of automation for time-consuming work that was formerly done manually. This record of success should provide encouragement to organizations seeking to tackle master data or hierarchy management issues.

CONCLUSION

Master data management (MDM) is not a new problem. But the management of shared data (such as organizational, customer, product, supplier lists and hierarchies) is receiving renewed attention in the marketplace. New technology solutions are appearing as master data, reference data, or hierarchy management. IDC interviews with organizations using Hyperion's master data management technology illustrate the fact that with proper planning and discipline significant progress can be made and measurable benefits achieved. This is an encouraging sign for Hyperion with the launch of its new MDM product and for organizations seeking to deal with this issue.