Mastering Master Data Management

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Despite vendor claims, master data management has more to do with governance, process, data quality, metadata management and stewardship than simply technology. Learn the definition of MDM, its role in enterprise information management and support for service-oriented architecture environments.
STRATEGIC PLANNING ASSUMPTION(S)

Through 2010, 70 percent of Fortune 1000 organizations will apply MDM programs to ensure the accuracy and integrity of commonly shared business information for compliance, operational efficiency and competitive differentiation purposes (0.7 probability).

Through 2010, organizations implementing both customer data integration and product information management MDM initiatives will link these efforts as part of an overall enterprise information management strategy (0.7 probability).

ANALYSIS

The problem of creating a common set of customer, product and supplier attributes to which the enterprise can agree has existed for decades. Most of the underlying issues have little to do with technology — they require organizational commitment and involve fundamental enterprise information management (EIM) principles.

The current emphasis on master data management (MDM), therefore, represents a new twist on an old problem. Yet, despite vendor promises, success in MDM is not solved with technology alone. Package solutions, which tout center-of-gravity or domain-specific remedies in customer data integration (CDI) or product information management (PIM), often lack subject area integration, or provide inadequate metadata management capabilities (as required for transparency during compliance and related data lineage processes). Nor are general-purpose MDM products (born out of the data-warehousing market), capable of addressing the scale and complexity of MDM issues in a bidirectional manner across the IT portfolio — from upstream applications to downstream applications.

Here, we describe the basics of MDM, discuss its role in EIM and provide guidance for targeting MDM efforts. In addition, we describe how MDM supports emerging trends, such as service-oriented architecture (SOA).

MDM Defined

Master data is the consistent and uniform set of identifiers and extended attributes that describe the core entities of the enterprise — and are used across multiple business processes. Some examples of core entities are: parties (customers, prospects, people, citizens, employees, vendors, suppliers or trading partners), places (locations, offices, regional alignments or geographies) and things (accounts, assets, policies, products or services). Groupings of master data include: organizational hierarchies, sales territories, product roll-ups, pricing lists, customer segmentations, preferred suppliers and so forth. Despite some claims, master data is not all your data — only the subset or finite list of elements required for sharing and standardization. Master data is infrequently changed and often referenced by a business process or event (see "Master Data Governorship Begins With a Reference Model").

Organizations use master data for consistency, simplification and uniformity of process, analysis and communication across the enterprise. Once implemented, master data moves the organization closer to long-sought objectives in data sharing within the application portfolio.

When organizations use master data at an enterprise level, the need for separate, departmentally maintained "versions of the truth" is abated. Thus, a master data program helps organizations break down operational barriers, thus enabling greater enterprise agility and simplifying integration activities. Furthermore, as master data sources mature within the enterprise as systems of record, organizations can begin to unravel the complex and brittle web of "spaghetti"
interfaces. Typically, the point-to-point connections between applications send and receive conflicting variations of the same class of enterprise information (such as different variations of product roll-ups, sales territories, organizational alignments, customer lists and so on).

MDM is a workflow-driven process in which business units and IT collaborate to harmonize, cleanse, publish and protect common information assets that must be shared across the enterprise. MDM ensures the consistency, accuracy, stewardship and accountability for the core information of the enterprise.

Organizations apply MDM to eliminate endless, time-consuming debates about "whose data is right" and "whose definition of sales will be used today," which can lead to poor decision making. Accordingly, we believe that, through 2010, 70 percent of Fortune 1000 organizations will use MDM as a disciplined process to achieve consistency of commonly shared business information for compliance, operational efficiency and competitive differentiation purposes (0.7 probability).

Success in MDM depends on data quality, governance, stewardship and change management. MDM is not a technology per se, nor is it a market. However, certain MDM functions can be enabled by technology. Organizations should first start their MDM efforts by securing the appropriate level of organizational commitment, which must outline business unit involvement and the shared accountabilities with the IT organization.

**Partnership Between the Business and IT Areas**

The business units typically fulfill a stewardship role, based on a workflow environment that includes reviews, approvals, development of standards, roll-ups, data quality and change management. The IT organization typically provides the enabling infrastructure for cleansing, storing, publishing and maintaining master data. Both groups must work together to achieve MDM program objectives.

**The MDM Process**

The process of developing and maintaining master data is a modeling, mapping, metadata and semantic reconciliation exercise. MDM merges and resolves conflicting data sources and establishes a trusted, authoritative source of reference for commonly used information assets.

Using the organization's enterprise data model as a jump-start, the scope of MDM includes the core set of subject area elements, maintained in a referenceable metadata repository. In addition, a standard set of services and actions for manipulating, changing and reusing these objects is developed as part of the MDM change management and governance process.

**Implementation Styles of MDM**

Master data can be stored in a number of ways and implemented following a range of architectural styles. As noted in "Learn the Four Styles of Customer Data Integration," these include the registry hub, coexistence hub or transaction hub, depending on the preferred method of persistence and level of performance required by the organization. Some sample names of persistence we've seen are: "product item master," "gold copy," "common business vocabulary" or "official hierarchy."

Several organizations are adopting single-subject-area approaches to MDM. For instance, an organization may use a PIM application to support MDM objectives for global data synchronization (GDS) or radio frequency identification (RFID) implementations. Another organization may use a CDI solution to support customer-centric or CRM integration objectives. These incremental efforts are important first steps. Accordingly, through 2010, 60 percent of
organizations implementing both CDI and PIM MDM initiatives will link these efforts as part of an overall EIM strategy (0.7 probability).

One other dimension is seen in customer implementations of MDM today — the use of MDM solutions operating as a system of record and a system of reference. When data is physically stored within and managed by the MDM solution, and all external systems subscribe to that data, the MDM solution is deployed as a system of record. If the physical record of the data is stored remotely, yet other systems still subscribe to it via the MDM solution (where the MDM solution is managing a metadata map to where the data resides), then the MDM solution is being implemented as a system of reference. In most implementations, we see a mixed approach — depending on the complexities relating to creation and governance of the data.

**Relationship to EIM**

The need for MDM is often identified within the enterprise information architecture (EIA) domain of an enterprise architecture (EA) initiative. The lack of consistent and accurate reference information is seen as a strategic barrier to enterprise agility, competitive differentiation and operational efficiency. Moreover, demands for the increased accountability and transparency of key enterprise information during the compliance process have accelerated interest in MDM.

MDM is a critical component within an organization's drive toward EIM (see "The Essential Building Blocks for Enterprise Information Management"). EIM serves as the operational arm of the EIA — implementing, in this case, the sharing objectives for MDM (see "Use Enterprise Information Architecture Techniques to Move to Information Management").

**Importance to SOA**

One of the first steps when creating service-oriented applications is aligning master data, reference data and metadata (see "SCM Vendors Support Master Data Management as a Precursor to SOA"). Without a focus on master data within the broader context of an EIM program, it becomes impossible to communicate information about a transaction, because there is no common understanding of basic business objects (for example, data definitions and connected business processes) to which the service or event refers. The standardization must go beyond simple syntax to a common understanding of the underlying semantics, location and context of the information that supports the service composite.

**MDM and XML**

MDM illustrates the growing importance of content convergence across structured and unstructured boundaries. For example, an organization's product item master (official product hierarchy) includes transactions and specifications from structured sources, such as databases and transaction systems, as well as unstructured sources, such as image files, text descriptions, document management systems and PDFs. Today, this presents challenges to data modelers and information architects who must develop unifying schemes for merging different content types using a combination of data modeling and taxonomy techniques. With XML's increasing adoption as the standard for information exchange, such barriers to content convergence can be mitigated. By applying XML, organizations are taking steps toward establishing models understood by multiple applications (see "Companies Should Align Their Structured and Unstructured Data").

Although XML may represent a promising way to represent and exchange schemas of master data objects, it cannot resolve underlying semantic issues. In certain domains, such as product data, there may be master data that is unstructured. But in many domains, master data remains
the purview of structured systems. As unstructured data is used to uniquely define and identify a master object, that unstructured data must become part of an MDM effort.

**Bottom Line**

Through MDM, organizations achieve consistency, accuracy and integrity of information assets in support of key initiatives, such as the successful migration toward an SOA environment. Enterprises must understand that master data can help break down operational silos, but successful MDM programs start with organizational commitment and shared accountabilities within the context of an overall EIM strategy.

**RECOMMENDED READING**

"Master Data Governorship Begins With a Reference Model"

"Learn the Four Styles of Customer Data Integration"

"The Essential Building Blocks for Enterprise Information Management"

"Use Enterprise Information Architecture Techniques to Move to Information Management"

"SCM Vendors Support Master Data Management as a Precursor to SOA"

"Companies Should Align Their Structured and Unstructured Data"

"Data Integration Is Key to Successful Service-Oriented Architecture Implementations"

"EIM Reference Architecture: An Essential Building Block for Enterprise Information Management"

"Creating the Single Customer View With Customer Data Integration"

**Acronym Key and Glossary Terms**

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<tr>
<th>Acronym</th>
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<tr>
<td>CDI</td>
<td>customer data integration</td>
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<tr>
<td>CRM</td>
<td>customer relationship management</td>
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<td>EA</td>
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<td>EIA</td>
<td>enterprise information architecture</td>
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<td>EIM</td>
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<td>GDS</td>
<td>global data synchronization</td>
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<td>MDM</td>
<td>master data management</td>
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<td>PIM</td>
<td>product information management</td>
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<td>RFID</td>
<td>radio frequency identification</td>
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<td>SOA</td>
<td>service-oriented architecture</td>
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<td>XML</td>
<td>Extensible Markup Language</td>
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