IBM Information Management software

Harnessing the power of master data

Contents

Executive summary

Business data is the single most valuable asset an organization possesses. Not all data, but the core reference data that describes the fundamental dimensions of your business—your products, your pricing and contracts, your customers and your suppliers. Collectively known as master data, it is the information that drives critical business decision making. Yet for all of its value, problems with master data plague businesses daily, whether caused by incomplete data, incorrect data, inconsistent data or simply inaccessible data.

Master data management (MDM) is the directive to collect and clean this essential business data, and to make it accessible to all data producers and consumers—not just within the enterprise, but throughout the value chain.

While nothing new, the master data crisis is brought under the lens of sharp corporate scrutiny because of the limiting effect it is having on organizations today. U.S. businesses spend more than US$600 billion annually trying to rectify data quality problems.[1] How many man-years of labor are wasted by manufacturers attempting to manually reconcile invoicing and discount discrepancies with their thousands of suppliers? How many millions of dollars are lost annually on mail and catalog campaigns that are incorrectly sent to the same people because duplicate records exist for these customers? How many billions of dollars will be spent this year on enterprise resource planning (ERP) consolidations because regional data does not reconcile at the global enterprise level?

Given the intense competitive pressure within every industry and shareholders' demands for improved return on investment (ROI), businesses simply cannot afford to lose time and money due to master data inefficiencies. MDM offers an improvement in master data correctness, consistency and accessibility that creates an opportunity for greater competitive advantage. Given the magnitude of the problem, MDM is not just a sound investment—it is an essential one.

Driving the need for master data management

The concept of the central management of master data, outside of business applications, is not new—organizations have been working at the problem for decades. But current market forces are driving the urgent need to improve on past efforts. These factors include:
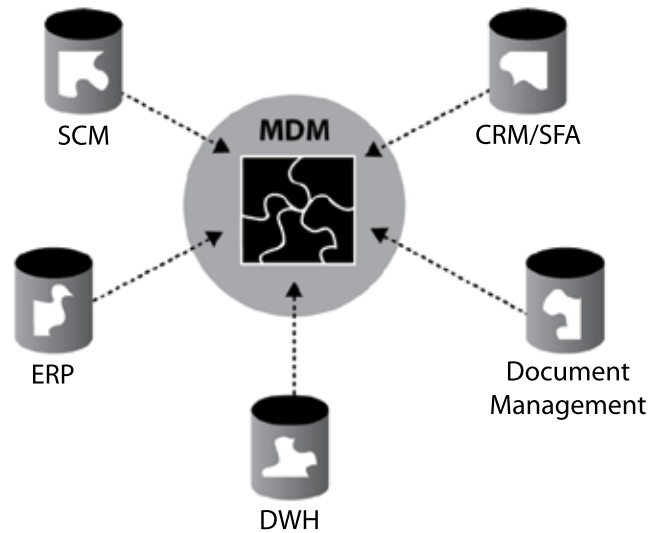
- *Value chain collaboration. Companies no longer exist as singular business entities. Throughout the supply chain, business data is exchanged as organizations strive to manage issues of common interest to suppliers, shippers, brokers, partners and other value chain members. This exchange requires accurate and consistent master data that is accessible to all parties.*

- *Moving toward a customer-centric business. Hammer and Champy first introduced the idea of restructuring business processes around a customer-centric view in 1993.[2] Major corporations are finally heeding this message as they realize that heightened customer service quality can provide a differentiating competitive edge. Reliable customer master data is necessary to achieve this holistic customer view.*

- *Portals and e-commerce sites. Whether used purely for information delivery or as an online sales channel, the Web has become the single greatest avenue of business data consumption. Furthermore, online demand continually pushes for faster information delivery. Without a centralized repository of master data tightly integrated with the corporate Web architecture, companies cannot meet the demand for accurate and timely information.*

- *Stricter regulatory compliance. Regardless of whether or not an organization's business information can be rolled up into a consistent, reliable summary that management can trust, executives are still held responsible. "I didn't know," is no longer a valid excuse. A master data management solution can provide the business information necessary to satisfy compliance reporting and answer questions posed by executives, regulators and shareholders.*

How did we get here?

Over the last 30 years, software has been developed or purchased at the departmental level to satisfy the specific requirements of individual business units. The data for these applications has likewise been stored at the department level, since the departments are each responsible for their own data and manage it locally within their systems.

The need to roll up departmental data in support of strategic decision making fueled the implementation of data warehouses and data marts. Yet despite this consolidation of cleansed and aggregated data, the source systems—that is, the systems of record where the data was managed on a daily basis—remained within the departmental applications. The executive level contributed to this data segregation problem by acting as its own department, complete with its own store of enriched, analytic data that did not tie back to any of the source systems from which it came.
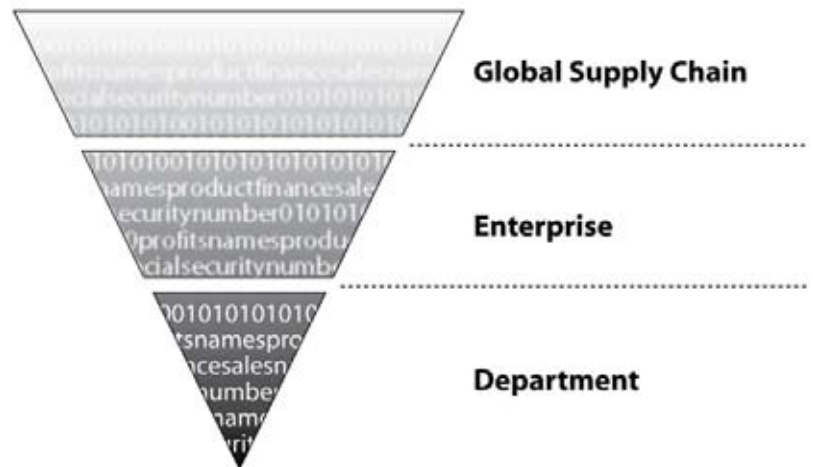
Figure 1: A master data management solution brings together disparate data—in both structured and unstructured formats—for a true 360° view.

Added to these isolated systems is all of the unstructured data floating around in spreadsheets, e-mails, documents and sticky-notes—none of it captured centrally and none associated with the relevant master records. (Merrill Lynch's Global Securities Research & Economics Group estimates that 80 percent of all business data is in unstructured formats.) Suddenly, what businesses have been touting as a 360° view of customers, products and value chain members is embarrassingly myopic.

Because of this, data may appear correct and sharply focused at the department level. But as one's view rises up through the enterprise, crossing national boundaries at the global level—where currencies, accounting standards and regulatory requirements all vary—inconsistencies and inaccuracies pile up until the picture is a muddled blur. While their departmental heads swear by the quality of the data in their care, senior executives are left with unreconciled reports and unverifiable summary statistics.

Figure 2: Business data may appear correct and sharply focused at a departmental level, but differences in categorization, currencies, accounting standards and more blur the overall picture.

MDM and service-oriented architecture

A service-oriented architecture (SOA) is an application framework where independent, stateless business functions accept requests for services across a network or the Web, and then respond to those requests using a standard interface. Maturing Internet messaging standards and ubiquitous access to the Web are quickly making SOA a reality. Market research firm The Radicati Group predicts that the Web services market will be worth US$6.2 billion by 2008.[3]

An MDM solution becomes a foundational component of SOA. Core business data gets bundled with the data management logic required to use that data. Together, they form information services available to requesting users, applications and portals. An information service could be as simple as *getGTINLocation*, which might return the current location of a particular pallet of products being shipped. Alternatively, a more sophisticated service such as *addCustomer* might be a composite of services used to set up a new customer account, complete with identifier, name, address, social security number and privacy preferences.

Whether or not SOA is a current objective, organizations can leverage the information services provided by MDM solutions should SOA become a priority.

Best practices for an MDM strategy

The successful industry-leading MDM initiatives have these best practices in common.

Deliver small, incremental projects that provide business value

Avoid the temptation to define an all-encompassing MDM plan that addresses all of your master data in one swoop. Start small, deliver business value sooner and then build on your success. Six months is a manageable length for project phases. Select your most critical business dimension to address first—for manufacturing and consumer packaged goods (CPG) companies, this might be products. For service-oriented companies, it might be customers. This approach will provide the greatest return in both the short term and the long term.

Avoid "pure infrastructure" project phases. By themselves they provide no benefit to the business. If infrastructure or middleware is required, bundle it into project phases that also deliver business value. This may require infrastructure to be assembled incrementally. Think out of the box to keep project lengths short and manageable at around six months.

Small, incremental deliverables do not imply a lack of vision or planning. Any MDM initiative will be a significant undertaking and should be part of a longer-term roadmap that identifies the subsequent phases and their targeted deliverables. Think big. Act small.

Identify which systems will become, or remain, systems of record

An MDM solution should provide reliable transaction processing, both in real time and in batch mode. This allows the solution to serve as the system of record (SOR) for business-critical master data. By shifting the job of managing an SOR from the application layer to a central MDM hub, consistent, reliable data becomes available to all applications that require it. Ideally, this is what an SOR should be—accessible.

Yet, for some applications, it may not be worth the effort to shift data management into the MDM hub. It may be more trouble than its worth to modify archaic legacy systems, particularly if your business lacks source code or programming resources. Many organizations possess such orphaned systems, and they are usually best left as is.

When designing an MDM architecture, evaluate all systems of record and prioritize them based on ease of modification and the value of the data they manage. Select the SORs to migrate into the MDM hub based on this analysis. Remember that project phases with practical, manageable scope are more valuable than a sweeping, grand vision that, in the end, cannot be achieved.

Master data should be stored in a usage-neutral form

One of the most compelling reasons to store master data in an MDM platform, rather than within business applications, is that the data within an application is inevitably in a format best suited for that application. That same data element may be stored in slightly different formats across a dozen applications, with no single data format being appropriate for the other eleven applications.

Master data should be stored in a usage-neutral format. If an application requires that format to be modified for its own purposes, the modification should occur within the application logic. This enables maximum usability for all applications.

View MDM as a lifestyle change rather than a crash diet

The path to master data management is unlike previous technology initiatives. While technology is a key enabler for MDM, it is only one piece of a larger picture. MDM is not a project with software that gets installed and then used. It is an entire paradigm shift in how a business views, values and manages its core business data.

Just as businesses are shifting their outward view from a "selling product" perspective to a "serve the customer" perspective, they likewise have to shift their inward view. When looking within the organization, the mindset needs to evolve from "these are the business tasks we perform" to "this is the business information we use and this is how we use it." Master data management is about taking a data-centric view of your company and harnessing the power that lies in your core business information.

Possibly the most critical component in a successful MDM initiative will be the redefinition of business processes around data stewardship and governance. Master data needs to be identified. Owners of every element and attribute need to be assigned. Workflow supporting stewardship and governance must be developed and implemented. Because of its far-reaching impact within an organization, an MDM initiative requires the highest levels of executive sponsorship and active involvement.

What to look for in an MDM solution

As demand for master data management grows, software vendors will be quick to position their products as either a total MDM solution or some significant part of said solution. Organizations need to beware of such vendor claims. An MDM solution requires a flexible architecture with the optimal set of components to complement the current application and technology footprint.

The short list below describes the functionality most important to expect when considering an MDM solution. No single product will likely have all of these capabilities, but how completely a solution architecture can meet this list is a good measure for relative comparison.

The ability to manage transactions in addition to data items, attributes and their relationships

An MDM solution should provide the ability to establish and reference data items, their attributes and their relationships with other data. But if the MDM hub is to serve as the system of record, it must also offer robust transactional capabilities, both in real time and in batch mode.

Information services that fit within an SOA framework

Data should be created, managed and accessed using intelligent information services that bundle data together with the appropriate data-handling logic. Some services will be fine-grained, low-level requests that affect a single data field, such as *increaseInventoryCount*. But also look for large-grained services such as *createNewAccount* made up of multiple finer-grained services. These will offer the greatest productivity, because they will provide more sophisticated functionality with greater ease.

An extensible data model

The benefits an MDM solution can provide are directly dependent on the extensibility of its data model. Master data in a large organization can become exceedingly complex. Because every department looks at this data and uses it in a different way, the data model must be able to reflect these differences in order to offer effective business support.

If the data model only supports one or a few dimensional hierarchies, departments will be shoe-horned into data hierarchies that do not accurately serve their needs. Multiple, extensible hierarchies help ensure that departments get the most value from master data. For example, the sales department might define a LOCATION hierarchy based on groupings of stores, which might graduate from the local level to the regional level; for example, Greater Boston to Eastern Massachusetts to New England to Northeast, depending on how sales managers are assigned. Marketing might want to define its LOCATION hierarchy based on media markets and their reach rather than store locations. Shipping might define its LOCATION hierarchy around customer locations, outlets, distribution centers and ports. Clearly one hierarchy will not apply across all divisions.

Other capabilities to look for in the MDM solution's data model include: the ability to define category- and relationship-specific attributes; code-driven tables that allow look-up values to change without requiring changes to the data model; and the ability to reuse and inherit data changes down through hierarchies.

Role-based attribute-level security

The only way to ensure ongoing data quality is to protect the data with fine-grained security. Read and write access should be definable to the attribute level, and permissions should be set based on roles that reflect the company's organizational model.

Attribute-level workflow that provides business process support

An MDM solution should support the workflow of data management. The tasks associated with data review, modification and signoff should be defined within the MDM platform and assigned to specific users. The sequencing, dependencies and routing of these tasks should also be captured in a way that provides easy monitoring of the tasks' progress and completion. Audit trail capabilities will help ensure accountability and safeguard long-term data quality.

Open interoperability

A master data management system is built on middleware, which provides the interconnectivity through which applications communicate. But middleware during the last two decades has evolved over two parallel, yet distinctly separate paths.

Large application suites and ERP systems represent the first path. These vendors built their products on proprietary middleware standards, saving their customers the need to integrate individual applications. In essence, they provided one-stop shopping. Any applications bought from these vendors would work together. The difficulty comes when businesses try to interface with applications outside these suites. The proprietary standards are not open and easily interoperable, and the required programming can be significant.

The second path, followed by some applications and middleware vendors including IBM, was to build products based on open, interoperable standards. While this is more challenging for the vendor, it offers the customer far greater flexibility when integrating disparate systems.

While the one-stop shopping approach to application integration is appealing under many circumstances, an MDM solution—by its very definition—must be able to communicate with many varied types of applications. This emphasizes the importance that any software considered in an MDM architecture be built upon open, interoperable standards.
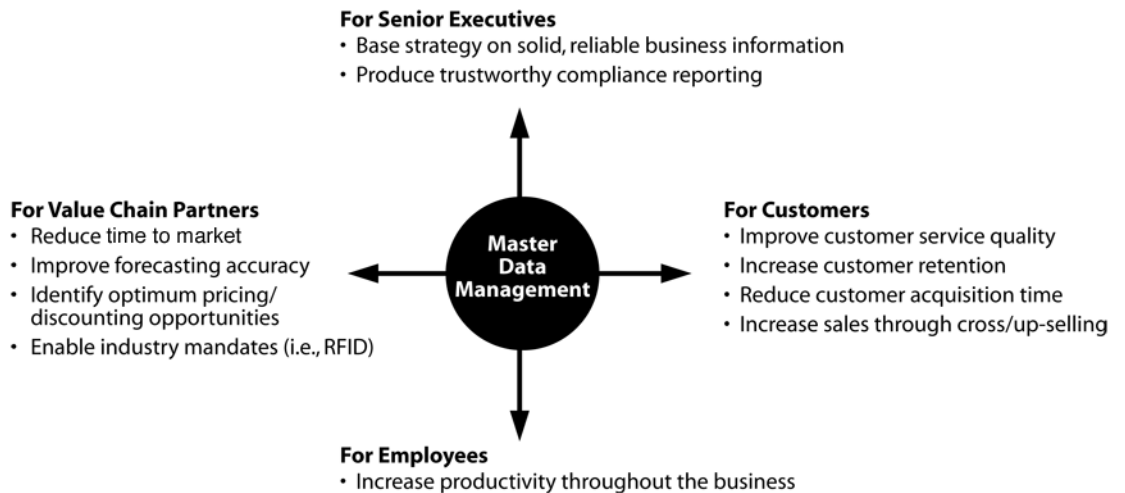
High-end scalability

Scalability is the growth capacity of a system. If a company's data volumes, transaction-processing rates and number of simultaneous users are modest and static, then most products should be able to meet those scalability requirements. But that is not the typical description of an MDM candidate. Global enterprises with immense amounts of master data, millions of records, tens to hundreds of client business applications and thousands to tens of thousands of users are more the norm.

Master data management is a large task. Smaller vendors with lesser-known products simply will not have the capability to support the capacities required. Look for an enterprise-level vendor with established reference accounts that approximate the size needed by your implementation.

What IBM MDM solutions can deliver

Master data management delivers value to all faces of the business. For value chain members, accurate and accessible data can reduce time to market, improve forecasting accuracy, identify optimum pricing and discount opportunities while leaving a company well positioned for possible industry mandates, such as radio frequency identification (RFID). Employees will benefit from productivity gains—they no longer need to manually hunt down and correct the voluminous data errors of the past. Customers will appreciate improved levels of service quality, which drive faster customer acquisition, increased sales through cross-selling and up-selling opportunities and long-term customer retention. Finally, executives will be able to base strategic decision making on solid, reliable information and satisfy compliance reporting with confidence.

Figure 3: Master Data Management delivers compelling benefits to every face of the business.

For Senior Executives
- Base strategy on solid, reliable business information
- Produce trustworthy compliance reporting

For Value Chain Partners
- Reduce time to market
- Improve forecasting accuracy
- Identify optimum pricing/ discounting opportunities
- Enable industry mandates (i.e., RFID)

Master Data Management

For Customers
- Improve customer service quality
- Increase customer retention
- Reduce customer acquisition time
- Increase sales through cross/up-selling

For Employees
- Increase productivity throughout the business

IBM MDM solutions deliver a broad range of capabilities:

- ***A framework of components maintains master data*** *as a "system of record" for the enterprise. Specific capabilities include the ability to author, manage and model different master data objects such as products, suppliers, customers, location, employees and material; the ability to capture changes or add new master data quickly, such as multichannel attributes, privacy preferences or events that can be made available across the enterprise and are not currently captured in enterprise applications.*

- ***Accurate, critical business information is available as a service*** *that can be used in the context of a business process at the right time by any application or process within the enterprise. Integration layers can allow data synchronization to and from all operational systems, including support for various styles of integration— such as synchronous, asynchronous, bulk load and others—as well as alignment of the latency for master data synchronization and replication with business requirements. This helps minimize disruption to the line-of-business (LOB) systems.*

- ***Support for a high-volume transaction environment*** *for real-time processing and large volume batch, as well as unit-of-work capabilities for the roll-back of changes for exception processing.*

- ***Semantic reconciliation capabilities*** *extract information from the data for analysis to match and reconcile master data entities such as customers, organizations and so on. This includes the ability to resolve suspects—automatically or manually— without the need for a common attribute key ,and also provide deterministic and probabilistic matching capabilities.*

- ***Master data quality is improved*** *through data standardization, data alignment, data cleansing and master data governance through data enrichment, quality rules and data transformation capabilities.*

- ***Flexible mapping capabilities*** *help model and manage master data cross-reference relationships and multiple taxonomies such as product classifications.*

- ***The ability to leverage unstructured information*** *is available from multiple sources to provide information about structured master data. This enables the on demand capability to create a "virtual <entity> record" that consists of structured and unstructured data from disparate data sources for authorized access by a user*

or application. In addition, the solutions provide mapping of Global Unique ID to system reference ID for master data–related data and directory services for the location of associated structured and unstructured data.

- ***Configurable event management and notification services*** *help generate alerts based on the occurrence of an event.*
- ***Real-time higher value analytic capabilities*** *help ensure the quality of master data. Specifically, they help identify key performance indicators for data quality measurements.*
- ***Governance capabilities*** *related to master data management help manage the access, entitlement and visibility of master data for security and privacy, and help maintain the history and traceability of master data.*

MDM is as much about business strategy as it is about software. MDM solutions span software, business processes, information stewardship, company governance and business transformation. Although an MDM solution makes it possible to manage master data in a holistic, comprehensive way, enterprises undertaking an MDM strategy also need to focus on the business processes that create and update master data and the company policies that govern the master data.

The promise of MDM is control over master information and business processes. Achieving that promise will require a cultural change to move to a holistic, service-oriented approach from a 30-year history of managing information and business processes in silos. The biggest challenges lie in changing the mindset of how to build applications and deliver solutions to business problems. It is critical to acknowledge that MDM is a journey, and that MDM spans software, business processes, information stewardship and business governance.

IBM provides a customer-proven strategy and set of best practices to help ensure a successful MDM realization. The IBM MDM strategy addresses executive sponsorship, alignment, data quality, knowledge transfer and

governance. It outlines a phased approach for organizational transformation, moving from the current state to an integrated end state in a prudent, controlled manner while delivering incremental business value and containing risk. This strategy has been developed in a flexible manner, based on best practices, so that an organization can assess and prioritize the overall focus of each implementation phase to drive the most business value.

The first step in the MDM journey is to identify and exploit the best opportunities for improving the business and to focus on one key area, such as product bundling or single customer view within the context of a well-defined business case and overarching MDM strategy. Ask you IBM representative to discuss how IBM can help ensure the success of you MDM journey.

For more information about IBM Master Data Management, please visit us on the Web at **ibm.com**/software /data/masterdata