Enterprise Master Data Management Trends and Solutions

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The idea of master data and master data management (MDM) evolved from the increased necessities of enterprises for a more efficient and effective data management, requiring unification and integration of enterprise-wide data from multiple systems. In order to do that, many companies are considering MDM solutions, which automate data integration across various systems and applications. The paper aims to establish the correct position and role of the MDM in the enterprise IT (Information Technology) systems and to identify the main approaches, trends and solutions in the emergent area of enterprise MDM.

1. MDM in the enterprise

According to Webopedia Computer Dictionary (http://www.webopedia.com) definition, **master data** (also called *reference data*), is any information that is considered to play a key role in the core operation of a business, typically shared by multiple users and groups across an organization and stored on different systems.

In other interpretation, master data is a set of core data elements – with their associated hierarchies, attributes, properties, and dimensions – such as customer, product, legal entity, employee, vendor, geographic location, etc., that span the enterprise IT systems and drive the business (Deloitte Development LLC, 2005). Master data may include data issued from facts that describe business entities as those already mentioned (clients and customers, employees, products, suppliers, etc.). This is particularly useful when multiple IT systems across a company identify those entities differently.

The Webopedia online encyclopedia defines **Master Data Management** (MDM), also called *Reference Data Management*, as "a type in IT that focuses on the management and interlinking of reference or master data that is shared by different systems and used by different groups within an organization." A MDM solution creates a system of record for every entity, so users have a single view that is more complete, accurate, and standardized than that of individual systems. In the same sense, a definition published by WhatIs.com states that "MDM is a comprehensive method of enabling an enterprise to link all of its critical data to one file, called a master file that provides a common point of reference."
(http://rss.techtarget.com/180.xml)

As Cohen(2006) remarks, MDM has to be considered as one of the six components of an effective enterprise data management (EDM) program, fitting together like a puzzle to help companies to take advantage of the latest technological innovations and more effectively manage their information (figure 1):
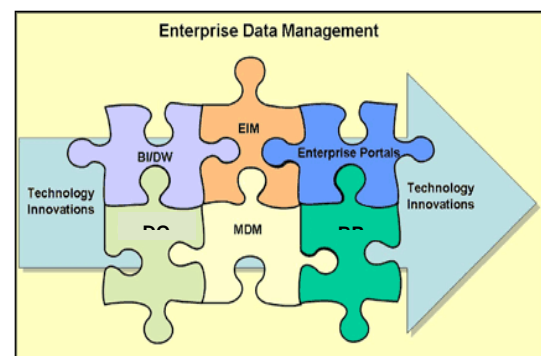

Fig.1. Components of the EDM program (Cohen,

1. **Enterprise information management** (EIM), considered as a sub-function of the overall EDM process, focussing mainly on strategy and governance.

2. **Business intelligence** (BI) and **data warehousing** (DW), considering that an effective EDM program should have a comprehensive BI/DW strategy that takes into account how information is collected and used enterprise-wide - and how these activities might change over time.

3. **Enterprise portals** as a way to increase the likelihood that people who need information are able to get it when they need it.

4. **Master data management** (MDM),

viewed as the process of helping a company to standardize the definition and attributes of all of its critical data elements to create a common point of reference enterprise wide.

5. **Business performance management** (BPM), as the process of monitoring, managing and increasing business performance.

6. **Data quality management** (DQM), considered as the process of significantly improving the accuracy, consistency, correctness, completeness and relevance of corporate data.

As Loshin(2006) points out, „as opposed to being a technology or a shrink-wrapped product, MDM is comprised of a mixture of business applications, methods and tools. These aspects can implement the policies, procedures and infrastructure that support the capture, integration, and subsequent shared use of accurate, timely, consistent and complete master data".

In a synthetic view, governance drives the actions and quality requirements for a successful MDM deployment (figure 2).
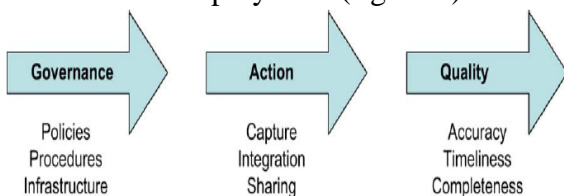

Fig.2. Towards a successful MDM deployment

Considering the main topic of the actual paper, the consequence for the IT architects of the enterprise is that they have to identify and promote new tools and technologies in order to integrate MDM and other components of effective EDM programs.

2. Trends in enterprise MDM

As Philip Russom (2006) remarks, trends unique to the first decade of the new millennium have brought MDM to the forefront:

• **Technology Trends.** As an integration practice, MDM is late to the data integration frenzy of this decade, yet still part of it. For many technical users, MDM is an extension of other growing practices, like DW, BI, DQM, and metadata management.

• **Business Trends.** MDM can be a useful component in the quick-but-critical integra-

tion of customers, financials, and products demanded of a merger, acquisition, or corporate reorganization.

• **MDM Trends.** Although MDM has long existed in a few isolated silo applications, companies now practice it in more silos and with more connections among silos. Forward-looking companies even practice enterprise MDM, with a broad scope across many applications and businesses. As with many data management practices, the general trend in MDM is toward broader and better integrated enterprise scope.

In a more recent column, Philip Russom observes that for many people in IT, this decade is all about integration (Russom, 2007).

Based on MDM's intersection with other practices and technologies, in order to establish the position of MDM inside the integration process technologies and trends, Russom (2007) offers some arguments too:

• **Data integration is booming this decade. T**his is partly driven by the "do more with less" mantra of the current economy, because data integration helps to get more out of preexisting applications and databases.

• **Integration is more likely than migration and consolidation.** IT managers would like to reduce the number of redundant applications and databases for better data visibility and less administrative cost, based on approaches like migration, consolidation, or integration. Russom points out that integration wins, because it's cheap, fast, and nonintrusive, compared to migration and consolidation, which are time-consuming, expensive, and disruptive. As a viable integration alternative for these cases, MDM has already proven itself in the forms of CDI (customer data integration) and PIM (product information management).

• **Virtualization is on the rise, and data virtualization is a subset of this trend.** Federated databases and virtual EII (Enterprise Information Integration) have gained ground this decade; data virtualization also affects MDM, which can be federated or virtual. Even so, MDM can also be physical (where data is copied among persistent data stores) or a hybrid of physical and virtual.

• **Many companies are still on a quest for a single view of customers and products.** Master data management is one way to achieve a single view, which explains why MDM is sometimes a component of CDI or PIM. Obviously, DW intersects with MDM, because both seek to provide "a single version of the truth."

3. Enterprise MDM Approaches and Solutions

On the emergent market of MDM solutions, we may identify approaches and offers of various types.

1. Analysing the impact of different approaches, Hagenau(2007) points out that, currently, there are two competing approaches to MDM:

• Infrastructure-Driven MDM**. Many MDM solutions today are infrastructure-driven, taking a bottom-up, enterprise-wide approach to data management, seeking to consolidate all of the enterprise's data into a single, literal data store or federated model that can be accessed through a variety of transactional interfaces. When completed, the infrastructure-driven approach to MDM provides a great potential benefit - a single, atomic data store that eliminates confusion caused by different, duplicate representations of the same record across multiple systems.**

• Solutions-Driven MDM**. Their goal is to gain the highest levels of data accuracy across applications but, unlike the infrastructure-driven MDM, to do so in a more cost-effective, nondisruptive manner. Solutions-driven MDM seeks to only integrate the data needed to meet the needs of an individual project and incrementally enhance the data hub on an as-needed basis as business usage expands. Typically, this approach does not attempt to physically consolidate the data, but instead creates a reference index and leaves the data where it is.**

2. Concerning the various type of existent MDM solutions, a first classfication can be made, according to Russom (2006), based on the fact that they are built into or closely associated with a larger application, or they span multiple applications.Considering the MDM solutions and the flow of enterprise data (figure 3), they fall into three broad categories:

• **Operational MDM.** Upstream in the general flow of data, one or more MDM solutions are built into and/or used to integrate operational applications: ERP, CRM, SCM, and so on. These applications and their business processes support transactions and sometimes operate in real time (OLTP), so operational MDM must, too.

• **Analytic MDM.** Downstream in the data flow, DW has long involved some form of MDM. Entity definitions change often due to data discovery, analytic business modeling, and other iterative practices. Analytic MDM is also seen in practices that resemble DW, like customer data integration (CDI) and financial performance management (FPM).
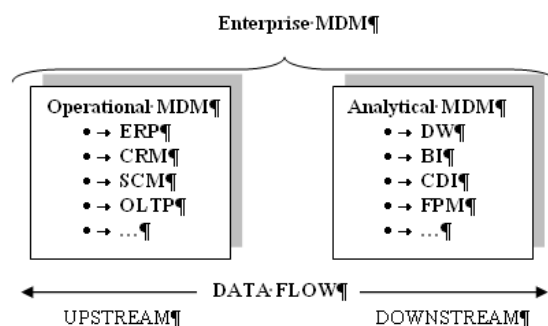

Fig.3.·MDM·solutions·and·the·enterprise·data·flow¶

• **Enterprise MDM.** Today, MDM is practiced mostly in isolated silos or with a short list of applications that don't step beyond the bounds of either operational MDM or analytic MDM. However, some organizations have moved to the next level with enterprise MDM, which is an autonomous infrastructure that can integrate master data across multiple IT systems and businesses.

3. Considering the vendor category, Russom (2007) identifies MDM solutions comming from:

• Platform vendors (such as IBM, HP);

• Application vendors (such asPeopleSoft, SAP);

-      Integration vendors (such asAscential - an IBM company, Informatica, Kalido);
-      System integrators (such as BearingPoint, Cap Gemini, Wipro).

Pointing oat that the list of vendors of different types is even more large than it, we include some concrete references to only one of above mentionned vendors: **SAP**, considering that its offers best reflects the tendencies of MDM solutions providers.

First of all we may mention **SAP Master Data Management (SAP MDM),** one of the component of the wellknown platform **SAP NetWeaver** (Woods & Word, 2004).

Delivered as a general-purpose one, the SAP NetWeaver platform includes along with components such as SAP Enterprise Portal, SAP Business Intelligence, etc. the **SAP Master Data Management** (SAP MDM), as the foundation for providing harmonized, consistent information to heterogeneous applications across the enterprise.

As another offer of the same producer, we may mention the **Collaborative Master Data Management** (CMDM). The CMDM product will collect and integrate data from SAP and non-SAP systems and applications so that an enterprise using CMDM will be able to obtain a single view of data, even if that data is classified differently in different systems.

(http://www.sap.com/company/press/press.asp?pressid=1411)

4. Conclusion

As a conclusion, according to Philip Russom (2007), we may predict the evolution of MDM: "Today, master data management is applied to the master data of a specific business entity, usually customer or product data. As this trend wends its way, the challenge for data professionals is to develop a strategy that addresses both isolated pockets of MDM today (for customer and product data) and broader enterprise use tomorrow (as MDM is applied to employee, supplier, and other business entities)."

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