

Win in the flat world

Implementing Federated Data Domains

– Madhukar

Abstract

In Financial Services Institutions it is often common that Lines of Business are interested to know the Customer's complete portfolio including the Products, Offers and Customers Interactions. Customer, Product and Location are primarily considered as key data domains (entity types) for multi domain master data management solution. This paper briefly explains the key data domains based on the Customer, Product, and Vendor. This paper also focuses about Federated Data Domains and factors involved in implementing them as part of an overall MDM solution. IBM WCC / MDM Server product supports implementation of federated style of the solution deployment. A case study on IBM WCC platform is explained to drive the idea of an integrated MDM solution involving Customers, Accounts and Federated data domains like Offers and Customer Interactions History.



Background

IT revolution in the 80's and the 90's most of the organizations focus was to implement an ERP system to streamline the production processes and to reduce cost and improve customer satisfaction. In late 90's CRM has been a buzz word to increase customer retention, improve customer satisfaction and to increase revenue. As time progressed, because of competitiveness, growth, mergers and acquisitions, multi geographical foot print organizations have developed and grown multiple data silos. These silos being the enablers in the respective geographies/ departments are not fulfilling the organization goals anymore to capture untargeted markets and to be more competitive to be positioned as leaders.

For instance a company sells a digital electronic camera to a customer in San Jose, California. The company records the customer and product information in the ERP system local to USA. The same customer also buys a digital home theatre system in Tokyo airport at a duty free shop for a lesser price. Since the company maintains the different ERP / booking systems across geographies, the company does not know that customer has bought two products. Often there needs to be a manual effort to know this kind of information. This information if known easily leads to cross selling some new products which would interest this customer. This is a very common problem / challenge being faced by many large companies across industry sector. To address this issue, a concept – Customer Data Integration (CDI) has evolved over past few years to integrate Customer data in the organization to consolidate into a common repository. The same issue with customer existed in the few companies who lacked the insight in the Products master, products to customer relationships etc. Product Information Management (PIM) addresses this issue to consolidate multiple product data sources into one single repository.

Over a period of time the CDI and PIM concepts have matured into an advanced subject called Master Data Management (MDM). MDM addresses the maintenance of various key Master Data entities in any organization – customer, product, account, vendor etc. MDM is the system which consolidates and delivers services for all the systems in the organization via SOA.

Master Data Domains

The key data domains for various organizations are Customer, Products, Locations, Suppliers, Employees, and Patients based on the Industry Type. To achieve the business goals and to solve the complex IT problems the organization need to build a Repository to have the golden copy of the data.

Third generation MDM solution is specific to the Data domains like Customer, Product in different solution bundle. Over a period of time, the MDM has evolved into the co-existence of the data domains in the same product suite due to the shared Entities across data domains. For instance IBM MDM Server v8.0 has the Product and Customer data domains sharing the data model and services. There are various entities that are common to Party and Product which makes this happen (see the picture below). Party as an entity is the Person or Organization to whom the products or services are made. For a bank the Person can be an individual having a Checking account. An Organization can be a small business Customer having few deposit or loan accounts with the bank

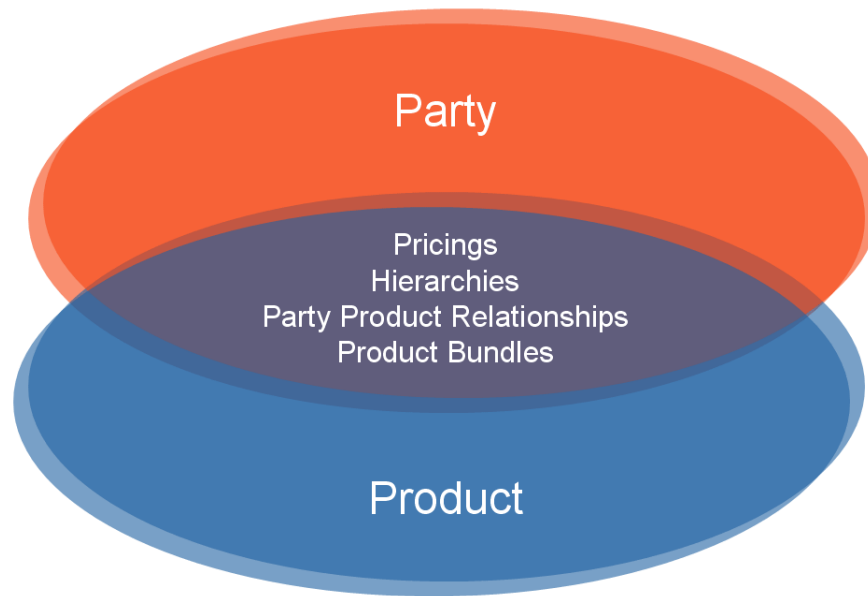


Figure 1 – Party and Product Master Data Domains

Key data domains

Customer Data Integration

CDI is perhaps most popular domain for MDM to consolidate the Customer data (CDI). CDI is the process of consolidating the customer data from all available data sources into one master copy of record. CDI can be called most rewarding and also among difficult MDM initiatives. Lack of strong data governance policy, lack of common data security policy, resistance to change among business users are few of the reasons which make the CDI initiatives difficult

Product Information Management

An organization needs to maintain Master Data on the base product, add-on features and each of the thousands of permutations and combinations. By this way you can manage the inventories, prices, discount policies, product profitability etc... PIM enables Product Development and Management, as it gives a complete view of the product portfolio.

Vendor Information Management

After Customer, this domain has most direct influence on organization commercials. Most of the CDI principles and benefits also apply on VIM. VIM enables you to

- Maintain blacklisting of vendors,
- Negotiate better deals as Vendor Data consolidation gives the true relationship value
- Consolidated Billing and Payments
- Standard contractual and legal agreements etc.

Parts Information Management

This is one level down from the Product Information Management. This domain is not much different from the way you do Product Information Management. Parts information Management domain is very closely linked with the production process.

Federated Data Domains

Each functional area of an organization possesses its own view of key entity data — whether customers, products, suppliers, locations, materials, assets, charts of accounts, employees... Based on the key entity i.e., Customer, Supplier etc required for an organization the federated data domain can be created. Federated data by definition means to store the key data in a physically distributed way to segregate the functionally distinct entities and to improve scalability and performance. The federated data creates a requirement to have a strong internal synchronization of the data between the various federated systems.

The Federated Data Domain typically follows a hub and spoke architecture with the key domain data at the center of the hub and the Customer related referential data in the spokes. For instance the Customer data like Name, Address, Location, Accounts are stored in the central hub. Whereas the offers made to the customer, the Interaction History etc are stored in the spokes. For instance, in a bank having huge data volumes of the below key entities – Customer, Address, Offers and Customer Interaction History (Service Requests, Calls). The key entities are accumulated because of the various mergers and acquisitions made and need to be consolidated. The nucleus for all the above entities being the Customer data; the other key entities like Offers and Interactions only store their relationship with the Customer Data in their respective systems. This being the situation, decoupling the Offers / Interaction specific data and federate them into separate components is the best approach to build an MDM solution.

Services and Data Federation

Typically any organization looking to implement an MDM solution has multiple data silos addressing various functionalities. MDM road map or blue print definition includes making MDM as the System of Record and retiring the existing legacy systems on a phased approach. During the MDM blueprint definition one of the key criteria is define the data and services federation coming out of the existing applications till the MDM becomes the Golden Copy of the record.

Data federation by the definition means that the enterprise data is present in different application databases and available for enterprise information integration through the services offered by the application. The data can be inquired, persisted and made available to the entire enterprise by Services and this is called as Services federation. The federated services make the enterprise information integrated seamlessly and in real time and near real time mode. In the picture below, the enterprise data is present across various in house applications like CRM, ERP etc. The common data for these applications for instance is the Customer demographics, address, identification, location and other customer related data. In the current world without MDM, the data is duplicated across all these system. With the introduction of MDM, the customer data is

authored, maintained and archived in MDM and serviced to all the Users across Business Units

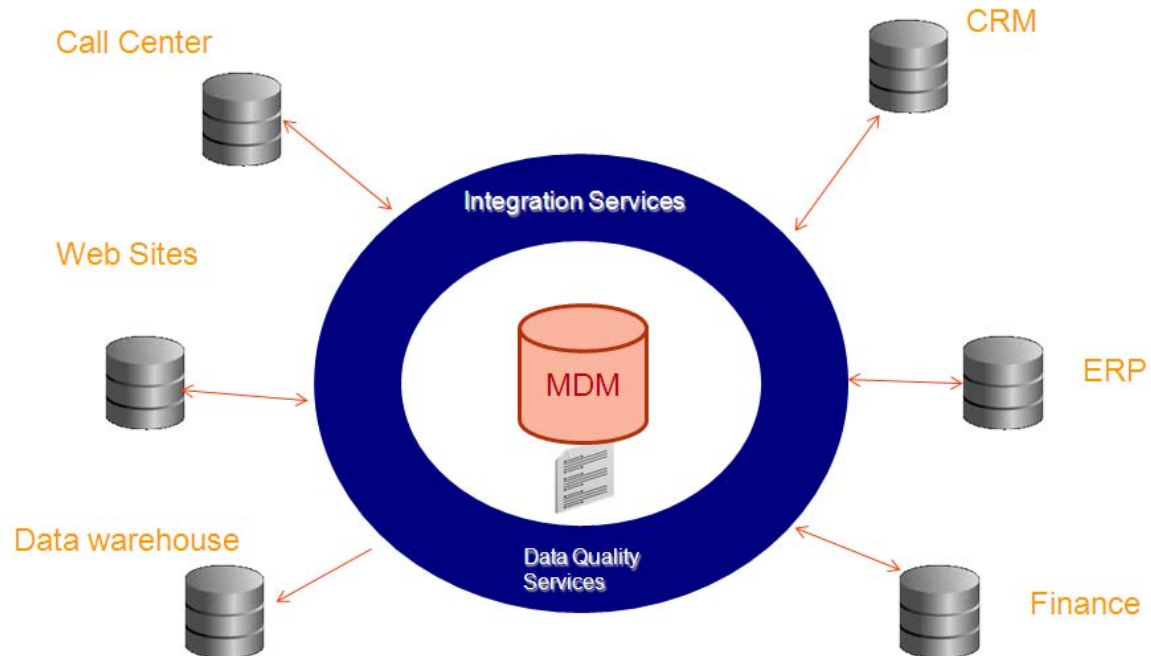


Figure 2 – Data Integration with Federation MDM

Implementation Guidelines

Data Structures and Data Volumes

The data structures in the source systems to be migrated to MDM have very little in common for instance Party data is the only common data for maintaining Offers, Alerts, and Interaction History for a given Customer. Volume of the data is also a key factor to federate the data in the MDM solution. If the volume of the data is in terms of millions of records then it's always recommended to go towards a federated approach to achieve higher performance

Performance and Scalability Requirements

Higher performance required – for instance to generate a 360 degree Customer dashboard in 150 ms. time frame. If the data model and services are federated, it's easier to create views from multiple systems not draining one system's resources. High Scalability is required due to market consolidation - major acquisitions / mergers. Addition of a new channel to the system also will increase the data and services volume and hence higher scalability is required

System Availability 24X7

High Performance and Availability can be achieved by implementing a clustering/load balancing at the distributed servers layer or at the database layer. It is Business as Usual for all the clients as the failover mechanism makes adjustments to the distributed traffic with advanced tools like 3DNS/BIGIP and failover/load balance clustering techniques. This is explained with the below example

Let us take a company X is implementing a complex MDM solution in North America. As per the requirement, there will be 24X7 HTTP traffic to the MDM instance and the application should be highly performing and available round the clock. To accommodate the regular maintenance schedules and failover cases, two sites should be planned to accommodate a HOT-HOT environment to accommodate the traffic requirements. Site A and Site B should have the Database instances with the same replica. With various products like IBM Q-REP, the database will be kept in sync at Microsecond latency. Site A and B should have clustered instances of the Distributed servers hosting the application and load balanced via 3DNS/BIGIP. If Site A goes down for any reason, the failover programs shall transparently failover the distributed traffic from Site A to Site B. Till the time, Site A comes back up Site B shall take the entire load. Usually, the time to failover is less than 5 minutes because of the level of the automation involved.

Simpler System Maintenance and Deployment capabilities

De-coupling of the existing systems is required as they serve different channels / LOB s Each federated component serves unique set of functionality The Federated system can be easily maintained without causing major Failed Customer Interactions. For instance a federated component can be maintained during night time while other components are still running.

Challenges, Solutions and Business Benefits of implementing Federated Data Domains

Challenge	Solution
Continuous Synchronization of the Hub and the Federated domains is always required to get a correct view of the data.	Application and Database graphical monitoring dashboards for monitoring the synchronization processes to accelerate issues resolution to remove bottlenecks
SLA s for Online and Near Real Time processes are critical for the success of the MDM to derive best Data Quality	Best in class infrastructure and sizing including clustering at Application Server and Database level to be implemented
One time data load - Data Quality Issues	Effective Mapping Tools and templates with mock data load early in the project implementation stages
Maintenance of the Legacy SOR systems till the acceptance of Federated MDM solution as the Single SOR for the organization	Effective co-ordination and communication between Legacy SOR and the Federated MDM teams is required throughout the project life cycles
Change Management / Training	Change Management/ Training needs to be done to Data Stewards, Business Users and to be driven by the Project sponsor and System Integrator

Benefits

- Single version of the Customer data can be viewed easily and relatively quickly
- Highly reliable and scalable SOR system which serves all the LOB s and Channels in the organization
- Increased sales revenues due to more cross sell and up sell Opportunities
- Lower TCO due to lesser maintenance costs as the existing SOR s will slowly retire
- Increased Customer Satisfaction and Retention

Case Study

Offers are proposals to a Customer to provide products / services at specific rates and terms. A major North American Bank currently stores Offers across multiple data silos based on various business rules. The bank wants to consolidate the Offers stored across the silos to a single Source of Record (SOR) system. The new SOR system shall be the only source of system that stores, retrieves, updates and archives Offers for all the Lines Of Business(LOB) / Channels including Banking Centers, Online banking, E-Commerce, IVR, ATM. These offers are made based on customer behavior, preferences and their account relationships with the bank. The Hub can interact with multiple other internal and external systems like authorization, authentication services, external credit bureaus like Dun & Bradstreet, Equifax etc

Refer figure 3 below for the pictorial representation of the case study. "Offers" is one of the spokes in the Federated MDM solution implemented at a large North America based bank. The core Customer data like profile, accounts, identity, address etc are stored in the central hub whereas the spokes are components like Offers, Alerts, Interaction History, Leads and referrals. To elaborate further, the common thread between the hub and the federated components is the Common Customer Id. The Offers solution for instance stores the Offers to the Customer relationships for building a 360 degree view of the customer. Other than this common attribute, the Offers federated data domain is the master copy of all the Offers in the bank. The Offers solution stores the Offers, Offers to Customer relationships, the products offered, Offer history. Offers history is later on sent to a downstream analytical system for pattern generation and management reporting. In case of a Customer combine or separate happens in the Customer Hub, an asynchronous message is sent to the Offers federated component to synchronize the Offers to Customer relationships to keep the data in sync.

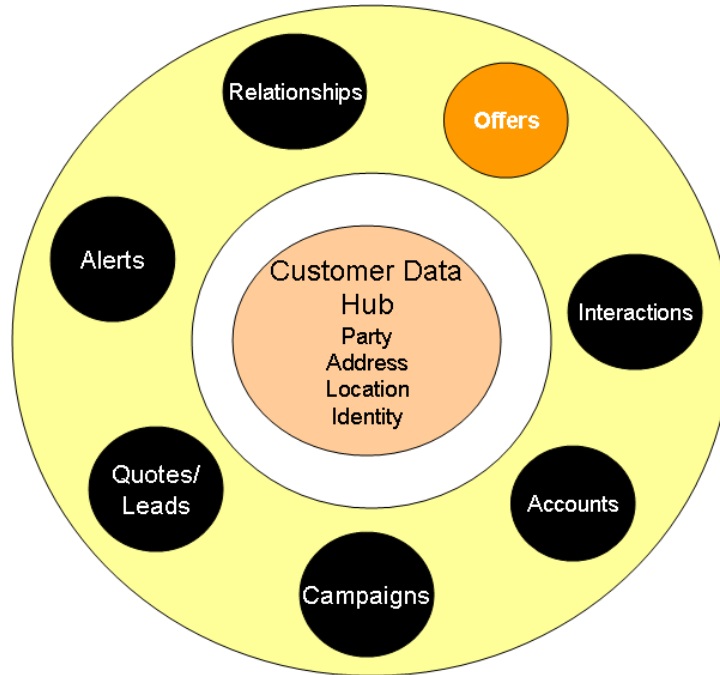


Figure 3 – Federated MDM Solution depiction

Requirements and Solution

Category	Requirement	Solution
Data	Ability to store all the Offers made to Customers of the bank.	Involves Federated Data Model based on the IBM Web sphere Customer Center v6.5 (WCC) data model with the Offers specific data structures to be able to store Offers
Business Services	Ability to provide web services to Create, Update, Retrieve and Fetch (based on the Customer id)	Leveraged WCC OOTB services to create the Extensions and Additions and deliver Custom Web Services – Create, Update, Retrieve, Fetch Offer services.
	Ability to provide Data stewardship services like Customer Combines, Separates for refreshing the Offer relations to the Customer Ids	Custom Data Stewardship services to be able to view Offers tied to Party data

Analytics	Ability to send the Offer and History data to Analytical systems for analyzing the Customer patterns of accepting / rejecting Offers	Daily extracts to Analytical and Letter systems
Reporting/Data stewardship	Performance Logging and Reporting metrics	WCC Performance Logging enabled for reporting the web services performance.
	24/7 Monitoring of the Application health Data stewardship Tools	Customer UI dashboards for monitoring and data stewardship activities
Miscellaneous	Ability to handle transactions at the rate of 500 Transactions per Second for a business day for 24/7 traffic with millisecond SLA s for Web Services	Two Physical Sites with Load Balancing and Site Failover / Disaster Recovery strategies
	Load Balancing and Site Failover requirements to be able to service the clients 24/7	Reduce TCO by consolidating the Offers into a single SOR system.
	A scalable solution for future Offer volumes serving multiple Lines Of Business (LOB) and Channels to cross sell / up sell the offers	

Benefits

- Consolidated data enables quicker sales and marketing turn around times
- Fast performing SOA web services resulting in increased productivity
- Analyze the consumer pattern analysis through intelligent analytics
- Ability to monitor the Application health through intelligent and real time monitoring dashboards
- Enhanced application maintenance and scalable, reliable catering to future needs

Conclusion

Managing the federated data domains like Offers, Interactions which are linked to the Master Data Domains on the same platform will provide increased business value to overall Master Data Management solution. A federated component to store Offers based on IBM WCC product can be implemented to deliver a flexible, scalable and reliable CDI solution to be able to be the System of Record.

About the Author

Madhukar is a Senior Consultant providing end to end Solutions in Customer Relationship Management (CRM) and Master Data Management (MDM) areas for various Fortune 500 clients. He has led a few green field implementations of CRM solutions for various clients in Banking, Retail and Education verticals. Leveraging a strong CRM knowledge base, Madhukar has also been working on Customer Data Integration / Master Data Management Solutions for Banking and Financial Services Institutions. Prior to Joining Infosys, Madhu has worked on hard core ERP and CRM product development as a Software Engineer and a Lead Programmer.

Madhu holds a Bachelors degree in Electronics and Instrumentation Engineering and a Masters Degree in Software Systems.

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