

Achieve and maintain a single version of truth across the enterprise

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IBM **Information Management** software

InfoSphere™ MDM Server v8 functional whitepaper

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Introduction

Leading organizations today are undertaking initiatives to break down information silos and gain control of their most important and commonly-shared enterprise information assets, or master data. The category of solutions deployed to achieve and maintain this single version of truth of master data across the enterprise is known as master data management (MDM). MDM solutions are designed to manage master data, which includes information about an organization's customers, products and accounts, throughout operational transactions and maintain a single operational view, which serves as the system of record for this data.

MDM solutions are integrated with existing operational systems through business services (or Web services). This integration enables the applications to benefit from sharing a complete understanding of master data and business processes to improve their effectiveness (for example, by providing better service to high-value customers or bundling products and accounts to deliver more attractive offerings). Because of their high level of integration, MDM solutions are important strategic investments that organizations must evaluate thoroughly in order to receive the highest possible return on investment (ROI). The most common and effective approach to MDM is to implement a neutral, service-oriented master data hub that persists the authoritative customer, product or account record in a database. In addition to a database or repository and a robust data model spanning multiple types of master data, the most effective master data hubs also deliver key components including:

- *Business Services designed to provide real-time access to master data in context of business processes*
- *Business Rules which can be configured to enforce policy on the treatment of master data*
- *Data Quality to maintain the integrity of master data*
- *Security to regulate user access to master data*
- *Integration elements for rapid implementation into existing environments and 3rd party tools*
- *User Interfaces for maintenance and administration of master data*

Organizations embarking on the journey of MDM not only evaluate technological elements, but also compare solutions based on the suitability of the product against the following decision-making criteria:

Service oriented architecture (SOA)

A MDM solution must contain data and business level services that are designed for consumption by business applications and integration technologies. Most often, MDM services are invisible to the user and must be able to be customized, extended and consolidated into composite business processes. Organizations can significantly reduce MDM and SOA implementation time as well as increase IT flexibility when implementing MDM with pre-built services.

Neutrality

A MDM solution must be business-process neutral. It is designed to be a common infrastructure component that is accessed by multiple business applications; therefore, it cannot have business processes that are specific to any one application. This is a common reason that organizations do not select MDM solutions offered by application vendors. In reality, those vendors are offering an application database with limited application-programming interfaces (APIs) and business function that is designed from the point of view of a application system user (for example, a call-center representative). The most effective MDM solutions are process neutral and manage business processes that are common to multiple business applications.

Performance and scalability

MDM solutions are placed at the center of organizations' operational transactions and can represent a single point of failure for master data. Obviously, these solutions need to perform well and scale to meet the requirements of large organizations, which often exceed hundreds of thousands of transactions per hour and demand sub-second response times.

Extensibility

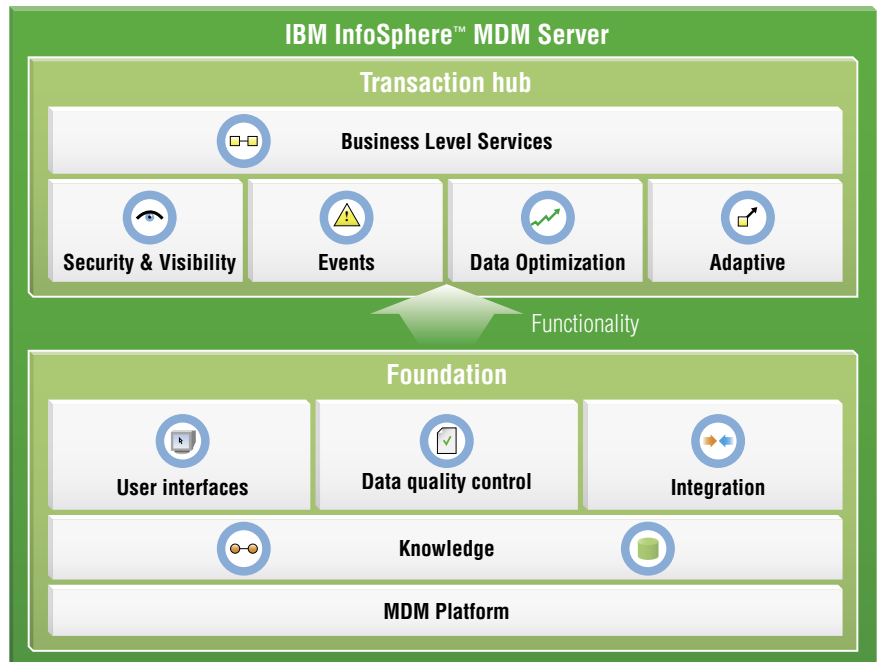
MDM solutions must be extensible to allow for customization and extension without changing the core product, because each business environment is unique. This allows organizations to benefit from the MDM solution's ongoing product road map, while still being able to configure the product to meet their specific needs. It is important that MDM solutions be able to support extensions and customizations being built in easy-to-use and widely available tools (for example, standard Java™-development tools). MDM solutions should not have proprietary tooling that is difficult to use and more costly to train resources on or hire consultants for, as this will increase the total cost of ownership (TCO) to the organization.

Flexibility

MDM solutions must be able to incorporate data from other sources and to integrate with those sources for continuous master-data processing. For example, MDM solutions should integrate with data-warehouse solutions to “operationalize” rich insight and to provide updates to the data-warehouse environment in order to marry the operational and analytical views.

In addition to the points mentioned, there are several functional requirements that represent the best practices for MDM. These requirements can be categorized by Foundation MDM and Transaction MDM (Figure 1). Foundation MDM provides all of the key components and functionality required in all MDM deployments regardless of scale. Transaction MDM leverages Foundation MDM components, but also delivers additional functionality required primarily in large scale fully transactional environments.

Figure 1: Functional Requirements for MDM



Foundation MDM

Knowledge (MDM Repository and Services)

A primary requirement is for the foundation MDM solution to persist master data to maintain the authoritative data record for a particular data domain, such as customer, product or account, as well as for related objects (location, demographics) and relationships (customer to a product to an account). Also required are data and application services and logic that can update and access master data held within the database. It also contains logic for composite business services that represent business processes (for example, adding a customer).

User Interfaces (UIs)

Foundation MDM functionality must be available to deliver trusted information to user interfaces. An MDM solution need not provide complete user interfaces as UI needs can be unique from user to user. However, functionality for the support of all UIs should be available through exposed and configurable data and business services.

Data Quality Control

The foundation MDM data quality component is a set of business rules and internal services that are accessed by other services. Data quality control services are the guardians of the single version of the customer truth and include matching, data-stewardship and data-validation services.

Integration

Integration provides interfaces and integration points that are packaged within the core application. Data and business services within the Knowledge component must contain integration hooks to allow clients to plug in custom logic, applications, or both, within the context of a MDM transaction. In addition, published interfaces for functions and common components allow clients to plug other vendor tools into published interfaces.

Transaction MDM

Business Level Services

Transaction MDM requires intelligent and complex business-level services, which can serve to fully meet high-value business process requests. Business-level services must have configurable business logic or rules which dictate actions to the MDM transaction solution.

Security and Visibility

Transaction and attribute level security, as well as the control of user access to critical master data, is a component of transaction MDM. Security and visibility includes data entitlements for users and user groups, as well as rules of visibility to filter the information that is available for consumption.

Events

The ability to configure and process events is a component of transaction MDM. An event management element allows organizations to set either user-defined or time-based events based on requirements and business rules.

Data Optimization

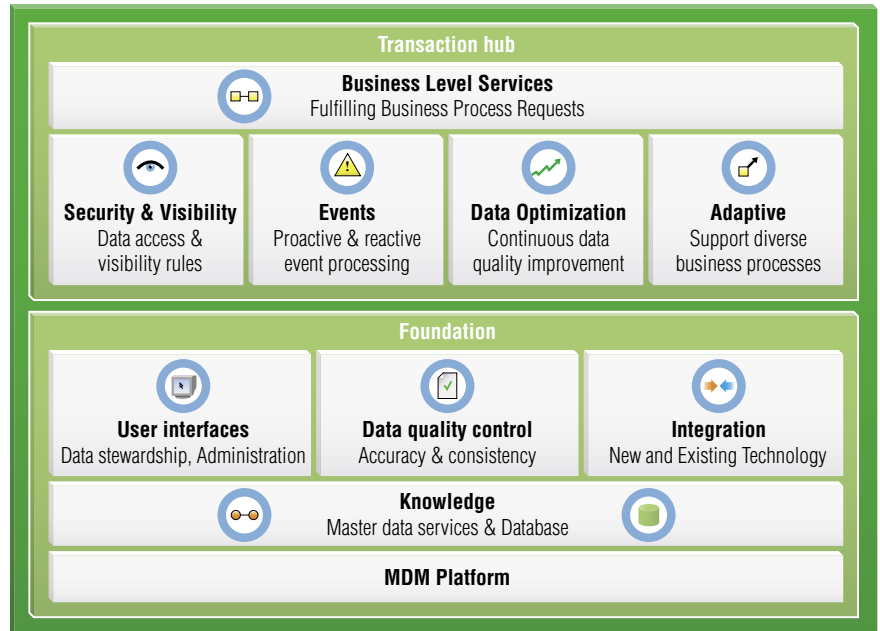
Additional data quality components are required in transaction MDM, to provide organizations with the ability to optimize information within the hub. This component can send information out in batch processes for additional cleansing and standardization or to prevent data corruption.

Adaptive

Transaction MDM requires components which are specifically designed to support multiple types of users, user groups, and lines of business (LOB). Adaptive transaction MDM maintains the single version of truth for master data entities and provides the capability to respond to diverse information and process requests across the enterprise.

InfoSphere™ Master Data Management Server, version 8.0 (see Figure 2) is part of the IBM portfolio of master data management solutions addressing the needs identified by organizations seeking a holistic understanding of their customer, product and account information. The use of this master data is primarily operational in nature – a core design characteristic of InfoSphere MDM Server.

Figure 2: Functionality grows from the foundation to the transaction hub



The IBM InfoSphere MDM Server uses a multiform approach to address master data issues. This means that InfoSphere MDM Server manages multiple master data “domains” - such as customer, product and account, as well as secondary domains. It further provides a platform for the use of this master data in different ways, operationally, collaboratively, or analytically. In addition to being able to manage multiple domains. InfoSphere MDM Server is a cornerstone offering within IBM’s Master Data Management portfolio, and while it manages all domains and styles, it is primarily deployed to operationally, to meet real-time business needs.

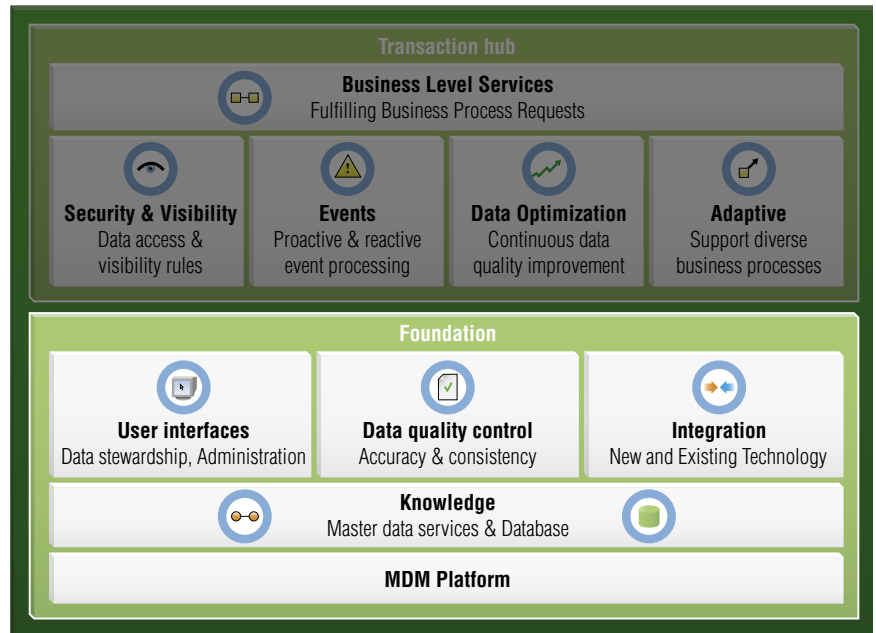
InfoSphere MDM Server overview

InfoSphere MDM Server is a highly flexible product, capable of being implemented in either a Foundation deployment or as a fully functional Transaction hub, dependent on organizational requirements. InfoSphere MDM Server Foundation provides clients with the core elements required for a complete MDM solution. InfoSphere MDM Server Foundation includes a robust data model, data and application coarse and fine grained configurable services, as well as data quality, integration, user interface and platform components. In addition to the foundation components, InfoSphere MDM Server Transaction hub includes the requirements for a deeper and more intelligent MDM solution. The Transaction hub includes business-level services, event-management and a business rules engine, as well as enhanced integration and integrity capabilities. Both deployments are designed to support operational functionality for three primary entities, or domains: Customer/Party, Account, and Product.

InfoSphere MDM Server — foundation

InfoSphere MDM Server Foundation provides the fundamental components required to succeed in any operational MDM implementation, (see Figure 3).

Figure 3: InfoSphere™ MDM Server foundation



Knowledge

An essential component of InfoSphere MDM Server is the Knowledge Manager which contains two primary elements: 1) A robust database and data model to maintain operational and historic master data, and (2) a set of course and fine grained services used to access this information. These services are designed to be integrated with business applications to provide full operational master data management capabilities. InfoSphere MDM Server contains services that are domain-centric, as well as services that retrieve master data by external party-reference keys (other system IDs). Services within InfoSphere MDM Server Foundation include data-level services such as basic create, read, update and delete (CRUD), as well as application-level services such as those required to fulfill an application

request across multiple domains and attributes. The services described in the following sections are both large-grain (implementing significant functionality) services and fine-grain (more-limited functionality) services. An example of a large-grain service is adding a party record; an example of a fine-grain service is updating a party's telephone number. Large-grain services typically contain several fine-grain services.

Party Domain, Defined

One of the central entities or objects within InfoSphere MDM Server is a party. A party is defined as a legal entity that is either a person or an organization (which can be a legal organization or a group of parties). InfoSphere MDM Server can manage multiple types of parties (customers, prospects, suppliers, employers...). Other logical data-model subject areas are related to and managed through the party component (for example, addresses are added to the database only when they are related to a party).

Party Services

InfoSphere MDM Server Foundation contains party-centric data and application services for maintaining both individual and organizational demographic information. Multiple names for a party are maintained with the party name services. Party values services maintain multiple value profiles for various categories of party data (for example, multiple risk scores within one profile, marketing insight scores in a second profile). Party search services allow clients to search for party records using multiple search criteria, including party names, addresses, contact methods and identifiers. Phonetic searches and search-exclusion capabilities improve search effectiveness. Delete party services remove a party record after determining that the record can be deleted (for example, if the party does not have an active role on a contract). Addition services delete history or audit records for the party. Party-history audit services retrieve historical information on the party record from the InfoSphere MDM Server history database.

There are also core party services available to process multiple requests, such as those that result from batch submission through data integration tools. This is referred to as delta processing and the services are optimized for this style of use.

Party Services: Identification

InfoSphere MDM Server maintains identification and registration for parties, such as driver's license numbers and credit card numbers in relation to a party. This identifier object maintains data on the issue date and location, reference ID, description and effective dates for the identifier. Each customer record has a system-generated unique customer identifier.

Party Services: Interaction

InfoSphere MDM Server stores and manages a party's complete interaction history across all channels in the organization—Web, wireless, call center, interactive voice response (IVR) and so on. Other front-office CRM systems (like call-center applications) can populate InfoSphere MDM Server with interaction history information using data and application services. By providing a central source of interaction information for the customer, organizations can ensure more-consistent service delivery across their existing communications channels. InfoSphere MDM Server manages summary-level data for an interaction (that is, the type of interaction and the party that the interaction is regarding). In addition, event notifications and other business processes can be triggered by interactions, which allow enterprise-level customer business processes to be initiated and accessed by all front-office systems.

Party Services: Roles

InfoSphere MDM Server contains multiple services for managing the role that a party plays within the organization. Party macro-role services manage the party's overall, or macro, role within the organization; examples include the role of customer, prospect, agent and so on. Party macro-roles can be related to other party-centric objects through granular party-macro role services, that is, to relate party-centric data to the party's role (in the role of customer, the party's home address applies and so on). A party can play one or many roles. Contract-party role services manage the multiple roles that a party can play on one or more contracts. Rebate or claim party-role services maintain role information that a party plays on one or more rebates or claims. Grouping party-role services maintain information on the role that a party plays within a party group (for example, the role "head of household"). Hierarchy party-role services maintain role information for roles that a party plays within a hierarchy, represented by the party being a node in the hierarchy. Relationship party-role services manage party roles for parties involved in a party-to-party relationship. For example, within an employer-to-employee relationship, person party X plays the role of "officer within signatory authority."

Party Services: Demographics

InfoSphere MDM Server stores and manages information specific to people and organizational parties. InfoSphere MDM Server manages information specific to a person, such as date of birth, country of citizenship, age and first, middle and last name, among many other attributes. InfoSphere MDM Server also manages information specific to an organization, such as its type, legal name and industry. However, recognizing that demographic data can range greatly from party to party, and could include for example employment history, military, education, personal data (height, weight), InfoSphere MDM Server provides the framework to define other unique demographic elements as needed.

Party Services: Privacy Preferences

InfoSphere MDM Server maintains privacy information for a party. The data model manages both default and customer-stated privacy preferences. Relationships can be established between default privacy preferences to denote which default preferences take precedence over other preferences. The party's specific preferences are also stored and override the default preference if they are present. Privacy preferences contain actions (for example, "do not call," "do not share data"). Privacy preferences can be related to other objects—such as locations (addresses and contact methods), contracts and parties. Customer service or contact preferences are also maintained within the same subject area. InfoSphere MDM Server manages alerts and notes for other objects, such as parties, contracts and addresses. Notes can be used to store important information on specific entities and to make this information available to all channels across the organization.

Party Services: Customer Service and Sales

InfoSphere MDM Server contains comprehensive business services for managing customer service and sales information that is required for multi-channel integration. Interaction history services maintain data on all inbound and outbound interactions regarding a customer. Campaign services store summary-level campaign information and share it with all channels to improve marketing campaign response rates. Privacy services maintain default and customer-stated privacy preferences for data management and solicitation. Preference services manage complex customer-service preferences (for example, contact preferences for specific contact methods and specific products). Party value-profile services maintain customer value and service indicators (for example, customer profitability scores). Party notes or alerts services maintain categorized party notes that are useful when servicing across multiple channels.

Party Services: Know-Your-Client

Know-Your-Client (KYC) initiatives are becoming common-place in today's financial industries, and InfoSphere MDM Server has been designed to specifically support these programs and allow organizations to meet compliance requirements. In addition to the inherent capability to understand customers more readily, InfoSphere MDM Server captures and maintains party compliance information, such as an address, and can be configured to schedule revalidation of this critical information in accordance with compliance needs. InfoSphere MDM Server also maintains KYC questionnaires, as well as a party's responses to those questionnaires and can store analytics based on this information (a risk tolerance, for example, which can then be used in operational processes such as determining the appropriate financial instrument to offer the customer.

Party Services: Financial Profile

InfoSphere MDM Server maintains a financial profile for a party. Income source services manage party-income source information, such as income amount, source and details, among others. Party financial-contract services maintain financial contract (for example, bank account, charge card) information. Party payroll-deduction information services maintain data for payroll deduction purposes. All payment contract data can be related back to contracts and bills.

InfoSphere MDM Server stores information on a party's payment contracts. Payment contracts include bank accounts, charge cards and payroll deductions. This information can be required and used during the payment process for the contracts owned by the customer. Payment source is related to contract through the billing object. InfoSphere MDM Server stores income source information for a party and relates that to its agreements and contracts.

Party Services: Campaign Services

InfoSphere MDM Server maintains summary-level campaign information for the party. Campaigns can be related to parties, products or groups of parties. Key customer-service indicators (such as profitability and so on) are maintained in the party values area.

InfoSphere MDM Server maintains a customer data index and maintains cross-references to other sources of customer information through the party equivalency area. External agreement and product information is linked through the system identifier area. InfoSphere MDM Server stores metadata in order to properly map index data to sources systems, original values should the customer data be changed, as well as date information on such a change.

Account Domain, Defined

InfoSphere MDM Server supports master data management requirements for the account domain, including managing the aggregation of referenced accounts that may be scattered throughout the enterprise. An account is defined as a legal agreement or other binding arrangement between one or more parties and the company. Master account information can include contract and agreement data and attributes (eg. signed date, termination date and reason) and support business initiatives such as account sweeps, consolidated statements, consolidated billing and payments and reward point management across multiple accounts. InfoSphere MDM Server can manage the relationships between a party and its account, as well as among account and associated products, and it shares the Terms and Agreement component with the product domain. InfoSphere MDM Server can persist terms and conditions for an account (for example a designated discount for the purchase of three products on a single account), or it can augment or override those terms and conditions associated with products as they pertain to accounts.

Account Services

InfoSphere MDM Server contains dozens of data and application-level services that are account-centric. These account-centric services allow clients to interact with the application using account data (for example, detailed data such as balances, account systems keys and so on). This is extremely important to organizations migrating from a product-centric to an account-centric strategy to differentiate themselves on the service provided to accounts, as it allows them to integrate existing account-centric processes while maintaining and providing more accurate and complete master data.

Account services maintain detailed information for an account, and these services can add account details, such as the name and type of account, currency values, LOB and language details. It can also add or create parties associated with the account, as well as managing additional data about the party (names, addresses, contact methods and so on). This large-grained service can be consumed by multiple channel applications and back-office systems for new business processing functionality. InfoSphere MDM Server also contains update and inquiry business services for contracts. Contract component services maintain components associated with a contract. Party contract-role services manage the role or roles that a party plays with respect to an account.

Account Services: Search

Account search services facilitate searching for accounts using contract or party data, or both. Account relationship services relate two contracts to each other and manage the details of the relationship between the two – or more – contracts (for example, one contract provides funds for another and so on).

Account Services: Location and Billing

Account location services maintain location-to-contract relationships, as well as the purpose of the location (address) for a contract (for example, a billing address). Billing services maintain summary-level billing information for a contract. Account notes or alert services maintain user-entered (free-form text) notes, as well as categories and types, for an account.

Account Services: History Audit

Account-history audit services are used to inquire on historical contract and associated information contained in the history database of InfoSphere MDM Server. Holding services maintain information on a party's holdings (assets, liabilities, physical objects) and relate them to contracts. Claim or refund services manage claim and refund information for a particular contract. Product services manage summary-level product information and product relationship information and link products to contract information. Contract services for "delta processing" are available to process multiple requests, such as those that result from batch submission through data integration tools.

Product Domain, Defined

InfoSphere MDM Server supports the real-time management of information within the product domain. This includes all key information about the product such as product type and category, terms and conditions associated with products, product hierarchies, product identifiers and system keys.

Product Services

InfoSphere MDM Server contains basic services to create, read, update and delete this data. Pre-defined and configurable services allow for searches of the product on a variety of search criteria such as name, status relationship type and description, and include filters to ensure only the most relevant data is retrieved.

Product Services: Product Types and Categories

InfoSphere MDM Server provides defined product types such as ‘Goods’ or ‘Services’, as well as the ability to configure additional product types and sub-types. InfoSphere MDM Server allows organizations to map their products to multiple product categories (an ink cartridge product can fit within the ‘consumables’ category and within a particular printer type category) and then map those into multiple category hierarchies (which may be needed for a website hierarchy or a merchandising category).

Product Services: Specifications

Organizations can define specifications for product types and sub-types which support the need for dynamic product attributes. This configurable element provides the organization with flexibility in determining product attributes which can then be applied to all products within types, sub-types and categories.

Cross-Domain Data and Services

As well as domain specific data management and services, InfoSphere MDM Server also manages and has significant functionality which spans multiple domains:

Relationships among Domains

InfoSphere MDM Server maintains direct party-to-party relationships. A single party can have multiple direct relationships to numerous other parties; they can be involved in a spousal relationship with another party, or an employment relationship with an organization party. Parties can also be indirectly related to one another through their relationship (the roles they play) on an account. Account role relationships are maintained within the context of the role that two parties play on an account; for example, a trustee relationship would be managed as an account role relationship. InfoSphere MDM Server contains pre-built relationship types and also allows organizations to easily customize types to their specific needs.

Parties can be grouped together by user-defined criteria. Groups can include households, affinity groups, and segmentation and risk-score groupings, among others. Groups can also be managed as parties (organizations), depending on the nature of the group and the amount of data and functionality required for that group.

Cross-Domain Services: Relationships

InfoSphere MDM Server contains business services for maintaining relationships among entities within a domain (for example, party-to-party as with business partners, spouses), as well as cross-domain (for example, party-to-account-to-product). Party-to-party relationships can exist between two parties independently (for example, party A and B are spouses) or within the context of the role that both parties play on a contract (for example, party A is the executor of the will for party B); role relationships are maintained by contract party-role relationship services.

Cross-Domain Services: Hierarchies

Multilevel relationships are managed by hierarchical relationships services (organization subsidiaries and so on). Hierarchy services maintain ultimate and local parent data for the hierarchy, hierarchy node relationship details (parent-child relationships between two nodes in the hierarchy), and the category and type of the hierarchy. Relationships among multiple parties (either persons or organizations) are maintained with party-grouping business services. These services maintain the relationships between one or more parties and the group, maintain definable values for a group, and can retrieve data objects for the group that are related to a party (for example, the primary address for a group). Similarly product relationships can be managed (product-to-product) when an organization needs to group a set of products to create and offer a bundle: Telecommunications companies do this when they bundle landline, mobility, and data services, and financial services companies bundle services when they deliver 'product value packages,' which may include checking, credit card and investment accounts.

InfoSphere MDM Server manages the relationship between all entities, such as a customer, addresses, products, organizations, contact methods, suspects, identifications, households, groups, systems, and servicing and sales agents.

Domain hierarchy relationships can be created and maintained to manage complex hierarchies (for example, organizational or product hierarchies). The data model supports management of a hierarchy object, a relationship to one ultimate parent entity, the relationship between nodes in the hierarchy, and one or more local parent designations. The hierarchy subject area can be used to manage other types of hierarchies as well (for example, a contract hierarchy).

Cross-Domain Services: Location

InfoSphere MDM Server contains business services for maintaining data on location—addresses and multiple contact methods—and relating them to a party, product or account. Household services identify parties that belong to the same address. Address standardization services are generalized interfaces to address standardization components and applications (for example, address-standardization software products, such as IBM QualityStage or Trillium Software System).

Cross-Domain Services: Data Stewardship

InfoSphere MDM Server delivers data stewardship functionality through stewardship services and a user interface. This functionality is designed to provide value in three key areas:

- *Duplicate Suspect Processing—InfoSphere MDM Server Data Stewardship is used to search for parties that are suspected to be duplicates based on user-defined parameters, including entity and attribute values, suspect-relationship, creation date, location and priority. Data stewards can then choose to view the suspect party list, a list of all source and suspect parties, as well as understand the ‘best match’ (that is, the match score is over a defined threshold and the party match falls into a defined match category). In addition, organizations can integrate InfoSphere MDM Server with IBM QualityStage to enhance party matching capabilities and display specific QualityStage probabilistic matching scores. Once matches have been determined, the user interface provides the capability to compare and collapse parties where required, or simply mark parties as suspects.*

InfoSphere MDM Server contains services for creating suspects (performing party matching for a specified target party). Mark and unmark suspect services allow for duplicate suspects to be identified or unidentified manually. This also includes functions to detect when to perform duplicate suspect matching, for example when critical data is updated or when a new party is added. Collapse party services manage the collapse of two parties into a surviving party record. All information related to the two customer records can be blended into the new customer record (for example, the address is correct on customer suspect-record number 1, but the first name is correct on customer suspect-record number 2). The product provides default data-survivorship rules (which can be customized) to select which data survives on the new party record, which is provided within the collapse party with rules service. The split party service splits a single party into two party records. Suspect search services facilitate searching for party suspect records by a variety of criteria, including match category levels, last name of one of the suspects or the date that the suspect relationship was created, among others.

- *Party Maintenance – Data Stewardship contains all necessary functionality to maintain master data entities as required. All services available in InfoSphere MDM Server Foundation are also available for use through the data stewardship user interface to perform full maintenance of all objects while business rules and security are enforced.*
- *Hierarchy Management – Through the use of the Data Stewardship user interface, organizations can maintain hierarchy information. Hierarchy nodes can be added or removed, parent-child hierarchy relationships can be created and managed, and even roles within a hierarchy can be defined.*

Cross-Domain Services: History and audit

InfoSphere MDM Server contains services for retrieving historical audit data for objects. If a date or a date range is passed within an inquiry transaction for parties, accounts or products, data is retrieved from the history database. Transaction audit-information log services allow for inquiry on transaction log data. Delete party-history services removes history records for a party from the history database.

User Interfaces

User interfaces are an important usability concern for any application. However, master data management solutions provide the most significant value through the availability and delivery of trusted information to consuming applications, rather than the graphical representation of that information. After successful MDM implementations, these consuming applications often leverage their own interfaces, ensuring that there is no user adoption time requirement as the MDM deployment is invisible to end-users. The design of InfoSphere MDM Server and its underlying services provide the underpinnings for virtually any user interface, but it also includes two user interface applications: the data-stewardship user interface and the administrator user interface. InfoSphere MDM Server is fully internationalized and available for a range of localizations, supporting users in the language and locale conventions of their choice.

Data-stewardship user interface

InfoSphere MDM Server contains a separate user-interface application – the data stewardship application – for maintaining data quality within the core application (see ‘Cross-Domain Services: Data Stewardship’). The data stewardship application is designed to be the user interface for the internal administrators of data quality within the MDM hub, and even includes task management for workload distribution among data stewards. All of the functionality offered through the data-stewardship user interface is also available as an exposed service, allowing companies to externalize data stewardship functions to other applications.

Administration user interface

The InfoSphere MDM Server administration user interface contains functions used to configure and manage the application. Functions include: code table management, error message management, rules of visibility and data entitlements, extension framework, data element and group definition, and user and user group definition.

Data Quality Control

The Data Quality Control functionality within InfoSphere MDM Server is designed to manage data quality and to maintain a single version of the master data truth:

Duplicate Suspect Processing

InfoSphere MDM Server enables an organization to maintain a single version of the truth for the customer by ensuring that duplicate party records are not entered. Services such as adding a new party or updating a party's address invoke the duplicate suspect process, which performs a party search and provides candidate parties to the party-matching engine. The party-matching engine uses business rules to compare a target party to a number of candidate match parties. The rules engine determines the matching and non-matching attributes and the party-matching algorithm determines a match and non-match score. Suspect action rules determine what action should be taken when specific categories of suspects are identified (for example, exact match found/update the existing party, partial match found/persist the second party and create a suspect relationship, return the list of suspects in a response message to the requesting application for right time duplicate-suspect processing and so on). When duplicate suspects have been detected, a notification message is sent to a message queue using InfoSphere MDM Server's event notification services. InfoSphere MDM Server can also maintain an aggregate view of known duplicates, whereby the records are kept separate based on an "x-factor," an identifier such as line of business or role, while the view as seen by the consuming systems and channel is logically consolidated. This accommodates needs such as line-of-business processing activities or legislative requirements.

InfoSphere MDM Server also has the ability to integrate with external matching tools, including out-of-the-box integration with IBM QualityStage. This integration allows for probabilistic matching in addition to InfoSphere MDM Server's core deterministic matching capabilities. Furthermore, these capabilities can be combined for extremely sophisticated matching scenarios.

Data Validation and Normalization

InfoSphere MDM Server provides a common framework to enforce data validation rules for all incoming transactions and data submitted from various applications. This common validation framework supports both structured and unstructured/dynamic data, and it allows for context-based validation as well as validation exclusion. InfoSphere MDM Server supports conditional external-data validation, meaning that data validation rules can be varied by conditions (for example, based on a party's LOB relationship). This ensures that all data entering the authoritative customer-information record is held to the same enterprise standard for data validation.

Error messaging

InfoSphere MDM Server has error-messaging functionality that returns error messages when InfoSphere MDM Server transactions fail. This functionality can be integrated with enterprise monitoring systems for system maintenance.

Integration

Within the core application, InfoSphere MDM Server contains a number of integration points and interfaces that extend to other IBM products, such as Information Server and Entity Analytic Solutions (EAS), as well as an organization's existing architecture. This allows clients to integrate other vendor applications within transaction business services.

Interfaces

InfoSphere MDM Server contains a number of interfaces that allow clients to plug into vendor party components, including:

- *Name standardization—passes a party name and accepts a standardized version of that name for storage in the person-name table. InfoSphere MDM Server contains adapters to IBM QualityStage and Trillium. Clients can build adapters to other tools as required.*
- *Address standardization—passes an address and accepts a standardized version IBM QualityStage and Trillium. Clients can build adapters to other tools as required*
- *Party matching—passes a list of candidate parties and expects to receive a list of those parties with match-level indicators (categories). InfoSphere MDM Server is integrated with the InfoSphere MDM Server matching engine and has an out-of-the-box integration point with IBM QualityStage for probabilistic matching functionality.*
- *External rules—manages various external rule files. InfoSphere MDM Server contains an interface and a runtime version of iLOG jRules.*
- *External reference ID—retrieves relevant party data from InfoSphere MDM Server, passes it to a party ID interface, and then stores the return value (ID) in the party identifier object. InfoSphere MDM Server contains an interface to Acxiom and Dun and Bradstreet technologies*
- *User or user group definition—retrieves user and user group definitions for use within InfoSphere MDM Server. InfoSphere MDM Server contains a Lightweight Directory Access Protocol (LDAP) 2.0 standard adapter.*
- *Data integration—provides integration and mappings from InfoSphere MDM Server's knowledge manager to IBM DataStage for loads and exports.*
- *Non-obvious relationships—assists in fraud and threat detection, recognize anti-money-laundering schemes, conflict of interest exposure and other such scenarios. InfoSphere MDM Server offers an integration with IBM Entity Analytics Solution.*

InfoSphere MDM Server supports multiple real-time and batch interfaces and multiple file formats for incoming transaction-request messages. Regardless of the requesting interface and message format, the message is parsed to InfoSphere MDM Server Java objects and all run through the same business services (business logic).

Real-time interfaces

InfoSphere MDM Server supports the following real-time interfaces:

- *XML interface*—InfoSphere MDM Server contains an XML interface for each of the more than 500 action services that support XML messages through Remote Method Invocation (RMI).
- *Web services adapter*—InfoSphere MDM Server contains a Web services adapter that supports SOAP transactions, and provides access to all action manager services.
- *Messaging adapter*—InfoSphere MDM Server has a messaging adapter and listener that reads transactions from a Java Message Service (JMS)-enabled queue and sends those transactions into the InfoSphere MDM Server action services. Messages can be put back onto a message queue for response transactions.
- *Java object interface*—InfoSphere MDM Server contains a Java object interface to its business objects (action services). This interface allows for direct integration with other applications to incorporate InfoSphere MDM Server customer-management services within those applications' processes and functions.
- *IBM WebSphere Business Integration Adapter*—InfoSphere MDM Server contains an interface to IBM WebSphere Business Integration. The interface contains a generic adapter for mapping to WebSphere Business Integration, as well as specific business services (action services) that are preconfigured to WebSphere Business Integration.
- *COBOL adapter and CICS interface*—InfoSphere MDM Server contains a COBOL adapter that accepts COBOL calls or CICS transactions and maps them to InfoSphere MDM Server services. The COBOL adapter works in conjunction with the COBOL Copybook parser component to parse incoming copybook formats to the InfoSphere MDM Server object format.
- *Content Management Integration*: Provides two Content Management System integration samples. Adapters specifically for IICE and FileNet P8 provide an interface via web services to search and retrieve the content and content properties of content assets from the CMS. The DSUI uses the sample adapters to find and return party specific content.

Batch interfaces

The InfoSphere MDM Server batch-transaction processor framework manages batch-transaction requests. The batch-transaction processor is a client application that processes batch files. It contains reader or writer functions to read batch files and write to output files. The flat-file input is then parsed using the request framework parser-constructor component. The batch-transaction processor controls the pace of sending InfoSphere MDM Server transactions to the core product (action services) for processing.

InfoSphere MDM Server includes an Extract, Transform, Load (ETL) adapter for direct data loads that provides flat-file and staging tables, and associated externalized metadata, to be used as inputs for these loads. This makes the integration with ETL tools easier and reduces potential errors.

The retrieve external identifier service and Acxiom Adapter retrieves Acxiom Abilitec keys. It is also a set of business rules that adjust the core party-matching engine scores based on the presence of an Abilitec key.

MDM Workbench

InfoSphere MDM Server maintains all client extensions through its extension framework, or MDM Workbench. This framework maps extended data, transactions and rules to core product data, enabling system users to define where custom extensions are used within the core application. It also simplifies the upgrade process, which is done on the core product while extensions are maintained. The MDM Workbench is a toolkit that automates the process of creating extensions and additions, helping to reduce overall implementation time and cost.

Using the MDM Workbench wizard, clients can add new code tables or data attributes to new addition tables or to core product tables. Extended data objects are created to manage the persistence of that data, and manual development of objects is reduced through an automated object-generation mechanism. Those objects are integrated with core product services through the Java inheritance model. This allows clients to seamlessly add new data attributes or edit existing attributes to the core product's services and data tables, while still maintaining enough separation to permit future core product upgrades and the extension and additions. Workbench supports all extension and addition mechanisms, and new dynamic data structure managed through XML specifications, stored within the database.

Metadata is supported through Workbench for such use as the creation of product specifications. Employing services such as Adding a Specification, Workbench can deploy data to appropriate tables within the application during runtime.

Platform

InfoSphere MDM Server's Platform contains features and functionality unmatched in today's MDM marketplace, including components to deliver the following functionality:

Flexibility

The platform provides the flexibility to employ multiple extension methods which can dynamically extend and add to the existing data model through multiple mechanisms.

Performance

Performance components are designed to allow for performance tuning and reporting. These components allow clients to manage cached data for in-memory processing and to design data-relevancy indicator attributes and denormalization options through dynamic attributes to minimize unnecessary database access and improve performance.

Federated Deployments

Because of compliance requirements, unique architectures or corporate policy, some organizations choose to implement multiple instances of their MDM application. InfoSphere MDM Server's federation ability provides these organizations to federate multiple instances of the application to provide a single enterprise understanding of master data.

Data Validation

InfoSphere MDM Server can enforce data validation rules to all incoming transactions and data submitted from various applications. InfoSphere MDM Server supports conditional external-data validation, meaning that data validation rules can be varied by conditions (for example, based on a party's LOB relationship). This ensures that all data entering the authoritative customer-information record is held to the same enterprise standard for data validation.

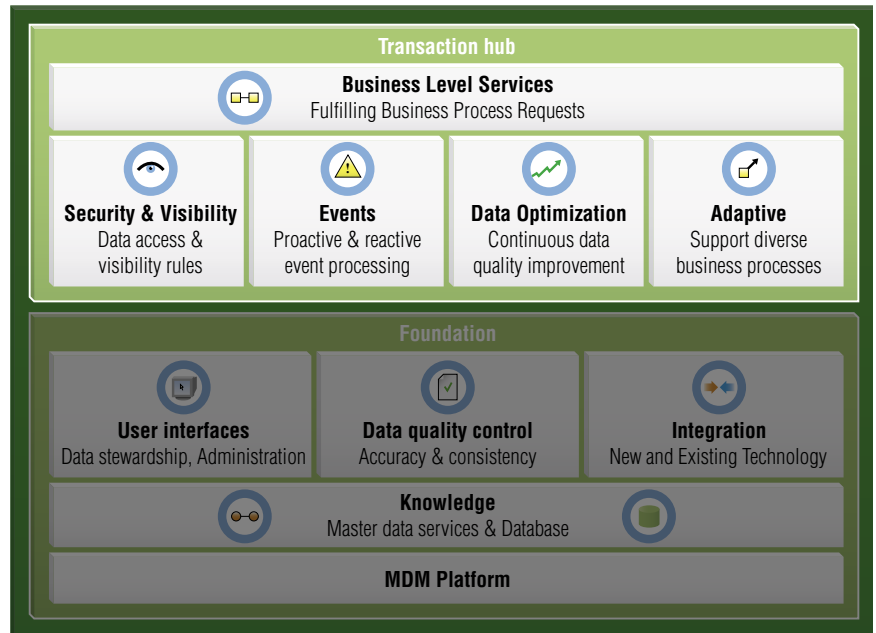
Message Notification

Specific event-notification messages content and topic information can be defined. The notification message is sent as an XML message through the messaging adapter after the master data is changed. This is linked to error-messaging functionality that returns error messages when InfoSphere MDM Server transactions fail. This functionality can be integrated with enterprise monitoring systems for systems maintenance.

Common Audit-Trail

InfoSphere MDM Server maintains a full history of all changes performed on the customer record, which establishes an audit trail of all changes to customer, product and account information across the enterprise. InfoSphere MDM Server records transaction history for the customer data—the specific transaction (business logic) used to change the customer data. Organizations can use that audit trail to track specific customer-information changes and which users and systems made those changes for audit-trail purposes.

Figure 4: InfoSphere™ Master Data Management Server transaction requires foundation functionality



InfoSphere MDM Server — Transaction Hub

InfoSphere MDM Server deployed as a Transaction hub (see Figure 4) includes all components of the InfoSphere MDM Server Foundation, with additional capabilities to enable the organization to achieve transaction MDM functionality, in which the application serves as the real-time system-of-record for all consuming applications, systems and processes across the enterprise.

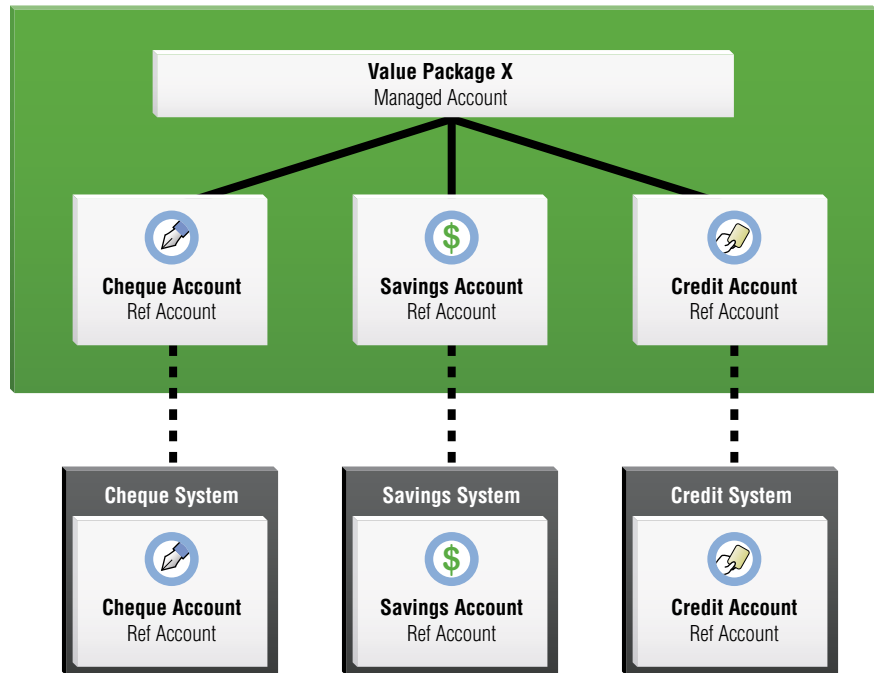
Business-Level Services

As compared to Foundation, InfoSphere MDM Server Transaction hub delivers additional MDM functionality through intelligent and complex business-level services. In comparison to both data-level and application-level services, MDM business services are designed to meet specific business requests, and to fully address the needs of a particular process. Business services require the employment of business logic or rules, dictating actions to the InfoSphere MDM Server.

Examples of business-level services include, but are not exclusive to:

- *Grouping and Relationships* – Business services manage the forming and reforming of groups based on customizable business logic (for example, whether a party can belong to more than one group when playing a specific role and what is the impact of belonging to one group on the activity of another).
- *Value Packaging* (see Figure 5) – Business services deliver key functionality of Value Packaging within the Account domain in InfoSphere MDM Server. Value Packaging allows the organization to bundle accounts and products from other source systems (reference accounts), maintain that bundle through an additional account (managed account), and associate this with a party. Terms and conditions associated with the reference accounts and the managed account can be maintained as well as enforced through complex business services.

Figure 5: Value packaging in InfoSphere™ Master Data Management Server



Security and Visibility

InfoSphere MDM Server provides varying levels of security, to meet corporate policy and regulatory requirements, based on organizational need. This is managed through a combination of InfoSphere MDM Server technologies including rules of visibility and data entitlements, across all Knowledge data entities as well as data and business type services.

Rules of Visibility filter data from InfoSphere MDM Server transaction responses or, optionally, the information retrieved from the database is optimized based on rules of visibility for best performance when dealing with larger result sets. For example, a user not entitled to see credit card numbers has this data attribute filtered from a Get Party identification transaction. Data entitlements manage the user's entitlements with respect to data updates on attributes, and can even span data stewards if needed. Rules of visibility and data entitlements allow InfoSphere MDM Server to manage privacy for master information, governing accessibility of specific master-data attributes.

InfoSphere MDM Server transaction-level security is configurable to the information requests of particular groups. Within this level of security, users and user groups are granted security access to specific component transactions. For users without appropriate access rights for a particular transaction, the transaction will fail and an error message is sent to the requestor. All transactions, including inquiry and search, as well as failed transactions can be logged. Transaction-level security works in concert with rules of visibility and data entitlements to maintain data privacy and security not only within the MDM Transaction hub, but also across all systems. Attribute-level security is enforced through InfoSphere MDM Server's Rules of Visibility and data entitlements, and enables the grouping together of master data attributes. User and user groups are then given access rights to the attribute groups.

Events

InfoSphere MDM Server has event management functions that detect transaction (master data is accessed, updated or added) or non-transaction (for example, date-driven) events across all data domains. Event rule definitions are created using the business rules engine. Services are available for accessing events, which can be either system-generated or user-defined. Additional services are designed to add user-defined events (for example, the event is discovered during a telephone interaction and is recorded with the customer-event profile).

The event notification framework within InfoSphere MDM Server allows clients to define business rules that monitor data changes that require event notifications. Specific event-notification messages content and topic information can be defined. The notification message is sent as an XML message through the messaging adapter after the master data is changed. Critical data-management services ensure that information cannot be changed without correct processing and allow InfoSphere MDM Server to manage data changes across lines of business that can have an impact on other lines of business.

Data Optimization

InfoSphere MDM Server components such as Evergreening and Data corruption management that provide organizations with the tools to pursue a continuous data improvement strategy with respect to data quality.

The Evergreening application within InfoSphere MDM Server is concerned with time-based triggering of data quality processes, at a master data record level. This component manages batch party processing, including identifying suspects and collapsing parties; it runs party actions at user-defined time intervals (for example, during off-peak hours).

Data Optimization

InfoSphere MDM Server's data-corruption management gives the ability to define data-corruption events and monitor them using event manager. When a data-corruption event is detected, notification messages are sent and the event is logged.

Adaptive Data Management

InfoSphere MDM Server is designed to support multiple users and user groups, lines of business and systems within a single instance of the application. Adaptive components enable the application to maintain a single version of the truth for master data, while also providing diverse requestors of information with only the data required. The adaptive components include:

Pending Critical Data Change

InfoSphere MDM Server manages changes in master data and understands the data needs of all other integrated systems to consume that information. Pending Critical Data Change services ensure that information cannot be changed without correct processing and allow InfoSphere MDM Server to manage data changes across lines of business that can have an impact on other lines of business or users.

Rules of Visibility

Rules of visibility filters data from InfoSphere MDM Server transaction responses or, optionally, the information retrieved from the database is optimized based on rules of visibility for best performance when dealing with larger result sets.

Configured Inquiry Services

InfoSphere MDM Server inquiry services, such as those to search for the retrieve a party, product or account record, can be configured to suit the requirements of users and user groups. While such services are often reusable, they can also be tailored to the particular needs of a line of business (LOB). For example, both LOB1 and LOB2 may use the 'Get Party' service. However, LOB1 requires the party name and address, while LOB2 requires additional information (such as interaction history and phone contact information) when retrieving the party. The existing 'Get Party' service can be configured to meet the needs of both LOB1 and LOB2 without large investments in development time, due to the construct of fine and large grained services within InfoSphere MDM Server.

Multi-Tenancy

Multi-tenancy capabilities in InfoSphere MDM Server transaction provide organizations with the ability to manage multiple iterations of a single entity and capture relationship information between records while maintaining separation between them. In multi-tenancy, InfoSphere MDM Server can provide an aggregate view of this entity. This may be required when compliance requirements mandate that an organization keep the records of a single individual separate across lines of business.

Federation

Because of compliance requirements, unique architectures or corporate policy, some organizations choose to implement multiple instances of their MDM application. InfoSphere MDM Server's federation ability allows these organizations to federate multiple instances of the application to provide a single enterprise understanding of master data.

Fast Track

InfoSphere MDM Server Fast Track transactions are designed to support high-speed inquiry, particularly for large-volume, mainframe-based batch jobs, which are often used with legacy systems in multiple lines of business. The Fast Track Server uses the interface components described before, including the Common Business Oriented Language (COBOL) adapter, IBM CICS® and COBOL Call interfaces, and the COBOL Copybook parser. Fast Track transactions are designed for performance and therefore support fewer configuration options than the central transaction server. The Fast Track Server contains a framework for designing custom transactions. Clients can define specific transactions to support their exact inquiry requirements, therefore optimizing performance to meet their processing requirements. The Fast Track transaction server runs on a mainframe IBM z/OS® infrastructure and can be deployed within the z/OS job control language (JCL) or a CICS transaction monitor.

Conclusion

InfoSphere MDM Server contains multiple components that allow it to be an active, intelligent, real-time master data management solution. Comprised of functionality required for either foundation deployments of MDM or for transaction MDM implementations, InfoSphere MDM Server is componentized to provide the solution needed for immediate requirements, while it provides a roadmap for project expansion and growth, and for moving from a foundation deployment to a transaction MDM deployment.

Within InfoSphere MDM Server, the knowledge layer persists all current and historical master data. This layer also is comprised of data, application, and business-level services that maintain and manage master. User interface functionality provides data stewardship and administrative UIs, but more importantly delivers the functionality, through exposed services, to provide unmatched flexibility. Data quality and optimization elements include matching,

evergreening and data corruption functionality as well as pre-defined integration points to IBM QualityStage. Further, InfoSphere MDM Server Integration ensures seamless integration with existing environments and 3rd party tools, systems and applications. Events contain configurable business logic for event management, and adaptive components deliver on the diverse requirements of users, user groups, and lines of business.

A complete master data management (MDM) solution must contain all of the components mentioned before in order to offer significant functionality and flexibility to configure the application as required. InfoSphere MDM Server foundation components provide the fundamental requirements in any MDM solution, while transaction components allow organizations to deploy a smart and active operational system that responds to events in real time and contains complex business logic to business-level services that manage data across multiple lines of business.

InfoSphere MDM Server is the recognized leader in the MDM market because of its broad and unique functionality, its ability to support configurations for specific business requirements while maintaining a core product upgrade path, and its ability to perform in demanding transaction load environments.

For more information

To learn more about IBM InfoSphere MDM Server software, visit:

ibm.com/software/data/masterdata/cdi.html



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