

MDM & Data Modeling in the SOA-driven organization

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MDM & Data Modeling in the SOA-driven organization



Agenda

This presentation will highlight the role of data modeling in Master Data Management(MDM). The presentation will provide an overview of the SOA approach to managing core master & reference data.

We will cover the following topics in detail ...

- Introduction
- Master Data Management in the SOA environment (MDM as a service!)
- Commonly observed MDM practices & myths
- Why data modeling is critical foundation for MDM initiatives and developing business services .
- Pros/Cons of building vs buying your model from a MDM tool vendor.
- Practical MDM techniques that could be introduced in your organization

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Introduction

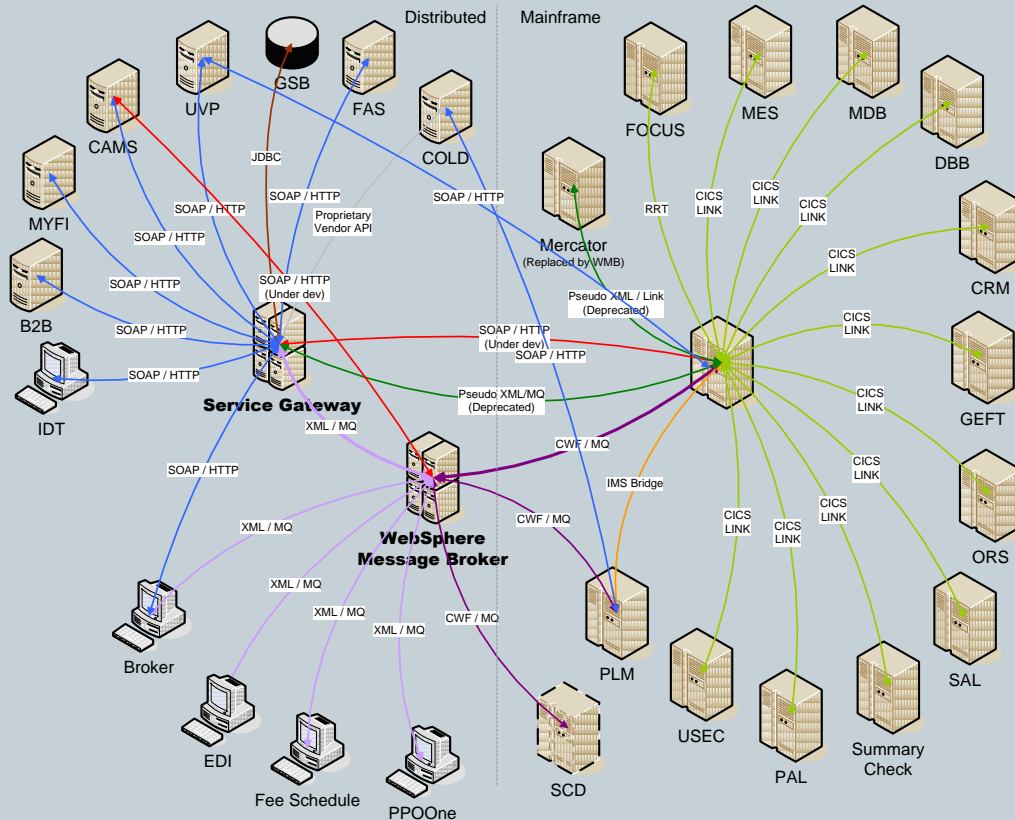


- Technology companies produce ‘disruptive’ technologies every few years promising miracles
 - 1990s – Client Server, ERP, Advances in communication & networking technologies
 - Early 2000s – Internet revolution, Web , Dot com bubble, Search engines
 - Mid to Late 2000s – SAAS /Cloud computing, Social Networking e.g. Facebook
- MDM and SOA was touted as a miracle Enterprise solution since the early 2000s and large vendors like IBM, Oracle, SAP all figure prominently in this space
 - Have they transformed the companies as we were hoping for?
 - Is there any success story worth sharing in your organization?
 - What insights can we draw from successful companies ?



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Application & Data Integration – Real life example

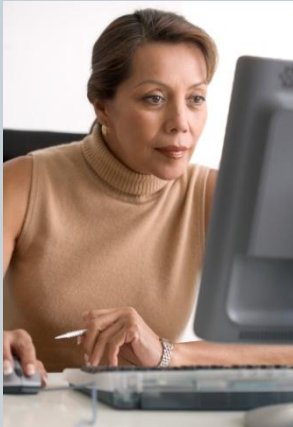


Key issues :

- Quantifiable Costs
 - Increased cost of storing redundant data (often inconsistently)
 - Complexity of data integration across multiple sources , mergers, acquisitions, etc
 - Poor data quality leading to higher re-work and legal costs
- Non-quantifiable costs
 - User stress and dissatisfaction
 - Limits sharing and re-use across enterprise
 - Loss in corporate confidence

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- Data Integration and MDM



ISSUES & CHALLENGES

- Redundant data across business segments
- Broad portfolio of disparate systems across the enterprise
- Lack of enterprise data integration across systems
- Lack of data quality & controls
- Increasing business cost to maintain systems
- Operational inefficiencies due to non-integrated systems and processes
- Regulatory compliance risk (AML, HIPAA, ARRA, PHI, SOX, etc)



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- Enterprise MDM Roadmap

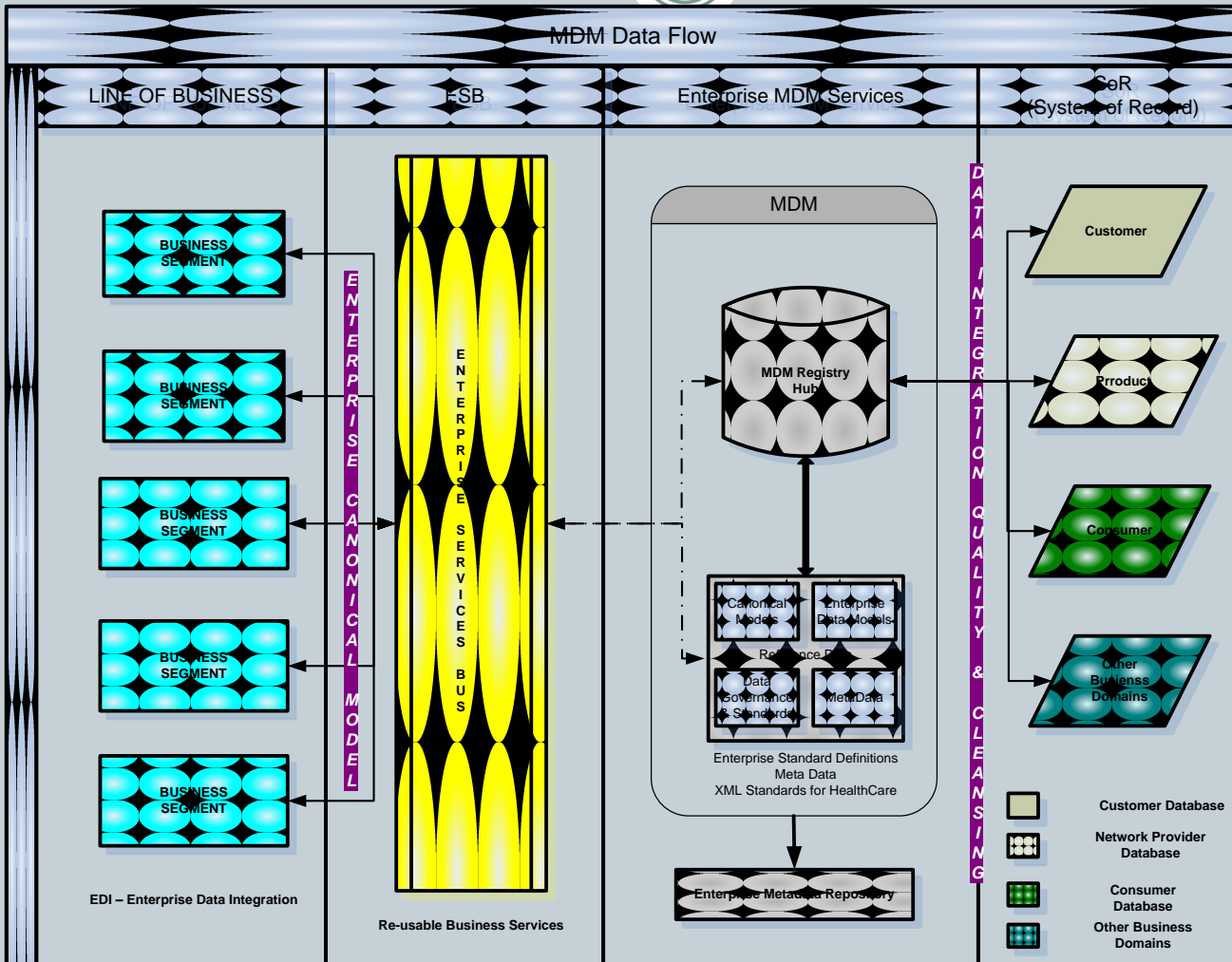


Overview of approach

- Employ a phased, incremental approach towards deploying the MDM program, starting initially with key business areas
- Use Common Enterprise Data Model (EDM) to standardize the definition of master data for customer, provider and member domains
- Define MDM Logical Architecture Blueprint across enterprise
 - *Identify single source of truth*
 - *Align business process incorporating SOA approach to build new MDM services*
 - *Choose key tools/technologies (e.g. MDM Registry, Data Cleansing & Profiling etc)*
- Provide a collaborative MDM data stewardship framework to define and maintain master data forming a data stewards committee with key stakeholders and SMEs
- ‘Think big, but build step by step’

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- Future State Vision of MDM in the enterprise



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- Integrating MDM with Services Oriented Architecture



Overview

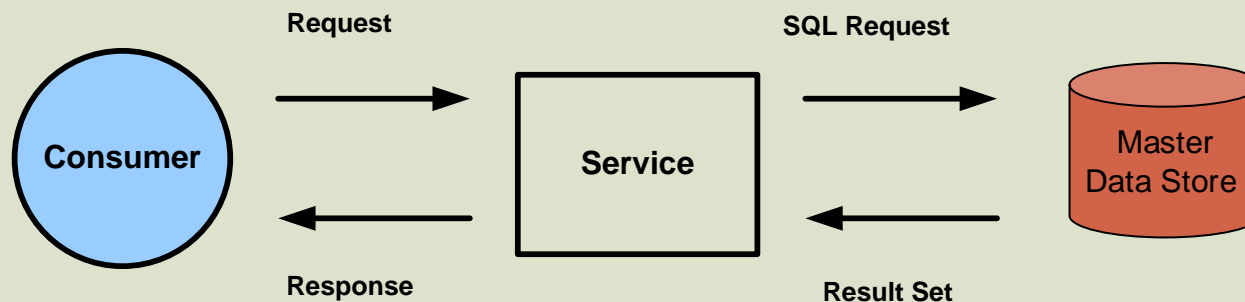
- SOA is an IT architecture framework using software and data components that can be exposed as re-usable business services on the network.
- In the MDM context, SOA layer helps make master data re-usable across different business segments & subscriber applications.
- Web Services will expose authenticated data to subscriber applications through deployment of MDM data services based on SOA architecture.
- These specialized MDM services can also help users with sophisticated business functionality/workflow, security management and improved agility.
- Role of pragmatic governance & security process is critical in success of MDM efforts.

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- Integrating MDM with Services Oriented Architecture (contd.)

Service Processing

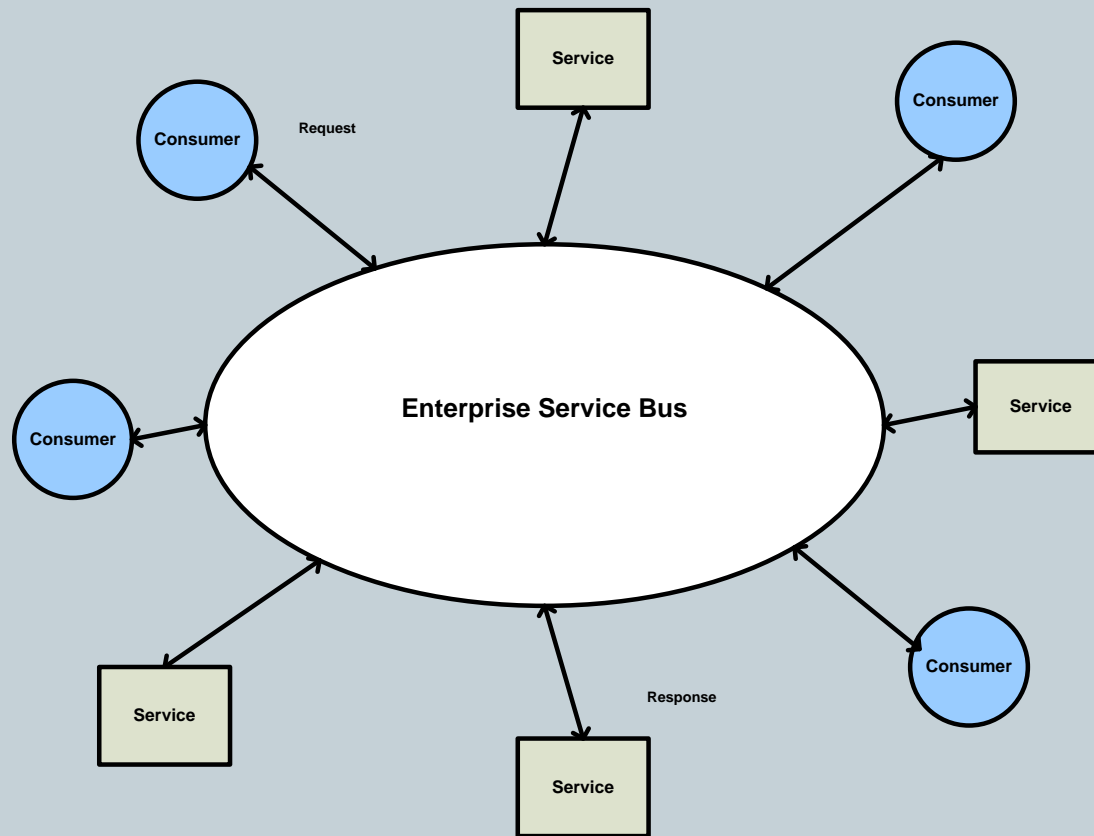
- Receives the request message
- Extracts the requested data from data store
- Process the request
- Insert the response data in the message
- Send reply message to the consumer



Messaging Services as a means of interaction with Consumer

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- Enterprise Service Bus (ESB)





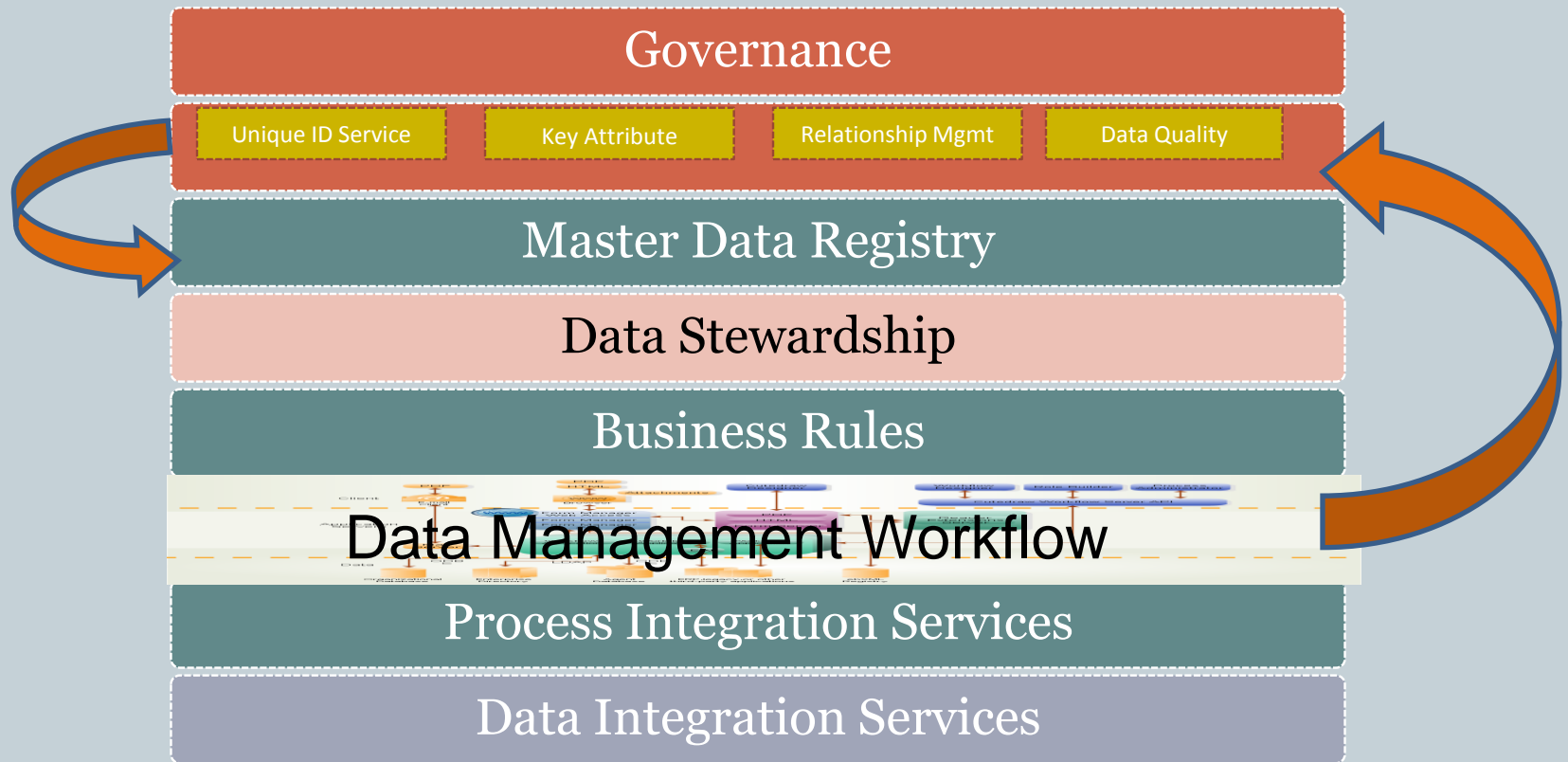
MDM Technology Solution Overview

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- Defining basic MDM blocks



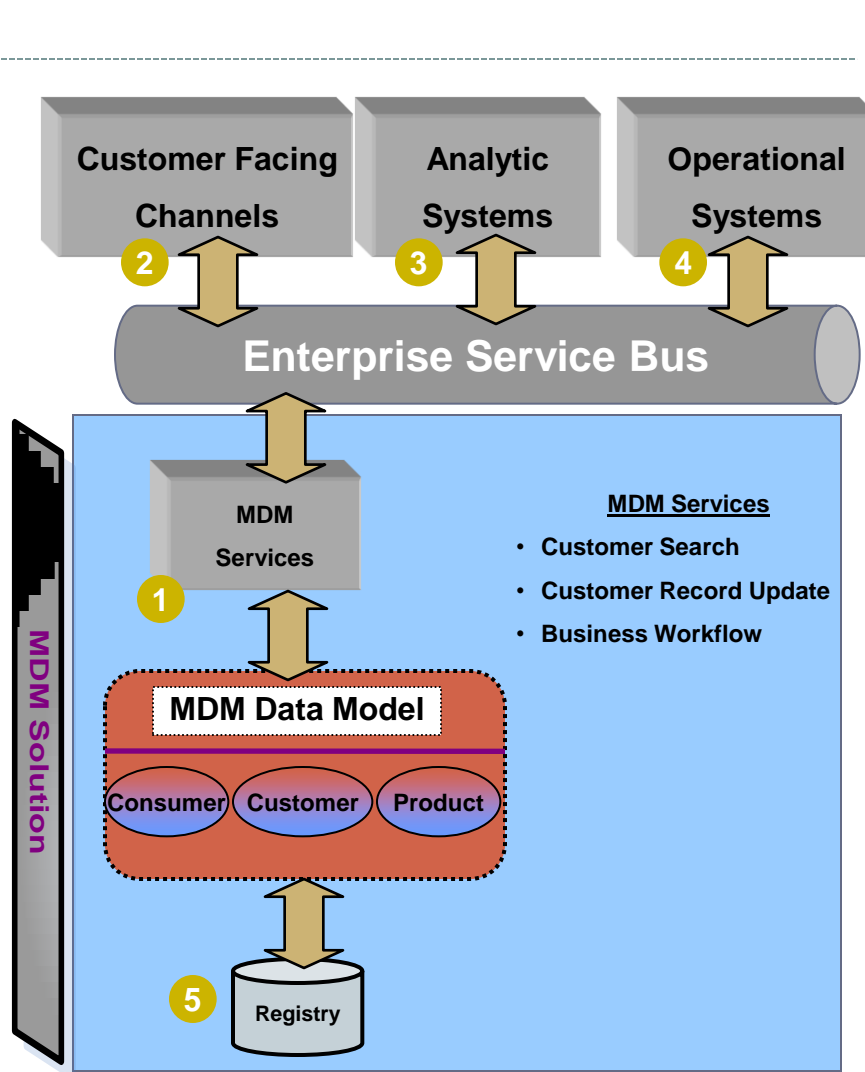
Definition : Master Data Management (MDM) is the authoritative, reliable foundation for data used across many applications and constituencies with the goal to provide a single view of the truth, no matter where it lies.



MDM Framework

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- MDM Architecture Blueprint (simplified)



- 1 MDM vendors have a generic MDM data model and sophisticated Data Services as part of the MDM Product offering
- 2 Customer facing channels (e.g. Call Center, Web) access the Customer Hub through business services to view all products that the customer has with UHG
- 3 Analytic systems (e.g. Data Warehouse, Data Marts) can access the Customer Hub to support advance analytics across business
- 4 Operational systems (e.g. CRM, ERP, transaction) can access the Customer Hub through business services to get a full view of the customer
- 5 MDM Registry generates unique ID after data de-duplication and pointers for cross-referencing

Industry Standard Terms

- MDM Registry
- Enterprise Service Bus
- Data Matching & De-duplication

(Example based on major MDM Vendor Solution)

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- MDM implementation styles taken by organizations

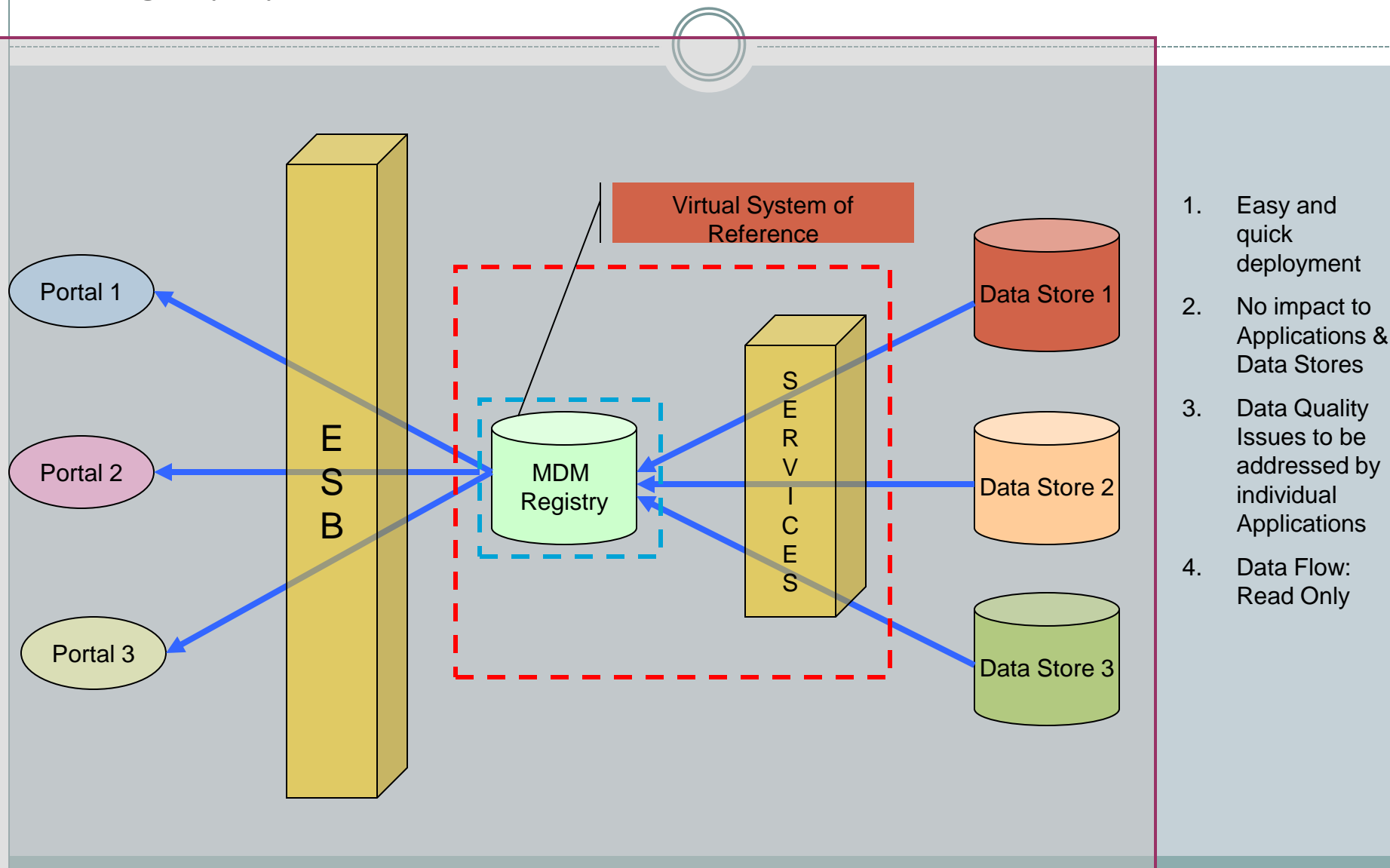


Major Types of MDM :

- Registry Style – Virtual, limited risk for integration
- Co-existence Style – Hybrid approach
- Transaction Style – Centralized Repository/ Hub

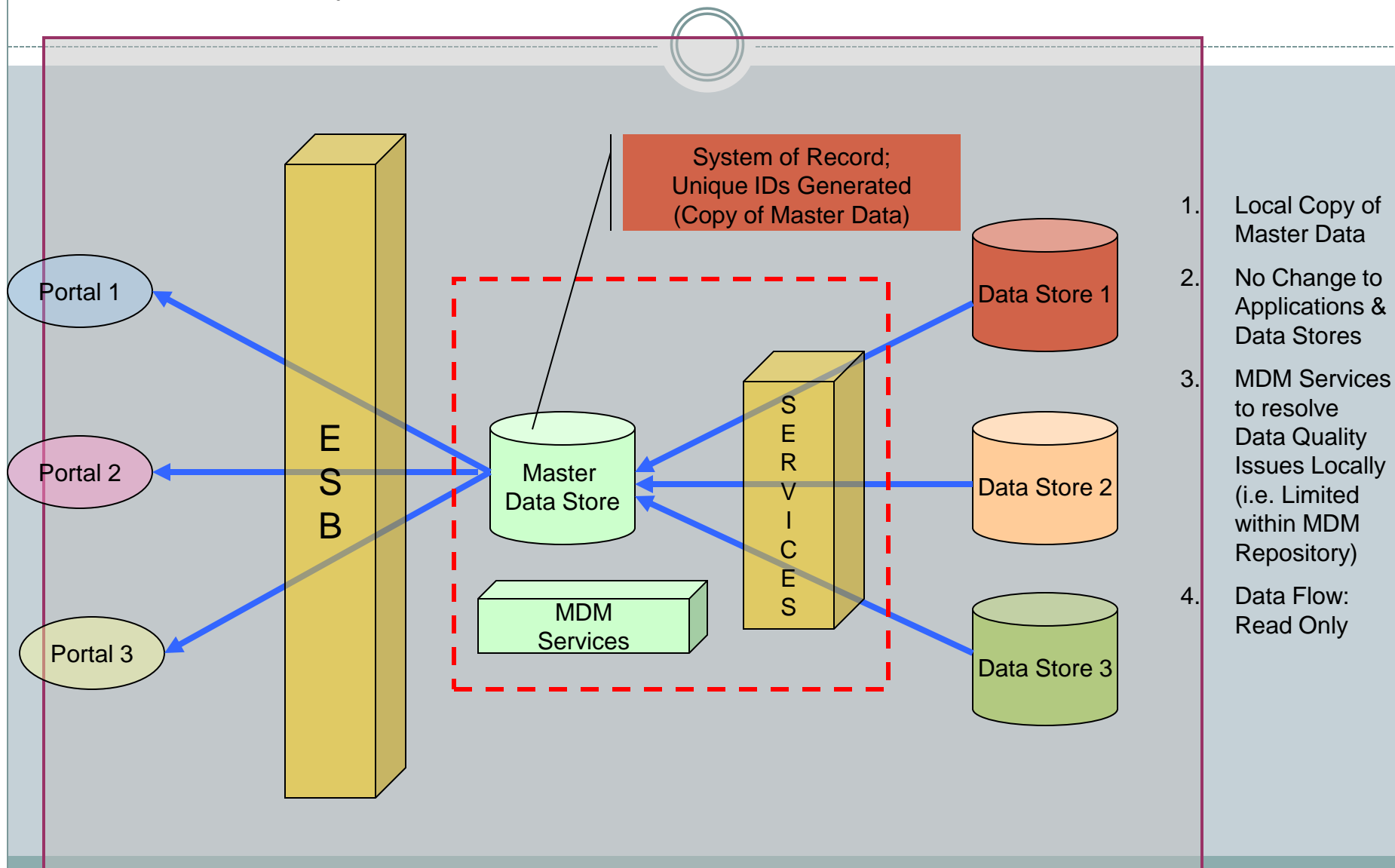
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- Registry style MDM



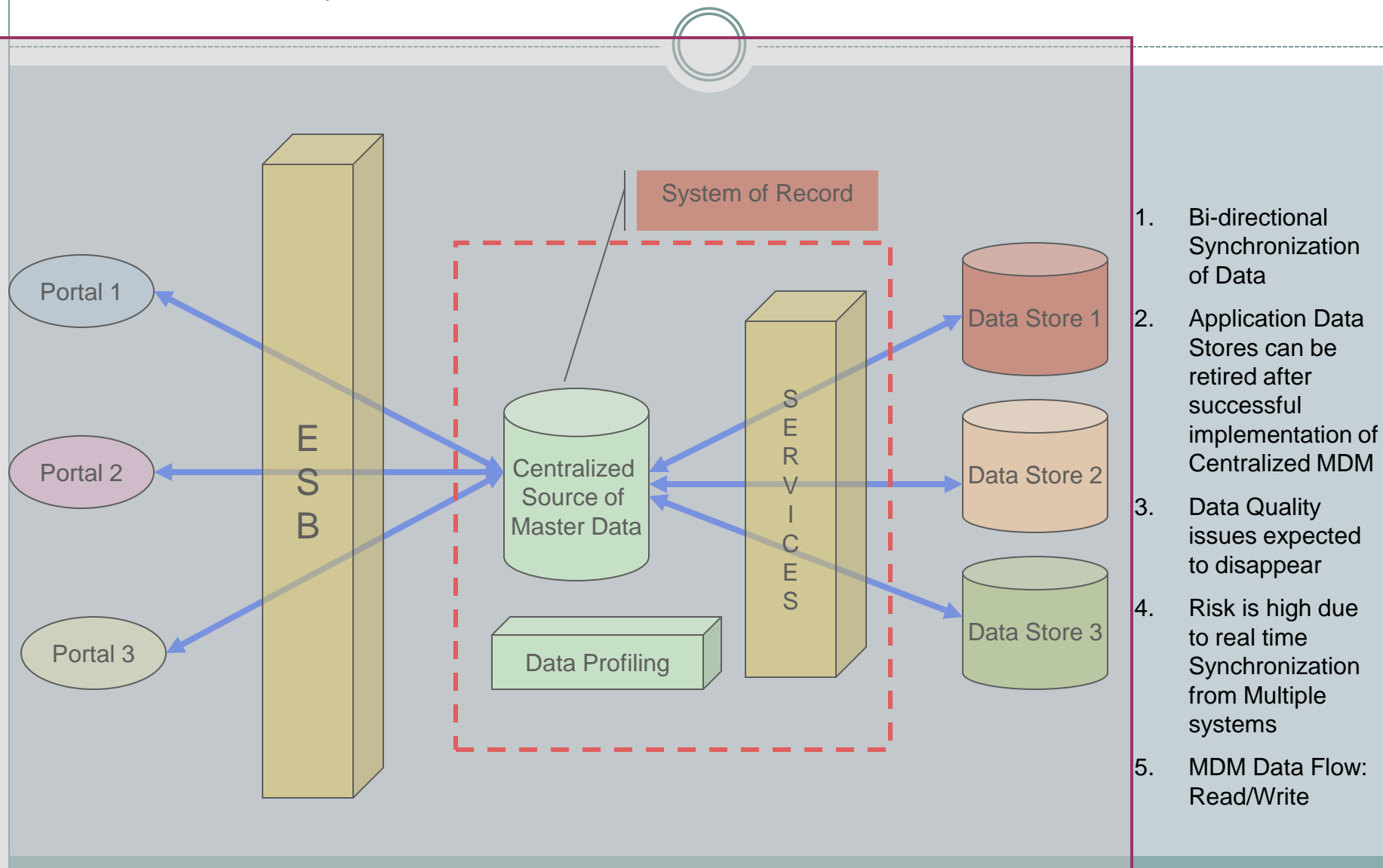
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- Co-existence style MDM



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- Transaction style MDM



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- Building vs buying your datamodel from a MDM tool vendor



Pros/Cons :

- To solve data integration challenges on MDM, one needs to look at resolving the underlying inconsistencies in data architecture and business process re-alignment
- Data Modeling needs to be treated as the foundation to MDM Success
- There are 2 basic approaches to address the modeling needs for any MDM program
 - Approach 1 – Buy your MDM Model from vendor and get a jumpstart
 - Approach 2 – Build your MDM Model based on specific enterprise requirements
- Approach should be chosen based on specific company needs and its environment
 - Company Size & Org. Complexity
 - Business /Sector driven factors
 - Existing IT Set-up

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-MDM Metadata Considerations



- Business Metadata
 - Business Glossary
 - Operational definition of key MDM terms
 - Data Owner and stewards
- Technical Metadata
 - Consistency of data definitions e.g. table & column names, size, data type
 - Clarity of Relationships PK , FK and indexes
 - Mappings (Transformations, XML, etc)

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-MDM Metadata Considerations (contd)



Operational Metadata

- Information about applications and run-time environment
 - procedures and scripts used to create/modify data
 - Last load, update and backups

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-Data Discovery & Profiling Considerations



- Clarity of data lineage
- Origins of a particular data set
- Potential usage across downstream systems
- Location , owner and steward
- View actual data values stored in source tables
- Need access to the database sources to view
- Metrics for MDM usage and adoption by downstream systems

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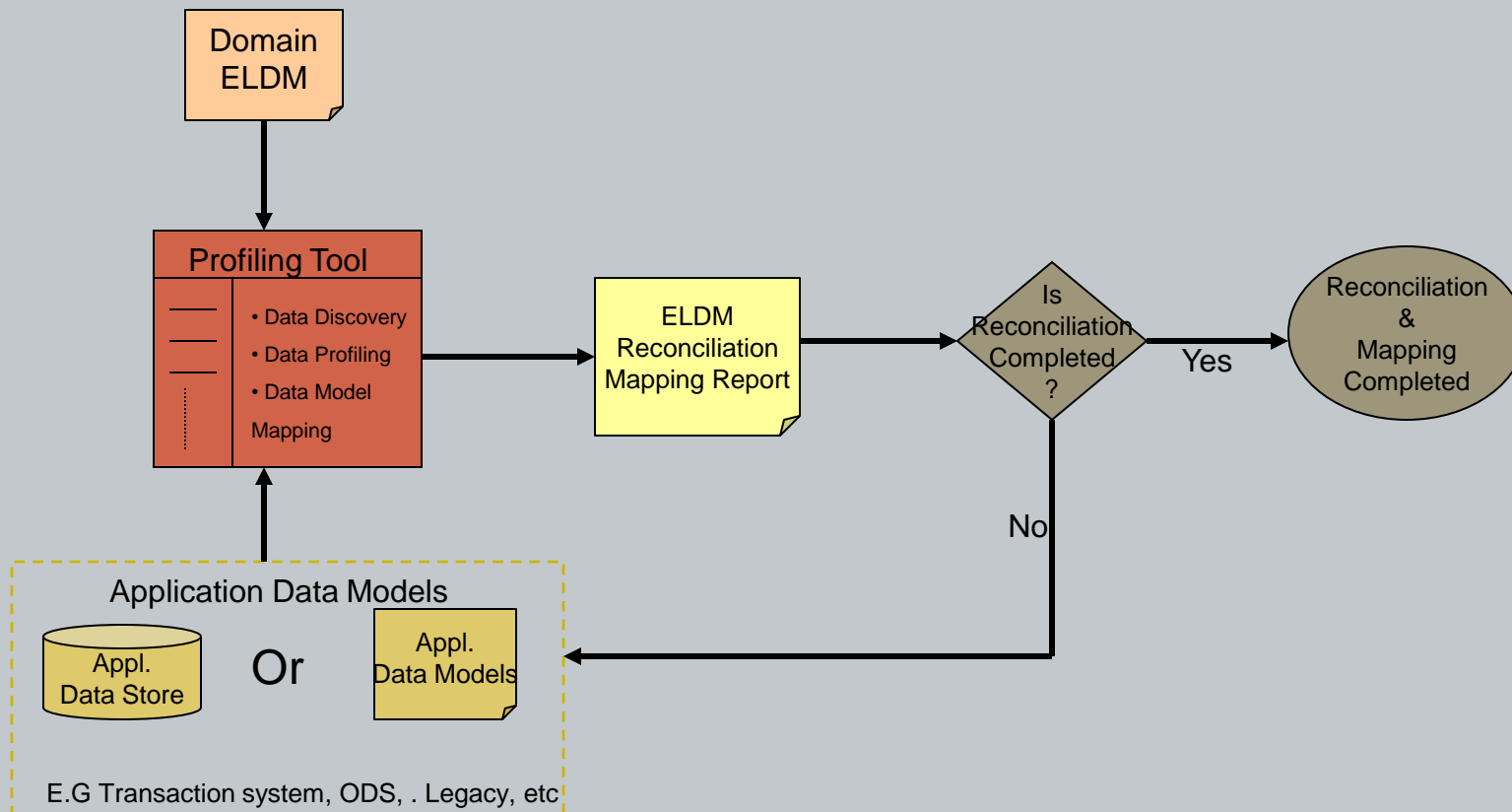
- Data Profiling approach taken for MDM



- Discover which data resources may be used as source for enterprise MDM
- Identify attributes that may contain master data
- Extract identifying information from the data sources
- Transform this into a standardized form
- Establish similarity to other standardized records
- Classify them for future reference and integration purposes

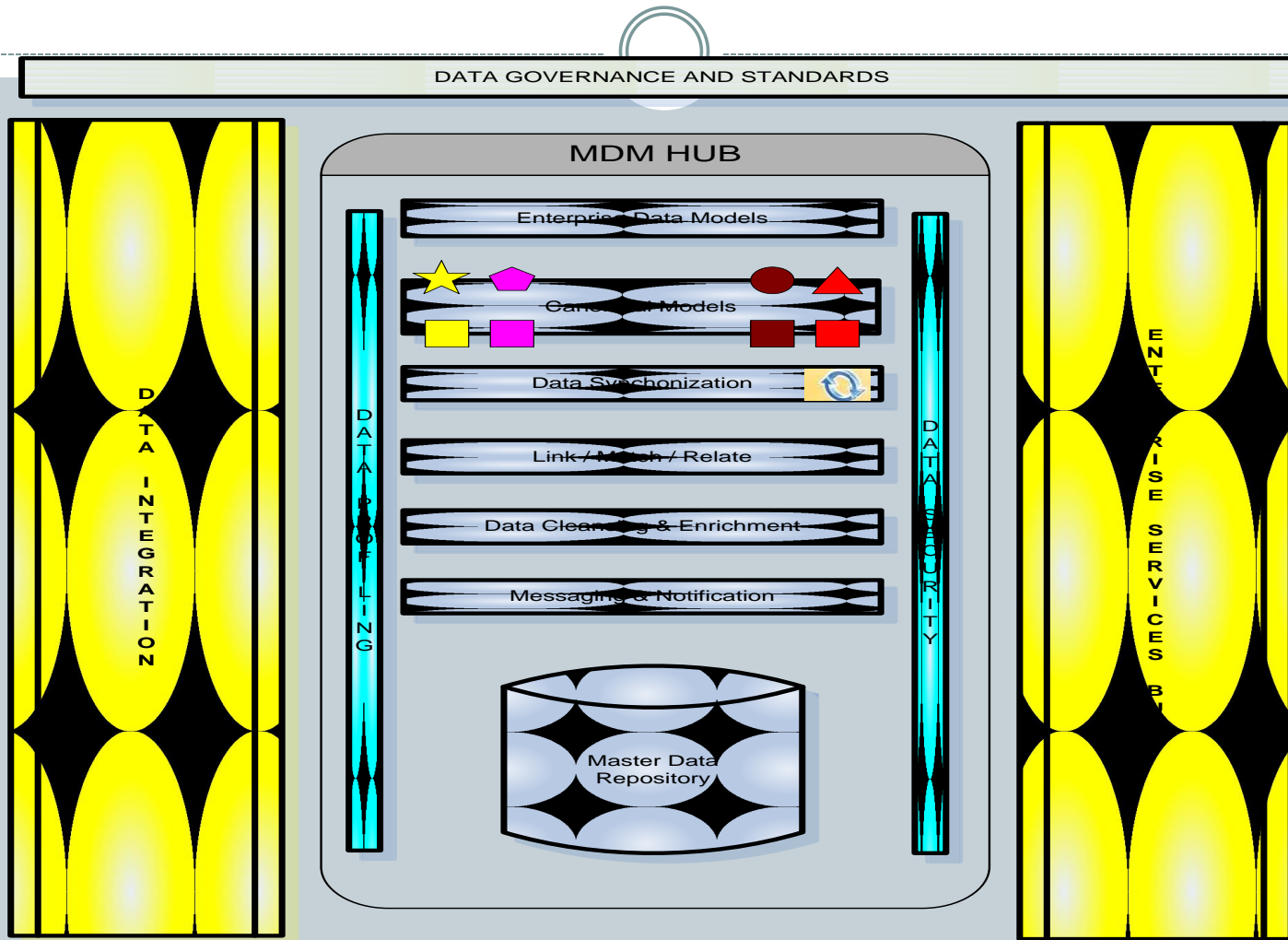
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- Ongoing MDM reconciliation process with Data Profiling tools



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- MDM solution components



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- MDM Technology Solutions and Vendors

Stand Alone MDM:

- IBM InfoSphere MDM Server, Initiate Systems, Siperian (Informatica), Kalido , Microsoft MDM, Purisma

ERP-Related :

- Oracle Customer Data Hub, Product Data Hub
- SAP Netweaver MDM

Build Your Own:

- Erwin, IBM Websphere MQ , ESB, Message Broker, HP Systinet, Trillium , Global IDs, ASG Rochade

-Source: The MDM Institute

<http://www.tcdii.com/links/vendorproducts.html>



**Enterprise Data Modeling
in the MDM environment**

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-Why data modeling is critical foundation for MDM initiatives ?



- As we discussed at outset, SOA and MDM was introduced as an enterprise integration solution in the Early to Mid 2000s promising a real 'breakthrough'.
- In our view, most of the products in market have not been able to deliver every benefit that was promised initially.
- Consumers/organizations can however benefit if they apply tools smartly in long run (breakthrough always come incrementally!)
- In reality SOA has been successful as a mechanism for moving the data back and forth without really looking to address the data integration /data quality issues
- To solve data integration challenges on MDM, one needs to look at resolving the underlying inconsistencies in data architecture and business process re-alignment
- The role of Data Modeling is often underplayed but it needs to be treated as the foundation to any MDM success!

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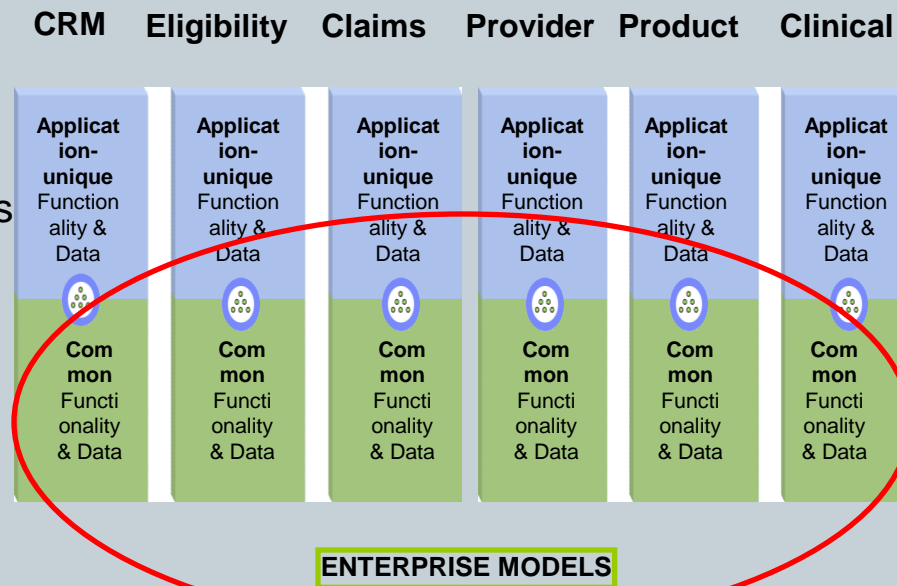
- What is Enterprise Data Modeling?

Enterprise Data Modeling IS...

- The *high value* information an organization *uses repeatedly* across many business processes
- The *core* entities impacting the major business processes: customers, partners, employee, products and plans
- Illustrating *relationships* among these business entities

Enterprise Data Modeling IS NOT...

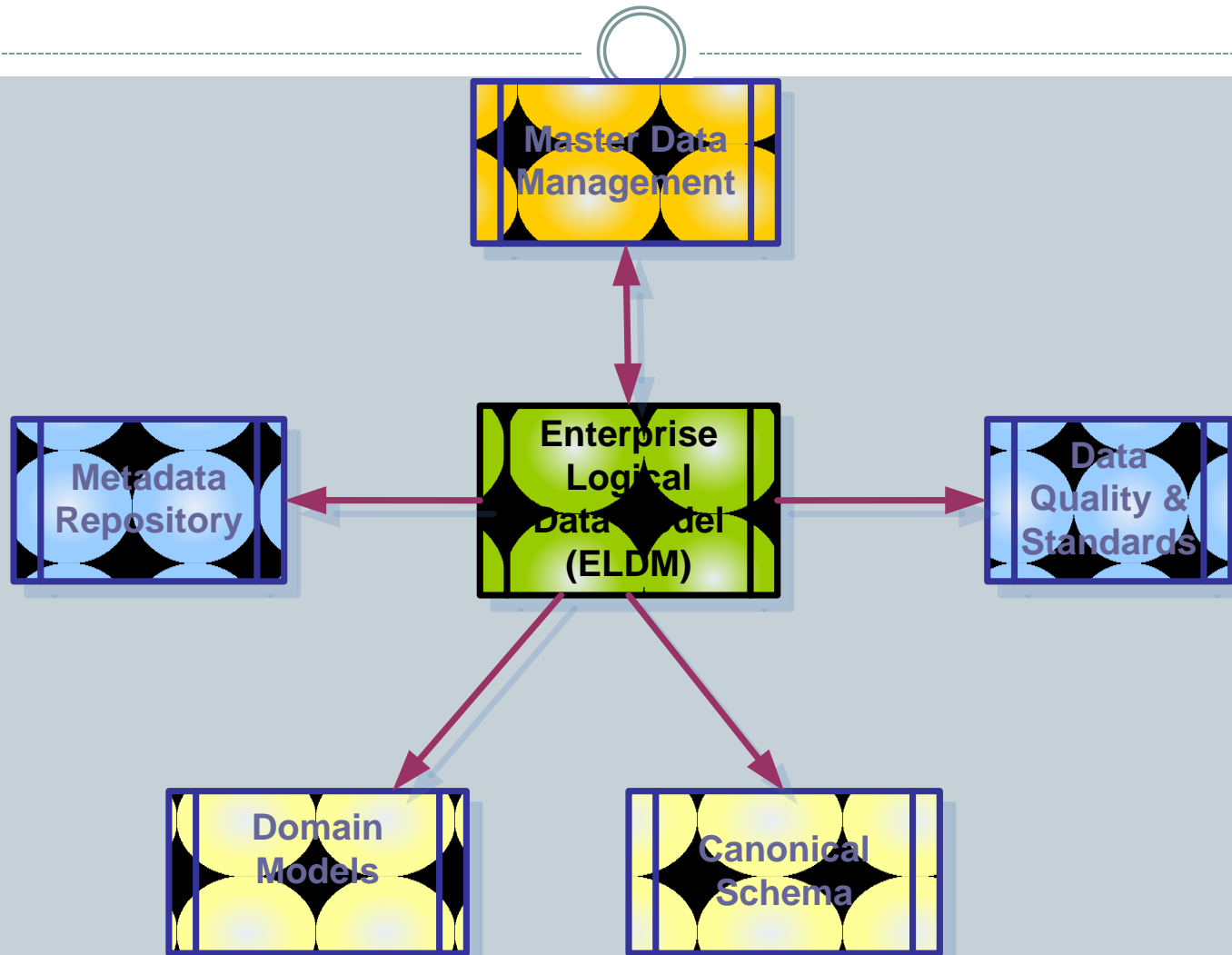
- Application-unique data
- Data scattered within heterogeneous application silos across the enterprise
 - Numerous applications / many subsidiaries / various LOBs
 - Becoming an inhibitor of a full scope enterprise transformation



Enterprise data models provide a consistent view of enterprise-level data in the organization, acting as a key enabler for sharing and re-using information across IT applications.

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-Why investing in Enterprise Data Modeling makes sense for MDM ?



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- Defining the Enterprise Data Model for MDM usage



Major features include:

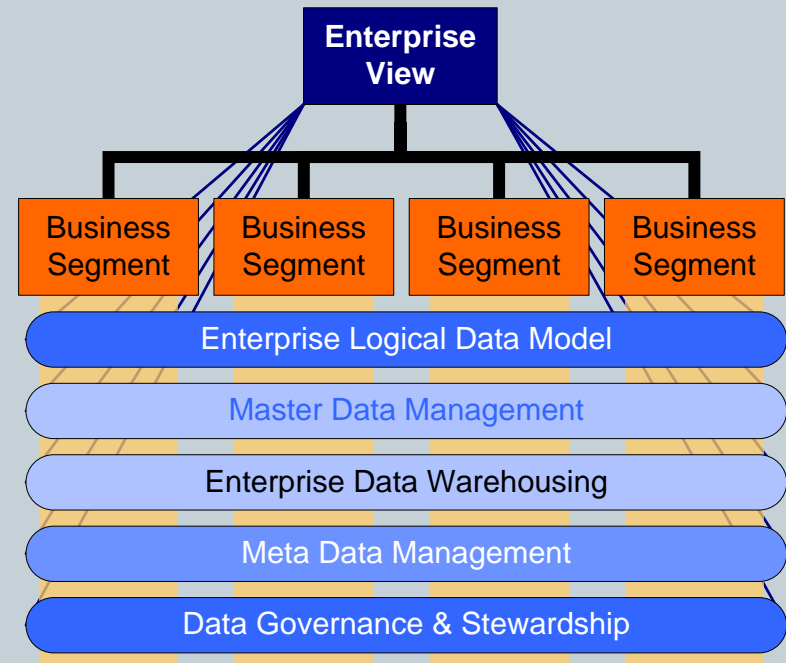
- This model provides an enterprise view detailing the primary objects of interest for MDM purposes
- The ELDM is broken into different domain areas(e.g.provider, member.etc)
- It will cover COMPLETE list of approved organizational entities (data),key attributes and their relationships
- Provides the common business language used to explicitly define structural Business rules, agreed-to data and metadata.
- It is represented at different levels- including Business, Logical and Canonical models (to support MDM Services)

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- Benefits attained by developing the Enterprise Data Model

Summary:

- Help promote sharing and re-use of core master & reference data across segments
- Drive uniformity and consistency in data design patterns
- Reduce program costs through collaboration and reduction of rework
- Prevent investments in redundant systems with appropriate controls/policies
- Ability to quickly accommodate to large-scale business changes (e.g. new acquisition)



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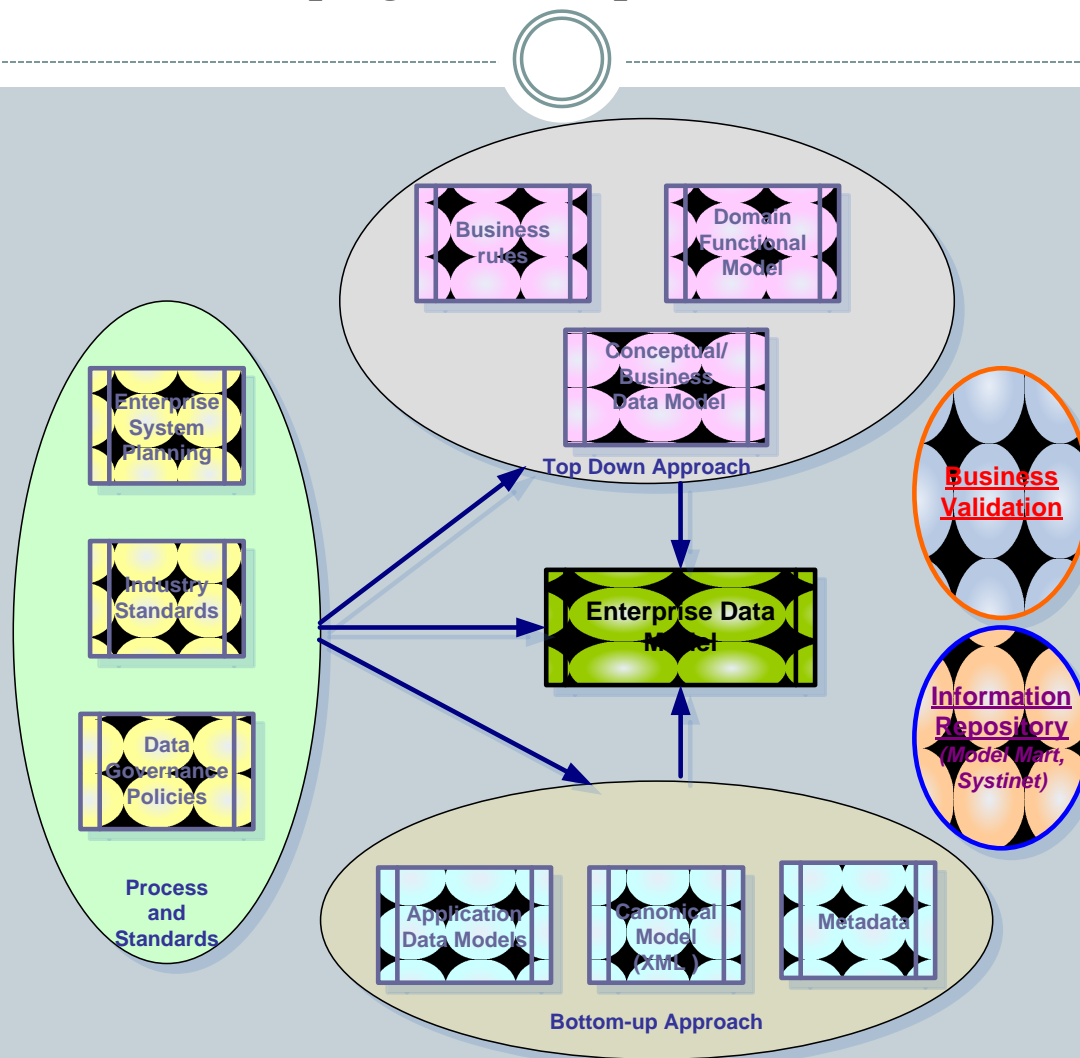
- Detail suggestions for developing the Enterprise Models



- Enterprise Modeling implementation can succeed if we combine both top-down and bottom-up approach in a pragmatic way.
- Enterprise Modeling Strategy comprises of two major areas –
 - Enterprise Logical Data Model (ELDM)
 - Enterprise Canonical Model (ECM)
- Enterprise Modeling SME team will work with Modelers across all business segments in guiding and reviewing new project initiatives to ensure that all application models reconcile with the ELDM
- Enterprise Canonical Models will be built leveraging ELDM as foundation for developing re-usable web services across the enterprise

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- Approach taken for developing the Enterprise Models

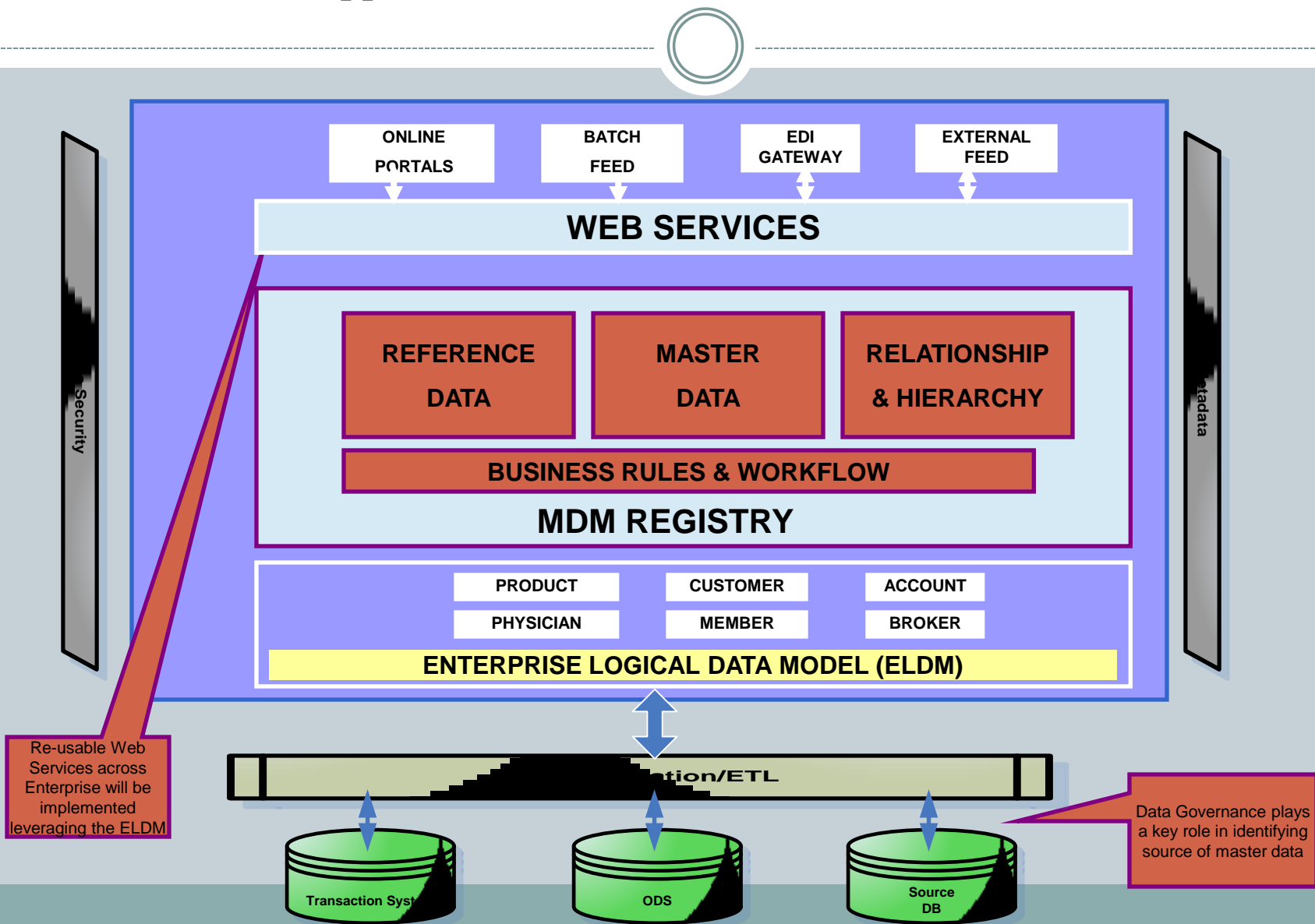




Deploying MDM Services using Enterprise Models

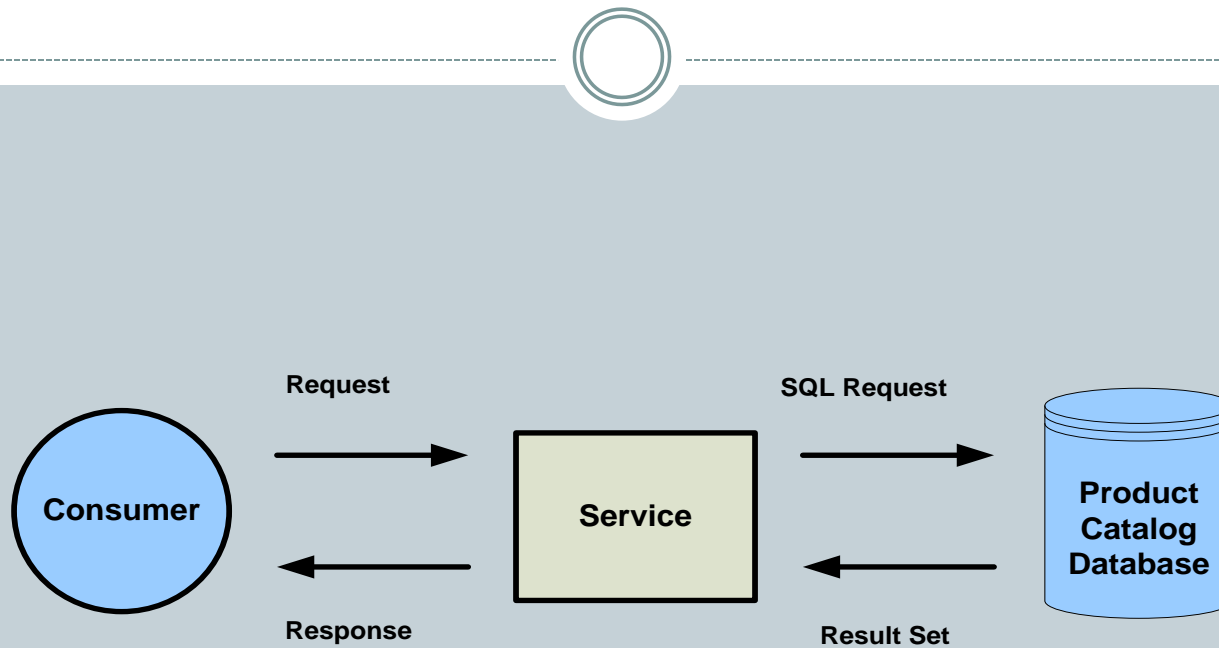
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- Services based approach to MDM



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- Example of Product Catalog Search using Web Services



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- Developing MDM Services for Product domain



Key steps suggested

- Identify business objectives with Domain SME team (e.g. Product Branding)
- Determine how these business objectives relate to existing business processes and architecture (e.g. gap analysis for future brands)
- Define service components that are necessary to achieve the identified business goals
- Catalog the services that are already available within the enterprise
- Designing and implementing the services

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- Major Classes of MDM Services



- Core Services
- Object Services
- Business application Services

Adapted from “SOA – a planning and implementation guide for business and technology” by Eric Marks and Michael Bell (Wiley 2006)

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- XML Canonical Model vs. Message Schema

Canonical Model

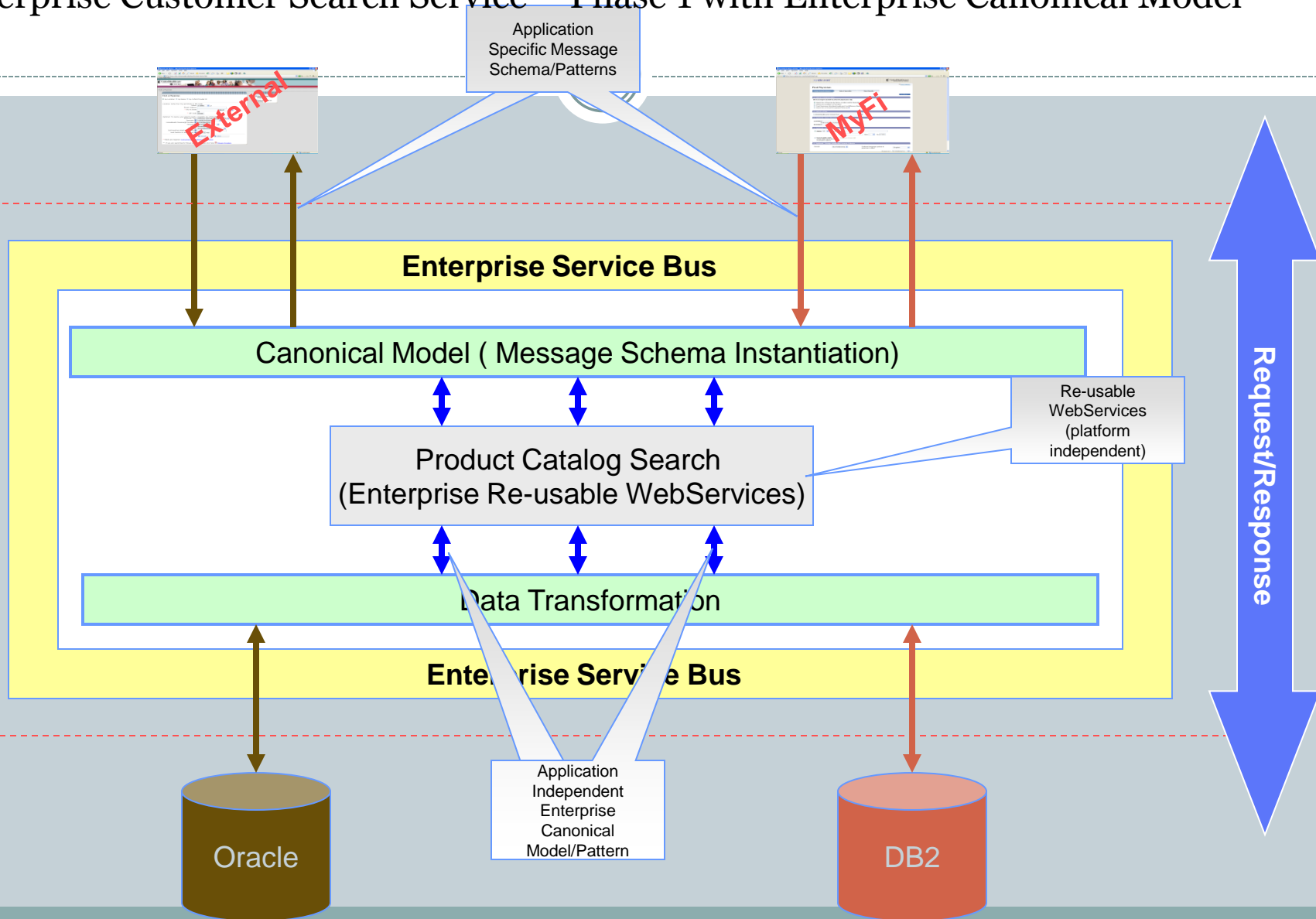
- Consistent and standard view of an organization's domains
- Based on Enterprise Data Model (EDM)
- Represents a standardized set of objects and relationships for re-use across organization
- Complies with Industry Standards (e.g. X12, HL 7)
- Process Independent
- **Enterprise design pattern**

Message Schema XSD

- Instantiation for individual platform based requirements
- Implementation will make re-use of the Enterprise Canonical Data Model
- Leverages infrastructure & tech. components running today (e.g. ESB, WMB)
- Performance considerations
- Process Dependent
- **Application oriented**

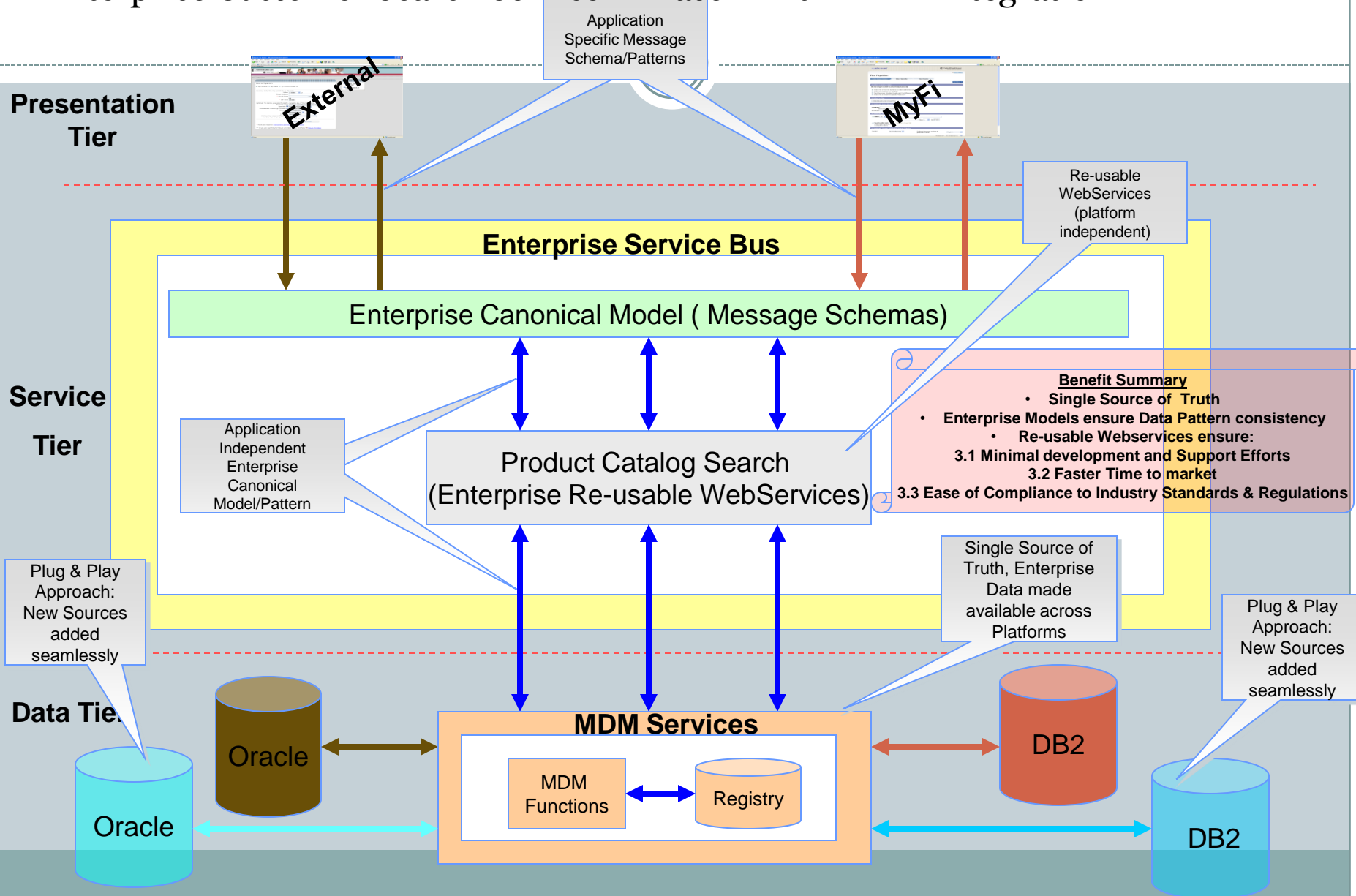
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- Enterprise Customer Search Service –Phase 1 with Enterprise Canonical Model



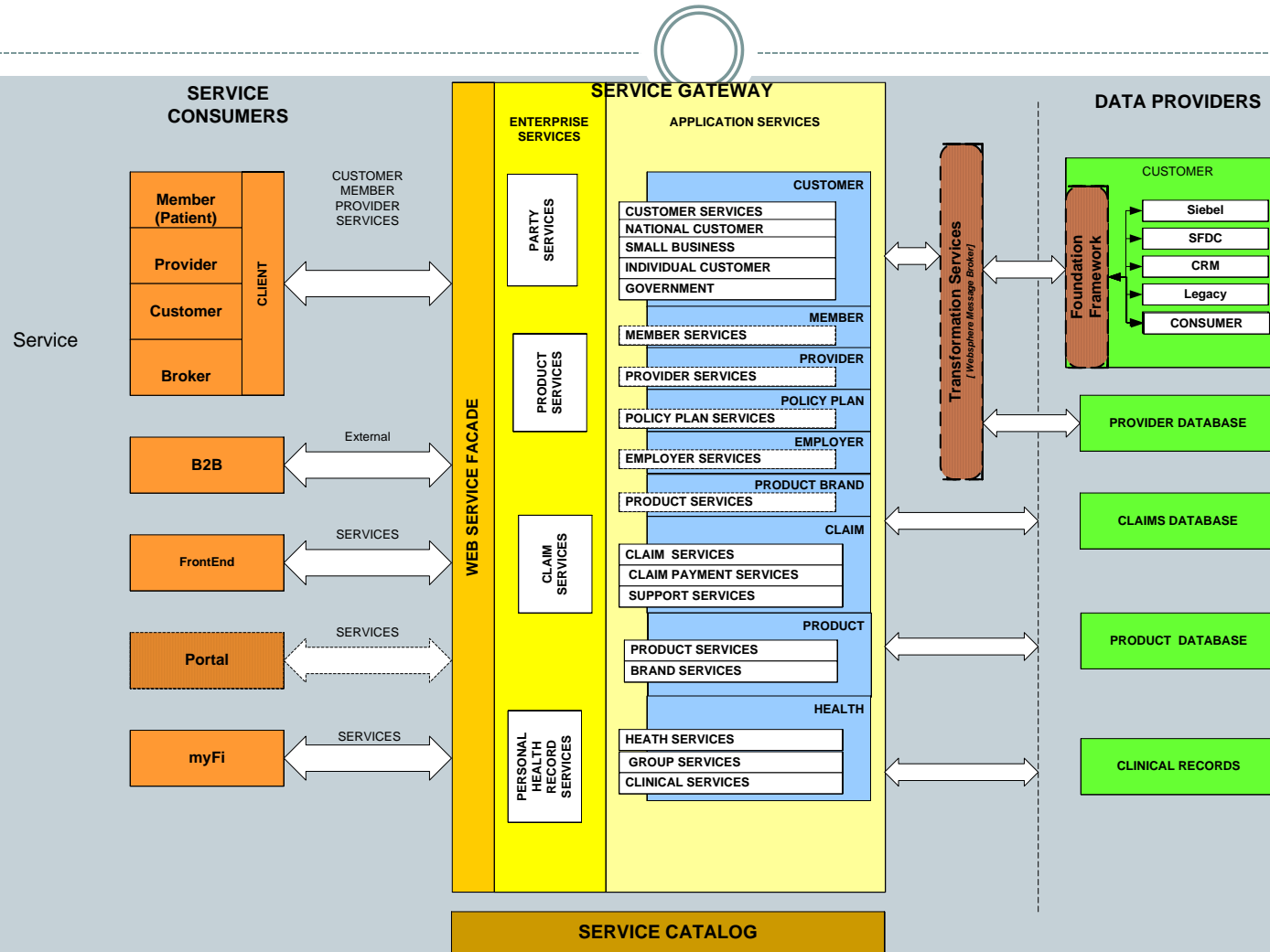
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- Enterprise Customer Search Service –Phase 2 with MDM integration



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- Enterprise MDM Services (across multiple domains)





Special Security & Privacy Considerations for MDM/SOA services

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- Major Security considerations



- Security considerations play crucial role in MDM /SOA implementation
 - Information Risk Management & Security
 - Industry regulations
 - XML Standards
 - Data Access & Entitlements
 - Consumer Privacy
 - Audit of MDM transactions

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- Regulatory, Industry & Sector Compliance requirements



- Patriot Act – AML, KYC provisions, Sarbanes-Oxley
- HIPAA 5010, HL-7, ICD 10
- Consumer Privacy laws
 - National Do Not Call
 - Gramm-Leach Bliley Financial Modernization Act (GLBA)
 - Fair Credit Reporting Act

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- Suggested steps to ensure compliance



- Define additional security specific business rules for specific tables/attribute
- Specify visibility rules within ELDM for key consumer information (Element level tagging)
 - Person Identifiable Information(PII) e.g. SSN, Name , DOB, Credit Card, Rating information
 - Person Health Information(PHI) – Biometric data, Privacy regarding Health Conditions like allergies, HIV, etc
- Data obfuscation – Data values in certain tables need to be masked (production and test environment)
- Event-driven security alerts and notification

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- Practical MDM implementation approach suggested

- Highly available service (24x7) desired– data latency and service availability varies based on the availability of data providing systems.
- Leverage assets in your existing IT environment when possible
- Consolidate and standardize tools
 - ▶ Use standard tools for storing messaging, XML models, testing tools
 - ▶ Centralized design time service repository (e.g.HP Systinet)
 - ▶ Define process for change control and automated request workflow
- Security & Privacy Considerations are critical!
 - ▶ Highlighted role of processes like IRM, Data Governance
 - ▶ Impact of tighter regulations in privacy and related compliance
 - ▶ Data interoperability and messaging standards

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- Defining role of MDM Governance



MDM Governance provides :

- A solid foundation of MDM principles, policies and standards
- Collaboration between business and technical teams across the enterprise to improve data quality.
- Data Ownership with official role for Business Stewards by domain
- Controls for achieving future state and managing the growth of data.



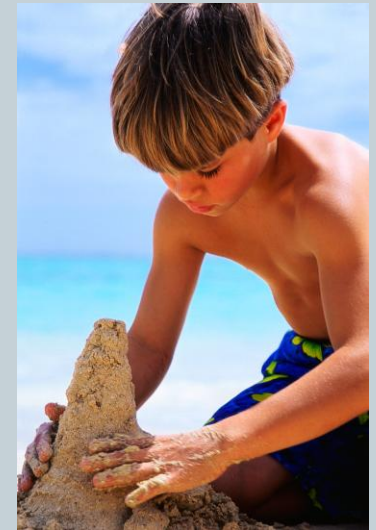
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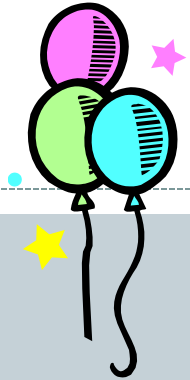
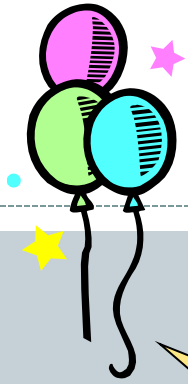
- Final observations



Use MDM as a competitive differentiator that can be leveraged to drive value and operational efficiency across any business

- Help reduce the duplication of data with MDM as foundation
- Eliminate redundant feeds by adopting single sources of truth approach
- Leverage the technology solutions in the MDM and SOA market but need to use it 'smartly' in the context of company specific needs
- Leverage existing Data/XML Models for MDM efforts
- Adopt governance policies, standards and monitor these periodically
- Accept some roadblocks as part of your journey!!!





Thank you!

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- Questions/Feedback ?



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