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Enterprise Master Data Management
# Architectural Aspects

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Mumbai

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Agenda

- **Requirements – EMDM Applicability**

- **Framework, Principles & Architecture Vision**

- **Business, Information & technology Architectures**

- **Opportunities and Solutions**

- **Migration Planning, Implementation Governance & Change management**

- **Best Practices**
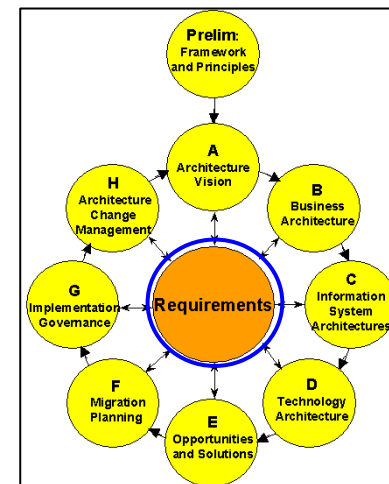
Applicability of EMDM

- Organizations, specifically, retailers and manufacturers have made many efforts to improve product flow – lean manufacturing, floor-ready merchandise, etc.
- However, the processes for information flow fall behind improvements in the supply chain flow.
- Delays caused by incomplete and inaccurate information limit trading partners' ability to capitalize on improvements in the physical supply chain.

Category	Industry Trends	Implications
Compliance Needs & Emerging Global standards	Basel II, Sarbanes-Oxley, HIPAA etc safeguard the data and assign ownership; focus on data quality Global standards like GDS	Solutions that trigger change in data management processes Bring key data elements into centralized control and define common view of key data elements
Mergers and Acquisitions	More sources of master data Leveraging Knowledge embedded in key master data across partners	Improve cross sell Negotiate better with vendors Eliminate pricing mismatch
Operational efficiency Improvements & enterprise initiatives	Increasing competitiveness Reduce latency; right data at right time Enterprise initiatives like RFID	Reducing time to market Improving supply chain interactions
Increasing Customer needs	Customer demands; reducing loyalty Considering master data as strategic asset	Ability to offer superior services Increase accuracy with single view

Business Context / Problem Context

- Problems with master data cause companies to under perform when transacting business with suppliers and customers
- Each business unit of a company has different representations of item and vendor numbers, resulting in inability to leverage its scale and hence reduce procurement costs from its vendors
- Because an online specialty foods retailer had a very manual item setup process, it took over thirty days to introduce new items. This was very frustrating for vendors and as a result, many decided not to continue to do business.

A Typical I/T Story

1,000 island Problem

Improve your odds with Infosys Predictability
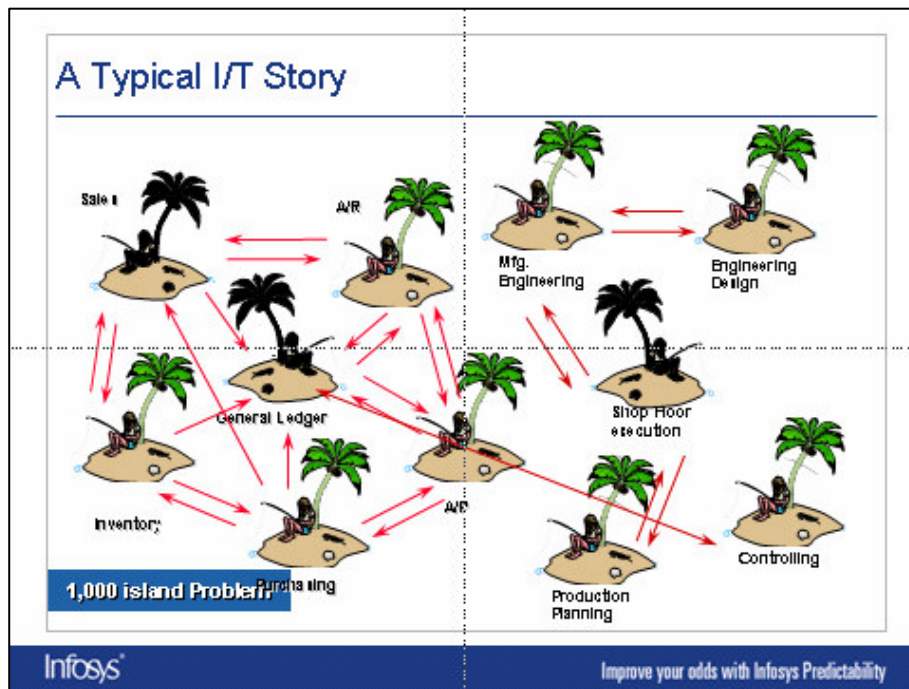
- There's no single enterprise view of customer, vendor or product

- Senior management request for information requires intensive manual effort to respond, and far longer than desired

- Low return on technology investments; higher operational costs

- No ownership of data; difficulty in complying with regulatory requirements

- Inability to keep up with volume, pace and variety of data

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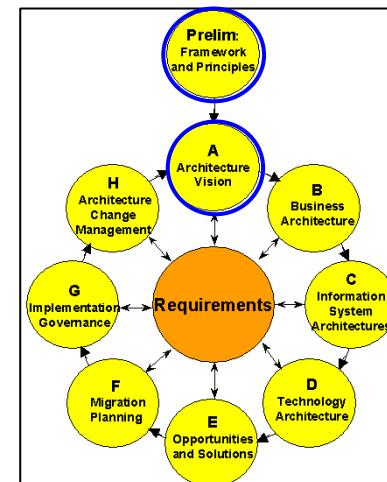
EMDM Architecture Framework
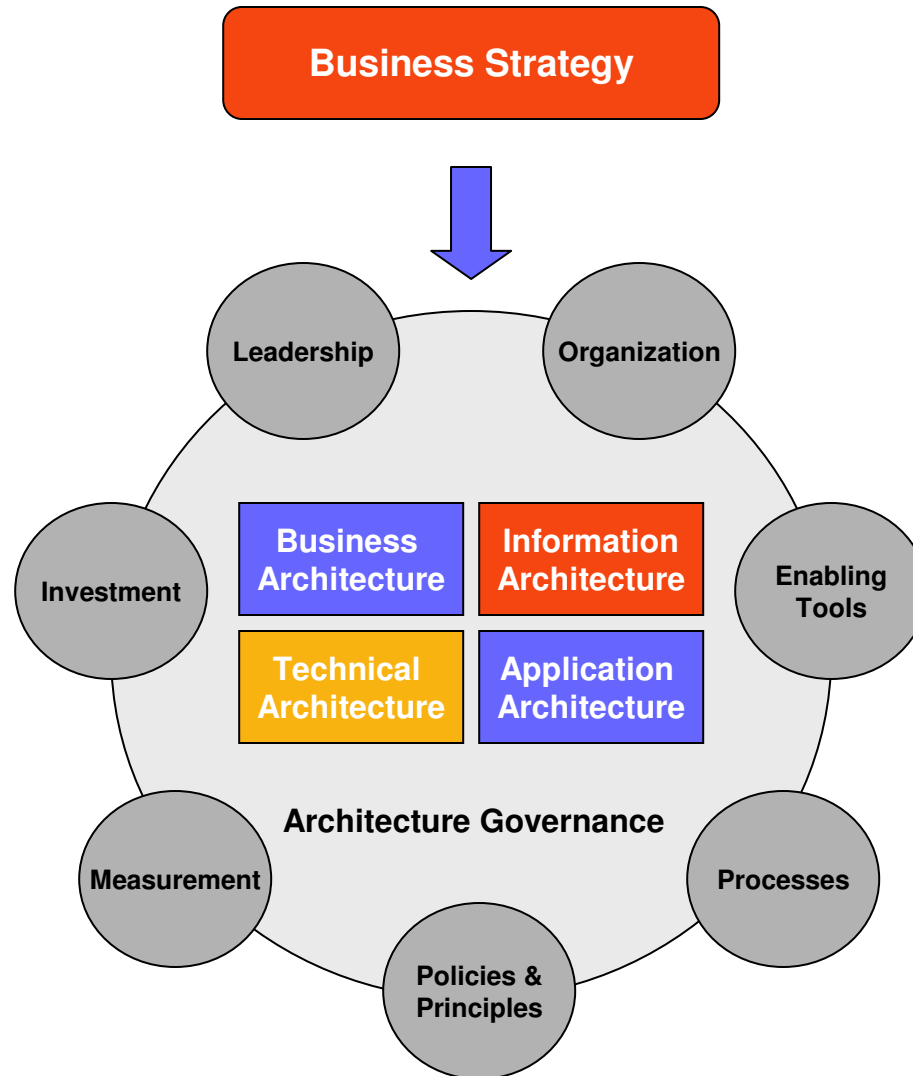
Business Architecture
Describes the business strategy, models, processes, services and organizations. Provides the foundation upon which the other enterprise architecture dimensions base their decisions.

Technical Architecture
Defines the strategies and standards for technologies and methods used to develop, execute and operate the Application Architecture

Architecture governance
The practice and orientation by which enterprise architectures and other architectures are managed and controlled at an enterprise-wide level.

Business Strategy

Leadership

Organization

Investment

Enabling Tools

Business Architecture

Information Architecture

Technical Architecture

Application Architecture

Architecture Governance

Measurement

Processes

Policies & Principles

Information Architecture
Identifies, documents and manages the information needs of the enterprise. Assigns ownership and accountability for the information and describes how data is stored by and exchanged between stakeholders

Application Architecture
Defines the specification of technology enabled solution in support of the business architecture. Provides a view of how services should be bundled to support a business process

Architecture Principles

- **Reduce load on mission critical systems**

- **Provide for different means of Master Data integration, combination of EAI, ETL & EII**

- **Separate functional concerns of OLTP, OLAP and MDM**

- **Non intrusive syndication**

- **Ease of other systems doing data stewardship**

Architecture Vision - Four building blocks for EMDM
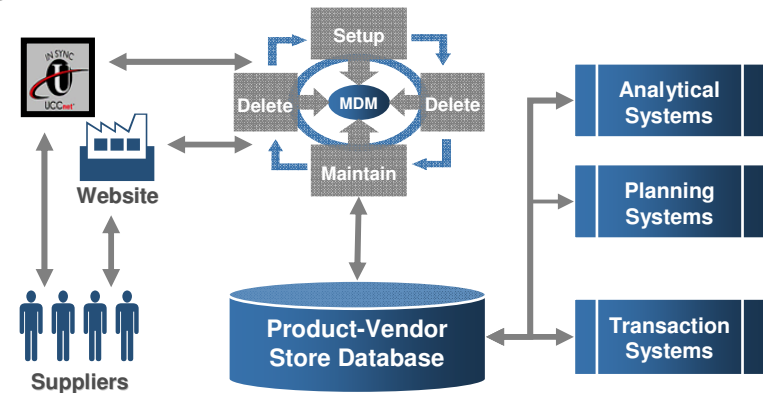
1 Streamlined Master Data Processes & Workflows

Setup

Delete

Inactive

Maintain
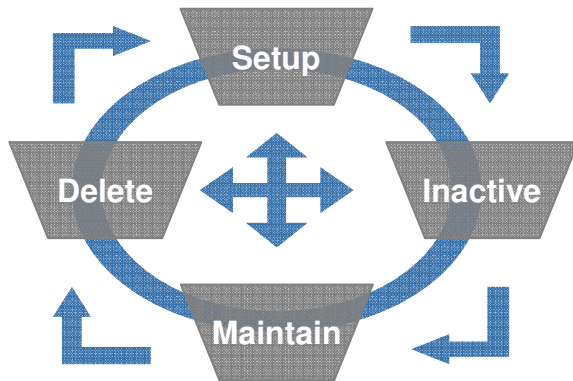
2 Master Data Repository & Internal Synch

Setup

Delete — MDM — Delete

Maintain

IN SYNC UCCnet

Website

Suppliers

Product-Vendor Store Database

Analytical Systems

Planning Systems

Transaction Systems

3 Electronic Data Synchronization w/ Vendors

Supplier A

Supplier B

Supplier C

Catalog

Vendor Portal

GDS

Master Data Repository
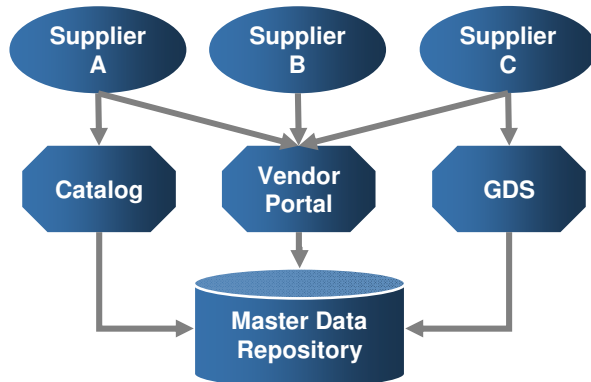
4 GTIN / GLN / EPC / Flexible Merchandise Hierarchy
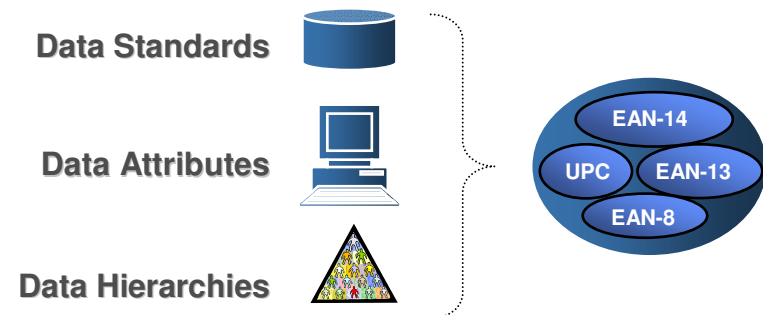
Data Standards

Data Attributes

Data Hierarchies

EAN-14

UPC

EAN-13

EAN-8

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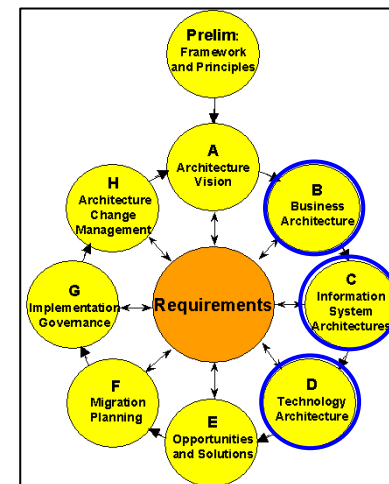
Typical Business Architecture
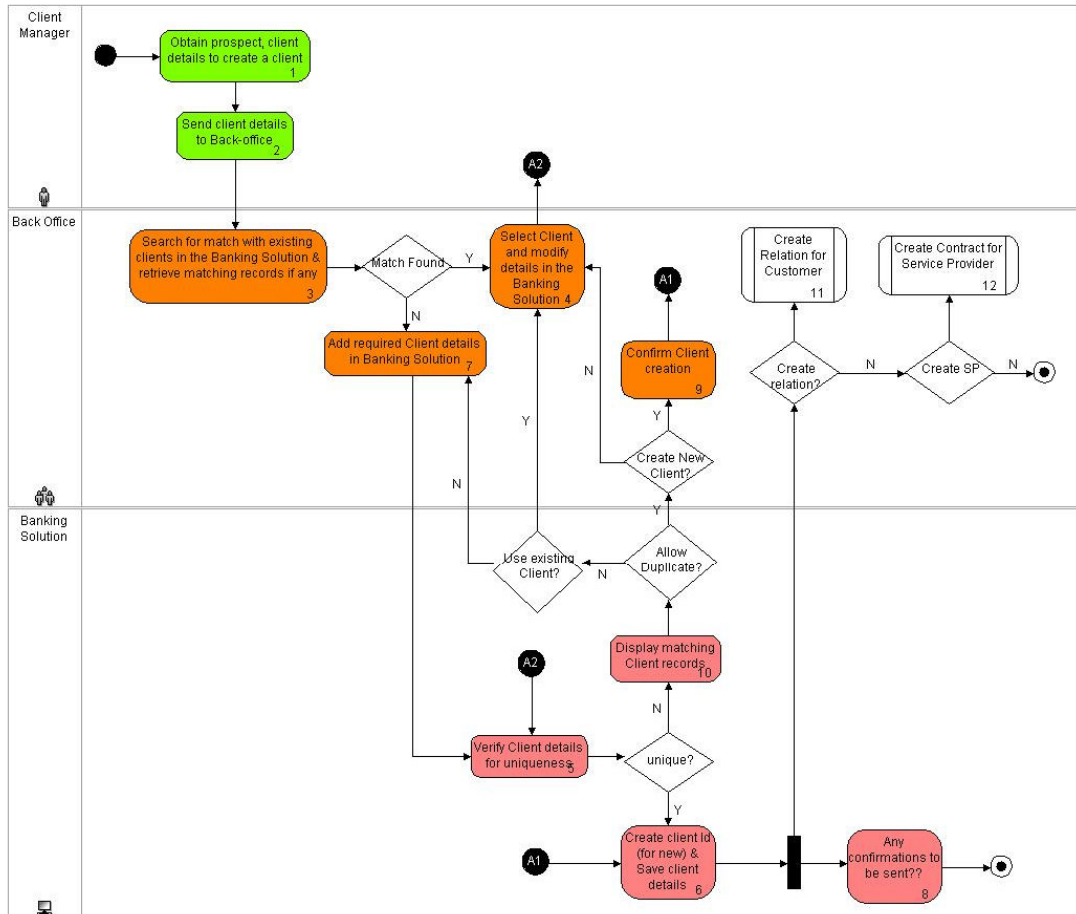
To Be : Acquire/Create Client

Typical Information Architecture – Datamodel, ER diag

Enterprise Entities and Relationships :

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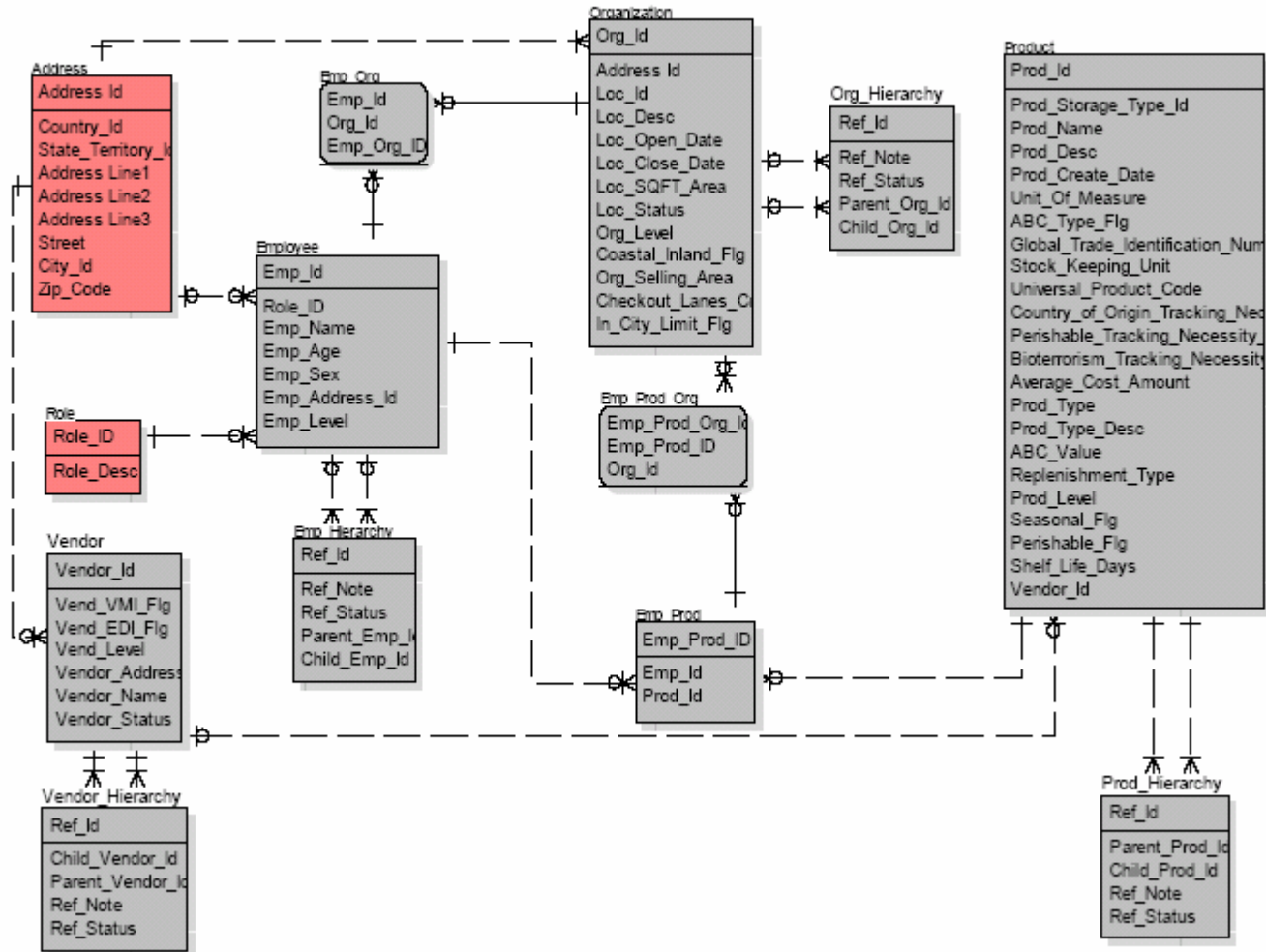
It is important to leverage existing technologies, while integrating new ones

Streamline Processes & Workflows

- **Intranet Portals**
- **Partner Gateways/Portals**
- **MDM Workflow Tools**
- **BPM Tools**
  (covers MDM as well as integration workflows)

Electronic Data Synchronization

- **External Data Pools Gateways**
- **Content Management Tool**
- **Catalog Publication Tool**

1 — Streamlined Item Processes & Workflows

2 — Master Item Repository & Internal Sync

3 — Electronic Data Sync w/ Vendors & Customers

4 — GTIN / GLN/ EPC / Flexible Merch. Hierarchy

Data Standards

Data Attributes

Data Hierarchies
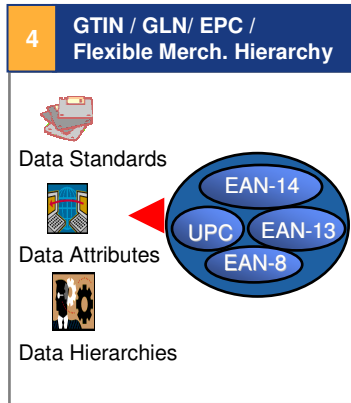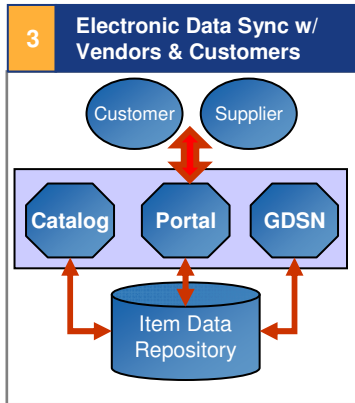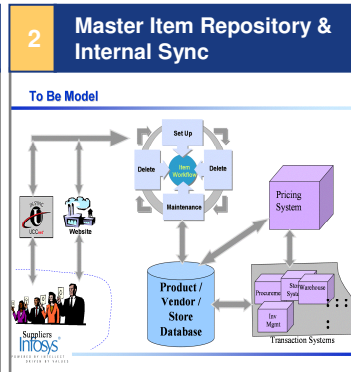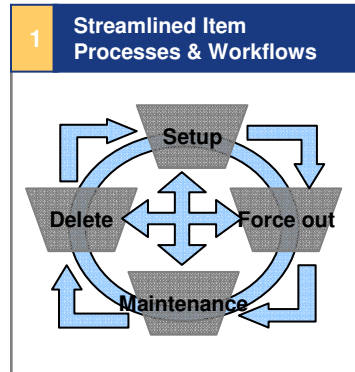
Master Repository

- **MDM Tools Repository**
- **Data Quality Tool**
- **Search and Match Tool**

Internal Synchronization

- **MDM Synchronization Tools**
- **Security and Directory Tools**
- **EII & EAI Tools**
- **ETL Tools**
- **Database Level Integration Components**

Required Tools

MDM	Others

Since different technology tools are needed to develop a comprehensive Master Data foundation, it is important to analyze alternatives and select appropriate tools as part of the MDM strategy

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Enterprise Master Data Management – Technical Architecture

Business Partners

Paper Based Data

Business Users

Business Modeler

UCCnet Repository

Data Requests & Authorizations

Firewall

Notifications & Master Data

Notifications & Master Data

Data Requests & Authorizations

Interactive Data Input

Manual Input

Master Data Mgmt Interactions

Process & Data Modeling

UCCnet Gateway
- FTP
- HTTP
- SMTP
- Protocol Mgmt & Workflow
- Translation & Adapter Layer

Partner Gateway
- FTP
- HTTP
- SMTP
- Protocol Mgmt & Workflow
- Translation & Adapter Layer

Vendor Portal
- Master Data Process UI
- Workflow Mgmt
- Adapters

Master Data Management Process Automation

Business Intelligence Tools

Data Mgmt & Process Logic

Adapters

Master Data Process User Interface
- Master Data Management Processes
- Workflow Automation
- Central Master Repository
- Process Monitoring & Management
- Workflow Modeling
- Process Repository

Enterprise Integration Backbone
- Event Management
- Translations
- Routing
- Synchronization Rules
- Scheduler
- Messaging
- Data Extract & Load Mechanisms
- Publish / Subscribe
- Request / Response

Exception Mgmt

Logging

Adapters

Enterprise Application (Remote @ Stores/DCs)

Application Master Data

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Opportunities & Solutions

- **Improve process efficiencies**
  - Getting some processes corrected and optimized
  - Collect process best practices

- **Improve execution efficiencies**
  - Speed up time to Shelf
  - Better support for data intensive applications

- **Better information management**
  - Reduce data administration costs
  - Improve product data accuracy
  - Collect industry best practice - data models, ER diagrams etc
  - Collect COTS product evaluation criteria & matrices
  - Identifying custom built components that can be built once & reused

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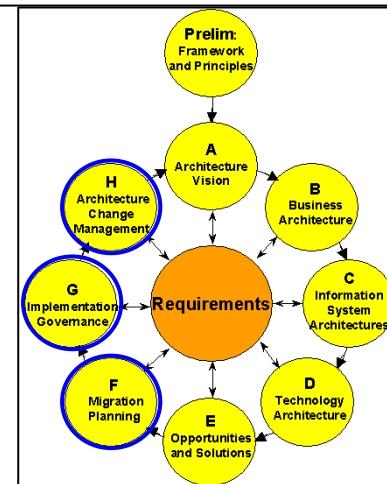
- **Best Practices**

Steady state, "To Be", governance model
Business and IT work together to ensure that Master Data provides business value across the enterprise

EDM Service Owner

EDM Service Manager

Enterprise Business Governance

Class Sponsor

Business Data Steward

Class Manager

Operate/Sustain

Support Manager

Service Desk	Data Availability	Data Quality	Monitoring	System Administration
	L2	L2	L2	Configuration
Security Specialist	L3	L3	L3	Maintenance

Create and Change

Implementation Mgr

Information Architect	Information Analyst	Distribution Team	System Administration
			Configuration
Acquisition Team		Security Specialist	Maintenance

LEGEND

Process Category
Process Areas
Roles

Steady state, "To-Be" multi-stage change management process
Supports the "To Be" Governance Model

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Change Management Considerations

```
                        ┌──────────────────────────┐
                        │    Change Management     │
                        └──────────────────────────┘
           ┌───────────────────────────┐   ┌───────────────────────────────┐
           │   Migration Planning &    │   │  Ongoing Change Management    │
           │ Implementation Governance │   │        & Governance           │
           └───────────────────────────┘   └───────────────────────────────┘
```

Create the Migration Approach
• Should address key aspects of the migration exercise like: implications of this project on other projects and activities, products needed, organizational resources needed to develop the new components, cultural impact on the user community, and how can it be controlled, cost of retraining the users…

Determine the Migration Impact
• Example of aspects to be addressed: parallel operations, choices of proceeding with phased migration by subsystem or by function, impact of geographical separation on migration

Assess co-existence of legacy and new projects. The main problems with coexistence are:
• User Interfaces – combining UI to the old and new applications in a single unit on the users desk can be difficult if not impossible
• Access to data – the new applications need to share data with the old applications, this may be difficult unless the old and new systems use the same technology
• Connectivity – may involve expenditure on software and gateway equipment

Create a Migration/Implementation Roadmap
• Determine the future disposition of current systems
• Develop an estimated value to the business as well as key business drivers for each subproject
• Create a project by project implementation plan

Identify the relevant governance groups and organize them along process area, process category and roles.
Example of Process Areas:
• Enterprise business groups
• Operate & Sustain
• Create & Change
Example of Category:
• Data Availability
• Data Quality
• Monitoring
• System Administration
Identify the key change management processes and group them into relevant functional modules
Example of Functional Module:
• Create
• Operate/Sustain
• Change
• Sunset
Map governance roles and positions to all change management processes
Provide detailed description of each role activities and responsibilities

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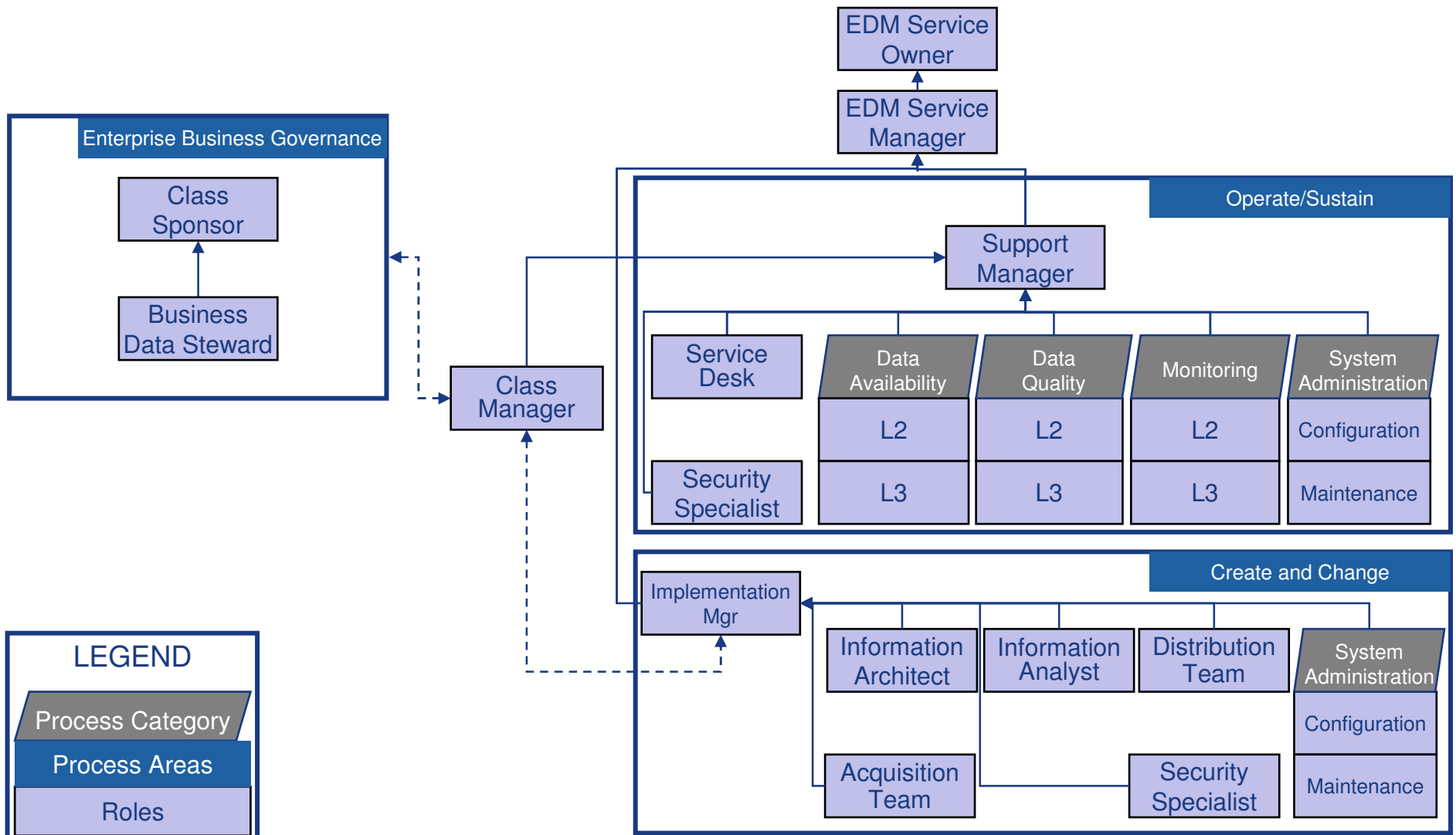- **Business, Information & technology Architectures**

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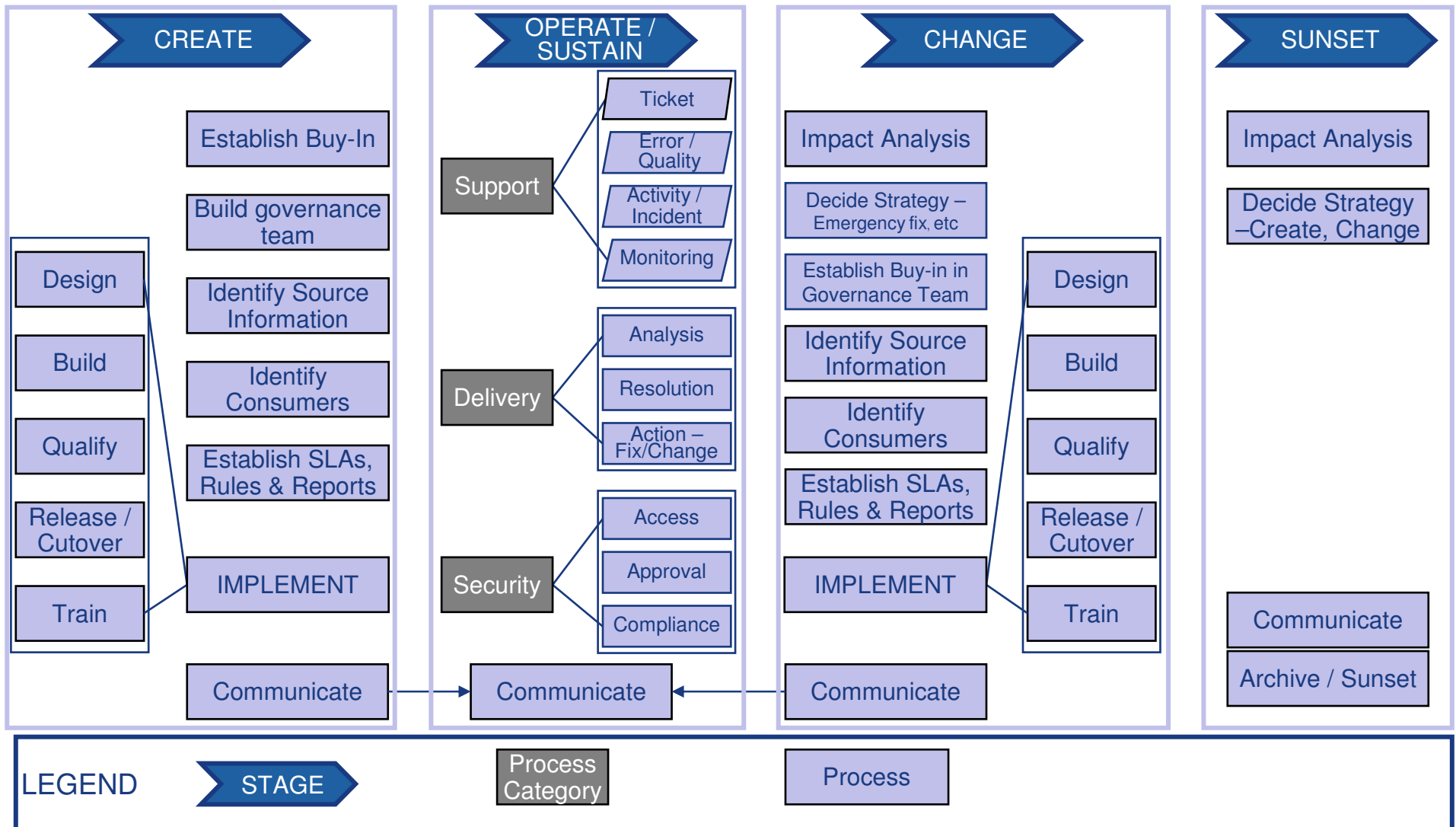- **Migration Planning, Implementation Governance & Change management**

- **Best Practices**

Master Data Management best practices

BEST PRACTICE	DESCRIPTION
• Establish clear objectives for master data initiatives & secure strong business & IT alignment	• Identify business capabilities desired and role of master data management • Obtain executive sponsorship and ensure participation of both business and IT team
• Streamline master data life cycle processes, and automate using workflows	• Streamline item life cycle processes e.g. (item introduction to item deletion) • Consider developing integrated new item process • Automate to provide alerts and exception management. • Clearly establish data ownership to establish accountability for data accuracy
• Electronically obtain master data from trading partners	• Leverage opportunities to obtain master data from trading partners through global data synchronization and vendor portals and minimize manual input
• Deploy master data repository to offer one version of truth to enterprise	• Design and deploy a master data repository that consolidates multiple master data sources • Include all data entities (item, customer, vendor etc) in the master item repository
• Ensure that the master data repository is not embedded in any application	• Clearly separate master item repository from any application
• Leverage one master repository for providing one version of truth to all channels	• All channels should access the same master data • Ensure robust internal synchronization to support access to multiple repositories across different channels
• Identify dependencies between master data and pricing	• Account for dependencies between master data and pricing execution activities
• Ensure robust internal synchronization	• Focus on streamlining back-end processes related to communicating master data to relevant applications • Analyze back-end processes on proactive basis and address any bottlenecks
• Do not build intelligence into the numbering system	• Ensure master data numbering does not have built in intelligence.

Data Quality Best Practices

Data Qualities

Correct
The values and description in the data describe their associated objects truthfully

Unambiguous
The values and descriptions in data can be taken to have only one meaning

Consistent
The values and description in data use one constant notational convention to convey their meaning

Complete
Ensuring that the individual values and descriptions in data are defined
Ensuring that the aggregate number of records is complete

Data Quality Activities

Measure	Monitor
Analyze	Parse
Standardize	Correct
Enhance	Match
Consolidate	Monitor

Data Quality Questions
•Data Quality improvement must be based on rigorous measurements. After analyzing the measurements it should be possible to answer questions like:
•Is data quality getting better or worse?
•Which source systems generates the most/least quality issues?
•Are there any interesting patterns or trends revealed in scrutinizing the data quality issue over time?
•Is there any correlation observable between data-quality levels and the performance of the organization as a whole?
•Which of my data quality jobs consume the most/least time in my ETL window?
•Are there data-quality filters that can be retired because the type of issues that they uncover no longer appear in our data?

Data Quality Objectives
•**Be Thorough** – The data-cleaning subsystems is under tremendous pressure to be thorough in its detection, correction, and documentation of the quality of the information it publishes to the business community.
•**Be Fast** – The whole ETL pipeline is under tremendous pressure to process ever-growing volumes of data in ever-shrinking volumes of time
•**Be Corrective** – Correcting data-quality problems is the only strategically defensible way to improve the information assets of the organization. The data warehouse team might be the first to discover data quality issues that have been missed for years
•**Be Transparent** – The data warehouse must expose the defects and draw attention to systems and businesses practices that the data quality of the organization

Questions & Answers

Thank you