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Turning Data into Knowledge: Creating and Implementing a Meta Data Strategy

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Agenda

- Introduction

- Meta Data Overview

- Principles of Meta Data Management

- Meta Data Strategy

- Key Roles in Meta Data Management

- Meta Data Quality

- Important Aspects of Metadata

- Conclusion

Anne Marie Smith - Background

- BA and MBA Management Information Systems (La Salle University)

- PhD, Management Information Systems (NorthCentral University)

- Consultant in data management, meta data, data warehousing, requirements analysis, systems re-engineering

- Certified Project Management Professional (PMP)

- Certified Data Management Professional (www.iccp.org)

- Author of over 40 publications and papers

- Instructor on varied information systems management topics

Meta Data Definition

All physical data (contained in software and other media) and knowledge (contained in employees and various media) from within and outside an organization, containing information about your company's physical data, industry, technical processes, and business processes.

Marco, D. P., <u>Building and Managing the Meta Data Repository</u>

Meta Data Is Knowledge

- Data is a sharable resource

- Effective use and reuse of data requires an enterprise view of essential concepts, entities and attributes for cross-application and cross-departmental functionality

- Enterprise view MUST be generated at the top of an organization, with active commitment and support for efforts

Strategic Plan for Information

- Evaluate and choose a meta data management methodology

- Customize methodology for unique business requirements

- Meta data strategy should be integrated into the enterprise data management strategy

- Develop and implement meta data strategy

- Integrate new methodology into systems development and maintenance
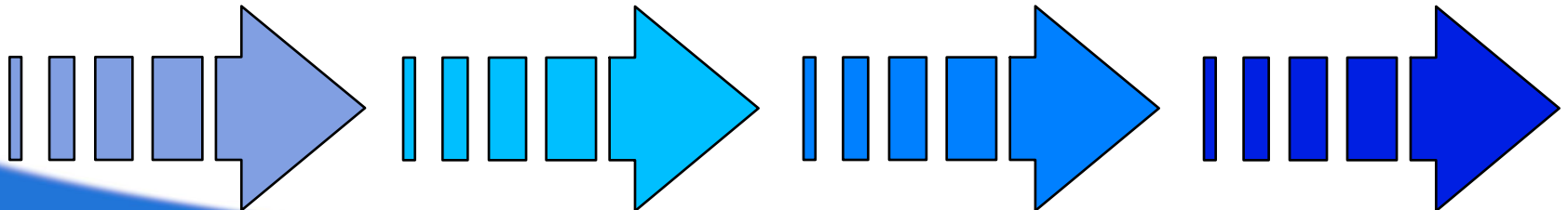
Goals of Meta Data Strategy

- Offer recognition of value of data and its components
- Develop map for managing expanding information requirements
- Highlight importance of enterprise data management
- Address data quality, data integrity, data reuse
- Enable strategic information to be consistently and accurately derived from operational data
- Improve productivity through component development, management and reuse
- Reduce time necessary for software development cycle
- Share information with customers and business partners
- An enterprise perspective of information resources and impact analysis provides competitive advantage

Meta Data Strategy Components

- Meta Data Challenges / Business Problems
- Meta Data Goals and Objectives
- Meta Data Usage Plans
- Meta Data Elements
- Meta Data Sources
- Meta Data Quality
- Meta Data Storage and Products
- Meta Data Standards and Procedures
- Meta Data Training
- Meta Data Measurement
- Project Plans – high level
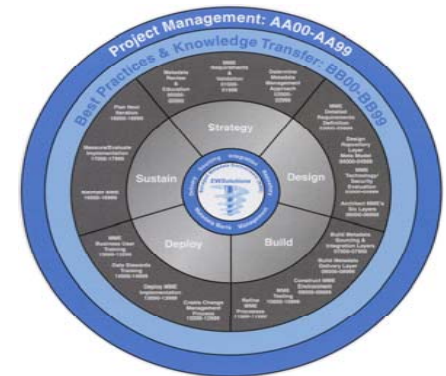
Data Management Objectives

- Build a framework for accurately capturing, sharing, distributing, securing and leveraging a company's data resources, including creating and refining data models and establishing and maintaining an enterprise meta data management environment

- Strategically plan for a company's future information requirements

- Support data self-reliance and efficient use of data in business practices

Principles of Meta Data Management

- Establish a meta data strategy and policies

- Create or adopt a meta data standards set

- Establish and maintain data stewardship role and function

- Establish and maintain a collection of relevant meta data

- Publish relevant meta data

- Maintain meta data standards set

- Maintain meta data content from all systems

Keys to Meta Data Management

- Develop meta data strategy before embarking on evaluating, purchasing and installing complex management products

- Products / tools are necessary for effective management of meta data

- Senior management commitment to meta data management is required - cost and time issues

- Explanation of WHY meta data is needed and the purpose of each type of meta data

- Policies to ensure definitions, acronyms and abbreviations are interoperable

- Procedures to ensure policies are implemented correctly

Enterprise Meta Data Strategy

- Offer recognition of value of data and its meta data (corporate assets)

- Establish information requirements

- Instill data management / meta data management practices into organization

- Address data quality, data reuse, data integrity issues for legacy applications and new development

- Promote enterprise use of common data management tools and techniques

- Highlight importance of enterprise data management

- Measurement of value of information

Meta Data Challenge

- **Broad**: some meta data for every production application and structure

- **Deep**: detailed meta data for critical production applications and structures

- **Decision points**:

  - What groups have "pain"? Why does "pain" exist?

  - What processes can be leveraged for maintenance?

  - What meta data is readily available and will be useful?

- Who owns meta data in an organization?

1. Introduction

2. Background

3. Executive Summary of Findings & Recommendations

4. Challenges ACME Company Faces

5. Business Drivers for A Managed Meta Data Environment

6. Potential Benefits of Enterprise Meta Data

7. Issues & Challenges of Enterprise Meta Data

8. Key Recommendations

9. Meta Data Roadmap Implementation Program & Timelines

Meta Data Strategy Components

- Meta Data Challenges / Business Problems
- Meta Data Goals and Objectives
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- Meta Data Training
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- Project Plans – high level
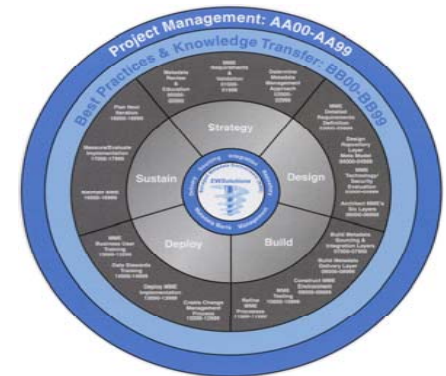
Levels of Metadata

- ## Direct:
  - ### Byproduct of original source – information systems that create, maintain and dispense data

- ## Indirect:
  - ### Created after direct meta data – derived from system artifacts, uses of system, analysis and decision-making

- Business:

  - Meta data that supports a company's business users

  - Examples:

    - Business terms and definitions for entities and attributes

    - Subject area names

    - Query and report definitions

    - Report mappings

    - Data stewards

    - ETL process names

- Technical:
  - Meta data that supports a company's technical users and IT staff
  - Examples:
    - The method a technical analyst uses for development and maintenance of the data warehouse
    - Physical table and column names
    - Data mapping and transformation logic
    - Source systems
    - Foreign key and indexes
   - Security
    - ETL process names

- Stewards manage data (instances of data values) <u>and</u> meta data (information concerning the data)

- Meta data management is a ***key technical enabler*** for the performance of successful governance

- Difficult to do governance successfully without a managed meta data environment

- Difficult to create a strong meta data approach without governance and stewardship

Meta Data Elements and Sources

- Business definitions and business names
- Database and modeling tools
- Software tools
- End users
- Documents/Spreadsheets
- Messaging/Transactions
- Applications
- Websites/E-Commerce
- Third parties
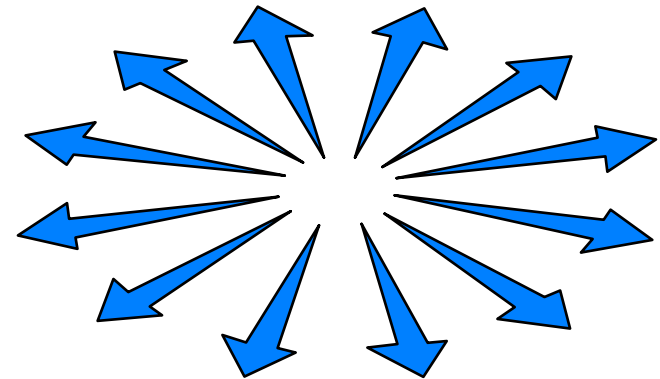
Quality: Imperative!

- Low-quality meta data creates:

  - Replicated dictionaries / repositories / meta data storage

  - Inconsistent meta data

  - Competing sources of meta data "truth"

- High quality meta data creates:

  - Confident, cross-organizational development

  - Consistent understanding of the values of the data resources

  - Meta data "knowledge" across the organization

  - Reuse of data and data structures

Meta Data Quality Metrics

- **Data Accuracy**: how well data values represent the actual business requirements

- **Data Completeness**: how well available data meets current and future business information demands

- **Data Currency**: how timely are data values

- **Data Consistency**: are data definitions and values are the same across all data stores

- **Data Integrity**: conformation of source data values to those allowed by business rules (data characteristics, default values, referential integrity constraints, derived data values)

Priority Criteria Example

Criteria for assessing assets to be governed	Weight	Comments
Enterprise asset?	3	
a. Reusable		
b. Standard		
c. System of record		
Business unit specific?	2	
Local?	1	
Ease of capture	2	
Subject area	1	Capture as part of asset metadata and filter
Master, transaction, BI data	3	In this order
Lineage at a high level	2	
Sustained asset, in transition or sunset	2	Determine how much value there would be in capturing meta data from a system which is being retired.
Consolidate other metadata sources - EPR		**Parallel track**; engagement would include commitment to retire old source

Weight:
0 = not needed
1 = some importance
2 = important
3 = critical

Courtesy of Deborah Poindexter, EWSolutions

Strategic Partner & Systems Integrator
Intelligent Business Intelligence^{sm}

Identifying Data and Meta Data Sources

- Transactional systems, data warehouses, non-structured sources (documents, email)
- Prioritize based on your criteria, examples:
  - Enterprise data – used by more than one functional area
    - Reusable
    - Standard
    - System of record
  - Specific subject area
  - Master, transaction, BI data
  - Sustained asset – not scheduled for retirement
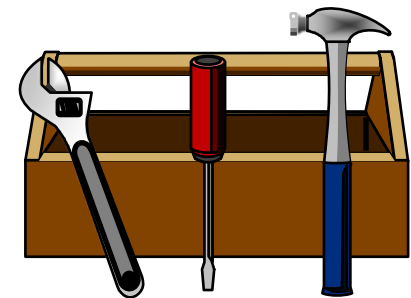
Meta Data Standards

- Established by Meta Data Council
- Naming standards
  - Abbreviations (systems and business)
  - Class words
  - Code values
  - Business names and definitions
- CASE modeling standards
- Standard definitions for elements
- Entity and element creation/modification procedures
- Storage and accessibility of standards and procedures

Meta Data Storage and Products

- Central versus distributed storage

- Active versus passive storage

- Physical requirements of storage facility

- Meta data products, capabilities and integration

  - Repository

  - User interfaces to repository

  - Warehouse manager software

  - Query tool data dictionary

Meta Data Training

- Systems
  - Data Administration
  - Database Administration
  - Application Development and maintenance programming
  - Executive

- Business
  - Primary users (e.g., data stewards)
  - Secondary users
  - Executive
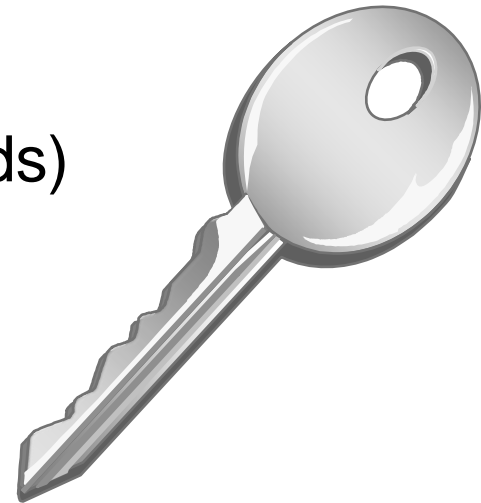
Meta Data Measurement

- Measure use and effectiveness of meta data

- Measure success of quality control program

- Measure acceptance and success of stewardship

- Integration of meta data strategy into systems methodology and business practices

- Measure reuse of data and data structures

- A focus on meta data requires a conscious cultural change from individually developed applications to a unified acceptance and usage of data as the foundation of information and knowledge

- Change is unsettling to all creatures - expectations and reactions must be anticipated, addressed and resolved

- To be effective, cultural change must be managed in a spirit of co-operation and mutual accountability

Meta Data Strategy
First Steps

Meta Data Strategy First Steps

1. Develop a charter for meta data management

2. Form the Meta Data Council – oversight for all meta data activities

3. Establish roles for council members - stewards

4. Create meta data management scope documents and overall project plan

5. Define and prioritize the council's activities

6. Design standard documents and forms for meta data management

Create a Charter

- Create a documented charter for all meta data activities, including all appropriate functions

  - Business purposes that necessitated creating the meta data roles

  - Target the specific concerns and opportunities of the organization concerning meta data management

- **Best Practice:** Most charters should fit on one or two single-spaced pages. Anything longer is likely *too* long

- Charter is a business document and not a technical document

Sample Project Charter

Project Title: Information Technology (IT) Upgrade Project

Project Start Date: August 23, 2001

Projected Finish Date: February 24, 2002

Project Manager: John Doe, jdoe@company.com

Project Objectives: Upgrade hardware and software for all employees (approximately 2,000) within 9 months based on new corporate standards. See attached sheet describing the new standards. Upgrades may affect servers and midrange computers as well as network hardware and software. Budgeted $1,000,000 for hardware and software costs and $500,000 for labor costs.

Approach:

- Update the IT inventory database to determine upgrade needs
- Develop detailed cost estimate for project and report to CIO
- Issue a request for quotes to obtain hardware and software
- Use internal staff as much as possible to do the planning, analysis, and installation

Approval Signatures:

Meta Data Council

- Chief Data Steward - Chair

- Business Data Stewards

- Technical Steward

- Other IT staff as necessary (DA, DBA. etc.)

- Project Representatives

Participates in the organization's Governance Council – focused on meta data issues and activities

Meta Data Council Charge

Meta Data Council

Meta Data Management Activities

↓ Policies, Procedures, Standards

Members:
- Chair/Chief Data Steward
- Business Data Stewards
- Technical Steward
- Other IT
- Project Reps

- Coordinates and directs meta data strategies and processes across the enterprise

- Ensures meta data strategies and processes support organizational mission and objectives

- Develops and directs meta data standards across the organization and projects

- Assigns roles, identifies responsibility and authority and implements meta data governance through a number of organizational layers

- Provides mechanisms for coordination, communications, information sharing, prioritization, and conflict resolution within the organization and across projects

- Communicates the institutional value and importance meta data and information management brings to the organization

- Serves as a resource to key organizational committees with meta data management issues
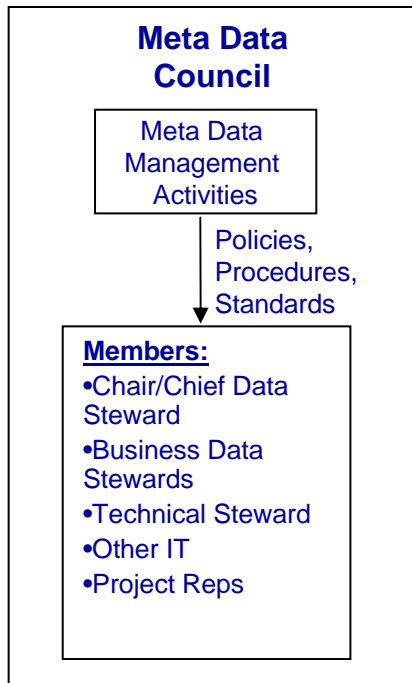
- Define the team's roles and responsibilities

- The stewardship roles (executive sponsor, chief, business, and technical) are a good place to start

- Most organizations will tailor (modify, add, and/or delete) these roles, titles and descriptions to suit their specific needs

Meta Data Responsibilities

- <u>Data Stewardship</u>: responsible for consistency and integrity of data objects under their control; usually from functional business units

- <u>Data Custodians</u>: responsible for syntactical value of data; usually from Data Administration and/or Database Administration

- Jointly establish standards and procedures for proper use, quality control and integration ("stewardship team")

Key Meta Data Management Tasks

- Establish data owners, custodians and users

- Formalize data stewardship team and governance council

- Define corporate data and process standards

- Define edit philosophy and user education philosophy

- Centralize information object identification and control processes and impact assessment

Key Meta Data Management Tasks

- Define basic enterprise information through an enterprise data model – capture enterprise level meta data

- Develop application data and process models based on enterprise model - define application information

- Become an integral part of the software design and development process

- Define data and meta data capture, integration, access, and delivery processes and choose appropriate tools

Meta Data Responsibility and Use

- *Data Ownership – syntactical value of data*

- *Data Stewardship – consistency and integrity of meta data*

- Establish standards and procedures

- Proper use, quality control and measurement
- Integration with methodology and business

Define and Prioritize Activities

- Meta Data Council must define the specific activities they will perform, individually and as a team

- These activities MUST support the strategic objectives of the Meta Data Management charter

- Once the activities have been defined, they must be prioritized – challenge: competing interests, competing resources, project needs, etc.

Define and Prioritize Activities

Possible Data Stewardship Activities	Projected Organizational Benefit	Projected Challenges	Priority – H, M, L
Define physical domain values for each attribute on the primary applications	Critical information for using systems as sources for decision-support	Identify primary applications first, need access to technical meta data, differing values for common attributes	H
Define key business rules for all data warehousing and CRM applications	Essential for migration of DW and CRM applications in Q2	No documented business rules, activity will require many interviews	H
Identify potential data stewards in company we are acquiring	Must be performed during due diligence phase – not until Q3	Need resumes and backgrounds of all acquired company staff	M
Align common meta data across primary source systems	Critical information for using systems as sources for decision-support	Differing values for common attributes	H

Courtesy of Deborah Poindexter, EWSolutions

Meta Data Strategy Scope Document

Scope Document

- Critical for setting good requirements
- All activities should be based on the scope document
- Use to prevent "scope creep"
- **Do NOT skip this step**

- Project Description

- Current state of meta data management

- Future state of meta data management

- Project Scope – areas to be included and areas to be excluded

- Critical Success Factors

- Risk Factors

- Assumptions

- Issues

- Resources (targeted, not formal yet)

- High-level Project Plan

- **Successes**:
  - Reduction of redundant data
  - Increased understanding of data sources, targets, usage, etc.
  - User-driven queries and information needs
  - Increased collaboration among roles

- **Challenges**:
  - Resistance to change from IT and business users
  - Concern over costs of Data Stewardship program
  - Education in enterprise data management, data stewardship
  - Lack of support from executives

- **I**ntegrate meta data management efforts into current methodology iteratively:
  - Planning
  - Requirements
  - Analysis
  - Design
  - Development
  - Testing
  - Implementation
  - Maintenance
  - Enhancement

How do your meta data management plans / objectives fit into these lifecycle stages?

Conclusions

- Meta Data Strategy can assist in achievement of data and information / intelligence goals

- Meta Data Strategy should be part of a comprehensive systems methodology and developed in conjunction with the business community

- Establishment and implementation of metrics and a permanent council for implementation are fundamental to the success of a Meta Data Strategy

Meta Data Reference Sources

- http://www.ewsolutions.com/resource-center/rwds_folder

- http://dublincore.org/

- http://metadata-standards.org

- http://www.ukoln.ac.uk/metadata/

- http://www.ulb.ac.be/ceese/meta/meta.html

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