7. XML-based Portals

- Effort wasted on code/coding
- Extending data management technology reach to include previously unstructured data
- Opportunities to make data quality initiatives visible
- XML-based Portal advantages
- ERP Example

A Legacy Example

- Cash Management System (CMS) Functional Summary
- Supports check processing and other specialized services for large corporate customers:
  - Zero balance account
  - Reconciliation of cleared checks
  - Electronic funds transfer (Swift)
  - Lock box operations
  - On-line query facility
  - Cost: $16 M/annually

CMS Technical Overview

- Most built in 1981 - 100 gigabytes
- 40 software modules
- 8 million lines of code
- COBOL/CICS/VSAM on IBM 3090
- Federal Reserve Bank connection
  Tandem (TAL)
- Lock box uses VAX (C)
- Processes 300,000 transactions daily & 1-2 million checks nightly
- Generations of programmers

Peeling

- 80 - 20 rule
- Slice away 6.3 of 8 LOCs as non-key functionality
- Xcheck (1 M COBOL/batch processing and reconciliation)
- Xtransfer (200 K COBOL)
- Xcash (500 K COBOL)
- Remainder
  - interfaces to other organizational parts
  - interface code
  - Interfaces to data
  - Interfaces to hardware (Check sorting hardware)
A closer look at relative size of the core functionality

Another perspective (what's bigger than the combined "important" components?)

<table>
<thead>
<tr>
<th>Component</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface code</td>
<td>2,400,000</td>
</tr>
<tr>
<td>System interfaces</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Data interfaces</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Hardware interfaces</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Three important components</td>
<td>1,700,000</td>
</tr>
</tbody>
</table>
Business logic is contained in just 21% of the code

- System Interfaces: 19%
- Interface code: 19%
- Data Interfaces to data: 20%
- Hardware Interfaces: 20%
- X-check (1 M COBOL/batch processing and reconciliation): 13%
- X-transfer (200 K COBOL): 3%
- X-cash (500 K COBOL): 6%
Portal/Web Services

Integration Possibilities
• User Interface
• Business Process
• Application
• Data

AV Component
• Well defined components
• Self-contained
• No interdependencies

Increasing Scope and Volume of Data Management

1 X Tabular Data

5 X Tabular and Non-Tabular Data
Integration of Unstructured Data

- Properties selection under the file menu of MS-Office 2000 +
- Queries can be run for slide titles or other document structures
Key Knowledge Management Functionality

- **Gather**: Capture in a common repository information and its location from sources important to you so it can be contributed to the group memory
- **Organize**: Profile the information in the repository, organize it in meaningful ways for navigation and searching, enable pieces of information to be related to other pieces of information
- **Distribute/deliver**: Harvest or acquire knowledge, either through an active mechanism (search interface) or a passive mechanism (push)
- **Collaborate**: Collaborate through messaging, workflow, discussion databases ... and so on
- **Teach/learn**: Distance learning
- **Analyze/refine**: Analyze information in the knowledge repository (data mining to identify relationships or patterns)
- **Publish**: Publish information to a broader audience, including individuals outside the organization
- **Lifecycle management**: Securely store, migrate, and purge information after a set period
- **Mediate**: Manage knowledge workers’ time

Adapted from Doculab’s Special Report on KM Products, April 2000
Portal Definitions

• "Envision the enterprise information portal as a browser-based system providing ubiquitous access to business related information in the same way that Internet content portals are the gateway to the wealth of content on the web"
  – [InfoWorld Electric] Web site

• Portals are applications that enable organizations to more rapidly interchange internally and externally stored information, and provide users a single gateway to personalized information needed to make informed business decisions. Portals are an emerging market opportunity; an amalgamation of software applications that consolidate, manage, analyze and distribute information across and outside of an enterprise (including business intelligence, content management, data ware-house and mart, and data management applications.

Portal Examples

• Corporate Portal or Enterprise Portal
  – "Single gateway via corporate Intranet or Internet to relevant workflows, application systems and databases – integrated using XML and tailored to the specific job responsibilities of each individual."

• Corporate Portal as “Employee Portal”
  – All employees can access processes, systems and databases via Intranet or Internet to carry out job responsibilities
    • Full security and firewall protection required

• Corporate Portal as “Customer Portal”
  – "Single gateway across Internet, or via secure Extranet, to details about products and services, catalogues, and order and invoice status for customers – integrated using XML and tailored to the unique requirements of each customer.”
    • Opportunities for one-to-one customer personalization and management – Customer Relationship Management (CRM)

• Corporate Portal as “Supplier Portal”
  – “Single gateway to purchase orders and related status information for the suppliers of an enterprise.”

• Corporate Portal as “Partner / Shareholder Portal”
  – “Single gateway for business partners or shareholders.”
Portal Motivation

- Portals do for the web what Windows did for DOS
XML-based Portals Provide Branding Opportunities

Portal metadata can include:

- Quality attribute measures
- Single source for newly cleansed data sources
- Simplified registry of data uses facilitates information sharing
- Information branding offers increased potential information value
XML-base Portals

• A style of developing information delivery systems
• Three key elements:
  – Engineered, XML-based and metadata-based data integration
  – Internet, Intranet, TCP/IP-based interfaces and delivery
  – Extensive use of new technologies including
    • 4GLs
    • Data analysis tools
    • Business rule engines
    • Data logistic networks
• Users won’t know or really care about any of the above!
Portal Navigation Rules

1. Any-to-any relationships
2. Drag and relate interaction metaphor
3. Point of view navigation
4. Metalinks
5. Three way scalability
   - Objects
   - Users
   - Records
6. Integration from different data sources and different data stores
7. Confederated Components Model

XML-based Portal Example
Relational Data Base Access Possibilities

1st Level Transitive Closure

If $A \rightarrow B$ and $B \rightarrow C$, then we should be able to navigate directly from $A \rightarrow C$. 
Autocomplete for all possibilities

Metadata before and after TopTier Autocomplete
Key Portal Attributes

- **Web/file indexing, cataloging**: Crawl and index Web sites and file directories and make them searchable in the portal
- **Application/data integration**: Link to databases, back-end servers, and third-party applications
- **Authentication and access rights** (for administrators): Create users, integrate with external directories, and control access to portal content through user and group roles
- **Personalization features** (for portal users): Customize design and content of their personal portal pages, notification, and content contribution features
- **Customization/extensibility** (for administrators): Change the design and layout of the portal to match company content and modify features through APIs and/or open standards
- **Management/administration**: Administer and configure the portal and the portal's facilities to view and track user activities
- **Scalability**: Manage increasing workloads and extend across the enterprise via multiple servers and/or system implementations

Advanced Features of Portal Products

- **Abstraction**: Most portal products have "portal components" that are used to access repositories and applications. Many portal components are written for each repository or application. Usually, low-level APIs are accessed, and individual portal components are needed to access each API. An advanced feature appearing in portal products is an abstraction layer. This may take the form of the "bus" approach of Tibco, of the "generic API" approach of Virtual, or the "metadata of metadata" approach of TopTier. Whatever the method of abstraction, this will become the preferred approach for integrating repositories and applications.
- **Federated Search**: Portal products use search components from vendors like Autonomy, Verity, Excalibur and UltraSeek. With these search tools, Web crawlers are dispatched on a regular basis to index the contents of (and in some cases categorize) the information that the portal manages. Federated search capabilities are showing up in portal products, where the search engine can not only search its own indexes, but also search the indexes of other repositories or search engines and return a consolidated result set to the user.
- **Visual Portal Component Builders**: Portal components from most portal products are created outside the portal or are created with text-editor-like features. Advanced portal products are beginning to utilize visual tools for building portal components.
- **Federated Portals**: Most portals are islands unto themselves. Advanced portals recognize the existence of other portals in the enterprise and cooperatively work with those other portals in servicing user needs.
- **Legacy Application Support**: Many portal products do not recognize that many legacy applications may not be integrated into the portal via portal components, if ever at all. Advanced portal products provide access to legacy applications directly via 3270/5250 emulation, or support for WTS or Citrix.
- **Internationalization**: For global enterprises, internationalization of portal products is a necessity. This includes not only foreign language support for the portal screens themselves, but also support for index, search and categorization of foreign language documents.
- **Mobile/Wireless Support**: Advanced portal products have adopted delivery of portal information and services to non-PC devices, predominantly mobile and wireless devices.
- **Offline Support**: For those non-PC devices that are not always connected, the ability to work in offline mode is important. Advanced portal products provide offline support; at the moment, such support is limited for PDAs.
- **Web "Collectors"**: An advanced feature related to content is appearing in some portal products. This feature allows the capture of segments of a Web page vs. the entire page. Select artifacts (e.g., graphics, text, tables) can be "collected" from Web pages and served up to users. Some portals are implementing these Web collectors in their products.
XBPs Can Be Used to Access Legacy Data Directly

Legacy Systems Transformed Into Web-services Accessed Through a Portal
A 3270 Screen Opens Up

Browser-based Reengineering
Window's based Reengineering

Display Credit Memo Request 65145866: Overview

Credit Memo Request 65145866

Net value: 300.00

Bolts to party: 35981 York Enterprises | 4924 Hope Avenue | Philadelphia PA 19113
Bolts to party: 35981 York Enterprises | 4924 Hope Avenue | Philadelphia PA 19113
Purchase order no: PO date

Sales document Item available Item detail Ordering party Payment

Sales document Item: 10 Item detail: CF-806 Tuna Blend Coffee

Pricing date 05/08/15

Target quantity: 10

Reason for rejection: Delivery date is late

Incoterms: CFR Philadelphia
Payment terms: 30/02
Billing block:

All items

Item Material Target quantity Item description

10 CF-806 10 Tuna Blend Coffee

Top Tier Demo
ERP Implementation Success

- Most ERP implementations today result in cost and schedule overruns; courtesy of the Standish Group

Change Requests

WHERE DO I PUT THE CHANGE REQUESTS?
Reverse Engineering PeopleSoft

Metadata Uses

• Workflow Metadata - business practice analysis and realignment
• System Structure Metadata - requirements verification and system change analysis
• Data Metadata - data conversion, data security, and user training

Example Query Outputs
PeopleSoft Process Metadata

Home Page Name
(relates to one or more)

Business Process Name
(relates to one or more)

Business Process Component Name
(relates to one or more)

Business Process Component Step Name

Panels is used to link in the Data Metadata Structure
Metadata Uses: Requirements

- Systematically determine the requirements that the PeopleSoft enterprise software could meet
- Document discrepancies between system capabilities and organizational needs
- Panels presented to users in JAD-like sessions that were organized using system structure metadata
- Functional users determined and certified the overall system functionality
- Associating requirements with components
- Discrepancies were noted for subsequent investigation and resolution

Metadata Uses: System Changes ...

- Evaluated proposed system changes, modifications, and enhancements
- Metadata types used to assess the magnitude of proposed changes
- For example: what are number of panels requiring modification if a given field length was doubled?
- Analyze the costs of changing the system versus changing the organizational processes
Metadata Uses: Practice Analysis

- Identify gaps between the DP&T/DOA business requirements and PeopleSoft
- Process components were mapped to user activities and workgroup practices
- Users focused their attention on relevant portions of the system
- For example, the payroll clerks accessed the metadata to determine which panels 'belonged' to them.

Metadata Uses: Realignment

- Realignment addressed gaps between functionality and existing work practices
- Once users understood the system’s functionality and navigate through process component steps
- Compared the system’s inputs and outputs with their own information needs
- If gaps existed, metadata used to assess the relative magnitude of proposed changes
- Forecast system customization costs
- Evidence for changing the business practice instead of the system
Metadata Uses: Training

• Training specialists used mappings to determine relevant combinations of panels, menuitems, and menubars
• Display panels in the sequence expected by the system users
• Users were able to swiftly become familiar with their 'areas'
• Screen session recording and playback capabilities

Metadata Uses: Additional Metadata

• Metadata describing LS1 & LS2
• Metadata supporting data conversion
  – initial motivation for the metadata development
  – each decision to convert a data item was recorded, permitting the tracking of the number of data items that had been mapped, converted, and to what they had been converted
• Associations with system batch reporting programs called SQRs
• User and user type metadata
**Metadata Uses: Database Design**

- CASE tool integrated to extract the database design information directly from the physical database
- Integrated into TheMAT
- Decomposition of the physical database into logical user views
- Document how user requirements were implemented by the system
- Planning security access levels and privileges

**Metadata Uses: Statistical Analysis**

- Guiding metadata-based data integration from the two legacy systems
- For example, the ERD information was used to map the legacy system data into PeopleSoft data structures
- Statistical summaries described the new system to users
### Metadata Uses

**Administer Workforce**
- Recruit Workforce (62%)
- Manage Competencies (20%)
- Plan Successions (~5%)
- Administer Training (~5%)
- Plan Careers (~5%)
- Manage Positions (2%)

**Plan Careers** (~5%)
- Develop Workforce (29.9%)
- Administer Workforce (28.8%)
- Compensate Employees (23.7%)
- Monitor Workplace (8.1%)
- Define Business (4.4%)
- Target System (3.9%)
- EDI Manager (0.9%)
- Target System Tools (0.3%)

### XML-Wrapping PeopleSoft Metadata

**Metadata Uses**
- **Workflow Metadata** - business practice analysis and realignment
- **System Structure Metadata** - requirements verification and system change analysis
- **Data Metadata** - data conversion, data security, and user training

**XML-Wrapping PeopleSoft Metadata**

- Application 1
  - XML Wrapper
  - Application 1
    - XML Interpreter
  - TheMAT

- Application 2
  - XML Wrapper
  - Application 2
    - XML Interpreter
Implementing Metadata Repository Functionality

- "The repository" does not have to be an integrated solution
  - it must be an easily integrateable solution
- Repository functionality = repository
  - metadata must easily evolve to repository solution
- Multiple repositories are not necessarily bad
  - as interim solutions, Excel has been working quite well
- Minimal functionality includes ability to create, read, update, delete, and evolve metadata items
- Remember the 1st law of data management
  - In order to manage metadata, you need metadata repository functions
3-Way Scalability

Expand the:

1. Number of data items from each system
   - How many individual data items are tagged?
2. Number of interconnections between the systems and the EIL hub
   - How many systems are connected to the hub?
3. Amount of interconnectability among hub-connected systems
   - How many inter-system data item transformations exist in the rule collection?

Approach Benefits

• Reusable formalized understandings
• Single metadata management format
• Ability to employ various data management technologies
• Clear migration path to evolving technologies
• Establishment of common business vocabulary
• Likely to be less expensive than other approaches
Portal Summary

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Improved, XML-based organizational metadata

Reverse engineering tools & techniques

Integrated business and systems engineering tools & techniques

Data Assets

XML-based Metadata

Business Rules

Business Processes

Web-based metadata delivery applications supporting business and systems engineering

Integrated business and systems components including metadata repositories, data warehouses, ERP implementations

Organizational metadata extracted and understood via metadata reverse engineering

Reused metadata

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