Integrating Document Management & GIS

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Why Document Management?

- Leverage documents as a strategic enterprise resource

- Organize anywhere from hundreds to millions of documents for easy retrieval

- Set enterprise-wide policies for document security, collaboration, backup, metadata, search

- Provide access through an easy to use web interface (new)

Features (1/2)

- Organize and find:
  - Define a *physical* tree structure (i.e. folders) for documents
  - Define many *logical* categories for documents
  - Define indexable (i.e. fast-search) document properties
  - Full text indexing of documents

- Manage:
  - Robust database storage of documents
  - Easy setup of automatic backup and restore
  - Large-scale and fine-grained security policies

Features (2/2)

- ## Collaborate:
  - – Check-in and check-out documents
  - – "Version" documents and restore to previous versions
  - – Set up complex workflows, i.e. document "owners" receive emails when documents are modified and must approve the change

- ## Integrate and customize:
  - – Well-defined Java, COM, and .NET (new) API's
  - – Web interfaces for easy use and UI customization (new)
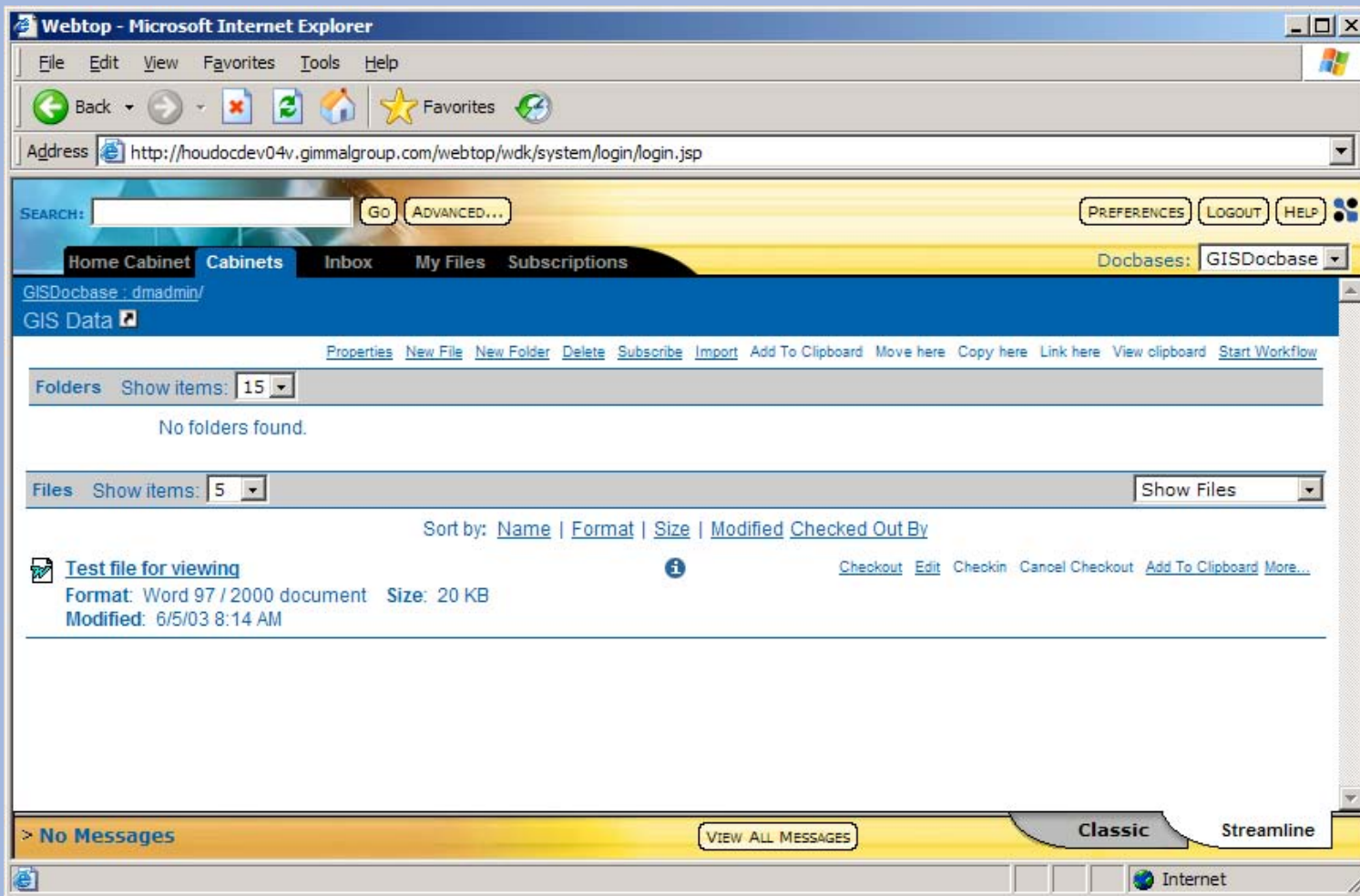 - – Support for web service integration (new)

DM Landscape: FileNET

- Largest, most well established company

- Known for very large image management and archiving systems with giant optical "platters"

- Known for large "turnkey" DM implementations
  - API is open but developer community is not especially well supported
  - New .NET-based "Open Client" web interface and "P8" FileNET-wide integration architecture

DM Landscape: Documentum (1/2)

- Could be considered the "trendiest" DM company

- Earliest adopter to full web interface

- Just released Documentum 5 with advanced J2EE-based web interface and web service integration
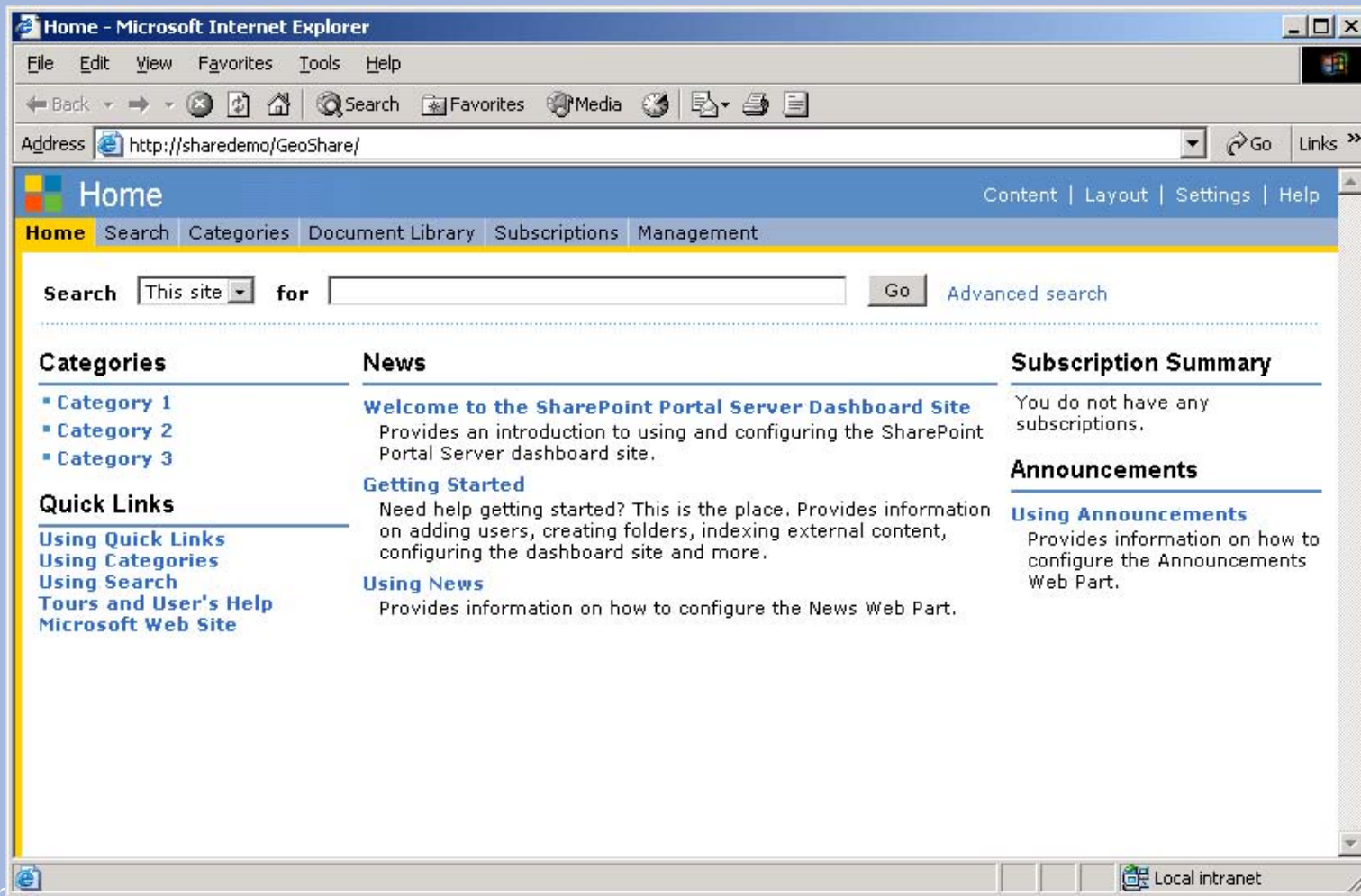
DM Landscape: Documentum (2/2)

DM Landscape: Sharepoint (1/2)

- Microsoft Sharepoint Portal Server 2.0 - the "new kid on the block" – completely redesigned

- Highly integrated with Windows Server 2003 and SQL Server

- Lighter DM features, stronger team-centric portal features and integration with .NET

- Easily confused with Sharepoint Team Services and Windows Sharepoint Services

- Price point much more competitive ($) than FileNET ($$$) or Documentum ($$)

DM Landscape: Sharepoint (2/2)

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⇒ - Industry examples of use with GIS

  – Fortune 500 energy company

  – Large city government

- Designing an integrated GIS / DM system

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Fortune 500 Energy Company

- Well logs: tests used to study the geology of a well

- Stores thousands of images of well logs in FileNET.

    – Indexed document property on each image storing the unique id of the well the well log is for.

- The company uses an ArcIMS interface to:

    – Select wells on the map in Internet Explorer

    – View a list of well logs associated with those wells

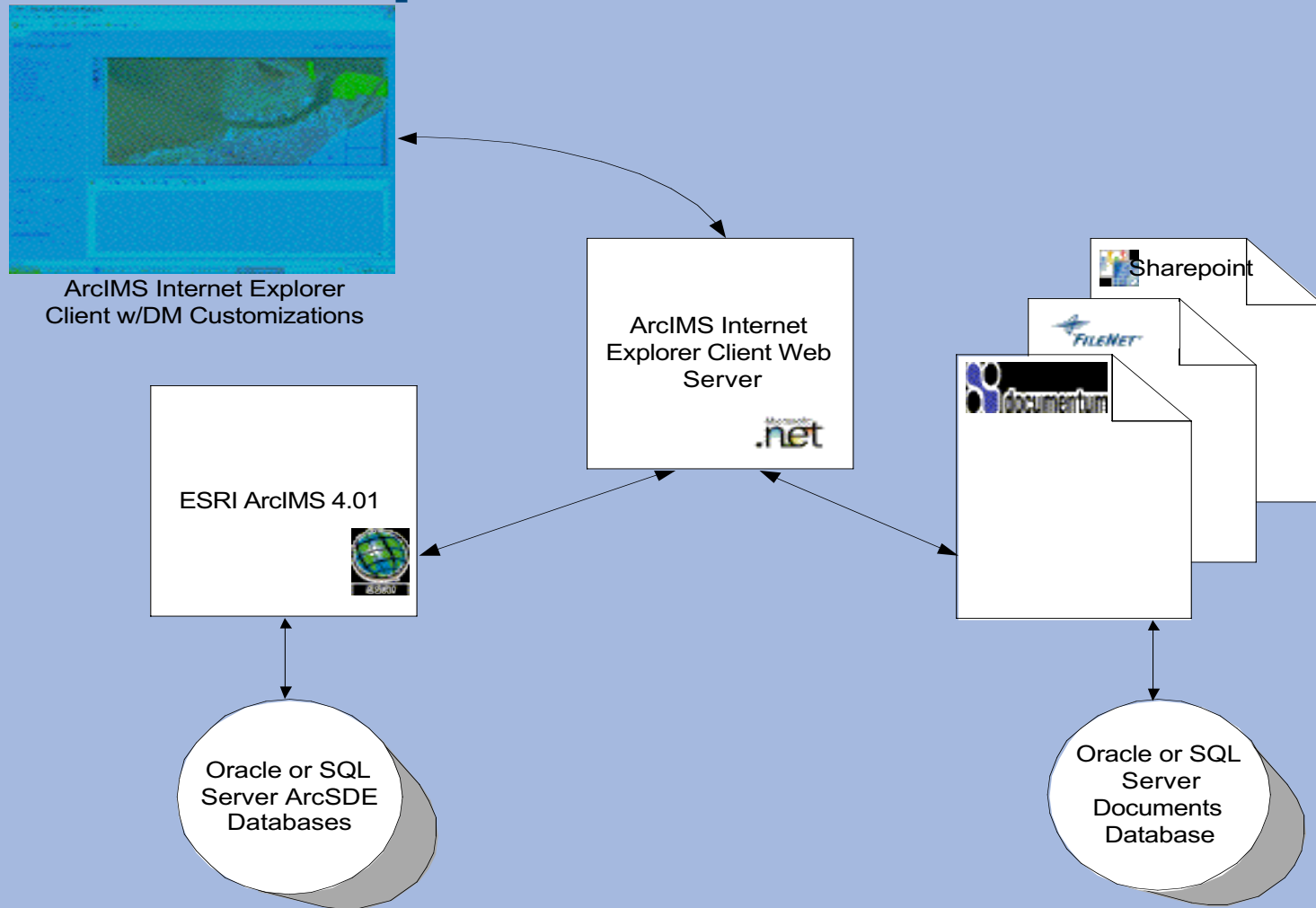   – Open individual well logs from FileNET in the browser

Large City Government

- Stores permitting and related documents about the city street system in Sharepoint

- Uses an ArcIMS interface to:
  - Enable users to select streets on the map in ArcIMS
  - Choose streets by geocoding an address
  - View a list of permitting documents for the selected streets
  - Open individual permitting documents from Sharepoint Portal Server in the browser

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- Implementation issues

Enterprise Architecture

ArcIMS Internet Explorer Client w/DM Customizations

ArcIMS Internet Explorer Client Web Server

Sharepoint

FileNet

documentum

ESRI ArcIMS 4.01

Oracle or SQL Server ArcSDE Databases

Oracle or SQL Server Documents Database

Database Design

- Tie a map feature ID and feature type to a doc ID in a many-to-many cross-reference table

Doc_Feature_Xref		
PK	**Feature_Unique_Id**	**VARCHAR2(20)**
PK	**Feature_Type**	**VARCHAR2(20)**
PK	**Document_Id**	**VARCHAR2(20)**
	Document_Name	VARCHAR2(100)
	Document_Type	VARCHAR2(10)
	Document_Url_Link	VARCHAR2(200)
	Document_Property_1	VARCHAR2(20)
	Document_Property_2	VARCHAR2(20)
	Document_Property_3	VARCHAR2(20)

API Integration

- Use to retrieve document properties, perform full-text searches, open documents

- Traditional COM and Java (and now .NET) API's
  - Java only well supported by Documentum
  - All three with large COM API's
  - FileNET and Sharepoint 2.0 with .NET, Documentum following suit

- Web services
  - New toolkit from Documentum
  - FileNET and Sharepoint moving that way, not there yet. Supposedly with FileNET P8 architecture.

- WebDAV queries
  - SQL-like language for retrieving document properties

Integrated DM Features

- Customize your ArcIMS client UI for integrated features

- GIS to DM features:
  - A document identify tool: click on a feature and see documents tied to it
  - See properties about documents in a table
  - "Launch" a document in your browser

- DM to GIS features:
  - Show me all features associated with a selected document
  - Show me all documents matching a text search in a table and let me find them on the map

Opening Documents Over the Web

- If using an ArcIMS Internet Explorer UI, have to launch documents over the web!

- Documentum 5 and Sharepoint
  - Launch documents from ArcIMS by opening a window to a specific URL

- FileNET
  - Launch to a specific URL if using FileNET Web Services or Open Client (new)
  - Custom COM API program that copies image from FileNET IS / DM systems to a location that can be opened through a hyperlink (old)

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  – Symbolizing documents

  – Managing cross-reference links

  – Document to feature relationships

  – Starting with a large DM system already

Symbolizing Documents

- How do you symbolize map features that have documents?
    - Don't do it at all
    - Put an icon of a document next to them
    - Turn them a different color

Managing Cross-Reference Links

- Problem with "hanging" documents or features

- Deleting documents or GIS features leaves them in the cross-reference table
  - Can use triggers if lucky
  - "Cleanup" job may be necessary

Document to Feature Relationships

- One to one, one to many, or many to many?

- If one to one, or one to many, you can store the feature ID as a property on the document instead of the database!

- Many-to-many increases the "hanging" documents or features problem

Starting with a Large DM System

- What if you already have thousands to millions of documents?

- Can't use an "associate document to map" tool easily

- Try an automated process:

  – Tie map features to document properties

  – If addresses on documents, try to geocode documents

Contact Information

- Links
  - Sharepoint Portal Server: http://www.microsoft.com/sharepoint/server/default.asp
  - Documentum: http://www.documentum.com
  - FileNET: http://www.filenet.com

- Alex Bain, VP Research and Development
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- Thanks: Lisa Derenthal