

Chapter 1 – Overview



Overview

- "Content"
 - data, documents, multi-media objects, ... accessible in computer networks
 - content is published
 - by editor, author
- "Content" in a digital library
 - documents, multi-media objects, ... of long-term value
 - content is archived
 - user: reader, customer, librarian



Content

- Information, to be "published" (made available) in LANs oder WANs (web)
 - structured, semi-structured, **unstructured**
 - > 85% of enterprise content resides outside a DB
 - file systems, specialized audio/video systems
- Examples
 - bills, reports, ...
 - scanned paper/fax documents
 - structured data in Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) systems
 - e-mail
 - office documents, mail
 - audio, video, images
 - web content



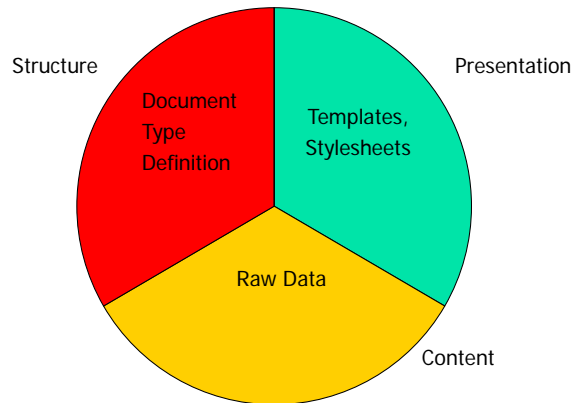
Content Management

- Process of managing content to be made available in a LAN/WAN
 - especially *management of multi-media content*
- Management functionality
 - data & document creation/authoring, editing, storing, searching, archiving, ...
 - core aspects
 - extraction/creation of meta data to further describe documents
 - search based on meta data and content
 - storage and search
 - RDBMS
 - Multi-media DBMS
 - Document Management Systems



Separation of Structure, Content, and Presentation

- "Anatomy" of a document



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Digital Libraries and Content Management

Web Content Management

- Restricted view of content management: to publish on the web
 - web site management
 - further restriction: management of dynamic web pages (fed by DB)
 - even more restricted: authoring tools for dynamic web pages
- Important capabilities
 - separation of content and layout
 - page templates
 - content authoring independent from web site programming
 - creation/modification of standardized layouts
 - automatic creation and maintenance of web site based on content updates
 - support for different kinds of users
 - content author, template author, editor, administrator
 - usually employs workflow management systems/techniques



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Digital Libraries and Content Management

Document Management

- Creation and management of multi-media documents
- Representation and control of document workflow
 - document routing
- Usually employed in a closed, intra-enterprise environment, not the web
- Advantages over web content management systems: document management systems often also manage the content (i.e., the documents)
- Document: often an office document with limited, standardized meta data
- Documents in digital libraries: structured meta data depending on document type



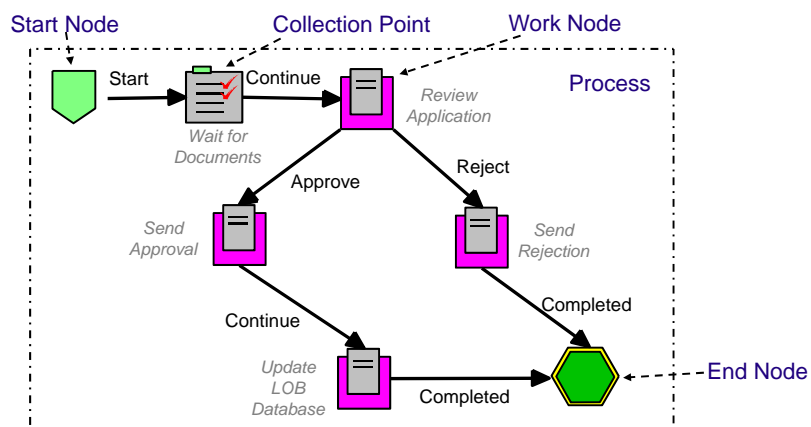
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Digital Libraries and Content Management

Document Routing

- Workflow management is an integral component



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Digital Libraries and Content Management

Enterprise Content Management

- Idea: all kinds of (unstructured) content are managed by a repository
 - independent of individual applications using/accessing the content
 - see: development of DBMS
- Management and access
 - storage, search
 - access control
 - versioning, check-out/check-in
 - warehousing vs. federation (materialized vs. virtual integration)
- "Intelligence"
 - analysis and mining for unstructured content
- Information Integration
 - integration with structured content



Phases Of Content Management

- "Level 1": focus on creation/publishing
 - creation of content, documents
 - gathering, integration of (external) documents
 - authoring, editing
 - review, approval
 - publication
- "Level 2": focus on storage/management (⇒ content repository)
 - catalogue/store
 - manage
 - query/retrieval
 - distribution
 - archiving

⇒ *requires generalization of traditional DBMS functionality to support multimedia documents*



"Classic" Library

- Collects, provides access to, and archives documents of long-term value
- Registers meta data and makes it available to readers for retrieval purposes
- Resembles single access point for users to all publications, regardless of document publisher



More Information Every Day

- Example: scientific journals
 - 1951: 10.000
 - today: ~160.000
 - some with only 100 subscribers, cost per year per subscription can reach 10.000 Euros

Problems

- How to find relevant literature
 - How to pay for the literature (Uni KL: reduced budget for computer science journal subscriptions, but subscription rates are rising)
- digital libraries as potential solution?



Digital Libraries

- Digital library is
 - a collection of documents with long-term value,
 - which are described and retrievable using meta data,
 - remain referencable for a long time,
 - may be versioned, but individual documents remain unchanged,
 - can be considered as digital
 - may be bought/owned by customer
- Digital library is
 - a software system to support document creation, access, description, storage, distribution, search, presentation, usage, and archiving
 - may be distributed world-wide, may include authors, content providers (publishers), mediators (libraries) and users



DL: a "Showcase" for Applied CS?

- Digital Libraries: modern information system with many challenges
 - information retrieval and search in DBMS (object-relational, semi-structured, ...)
 - multi-media retrieval, MMDBMS
 - notification, alerting
 - document representation
 - distribution, storage media
 - user interface (usability)
 - archiving
 - business models (electronic commerce, payment models)
 - international exchange (standards, ...)
 - legal issues



Content Management vs. Digital Libraries

- Digital Libraries
 - long-term management of meta data and documents
 - provider-side and customer-side content management
- Emphasize different phases of the CM life cycle
- Content Management
 - creation and presentation of content
 - author, publisher
 - focus is more on level 1 of the content management phases
- Digital Library
 - collecting, storing, archiving, searching/retrieving, and using content
 - library, reader/customer
 - focus is more on level 2 of the content management phases



Multimedia Database Management Systems

- Extend the functionality of DBMS to manage multi-media objects
 - similarity search
 - specialized access paths
 - storage structures
 - large objects
 - data "delivery"
- ... but keep the well-known advantages of DBMS
 - data models, data independence
 - query languages, content-based search
 - transactions
 - ...



XML Databases

- Management of XML data and documents
- Object-relational or hybrid XML/SQL DBMS with
 - data type XML
 - import/export capabilities for XML (shredding of documents)
- XML DBMS
- XML search engines for document management systems



Course Outline

- Three major blocks
 - Block 1: Content and Document Repositories
 - Concepts and Definitions
 - Multimedia Data and Information Retrieval
 - Documents and Hypermedia
 - DBMS-support
 - Multimedia Databases
 - Object-Relational DBMS (with multi-media/XML support)
 - Block 2: Additional Aspects for Content Management and Digital Libraries
 - Functionality
 - Systems and Architectures
- Literature references will be provided for each chapter separately

