Web-Enabled Information Systems
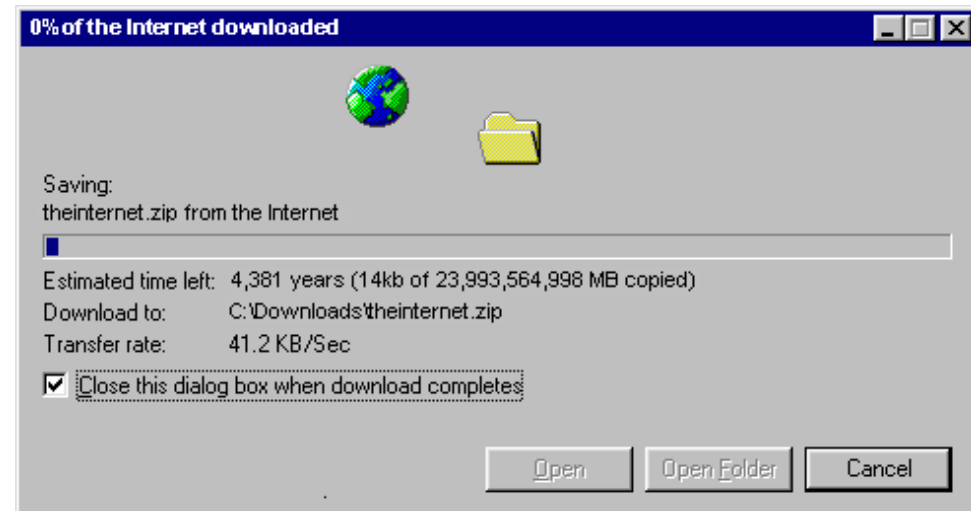
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Components of Data-Intensive Systems

- Presentation

  - Primary interface to the user

  - Needs to adapt to different display devices (PC, PDA, cell phone, voice access, …)
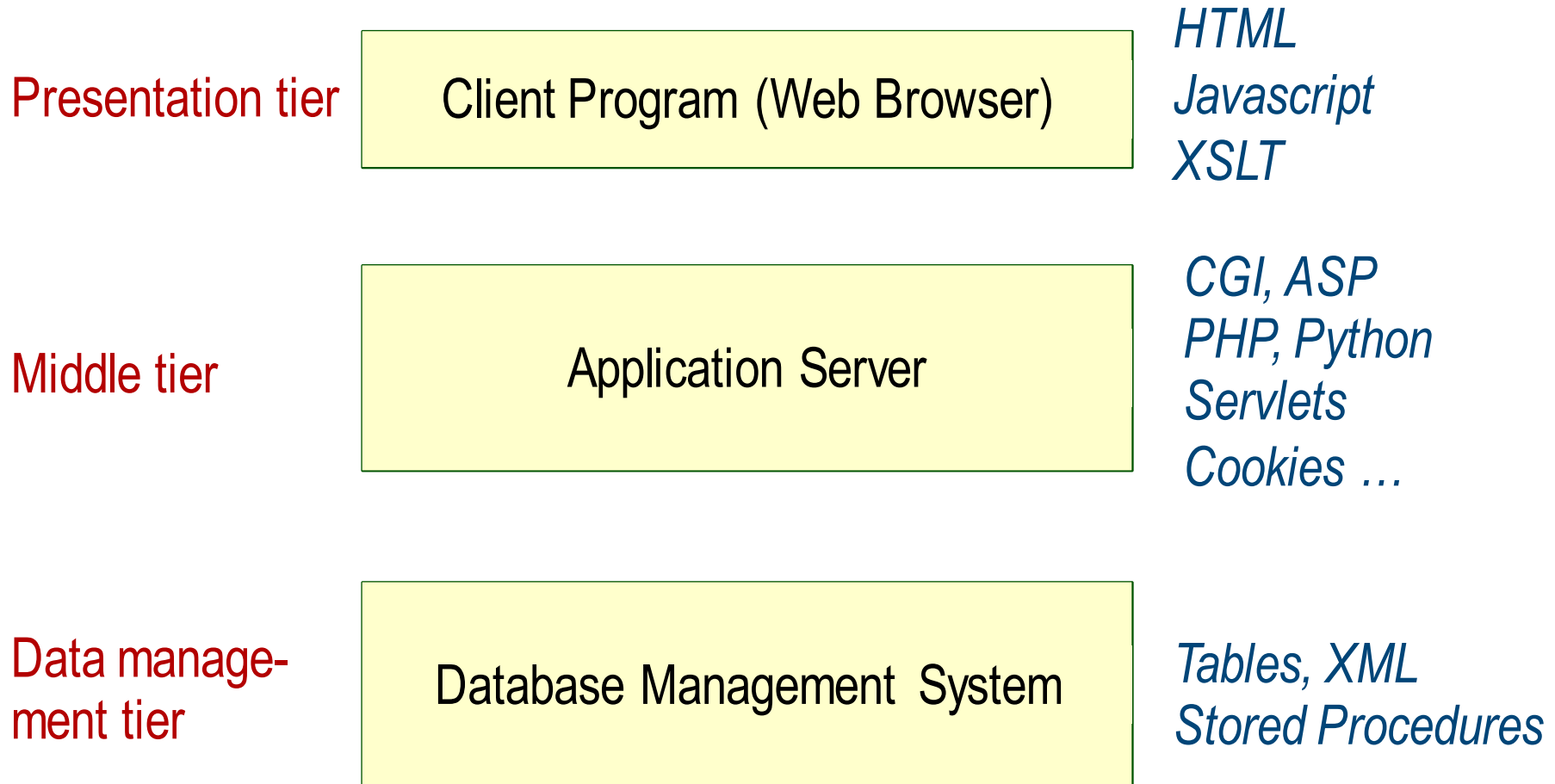
- Application ("business") logic

  - Implements business logic (implements complex actions, maintains state between different steps of a workflow)

  - Accesses different data management systems

- Data management

  - One or more standard database management systems

- single system or distributed

Three-Tier Architecture

Presentation tier

Client Program (Web Browser)

*HTML
Javascript
XSLT*

Middle tier

Application Server

*CGI, ASP
PHP, Python
Servlets
Cookies …*

Data manage-
ment tier

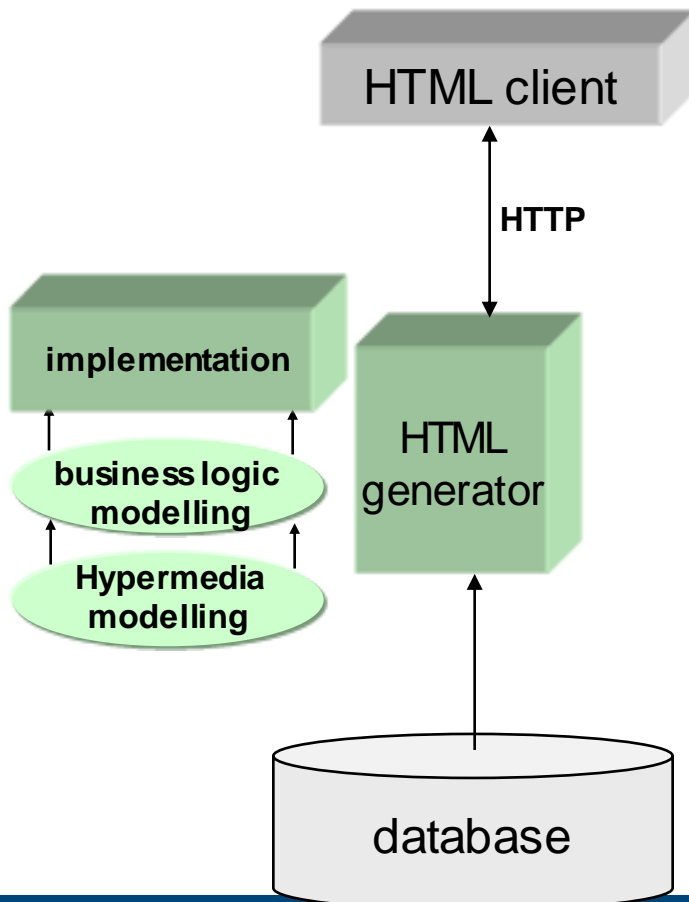Database Management System

*Tables, XML
Stored Procedures*

Content Management Systems

- Historically: Document Management Systems (DMS)

  - (scanned) documents = facsimile + searchable records

  - Company internal

- Then: Content Management Systems (CMS)

  - Everything *maintained electronically*
    – text, images, audio, video + links

  - Company internal

- Now: Web Content Management Systems (WCMS)

  - Browser as GUI (web authoring), High emphasis on appearance, availability, security

- Component / Enterprise CMS

  - Use componets to build up douments (single source of information)

  - The latter is focused on whole business management, not just web authoring

related:
Workflow
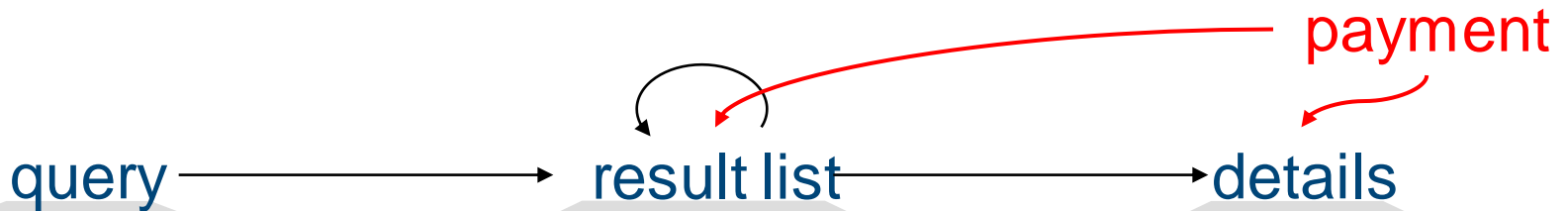*Management*
Systems (WMS)

Schematic WCMS Architecture

- Variant 1:
  hard-coded business logic

- Variant 2:
  configured business logic
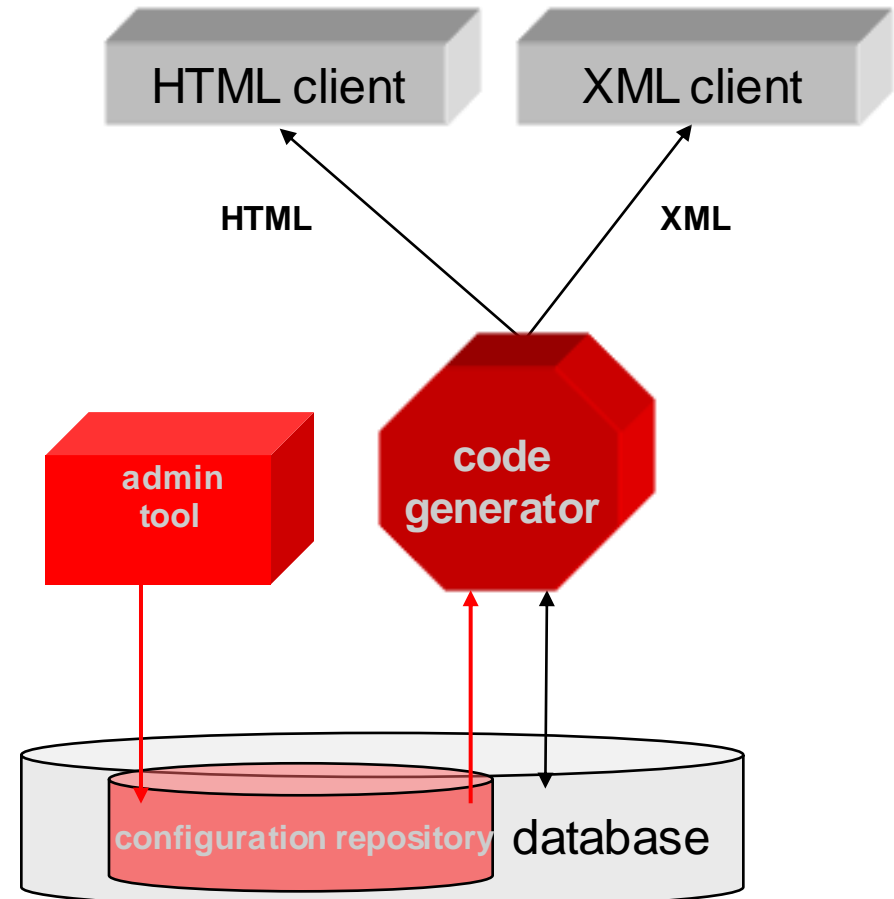
Standard Web Retrieval Cycle

payment

query → result list → details

automatic scroll controls

Query Mechanisms

- One or more form entries

- Qualitative / fuzzy search

- Advanced search criteria, including joins

- Drop-down lists generated from database contents

- Tree-based & other representations using JavaScript

Modelling Tool

- Modular design

- User-defined layout elements
  - down to HTML/XML tags

Benefits and disadvantages of WCMS

Advantages:

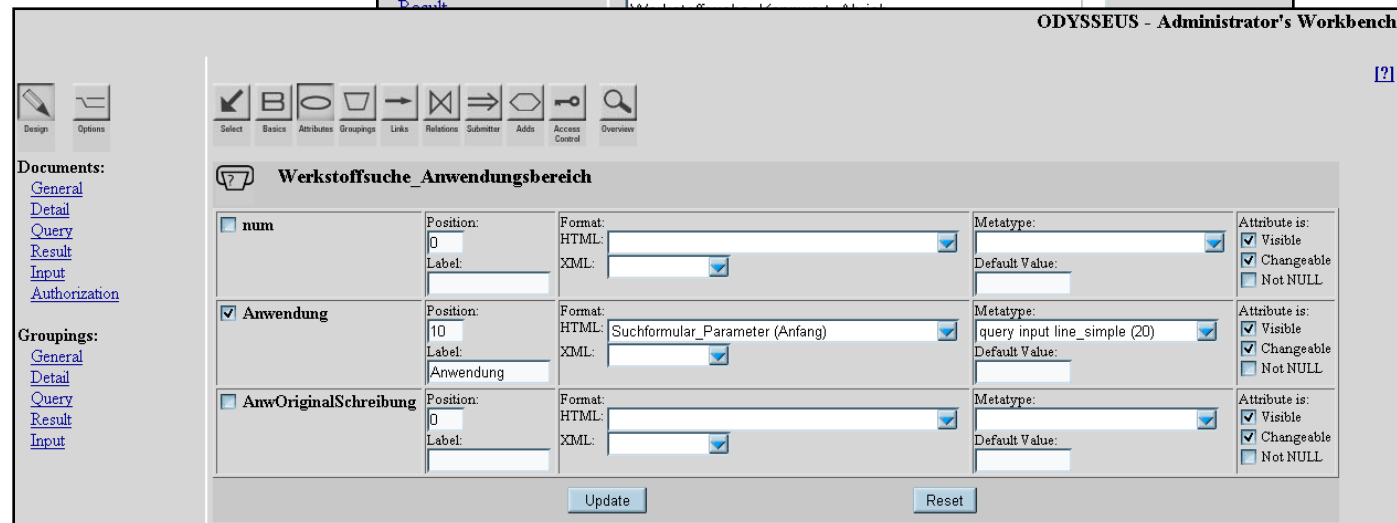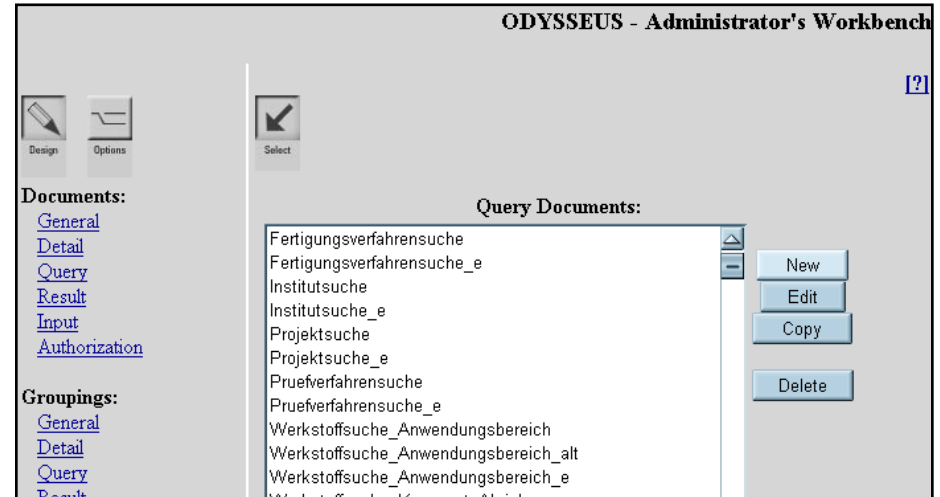- Low cost (many free systems)

- Rapid prototyping & deployment
  - for small installations

- Plugin / Add-on extensibility

- Personalisation, role-based access control, workflow control

- Web-based administration & maintenance

- Flexible target formats from one source

Disadvantages:

- Total costs of ownership (TCO)
  - May require training for efficient use, dedicated hardware maintenance or licensing costs (training for upgrades may also be needed)
  - If web provided as a service, forces to its continuous update

- Performance
  - Larger installations can incur performance issues due to under optimization (DBMS) or inadequate hardware capacity (peak workload, large data files)

WebApp Attributes—I

- ### Network intensiveness
  - Served and accessed over the network
  - diverse community of clients (see browsers later on)

- ### Concurrency
  - large number of users may access at same time
  - patterns of usage vary greatly

- ### Unpredictable load
  - number of users may vary by orders of magnitude from day to day

- ### Performance
  - If user must wait too long may go elsewhere
  - (due to access, server-side processing, client-side formatting and display, …)

test use cases?

WebApp Attributes—II

- Availability

  - 100 percent availability unreasonable

  - Yet users often demand "24/7/365" access

- Data driven

  - primary function of many WebApps: use hypermedia to present text, graphics, audio, video content

  - Document Management System (DMS), Content Management System (CMS), Web Content Management System (WCMS)

- Content sensitive

  - up-to date, comprehensive, customer-oriented, …

- Aesthetics

  - As critical as technical design

WebApp Attributes—III

- Immediacy

  - time to market a few days or weeks

  - sophisticated Web pages within few hours using modern tools

- Continuous evolution

  - conventional software: evolves over planned, chronologically-spaced releases

  - Web applications: evolve continuously

- Security

  - protect sensitive content + provide secure transmission

  - HTTPS, SSL, …

Testing WebApps

- Deceptively easy-looking – "we just see that it all works fine"

- Check, among others (client-side; what about server-side?):
  - Dangling links – systematically only with tool (eg, wget)
  - Plug-ins (Flash, ...) UI components (applets, Active X, ...) Security
  - Performance – load times on DSL, ISDN, modem; concurrent access stress test
  - Proper reaction on error situations (illegal user input, system failure, ...)

- Browsers…

Stats can be biased,

but provide a good basis

Usage share of desktop browsers for March 2013

Source	Chrome	Internet Explorer	Firefox	Safari	Opera	Other
StatCounter	38.07%	29.30%	20.87%	8.50%	1.17%	2.09%
Wikimedia	44.06%	22.08%	18.17%	3.24%	3.38%	9.07 %
W3Counter	30.30%	24.60%	19.30%	16.30%	2.30%	7.20%
NetApplications	16.45%	55.83%	20.21%	5.31%	1.74%	0.20%
Clicky	35.13%	33.38%	21.18%	8.92%	1.15%	n/a%

source: http://en.wikipedia.org/wiki/Usage_share_of_web_browsers

Selenium: browser automation

- Selenium automates browsers, that's it…
  well, it also enables content verification

  - http://docs.seleniumhq.org/

- Selenium IDE: Firefox add-on for record-and-playback of interactions

  - bug reproduction scripts

  - scripts for automation-aided exploratory testing

- Selenium WebDriver: language specific bindings to drive a browser

  - browser-based regression automation

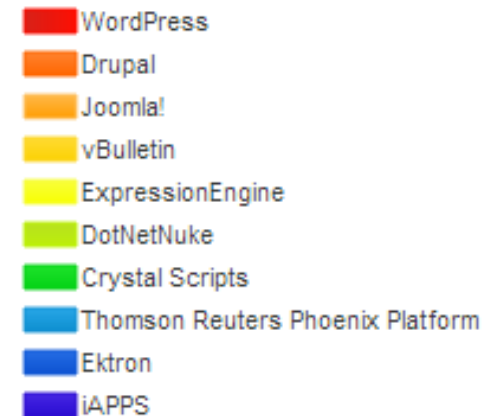 - distribute scripts across many environments

Which Open-Source WCMS?

Torge Schmidt, IRC-IT

- Free (See www.opensourcecms.com) / paid commercial / hosted

- IRC-IT has evaluated ~15 systems, here the creme:

  - MediaWiki

  - TYPO3

  - Mambo

  - Drupal

  - Xaraya

  - Xoops

  - Tiki-Wiki

CMS Distribution in Top 100,000 Sites

- WordPress
- Drupal
- Joomla!
- vBulletin
- ExpressionEngine
- DotNetNuke
- Crystal Scripts
- Thomson Reuters Phoenix Platform
- Ektron
- iAPPS

source: http://trends.builtwith.com/cms
April 2013