SSE 3200 Course: Analysis and Design of Web-Based Services

ASEE SECC 2010
A Curriculum for Engineering Service Systems Workshop
June 20, 2010

Presented by: Nilufer Onder
Michigan Technological University
Motivation for the course

- Widespread use of the web for delivering services
- An engineering perspective to
  - Design
  - Development
  - Testing
  - Problem solving
The strategy and technology behind developing web-based service systems will be the focus of the course. Topics will include flowcharting, cost estimating, performance measurement, and alpha and beta testing. A semester project will illustrate the use of these tools.
Prerequisite support

- **CS 1121 Computer Science 1**
  Starting point of the CS program. A high-level, object-oriented programming language is introduced as a problem-solving tool. Topics include design, coding, documentation, debugging and testing of programs. Programming assignments are given in both a lab setting and as homework.

  *(Programming in Java)*

- **SSE 2300 Service Systems Dynamics and Design**
  Introduces a systems perspective in solving complex problems. How systems are designed and implemented will be a focal point of the course. Topics such as simulation, life cycle, and regulation will be introduced.

  *(Design of complex systems)*
Course structure

- General topics
- Part 1: Web based services through web browsers
  - Human – computer
  - Hands on focus
- Part 2: Enterprise Application Integration
  - Computer – computer
  - Design and technology focus
General topics

- Distributed Information Systems (DIS)
- Proprietary networks vs. the Internet
- Layered design
- Architecture (one-tier to n-tier)
- Communication (blocking or non-blocking)
- Middleware
- Web technologies
Part 1: Human-computer services

- XML: eXtensible Markup Language
- HTML: HyperText Markup Language
- JavaScript
- PHP
- MySQL
Example

User interface form to insert field data

FieldManager.php
Add data to user’s local database

Local Database

FMOnlineSubmit.php
Reads local database, stores in web database

Network Server Database

Line of user visibility
Part 2: Computer-computer services

- RPC: Remote Procedure Calls
- TP monitors: Transaction Processing Monitors
- Object brokers
Part 2: Computer-computer services (cont’d)
B2B document sharing

- A research project conducted at IBM’s Almaden Research Center
- Business clients, procurement analysts or approved employees need documents
- Clients in 26 countries
- An order based system

Krishna et al., 2007 IEEE International Conference on Services Computing (SCC 2007)
Example routing rule

If the customer name contains the string “AA1” and the country code is in the set {UK, FR} then notify by e-mail the following CSRs as follows:

To: johndoe@uk.ibm.com
Cc: aa@fr.ibm.com
Bcc: customer_support@ibmc1.pe.e2open.net
Possible problems

- Error prone
- Incorrectly routed orders
- Service Interruption
  - Manual rule update
  - Shutdown
- Tracking difficulties
- Wrong CSR
  - Raw order
  - Customer Service Representative (CSR)
- Lost orders
  - Lotus notes
  - E-mail Server and Rules Editor

Business user

B2B client
After

B2B client

Business user

Automatic rule updates

e2Open Gateway

Raw order

IDG

Processed order

Content management

Websphere™

Web reporting

CSR
Textbooks

- Learning PHP, MySQL & JavaScript
  Robin Nixon
  2009, O’Reilly

- Web Services: Concepts, Architectures, and Applications
  Gustavo Alonso, Fabio Casati, Harumi Kino, and Vijay Machiraju
  2004, Springer Verlag
Summary

- The course was offered twice (Spring 2009 and Spring 2010)
- The students liked the hands-on parts
- They commented that they learned a lot about the Internet’s architecture and web based transactions