Middleware and Web Services

Motivation and Course Overview

doc. Ing. Tomáš Vitvar, Ph.D.

tomas@vitvar.com • @TomasVitvar • http://vitvar.com



Czech Technical University in Prague

Faculty of Information Technologies • Software and Web Engineering • http://vitvar.com/courses/mdw





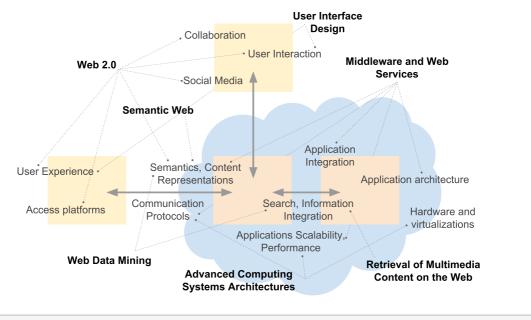
Modified: Tue Apr 11 2017, 10:14:38 Humla v0.3

Hellos

- Tomáš Vitvar
 - Web Engineering curricula chair, CVUT FIT
 - Research Web Intelligence, Semantic Web, LinkedData, Web Services
 - Consulting Technical Director at Oracle
 - → SOA and Oracle Integration Architectures Consulting Projects (IKEA IT, Vodafone UK, MTN ZA)
- Jaroslav Kuchař, Milan Dojčinovski
 - research assistants, Ph.D. students
 - Web services, data mining, analytics, Web technologies

Web Engineering Curricula – bird's view

- Web 2.0 engineering is...
 - far beyond PHP and HTML!



Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

- 3 -

Overview

- Course at a Glance
 - Motivation and Scope
 - Requirements and Organization
- Assessment
- Communication and Resources

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

_ 4

Motivation in Brief

- Systems rely on complex infrastructures
 - A lot of data and many processes, internal and external
 - As people communicate, underlying systems must too
 - *− But:*
 - → variety of data formants, technologies, protocols
 - \rightarrow variety of architectures, client-server, peer-to-peer, ...

Good performance

- frequent changes in applications' loads, peek hours
- scalability effective load balancing
- low costs cheaper to outsource?

• Rapid changes in applications' functionality

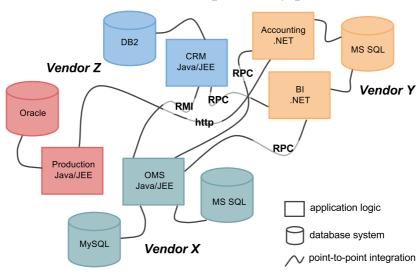
- modular development
- reuse of application functionality
- low costs do it now and quickly!

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

- 5 -

Spaghetti Architecture

- Need for the integration
 - One-to-one integration
 - Hard to maintain, vendor interoperability problem



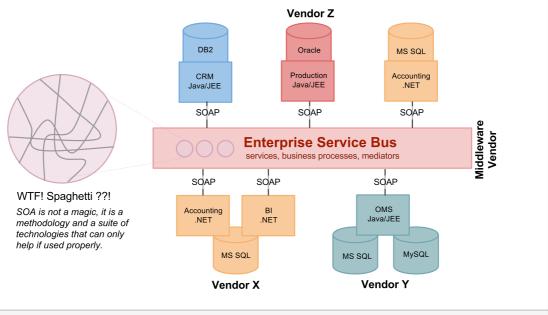
Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvan

- 6

SOA Architecture

• Integration organized

- Enterprise Service Bus, to be used wisely



Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvan

-7-

Scope

• Architectural and conceptual basis

- What is an architecture enterprise, processes, data, software
- Service Oriented Architecture, Service Concepts, Middleware, ESB

Web Service technologies

- Web Service Description Language, SOAP
- Process languages BPEL/BPMN
- Communication patterns synchronous, asynchronous, decoupling

Middleware

- Application server
- Middleware technology for SOA
- Performance, Scalability

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

- 8

Overview

- Course at a Glance
 - Motivation and Scope
 - Requirements and Organization
- Assessment
- Communication and Resources

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

- 9 -

Prerequisites

- Object-oriented programming
 - Principles
 - \rightarrow class, object, inheritance, encapsulation, ...
 - \rightarrow basis for service concepts
- Java
 - All code examples will be in Java
 - All lab work will be in Java
- Web Architecture
 - Basics of XML, XPath, HTTP, URI
- Other
 - Networking
 - Regular expressions, basics of Linux

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

- 10 -

Organization of Lectures

- 13 Lectures
 - Czech: Mon 7:15-8:45, T9:155
 - English: TBA
- Plan
 - 1. 05.10.2015 Motivation and Course Overview (html)
 - 2. 05.10.2015 Introduction to Application Server (html)
 - 3. 12.10.2015 Introduction to Architectures (html)
 - 4. 19.10.2015 Application Protocols (html)
 - 5. 26.10.2015 Application Server Services (html)
 - 6. 02.11.2015 Messaging Systems (html)
 - 7. 09.11.2015 High Availability and Performance (html)
 - 8. 16.11.2015 Service Concepts (html)
 - 9. 23.11.2015 SOAP and REST (html)
 - 10. 30.11.2015 Web Service Description Language (html)
 - 11. 07.12.2015 Enterprise Service Bus (html)
 - 12. 14.12.2015 Service Orchestration (html)
 - 13. 04.01.2016 Reserve/Exam

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

- 11 -

Organization of Labs

- Individual work (no teams!)
- Labs every second week
- Number of labs: 5
 - 1. Introduction, Setup
 - 2. WebLogic Server, application
 - 3. Service design, implementation, wsdl, soap, soapui
 - 4. Oracle Service Bus, Web service integration
 - 5. Interoperability, transformation

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

– 12 -

Methodology for Lab Work

- No app development, not directly related assignments
 - assignment every second week
 - be prepared for the lab!
 - work alone, ask others for advices
 - Results:
 - → 5 completed tasks
 - \rightarrow documentation (in the wiki)
 - → implementation (code in the source tracker)

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

_ 13 -

Development Platform

- WebLogic Server
 - JEE development environment
- Oracle Service Bus
 - Oracle Middleware platform
 - Runs on WebLogic Server
 - You use scripts to install it and run it

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

_ 14 -

Overview

- Course at a Glance
- Assessment
- Communication and Resources

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

- 15 -

Assessment

- Labs
 - Presence is mandatory
 - → You can miss up to 1 lab without sending regrets
 - Every task gives you a max. of 6 points
 - 6 \cdot 5=30 points
 - Activity in labs gives you a max. of 10 points
 - Total maximal points: $p_p=40$, to pass: $p_p \ge 20$
- Final exam
 - Written exam: 3 exercises, 1 hour
 - \rightarrow each gives you a max. of 20 points, the total p_t = 60 points
 - → To pass, you need to have at least 50\% from each exercise!
 - Final score:
 - $\rightarrow p_p + p_t = 100 \text{ maximum points}$

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

_ 16 -

Final Marks

Mark	Points	In words
А	100–90	výborně
В	89–80	velmi dobře
С	79–70	dobře
D	69–60	uspokojivě
E	59–50	dostatečně
F	49–0	nedostatečně

Source: http://www.cvut.cz/pracoviste/pravniodbor/dokumenty/studijni-predpisy/studijnirad.pdf

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

_ 17 -

Overview

- Course at a Glance
- Assessment
- Communication and Resources

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

_ 18

Communication

Language

- Text: English (slides, tweets, posts, instructions, etc.)
 - → choose English/Czech for your contributions to the wiki
- Voice: Czech and English (English version of the course)

Direct

you can always contact me directly at tomas@vitvar.com or@TomasVitvar

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

_ 19 -

Overview of Resources

• Overview of resources

Item	URL	Feed
Course page	http://vitvar.com/courses/mdw	-
EDUX	http://edux.fit.cvut.cz/courses/MI-MDW	-
Lab project	https://gitlab.fit.cvut.cz	-
Bookshelf	http://vitvar.com/courses/mdw/bookshelf	RSS

Books

- Thomas Erl: Service-Oriented Architecture: Concepts, Technology, and Design, Prentice Hall, Aug 2, 2005.

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

_ 20 -

About Slides

- Humla Open Source HTML5 Presentation Environment
 - every slide has a unique URL
 - all figures linked with Google drawings
 - possible to format and print in PDF
 - running local, with back-end NodeJS support, and offline
 - Fork it at Humla github repo
- Keys
 - default browsing mode
 - slideshow mode (automatically scales to fullscreen)
 - 3 grid (overview) mode
 - print mode, 2 slides per page
 - ← slide left
 - → slide right
 - d debug mode
 - toggle last error messages on/off

Lecture 1: Motivation and Course Overview, CTU Winter Semester 2016/2017, @TomasVitvar

- 21 -