Middleware and Web Services

Motivation and Course Overview

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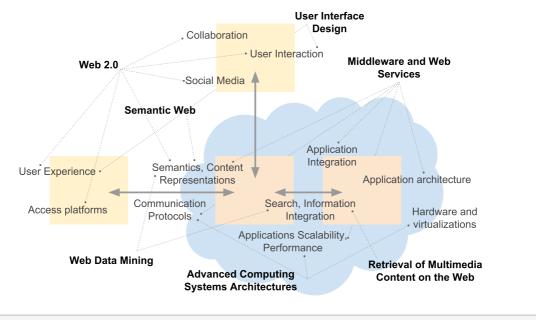
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Hellos

- Tomáš Vitvar lectures (Czech)
 - Web engineering study programme chair at CTU FIT
 - Technology Architect Director at Oracle
 - Research
 - → Web Intelligence, Semantic Web, Linked Data, Web Services
 - Industry
 - → Large scale integration architecture projects (Vodafone UK, IKEA IT Sweden, Turkish Telecom)
 - → Design, governance, troubleshooting, performance tuning
- Jaroslav Kuchař labs (Czech)
 - Research assistant at CTU FIT
 - Web usage mining, big data analytics, Web services
- Milan Dojčinovski lectures and labs (English)
 - research assistant at CTU FIT, Ph.D. candidate
 - Semantic Web, Linked Data, NLP, Web services

Web Engineering Curricula – bird's view

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



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Overview

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

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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

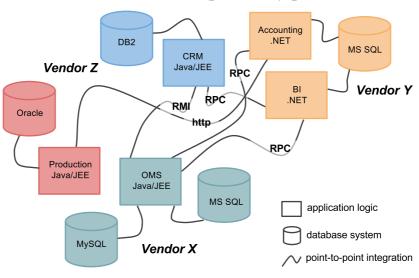
- modular development
- reuse of application functionality
- low costs do it now and quickly!

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Spaghetti Architecture

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



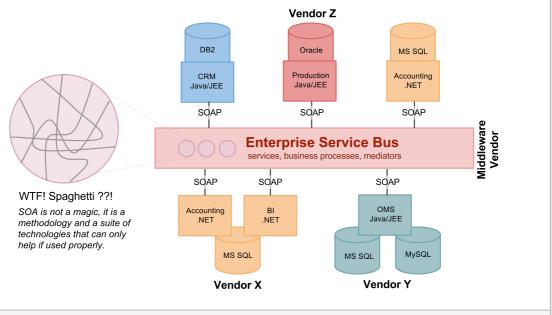
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SOA Architecture

• Integration organized

- Enterprise Service Bus, to be used wisely



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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

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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

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Organization of Lectures

- 13 Lectures
 - Czech: Mon 9:15-10:45, TK:BS
 - English: TBA
- Plan
 - 1. 02.10.2017 Motivation and Course Overview (html)
 - 2. 09.10.2017 Introduction to Architectures (html)
 - 3. 16.10.2017 Application Protocols (html)
 - 4. 23.10.2017 Introduction to Application Server (html)
 - 5. 30.10.2017 Application Server Services (html)
 - 6. 08.11.2017 Messaging Systems (html)
 - 7. 13.11.2017 High Availability and Performance (html)
 - 8. 20.11.2017 Service Concepts (html)
 - 9. 27.11.2017 SOAP and REST (html)
 - 10. 04.12.2017 Web Service Description Language (html)
 - 11. 11.12.2017 Enterprise Service Bus (html)
 - 12. 18.12.2017 Service Orchestration (html)

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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

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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)

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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

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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 5 = 30 points
 - Activity in labs gives you a max. of 10 points
 - Total maximal points: $v_p = 40$, to pass: $v_p \ge 20$
- 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:
 - $\rightarrow p_p + p_t = 100 \text{ maximum points}$

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Final Marks

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

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

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Communication

Language

- Text: English (slides, tweets, posts, instructions, etc.)
 - \rightarrow 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

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Overview of Resources

Overview of resources

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

Books

- Thomas Erl: Service-Oriented Architecture: Concepts, Technology, and Design. Prentice Hall, Aug 2, 2005.
- Jon Mountjoy, Avinash Chugh: WebLogic: The Definitive Guide. O'Reilly Media, Inc., 2004

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About Slides

- Humla Open Source HTML5 Presentation System
 - every slide has a unique URL
 - all figures linked with Google drawings
 - auto-generated PDFs (1 and 2 slides per page) using travis-ci
 - running local (with local nodejs-based http server), and in github pages
 - Suggest edits or correct errors by pull requests at mdw 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

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