

Middleware and Web Services

Motivation and Course Overview

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



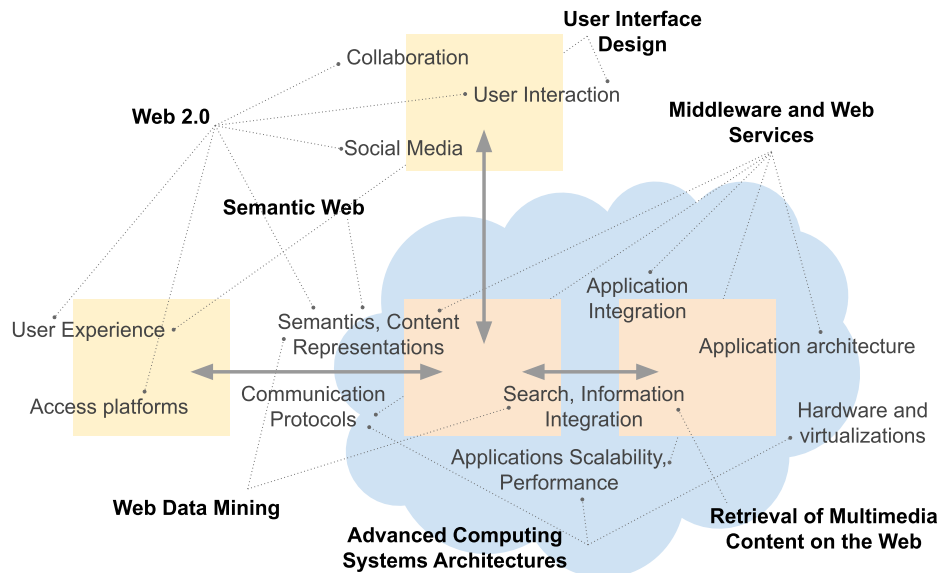
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Hellos

- **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, Seznam.cz*
 - *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!*



Overview

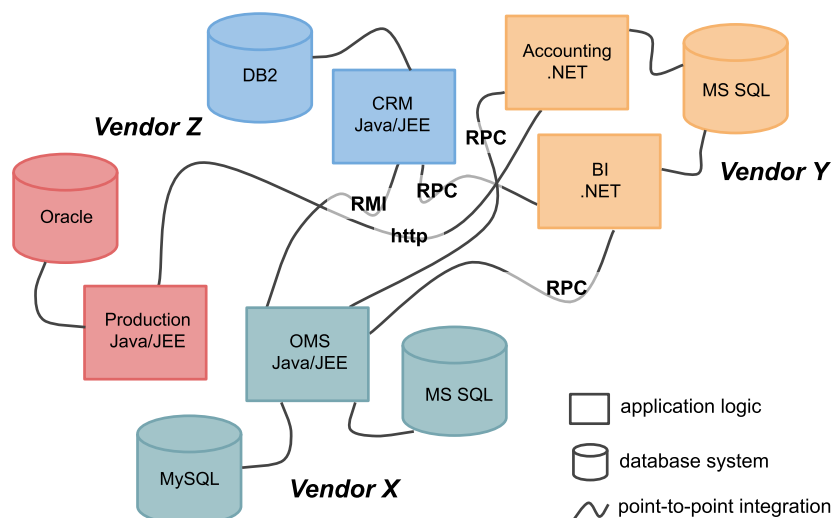
- Course at a Glance
 - *Motivation and Scope*
 - *Requirements and Organization*
- Assessment
- Communication and Resources

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*
 - *variety of architectures, client-server, peer-to-peer, ...*
- Good performance
 - *frequent changes in applications' loads, peak 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!*

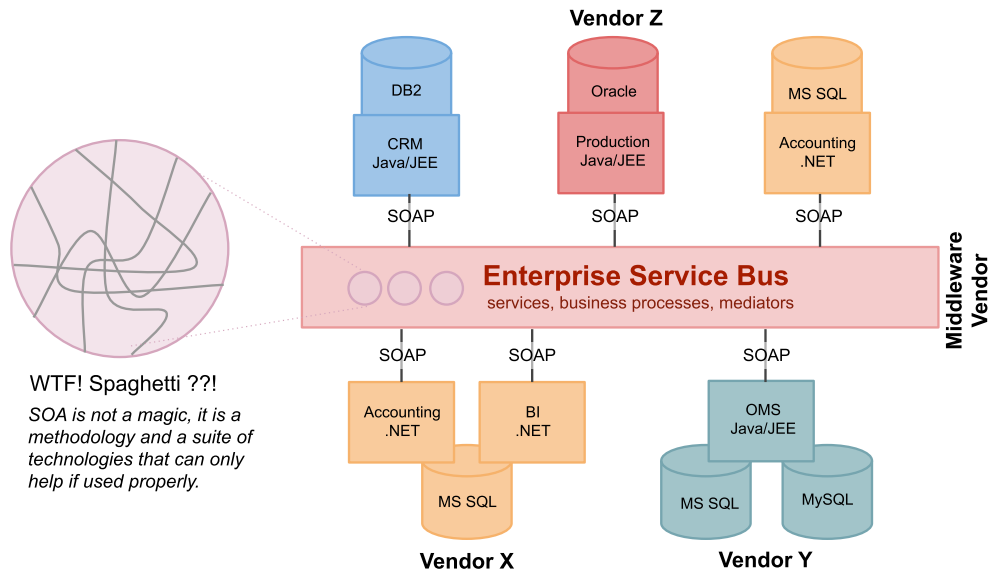
Spaghetti Architecture

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



SOA Architecture

- Integration organized
 - *Enterprise Service Bus, to be used wisely*



Scope

- Architectural and conceptual basis
 - *What is architecture – enterprise, processes, data, software*
 - *Service Oriented Architecture, Service Concepts, Middleware*
- Web Service technologies
 - *Details of HTTP and REST, SOAP*
 - *Web Service Description Language (WSDL)*
- Infrastructure and Middleware
 - *Performance, Scalability*
 - *Application server*
- Cloud Architectures

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Prerequisites

- Object-oriented programming
 - *Principles*
 - *class, object, inheritance, encapsulation, ...*
 - *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*

Organization of Lectures

- 12 Lectures
 - Czech: Mon 9:15-10:45, T9:107
 - English: TBA
- Plan
 1. 23.09.2019 – Motivation and Course Overview ([html](#))
 2. 30.09.2019 – Introduction to Architectures ([html](#))
 3. 07.10.2019 – Service Architecture ([html](#))
 4. 14.10.2019 – Representational State Transfer ([html](#))
 5. 21.10.2019 – Advanced Service Concepts and Technologies ([html](#))
 6. 04.11.2019 – Application Server Architecture ([html](#))
 7. 11.11.2019 – Application Server Services ([html](#))
 8. 18.11.2019 – Integration Patterns ([html](#))
 9. 25.11.2019 – Messaging Systems ([html](#))
 10. 02.12.2019 – High Availability and Performance ([html](#))
 11. 09.12.2019 – Cloud Architectures ([html](#))
 12. 16.12.2019 – Reserve

Organization of Labs

- Individual work (no teams!)
- Labs every second week
- Number of labs: 6
 1. Introduction - Setup, Simple Web Application
 2. REST – Basics, development of a REST service
 3. REST advanced
 4. SOAP Web services
 5. Messaging Services - JMS
 6. Web Logic Metrics and Load Balancing

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*
 - *you will submit results to gitlbab@FIT*

Overview

- Course at a Glance
- **Assessment**
- Communication and Resources

Assessment

- Labs
 - *Presence is mandatory*
 - *You can miss up to 1 lab without sending regrets*
 - *Every task gives you the maximum of 6 points = 30 points in total*
 - *Activity in labs gives you the maximum of 10 points*
 - *Total maximum points = 40, **to pass**: 20 points minimum*
- Final exam
 - *Written exam: 3 exercises, 1 hour*
 - *each gives you a max. of 20 points, the total is 60 points*
 - *To pass, you need to have at least 50% from each exercise!*
 - *Final score:*
 - *100 points maximum*

Final Marks

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

Source: <http://www.cvut.cz/pracoviste/pravni-odbor/dokumenty/studijni-predpisy/studijnirad.pdf>

Overview

- Course at a Glance
- Assessment
- **Communication and Resources**

Communication

- Language
 - *Text: English (slides, tweets, posts, instructions, etc.)*
 - *Voice: Czech and English (English version of the course)*
- Direct
 - *you can always contact me directly at tomas@vitvar.com or [@TomasVitvar](https://twitter.com/TomasVitvar)*

Overview of Resources

- Overview of resources

Item	URL
Course slides	http://mdw.vitvar.com
Courses@FIT	https://courses.fit.cvut.cz/MI-MDW/
Lab projects	https://gitlab.fit.cvut.cz/
Assessment	https://grades.fit.cvut.cz/courses/MIE-MDW.16/

- Books

- Jiří Voříšek: *Strategické řízení informačního systému a systémová integrace*. Management Press, 1997.
- L. Richardson, S. Ruby: *RESTful Web Services: Web services for the real world*, O'Reilly Media, May 2007, ISBN 9780596529260.
- Jon Mountjoy, Avinash Chugh: *WebLogic: The Definitive Guide*. O'Reilly Media, Inc., 2004
- Thomas Erl: *Service-Oriented Architecture: Concepts, Technology, and Design*. Prentice Hall, Aug 2, 2005.

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

- 1 default browsing mode
- 2 slideshow mode (automatically scales to fullscreen)
- 3 grid (overview) mode
- 4 print mode, 2 slides per page
- ← slide left
- slide right