

# 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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Humla v0.3

## 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!*

Drawing not available

## 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 formats, 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*

Drawing not available

## SOA Architecture

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

Drawing not available

## 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*
    - *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

- 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](#))

## 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

## 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*
    - *documentation (in the wiki)*
    - *implementation (code in the source tracker)*

## 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*

## 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 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**:  $p_p \geq 20$
- Final exam
  - Written exam: 3 exercises, 1 hour
    - 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:
    - $p_p + p_t = 100$  maximum points



## 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
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- Communication and Resources

## 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](mailto:tomas@vitvar.com) or [@TomasVitvar](https://twitter.com/TomasVitvar)

## Overview of Resources

- Overview of resources

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

- 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
  - Jiří Voříšek: *Strategické řízení informačního systému a systémová integrace*. Management Press, 1997.

## 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)*
  - grid (overview) mode*
  - print mode, 2 slides per page*
  - slide left*
  - slide right*