

# 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>



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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, 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

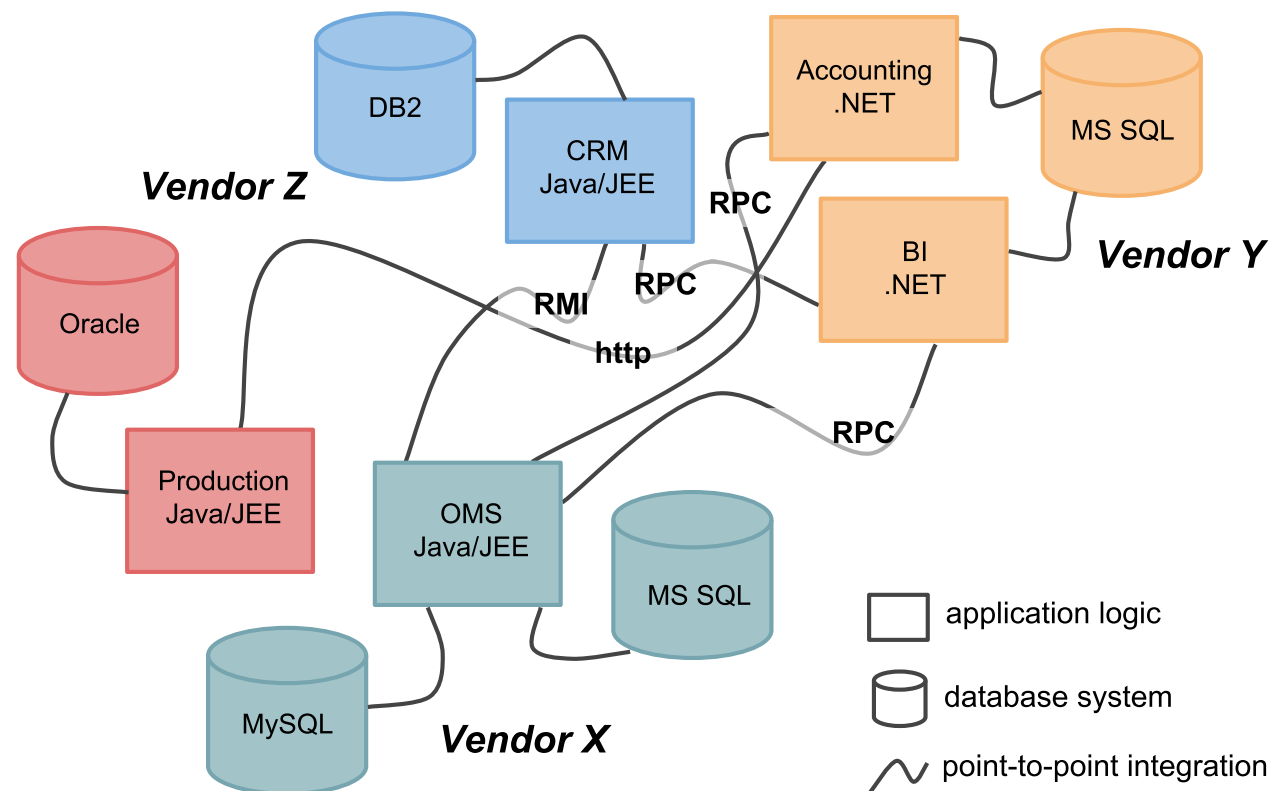
- Course at a Glance
  - *Motivation and Scope*
  - *Requirements and Organization*
- Assessment
- Communication and Resources

# 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!*

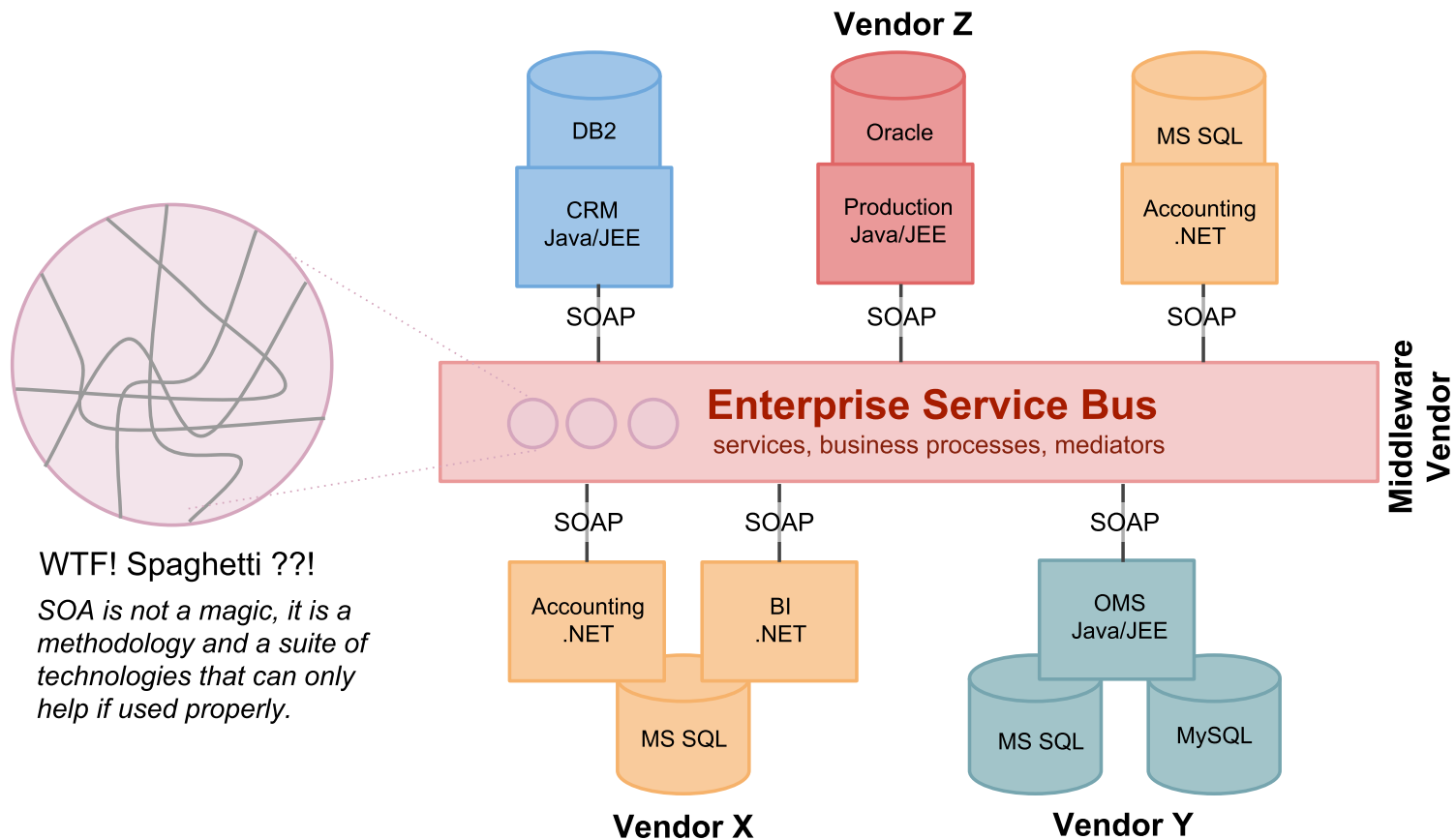
# Spaghetti Architecture

- 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
  - *Microservices, Docker*



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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, TK:BS*
  - *English: TBA*
- Plan
  1. 01.10.2018 – *Motivation and Course Overview* ([html](#))
  2. 08.10.2018 – *Introduction to Architectures* ([html](#))
  3. 15.10.2018 – *Service Architecture and Technologies 1* ([html](#))
  4. 22.10.2018 – *Service Architecture and Technologies 2* ([html](#))
  5. 29.10.2018 – *Service Architecture and Technologies 3* ([html](#))
  6. 05.11.2018 – *Application Server 1* ([html](#))
  7. 12.11.2018 – *Application Server 2* ([html](#))
  8. 19.11.2018 – *Messaging Systems* ([html](#))
  9. 26.11.2018 – *High Availability and Performance 1* ([html](#))
  10. 03.12.2018 – *High Availability and Performance 2* ([html](#))
  11. 10.12.2018 – *Cloud Architectures* ([html](#))
  12. 17.12.2018 – *Microservices and Docker* ([html](#))

# 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](mailto: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 5 points*
  - $5 \cdot 5 = 25$  points
  - *Activity in labs gives you the maximum of 15 points*
  - *Total maximum 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

- 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](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>
Courses@FIT	<a href="https://courses.fit.cvut.cz/MI-MDW/">https://courses.fit.cvut.cz/MI-MDW/</a>
Lab projects	<a href="https://gitlab.fit.cvut.cz/">https://gitlab.fit.cvut.cz/</a>
Assessment	<a href="https://grades.fit.cvut.cz/courses/MIE-MDW.16/">https://grades.fit.cvut.cz/courses/MIE-MDW.16/</a>

- 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*