

# Middleware and Web Services

## Motivation and Course Overview

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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!*



# Overview

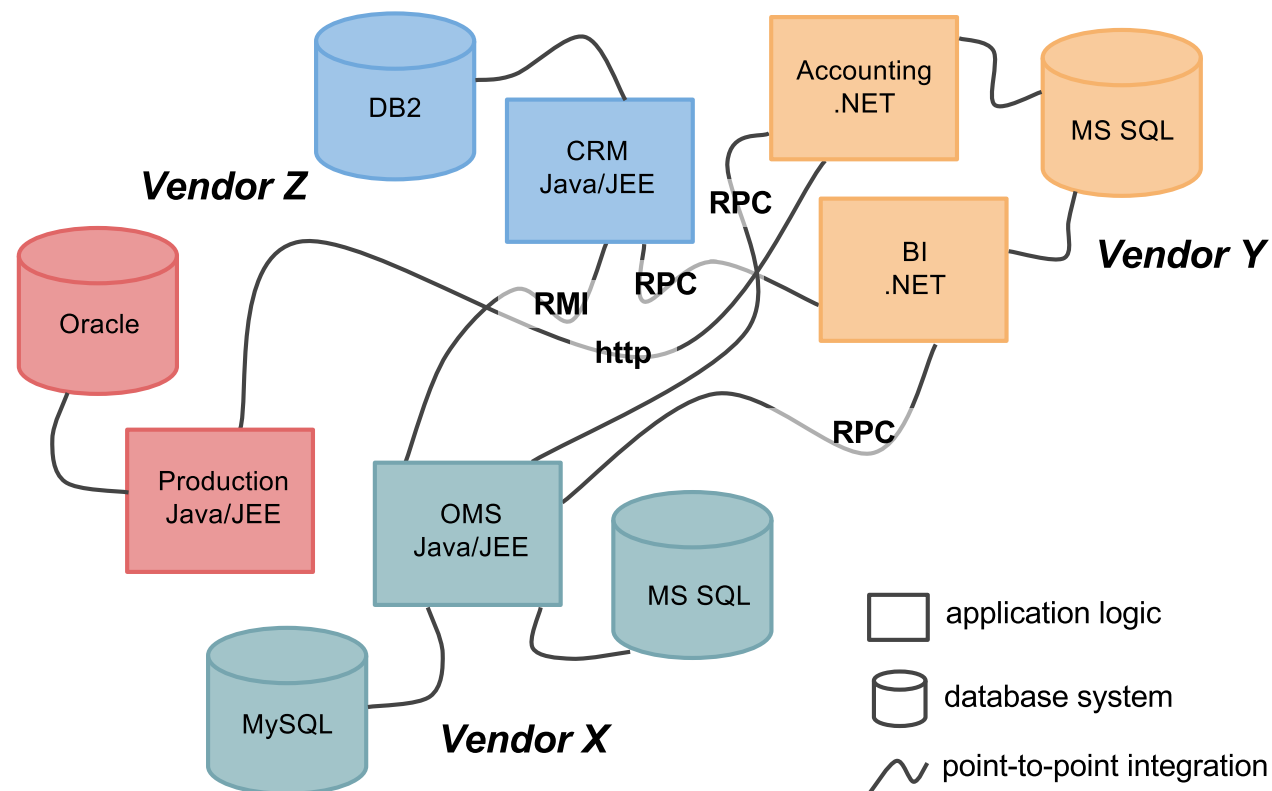
- Course at a Glance
  - *Motivation and Scope*
  - *Requirements and Organization*
- Assessment
- Communication and Resources

# 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!*

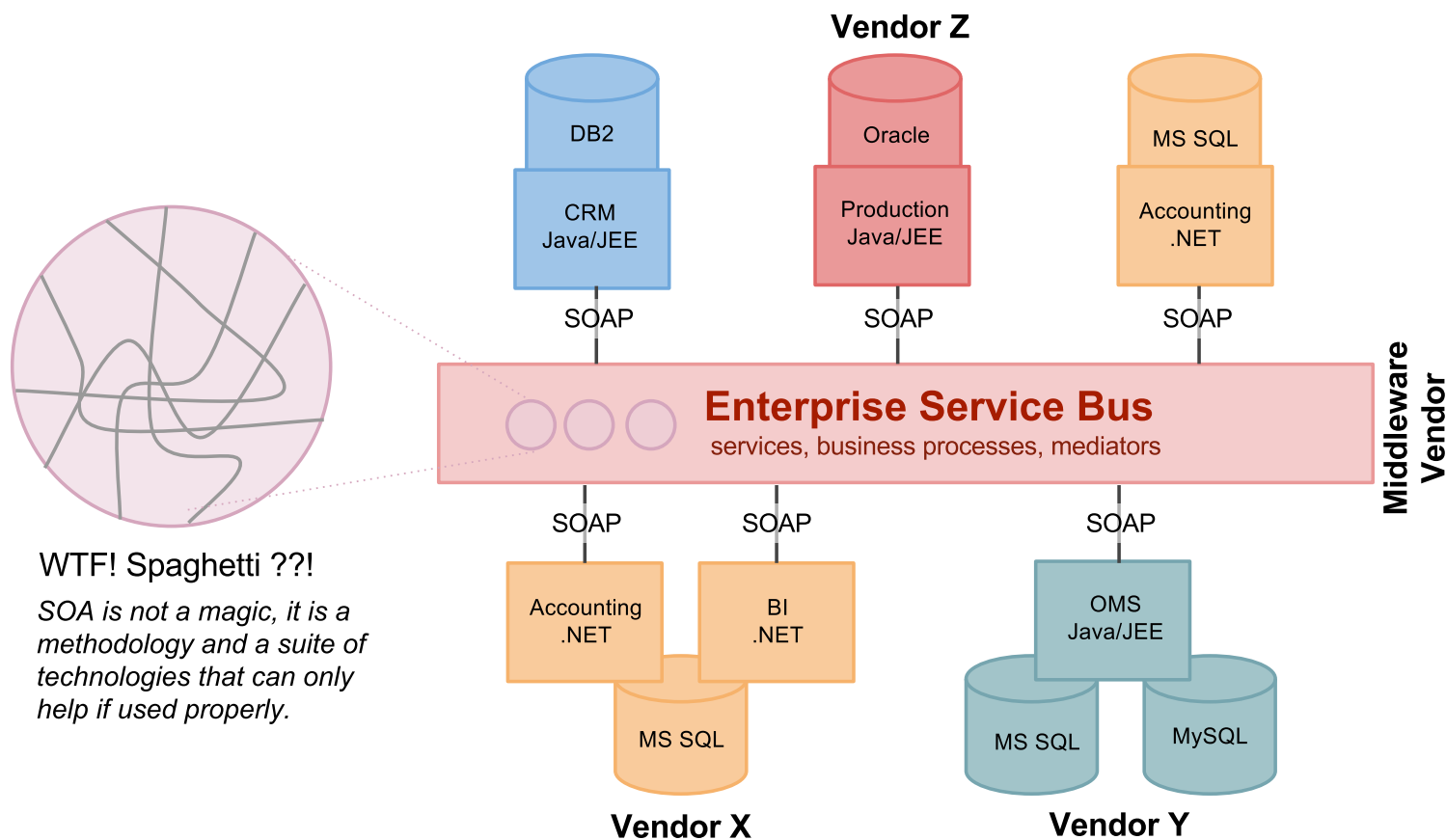
# Spaghetti Architecture

- 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 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 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

# 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

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# 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	Feed
Course page	<a href="http://vitvar.com/courses/mdw">http://vitvar.com/courses/mdw</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>	RSS

- Books

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

# 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
  - 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*
  - d *debug mode*
  - e *toggle last error messages on/off*