# Middleware and Web Services

#### **Motivation and Course Overview**

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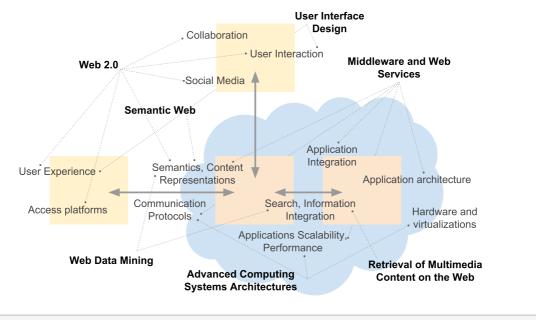
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## Hellos

- 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

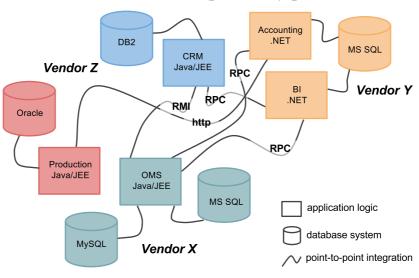
- modular development
- reuse of application functionality
- low costs do it now and quickly!

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# **Spaghetti Architecture**

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



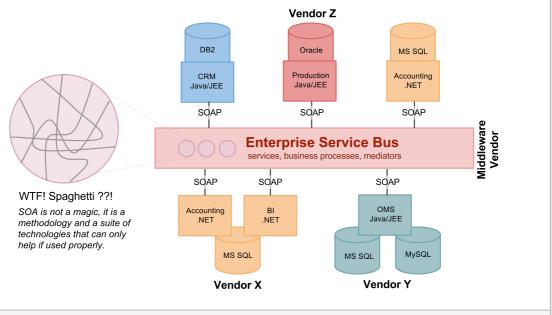
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### **SOA Architecture**

# • 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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### **Overview**

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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  $p_{\text{T}}$  60 points
    - → To pass, you need to have at least 50\% from each exercise!
  - Final score:
    - $\rightarrow p_p + p_{\rm t}$  100 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.)
  - → 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
- Jiří Voříšek: Strategické řízení informačního systému a systémová integrace. Management Press, 1997.

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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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