Middleware and Web Services

Motivation and Course Overview

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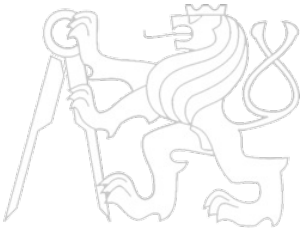

Czech Technical University in Prague
Faculty of Information Technologies • Software and Web Engineering • http://vitvar.com/courses/mdw

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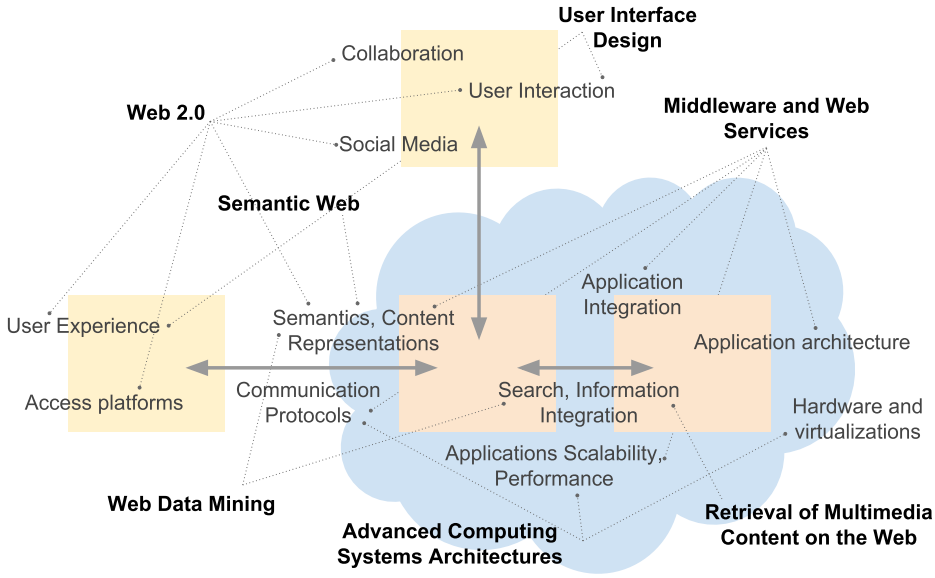
Humla v0.3

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*
  - *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

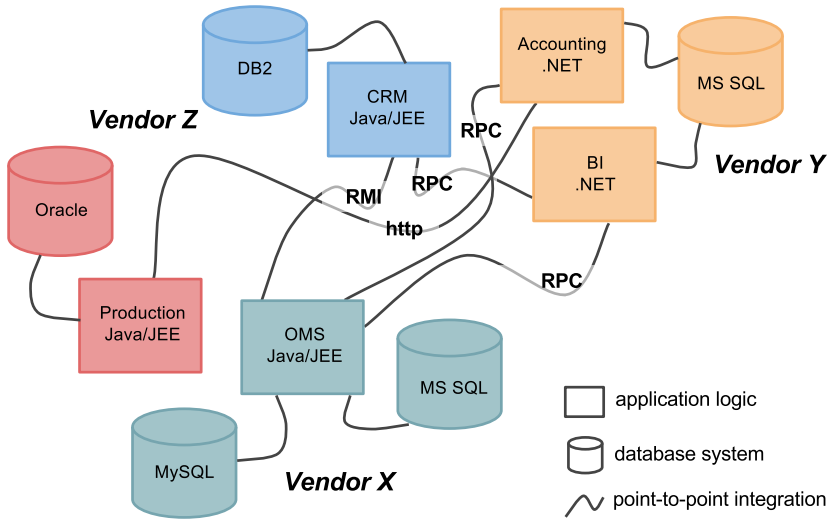
- Course at a Glance
  – *Motivation and Scope*
  – *Requirements and Organization*
- Assessment
- Communication and Resources

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, 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!*

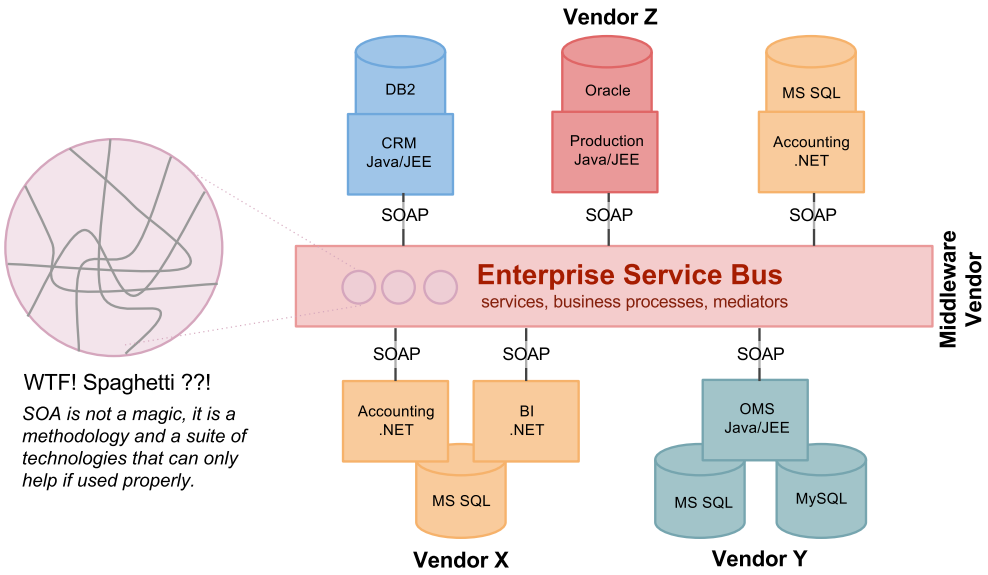
Spaghetti Architecture

- 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 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*

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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*
  - $6 \cdot 5 = 30$ *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

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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*

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*

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*