Middleware Architectures 1

Motivation and Course Overview

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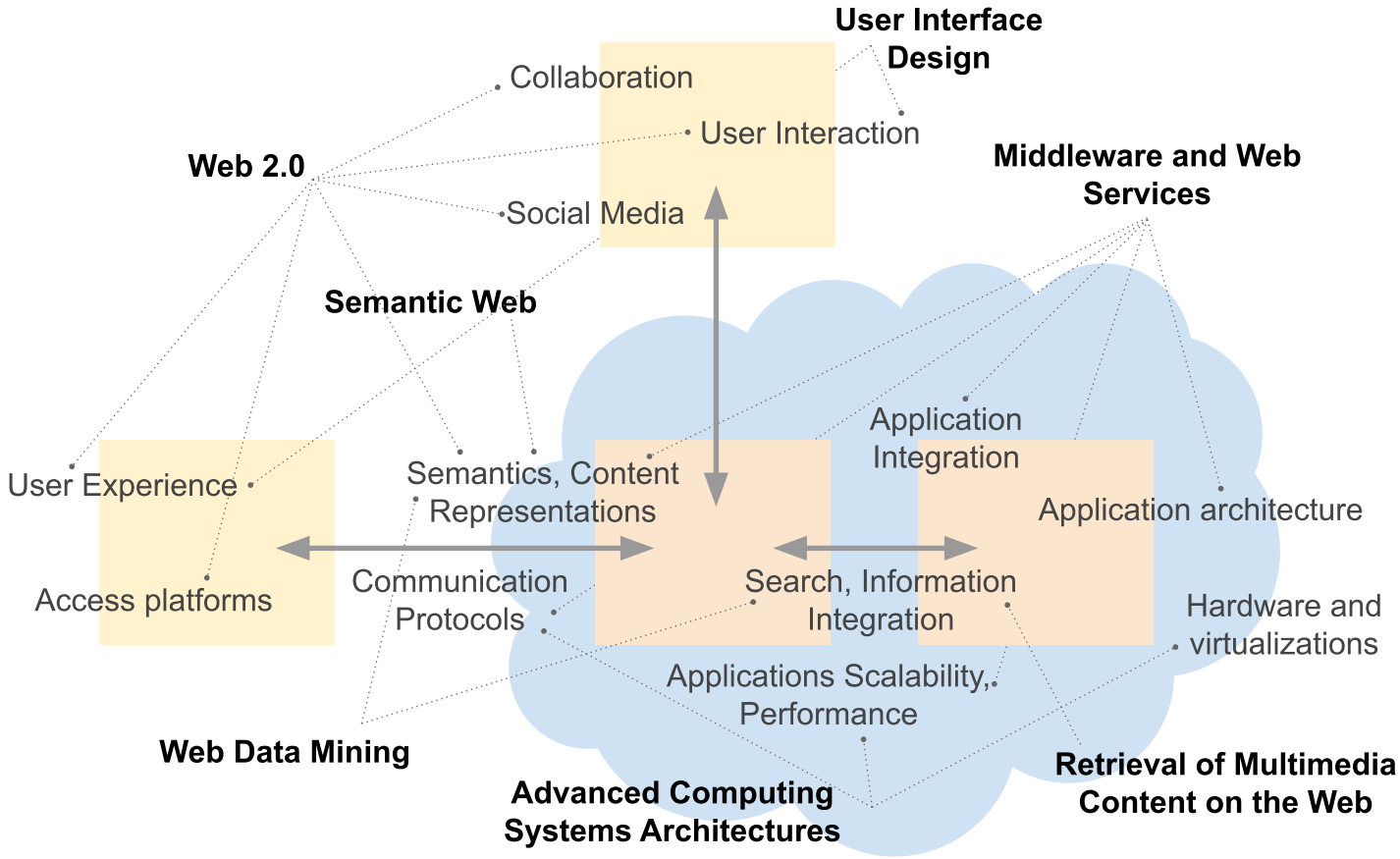
Humla v0.3

Hellos

- Tomáš Vitvar – lectures (Czech)
  - *Web engineering curricula 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

What is Middleware?

- Say anything you think has something to do with middleware
  - *Architecture*
  - *Tehnology*
  - *Tools*
  - *Concept or style*
  - *Methodology*
  - ...
  - *No worries, there is no bad answer!*

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, ...*
- Rapid changes in applications' functionalities
  - *modular development*
  - *reuse of application functionality*
  - *low costs – do it now and quickly!*
  - *Good performance*
    - → *frequent changes in applications' loads, peek hours*
    - → *scalability – effective load balancing*
    - → *low costs – cheaper to outsource?*

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*
  - *relation to SOAP*
- Infrastructure and Middleware
  - *Application server*
  - *Performance, Scalability*
- Cloud Architectures

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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, T9:107*
  - *English: TBA*
- Plan
  1. *20.09.2021 – Motivation and Course Overview (html)*
  2. *27.09.2021 – no lecture*
  3. *04.10.2021 – Information System Architectures (html)*
  4. *11.10.2021 – Service Architectures and Integration Patterns (html)*
  5. *18.10.2021 – Application Server Architecture 1 (html)*
  6. *25.10.2021 – Application Server Architecture 2 (html)*
  7. *01.11.2021 – Resource-oriented Web Service Architecture (html)*
  8. *08.11.2021 – Web Service Architecture State Model (html)*
  9. *15.11.2021 – Caching, Revalidation, Concurrency Control (html)*
  10. *22.11.2021 – High Availability and Performance (html)*
  11. *29.11.2021 – Event-driven architectures (html)*
  12. *06.12.2021 – Reserve 1*
  13. *13.12.2021 – Reserve 2*

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*

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Assessment

- Labs
  - *Presence is mandatory*
    → *You can miss up to 1 lab without sending regrets*
  - *Every task gives you the maximum of 6 points = 30 points in total*
  - *Activity in labs gives you the maximum of 10 points*
  - *Total maximum points = 40, **to pass**: 20 points minimum*
- Final exam
  - *Written exam: 3 exercises, 1 hour*
    → *each gives you a max. of 20 points, the total is 60 points*
    → *To pass, you need to have at least 50% from each exercise!*
  - *Final score:*
    → *100 points maximum*

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.)*
  - *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
Courses@FIT	https://courses.fit.cvut.cz/NI-AM1/
Lab projects	https://gitlab.fit.cvut.cz/
Assessment	https://grades.fit.cvut.cz/courses/NI-AM1/

- 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.*
  - *I. Grigorik: High Performance Browser Networking, O'Reilly Media, May 2013, ISBN 978-1-449-34476-4.*
  - *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*