

Middleware Architectures 2

Motivation and Course Overview

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Modified: Tue Feb 16 2021, 08:39:41
Humla v0.3

Overview

- **Motivation**
- Scope, Requirements, Learnings
- Assessment, Resources, Communication

Web 2.0

- A new version of the Web?
- Principles
 - *Read-Write Web*
 - *Programmable Web*
 - *Realtime Web*
 - *Social Web*

Motivation in Brief

- Need for highly performant and scalable apps
 - *Sudden increase in traffic*
 - *Slashdot effect*
- The Web is programmable
 - *Applications provide **data** and **functionality***
 - *Users – end-users (GUI) and programmers (API)*
 - *Any company with a Web presence has an API*
 - *Google, Amazon, LinkedIn, Facebook, ...*

AM2 and AM1 Courses

- **AM2 builds on AM1**
- **Application Architecture**
 - *Multi-tier client-server architecture*
 - *Cloud native and microservices*
 - *Interface of the app, REST*
 - *Client side of the architecture, JavaScript, AJAX*
 - *Infrastructure empowered by cloud technologies*
- **Technology, Platform**
 - *JavaScript*
 - *client-side + related technologies*
 - *server-side – asynchronous I/O, node.js*
 - *It does not mean you cannot combine technologies*
 - *Node.js as a Web server, ESB for proxy services with back-end systems, all running in a cloud environment (auto scaling, load balancers, message queues, etc.)*

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Scope

- Cloud Architectures
 - *Details of some IaaS and PaaS services*
 - *Cloud Native, Microservice Architecture*
 - *Containers*
 - *Docker, Kubernetes*
- Advanced HTTP
 - *Same origin policy, cross-origin*
 - *OAuth, Open ID, JWT*
 - *Realtime Web protocols*
 - *HTTP Performance, HTTP/2*
- Selected middleware technologies

Organization of Lectures

- 13 Lectures
 - *Czech: Mon 9:15-10:45, online*
- Plan
 1. 15.02.2021 – *Motivation and Course Overview*
 2. 22.02.2021 – *Asynchronous I/O*
 3. 01.03.2021 – *Introduction to Cloud Computing*
 4. 08.03.2021 – *Cloud Native Architecture*
 5. 15.03.2021 – *Microservices Patterns*
 6. 22.03.2021 – *Accessing and Utilizing Services*
 7. 29.03.2021 – *Security*
 8. 05.04.2021 – *Easters*
 9. 12.04.2021 – *Protocols for the Realtime Web*
 10. 19.04.2021 – *HTTP Performance Optimization*
 11. 26.04.2021 – *Kafka*
 12. 03.05.2021 – *Reserve*
 13. 10.05.2021 – *Reserve*

Organization of Practicals

- Work alone, you can collaborate
- Practicals every second week
- Number of sessions: 6-7, 5 major tasks
 1. *Introduction, JavaScript*
 2. *CORS/JSONP*
 3. *OAuth (JWT)*
 4. *Realtime Web*
 5. *HTTP/2*
- Plus a number of tasks to complete at home

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Assessment

- Labs
 - *Presence is mandatory*
 - *You can miss up to 1 lab without sending regrets*
 - *Total maximum points: $P=40$*
 - *exercises for labs + your activity + your homeworks*
 - *to pass: $P \geq 20$*
- Final exam
 - *Mandatory written test: 3 parts, ~1 hour*
 - *each gives you a max. of 20 points, the total $E = 60$ points*
 - *you must have at least 50% of points from each theme covered by a test part and 50% of points in total*
 - *Final score:*
 - *$P + E = 100$ maximum points*
 - *The more points you have from labs, the better for the exam!*

Assessment – 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>

- Everything good and bad will count
 - *practicals, coding, (pro-)activity, passiveness, hacking, lectures, exam, cheating, ...*

Resources

- Online sources
 - <https://edux.fit.cvut.cz/courses/MI-W20/> – EDUX
 - <https://project.fit.cvut.cz/> – your project home
 - <http://w20.vitvar.com> – both html and pdf (1 and 2 slides per page)
- Books
 - I. Grikorik: *High Performance Browser Networking*, O'Reilly 2013
 - B. Burns: *Designing Distributed Systems*, O'Reilly 2018
 - L. Richardson, M. Amundsen: *RESTful Web APIs*, O'Reilly Media, May 2015, ISBN 978-1-449-35806-8.
- Other
 - Many sources on the Web, to be listed throughout the course
 - A lot of W3C sources, Web architecture, HTTP

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 full screen)
 - 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