VSR | EDU

Software Service Engineering

Software Service Engineering

Prof. Dr.-Ing. Martin Gaedke
Technische Universität Chemnitz
Fakultät für Informatik
Professur Verteilte und selbstorganisierende Rechnersysteme

http://vsr.informatik.tu-chemnitz.de

Motivation

"The Web is all about connecting people!"

Tim Berners-Lee

Motivation

- Initial situation
  - Rapid computer and communication networks' development
  - Anytime, Anywhere: Ubiquitous data access
  - Networks of autonomous web-based systems form novel distributed solutions
- Examples
  - Web-applications
  - Trading platforms
  - Markets
  - Specific examples: eBay, Google, Amazon etc.

Lecture

- Type of event: Lecture
- Instructor: Prof. Dr.-Ing. M. Gaedke
- Exercise instructor: V. Siegert
- Place and time:
  - Lecture SSE:
    Tuesday, 9:15 – 10:45, Room 1/201 (A10.201)
  - Tutorial
    Wednesday, 11:30-13:00, Room 1/346 (A12.346)
    Thursday, 11:30-13:00, Room 1/346 (A12.346)
  - First tutorial will be announced on the web site
- SWS: 2 + 2
- Grading adheres to the Prüfungs-/Studienordnung

Preliminary Remarks

- Lecture style
  - Interactive – Questions are allowed and encouraged
  - "Homeworks"
  - Web-based tools
  - Learning-to-learn-for-the-future
- Language
  - Lecture: English
  - Slides: English
- Prerequisite
  - Lecture "Rechnernetze"
  - Deep understanding of HTTP
- Recommended, but not necessary
  - Lecture "Entwurf Verteilter Systeme"

Lecture Information Space

- Links to important websites
- URLs will be provided on the professorship's website:
  - http://vsr.informatik.tu-chemnitz.de/edu/2019/sse

Further Information

- Literature
  - List will be published on the website
  - No script exists
  - All the relevant material (websites, books, etc.) will be announced on our website
- Programming tools
  - Will be announced on our website
  - Most of the used tools can be obtained for free, others are available under special license conditions within university agreements (z.B. MSDN AA)
  - Most of them are installed in Computer Pools
- Slides
  - Special print-version of the slides will be made available after the lecture on the website

New Guiding Element

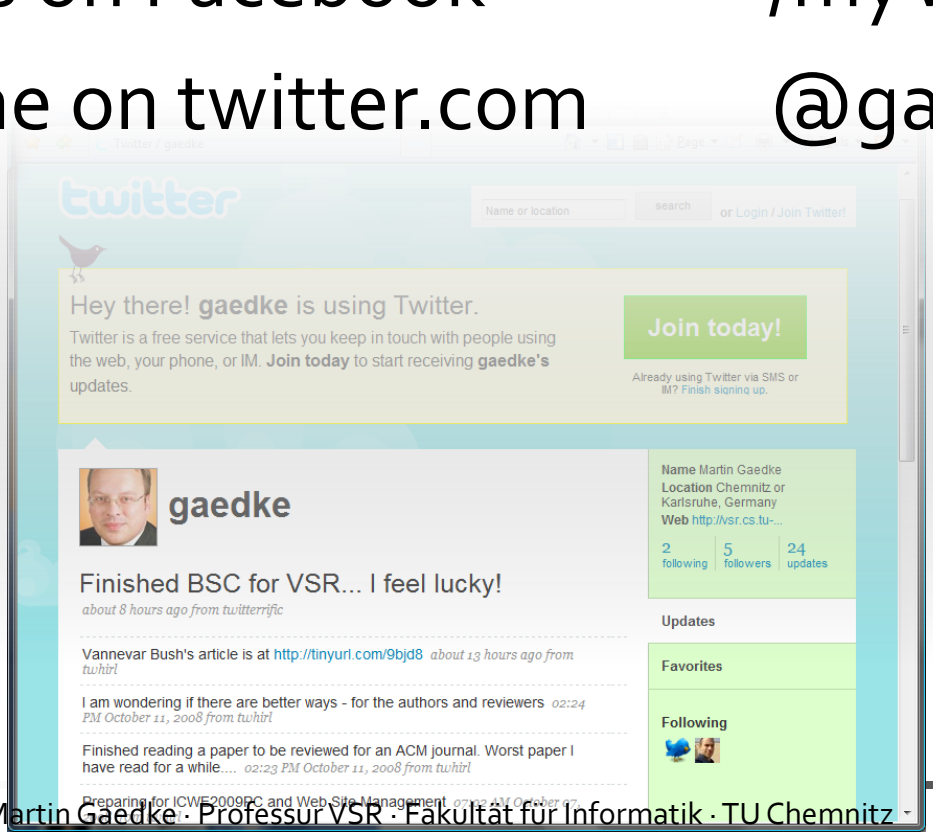
NEW: This semester, we will start increasing the use of Standards and de-facto (industry-relevant) standards from Standards organisations, NGOs, companies, political bodies etc. as guiding elements and source for content – so you will be prepared in the future where to look for updates and how to deal with them!

These include, but are not limited to e.g.:

- International Standardization Organization (ISO) – https://www.iso.org/
- Internet Engineering Task Force (IETF) – http://www.ietf.org
- Institute of Electrical and Electronics Engineers (IEEE) – https://www.ieee.org/
- World Wide Web Consortium (W3C) – http://www.w3.org
- Object Management Group (OMG) – http://www.omg.org
- Project Management Institute (PMI) – http://www.pmi.org
- Scrum Alliance – https://www.scrumalliance.org
- European Union (EU)
  - http://www.europa.eu
  - http://www.eugdpr.org
- United Kingdom (UK) – sdf sdf https://www.gov.uk/service-manual
- Companies and services, like
  - Amazon - Lambda: https://aws.amazon.com/lambda/
  - Google - Cloud Functions: https://cloud.google.com/functions/
  - Microsoft - Azure Functions: https://azure.microsoft.com/en-us/services/functions/
  - IBM - OpenWhisk: https://www.ibm.com/cloud-computing/bluemix/openwhisk

Online Informationen

- VSR-Education WebSite:
  - http://vsr.informatik.tu-chemnitz.de/edu
- Follow us on Facebook /myVSR
- Follow me on twitter.com @gaedke



PART I

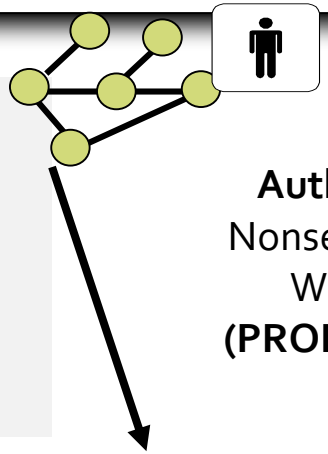
WHAT IS SSE

Chapter 1

INTRODUCTION

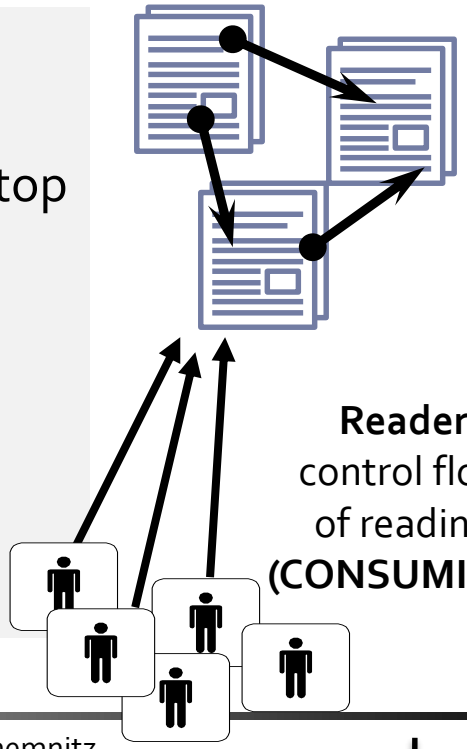
World Wide Web

- 1989 initiated by Tim Berners-Lee at CERN
- 1991 originally proposed
- For further information visit: http://w3.org



Authoring: Nonsequential Writing **(PRODUCING)**

- **Goal – Connect People**
  - Support the cooperation of distributed research teams (e.g. to exchange research documents) on top of a heterogeneous system environment
- **Idea**
  - WWW application of the Hypermedia paradigm
  - Using distributed (heterogenous) computers for serving documents
  - Enabling navigation using "Links"



Reader control flow of reading **(CONSUMING)**

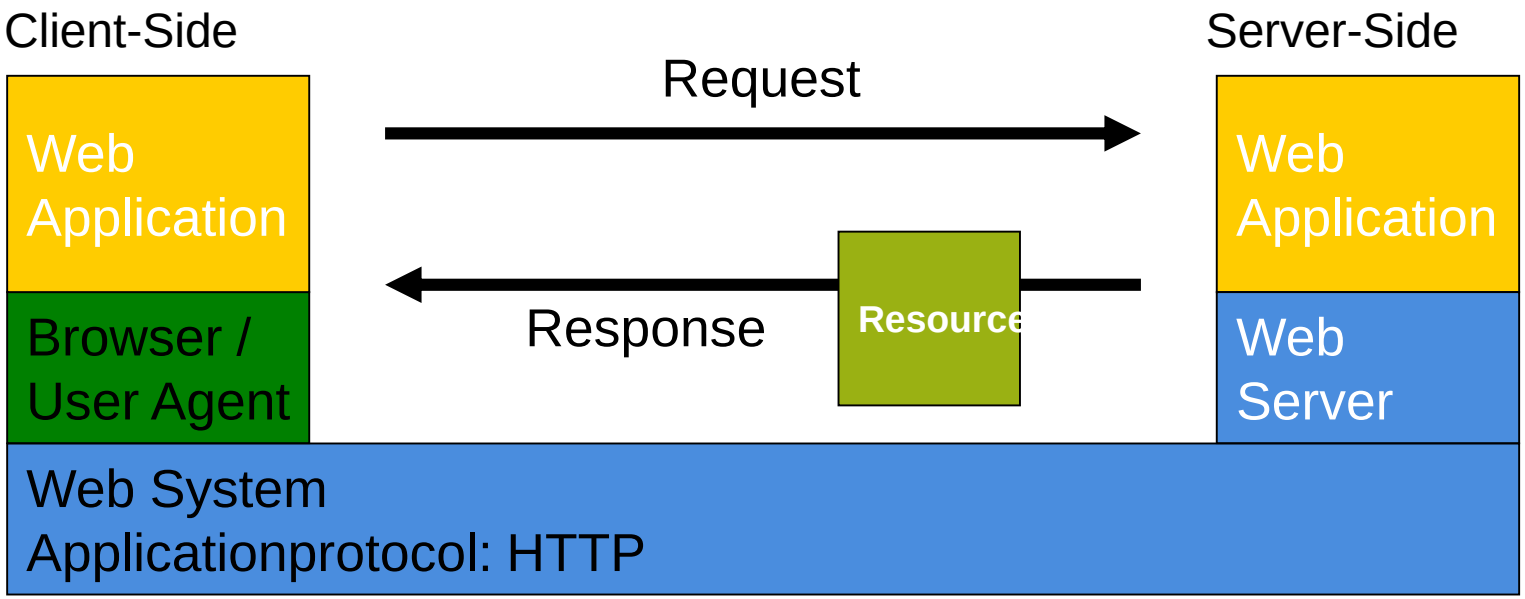
Core Concepts

- Idea: “Universe of network-accessible information”
  - Everyone may act as Author of Resources
- Uniform Addressing
  - Unique, world-wide addresses
  - Abstracts geographical distribution of information nodes (resources)
- Uniform Access
  - Browser offer uniform access to any resource in the WWW
- WWW is a collection of resources, software, protocols, standards, and recommendations providing a Hypermedia system

WWW's Technical Aspects

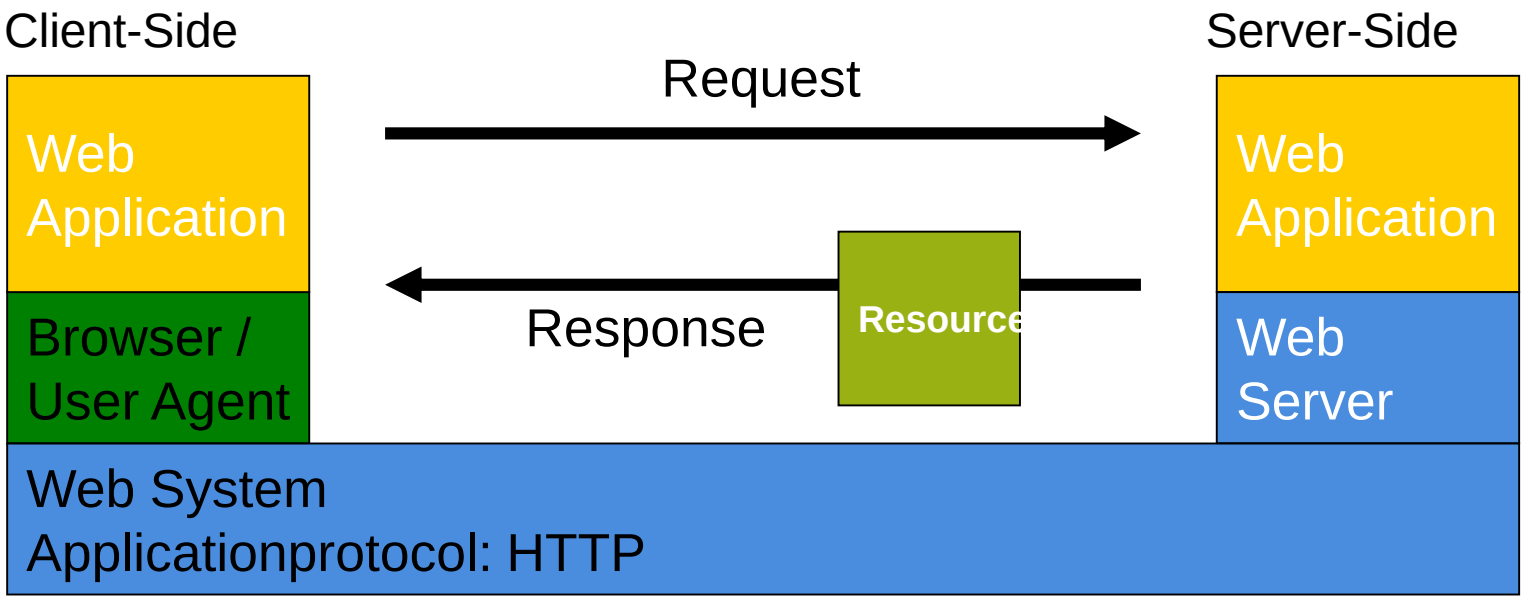
- WWW is a **distributed System**
  - Based on a **Client-Server architecture**
  - Supporting the **Hypermedia Paradigm**
- **Server** provide access to resources
  - E.g. HTML-documents, images, audio, etc.
  - Resources may be created dynamically
- **Client** (**User Agent**) interprets resources
  - Browser present interpretation (Layout, play sound etc.)
  - Other kinds of User Agents may use the resource in other ways (e.g. robots - indexing words)
  - Every request implies a new connection (Stateless)

1st Generation



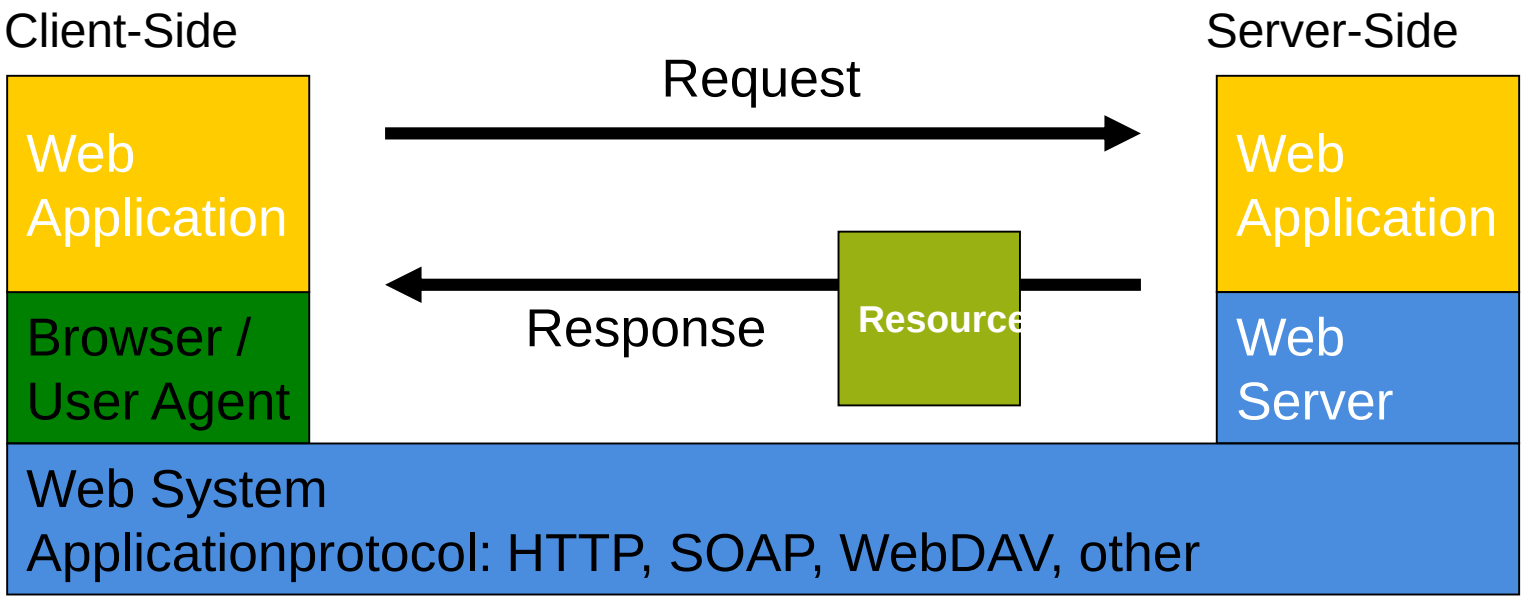
- Browser
  - Mosaic
  - HTML
  - Images (GIF)
  - HTML-Forms
  - Helper
    - Audio, Video etc.
- Web System
  - HTTP
- Web Server
  - HTTP
  - CGI
    - Database
    - Information Systems

2nd Generation



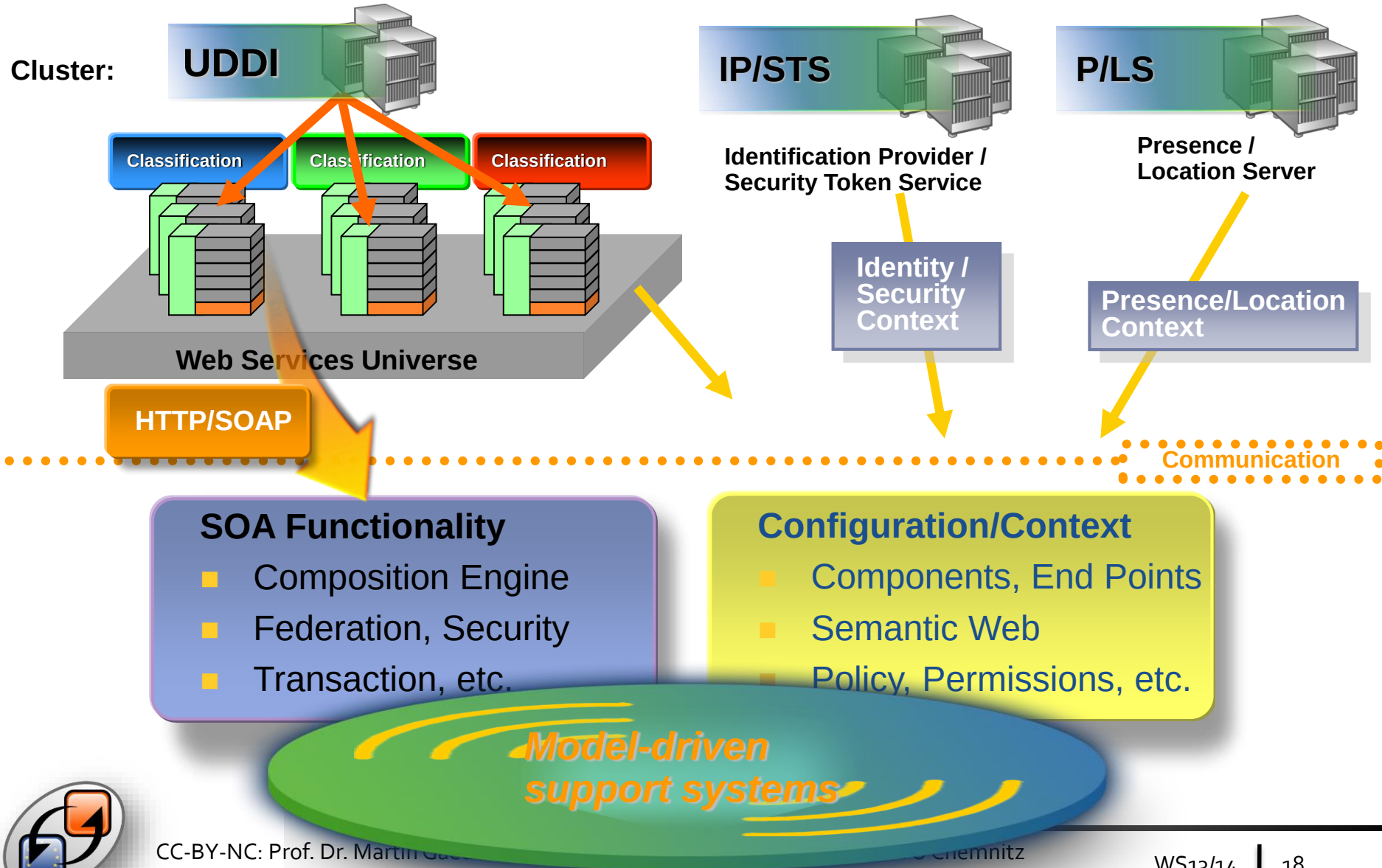
- Browser
  - Mosaic, Netscape
  - HTML, Frames
  - Images
  - HTML-Forms
  - Helper
    - Audio, Video etc.
- Web System
  - HTTP
  - Cookies
- Web Server
  - HTTP
  - Server-API & CGI
    - Database
    - Information Systems
    - Media Server

3rd Generation (Multi-Tier)



- User Agent
  - Netscape, IE, and PDA-Browser etc.
  - Other Types of User Agent
  - Plug-Ins, Applets, ActiveX
  - Script-Code
  - DHTML, More…
- Web System
  - HTTP, WebDAV, SOAP, other
  - Cookies
  - UDDI
  - Other relevant protocols FTP, SMTP
  - More…
- Web Server
  - HTTP, more
  - Server-API & CGI
  - XML-Support
  - Component-Support
    - Servlets
    - Web-Services

4th Gen. (SOA-buzz starting 2000)



5th Generation (around 2004)

Distributed application (take crowd into account)

User generated content is key

User Interface – oriented part of the application
UI/UX & Interaction & Navigation & Client-side code & Sensor-code

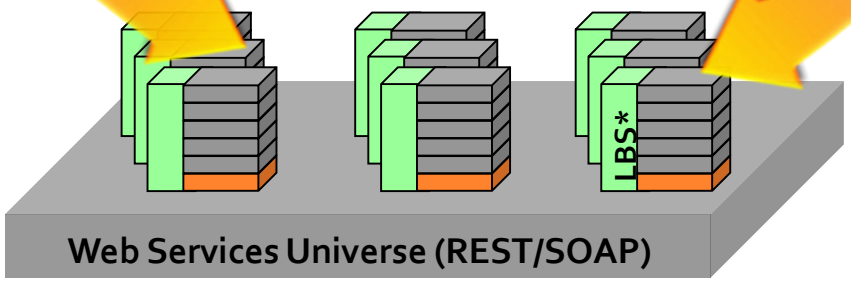
Browser (several)

Embedded User Agents

Mobile Phones

Communication

API-First Principle



several Identity Systems

*Location-based Service

6th Generation (around 2005)

Distributed application (take crowd into account)

User relationships are key

Social Web – oriented part of the application
(take social graph into account)

User Interface – oriented part of the application
UI/UX & Interaction & Navigation & Client-side code & Sensor-code

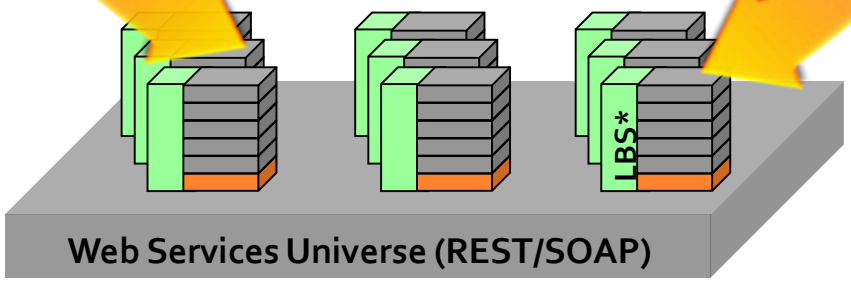
Browser (several)

Embedded User Agents

Mobile Phones and other devices (Tablets)

Communication

API-First Principle



several Identity Systems

*Location-based Service

7th Generation (around 2007): IoS

Distributed application (take crowd into account)

User relationships are key

Social Web – oriented part of the application
(take social graph into account)

User Interface – oriented part of the application
UI/UX & Interaction & Navigation & Client-side code & Sensor-code

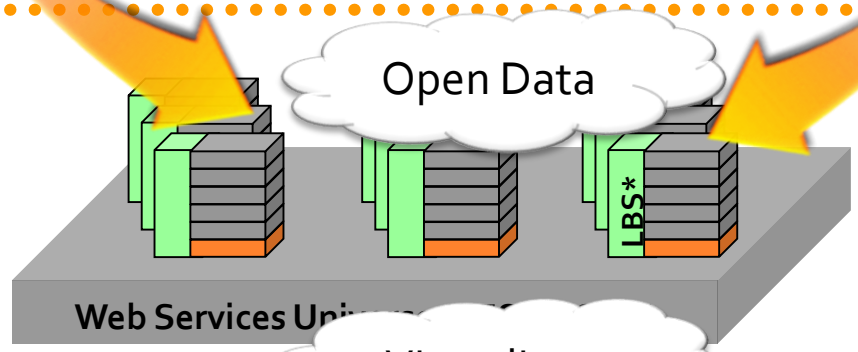
Browser (several)

Embedded User Agents

Mobile Phones and other devices (Tablets)

Communication

API-First Principle



several Identity Systems

*Location-based Service

And what about today?