

Cloud computing 2016, Panel on CLOUD/SERVICES

IoT & Cloud Computing

Standardization Challenges in Cloud & Service-oriented Approaches

Moderator

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2016. 3. 22 Rome, Italy

● Moderator

Yong Woo Lee, University of Seoul, South Korea

● Panelists

- Janusz Klink, Wroclaw University of Technology, Poland
 - Aspen Olmsted, College of Charleston, USA
 - Stefan Rass, Universitaet Klagenfurt, Austria
 - Uwe Hohenstein, Siemens AG, Germany
 - Marcelo De Barros, Microsoft Corporation, USA
 - Andreas Hausotter, University of Hannover, Germany
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Topics – Standardization in Cloud & Service-oriented approach

1. Who works for them?
 2. What is current shape?
 - NIST's approach. 2. ISO. etc..
 3. De we need cloud standards now?, That is, is it proper time to have it?
 4. Why?
 5. What benefit? Vs. What disadvantage?
 6. What obstacles?
 7. Essential things to be considered.
 8. Pitfalls.
 9. Internet of Things? What is the infection?
 10. Any suggestions?
-

Who works for the standards?

- ISO: International Standard Organization.
- ITU.
- Internet organizations as well.
- National Organizations
 - ANSI, NIST,



Proper timing for standardization.

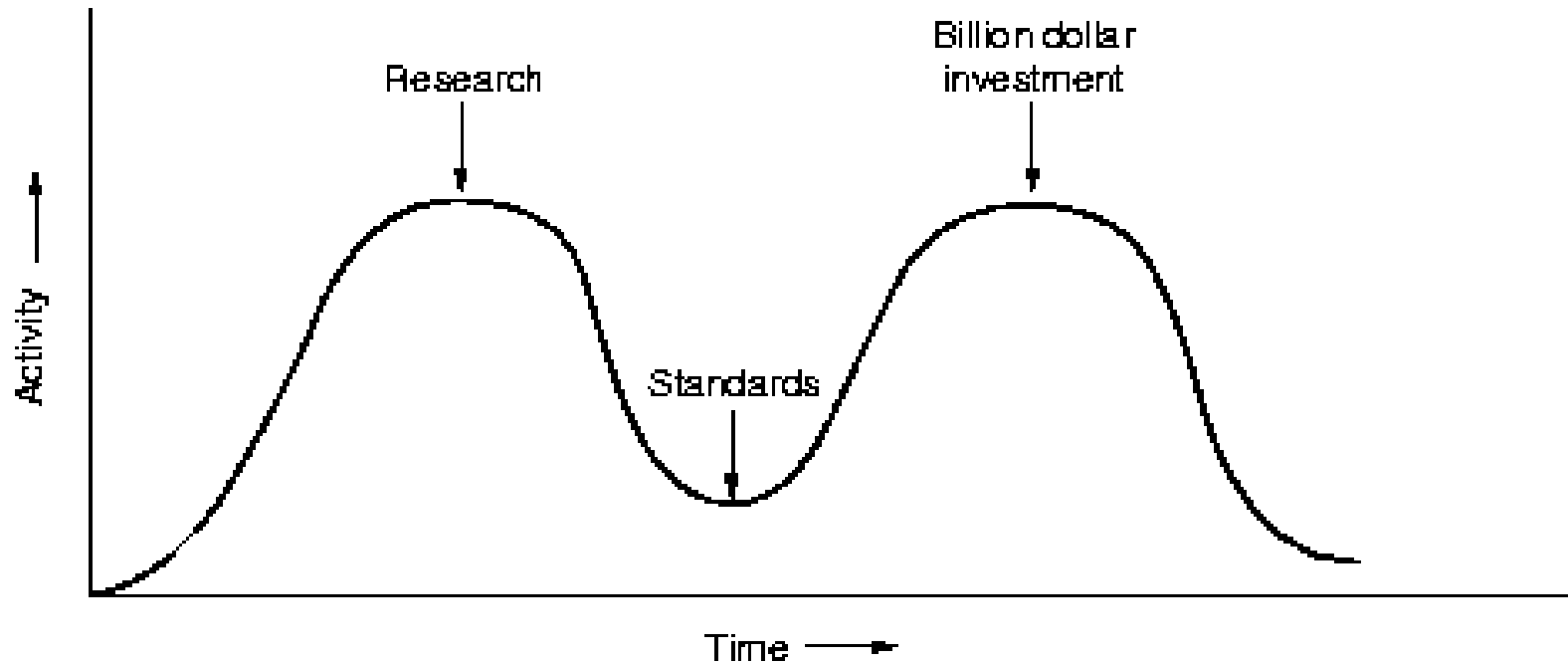
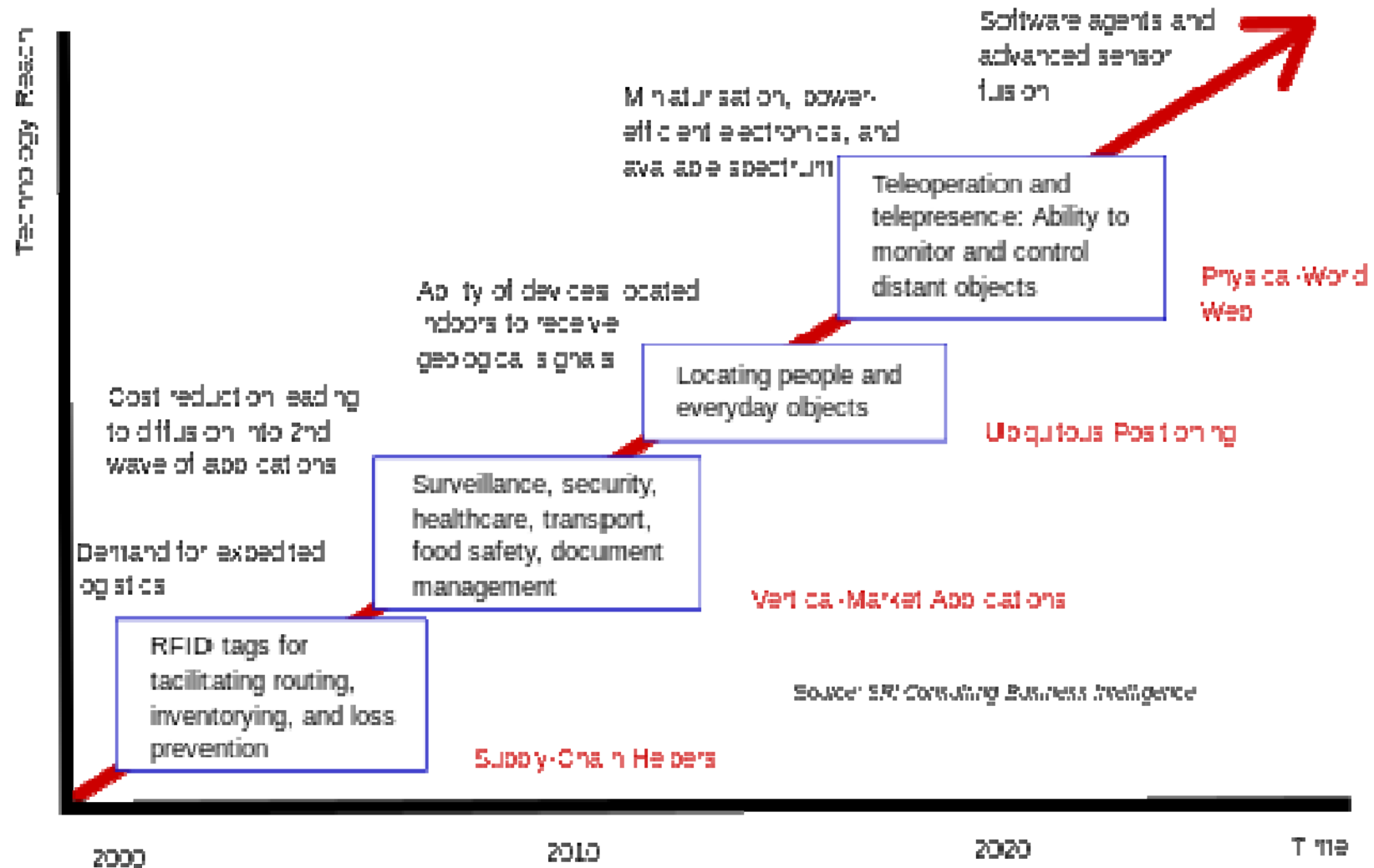


Fig. 1-20. The apocalypse of the two elephants.

Technology roadmap: The Internet of Things



Failure of the OSI model

- Bad Timing
 - Bad Technology
 - Bad Implementation
 - Bad Politics
-

Essential things to be considered.

“Cloud provider lock-in fears and the inability to move virtual machines and data from cloud to cloud.”

Cloud Computing

- Essential for smart devices in IoT/IoE.

Internet of Things / Everything

"Internet of Things Global Standards Initiative". ITU. Retrieved 1 March 2016.

- The Global Standards Initiative on Internet of Things (IoT-GSI) concluded its activities in July 2015 following TSAG decision to establish the new Study Group 20 on "IoT and its applications including smart cities and communities".

Cloud Computing Standards

- Essential for the smart city.

Cloud Computing Standards

- Essential for the E-government.
-

Cloud Computing Standards

- Essential for the Mobile computing.
-

Conclusion

**Service Computation 2016
March 20 - 24, 2016 - Rome, Italy**

Panel on CLOUD/SERVICES

„Standardization Challenges in Cloud and Services-oriented Approaches“

Panelist: Andreas Hausotter

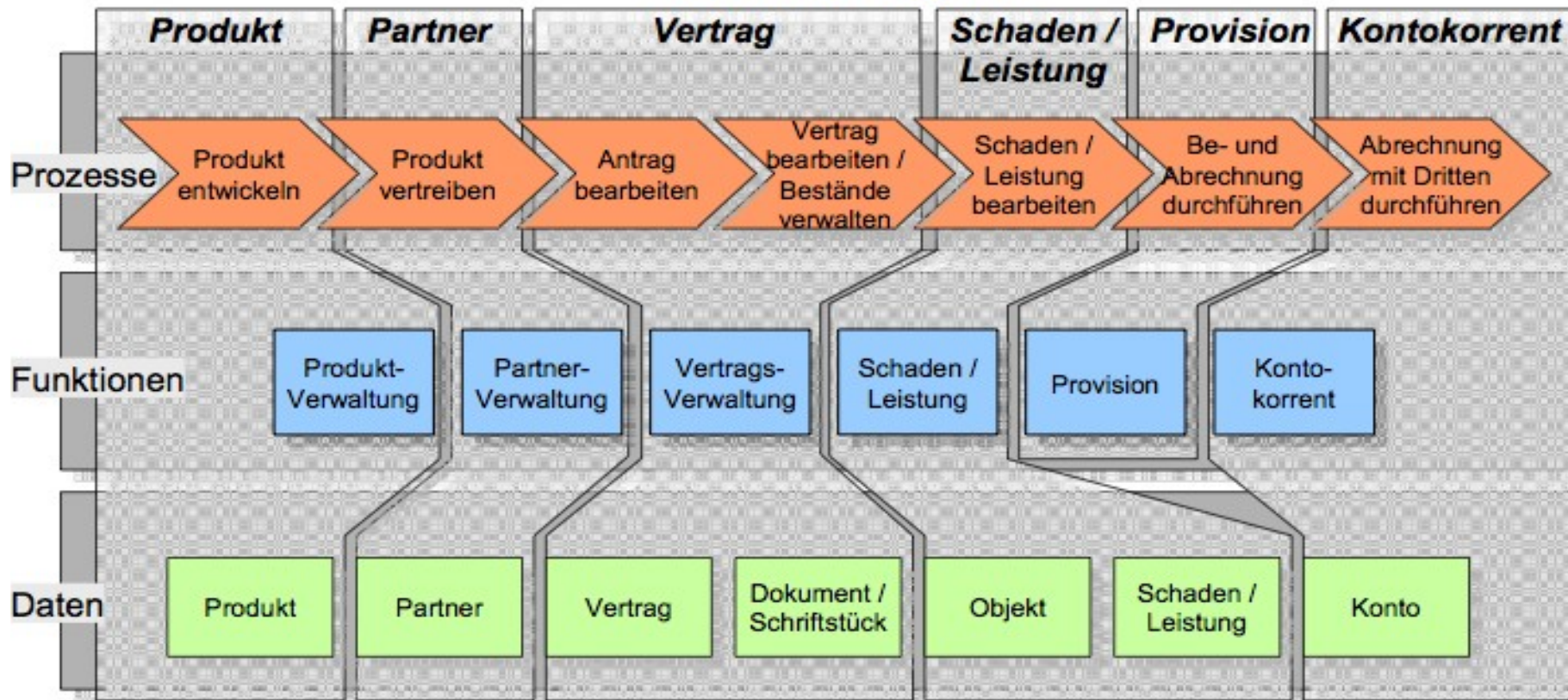
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Andreas Hausotter

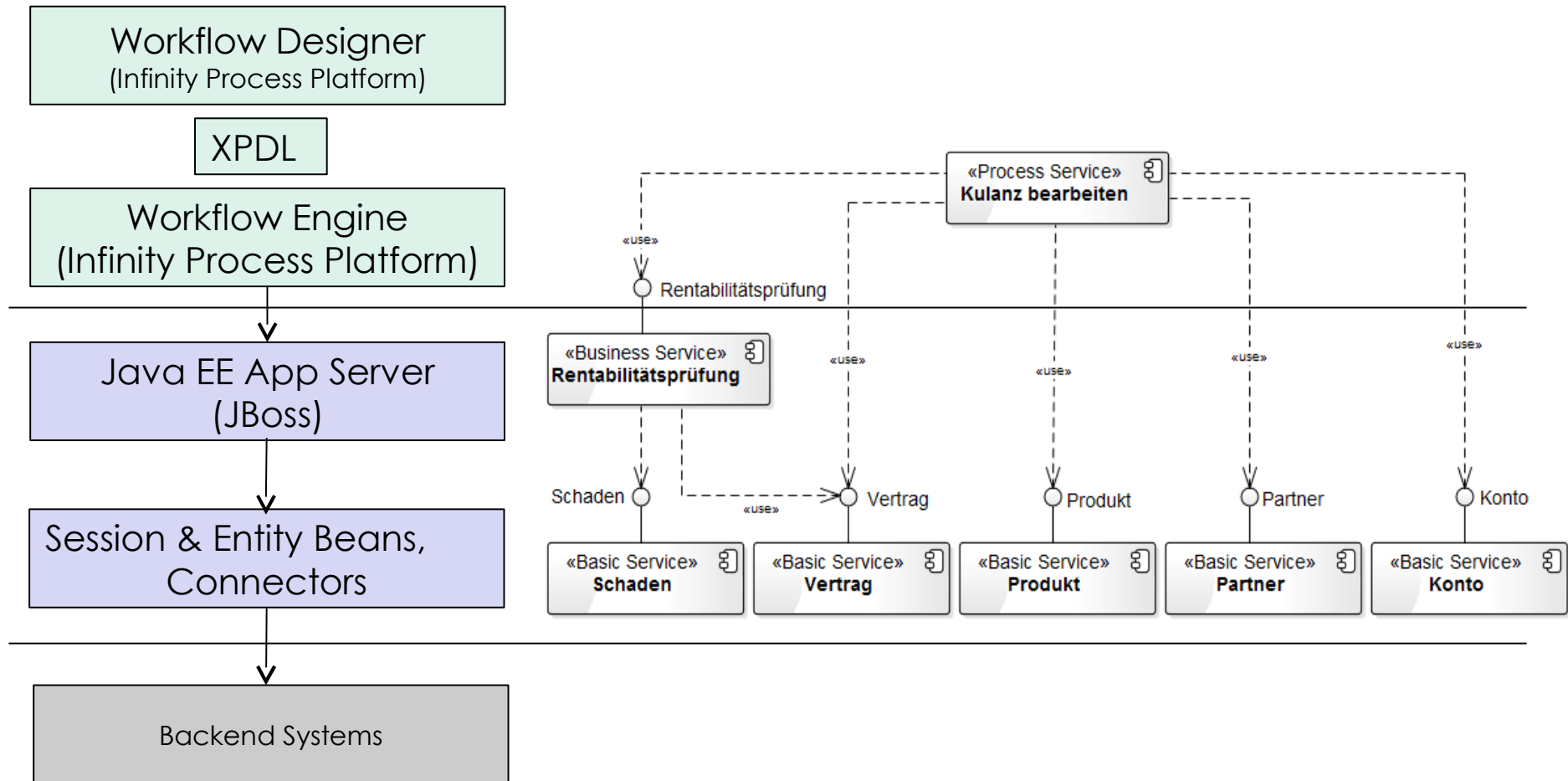
- Professor at the **University of Applied Sciences and Arts, Hannover, Germany**
 - Faculty of Business and Computer Science
 - Department of **Business Information Systems**
- Teaching areas
 - Database Systems, XML Databases, Information Modeling
 - Operating Systems, **Distributed Information Systems**
- Research areas
 - **Service-oriented Architectures**, Web Services
 - Business Process Management, Business Rules Management
- Member of the Competence Center Information Technology & Management (CC_ITM)

- Competence Center Information Technology & Management (CC_ITM)
 - **Institute** at University of Applied Sciences and Arts, Hannover
 - Founded in 2005 by colleagues from the departments of Business Information Systems and Computer Science
 - Members: **Faculty staff, industry partners** (practitioners) of different areas of business (financial institutes, insurances, IT services industry)
 - Main objective: **Combination of research and practical experiences**, Knowledge transfer between university and industry
- Research topics
 - Management of information processing: Information Management, IT Governance, IT Controlling, IT Risk Management, ...
 - IT Security: Secure development, secure communications, security architectures , ...
 - **Service-oriented Architectures (SOA)**: Service computing, BPM, BRM, ...

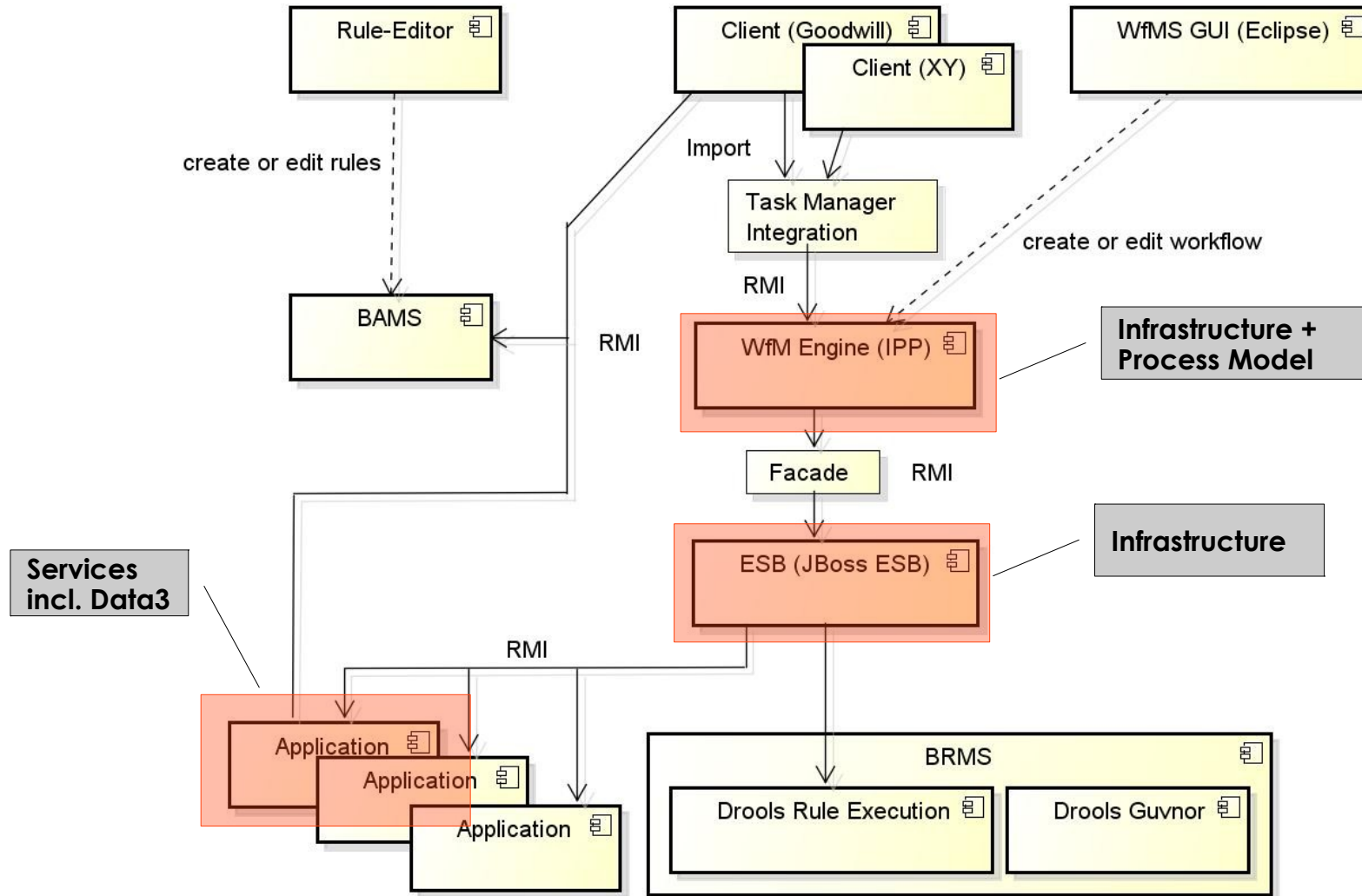
Insurance application architecture



SOA: Best-of-bread Approach



SOA & Cloud Computing



Cloud Computing in the Insurance domain

- Status
 - Several business units are **receptive to cloud computing**:
Product design, risk assessment
 - Core processes are not ready for cloud computing
Product, partner, contract, claim processing,
- Challenges
 - **IT security / privacy**: Data must be safe according to (German / European) Data Protection Act
 - **Governance and Compliance**
 - **Technology**: Different technology standards (Workflow, Business Rules), ...
- Forecast (my personal opinion)
 - **Big changes in the next 5 years**: Insurance companies will adopt Cloud Computing technologies



COLLEGE *of*
CHARLESTON

Aspen Olmsted, Ph.D

**Assistant Professor of Computer Science
and Graduate Program Director
Secure Data Engineering Lab**

Research Interests

- Databases (CLR plugins)
- Web Services (SOA Architectural Guarantees)
- Cloud PaaS
- Software Engineering
- Cybersecurity (CIA)

Database Guarantees

- Relational ACID databases do not scale well
- NoSQL (No ACID) do not work in all application domains
- We need new data architectures for cloud that provide real guarantees
 - Eventual consistency is not really consistent
 - GAE can do 1 trans/sec with consistency

Cloud Clients w/Hardware, Offline Sync, Caching

- Old solutions are going away
 - OCX (dies with IE)
 - NPAPI (soon only Firefox)
 - Flash (not on mobile)
- New solutions are not standardized
 - Opera/Edge try to follow Chrome
 - Chrome has native apps
 - Safari/Firefox are proprietary

Cloud Clients Security

- Clients may be public. Need a way to sign data sent to cloud without installing a certificate on client.



Wrocław University of Technology

Panel on Cloud/Services

Standardization Challenges in Cloud and Services-oriented Approaches

A telecommunication approach

Janusz Klink

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Telecommunications Networks Lab

- Traffic engineering
- Protocols
- Services
- Quality Assessment



Services - the main issues

- Service provision
(service providers/operators)
 - Competition
 - Fair-play behaviours
- Service consumption (users)
 - Equal access for all users
 - Information on quality and price
- Service quality assessment (service provider/operator/third party/user)



Services - EU's point of view

- The European Parliament has become very concerned with the telecom. services (and their quality) in recent years, therefore has launched...



EU Directives

- 2002/19/EC - access to comm. netw.
- 2002/20/EC - authorisation of comm. netw. and services
- 2002/21/EC - service availability and good quality (regulatory framework)
- 2002/22/EC - users' rights and providers' obligations (Universal Service Directive)
- 2002/58/EC - privacy in electronic communications



EU Directives

- 2009/140/EC

Access to comm. networks
and services

- 2009/136/EC

Users' rights relating to comm.
networks and services,
universal service

They are subject of periodic review by the European
Commission



Universal service*

- The provision of a defined minimum set of services to all end-users at an affordable price
- The provision (on users' request) of a connection to the public telephone network at a fixed location at an affordable price

*) Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 amended by Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009



BEREC

- The conclusion (based on Directive 2009/140/EC):
 - Lack of an internal market for electronic communications in the EU
 - Regulatory fragmentation and inconsistencies between the activities of the national regulatory authorities
- The EU regulatory framework for electronic communications networks and services should therefore be reformed
- 25 November 2009 establishing the **Body of European Regulators for Electronic Communications (BEREC)** and the Office



Service quality regulations in Poland

- Polish national regulator (UKE), issued the so-called “Memorandum on cooperation with the aim of telecom. service quality improvement” (Nov. 2012)
- In February 2014 the Report, formulating regulations on QoS in telecommunication networks, was issued
- The quality measurements have been performed for the last two years



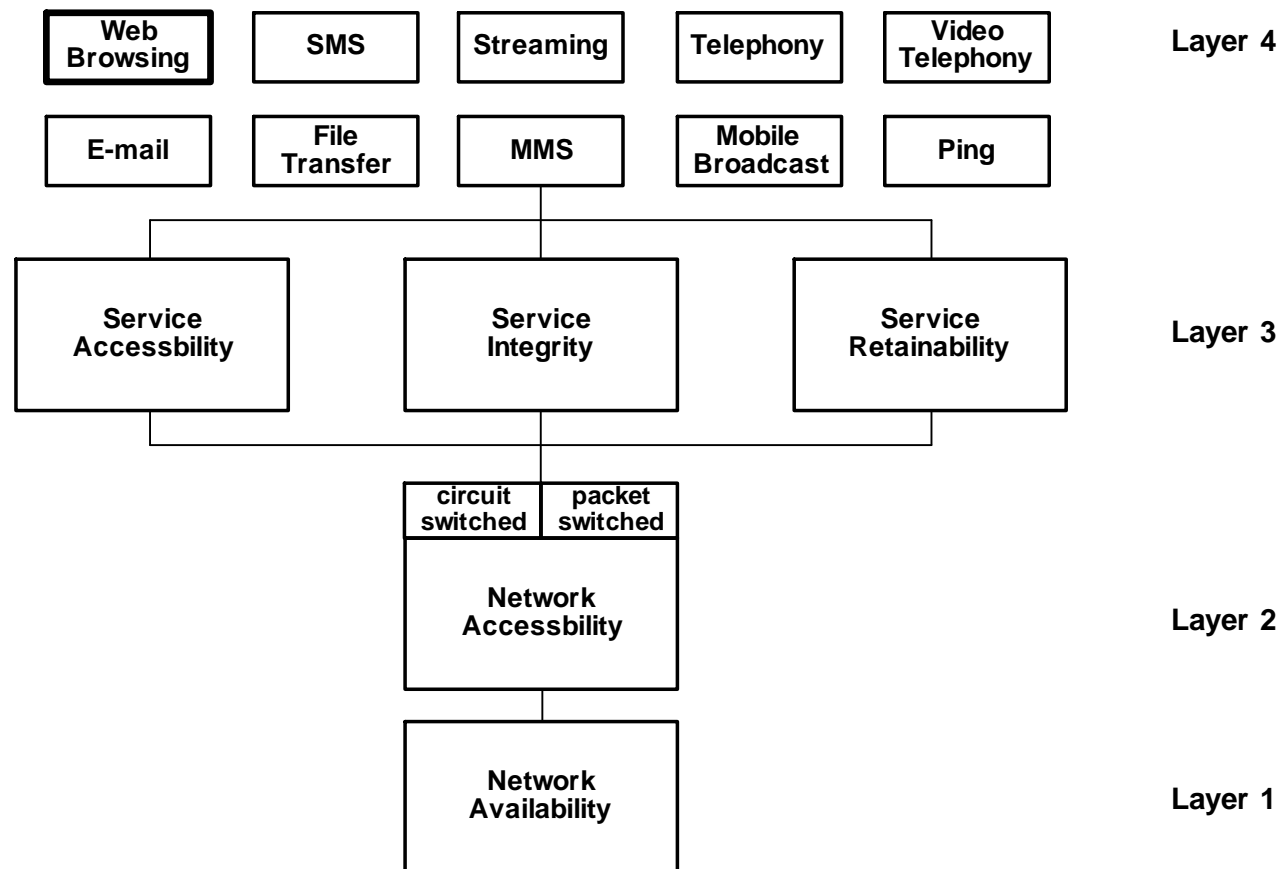
Service Quality assessment - the motivation

- All the documents (mentioned above) underline the users' rights to be informed about the quality of services they pay for
- Quality and price are key factors in a competitive market and national regulatory authorities should be able to monitor achieved quality of service for undertakings which have been designated as having universal service obligations
- National regulatory authorities should also be able to monitor the achieved quality of services of other undertakings providing public telephone networks and/or publicly available telephone services to users at fixed locations



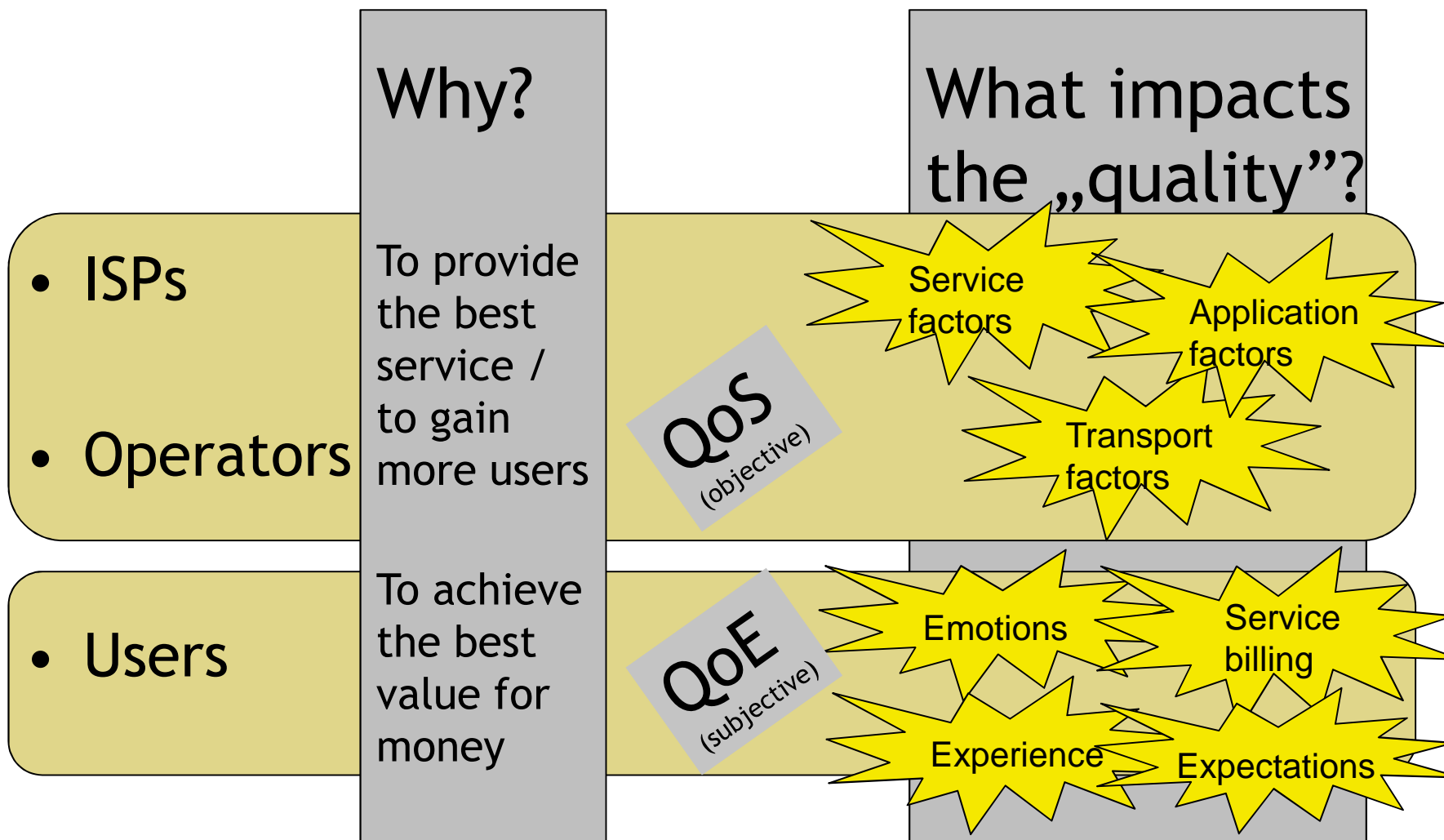
QoS - what it means?

QoS models for different services





Quality assessment





QoS vs. QoE

What does
the „quality”
mean?

QoS

(Objective)

Connected with technical aspects - starting from physical medium and finishing on protocols and mechanisms that ensure specific quality

QoE

(Subjective)

The overall acceptability of an application or service, as perceived subjectively by the end-user



Conclusion

- **European Authorities** have become very **concerned** with the **quality** of telecom. services in recent years
- **QoS measurements** are very important in today's competitive world
- There is a need for **building QoE models** for different services



ITU-T Questions under study regarding QoS

- Methods, tools and test plans for the subjective assessment of speech, audio and audiovisual quality interactions
- Perceptual-based objective methods for voice, audio and visual quality measurements in telecommunication services
- Conferencing and telemeeting assessment
- QoE, QoS and performance requirements and assessment methods for multimedia
- Development of parametric models and tools for multimedia quality assessment
- Performance of packet-based networks and other networking technologies



Wrocław University of Technology



Thank you!

Panel on Cloud/Services

Marcelo De Barros

Bing UX Features and Shared Tools Team

Microsoft

Rome

March 2016

Servicification Standardization

When and when not to standardize?

Successful Stories of Standardization

Successful stories of standardizations (such as schema.org, SSL) and unsuccessful ones (such as programming languages, authentication technologies): why some succeeded while others fail? Can we pinpoint a pattern?

Multiple Standards?

Thinking outside the box: multiple "standards" to solve the same problem - why can't we consider that?

No Standards at all?

Giving up standards altogether - is there another alternative with one layer of abstraction higher instead of building standards?

Panel Discussion

IARIA CLOUD COMPUTING

Rome
March 20-24, 2016

S. Rass
Associate Professor @ Universität Klagenfurt
System Security Group, Institute of Applied Informatics
Austria

- Applied (Quantum) Cryptography
- System Security and Infrastructures
- Game- and Decision Theory for Security
- Complexity Theory
- Theoretical Computer Science

Additional (selected) research areas of the system security group:

- Authentication
- Security Tokens
- Anonymization
- ...contract and industrial research...

...many services „go cloud“ ...

- Is there a real industrial interest in standardization?
- Vendor lock-in – A Bug or a Feature? ← depends on who you are
- What do standards really mean for the customer and the provider?

...Fog computing → a „generalization“ of clouds?

- Why would anyone be willing...
 - ...to let others do computations on the own smartphone?
 - ...to leave private information with a cloud?
 - ...to become part of a bigger cloud involving so many other unknown people?
→ Would standards help?
- Terms & Conditions
 - Lengthy – unnecessarily long?
 - Complicated – intentionally?
 - Really thoroughly read or understood by most people?

...IoT is based on cloud computing

- Is letting everything talk to everything else really desirable?
- How much control is retained over our data?
- Is the potential privacy infringement ahead of us bigger than the benefits?

→ So far: not even cloud standards available!
→ Diversification of services will not simplify the already difficult goal of standardization

Panel Discussion on “Standards for Cloud Computing”

Uwe Hohenstein
Siemens AG – Corporate Technology

Cloud Computing Conference 2016, Rome, March 2016

Research Areas (?)

Implementation of Non-Standard Database Systems

Federated Database Systems

Standard Database Systems (Object-Oriented DBs, O/R, XML DBs)

Benchmarks

Aspect-Oriented Software Development

Cloud Computing

NoSQL DBs

Architectural Knowledge Management

Disclaimer & Scope

I am focusing on *Software Standards in general*.

**The opinion that I am presenting is my personal one and
might *not* reflect the opinion of my company!**

I have 3 different opinions (at least) – This is the most negative one.

Quote from Andrew Tanenbaum

“The nice thing about standards is that you have so many to choose from.”

<http://www.goodreads.com/quotes/589703-the-good-thing-about-standards-is-that-there-are-so>

Forms of Standards

- ***Official:*** ISO/IEC, OMG, ETSI, OASIS, DIN (in Germany) etc.
- ***De-facto:*** Hibernate, the "Java eco-system" (JSR)
- ***"Defining":*** NIST definition of Cloud Computing
- ***Wannabee:*** ODMG, OData

What are the Benefits of Software Standards?

What are standards for?

[<http://www.etsi.org/standards/what-are-standards>]

Standards are good for:

- **portability**
- **exchangeability of products**
- **avoidance of vendor lock-in**
- **cooperation/communication (e.g., data exchange)**
- **common terminology**

Is This True?

- **Who chooses a RDBMS because of the *SQL Standard*?**
 - Isn't it rather functionality and maturity?
- **Why are NoSQL products in use (without having a standard)?**
 - There is a real benefit for applications!
- **Is portability achieved and vendor lock-in avoided?**
 - Migration from one RDBMS to another:
 - reasons?
 - dialects, stored procedures?
 - performance?
- **Does the NIST definition define "Cloud Computing"?**

Do not mix "standard" with "open source" product!

Some Facts

- **Many competing standards: JPA vs. JDO (vs. Hibernate)**
 - cf. [Tanenbaum]
- **Standards are driven by organizations:**
 - **strongest partner wins or standstill (e.g. Temporal SQL:2011)**
- **Standards are imprecise with "could offer", "optional" (yes or no?)**
- **Standards determine least common denominator (and several optional add-ons)**
- **There are nearly always extended features in compliant tools:**
 - **useful (unfortunately): save development cost**
 - ***optimistic* approach: to use and save development now**
 - ***pessimistic* approach: develop in standard-conforming manner and save migration cost later (or never)**

Requirements for a “Good” Standard

- Driven by *consumers* and their needs (instead of vendors interests), similar to open source community
- Fast implementation and availability: before products appear, not afterwards
- Compliance of tools should be verifiable (cf. JSR process)
- Be precise (e.g., no maybe’s)
 - minimal = maximal functionality?

Question

Do we need Software Standards?

Feel free to add or comment!

Questions

