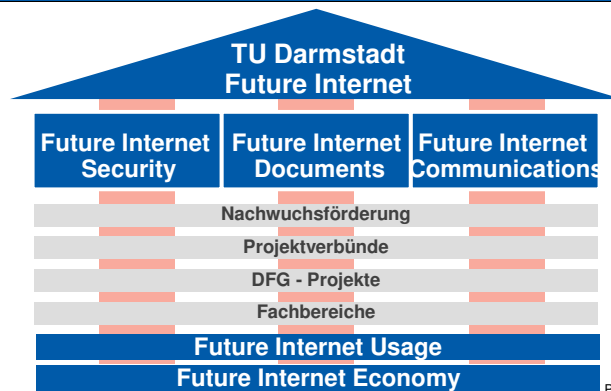


Implications of Social Media for the Mobile Future Internet



Future Internet Congress
3. Dez. 2012, EUMETSAT



Christian Gross, M.Sc.

Prof. Dr.-Ing. Ralf Steinmetz
KOM - Multimedia Communications Lab

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Template all v.3.4

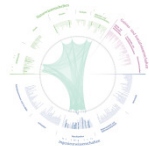
Overview



- 1 Research Cluster Future Internet
- 2 The networked Future -
Report of the Münchner Kreis and VDE ITG
- 3 Mobile Communications – Social Networks – Location based
Services
- 4 An Example of Social Media – Mobile - Location-based Information
Exchange
- 5 Future Internet Approach
- 6 Summary

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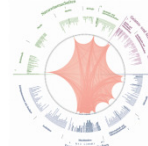
1 Research Cluster Future Internet



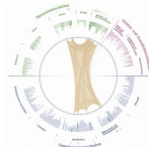
Thermofluidynamik und Verbrennungstechnologie



Future Internet



Integrierte Produkt- und Produktionstechnologie



Moderne Materialien und Werkstoffe

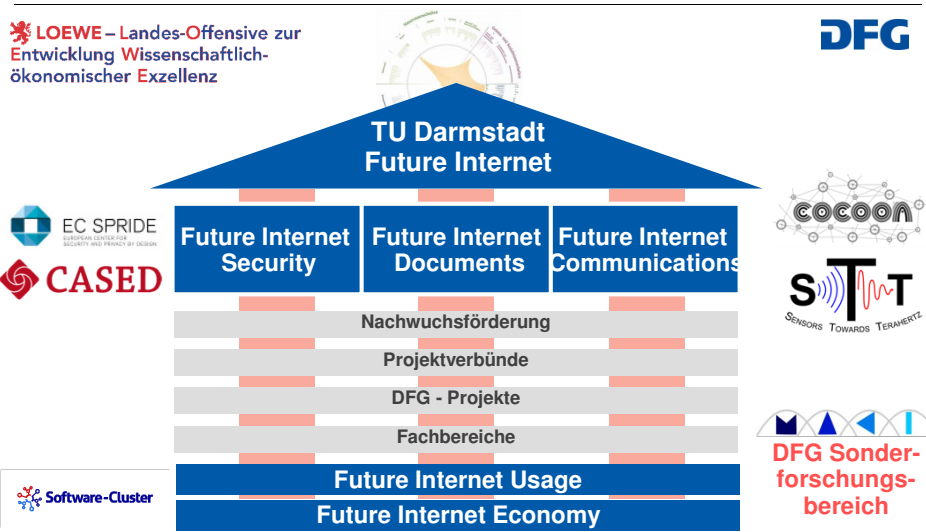


Teilchenstrahlen und Materie

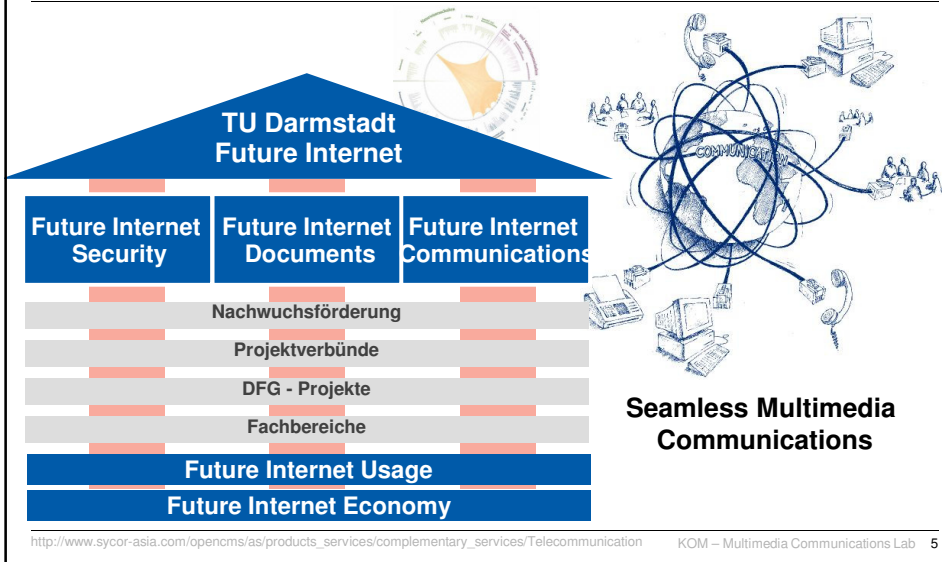
Future Internet



LOEWE – Landes-Offensive zur Entwicklung Wissenschaftlich-ökonomischer Exzellenz



Future Internet & Multimedia Communications



http://www.sycor-asia.com/opencms/as/products_services/complementary_services/Telecommunication KOM – Multimedia Communications Lab 5

Multimedia Communications



Knowledge & Educational Technologies
Multimedia Technologies & Serious Games
Mobile Systems & Sensor Networks
Self organizing Systems & Overlay Communications
Service-oriented Computing

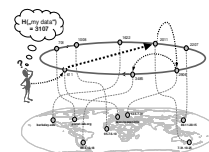


Knowledge & Educational Technologies

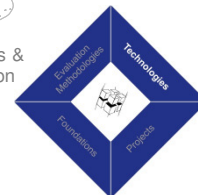


Service-oriented Computing

Mobile Systems & Sensor Networks



Self organizing Systems & Overlay Communication



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2 The networked Future - Report of the Münchner Kreis and VDE ITG



Health Assistant



Automatic Energy Manager

Living

Source: www.zukunft-ikt.de



E-Billing



Mobile Shopping



Digital Wallet

Consume and pay

Source: www.zukunft-ikt.de



Digital School Book

Learning

Source: www.zukunft-ikt.de



Online data manager.



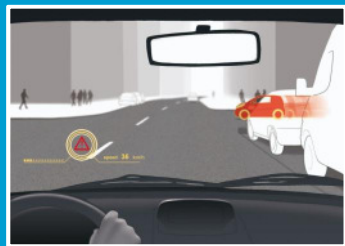
The digital citizen service office.



The ubiquitous desk.

Working

Source: www.zukunft-ikt.de



Environmental Communication



Personal Mobility Assistant



The self-driving car

Mobility

Source: www.zukunft-ikt.de



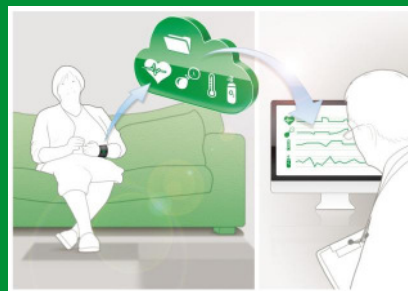
Personalized TV



Data Save

Entertainment

Source: www.zukunft-ikt.de



Telemonitoring.

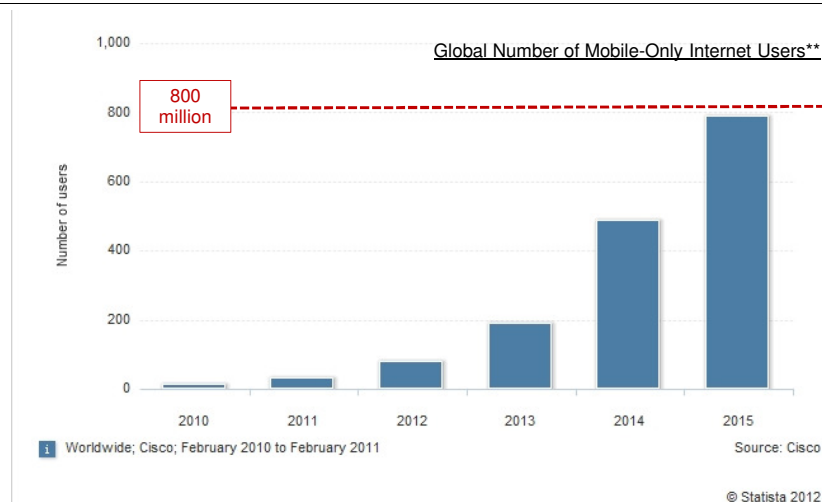


Intelligent Physician Report

Health

Source: www.zukunft-ikt.de

3 Mobile Communications – Social Networks – Location based Services



* <http://www.statista.com/statistics/218867/high-speed-mobile-broadband-subscribers-in-western-europe/>
 ** <http://www.statista.com/statistics/233989/mobile-only-internet-users-in-selected-regions/>

Mobile Communications

Plays an increasingly important role in all major part of life

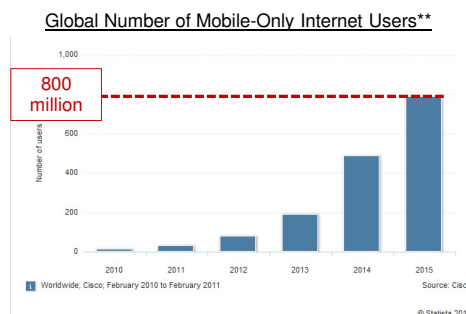
- Appr. 380 million high-speed mobile broadband subscribers in western Europe by 2014*

Influences the way how we interact with content in the Internet

- Anytime, anywhere, anykind
- Use of well known services
- Boosting new kinds of (social) applications
 - Position-aware data generation and consumption
 - due to position-aware devices
 - fast mobile Internet access
 - aka Location-based Services

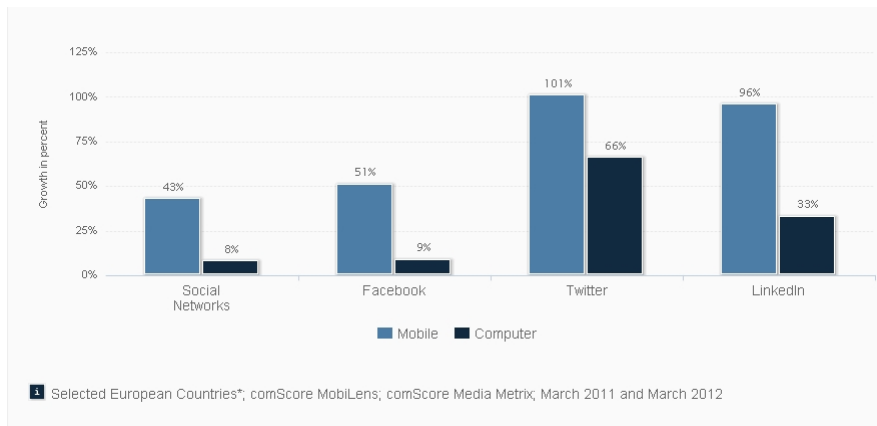
Rising number of mobile-only users

- 800 million by 2015



* <http://www.statista.com/statistics/218867/high-speed-mobile-broadband-subscribers-in-western-europe/>
 ** <http://www.statista.com/statistics/233989/mobile-only-internet-users-in-selected-regions/>

Year-on-Year Growth of Leading Online Social Networks



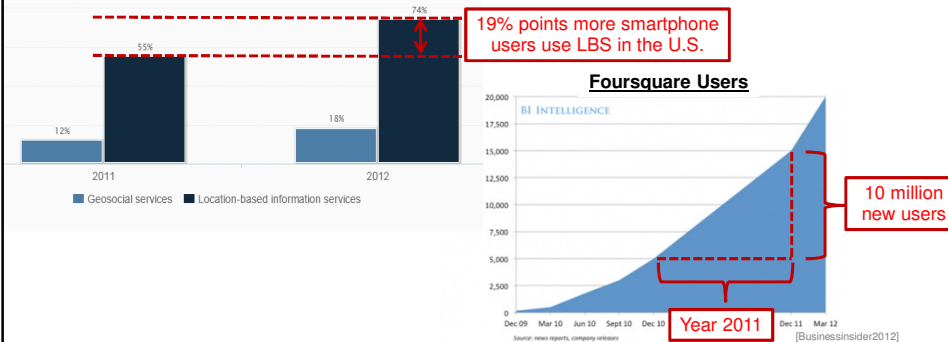
<http://www.statista.com/statistics/227140/visitors-development-of-social-networks-in-europe-by-platform/>

Location-based Services

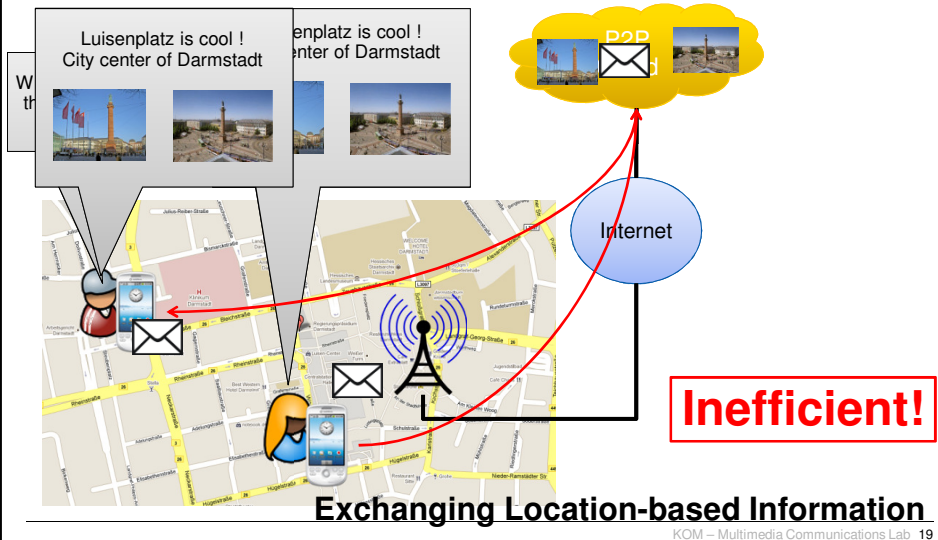
Location-based Services are on the rise

- Ubiquitous availability of fast Internet access
- Vast deployment of position-aware devices
 - More than 100 million smartphone users in the U.S. in 2011 [comscore2011]

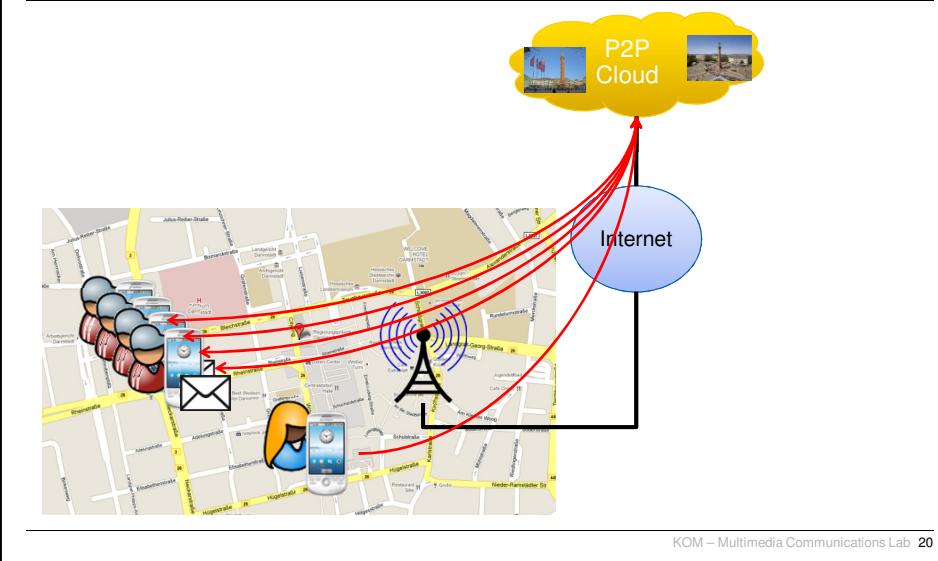
Usage of Location-based Services in the U.S.



4 An Example of Social Media – Mobile - Location-based Information Exchange



Problem: Overloaded Base Station

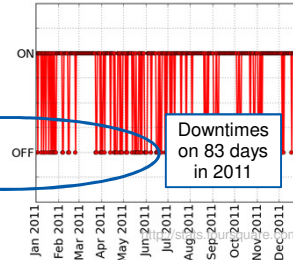


Location-based Service Provider Perspective

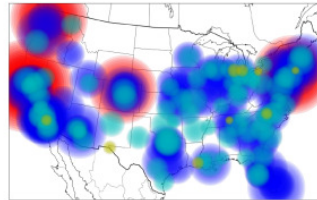
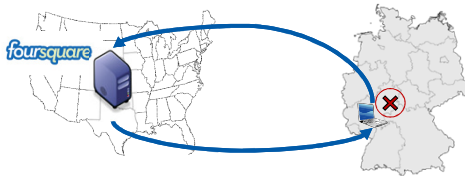
Large number of users denote burden on infrastructure of location based provider perspective

- scalability problems
- unavailability of service
- high costs for infrastructure

Example: Foursquare



Client Server paradigm does not reflect the locality of location-based service usage



Cheng, Z., Cavallaro, J., Lee, K., & Su, D. Z. Exploring millions of footprints in location sharing services. 5th International AAAI Conference on Weblogs and Social Media (ICWSM) (Vol. 2010).

Mobile Network Provider Perspective

Impact of the intense utilization of mobile communication devices

- Growing number of users
- Growing data traffic



Monthly global total traffic in mobile Networks

→ Cellular access networks must carry the load

But...

- Not designed for massive data traffic
- Often reaching its limits

“O2 Germany has confirmed its

“The typical 3G network will

“Telecom operators' sales in mature markets are not growing fast enough to justify major investments, which may mean an increase in demand instead for other technologies such as Wi-Fi or femtocells.” [Reuters10]

Q1 02 03 04 01 02 03 04 01 02 03 04 01 02 03 04 01 02 03 04 01 07 07 07 07 08 08 08 08 09 09 09 09 10 10 10 10 11 11 11 12

[Ericsson12]

5 Future Internet Approach

Tradeoff mobile networks

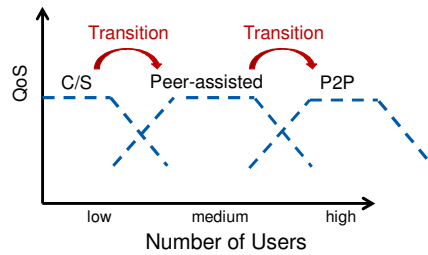
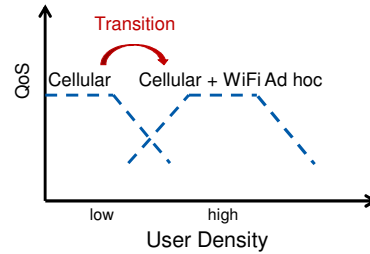
- Cellular:
 - Good for low density
 - in high density scenarios base stations get easily overloaded
- Solution:
 - Integrate communication capabilities of smartphones

Tradeoff LBS provider infrastructure

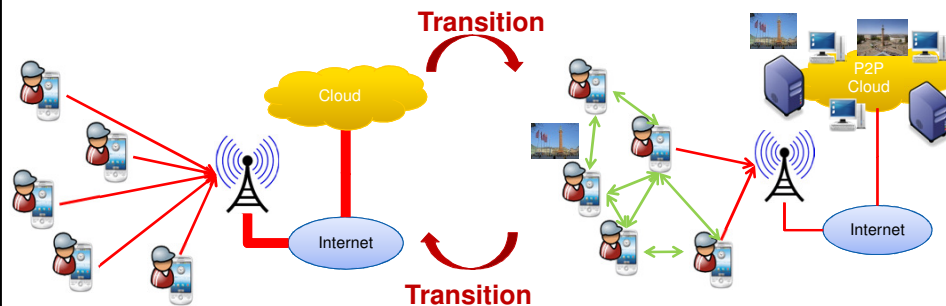
- Client Server
 - designed for average load
 - scalability problems during flash crowds
 - no incentive to do overprovisioning due to high costs
- Peer-assisted
 - Integrate resources of end user devices
 - Higher complexity & security issues

Approach:

- Select mechanism depending on environmental conditions
- Execute transition between them



Goal and Approach



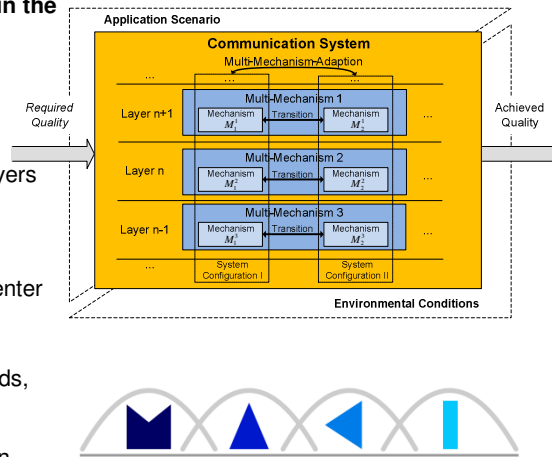
Multi-Mechanism Adaption in Future Communication Systems

Adaptation will play a major role in the Future Internet

- Enable coordinated transitions between mechanisms that
 - realize the same functionality
 - but with different concepts
- Adaptation spanning multiple layers (cross layer)

SFB MAKI 1053

- DFG Collaborative Research Center
- First phase: 2013-2016
- Research of
 - construction principles, methods, and models
 - enabling Multi-Mechanism-Adaptation in future communication systems



6 Summary

Social media usage has a significant impact

- Overloaded mobile networks
- Scalability problems at the social media / location-based service provider

Transition between different mechanisms depending on environmental condition improves the QoS of location-based services

- Transition from pure cellular to cellular + WiFi Ad hoc communication
 - Exploit local data exchange among mobile users → offload base station
- Transition from C/S to peer-assisted backend
 - Integrate stationary devices into the cloud → offload infrastructure of LBS provider
- Evaluation:
 - Media objects can be downloaded three times faster
 - Response time for complete content retrieval is 1.7 times higher
 - Mobile network providers benefit from traffic reduction at base stations by up to 35%

Thank you for your attention!



Multimedia Communications Lab - KOM



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Dept. of Computer Science (adjunct professor)

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Germany

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Fax +49 (0) 6151/166152
www.kom.tu-darmstadt.de



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Offizielles Vorprogramm

- 10:00 Uhr **Workshop des interdisziplinären House of IT-Arbeitskreises „Intellectual Property in der Software- und IT-Industrie“**
Jürgen Beckers, Rechtsanwältin BDN Beckers und Kollegen
Peter Bittner, Peter Bittner und Partner
Dr. Karl Popp, SAP AG
- 11:30 Uhr **Besichtigung der EUMETSAT - European Organisation for the Exploitation of Meteorological Satellites**
- 12:00 Uhr **Business Lunch**



Offizieller Kongressbeginn

Moderation
Thomas Lünendonk

- 12:45 Uhr **Begrüßung**
Staatssekretär Steffen Saebisch, BMWV - Hessisches Wirtschaftsministerium
Oberbürgermeister Jochen Partsch, Wissenschaftsstadt Darmstadt
Aline Rauter, Generaldirektor EUMETSAT - European Organisation for the Exploitation of Meteorological Satellites
Prof. Dr. Hans Jürgen Prömel, Präsident der Technischen Universität Darmstadt
- 13:15 Uhr **Das digitale Unternehmen - Potenziale und Herausforderungen**
Karl-Heinz Streibich, Software AG
- 13:45 Uhr **Technology Vision**
Frank Riemensperger, Accenture GmbH
- 14:15 Uhr **Kaffeepause**
- 14:45 Uhr **Mobile Empowerment - Disruptive B2B2C-Anwendungen im Internet der Zukunft**
Prof. Dr. Martin Przewlaka, SAP AG
- 15:15 Uhr **Konsequenzen sozialer Anwendungen für das mobile Future Internet**
Prof. Dr.-Ing. Ralf Steinmetz, Technische Universität Darmstadt
- 15:45 Uhr **Vom Ende der Informationshoheit**
Daniel Domscheit-Berg, OpenLeaks
- 16:15 Uhr **Kaffeepause**
- 16:45 Uhr **Podiumsdiskussion „Social Media - der Preis des Kostenlosen“**
Moderation
Katja Marx, hr-INFO
mit
Prof. Dr. Peter Baumann, Technische Universität Darmstadt und House of IT
Daniel Domscheit-Berg, OpenLeaks
Gerhard Fercho, CSC in Deutschland
Markus Heinen, Ernst & Young
Prof. Dr. Michael Waidner, Fraunhofer SIT und CASED
Brigitte Zypries, Abgeordnete des Bundestags
- 18:00 Uhr **Get-together**

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