

Future Internet and Multidisciplinary Research

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Bold ambitions

- The Future Internet will be fundamental to tomorrow's economy and society
- A call for multidisciplinary approaches
- Political visions as well as research work programmes

The BLED Declaration:

Towards a European approach to the Future Internet

Current Internet: Success & Challenges

With over a billion users world-wide, the current Internet is a great success – a global integrated communications infrastructure and service platform underpinning the fabric of the European economy and European society in general. However, today's Internet was designed in the 1970s for purposes that bear little resemblance to current and foreseen usage scenarios. Mismatches between original design goals and current utilisation are now beginning to hamper the Internet's potential. A large number of challenges in the realms of technology, business, society and governance have to be overcome if the future development of the Internet is to sustain the networked society of tomorrow.

Future Internet: Vital to continued economic Growth in Europe

In the future, even more users, objects, services and critical information infrastructures will be networked through the Future Internet which will underpin an ever larger share of our modern and global economies. It is therefore time to strengthen and focus European activities on the Future Internet to maintain Europe's competitiveness in the global marketplace.

BLED Declaration on Future Internet

- "Future Internet ... will underpin an ever larger share of our modern and global economies."
- "A significant change is required ... the urgent necessity to redesign the Internet, taking a broad multidisciplinary approach, to meet Europe's societal and commercial ambitions."

UPDATED WORK PROGRAMME 2009 **AND WORK PROGRAMME 2010**

COOPERATION

THEME 3

ICT – Information and Communications Technologies

(European Commission C(2009) 5893 of 29 July 2009)

1 Objective

Improving the competitiveness of European industry and enabling Europe to master and shape future developments in ICT so that the demands of its society and economy are met. ICT is at the very core of the knowledge-based society. Activities will continue to strengthen Europe's scientific and technology base and ensure its global leadership in ICT, help drive and stimulate product, service and process innovation and creativity through ICT use and value creation in Europe, and ensure that ICT progress is rapidly transformed into benefits for Europe's citizens, businesses, industry and governments. These activities will also help reduce the digital divide and social exclusion.

2 ICT research drivers: The 2015-2020 ICT landscape

FP7 ICT Work Programme

- “New breakthroughs in ICT will continue over the next decades to bring ever-more wide ranging applications that will continue to drive growth and innovation and ensure sustainability in our economies and societies.”
- “Breakthroughs in ICT increasingly come from cross-overs, combinations and convergence of technologies and disciplines at different levels, networks-services-devices.”



EUROPEAN
COMMISSION

European
Research Area

Preparing Europe for a New Renaissance A Strategic View of the European Research Area

First Report of the European Research Area Board – 2009

European Research Area Board: 'A New Renaissance'

- "One of the key messages is that both researchers and society at large need to be fully engaged with and realize the consequences of the wider challenges facing us."
- "Research in the social sciences and the humanities will be at least as important to our future as the physical or engineering sciences."
- "A new, holistic way of thinking is required as technological answers alone are not the end-solution to a given problem."

Future Internet Assembly in Stockholm

11.15 - 12.45	<p>Session I.1 Different architectures for different business models?</p>	<p>Session I.2 eID management and provisioning in the Future Internet infrastructures including routing, services, and content</p>	<p>Session I.3 What does it mean to conduct experimentally driven research?</p>
12.45 - 14.15	Lunch break. Final 30 minutes Posters and Coffee		
14.15 - 15.45	<p>Session II.1 Orchestration across networks, things, services and content</p>	<p>Session II.2 How to measure trust?</p>	<p>Session II.3 What does Future Internet mean for smart cities?</p>
15.45 - 16.30	Coffee break with posters		
16.30 - 18.00	<p>Session III.1 The question of Discovery and Search in the future internet</p>	<p>Session III.2 What does Future Internet mean for enterprise?</p>	<p>Session III.3 Deploying on Future Internet Research & Experimentation (FIRE)</p>
18.30	Busses will leave to the Museum of Modern Art in Stockholm for tour and gala dinner		
Tuesday 24 November			
9.00 - 11.00	<p>Session IV.1 FI Socio-economics</p>	<p>Session IV.2 Management & Service aware NA</p>	<p>Session IV.3 Trust & Identity</p>
		<p>Session IV.4 Usage of facilities</p>	<p>Session IV.5 FI Service Offer</p>
		<p>Session IV.6 Real-world Internet</p>	<p>Session IV.7 Future Content Networks</p>

Right level of ambitions?

- If our ambitions are mostly technical, then it is logical to focus merely on technical research
- But if our ambitions go beyond that - if we believe that the Future Internet will be intertwined with the very fabric of tomorrow's society - then we need a broader approach to research

Future Internet Research

- The technical research is at the core, since it is enabling everything else – this should not change
 - Perhaps, even more funding is needed for “FI basic research” - given the outlined ambitions above
- But it needs to be complemented by a thorough understanding of basic human, organization and societal behaviour, from other disciplines
- Socio-economics is partly addressing this, but the focus is on business and society needs, less on real people

A broader approach to research

- Many technical innovations have had a much wider adoption than anticipated by their inventors
 - Telephone, Email, SMS...
- And vice versa
 - Mobile video telephony (3G Networks), MMS
- Could things have been different if social science had been applied?

Identity vs. Authentication

- Sociology, Social Psychology
- Social Identity Theory
 - Multiple social identities (roles)
 - Work, private, family, friends, etc
 - Fundamental for our self-image
- Technical approaches rarely take this into account
 - identity is more or less equated with authentication of an individual (same with law)

Everyday examples and workarounds

- Facebook, LinkedIn...
- Many online services equate your email address with your (single) identity, as it is used as a login name
- Workaround as solution – have several email addresses associated with different roles
- Would we accept an analogous situation with physical postal addresses?

Everyday examples and workarounds

- Opposite problem: In healthcare, people share login accounts and passwords which are supposed to be individual.
- Conclusion: mismatch between real world and people's behaviour, and concept and systems for identification/authentication

Social and behavioral science

- Of course, there is social science research on how people use internet and other mediated communications technologies
- But much of that is not future- and design-oriented
- And not well represented here, in the FIA community

FIND Observer Panel Report

Vint Cerf Bruce Davie Albert Greenberg Susan Landau David Sincoskie

April 9, 2009

Executive Summary

A panel of five external senior researchers (Cerf, Davie, Greenberg, Landau, Sincoskie) was tasked to (1) gauge the quality, the potential for game-changing impact, and the intellectual merit of the NSF Future Internet Design (FIND) program, and to (2) recommend whether and how NSF should continue with FIND.

Our findings are as follows:

First, the panel is pleased and encouraged by the results presented on over 30 projects, over the course of the April 6–7, 2009 workshop sponsored by NSF. FIND has had a refreshing and liberating impact on network architecture research — refreshing in the sense that architectural gaps in the Internet architecture have been identified, and liberating in the sense that researchers are working on long-term target of a better Internet, not short term myopic improvements. New ground is being broken over a wide range of core networking areas, e.g., naming, addressing, routing, monitoring, mobility, network management, access and transport technologies, sensing, content and media delivery, and networked applications.

FIND has now run for three years, and has ramped up to its current level of funding 49 projects, each roughly at level of 500 thousand to one million dollars over three

NSF FIND Panel recommends...

- Security at the core
- Examine incentives of all stakeholders
- Holistic view
- User behavior, almost as an "OSI Level 8"

Conclusions (1/2)

Discrepancy between...

1. Bold statements in opening paragraphs of research programs and political visions – and the actual research carried out
2. Some of the concepts and models that underpin current and future technical infrastructure – and the everyday reality of ordinary people

Conclusions (2/2)

- Research on Future Internet is vital, and technology research is at the core
- Ambitions and expectations are high and broad
- Current research approaches seem insufficient to be able to live up to the expectations
- We need really multi-disciplinary, integrative approaches to tackle these important challenges