



## 5<sup>th</sup> Future Internet Assembly Conclusions & Discussions

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# 5<sup>th</sup> Future Internet Assembly

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- ❑ FI Architecture
- ❑ Foundations of Trust
- ❑ Search in the Future Internet
- ❑ The economics of information
- ❑ Future Internet Research & Experimentation
  
- ❑ What does Future Internet mean for **Enterprise**?
- ❑ What can Future Internet mean for **Smart Health**?
- ❑ What can Future Internet mean for **Smart Energy**?
- ❑ What can Future Internet mean for **Smart Cities**?
  
- ❑ **Help shape the next Future Internet Assembly in Ghent**

# FI Architecture

## □ FI Reference Model

### – New FI Architecture? YES! **If...**

- It is better than today's architecture
- We find the ways to be adopted/deployed

### – Design Principles

- “Keep it simple” but not “K.I.S.S.”
- Scalability, Flexibility, Openness, Federation, Trust, ....

### – Approach

- Design one Reference Model and focus research on that?
- Continue research and then consolidate to a Reference Model?
- In between?

# FI Architecture

- ❑ Research projects results
  - ❑ A number of architectures are already designed & prototyped
  - ❑ How to evaluate an architecture and/or a reference model?
  - ❑ How to step from a reference model to large scale prototypes validation?
- ❑ Standardization bodies/groups exist or can be formed

# Foundations of Trust

## FIA Topics

Emerging threats

Provenance

Economics of  
security

Legal Frameworks

Identity and Privacy



## Research challenges for roadmap

- Anticipating **threats** – proactive vs. reactive
- Combating the '**underground economy**'
- Quantifying **risk** and **consequences**
- **Productive trust** –citizens in control of risks they take
- **Quality of information** – how do we know to trust it?
- Addressing '**linkability**' and **rights/obligations**
- Trust between **people / data and information**
- Designing FI to incorporate **legal principles**
- **Transparency** Enhancing Technologies
- **User interfaces** that put users in control
- ....

*Building ID Provisioning into core FI Platform*

# Search in the Future Internet

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- ❑ Search in Content, eHealth, sCities, Green ICT, ...
- ❑ There is **no “one-size fits all” search** – even for a single vertical domain
- ❑ Provides an opportunity for SMEs to target narrow search
- ❑ Search is a core part of the Future Internet infrastructure
  - Search is behind all **tier-one Cloud Computing players** and at the core of **every Cloud infrastructure**
    - Google, Yahoo, Microsoft, Amazon, etc.
    - Storage, Computing (virtualization, distributed, Java, etc.) and indexing
- ❑ Research in trust, speed, scalability, simplicity, relevance

# The economics of information

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- Theoretical principles and viewpoints on information economics
  - Roles and limits of **economic games in experimentation**
  - Information monitoring can be used to **influence behaviour** (e.g. energy monitoring in the home)
  - **Increased complexity** and limits of cognitive ability
  - ...
- Practical application depends on important FI capabilities
  - Techniques to **identify communities** of interest and to capture, evolve and enforce **rules of engagement**
  - **Linking people through content** and going beyond textual links
  - Development of acceptable **participation technology** (e.g. social metadata, etc)
  - Availability and legality of **monitoring and analytical tools** (e.g. for tracking the evolution of relationships and their meaning through content)

# Future Internet Research & Experimentation



- ❑ FIRE White Paper on experimentally-driven research
- ❑ Update on FIRE – Portfolio analysis
  - Outcome of projects; more federation and collaboration needed =>opportunity
  - New projects from Call 5
- ❑ Create European market for testing and experimentation facilities
- ❑ FIRE internationally:
  - Going “Glocal”; we cannot do this alone
- ❑ FIREweek in Barcelona 28.6.-2.7.2010

# What does FI mean for Enterprise?

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- ❑ **New opportunities** for “traditional” & new enterprise, new **business models, customer satisfaction,**
- ❑ **Enterprises need to think out of the box:** the FI will enable a whole new world of business, but companies need to be prepared to **learn, to evolve, to change,** maybe even to **transform** (not only services/products but also vision).
- ❑ There were concerns raised including trust, failover alternatives, ease of use for SMEs, leaking of IP, and of course cost
- ❑ In terms of outcomes, the session agreed to elaborate **Scenarios for the future of businesses on the Internet**
- ❑ The entire Enterprise session was summarized (real-time) online on at <http://FIAEnterprise.wordpress.com> and the discussion continues.

# What can FI mean for Smart Health

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- ❑ The full deployment of the FI paradigm will result in an earlier and easier adoption of the new models for **Virtual Physiological Human**.
- ❑ **Lifestyle**. Future Internet can be a catalyser for the introduction of new habits into the population.
- ❑ **New business models** for the new personalised health services.
- ❑ There is a **convergence between the “media internet” and the “health internet”** – HD content, 3D, etc. but there are many barriers to this, especially due to the special requirements for security, privacy and data integrity in the area of health.
- ❑ A more **patient centric model** and a more **holistic approach** in eHealth using the Future Internet can improve both efficiencies and general public health.

# What can FI mean for Smart Energy

- ❑ ICT/FI technologies for:
  - End-users energy awareness/active
  - Energy Demand/Response automatic control
- ❑ Different categories of users => Different business motivations => New requirements
- ❑ FI technology brings new challenges to be promptly exploited
  - M2M transactions & **interoperability**
  - Management of large amount of data
  - The portion of **renewable energy can be increased.**
  - New approach in **Energy Demand-Response**
  - Electrical Vehicle integration
  - Energy efficiency of FI infrastructures
  - Economics Smart energy

# What can FI mean for Smart Cities

- ❑ Smart cities can
  - ❑ Keep citizens informed
  - ❑ Empower citizens
  - ❑ Be efficient
  - ❑ Quality of life
  - ❑ Give people choices
  - ❑ Change behaviours
    - Be greener ...
- ❑ What FI must pay attention to
  - ❑ Put citizens at the centre
  - ❑ Establish trust in smarts
    - Massive data, privacy, etc.
  - ❑ Must give citizens an 'off button'
  - ❑ Balance corporate and citizen needs
  - ❑ Engage citizens in building smart cities
  - ❑ Reliability, 24/7
  - ❑ Inclusion
  - ❑ Interoperability across sectors
  - ❑ Open, innovation friendly systems

## Plenary Panel

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- ❑ **Architecture:** Markus Brunner (NEC Europe)
- ❑ **Smart Energy:** Susana Bañares Hernandez (REE)
- ❑ **Trust:** Mireille Hildebrandt (Vrije Universiteit Brussel/Erasmus)
- ❑ **Smart Cities:** Martin Brynskov (Center for Digital Urban Living)
- ❑ **Enterprise:** Miguel Borrás (Antara)
- ❑ **FIRE:** Piet de Meester (IBBT)
- ❑ **Search:** Petros Daras (CERTH)
- ❑ **Health:** Paul Moore (Atos Origin)
- ❑ **Economics of Information:** Tuan Anh Trinh (Network Economics Group)

# Questions....

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- ❑ What should an architecture of the future internet contain in order to be able to offer the applications of the future?
- ❑ Will application domains or socio-economic considerations deliver the right requirements for the Future Internet, or can it be designed without any application in mind?
- ❑ How can we test and validate the Future Internet core platform/ components/ architecture?
- ❑ What are the next steps? How can we move towards a consolidated EC view?
- ❑ .....



# Thank you

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