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The Internet is more successful than was ever imagined - but its innovative and widespread uses pose challenges, for example for security and privacy. Opinions differ on how to approach those challenges; but experimental facilities are supporting the evidence base for the Future Internet. Share this

The Internet's size, complexity and role in modern society have far exceeded the expectations of its creators. It is a complex and constantly-expanding structure that has become an essential part of our work and personal lives; it is a **social and economic critical infrastructure**.

The basic Internet protocols are now 30 years old, and the Web has grown dramatically in scale; moreover it has acquired hundreds of additional protocols and extensions, making it increasingly complex to manage.

Social networking sites are attracting hundreds of millions of users worldwide; and there is ever more user-generated content from 'Web 2.0'. New applications, such as voice and video over IP (e.g. Skype), crowdsourcing (e.g. Wikipedia), social networks (e.g. Facebook), and video sharing (e.g. YouTube), are extremely popular and useful: but they have also taken Internet use into unforeseen and unanticipated directions. This poses significant technological and policy challenges, for example in terms of **security, mobility, heterogeneity, 'ad hoc' connections and complexity**.

The issues at stake include: the balance between intelligence in the core versus in the edges; network neutrality and the end-to-end principle; the integration of network, computer and services infrastructures; trust and security by design; or the use of open source and open standards.

As for the Future Internet, opinions differ over how to confront such challenges. Indeed, some believe **the current Internet is fully scalable**, and view efforts to impose a new architecture as a threat to its long-term stability and growth.

However, others consider the solutions seen thus far to be mere 'patches' which cannot last forever - and hence they believe a radical redesign or paradigm change is due in the medium or long term. So in recent years, a number of researchers and industries worldwide have started considering radical new approaches to Internet design, sometimes called 'clean slate' approaches.

For this kind of 'experimentally-driven research' related to the Future Internet, researchers need an **experimental facility for validating innovative research and development** on network and service architectures and paradigms.

To be representative and convincing, the **experiments must be performed on a large scale**. Experimental facilities based on federating testbeds at different levels of maturity, from proof-of-concept to validation, are needed to test compatibility and interoperability, and to derive potential migration paths for innovative technologies.

## ICT Work Programme

Under the last Framework Programmes for Research and Technological Development (FP6 and FP7), Europe has to date **invested hundreds of millions of euros in researching the Future Internet**: an effort unparalleled anywhere else in the world. Work Programme 2013 continued this effort by strengthening and focusing the support for Future Internet research, mostly concentrated under [Challenge 1](#) [1], 'Pervasive and Trusted Network and Service Infrastructures'.

[Objective 1.7 on 'Future Internet Research Experimentation' \(FIRE\)](#) [2] - one of nine objectives under Challenge 1 - will make a significant contribution to the future of the Web, based on an experimentally-driven vision for developing the Future Internet.

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[1] <http://cordis.europa.eu/fp7/ict/docs/ict-wp2013-10-7-2013.pdf#page=16>

[2] <http://ec.europa.eu/research/participants/portal/download?docId=32767>

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