Future Internet

SSH and RRI contents

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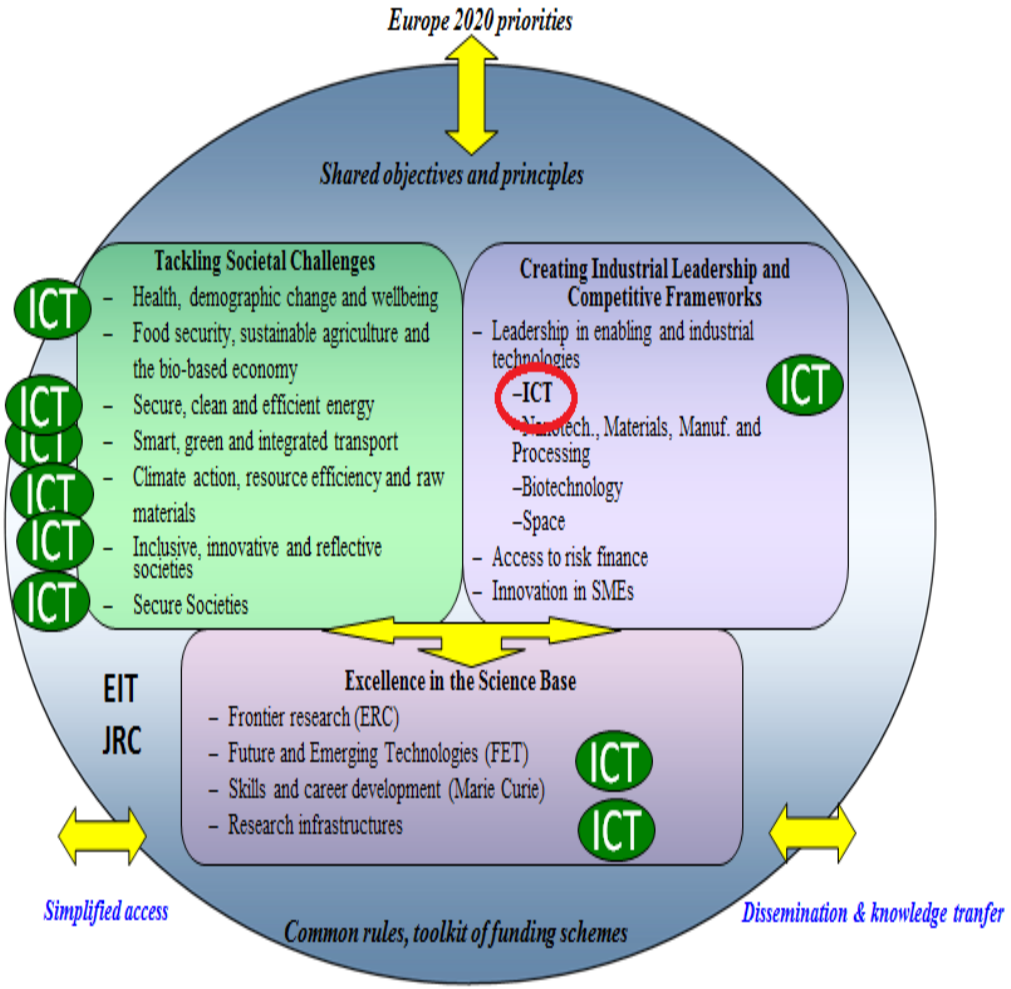

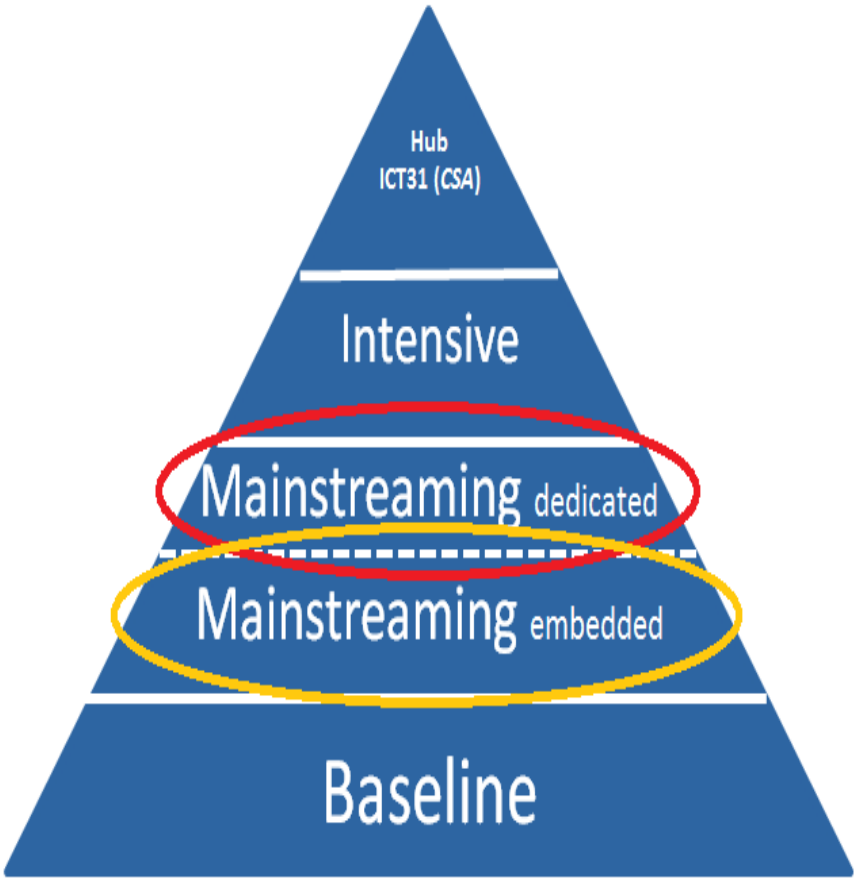

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Scope:

a. **Research & Innovation actions:** proposals are expected to cover one or more of the themes identified below, but not necessarily all of them.

- **High performance heterogeneous cloud infrastructures.** The focus is on development, deployment and management of cloud-based infrastructures and services (IaaS, PaaS, SaaS) over large-scale, distributed, heterogeneous, dynamic computing and storage environments.
- **Federated cloud networking:** Techniques for the deployment and management of federated and decentralised cloud infrastructures, in particular cloud networking techniques (within software-defined data centres and across wide-area networks) and mechanisms to enable incorporation of resources and services independent of their location across distributed computing and storage infrastructures. Approaches, including standards, to increase interoperability between cloud services and infrastructure providers to enable efficient interworking and migration of services, applications and data.
- **Dynamic configuration, automated provisioning and orchestration of cloud resources:** Tools for automatic and dynamic deployment, configuration and management of services to enhance availability, flexibility, elasticity and to meet targeted performance constraints; techniques for managing big data taking into account integrity, consistency and maintenance aspects. Tools to facilitate the coherent deployment of distributed applications over heterogeneous infrastructures and platforms from multiple providers. Mechanisms to off-load computation and storage tasks from mobile devices onto the cloud at both design and execution time.
- **Automated discovery and composition of services:** Innovative ways to facilitate collaboration between public administrations, users and other stakeholders as to produce, discover, mix and re-use different service components and create new public services through pooling and sharing of resources, data, content and tools, even across national borders. The research will build on the "cloud of public services" concept[9] that requires interoperable, reusable modules for public service functionalities. These are likely to be cross-institutional, cross-sector, easily used, re-used and combined dynamically[10] to address specific needs.
- **Cloud security:** Mechanisms, tools and techniques to increase trust, security and transparency of cloud infrastructures and services, including data integrity, localisation and confidentiality, also when using third party cloud resources.

b. **Innovation Actions: platforms for trusted cloud systems.** Collaborative development, adaptation and testing of open source software for innovative and trusted cloud-based services. Allow on-line collaboration across different platforms and different technical environments for geographically dispersed teams. Encourage the rapid prototyping and testing of open applications, including early and active involvement of users.

c. **Coordination and support actions:**
Support to the definition of common reference models for SLAs in the cloud. Support for the adoption of cloud computing infrastructures and services by addressing legal, economic, and societal factors.

ICT 7 - 2014: Advanced Cloud Infrastructures and Services (dedicated)

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b. **Innovation Actions:** proposals are expected to cover one or more of the strands identified below, but not necessarily all of them.

Strand Network virtualisation and Software Networks.
Significant work is on-going globally on the way equipment services and network applications can be designed and deployed, with a highly flexible, manufacturer-independent model of controlling reconfigurable resources supporting changing/emerging application requirements. Actions may address large scale validation, testing and standardisation in following domains:

- Virtualisation: i) of network functionalities at infrastructure level, with physical resources reused by concurrent processes, with open interfaces (API) virtual machines; ii) of the implementation of network services running on top of the infrastructure, taking a broad approach to network services (routing, NAT, firewalls..), beyond fully programmable nodes as high-speed, forwarding devices. Migration paths and co-existence with legacy networking devices is to be considered.
- Orchestration logic (SDN), enabling network programmability, automation of cross domain network configuration, simplification and programmability of devices, moving towards Operating System (OS) like orchestration mechanism of the software components of the network. Open source approach may be considered.
- Tighter integration between the application/service layers and the networking layers, with full landscape aware decision capability enabling improved reconfiguration capability and time to reconfigure.
- Support of open network functionalities for dynamic integration with third party and OTT cloud environments offering guaranteed and negotiable end to end SLA's including security aspects, and enabling exposure of network resources to third party application developers.

c. **Support Actions:** proposals are expected to cover one or more of the themes identified below, but not necessarily all of them.
In order to ensure coherence and maximum impact of the PPP, additional activities are foreseen:

- Overall programme integration through projects cooperation agreement and analysis of the outcomes generated by the various FI projects (project portfolio analysis);
- Horizontal supervision of the societal perspective of the addressed technologies
- Monitoring of the openness, fairness and transparency of the PPP process, including sector commitments and leveraging factor;
- Analysis of international activities in the relevant 5G domains and identification of international co-operation opportunities, in view of fostering global solutions, standards and interoperability;
- Support to standardisation bodies through early identification of promising technologies;

ICT 14 - 2014: Advanced 5G Network Infrastructure for the Future Internet (dedicated)

ICT 5 – 2014: Smart Networks and novel Internet Architectures

Specific Challenge: The Internet architecture is fundamentally a "host centric" architecture, with limited "in network" service capability and static routing/addressing. Key functionalities like security, trust or mobility had not been planned in the original design. Additional service capabilities on the Internet have been made possible with overlay architectures or patches presenting inherent weaknesses. The ever larger portfolio of business models, processes, applications/devices that have to be supported, coupled with a rapidly growing number of application and societal requirements, calls for a new approach towards the Internet architecture, which will also bring computer architectures and network architectures closer for greater efficiency.
Multiple approaches have been researched: Information Centric Networks, Named Data Networking, Publish Subscribe information Networking, opportunistic and Disruption Tolerant Networking are a few of them, breaking the link between information and the physical network address where it is located. Recursive architectures have also been proposed, to better address security and trust issues and to reengineer the layered architecture.
The next wave of research in the field of Internet Architecture should solve remaining problems and bring the most promising options closer to deployment.

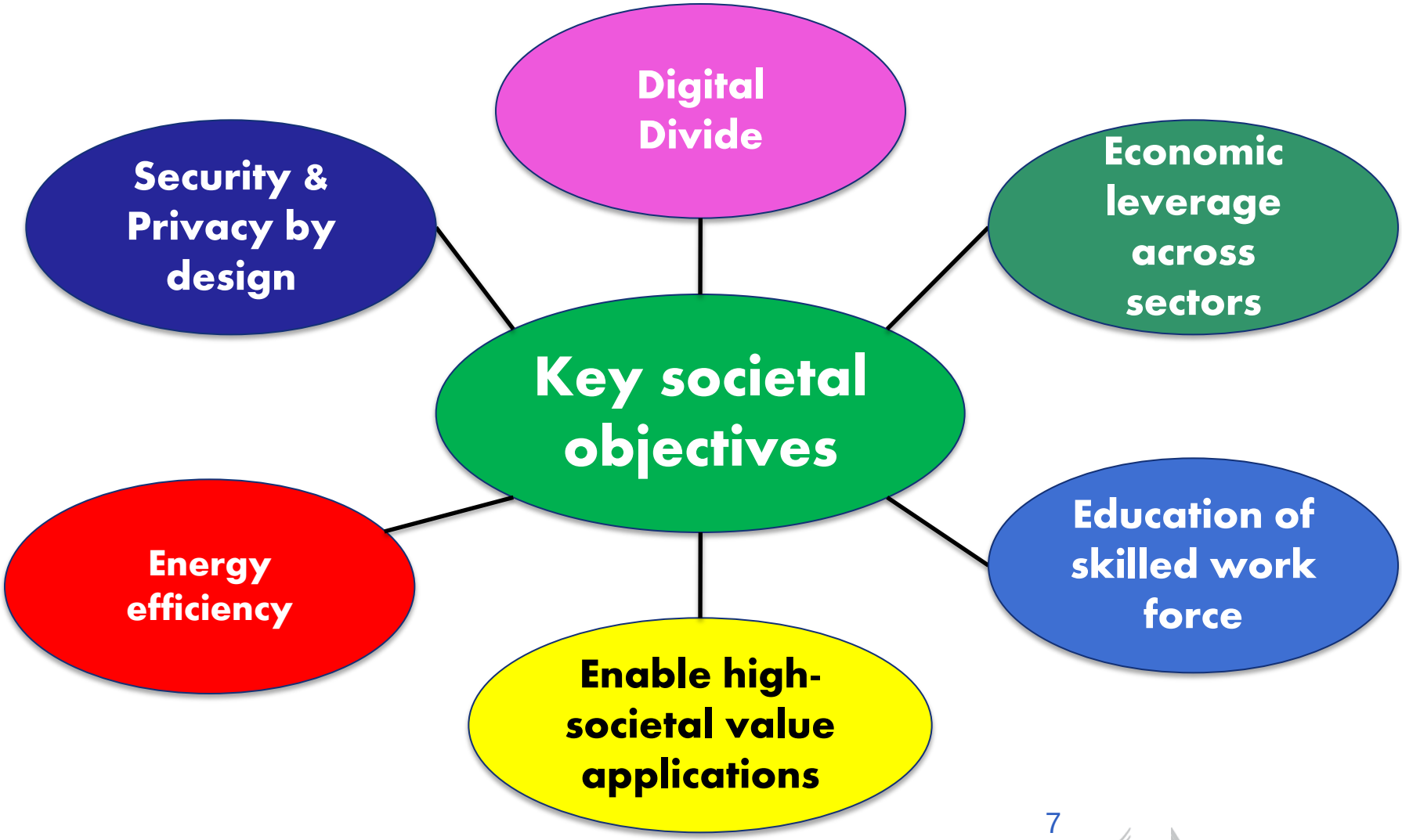
Scope: The focus of the research covers innovative Internet architectures and networking concepts that can meet the challenges and opportunities of the 21st century, taking into consideration the larger social, economic and legal issues that arise from the interplay

between the Internet and society. The target research is thus expected to address novel approaches to information access and delivery, built-in security and privacy, generalised mobility, and seamless integration with computing environments as typical drivers. The proposed approach should go beyond fixing today's recognised limitations (e.g. ICN for content networking). It should also be adapted to future applications such as sensor based applications. A key target will be to prove that the proposed architecture does actually scale and makes possible a low cost migration strategy from existing IP networks. Comparative pilot experiments using virtualised platforms are encouraged.

ICT 5 - 2014: Smart Networks and Novel Internet Architectures (embedded)

Your Content

ICT 5-6-14 Future Communications Networks



Opportunity! €2 million in Call1 - ICT-14.c (closing 25/11/2014): Support Actions

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ICT 5-6-14 Future Communications Networks

Key Performance Indicators 5G-PPP will be formally monitored (Societal KPIs)

- Up to 90 % reduction of energy consumption per service
- European availability of a competitive industrial offer for 5G systems and technologies (jobs, skills, welfare)
- Enabler of novel range of services of high societal value like U-HDTV, car safety, e-health, M2M applications (value contribution to be monitored)
- Establishment and availability of 5G skill development curricula in partnership with the EIT.

ICT 7 Cloud

- Cloud partnership (public procurement)
  - ✓ Making Europe the natural home of safe cloud computing
- Safe and fair contract terms and conditions
  - ✓ data preservation after termination of the contract
  - ✓ data disclosure and integrity
  - ✓ data location and transfer
  - ✓ ownership of the data
  - ✓ direct and indirect liability change of service by cloud providers and subcontracting
- Streamlining standards

Opportunity! €2 million in Call1 – ICT-7.c
(closing 23/04/2014): Coord. & Support Actions

ICT 30 Internet of Things and Platforms for Connected Smart Objects

- Focus: Platforms for "Connected Smart Objects" /new ecosystems
  - ✓ Challenge: To overcome fragmentation of vertically-oriented closed systems, architectures and application areas
  - ✓ Cuts across several LEIT-ICT challenges: smart systems integration, cyber-physical systems, smart networks, big data
  - ✓ Brings together different generic ICT technologies: nano-electronics, wireless networks, low-power computing, adaptive and cognitive systems
  - ✓ Applicability across multiple application domains: e.g. ehealth, energy, food chain, intelligent transport and systems, environmental monitoring and logistics)

Indirect opportunity! €1 million in Call 2015 ICT-30.b (closing [*15/04/2015*]) – One Coord. & Support Actions