ETICS: Economics and Technologies for Inter-Carrier Services

ETICS reshapes the current Internet ecosystem and designs new technological solutions for inter-carrier Quality of Service assurances to meet future application usages, while taking into account new business models to foster investments of all actors of the end-to-end service value-chain.

At A Glance: ETICS

Economics and Technologies
for Inter-Carrier Services

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Main Objectives

The evolution of Internet usages appeals for more Quality of Service (QoS) guarantees in order to support stringent services (e.g. security for Cloud Computing, end-to-end delay for real-time applications, etc.). To ensure an excellent quality of experience for these services, networks must continue to evolve to meet the ever increasing capacity and reliability needs. However, it may be not sufficient for certain QoS parameters, whose, end-to-end (e2e) assurance is further complexified by independent and heterogeneous control and management systems.

Hence, a major challenge for future deployments lies in having an **effective collaboration between often competitive providers** allowing dynamic and scalable solutions, while preserving confidentiality on providers' assets.

Another key challenge arises at business level, since existing agreements do not cover QoS-capable services. Before investing in these future infrastructures, providers must be ensured to perceive incentive compensations.

The ETICS project proposes a global response to these issues through **a technical and economic framework** supporting the whole life-cycle of a QoS-ensured service **across multiple heterogeneous operator networks** while providing **adequate revenue sharing models for all value-chain actors** (i.e. application/content and network providers).

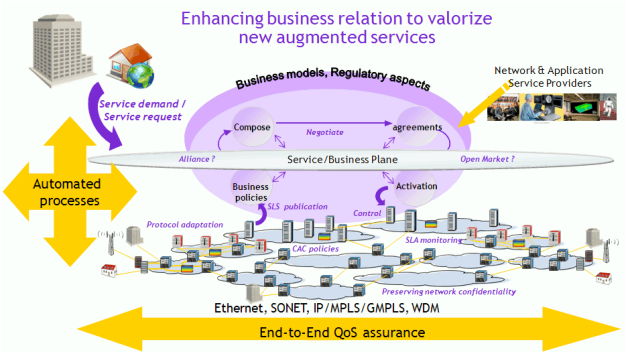
ETICS proposes a technical and economic framework supporting the whole life-cycle of a QoS-ensured service across multiple networks

ETICS aspires to highly impact the technical leadership of the participating partners, who will be in position to **drive the roadmaps and standards for the future multi-service and multi-actors networks**. Involvement of other operators and vendors, but also of regulators and Application Content Providers (ACPs), through open workshops and an external advisory panel, will ensure that all stakeholders contribute to the requirement definitions and to the validation of business and technical models, and may exploit the outcomes of ETICS. This approach will significantly lead to produce a **common vision and path towards future inter-networking technologies**.

Technical Approach

ETICS promotes a converged infrastructure where network operators provide end-to-end QoS guaranteed services to different users and applications, as they will receive fees relative to the actual usage of their resources. This usage will not be defined solely with respect to the bandwidth but also with respect to other performance or criticality factors such as delay, jitter, availability, flow isolation, etc. Business customers and every user will therefore see the benefits of new technologies through a greater experience, in particular through the use of interactive applications. ETICS roadmap is divided into 3 research axis:

• **Paving the way towards a sustainable enhanced Internet ecosystem**. New business models will be actively considered among a large panel from alliance/federation to trade market models, to ensure profitability, stability of arrangements and return of investment for all the involved players. ETICS will also investigate the impact of end-to-end QoS provisioning on carrier interactions and interconnection incentives, but also on interactions between carriers and ACPs.



• **Designing a different network virtualization approach.** ETICS will work on an ecosystem designing features of a Service/Business Plane, which manages network and content provider services. ETICS will define templates and processes allowing ACPs to have end-to-end connectivity requests with various levels of QoS assurances across multiple networks.

• **Ensuring a coordinated network control & management**. ETICS addresses the technical issues of ensuring expected QoS across heterogeneous networks contracted between different actors. It will propose evolutions in routing protocols, constrained-path computation, congestion control mechanisms and will leverage on existing standards (e.g. GMPLS, PCE, PCN) to design automated network management processes providing QoS interconnections..

Test-bed experiments and performance assessment analysis will be performed in order to demonstrate the technical feasibility and the benefits of the proposed business models, and to promote the inter-carrier architecture in socio-economic and technical domains.

Key issues

To support end-to-end QoS guarantees, ETICS fundamental mainstream is thus to build a sustainable ecosystem where the issues in interconnecting network architectures are both economically and technically addressed (cf. figure):

- Economically, to **motivate carriers to invest in new technologies** on their infrastructure which will ease the openness to third parties (other network service and application providers);
- Technically, to **provision end-to-end QoS guarantees** across multiple carrier networks having different control, management, operation and business systems.

Expected Impact

The ETICS project aspires to propose a **new technological perspective with respect to the current availability of static inter-carrier services**. The expected influence is on "classical" frameworks for remote working, learning and telemedicine, but also on "newer" emerging and highly demanding services such as enhanced converged services, integrated with shared virtual reality spaces, HD/3D TV, virtual private networking, real time stock market information…. Guaranteed QoS services will be one of the key factors driving innovation on the web in the future.

ETICS aims at **accelerating the creation, management and deployment of new business models and network services interconnection** for fixed and mobile technologies. It will enhance the interworking of service providers, improve the time to market of new services, reduce operational costs and complexity, and provide new revenue opportunities for carriers and ACPs. It will reduce the time required to return the investments when deploying new generation equipments from vendors, thus facilitating their adoption.

To reach these goals, ETICS will also actively participate in standardization efforts to develop/extend open and interoperable protocols (e.g. IETF CCAMP, PCE, PCN working groups) and business processes (e.g. TMF/IPsphere Forum). Finally, the ETICS testbed will help European network operators and equipment vendors in their exploitation strategies and leadership position in future standardization directions.