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FIGARO

Future Internet Gateway-based Architecture of Residential Networks



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D6.1 FIGARO Project Presentation

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Project Manager: Henrik Lundgren, Technicolor R&D Paris

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Abstract

Future Internet services are rapidly moving towards an increasingly heterogeneous landscape with end users capable of creating, storing and delivering content and applications. To address this diversity, FIGARO proposes an evolvable Future Internet architecture based on gateway-oriented federation of residential networks. This document is a short project presentation that summarises FIGARO's main objectives, technical approach, and expected impact.

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Dissemination Level		
PU	Public	✓
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

v1.0	<i>FIGARO</i> D6.1 FIGARO Project Presentation	
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Document Revision History

Version	Date	Description of change	Authors
v0.1	23.09.2010	First draft	Henrik Lundgren (TRDP), Monique Calisti (MARTEL)
v0.2	18.10.2010	Revision based on partners' comments	All partners
v0.3	16.11.2010	Revision based on partners' comments	All partners
v1.0 (Final)	31.12.2010	Applied deliverable template. Minor editing.	Henrik Lundgren (TRDP)

v1.0	FIGARO D6.1 FIGARO Project Presentation	
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1 FIGARO – FUTURE INTERNET GATEWAY-BASED ARCHITECTURE OF RESIDENTIAL NETWORKS

At A Glance: FIGARO

FIGARO - Future Internet Gateway-based Architecture of Residential Networks

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Telefonica I+D (ES),
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FIGARO Main Objectives

The Internet has evolved from a technology-centric core network to a user- and content-centric scenario that must support millions of users creating and consuming a variety of content and applications. It must be able to accommodate new services with diverse requirements while coping with heterogeneous networks and systems.

Through a strong and committed industry-driven consortium, **FIGARO proposes a Future Internet architecture that is structured around residential networks.** In this architecture, **federated home gateways have a key role** as integrator of different networks and services, and as a coordinator of Internet-wide distributed content management. As “always on” devices interconnecting the residential networks with the Internet and responsible for aggregating a multitude of devices and services, **home gateways become essential components for an efficient management of physical resources and applications.** By building on an experimental approach that includes testbed prototyping of solutions, **FIGARO will deliver:**

FIGARO provides an evolutionary path to the Future Internet, departing from centralized cloud-based architectures towards federation of residential networks.

- The design of a novel content management architecture that enables distributed content backup, search and access.
- A network optimization framework, leveraging community networks and heterogeneous networks.
- A network management architecture with new network monitoring and real-time troubleshooting techniques.
- A deeper understanding of novel Internet-based communication and service solutions for emerging sectors, such as energy management and e-health care.

Furthermore, the integration of new sectors into the future Internet will spur trans-sector innovation and create new businesses. Finally, FIGARO is expected to result in technologies that will strengthen Europe’s position and give competitive advantage to European industry in the areas of Future Internet technologies and services, residential gateways and home automation.

Technical Approach

FIGARO proposes an evolvable Future Internet architecture based on gateway-oriented federation of residential networks.

Gateway-centric Networking

The residential gateway has a central role in our vision of the Future Internet. It interconnects the residential network with the Internet and is responsible for aggregating a multitude of devices and services within the residential network. The gateway is the only invariant and indispensable element of the residential network and is a natural control point through which Internet-based services pass. Most Internet-enabled end-user devices are connected to it while at home, and will in the future also access the gateway remotely over the Internet. Furthermore, a residential gateway today is nearly as powerful as a PC, and is capable of supporting the increasing requirements originating from the Future Internet. With the convergence of networking technologies, the home gateway has become a critical infrastructure at home and is one of the few “always on” devices. A gateway-centric approach enables efficient network management in terms of monitoring of networks, applications, and services, as well as automatic troubleshooting and network optimizations. Furthermore, it also enables efficient management of digital content.

Federation of Residential Networks

In FIGARO, residential gateways undertake the federator role, internally as well as externally. The figure shows residential networks connected at the edge of the Internet and illustrates a simplified view including the two types of residential network federation. The upper part illustrates external federation interconnecting multiple gateways to form a cooperative overlay across residential networks. This federation enables further collaboration to offer added value in terms of, for example, access and sharing of content, storage and network capacity. The right-most residential network illustrates an example of an internal network federation consisting of the regular IP-based network on one hand, and other types of networks, possibly non-IP, specific to services in other sectors (e.g., home automation and e-health). The federation enables features such as

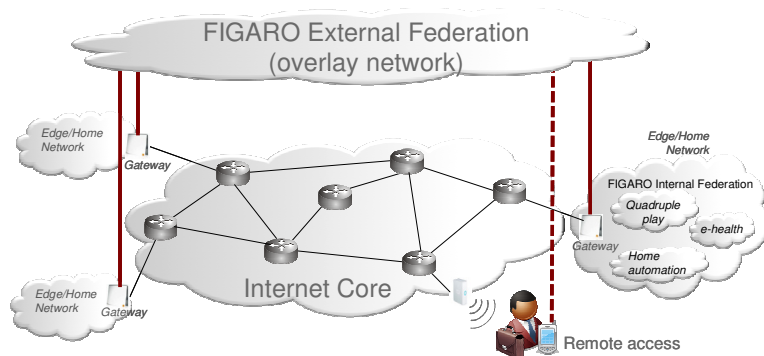
communication, resource, and content sharing among the involved networks as well as a common interface to these networks through the gateway.

Key Issues

The Future Internet will consist of millions of residential networks that communicate and exchange content through an over-provisioned Internet core.

In FIGARO, the primary challenge is to design a new home network centric communication architecture that is capable of supporting:

- Efficient distributed content management.
- Networked services federation (such as energy management, home sensors and e-health care in addition to triple/quadruple play services).
- Simple network management.
- Optimized network performance and resource utilization.



Expected Impact

By shifting content storage to the edges of the network, FIGARO’s gateway-centric architecture has a huge potential for positive impact economically, technologically, and scientifically. The project outcomes will be fed into the European Future Internet programs, and strengthen the European residential gateway business and home automation industry. The integration of other sectors with the home network and the Internet is expected to spur innovation of “cross-sector” services and applications, creating numerous opportunities for SMEs and giving Europe a lead in this area. The consortium with major players in the fields of home gateways and home automation, combined with research institutions, start-up companies, and SMEs will ensure that the research innovations developed in this project will end up in real systems, and hence drive the Future Internet and residential networking market.