EU ICT COMBO Project: Fixed Mobile Convergence Solution

Ricardo Martínez
ONA, IP Tech. & Engineering Unit
Outline

Project details
Scope
Challenges and Concept
Targets
Workplan
CTTC participation
Project Details
Project Details

**COMBO:** CONvergence of fixed and MOBILE Broadband access / aggregation networks

**Start Date:** January 1st, 2013 – 36 Months

**Consortium (17):**

** Operators:** Deutsche Telekom (technical leader), Telefónica I+D, France Telecom and Türk Telekom

** Vendors:** Alcatel Lucent Italia, Ericsson and ADVA Opt. Networking (UK and Germany),

** SME:** FON, AITIA, TELNET and JCP (management leader)

** Academia (Universities / R+D centers):** BME, POLIMI, IT-TB, ULUND and CTTC

**Budget and Effort:**

Effort: 947 MM

Project Funding: 7,449,000 €

**Kick-Off meeting:** 28-30 January 2013, Rennes (Fr) organized by JCP and hosted by FT
Introduction
Introduction

In the following years it is expected a huge growth of data traffic in fixed and mobile access networks.

Fixed broadband access: different ADSL flavors, FTTCurb, FTTH

Mobile access: 2G, 3G, LTE, LTE-A, WIMAX
Introduction

Fixed & mobile networks have been optimized / evolved independently

Complete functional & physical separation of fixed access/aggregation and mobile networks

E.g.: the availability of locations for mobile base station sites and fixed network central offices are not re-considered by each other for future deployments

Challenges

Cope with the huge capacity demand

Attain more cost / energy efficient mobile / fixed network infrastructures

Solution

Design / deploy scalable Fixed Mobile Convergence (FMC) networks

**FMC idea:** to define framework for a common converged network capable of supporting both mobile and fixed services
Scope

Lot of uncertainty wrt technological evolution due to many technical options in FMC --> COMBO project

Scope of COMBO project
Challenges and concept
COMBO Challenges

COMBO project will answer the key questions addressing FMC challenges:

**Save cost**: reduce CAPEX and OPEX ensuring QoE

**Deal with the increasing traffic** and **changing applications**: scalability / flexibility

**Adapt network structure**: node consolidation

**Where to locate the intelligence in the network**: functions such as handover between cells and technologies, OAM, synchronization, etc.

**Enable multi-operator / multi-vendor environment**: interoperability

**Reduce energy**: reduce 20% of energy consumption

Joint optimization of fixed and mobile access and aggregation networks
COMBO Concept

**COMBO** proposes a **new access / aggregation network architecture** around the innovative concept of **NG-POP**

NG-POP disruptive evolution of the Central Office node / local POP

First aggregation node: mediation between access and core network

Several constraints: different services and technologies, scalability, operations, ….
COMBO Concept

NG-POP combines two basic aspects of FMC: **functional** and **structural**

**Functional convergence (@ or below L3, IP)**

Openness of network interfaces, interoperability among access technologies, unified control plane, better distribution/localization of essential network functionalities (BBUs, P-GW, etc.)

**aim:** enhance the QoS, QoE, scalability and flexibility

*Example 1:* fast handover between technologies (WiFi, WiMax, LTE/LTE-A) and cell sizes (macro, micro, pico, femto)

*Example 2:* optimized localization of centralized BBU and P-GW, traffic offloading techniques to efficiently balance traffic load
COMBO Concepts

Centralised P-GW case

Internet flow
Content multimedia flow
User to user flow

National POP
MME
P-GW

Regional POP
S-GW

Aggregation Network

WiFi
3GPP

Internet

Distributed P-GW case

Internet flow
Content multimedia flow
User to user flow

National POP
MME

Regional POP

Aggregation Network

WiFi
3GPP

Internet

CTTC
Centre Tecnològic de Telecomunicacions de Catalunya
COMBO Concept

Structural convergence

Mutualisation of fixed and mobile access / aggregation network infrastructures and HW

Central office consolidation and BBU hotelling techniques

**aim**: joint fixed/mobile equipment and infrastructures

*Example 1*: convergence of traditional PON access and dedicated wavelengths for mobile traffic backhauling on a single infrastructure with packet over optical aggregation transport segment

**Access segment**: PON technologies    **Aggregation segment**: MPLS-TP over WSON
Targets
**COMBO: targets**

**Main target:** to deploy FMC networks achieving:

- **optimal QoE** for the end user
- **optimized network infrastructure** in terms of increased performance, reduced cost and energy consumption

**Associated objectives:**

- Assess multi-operator/vendor FMC scenarios
- Experimental demonstration of FMC features and concepts in lab and field trials
- Drive standardization activities
COMBO: Workplan

**WP1** Project management and coordination (leader **JCP**)

**WP2** Framework definition, architecture and evolution (leader **TID**)

General framework for FMC, KPI (bit rate, bw, delay, reach, …), traffic modelling, etc.

**WP3** Fixed mobile convergent architectures (leader **FT**)

Define and technically assess candidate architectures for FMC

**WP4** Traffic and performance management (leader **EAB**)

Define measurable QoS parameters to optimize FMC networks (e.g., capacity, quality and energy consumption). Performance monitoring and management tools

**WP5** Techno-economic assessment (leader **BME**)

Assess qualitatively FMC architectures based on cost and energy consumption. Evaluate the impact on business ecosystems

**WP6** Functional development & experimental research activities (leader **ADVA**)

Experimentally validate and demonstrate investigated convergence levels within COMBO

**WP7** Dissemination and standardization (leader **DTAG**)

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[Logo: Centre Tecnològic de Telecomunicacions de Catalunya]
CTTC Participation
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WP1 CTTC: 0.5 MM

WP2 CTTC: 7MM

T2.2 and T2.3: study the evolution of wireless and access aggregation segments, traffic offloading techniques, and the aggregation network integrating packet and optical switching technologies

WP3 CTTC: 11MM

T3.2 and T3.3: definition of a control plane (e.g., GMPLS/PCE, OpenFlow) handling the multi-layer (packet/optical) aggregation network
CTTC participation

WP4 CTTC: 24 MM

T4.2 and T4.3 (leader): topics related to self-organized schemes for energy-aware RRM and network-managed traffic offloading; experimentally validate / evaluate dynamic packet and optical transport infrastructures for mobile backhaul

WP5 CTTC: 7MM

T5.4: Assessment of energy saving benefits through applying the novel approach to set up RRM enablers in RAN

WP6 CTTC: 10MM

T6.2: Experimentally validate selected functions of specific parts of defined FMC architecture: emulated RAN (based on LTE), optical aggregation network and limited EPC functions

WP7 CTTC: 1MM
Thank you! Questions?

http://wikiona.cttc.es