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Deliverable D7.1

Platform – Line-Up Specification

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Abstract

This document aims to describe all features that the demonstrator will provide. It is to be read in line with D7.2 document which describes how scenario can be set up based on platform line-up.

This document lists inputs from other work-packages and impacts on platform realization. It also proposes some realization schemes.

Keyword list

OMEGA, Demonstrator, Scenario, Features, Raptor, Inter-MAC , Radio, PLC, InfraRed, VLC

Executive Summary

Impact on the other Work-packages

Platform Line-Up specification summarizes inputs from work-packages:

- WP1 for requirements: list of features that the demonstrator should make available for implementing the scenario
- WP2 for radio technologies (IEEE 802.11n & 60 GHz systems)
- WP3 for PLC media contribution
- WP4 for optical wireless media contribution (IR & VLC)
- WP5 for OMEGA Extender contribution (Inter-MAC layer Software and Raptor card)
- WP6 for general architecture

Outcomes of this document should be used not only to identify how the demonstrator looks like, but also to check if all work-packages contributions are in line with features and scenarios to demonstrate. This document is also based on 2 platform versions: V1 (Nov. 2009) and V2 (Nov. 2010).

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List of Acronyms

Acronym	Meaning
ADSL	Asymmetric Digital Subscriber Line
DSL	Digital Subscriber Line
DVB	Digital Video Broadcast
HAN	Home Access Network
HDTV	High Definition TV
HG	Home Gateway
HWO	Hybrid Wireless Optics
IP	Internet Protocol
LAN	Local Area Network
MAC	Medium Access Control
OFDM	Orthogonal Frequency Division Multiplexing
OMEGA	Home Gigabit Access
PLC	Power Line Communications
QoS	Quality of Service
IR	Infra Red
VLC	Visible Light Communication
WAN	Wireless Local Area Network
Wi-Fi	Wireless Fidelity
WLAN	Wireless Local Area Network
WP	Work Package

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1 Introduction

1.1 Scope of the document

This document intends to summarize inputs for OMEGA Platform demonstration, as taken from work packages, and to propose accordingly some platform outlines.

1.2 Inputs from work packages

1.2.1 WP1

WP1 defines the scenarios to be demonstrated, so to be used as requirements for WP7:

- WP1 contribution to WP7 is held by TID
- FT contributes by providing their demo room for holding the demonstrator

WP1 defines also how the showroom can be used for demonstration scenarios. Therefore, WP1 and WP7 defined together which features the demonstrator should make available.

1.2.2 WP2

WP2 provides the radio technologies: IEEE 802.11n and 60 GHz communication:

- IEEE 802.11n prototypes will be provided by IFAT
- 60 GHz prototypes will be provided by IHP.

1.2.3 WP3

WP3 provides the PLC media:

- WP3 contribution to WP7 is held by Spidcom.

1.2.4 WP4

WP4 provides the Optical Wireless media: Infra Red (IR) and Visible Light Commutation:

- WP4 IR contribution to WP7 is held by UOXF
- WP4 VLC contribution to WP7 is held by HHI.

1.2.5 WP5

The Inter-MAC layer, illustrated in Figure 1, is a new layer, technology-independent, that would use the information received from the underlying technologies to select the most appropriate one fitting to services requirements [OMWP]. The Inter-MAC is located in each OMEGA device between the network protocol layer and the medium access control layer. The Inter-MAC layer establishes and manages the OMEGA network, assuring QoS to the end-user applications acting as an intelligent bridge between PLC, Radio and HWO.

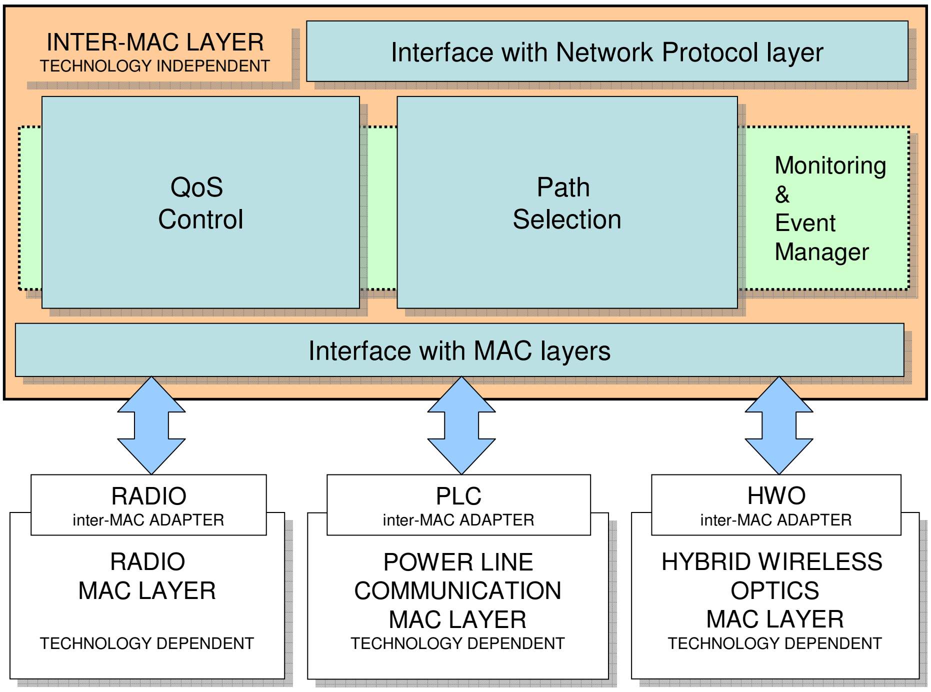

Figure 1 Inter-MAC overview

WP5 provides OMEGA Extender device: Raptor card and Inter-MAC layers:

- WP5 Inter-MAC contribution to WP7 is held by IFX
- WP5 Raptor card contribution to WP7 is held by IFX, subcontracted to University of Paderborn
- Inter-MAC definition is held by ComNets

1.2.6 WP6

WP6 provides OMEGA architecture, which will cover the services part of the demonstrator.

1.3 D7.1 purpose

Based on other work-packages input, WP7 has to describe in D7.1:

- which features will be made available
- propose corresponding platform line-up
- build a plan of intermediate platforms in order to be able to integrate parts in a suitable way
- prepare to define services which will be used by means of the platform
- check that OMEGA devices or legacy devices will be available in a sufficient number in order to demonstrate OMEGA capabilities

2 Requirements: WP1 features

2.1 WP1.1: Access to Gigabit network

The OMEGA network will be connected to ultra-high speed networks like Gigabit Ethernet networks, this must be visible.

2.2 WP1.2: More than one HDTV channel can be watched in an OMEGA network

In an OMEGA network, many high quality HDTV channels can be watched simultaneously.

2.3 WP1.3: Connectivity everywhere in the home

In an OMEGA network, thanks to extenders and wireless technologies, high data rate connectivity is available with a wide coverage.

2.4 WP1.4: Unified Home Area Network with continuity of services

In an OMEGA network, Inter-MAC layers handle handover and enable to stay connected in the whole HAN. Handover shall also be visibly demonstrated.

2.5 WP1.5: Guaranteed QoE / QoS

In an OMEGA network, Inter-MAC layers handle QoS from technology MAC layers, and are able to select the most suitable technology and path. OMEGA equipment connected to the Inter-MAC is also able to manage the QoS data provided by the Inter-MAC.

2.6 WP1.6: Easy setup and installation

In an OMEGA network, thanks to extenders, wireless technologies and existing power lines, installation is easy, as additional wiring can be avoided. Appropriate measures also assure simple setup and configuration.

More details on the scenarios defined in WP1 can be found in [OMD11].

3 Overview

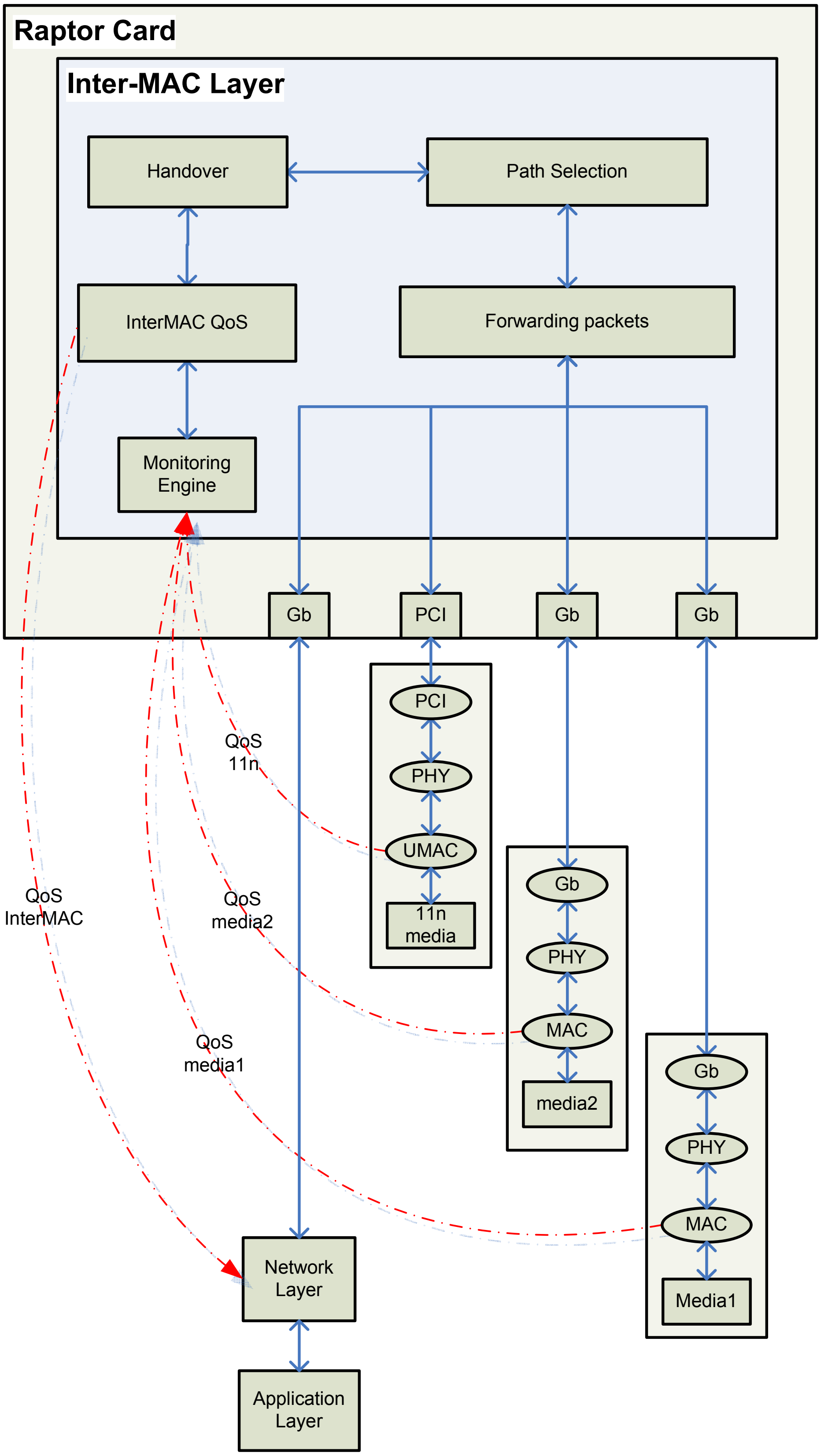

Figure 2 Overview of the OMEGA Demonstrator

Figure 221 presents main parts of the OMEGA Demonstrator:

- A raptor card (OMEGA Extender) which embeds
  - Inter-MAC layer
  - Gigabit Ethernet and PCI connection to physical media
- External media, connected to Raptor card through Gigabit Ethernet.
- Network and Application, connected to Raptor card through Gigabit Ethernet.

OMEGA Extenders are connected to the Home Gateway through Gigabit Ethernet also.

3.1 Overview of Requirements Matrix

Requirements	Overview
WP1.1: access to Gigabit network	An OMEGA Extender is connected to the Home Gateway. The Home Gateway is connected to FTTH and provides Gigabit services to the HAN.
WP1.2: more than one HDTV channel can be watched in OMEGA network	Equipment for watching HDTV must be connected to media via OMEGA extenders.
WP1.3: connectivity everywhere in the home	OMEGA extenders and media connected to them shall cover the entire show room. Gigabit Ethernet connections between extenders and/or HGW shall be avoided as much as possible.
WP1.4: unified Home Area Network with continuity of services	Inter-MAC handover functionality shall be successfully operating. Equipment connected to the Inter-MAC shall be capable to demonstrate from which media it receives its data.
WP1.5: guaranteed QoE / QoS	Inter-MAC QoS / QoE feature shall be functional, and exported to supervision devices. Application connected to the Inter-MAC (through its network layer) shall be capable to show QoS information as reported by Inter-MAC.
WP1.6: easy setup and installation	As installed in the showroom, connection of equipment to media shall appear simple.

Table 1: Overview of requirements

In order to fulfil the requirements listed in Table 1, the following parts have to be provided:

- Physical Media:
  - Connectivity to OMEGA extender via Gigabit Ethernet
  - Coverage range and PHY data rate
  - Appropriate physical size, easy installation
  - Power consumption and connectivity materials
  - MAC layer availability (ready for QoS parameters interface)
- OMEGA Extender (Raptor Card):
  - Inter-MAC layers feature availability (development and integration plan)
  - Number of cards available for demo
  - Appropriate physical size, easy installation
  - Power consumption and connectivity materials

- Network and application layer availability (development and integration plan)

In this document, Physical Media and Raptor Card are covered in order to provide requested features.

The hereunder described platform line-up refers to two global versions:

- V1: expected to be set up by November 2009
- V2: at the end of the OMEGA project (November 2010)

4 Radio Technologies

Two radio technologies are prototyped in the OMEGA project: IEEE 802.11n and 60 GHz communication. More details on the requirements regarding the hardware and software of the radio demonstrators are captured in [OMD23].

4.1 IEEE 802.11n

Figure 3 illustrates the IEEE 802.11n prototype with a Raptor card. Besides the digital baseband, the IEEE 802.11n MAC and the Inter-MAC each are running on one of the two PowerPCs.

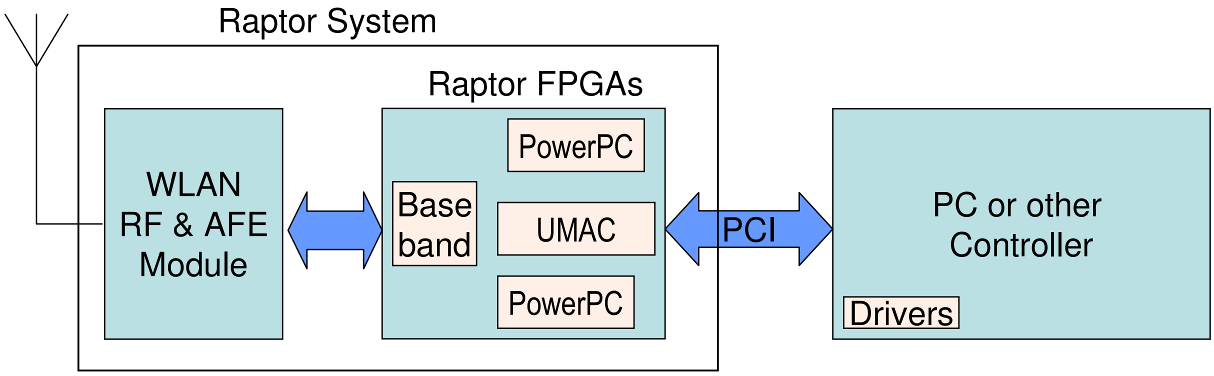

Figure 3 IEEE 802.11n prototype with Raptor board

4.1.1 Summary

- Contact: Infineon.
- Connectivity to OMEGA extender: internal to the Raptor card.
- Coverage range and PHY data rate:
  - 10-70 m
  - V1: 150 Mbps, V2: 450 Mbps (planned)
- Physical size: PCI card
- Interface: PCI socket
- Power: via PCI
- Number of instances for demo: 1/Raptor card
- MAC layer: UMAC, internal to Raptor card
- MAC QoS parameters interface: OpenPP, see D2.3 chapter 3.5

4.1.2 Conclusion

IEEE 802.11n is a critical feature to show handover, as Wi-Fi could be expected for maximum wireless coverage.

4.2 60 GHz

4.2.1 Summary

- Contact: IHP
- Connectivity to OMEGA extender: Gigabit Ethernet
- Coverage range and PHY data rate
  - Current maximum 10 m
  - V1: 100 Mbps, V2: ~1 Gbps

- Physical size: 30 cm x 30 cm
- Interface: Gigabit Ethernet
- Power: Dedicated power supply
- Number of instances for demo: 1
- MAC layer: Mini MAC based on IEEE 802.15

4.2.2 Conclusion

60 GHz in its 1Gbps configuration is only for short range coverage, it should be used for ultra-high data rate transmissions in one room.

4.3 MAC and Inter-MAC interface

The interface between the radio MACs and the Inter-MAC will be specified in deliverable D2.5 [OMD2.5], which will be available in November 2009.

5 PLC Media

5.1 MAC and Inter-MAC interfaces

The goal of this section is to describe the interface between PLC MAC and Inter-MAC. This description will be divided into three parts:

- Reporting from PLC-MAC to Inter-MAC: what kind of information will be sent from PLC MAC to Inter-MAC
- From Inter-MAC to PLC-MAC: Inter-MAC resource reservation is required to PLC MAC layer
- Exchange format: what type of frames will be used with what type of physical interfaces

5.1.1 From PLC-MAC to Inter-MAC

In this section, a description of available information that will be transmitted from the PLC MAC to the Inter-MAC will be made, with the goal to give to the Inter-MAC a report about the PLC link. Main information used will be:

- Bit Loading Estimate (BLE): this quantity represents the number of data bits that can be carried over the channel per microsecond. It takes into account FEC and guard interval redundancy but does not take into account delimiter or protocol overhead. It can also take different values over a beacon period (40ms @50Hz). BLE represent an interesting metric because
  - It aggregates most of channel characteristics to compute capacity
  - Abstract physical layer characteristics => can be used for any technology
- Number of MSDUs / octets / segments / PHY Blocks transmitted or received
- drops / retries / failures
- Number of PHY frames / Number of bursts
- Latency statistics

5.1.2 From Inter-MAC to PLC-MAC

For resource reservation, Inter-MAC must ask the PLC MAC what are the needs. The idea is to use the Connection SPECification (CSPEC) for the Inter-MAC to ask for its specific requirements. Main points available are:

Many parameters can be specified to ask for new link or to negotiate QoS:

- Delay/Jitter bound
- Average / Maximum MSDU size
- Min / Max / Average data rate (not including MAC and PHY overhead)
- Smallest tolerable average data rate
- Min / Max time between two TX opportunities
- MSDU error rate
- Exception policy / max inactivity time

Also include Connection Description:

- IP source/destination addresses and protocol

Upon reception of a CSPEC, the bandwidth manager is responsible for resource allocation:

- If requested CSPEC cannot be met, an alternate CSPEC can be proposed.
- Link quality is monitored and application should be warned if CSPEC is violated. In that case a new CSPEC may be proposed by the Inter-MAC to reconfigure the connection.

The connection specification provides a format for resource reservation that supports many scenarios for link creation, negotiation, maintenance.

5.1.3 Exchange format and physical interface

For the data plane, the retained proposal is to use Gigabit Ethernet as physical interface between PLC and Inter-MAC platform.

For the control plane, the idea is to use Management Messages (MM) over Ethernet to exchange information from Inter-MAC to PLC and from PLC to Inter-MAC. Main advantages of using such a format are:

- MM are Ethernet frame using a specific Ethertype
- Format proposition is available, can be detailed when needed
- No need for a second hardware link
- simplify prototyping and development,
- MM can be bridged easily

The full description of frame format and management messages complete list will be detailed later.

Figure 443 illustrates Inter-MAC and PLC-MAC interfaces.

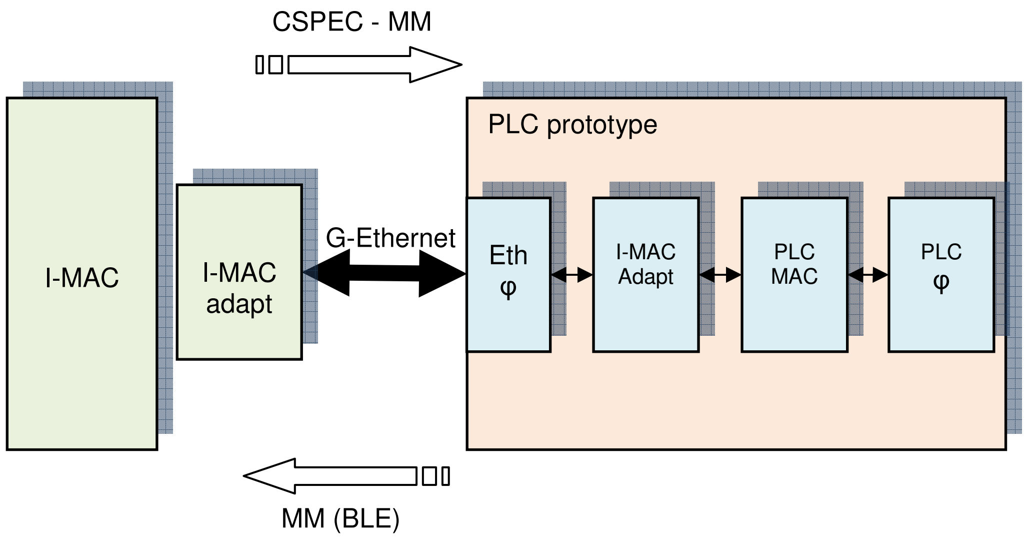

Figure 4 Inter-MAC – PLC-MAC exchange overview

5.2 Demonstrator v1

The first version of OMEGA-PLC demonstrator will be real-time oriented including Inter-MAC adapter block and will be delivered end of 2009. The proposal is based on SPiDCOM HomeplugAV chipset and specific firmware. The main limitation will be the maximum throughput that will be 300 Mbps for the physical layer. A description of the main blocks of this prototype board is depicted in Figure 554. Each prototype is reconfigurable in Tx or Rx mode.

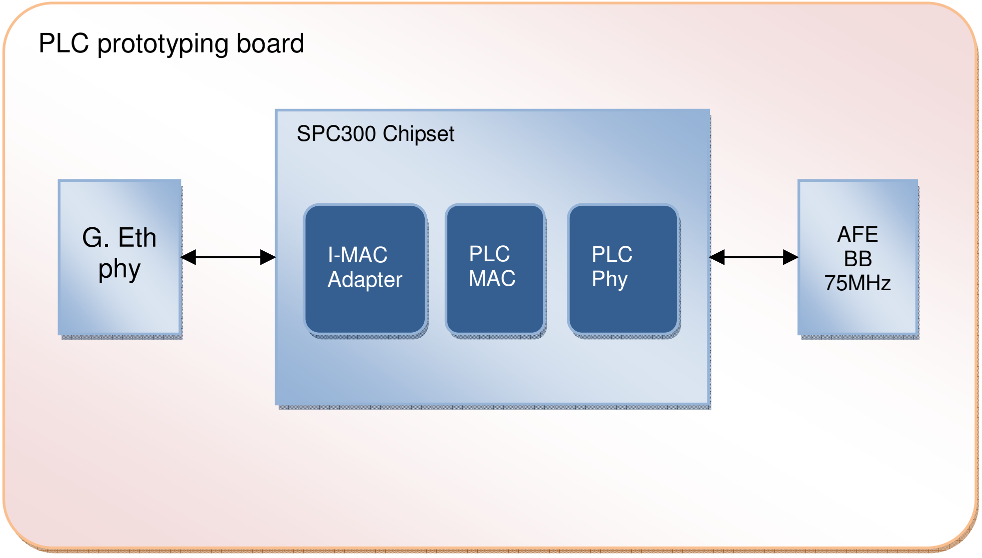

Figure 5 v1 PLC demonstrator

5.3 Demonstrator v2

For the second generation of the PLC prototype, scheduled for the end of year 2010, two different versions of the demonstrator will be delivered:

- A real-time oriented demonstrator
- A physical layer oriented demonstrator which will allow demonstrating the feasibility of a high rate transmission over PLC network.

5.3.1 Real-time oriented v2 demonstrator

It is basically the one previously mentioned in section 5.2 including the lasts improvements and evolution of Inter-MAC functionalities inside the Inter-MAC adapter block.

5.3.2 Physical layer oriented v2 demonstrator

This prototype aims to demonstrate the feasibility of Gigabit/s bitrate in the physical layer. A description is shown in Figure 665: a PC is used to host a prototyping board and software pre and post processing. Main functionalities can be divided into three parts:

- An Analog Front End board: a baseband architecture will be used at the sampling frequency of 200 MHz. This board is configurable in Tx or Rx direction in a half duplex mode, meaning that Tx and Rx are not used simultaneously. It contains also Tx and Rx filters and programmable gain amplifiers.
- An FPGA board containing
  - A sample memory where Tx or Rx samples are stored and linked with software pre & post processing.
  - Automatic Gain Controller (AGC) used in Rx mode
  - Detection & synchronization used to trigger Rx signal start
- Software pre & post processing (MATLAB or C code)
  - In Tx mode, pre processing is used to convert bit stream into time domain signal which is stored into the sample memory
  - In Rx mode, post processing is used to decode data from the time domain samples coming from FPGA sample memory.

These prototypes combine a real-time part (AFE, FPGA boards) and a non-real-time part for the software pre and post processing. The partitioning envisaged between these two parts corresponds to what is shown in Figure

665 but can be slightly modified depending on FPGA capacity. This gives an important flexibility in what can be demonstrated for the physical layer domain: several modulation schemes can be implemented and evaluated by changing software processing.

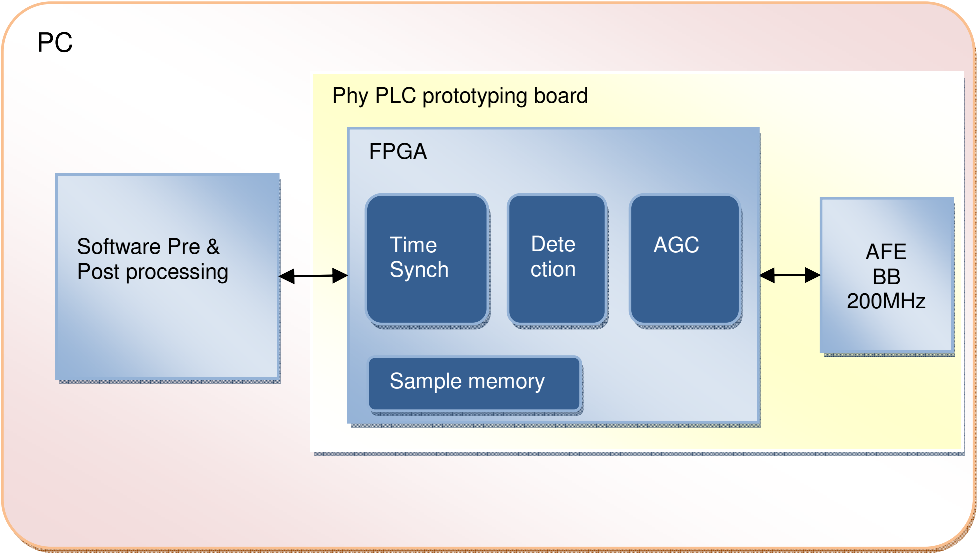

Figure 6 PHY v2 demonstrator overview

The complete equipment is shown in Figure 776.

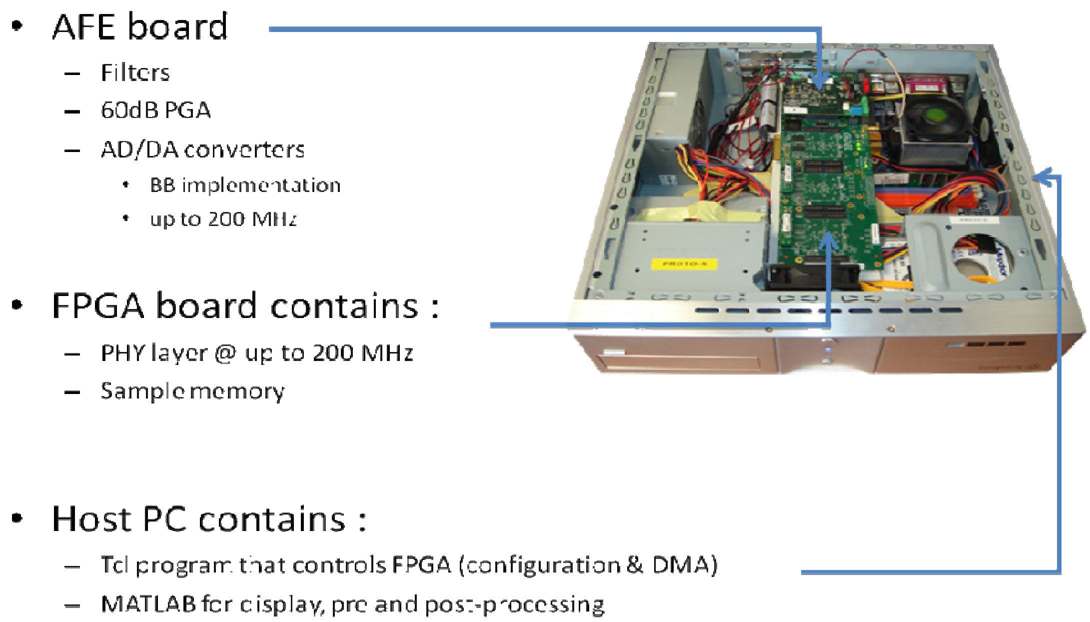

Figure 7 PHY v2 complete equipment

Hence, an example of demonstrator use is shown in Figure 887 using two PCs, PC1 being configured in Tx and PC2 in Rx mode, can be decomposed in the following steps:

1. MATLAB configures the Rx proto
2. MATLAB configures the Tx proto and launches a PhyTx test
3. The Rx proto receives the frame

4. MATLAB reads the results, processes them and displays

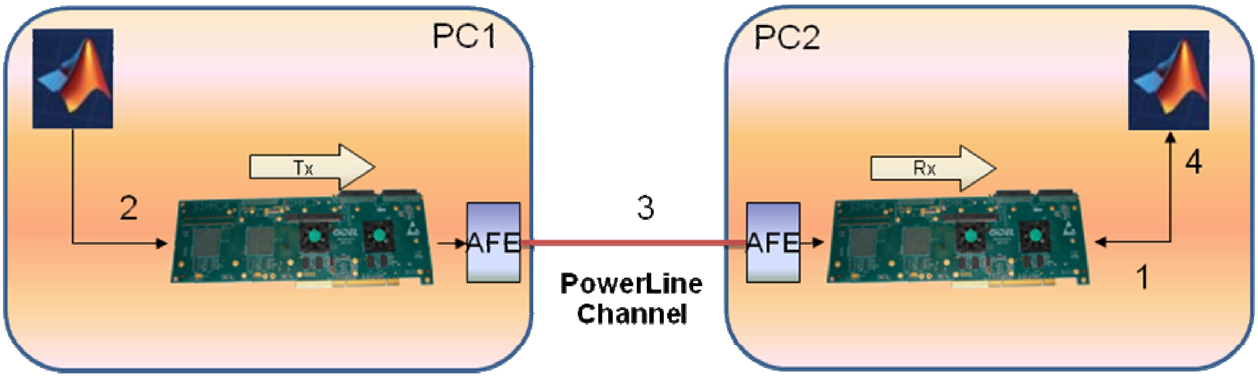

Figure 8 PLC communication setup with PHY v2 prototype

5.4 Conclusions

In this document, OMEGA PLC demonstrators were presented showing the different version of PLC demonstrator:

- Demonstrator v1
  - Real-time demonstrator including PLC physical layer, PLC MAC layer and Inter-MAC functionalities
  - Max physical layer bit-rate is 300 Mbps
  - Physical interface with Inter-MAC is Gigabit Ethernet
  - PLC-Inter-MAC exchange messages via Management Messages (MM) over Ethernet
  - Available in November 2009

- Demonstrator v2
  - Two different version of demonstrator v2 will be delivered simultaneously
  - Each of them will be available in November 2010
  - V2.1
    - Same architecture than Demonstrator v1
    - Lasts evolutions of Inter-MAC functionalities implementation
  - V2.2
    - Physical layer oriented demonstrator (No Inter-MAC interfacing)
    - Basic MAC layer implementation, no traffic bridging
    - Max physical layer bit-rate will be 1 Gbps on real PLC channels
    - Several modulation schemes can be tested by software modifications

PLC will be used as backbone between OMEGA extenders. It would therefore be very useful to have enough instances of PLC for connecting 4 raptor cards.

5.5 Summary

- Contact: Spidcom
- Connectivity to OMEGA extender: Gigabit Ethernet
- Coverage range and PHY data rate:
    - several meters, 1 Gbps
    - Initial version: 1 session at 300 Mbps
    - Next versions: >1 session with bandwidth negotiation
- Physical size: see previous sections
- Interface: Gigabit Ethernet
- Number of instances for demo: 2 boards for v1. 3 boards for v2.1 and 2 PCs for v2.2
- MAC layer: HomePlug AV
- MAC QoS parameters interface: see previous sections

6 Optical Wireless Media

HWO is split into 3 parts: Visible Light communication, Infra Red, Optical MAC, as described in Figure 998.

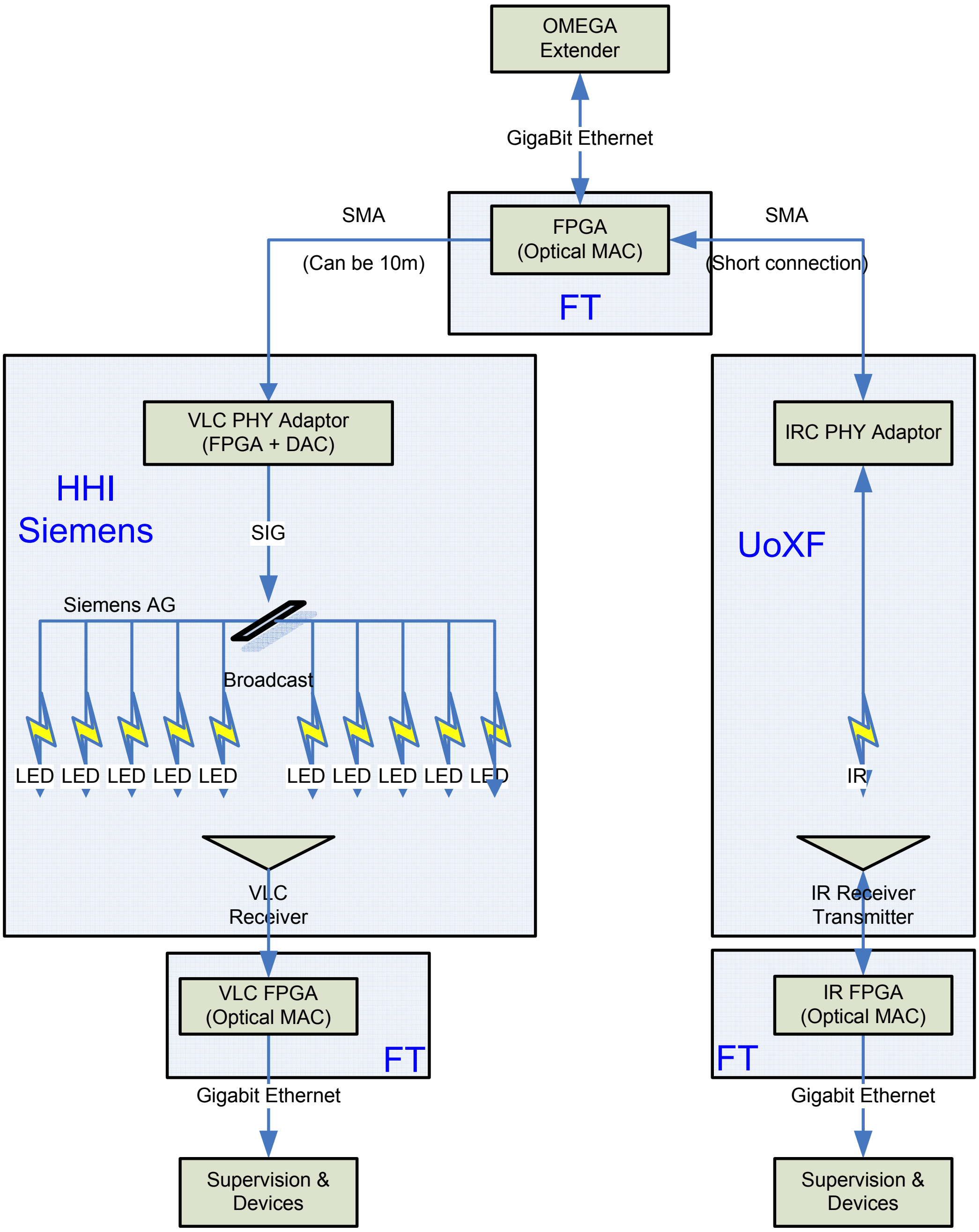

Figure 9 Optical Wireless Media

6.1 VLC

6.1.1 Summary

- Contact: HHI / Siemens..
- Connectivity to OMEGA extender: through Optical MAC FPGA.
- Coverage range and PHY data rate: 3 m, 100 Mbps, Broadcast only.

- Physical size (how to install it): 1 lamp in the ceiling for each square meter coverage, 1 receiver
- Power: 220 V for alimentation
- Number of instances for demo: 10 lamps and 1 receiver (10 sq.m. area coverage)
- MAC layer: handled by Optical MAC
- MAC QoS parameters interface: handled by Optical MAC

6.1.2 Conclusion

Due to its unidirectional constraint, VLC shall be used in very dedicated scenario to be discussed. VLC can only cover a part of the room.

6.2 IR

6.2.1 Summary

- Contact: University of Oxford.
- Connectivity to OMEGA extender: through Optical MAC FPGA.
- Coverage range PHY data rate:
  - 2 or 3 m from the ceiling
  - Initial version: up to 150 Mbps data throughput handled by the OWS. The PHY will be 1.25 Gbps line rate , with manual adjustment of IR cells
  - Later version: 1Gbps data throughput, line rate still 1.25Gbps
- Physical size (how to install it): At the moment the Demo1 devices will consist of a receiver unit of 7 channels and a transmitter unit of 7 channels, mounted in a single box that will be approximately 300 mm long and 200 mm wide and 100 – 150 mm deep. The power supplies will be external to these dimensions. For the base station the device could be mounted within the ceiling space with the front surface flush with the ceiling level. We will need to have a closer look at the false ceiling to check if this option is feasible. For the user device these will have to be free standing units.
- Power: IR units connect directly to the FT OWS via SMA and 'D' type connectors but we will need two 13 A 220 V sockets for the base station device and also two 13 A 220 V sockets for the user device.
- Number of instances for demo: 1 emitter unit consisting of 7 channels and 1 receiver unit consisting of 7 channels, both at the ceiling and at the user device to form a bi-directional link.
- MAC layer: handled by Optical MAC
- MAC QoS parameters interface: handled by Optical MAC

6.2.2 Conclusion

As installation will be heavy, only a small area is expected to be covered by IR. Anyway, high data bit rates could be experienced in such area.

6.3 Optical MAC

6.3.1 Summary

- Contact: France Telecom.
- Connectivity to OMEGA extender: Gigabit Ethernet.
- Coverage range and PHY data rate: NA
- Physical size (how to install it): 3 FPGA boards + power supply
- Power:

    - VLC : 10 single power supplies to feed all the lamps therefore it will be necessary to use multiple power sockets for distribution => more than one power plug available in the ceiling area and at least one power outlet in the ground area (underneath the VLC-lamps).
    - IRC : 4x13A 220V sockets for the base station device and also 4x 13A 220V sockets for the user device.
  - Number of instances for demo: 3 FPGA boards.
  - MAC layer: Optical MAC FPGA SW
  - MAC QoS parameters interface: RSSI can be provided as link metric

6.3.2 Conclusion

Optical MAC FPGA boards will allow integrating separately HWO from the rest of the system. Moreover, FPGA boards will provide an interface to a connection supervision PC.

As a constraint, all HWO equipment shall be located close together.

7 OMEGA Extender

OMEGA Extender is made of:

- a Raptor card (physical part)
- an Inter-MAC software layer (heart of OMEGA system)

7.1 Raptor card (physical part)

  - Contact: Infineon, University of Paderborn
  - Number of cards available for demo: 4
  - Physical size (how to install it): embedded on a PC
  - Power consumption and connectivity materials: less than 100 W, inside a PC

7.2 Inter-MAC software layer

Inter-MAC is currently expected to be made of following software bricks:

- Media Inter-MAC adapters to Gigabit Ethernet or an OMEGA Technology
- Forwarding Engine
  - Including a Forwarding Table
  - Enriched potentially with Encryption Engine, Neighbour Authentification and Security Management Client (for security purposes)
- Path Selection
  - Path Selection Engine
  - Path Selection Table
- Quality of Service
  - QoS Mapper
  - Admission Control
  - Interface to Physical Media MAC
  - Interface to Network layers
- Handover
- Monitoring engine
  - Including an Information Database
- Implementation
  - Refer to: Open source (OpenPP) see D2.3 chapter 3.5

8 Platform Line-up

8.1 V1 and V2 capabilities

Technology	V1 PHY data rate	V2 PHY data rate	Range	Comments
IEEE 802.11n	150 Mbps	450 Mbps (planned)	10 – 70 m	
60 GHz	100 Mbps	1 Gbps	10 m	
PLC	300 Mbps	Close to 1 Gbps	Large	V2 will embed MATLAB simulation

VLC	100 Mbps	100 Mbps	3 m	Broadcast only
IR	150 Mbps	1 Gbps	3 m	
Total	100 Mbps typical	Up to 1 Gbps		

Table 2: Bandwidth capabilities

Table 2 shows a summary of achievable PHY data rates and typical coverage range for both V1 and V2 demo:

8.2 Requirements Matrix Compliancy

Requirements	Overview	Compliancy
WP1.1: access to Gigabit network	An OMEGA Extender is connected to the Home Gateway. The Home Gateway is connected to FTTH and provides Gigabit services to the HAN.	Demonstrate Gbps in the network without Inter-MAC V1: 100 Mbps V2: 1 Gbps
WP1.2: more than one HDTV channels can be watched in an OMEGA network	Equipment for watching HDTV must be connected to media via OMEGA extenders.	V1: 1 or 2 channels due to 100 Mbps limit V2: no limit
WP1.3: connectivity everywhere in the home	OMEGA extenders and media connected to them shall cover the entire show room, also considering a meshed network.	Enhance Gbps with OMEGA in meshed network
WP1.4: unified Home Area Network with continuity of services	Inter-MAC handover functionality shall be successfully operating. Equipment connected to the Inter-MAC shall be capable to demonstrate from which media it receives its data.	If device is connected closer to OMEGA device, it can achieve higher data rates: nomadic equipment in the room will stay connected.
WP1.5: guaranteed QoE / QoS	Inter-MAC QoS / QoE feature shall be functional, and exported to supervision devices. Application connected to the Inter-MAC (through its network layer) shall be capable to show QoS information as reported by Inter-MAC.	OMEGA device contributes to Gbps penetration: if an OMEGA extender is reachable, QoS and QoE induced by this extender can be shown.
WP1.6: easy setup and installation	As installed in the showroom, connection of equipment to media shall appear simple.	V1 and V2 might be constituted by a lot of open cards and PC like equipment, so easy setup and installation might not be fulfilled.

Table 3: Overview of requirements

8.3 What to demonstrate

According to compliancy statements described in Table 3, the demonstrator will aim to show:

- Demonstrate Gbps in the network without Inter-MAC
- Enhance Gbps with OMEGA in meshed network
- If device is connected closer to OMEGA device, it gets more bandwidth
- OMEGA device contributes to Gbps penetration

The demonstrator will then:

- provide a meshed network
  - meaning at least 3 extenders to be used as nodes

    - OMEGA nodes will be interconnected with more than 1 OMEGA technology, in order to be able to disconnect one
        - So handover can be demonstrated
- connect the OMEGA raptor nodes to application directly
    - so this application + raptor is seen as an OMEGA device
    - the application will display QoS
    - the application can show services
        - Video with STB
        - Data with other application
- A nomadic device connected to a raptor will be used as nomadic OMEGA device to show
    - Connectivity
    - Guaranteed QoS / QoE
- An additional device can be added in the network
    - So QoS for nomadic device is increased.

8.4 Line-Up Proposal

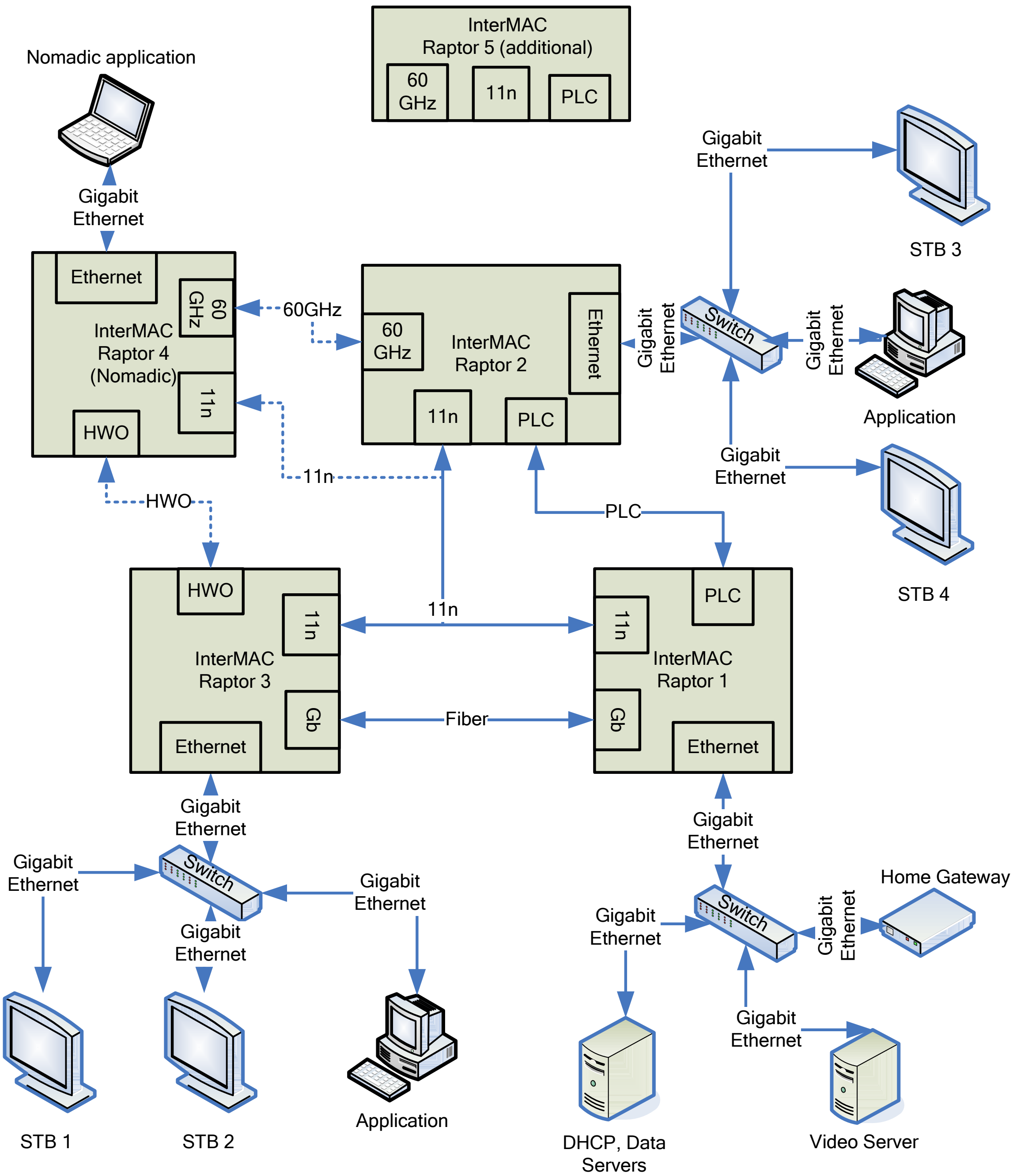

Figure 10 Platform Line-Up

Figure 10109 shows a proposal for platform line-up:

- Meshed network is composed of Raptor cards 1, 2 and 3 (acting as OMEGA Extenders and OMEGA End Devices)
  - Use of radio communication, PLC and HWO will allow to show multiple paths
  - Disconnecting Fiber will allow to show handover
- Raptor cards 1, 2 and 3 also embed legacy adapters to connect to legacy devices:
  - STB behind a switch

  - Servers and Gateway behind a switch
  - Other application
- Raptor card 4, with HWO, IEEE 802.11n and 60GHz interface and a legacy device adapter also, constitute a nomadic OMEGA End Device
  - Check connectivity in the home using all wireless technologies
  - Move the nomadic equipment to show change in QoS/QoE
- Raptor card 5 could be added, providing only PLC, 60GHz and 802.11n in order to show extension of the network, acting as an OMEGA Extender.
  - Raptor card is included / removed in / of the OMEGA network by un/plugging PLC
  - Nomadic device shows effect of adding / removing Raptor card 5

9 Conclusion

This proposal covers line-up for V1 and V2. Final outline for demonstrator is to be found in D7.3 Demonstrator document.

In addition, based on this line-up, D7.2 Platform Services document can be built, defining which nomadic applications can be used.

For V2, updates due to change request out of the OMEGA consortium or due to technical reasons will be done in accordance with the management handbook.

10 References

[OMD11] ICT-OMEGA Deliverable D1.1 "Final Usage Scenarios Report," September 2008, available at http://www.ict-omega.eu/fileadmin/documents/deliverables/OMEGA_D1.1.pdf

[OMD23] ICT-OMEGA Deliverable D2.3 "Hardware/Software requirements (radio)," April 2009, available at http://www.ict-omega.eu/fileadmin/documents/deliverables/OMEGA_D2.3.pdf

[OMD25] ICT-OMEGA Deliverable D2.5 "Performance report of the radio convergence adapter," will be available in November 2009

[OMWP] ICT-OMEGA White Paper "Inter-MAC concept for Gbps Home Network," April 2009, available at http://www.ict-omega.eu/publications/white-paper.html