Enhancement and convergence of high-rate radio technologies

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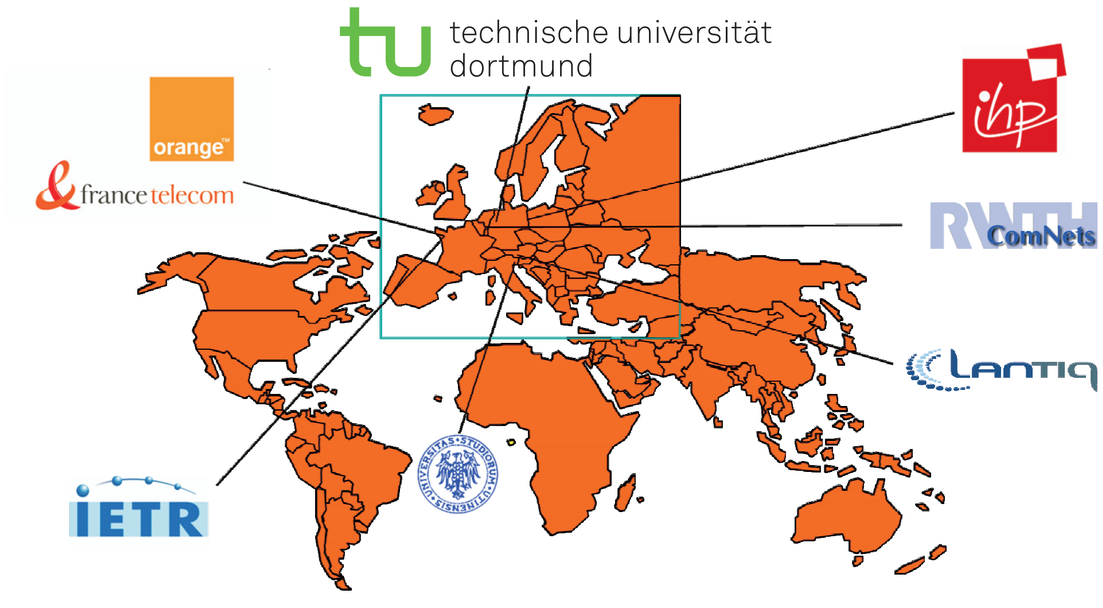
OMEGA radio communication (WP2)

- Largest work package of FP7 IP OMEGA
- Runtime: January 2008 – December 2010
- Total resources: 340 PMs
- Seven European partners from industry and academia



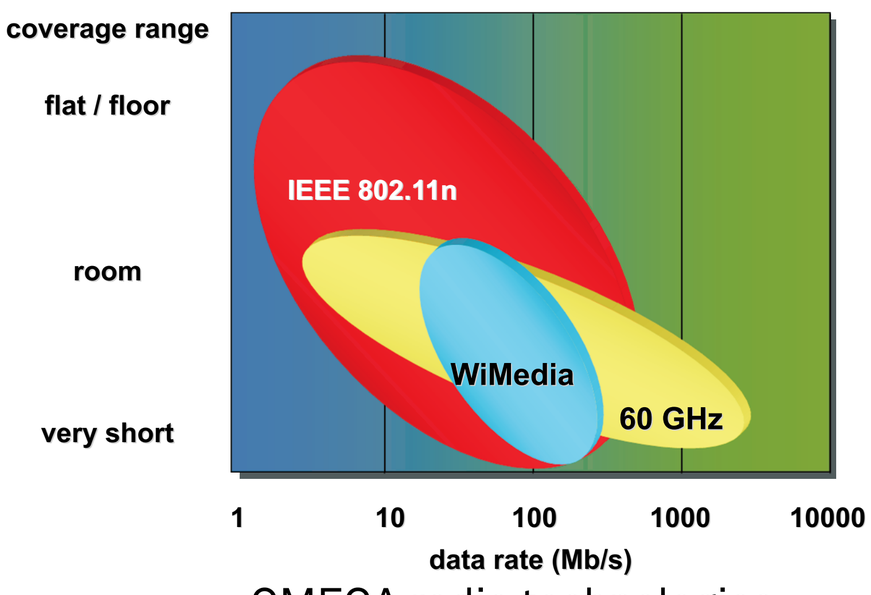
OMEGA WP2 objectives

Due to the trade-off between data rate and coverage range inherent to radio systems, only a mixture of different radio technologies trimmed to the different classes of applications can fulfil the customer‘s demands to the desired extent. Therefore, OMEGAs objectives are:

- Seamless convergence of heterogeneous radio technologies
- Provision of gigabit throughput
- Satisfy QoS without any effort for the user
- Reduce power consumption
- Compatibility to existing devices

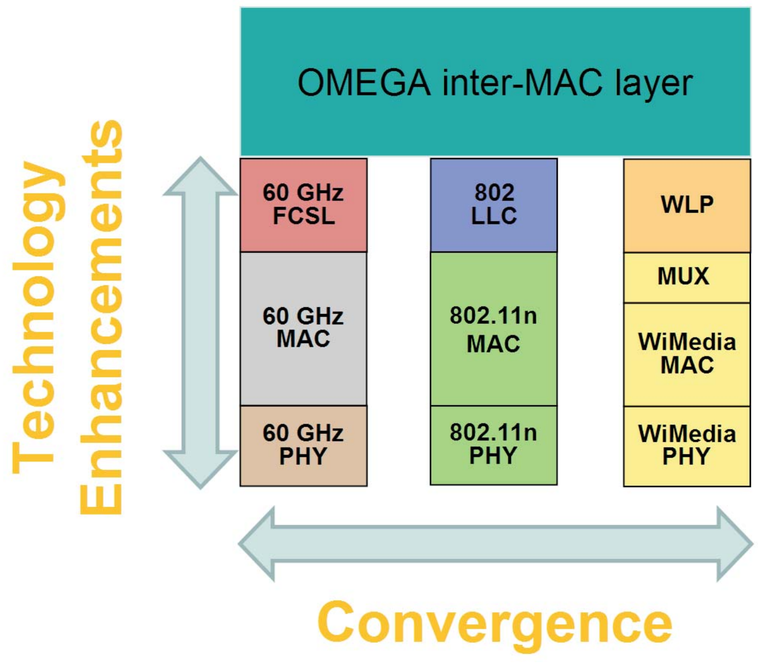
OMEGA radio technologies

The considered radio technologies comprise state-of-the-art systems like WLAN (IEEE 802.11n), emerging systems based on WPAN UWB (WiMedia) and systems at development stage like WPAN 60 GHz.



OMEGA radio technologies

OMEGA WP2 research directions



- **Physical layer**
  - Link adaptation
  - Single-user MIMO
  - Advanced PHY processing elements
  - 60 GHz PHY
- **MAC layer**
  - Radio convergence adapter
  - Resource allocation and scheduling
  - Meshing
  - Adaptations to in-house conditions
- **Cross-layer**
  - Simultaneous transmissions with multi-user MIMO
  - Interference mitigation techniques and soft-spectrum management
  - Joint optimization of MAC and PHY
  - Energy Efficiency
  - Self-organizing, cooperative radio networks

OMEGA WP2 demonstrator

The most promising designs will be integrated into radio proof-of-concept prototypes which will be integrated into to the overall OMEGA platform.

- Low cost of manufacturing and integration
- Ability to operate in a wide spectrum (1-60 GHz)
- Ability to coexist with a number of RF devices
- Optimized MAC-PHY Interface
- Physical convergence:
  Combined 60 GHz/WiMedia Platform

Acknowledgement

The research leading to these results has received funding from the European Community's Seventh Framework Programme FP7/2007-2013 under grant agreement n° 213311 also referred as OMEGA.