



# SEMAFOUR

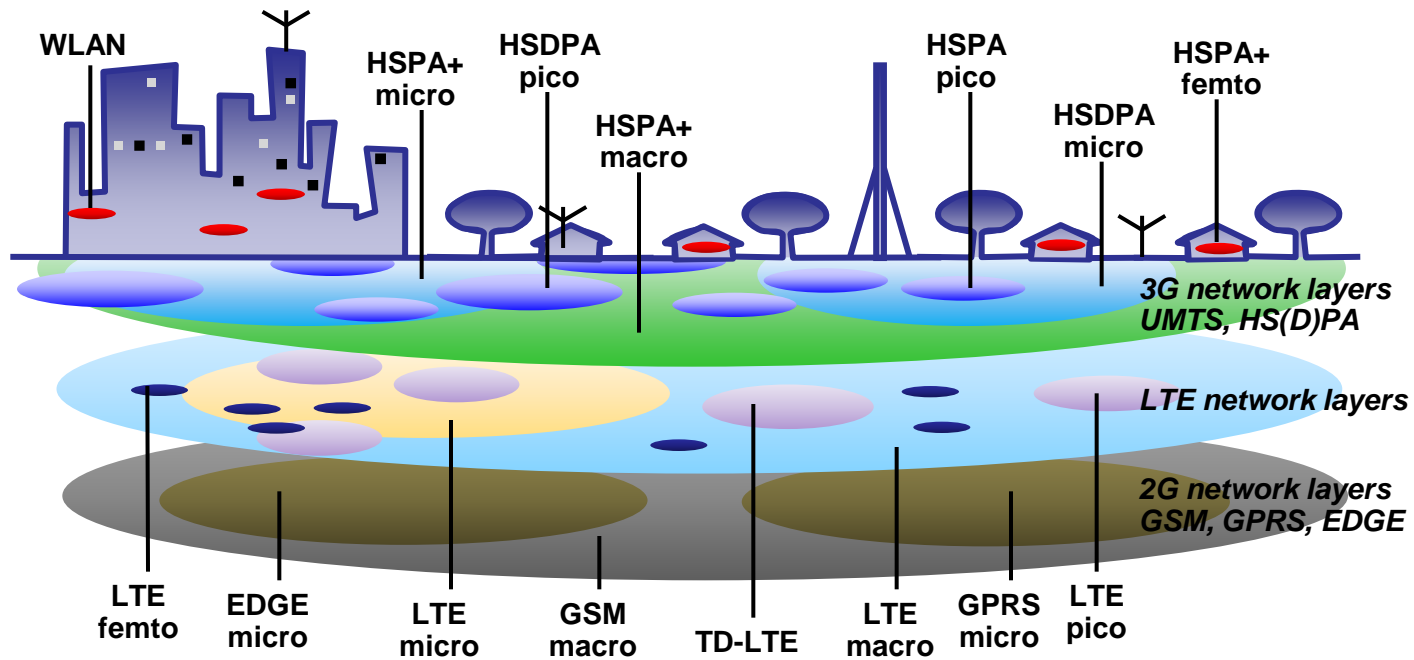
## Self-Management for Unified Heterogeneous Radio Access Networks

Future Networks 10th FP7 Concertation Meeting  
Brussels, 10<sup>th</sup> -11<sup>th</sup> October 2012

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# Overall SEMAFOUR Objective

- Design and develop a ***unified self-management system***, which enables the network operators to *holistically manage and operate* their heterogeneous access networks comprising multiple RATs and layers, *governed by general network-oriented objectives* that consider the tradeoffs between service quality, coverage, flexibility and resource efficiency



- **Develop concepts, methods, algorithms for selected set of SON functions.**
  - SON-functions in multi-RAT and multi-layer networks
  - Governed by general network-oriented objectives
- **Develop concepts, methods algorithms for an integrated SON management.**
  - Policy transformation and supervision
  - Operational coordination of multi-RAT and multi-layer SON functions
- **Design and develop a suitable architecture**
  - Incorporating the developed self-management solutions
  - Considering the network heterogeneity and large number of cells.
- **Develop a demonstrator**
  - For proving, through simulation in realistic scenarios, that the vision, concepts, methods and algorithms developed within the project provide significant benefit.
- **Influence standardization**
  - In 3GPP (Release 12 onwards), IEEE 802 as well as NGMN
- **Exploration work on longer term issues (study items):**
  - A common SON management for the purpose of traffic steering,
  - A decision support system providing recommendations on network deployment and enhancements,
  - SON for shared networks, SON for future LTE and post-LTE networks.

- Project Key Performance Indicators
  - Considerably reduce IMPEX, OPEX and CAPEX of a complex heterogeneous mobile network infrastructure through automatic configuration and optimisation
  - Increase network performance through continuous optimisation and fast failure recovery, and a co-ordinated simultaneous operation of a large variety of SON-functions
  - Allow the network operator to control and supervise the heterogeneous infrastructure in an integrated way through high-level objectives
- Uniqueness
  - SEMAFOUR focuses only on SON enhancements for future networks, i.e., it is not just some optional extra part considering SON aspects
  - The project is driven by the industry requirements from the major operators
  - It combines leading telecoms vendors, together with proven research institutes and SMEs to develop solutions for these requirements.
- Opportunities:
  - The project aims to take SON to the next level. This potentially will lead to:
    - Enhanced global 3GPP SON standards
    - A new generation of innovative SON products
    - Improved manageability in terms of performance and cost for future mobile networks



# SEMAFOUR

## Support Slides

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- Project Website: [www.fp7-semafour.eu](http://www.fp7-semafour.eu)
- Project Coordinator: Nokia Siemens Networks, Munich, Germany
  - Project Leader: Dr. Colin Willcock, [colin.willcock@nsn.com](mailto:colin.willcock@nsn.com)
  - Technical Manager: Lars Christoph Schmelz, [christoph.schmelz@nsn.com](mailto:christoph.schmelz@nsn.com)
- Funding Programme: FP7 Call 8
- Funding Scheme: STREP
- Project start date: September 1<sup>st</sup>, 2012
- Project end date: August 31<sup>st</sup>, 2015
- Total project cost: 6.124.521 EURO
- EU project funding: 3.818.000 EURO
- Total effort planned: 499,5 Person Months
- Call identifier: FP7-316384

**Need for network performance, reliability, flexibility, efficiency**  
*(quality of service / experience, failure & disaster prevention & recovery, diversity & dynamics of services, energy savings, OPEX/IMPEX reduction, etc.)*

**Complexity of future mobile network environments**  
*(network heterogeneity, network sharing, multi-vendor deployments, uncoordinated deployments / limited control over infrastructure etc.)*

**Need for management automation**

**(initial SON deployments: independent SON functions for self-configuration, self-healing, and self-optimisation)**

**Overcome limited State-of-the-Art of existing SON solutions**  
*(single-RAT, single-layer, uncoordinated functions, missing policy transformation)*

## SEMAFOUR

**Unified self-management system efficiently operating a heterogeneous mobile network comprising a multitude of radio access technologies and layers**

# Role and specific contribution of each partner

- Nokia Siemens Networks is a major network vendor bringing commercial network knowledge to the project. In addition NSN has the role of overall Project Coordinator and leader of the crucial WP5: Integrated SON Management



- atesio is an SME located in Berlin, Germany, which specializes in planning and optimisation services for telecommunications and provides the project with research excellence. atesio is one of the key research partners in the project.



- Ericsson is a leading network vendor and will bring commercial network knowledge into the project. In addition Ericsson will lead the critical WP4: SON for Future Networks



- iMinds (formerly IBBT) is an independent research institute which provides telecommunications research expertise and dissemination experience. iMinds will lead WP6: Dissemination and Exploitation





# Role and specific contribution of each partner

- Orange is a major international telecommunications operator who provides key insight into the real industrial issues. Orange will lead WP2: Requirements, Use cases and Methodologies.
- Telefonica is a major international telecommunications operator who provides key insight into the real industrial issues.
- TNO is a non-profit research organisation with strong knowledge and broad experience with respect to mobile networking in general, radio resource management, network performance and QoS provisioning in mobile/wireless networks. TNO will lead WP3: Demonstrator.
- TUBS will carry to the project apart to its experience on radio network planning and optimisation in general, and its knowledge of various radio access technologies. TUBS will take the role of a key research partner.

