METIS II overview

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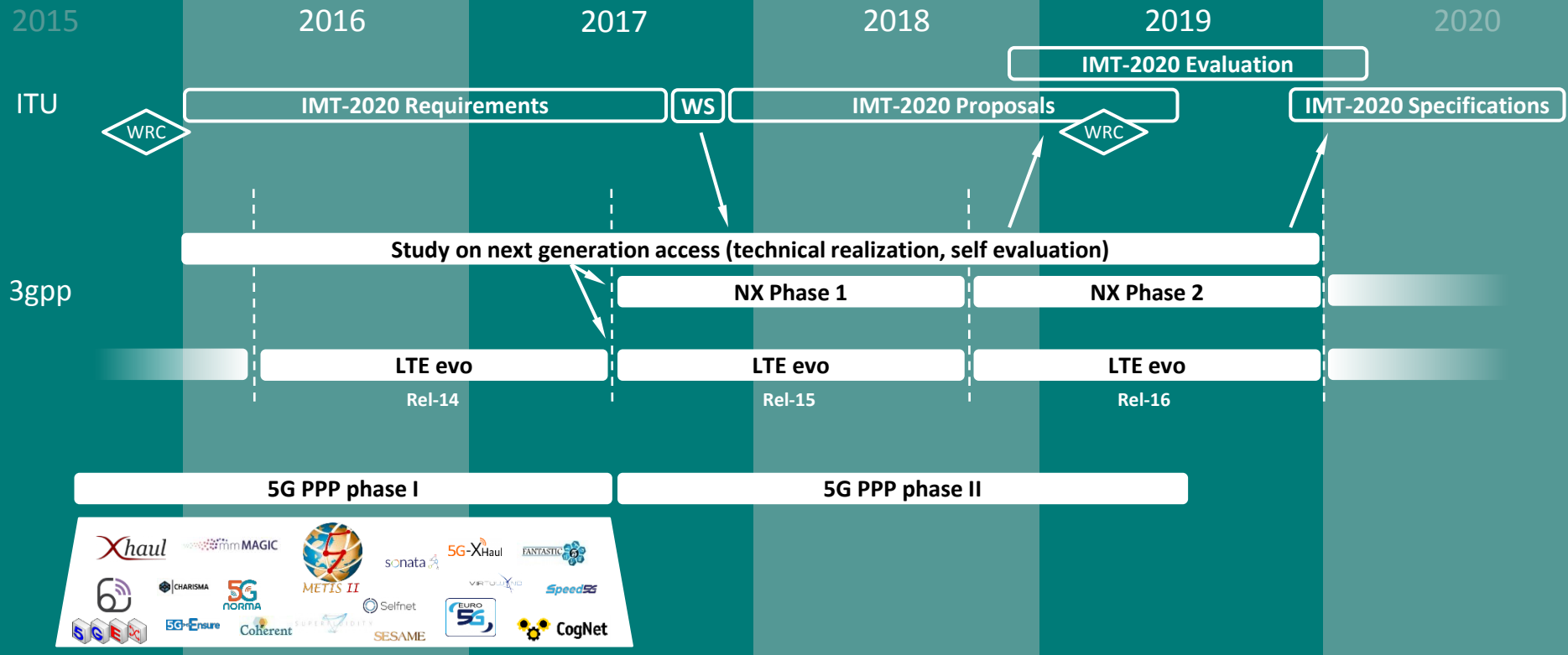
METIS-II objectives

1	Develop the overall 5G radio access network design Special focus on pre-standardization
2	Provide the 5G collaboration framework within 5G-PPP for a common evaluation of 5G radio access network concepts
3	Prepare concerted action towards regulatory and standardization bodies

METIS-II IN CONTEXT



19 partners, world-wide

Operators

NTT Docomo, Orange, DTAG, Telefonica, Telecom Italia

Vendors

Ericsson, Nokia, Huawei, Alcatel-Lucent, Samsung, Intel

Academia, Europe

KTH (Stockholm), Uni Valencia, Uni Kaiserslautern

Small and Medium Enterprises

iDate, Janmedia

Non-European partners

NYU, Winlab, ITRI

Project coordinator Olav Queseth, Ericsson

Technical manager Patrick Marsch, Nokia

5G RAN design

The METIS-II 5G RAN design will comprise

- the **potential spectrum usage** foreseen for 5G
- the **air interface variants** expected to be introduced in 5G or evolved from legacy
- describe **integration variations of air interfaces** (extent of harmonization, protocol level of aggregation et cetera)
- **a comprehensive control and user plane design** of a 5G RAN, to the level of detail of ‘technology readiness level 2’

Key innovation pillars

Holistic spectrum management architecture

Holistic air interface harmonization framework

Agile resource management framework

Cross-layer and cross-air-interface access and mobility framework

Common control and user plane framework

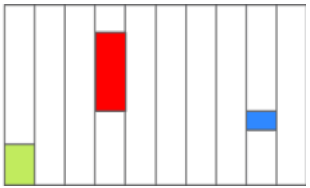
METIS-II Cross-AI Access and Mobility Framework

- Future proofness for efficient standardization process and Energy Efficiency for sustainable networks
- Support for services with diverging performance requirements and network slicing at the 5G RAN
- Support for a high diversity of propagation conditions (incl. mmWave with challenging propagation)

Lean design

- Ultra-lean, self-contained and beam-based signals
  - Support access procedures and mobility (e.g. detection / synchronization and neighbor measurements)
  - Ultra-lean for energy efficiency → minimization of broadcasted signals i.e. dedicated transmissions
  - Self-contained for future proofness → less occupancy of channels for the introduction of new services
  - Beam-based → compensate for spotty coverage in higher frequencies

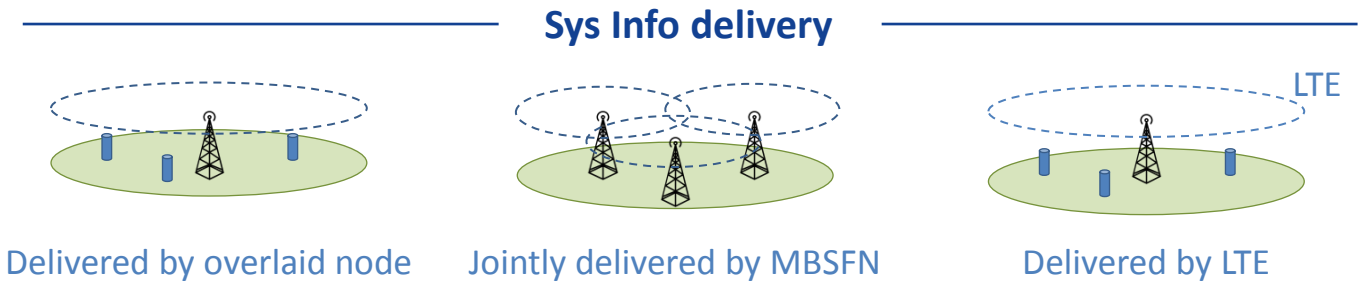
Ultra-lean



Self-contained

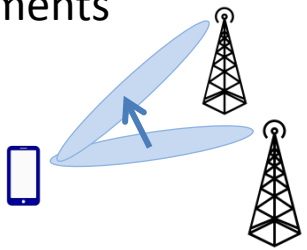
System access

- New System Access Schemes
  - New ways to distributed system info
    e.g. minimize broadcast for energy efficiency
  - System Control plane split from UP
  - 5G Sys info distributed over LTE

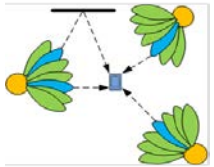


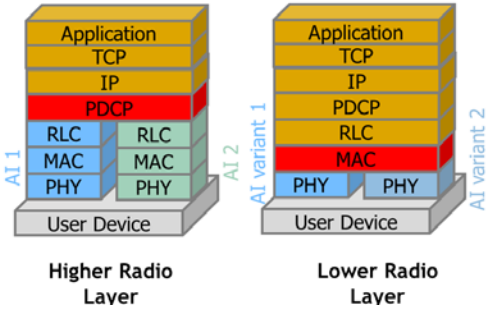
Multi-connectivity and mobility

- New Multi-connectivity and Mobility schemes
  - Support for RAN-based multi-RAT multi-connectivity (incl. evolved LTE)
  - UP/CP features: aggregation, switching, diversity
  - Beam-based mobility and multi-connectivity for Ultra-Reliability
  - Multiple protocol aggregation alternatives being investigated
  - Centralized and distributed deployments



Beam-based mobility

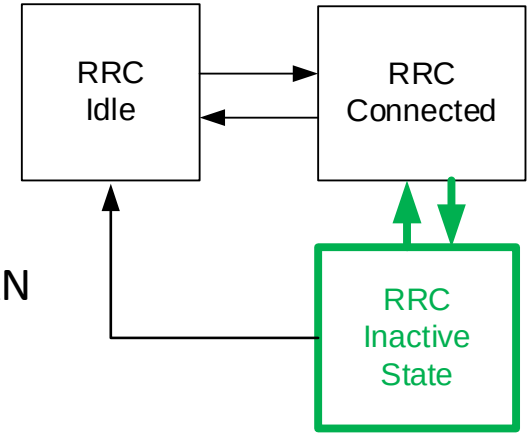




Beam-based multi-connectivity

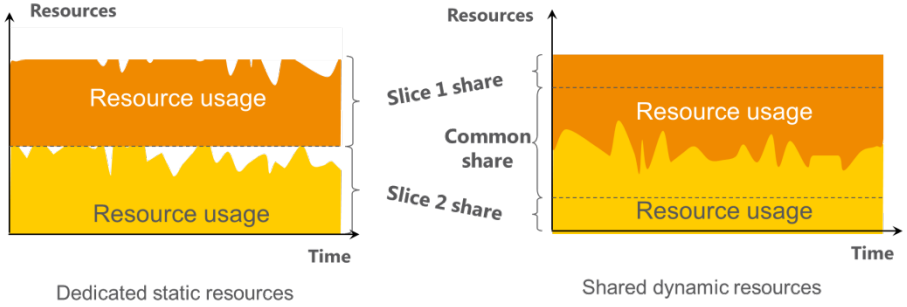
System Access and States

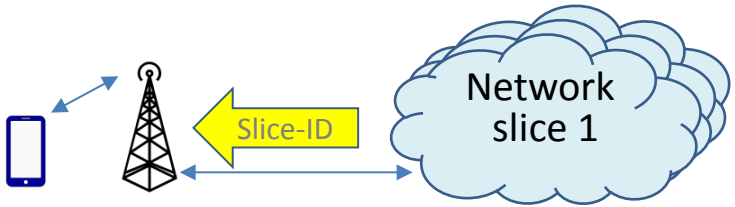
- New Connected (Inactive) State
  - Optimized for UE battery savings (inactivity) with UE-based mobility
  - RAN-based paging (optimized for semi-static devices)
  - Enabling fast transition to active (RAN context stored) which happens very frequently
  - Can be optimized for different slices and devices based on RAN information



Network Slicing

- E2E network slicing is about supporting multiple logical network on the same physical infrastructure
- RAN impact of network slicing
  - Handling of common resources (radio channel, hardware, etc.)
  - Awareness of slicing (or some other abstraction level) in the RAN
  - Mechanism for prioritization of traffic
  - Protection / isolation (e.g. access barring, overload control, etc.)

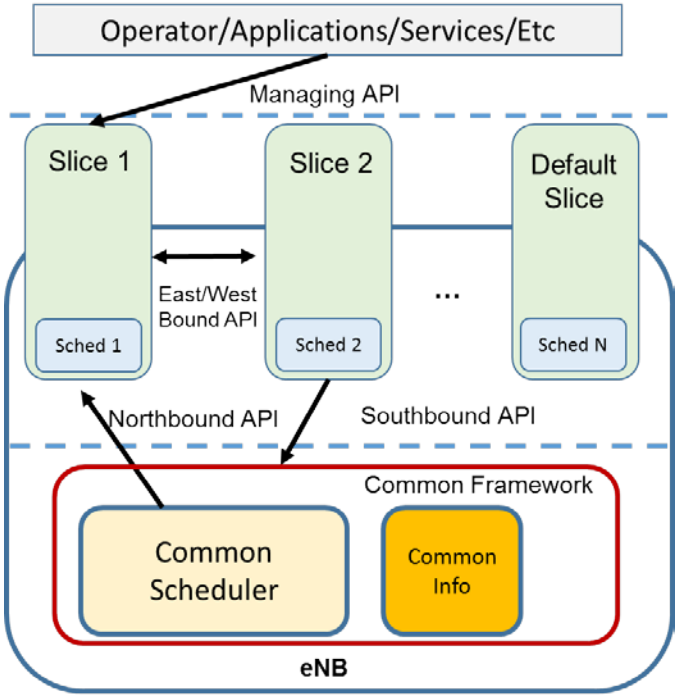




Network Slicing cont'd

WINLAB @ Ericsson collaboration

- Scheduling strategies enabling RAN network slicing
  - Scheduling programmability / configurability for slice owners
  - Common scheduler vs. Coordinated dedicated schedulers
  - Investigation of different levels of abstractions (APIs)
- Investigation on LTE but aiming at 5G design
- Concept work + prototyping on ORBIT
- To be delivered in Q1 2016 as a METIS-II work



Summary

The METIS-II project is a major and global contributor to the development of 5G technologies

The standardization work in 3GPP is starting

Attention to designs that are flexible and future proof, leaving room for future requirements, new research findings and great innovations

Thank You

http://www.metis2020.com