

OmniRAN

Introduction and Way Forward

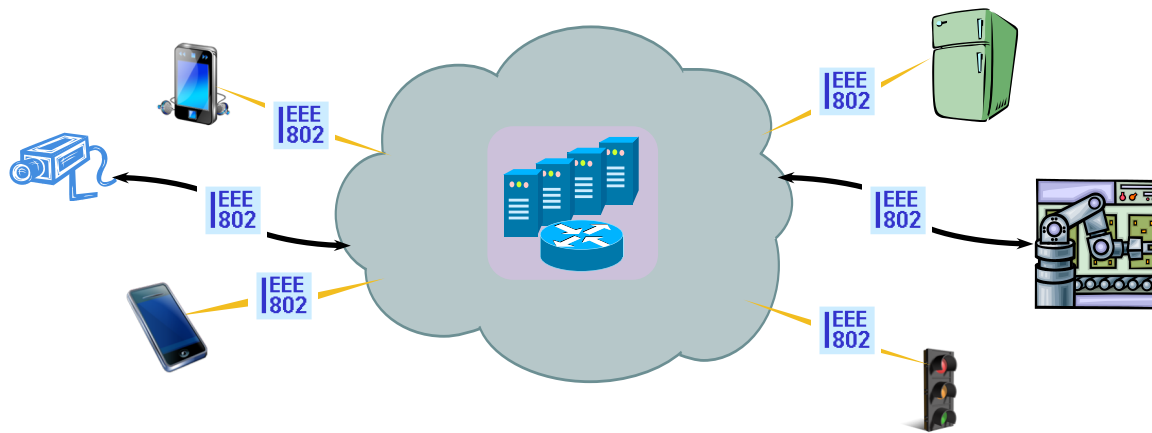
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Max Riegel

(OmniRAN SG Chair)

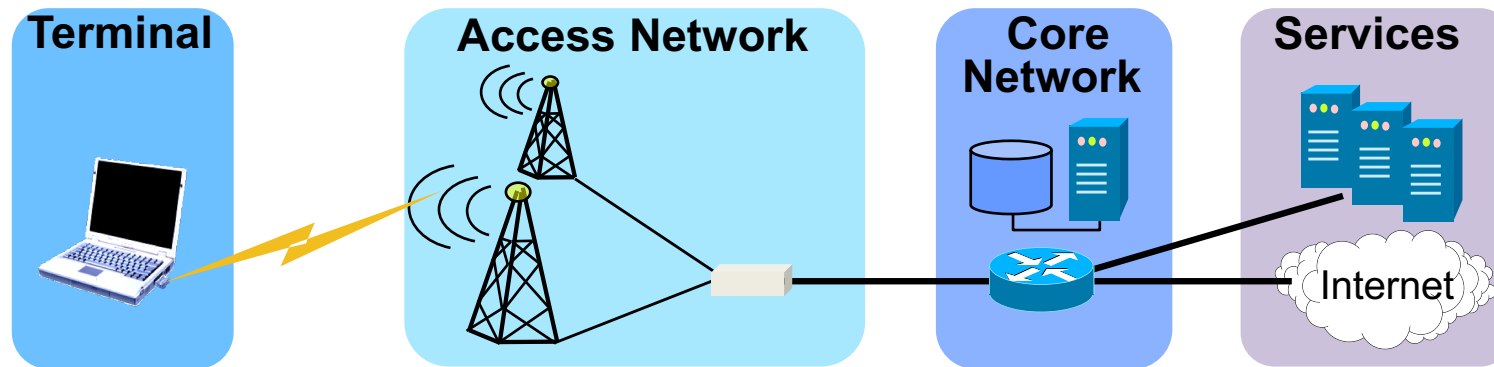
OmniRAN

- OmniRAN is about attaching terminal devices deploying IEEE 802 technologies to communication networks.



- OmniRAN defines interfaces and generic network functions for access networks based on IEEE 802 technologies
 - including IEEE 802.3!
- BTW: What does OmniRAN stand for?
 - **O**pen **m**obile **n**etwork **i**nterface for omni-**R**ange **A**rea **N**etworks

Dynamic attachment of terminals to networks



- Communication networks supporting dynamic attachment of terminals are usually structured into
 - Access Network
 - Distributed infrastructure for aggregation of multiple network access interfaces into a common interface
 - Core Network
 - Infrastructure for control and management of network access and end-to-end IP connectivity
 - Services
 - Infrastructure for providing services on top of established IP connectivity

Functions for establishment of end-to-end IP Connectivity

Access Network

- Network advertisement
- IEEE 802.xx PHY and MAC
- Authentication, authorization and accounting client
- L2 session establishment
 - w/ QoS and Policy Enforcement
- L2 mobility management inside and across access networks
- Local Mobility Anchor (LMA)
- Traffic forwarding to core

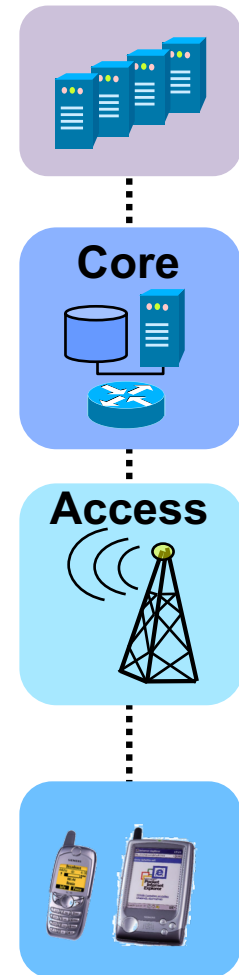
Core Network

- Authentication, authorization and accounting server
- IP address management
- Policy & QoS management based on a SLA
- Mobility among multiple access networks (MAG)
- IP connectivity establishment to Internet and services
- Roaming via other core networks

Technical issues solved for legacy communication networks. Open issues might exist for heterogeneous networks and new domains of communication network deployments.

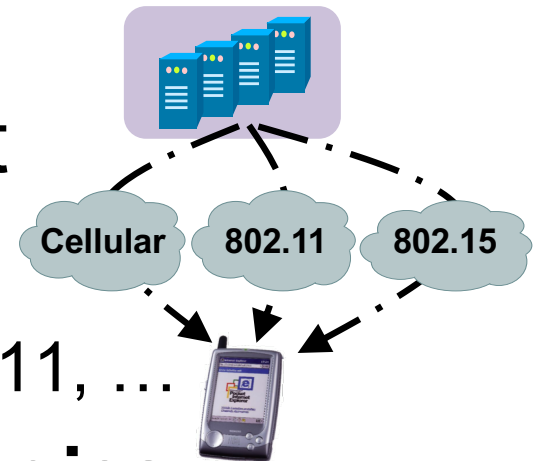
Legacy Communication Networks

- Close relationship between user terminal, access network and service provider
 - Single interface in terminal
 - Single access network topology
 - Single operator
 - single entity (operator, IT department) controls complete service chain
- Operators with long-term experience in network operation.



OmniRAN for Heterogeneous Networks

- User-Terminals have to support
 - **multiple network interfaces**
 - e.g. Cellular, IEEE 802.3, IEEE 802.11, ...
 - **multiple access network topologies**
 - e.g. IEEE802.11 in residential, corporate and public



- **multiple network subscriptions**
 - e.g. multiple subscriptions for same interface
- Generic solution to cope with complexity

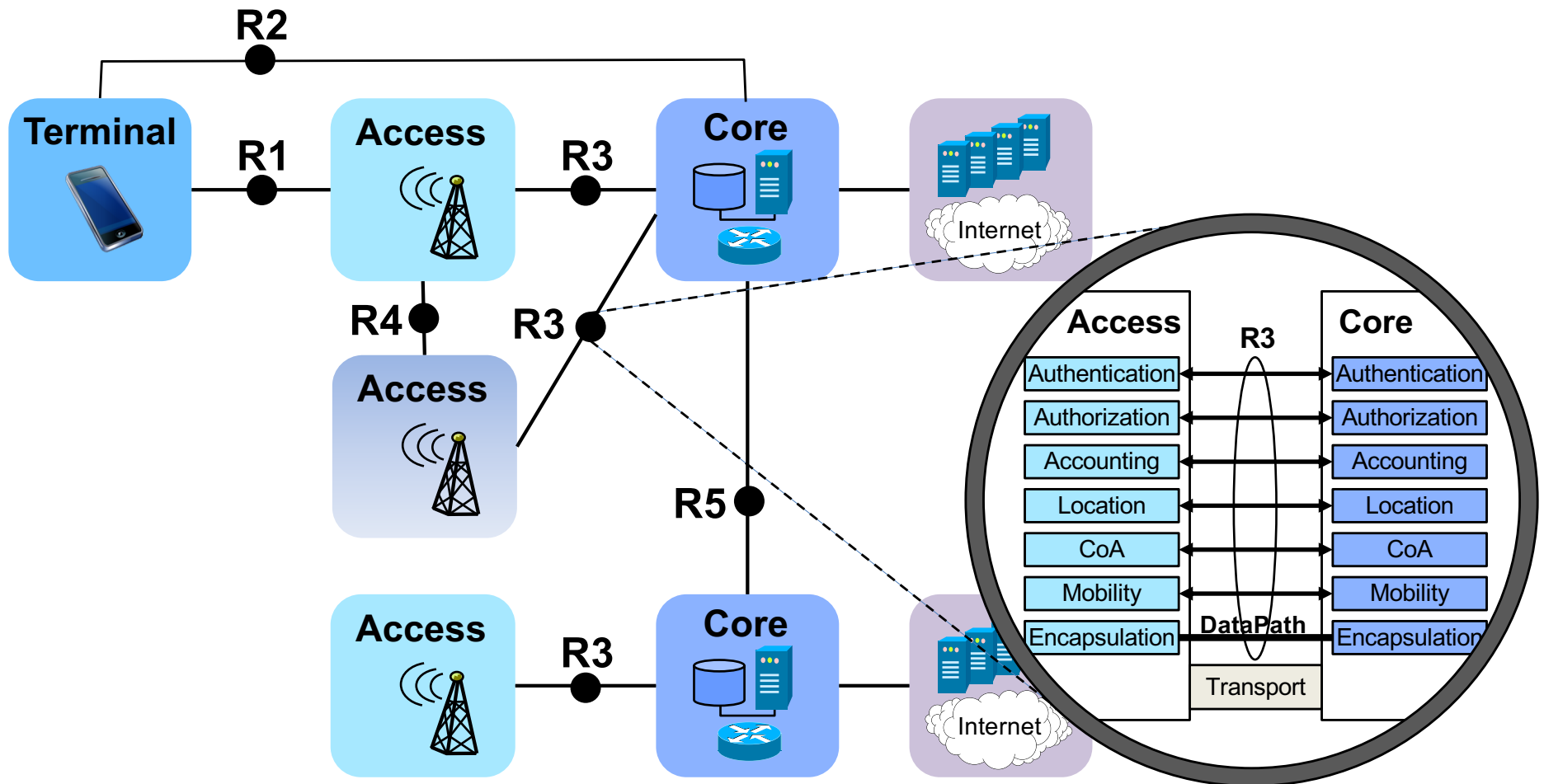
OmniRAN for Emerging Networking Markets

- Many more (huge) networks are coming up by everything gets connected
 - e.g. SmartGrid, HomeAutomation, Car, ...
- Many new markets for IEEE 802 access technologies
 - e.g. factory automation, in-car communication
- New deployments often suffering by the same old networking issues
 - e.g. service control, security, provisioning
 - new operators lacking long-term experience
- Generic solution to foster market growth

Functional Scope of OmniRAN

- Network detection and selection
 - Finding the most appropriate network access
- *Setting up the access link*
 - *Scope of individual IEEE 802.xx specifications*
- Authentication
 - Framework, *based on IEEE 802.1X*
- Setting up the e2e communication link
 - Authorization, service management
- Maintaining the user data connection
 - Mobility support to maintain connectivity when changing access points
- Usage and inventory reporting
 - Accounting, service monitoring, location
- Subscription management
 - Adding new users to a network and maintaining existing subscriptions
- Management of terminals
 - Initial configuration and provisioning and update of policies

OmniRAN Architecture and Reference Points



- Reference Points represent a bundle of protocols between peer entities
 - Similar to real IP network interfaces

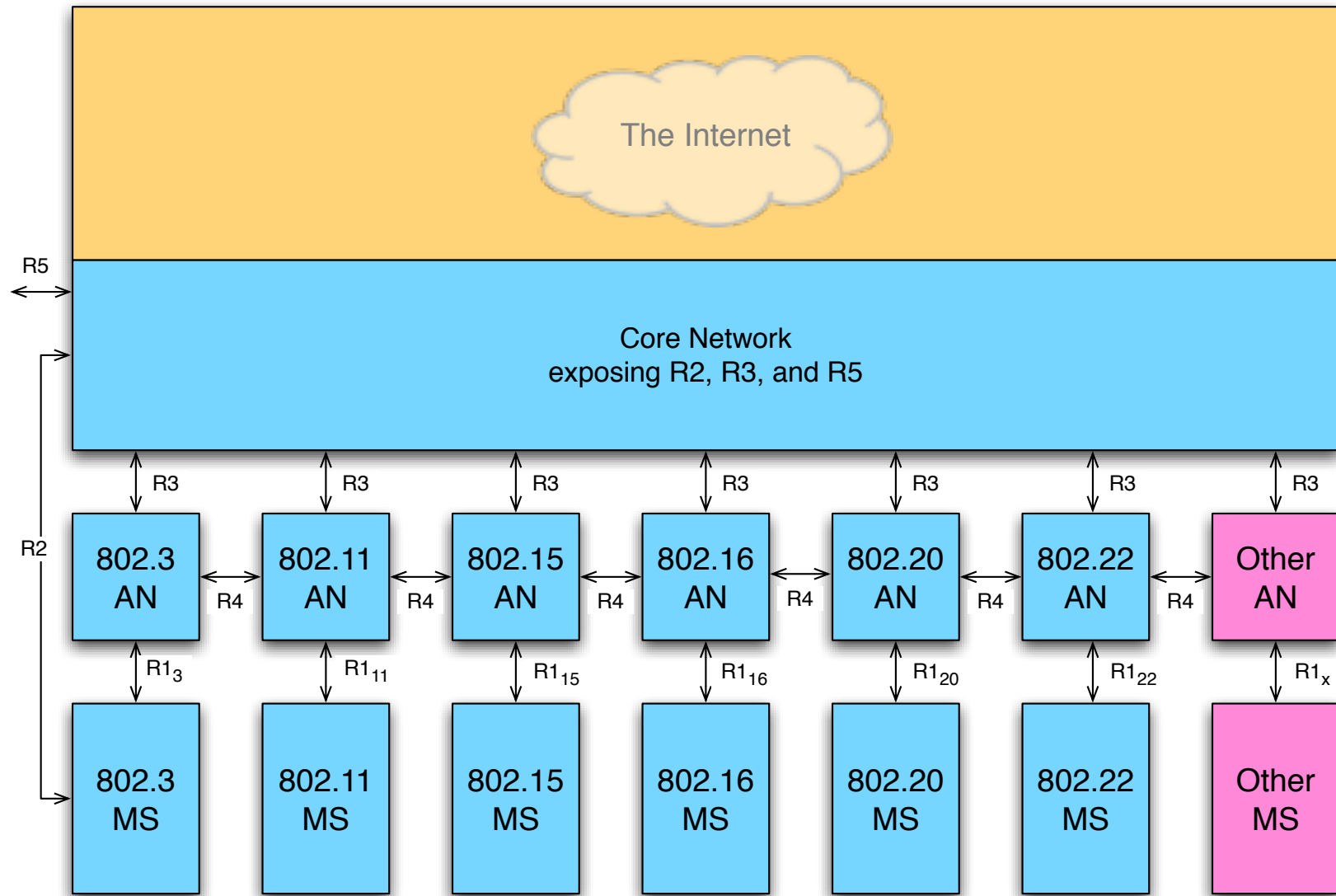
OmniRAN Interfaces

- R1: Access link, *technology specific*
- R2: User & terminal authentication, subscription & terminal management
- R3: Authorization, service management, user data connection, mobility support, accounting, location
- R4: Inter-access network coordination and cooperation, fast inter-technology handover
- R5: Inter-operator roaming control interface

All interfaces may comprise a number of different protocols. However, only the protocols related to required functionality have to be present on the interfaces.

– Approach allows for a common specification framework for various applications covering very simple to extremely complex network functionality.

Heterogeneous Networking w/ OmniRAN

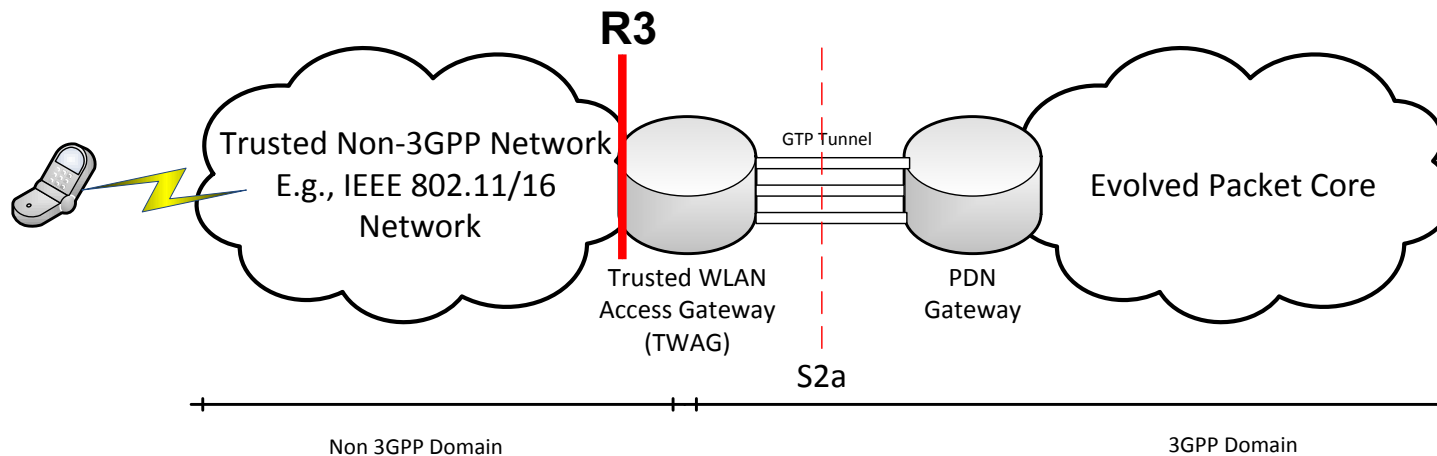


AN = Access Network,
exposing R3 and R4

MS = Mobile Station

What OmniRAN would provide to 3GPP

- SaMOG is defining a gateway controlling the Trusted Non-3GPP access network by the EPC



- OmniRAN would provide an interface (R3) to which 3GPP would be able to reference.
 - Expanded beyond IEEE 802.11/802.16

No desire to re-invent the wheel...

Limiting the effort to create beneficial results

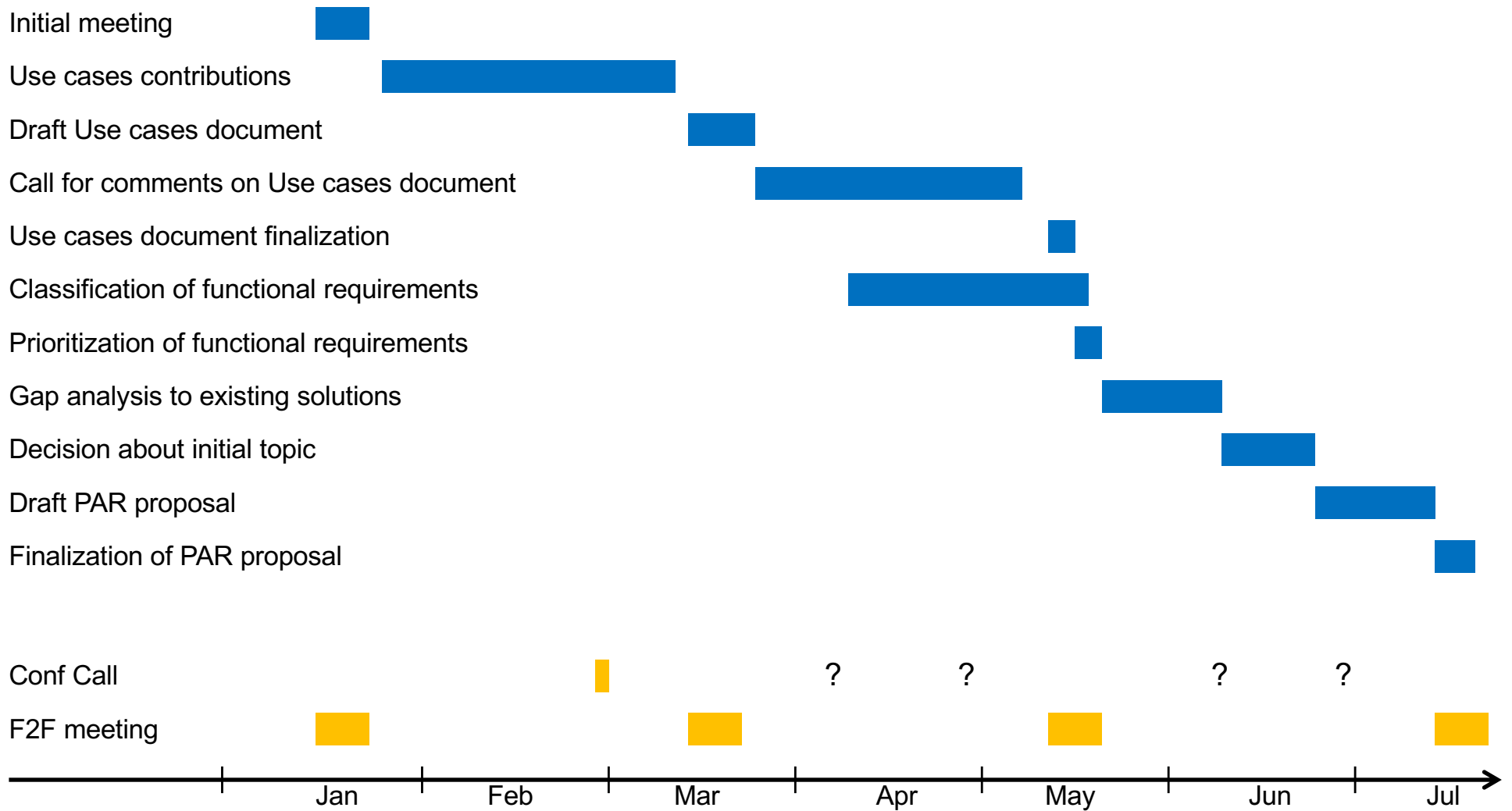
- There are plenty of specifications available which OmniRAN can leverage
 - IETF protocols
 - WiMAX specifications
 - Wi-Fi Alliance solutions
 - ZigBee specifications
 - ...
- Step-wise development allows to provide valuable results early, e.g.:
 - Interface by interface
 - e.g. starting with R1 and R2, then R3, adding R4 and R5 later
 - Functional complexity
 - e.g. starting with simple nomadic scenario, adding dynamic service control, later L3 mobility management and inter-AN optimizations
 - ...

OmniRAN EC SG is searching for the single most wanted access network function to be specified for IEEE 802.

Plan for the initial OmniRAN PAR

- OmniRAN EC SG had its initial meeting in January 2013
 - Good participation throughout the industry
 - Call for contributions for use cases document issued.
- Plan for creation of initial PAR proposal until July 2013:
 - Creation of use cases document illustrating the most important deployments of OmniRAN
 - Circulating the use cases document among stakeholders for comments and confirmation
 - Deriving common functional requirements from the agreed use cases document
 - Prioritization of the derived functional requirements
 - Gap analysis to existing solutions starting from the most prior functional requirements
 - Decision about topic to be addressed first based on scope, purpose, need and support of stakeholders
 - Develop draft PAR based on selected initial topic
 - Submission of PAR proposal to IEEE 802 EC

Planned Timeline of OmniRAN EC SG



Questions & Comments from IETF

Our Questions to the IETF:

- Which IETF WGs would be interested in OmniRAN?
- What would be the best way for timely discussions between IEEE 802 and IETF on OmniRAN?
- Can IETF add to the decision process to determine most urgent issue in IEEE 802 access networks?
- Recommendations on the network specifications to leverage for OmniRAN?