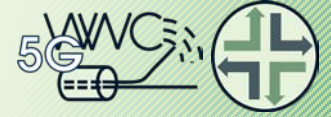# 5G Convergence

Broadband Forum 5G Work Overview and Status Update

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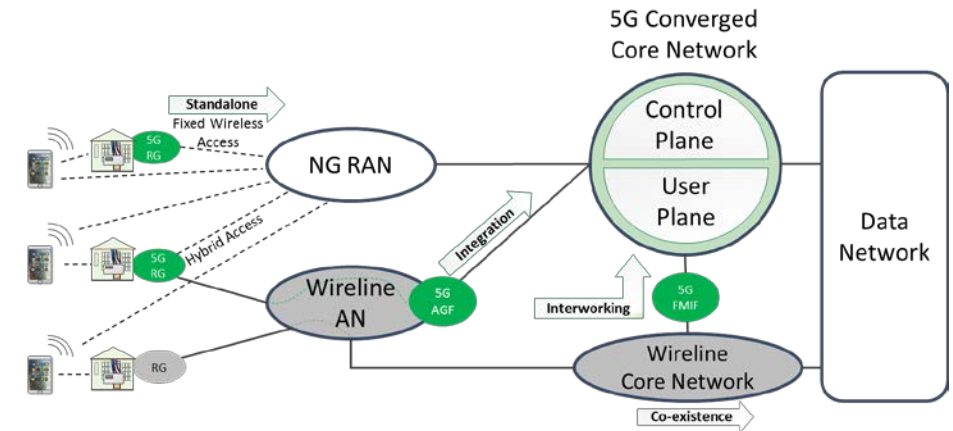
Broadband Forum 5G work overview

- ## 5G Fixed Mobile Convergence

  Use of common 5G Core across Wireline & Wireless Access Networks
  - Integration: access directly to 5G core with full operational integration
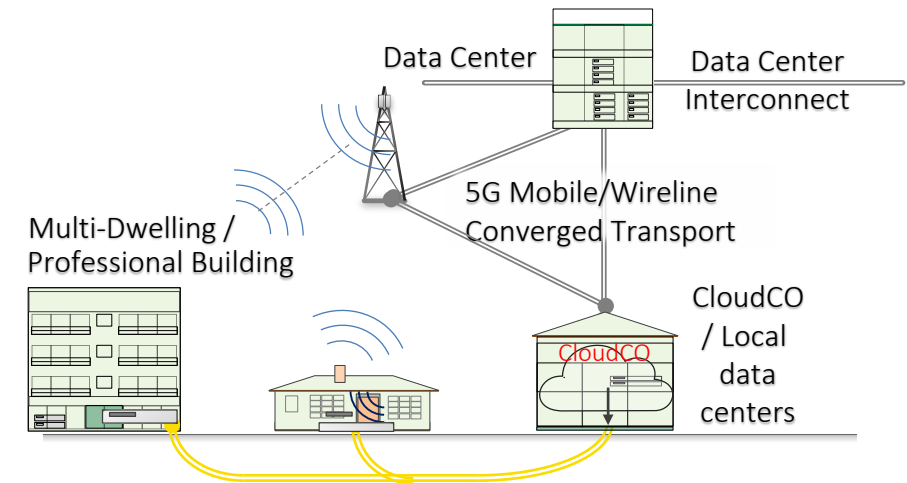 - Interworking: subscriber access to 5G Core components

  Supporting coexistence of 5G & legacy services on a common access network

- ## 5G Fixed Access and Transport

  Backhaul & Fronthaul: Access and transport

  Routing & Transport: enhancements for 5G covering capacity, performance reliability & determinism

- ## Network Slicing, applied to the above areas

5G Fixed Mobile Convergence

Specific Deliverables of the BBF 5G-FMC Project

- **Provide recommendations for 5G system architectural & functional integration**
  - related to convergence items identified during the joint 3GPP-BBF Workshop in 2017

- **Devise migration and coexistence strategies**
  - Meeting operator requirements for direct connection to the 5G core, as well as for interworking of existing users and deployed equipment into a 5G core

- **Specify**
  - a 5G Access Gateway Function (AGF) that adapts the wireline access onto the 5G core
  - Several architectural deployment options as well as underlying infrastructure aspects
  - Further related aspects as they become identified over the course of this work
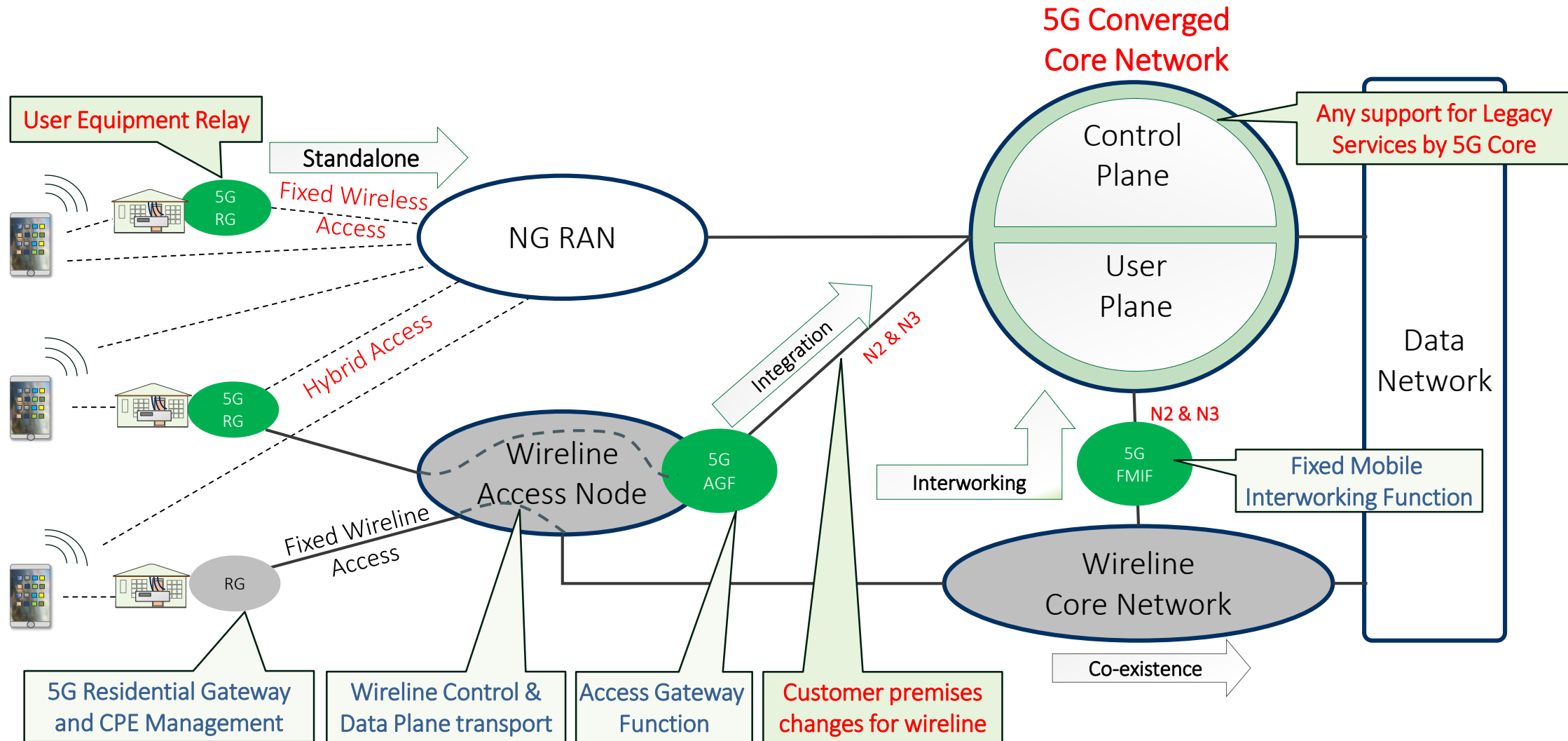
High Level Architecture
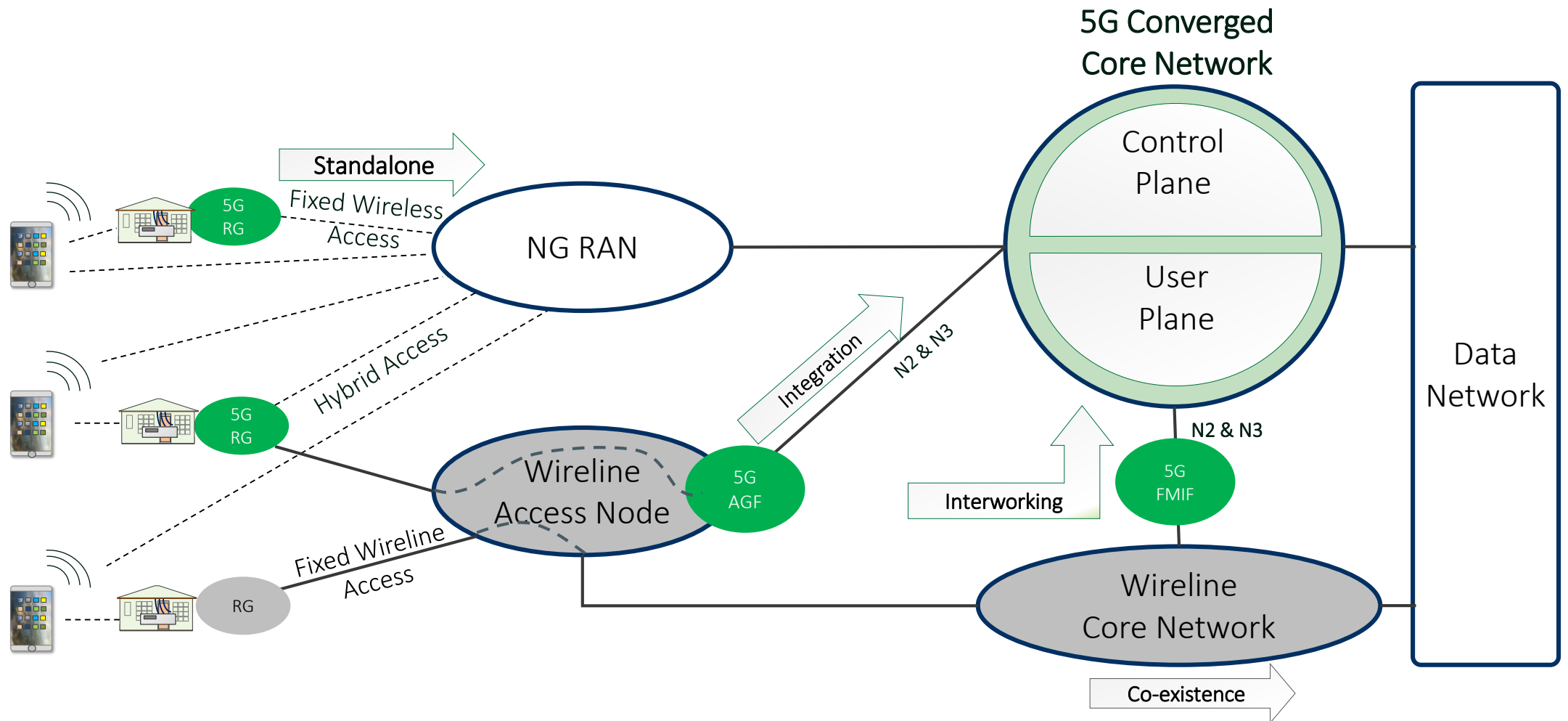
High Level Architecture
- and elements to be standardized

BBF 5G FMC - Work in Progress

- SD*-407 / SD-420 5G Fixed Mobile Convergence
  - SD-407: Root document & repository for ongoing 5G-FMC study work
    - Subject Areas: Integrated, FWA, Interworking, Hybrid, UE Relay
  - SD-420-R1: containing recommendations distilled from SD-407 to 3GPP (externally liaised)
    - First revision released per Jan15th: key issues + proposed solutions
    - New revisions to follow as further subject areas mature and conclude
  - ➤ Liaisons with 3GPP SA2, ITU-T SG13/JCA IMT-2020

- SD-406 End-to-End Network Slicing
  - Ecosystem analysis nearly complete
  - Potential internal and external handover points being worked out
  - ➤ Liaisons with 3GPP SA5, GSMA, ITU-T SG13/JCA IMT-2020, 3GPP RAN3

BBF 5G FMC Work – Content of SD-407

Structured per service models and deployment scenarios

Service model independent key issues
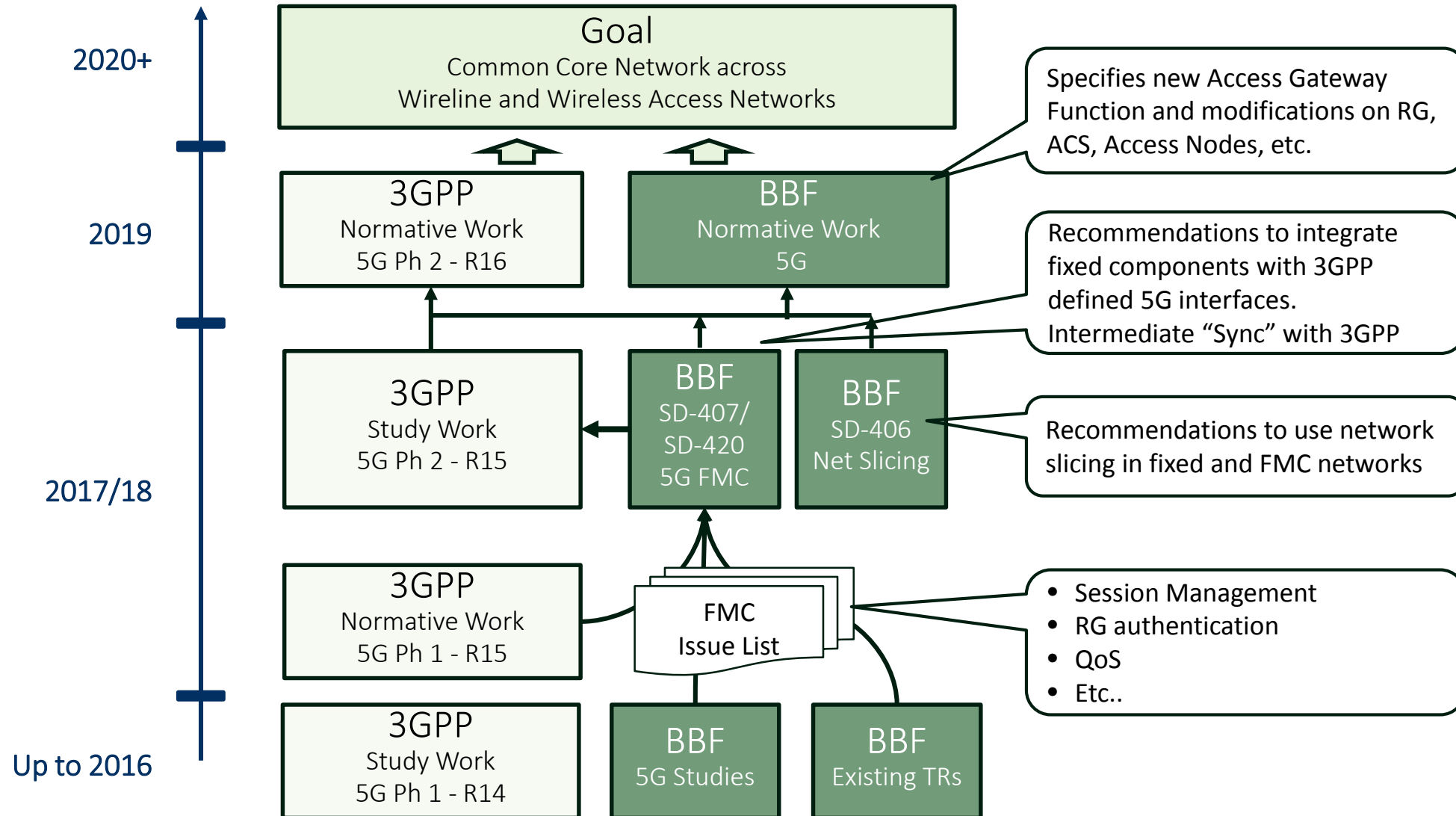- Registration & Connection management procedures
- Transport and Encapsulation in the Access
- Regulatory Requirements
- Operational requirements
- Resource management in the access
- IPTV and multicast
- Network Slice Selection

Service model dependent key issues
- Session management
- Addressing for IPv4 and IPv6,
- Home LAN support
- QoS

➔ Plan to provide next extract of recommendations to 3GPP by July'18

BBF 5G FMC - Standardization Timetable

2020+

Goal
Common Core Network across
Wireline and Wireless Access Networks

2019

3GPP
Normative Work
5G Ph 2 - R16

BBF
Normative Work
5G

Specifies new Access Gateway Function and modifications on RG, ACS, Access Nodes, etc.

2017/18

3GPP
Study Work
5G Ph 2 - R15

BBF
SD-407/
SD-420
5G FMC

BBF
SD-406
Net Slicing

Recommendations to integrate fixed components with 3GPP defined 5G interfaces. Intermediate "Sync" with 3GPP

Recommendations to use network slicing in fixed and FMC networks

3GPP
Normative Work
5G Ph 1 - R15

FMC
Issue List

- Session Management
- RG authentication
- QoS
- Etc..

Up to 2016

3GPP
Study Work
5G Ph 1 - R14

BBF
5G Studies

BBF
Existing TRs

BBF 5G FMC - Standardization Process

- Collaboration with 3GPP
  - Kickoff in February 2017 at joint 3GPP-BBF workshop in Dubrovnik
  - **Parallel Studies & Coordination** - aligned with 3GPP Release 16 Timeline
    - BBF SD-407 5G Fixed Mobile Convergence Study
    - 3GPP 5WWC 5G Wireless Wireline Convergence Study
    - 3GPP ATSSS Access Traffic Steering, Switching and Splitting Study
- ➤ Studies expected to be completed by 2018Q4, with specification work starting before year end
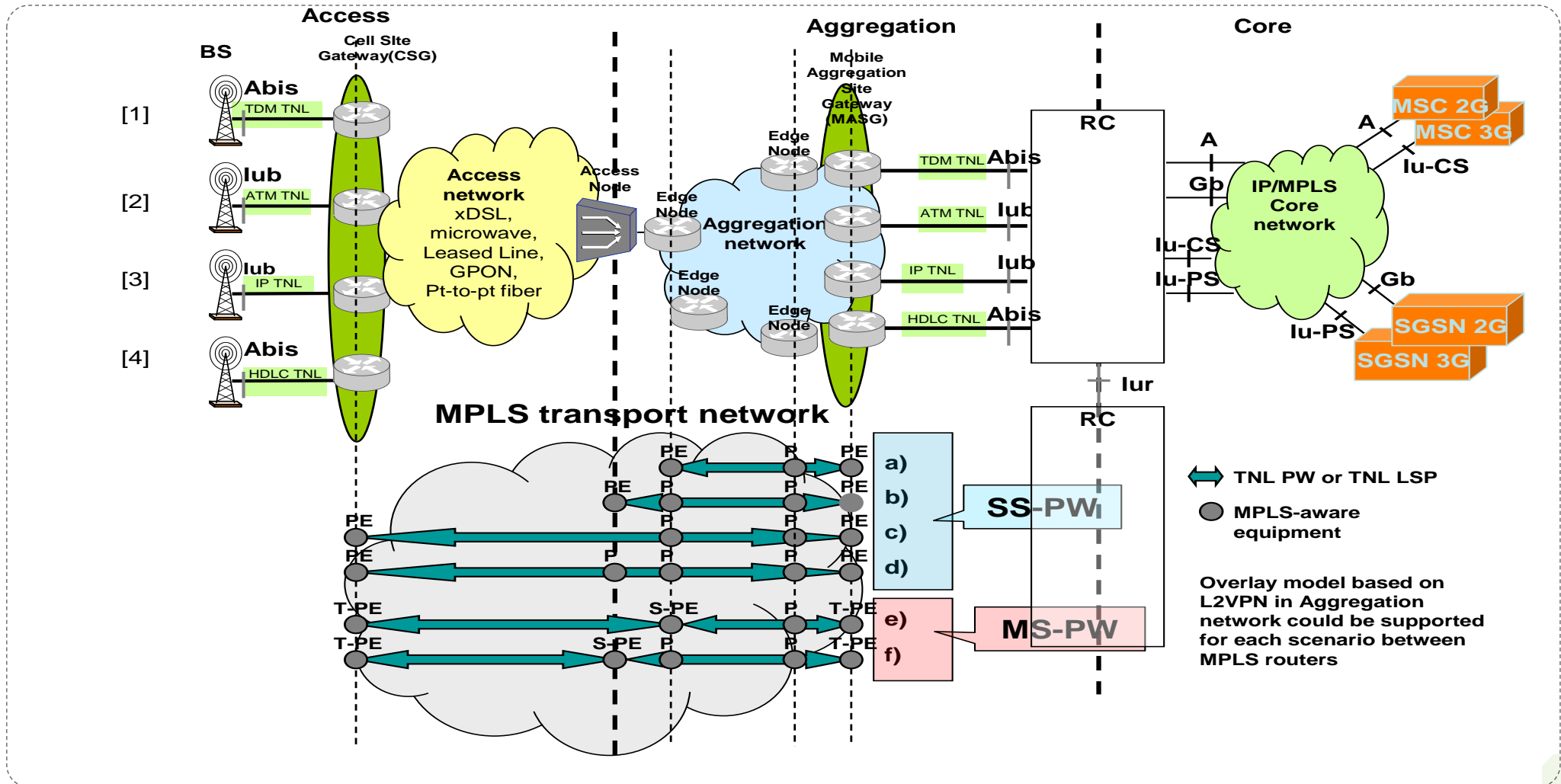
5G Transport

5G Transport: Where have we come from?

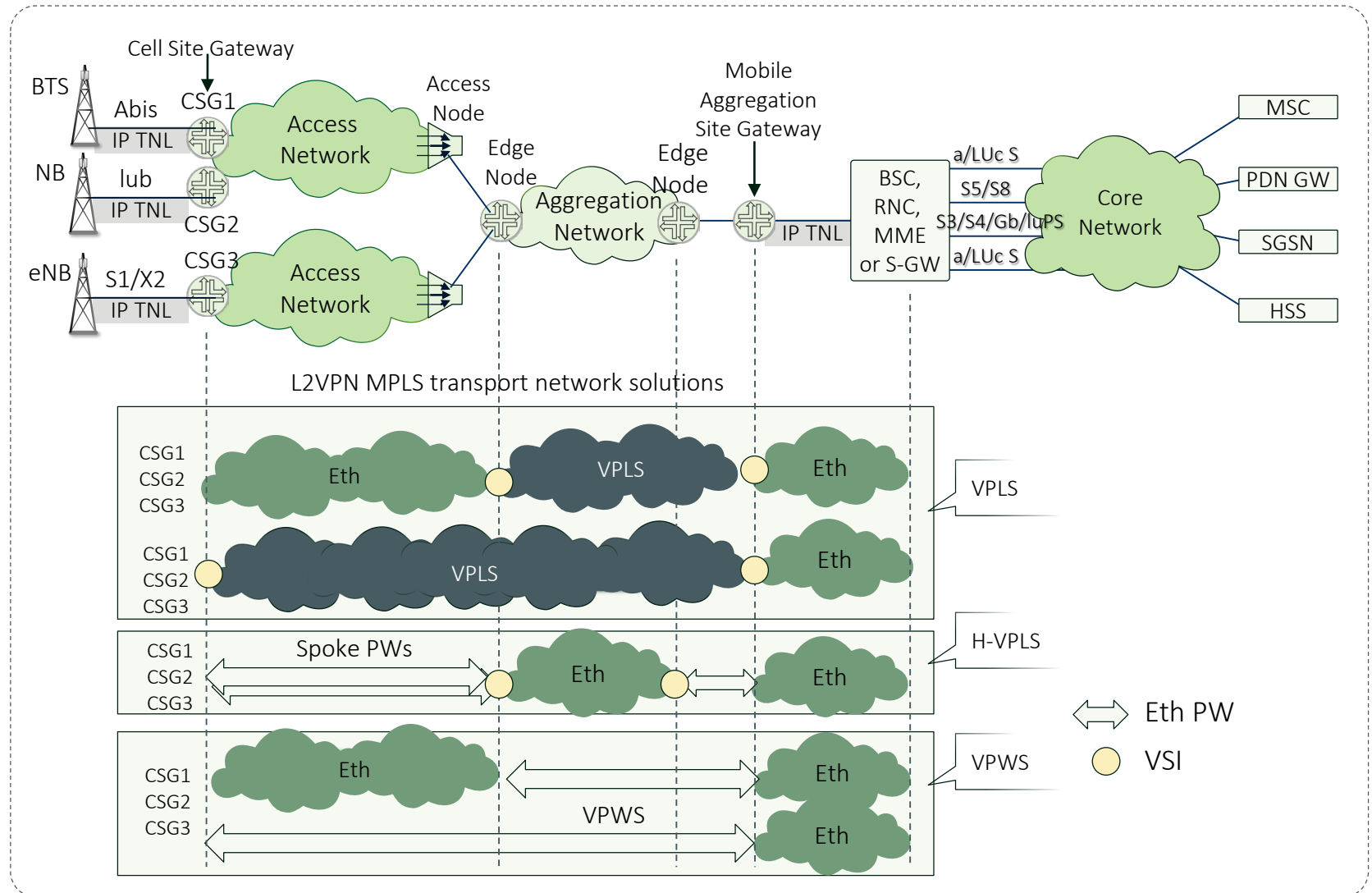## MPLS in Mobile Backhaul Initiative (MMBI) Reference Architecture - ~2007-2015
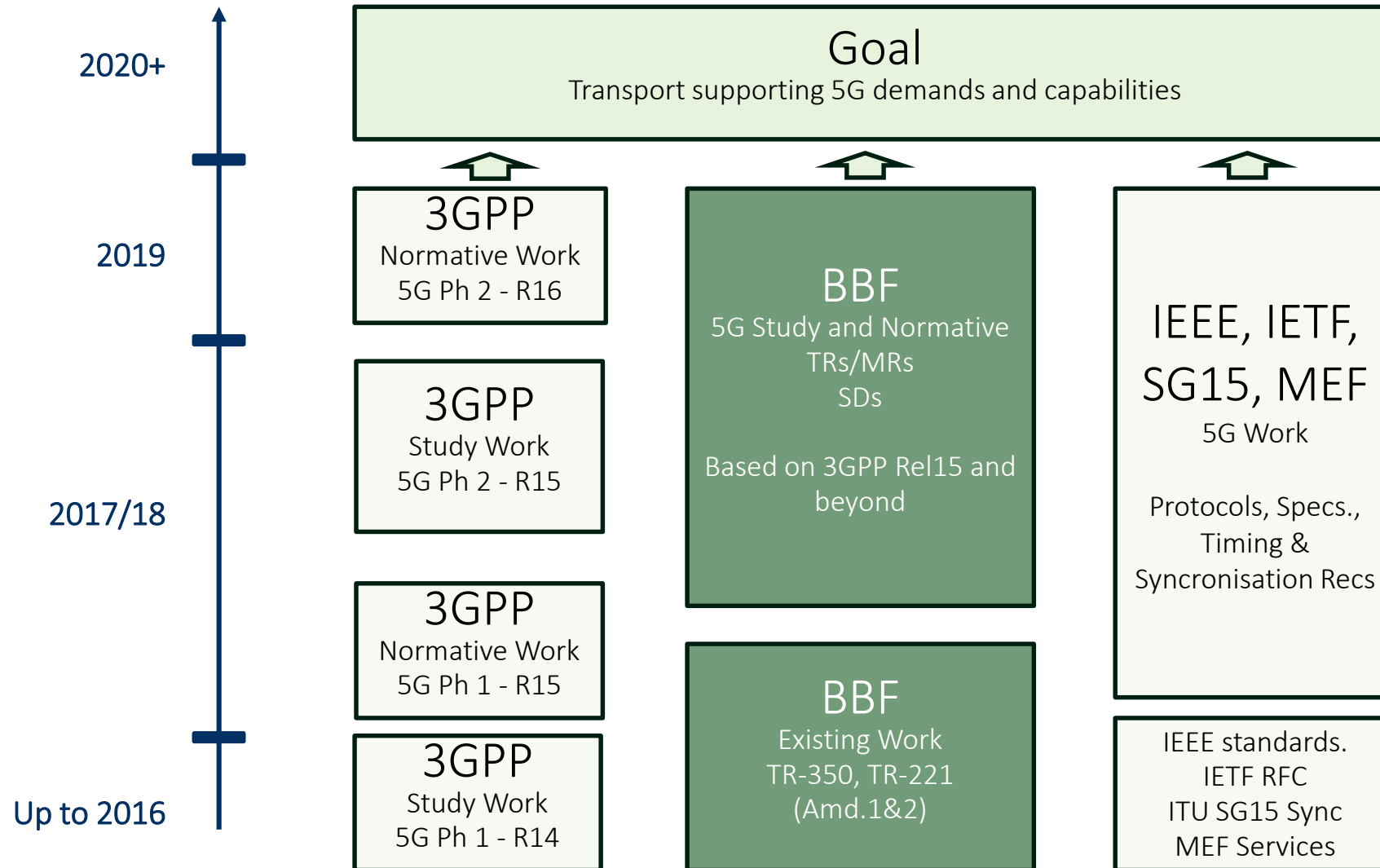
From 2G to "LTE-A"

5G Transport: Where are we going?

To meet needs of 5G we must integrate the functions below into what we have today

- SDN
- Segment Routing
- Service Function Chaining
- Ethernet VPN
- Deterministic Transport
  - IEEE TSN
  - IETF DetNet
  - FlexE
- Virtualization
- Faster speeds, higher capacity
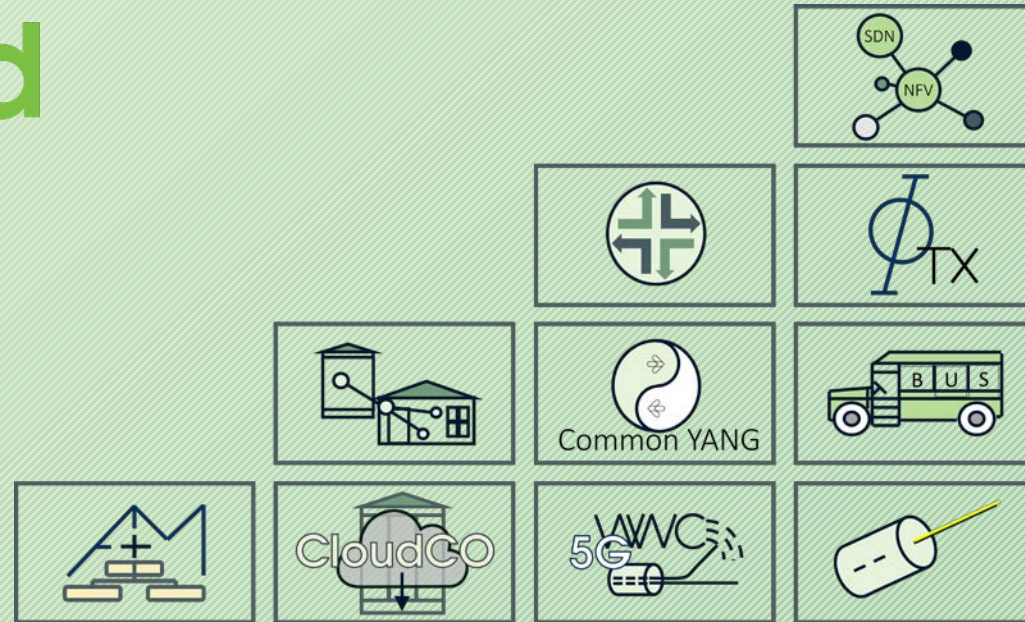- Intelligent management & orchestration

5G Transport - Standardization Timetable

Timeline labels (left axis, top to bottom): 2020+, 2019, 2017/18, Up to 2016

Goal
Transport supporting 5G demands and capabilities

3GPP
Normative Work
5G Ph 2 - R16

3GPP
Study Work
5G Ph 2 - R15

3GPP
Normative Work
5G Ph 1 - R15

3GPP
Study Work
5G Ph 1 - R14

BBF
5G Study and Normative TRs/MRs
SDs

Based on 3GPP Rel15 and beyond

BBF
Existing Work
TR-350, TR-221
(Amd.1&2)

IEEE, IETF, SG15, MEF
5G Work

Protocols, Specs., Timing & Syncronisation Recs

IEEE standards.
IETF RFC
ITU SG15 Sync
MEF Services

Summary

- Work is operator-driven & based on use cases
  - Converged Core Network Functions and Interfaces
  - Common infrastructure (transport and cloud)
  - Network Slicing
  - Transport: new capabilities to support advanced 5G services (higher speeds, deterministic transport)
- Timeline of BBF work aligned with 5G industry roadmap
- Cooperation with peer SDO and industry fora
- Interaction and Coordination with the ITU-T
  - On the IMT-2020 roadmap with the JCA IMT-2020
  - On FMC with JCA IMT-2020, potential for SG13 (Q23/13) to coordinate
  - On transport & synchronization for 5G Back-&Fronthaul with SG15 (WP3/15)
  - On the use of optical access technology (e.g., NGPON-2) with SG15 (WP1/15)

Broadband Forum 5G Work

more at **broadband-forum.org/5G**