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
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

NG RAN

Wireline Access Node

5G AGF

5G Converged Core Network

Control Plane

User Plane

Data Network

Co-existence

Integration

N2 & N3

Interworking

N2 & N3

Standalone

Fixed Wireless Access

Hybrid Access

Fixed Wireless Access

5G RG

5G RG

5G FMIF

Wireline Core Network
High Level Architecture
- and elements to be standardized

- NG RAN
- Wireline Access Node
- 5G AGF
- User Equipment Relay
- 5G RG
- Fixed Wireless Access
- Hybrid Access
- 5G FMIF
- Fixed Mobile Interworking Function
- 5G Converged Core Network
- Control Plane
- User Plane
- N2 & N3
- Integration
- Interworking
- Co-existence

Generalized Approach agreed in the BBF
BBF Specified Items
3GPP Specified Items

5G Converged Core Network
- Any support for Legacy Services by 5G Core

Data Network

5G Residential Gateway and CPE Management
Wireline Control & Data Plane transport
Access Gateway Function
Customer premises changes for wireline

5G AGF
Access Node
Fixed Mobile Interworking Function

6G
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

*SD (Study Document) is the BBF’s terminology for work being developed as the source of the membership work
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**

**Goal**
Common Core Network across Wireline and Wireless Access Networks

- **3GPP Normative Work 5G Ph 2 - R16**
- **BBF Normative Work 5G**
- **3GPP Study Work 5G Ph 2 - R15**
- **BBF SD-407/SD-420 5G FMC**
- **BBF SD-406 Net Slicing**

- **BBF 5G Studies**
- **BBF Existing TRs**

- **FMC Issue List**

**Recommendations**
- Specifies new Access Gateway Function and modifications on RG, ACS, Access Nodes, etc.
- Recommendations to integrate fixed components with 3GPP defined 5G interfaces. Intermediate “Sync” with 3GPP
- Recommendations to use network slicing in fixed and FMC networks

**BBF**
- Session Management
- NG authentication
- QoS
- Etc..
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?


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

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 & Synchronisation Recs

IEEE standards,
IETF RFC
ITU SG15 Sync
MEF Services

Up to 2016
2017/18
2019
2020+
• 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)
more at broadband-forum.org/5G