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5G Broadband Acceleration Seminar

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Enabling Converged Connectivity by 5G

Dr. Gerhard Kadel
Senior Architect, Project Manager and Team Leader – Strategy & Technology Innovation
ENABLING CONVERGED CONNECTIVITY BY 5G

Gerhard Kadel, Deutsche Telekom
5G Broadband Acceleration Seminar (BASe)
Workshop @ Broadband World Forum, 15th October 2019
| 01 | Key drivers          |
| 02 | Long-term target picture |
| 03 | Standardization progress |
| 04 | Network transformation |
| 05 | Prototype implementations and trials |
| 06 | Success factors & challenges |
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KEY DRIVERS

Enhance customer experience

- Unified connectivity across different networks and devices – at home and on the move
- Seamless, demand- & context-driven service experience
  - Always best connected and best served
  - Sufficient network quality (speed, coverage, ...)

Improve production efficiency

- Flexible combination of fixed & mobile network assets
- Leverage potentials of integrated connectivity-based offerings
- Simplification and automation of network production and operation

Converged connectivity propositions – enabled by network-based Fixed Mobile Convergence (FMC)
Customer want to have an “always best connected” and “seamless connectivity” experience

Selection of networks and steering of traffic shall be managed by the converged network.

Basic requirements:

1. Traffic Steering & Aggregation:
   - Connection management: Intelligent selection of “best” access network(s)
   - Overarching, network-based traffic steering
   - Aggregation of multiple access links if required

2. Converged network functions:
   - Use as much as possible common “5G” functions, regardless of the access
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NEW STANDARDS WILL PROVIDE FOUNDATION FOR “5G FMC”

- **3GPP Rel. 16**
  - **ATSSS** (Access Traffic Steering, Switching and Splitting)
    - Extend the 5G System in order to support flexible traffic management and traffic aggregation between 3GPP and non-3GPP access networks
  - **5WWC** (5G Wireless and Wireline Convergence)
    - Enhance the common 5G (Phase I) core network in order to support wireline access networks and Trusted Non-3GPP access

- **Broadband Forum (BBF)**
  - **Wireline Wireless Convergence**
    - Extend broadband access to support converged wireline-wireless networks that use the 5G Core, in close cooperation with 3GPP, aligned with R16 timeline

- **IETF**
  - Existing IETF standards selected or considered as protocols for Rel. 16
    - Example: MP-TCP selected for ATSSS
  - New standards (e.g. “MP-UDP”) can be enabler for eATSSS in Rel. 17
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HIGH LEVEL VIEW FOR A CONVERGED ARCHITECTURE
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POTENTIAL 5G FMC DEPLOYMENT SCENARIOS

(1) Fixed Wireless Access (5G-RG)
(2) Multi-access (5G-RG)
(3) Integration in Direct Mode (5G-RG)
(4) Integration in Adaptive Mode (FN-RG)
(5) Interworking (FN-RG)
(6) Coexistence (FN-RG)

RG = Residential Gateway
BNG = Broadband Network Gateway
AGF = Access Gateway Function
FMIF = Fixed-Mobile Interworking Function
Disaggregation & Softwarization
to drive flexibility & scalability (e.g. Access 4.0, 5G Core, CUPS,...)

Orchestration
across domains and lifecycles to drive speed & quality by DevOps and cope with complexity of network

Open APIs & Ecosystem
optimize TCO, enable global reach & connectivity and network monetization (e.g. Edge Computing)
Corner stones of “Zero Touch” field trial:

- Software-based solution for “converged connectivity” functions in the device and in the network
- Implementation of functions in device OS (Android kernel) – no App required
- Traffic aggregation based on MP-TCP (part of ATSSS) – “MP-UDP” implementation available as prototype
- “Auto Login” functionality for Wi-Fi networks
- “Auto Connect” feature with neutral connectivity symbol shown to the customer

See presentation on „Zero Touch Connectivity“ by Thomas Henze (DT) in Wednesday afternoon „Intelligent Network“ session
DRIVING ADOPTION THROUGH OPEN SOURCE IMPLEMENTATIONS
ONF POC FOR OPTIMIZED USER-PLANE HANDLING VIA SDN & EMBEDDED VNFS

Realization of User Plane Convergence for Fixed and Mobile Network Functions
- Embedded VNFs handle the “packet pushing”, i.e. Network Functions that process and forward user traffic are realized on high-performance switching hardware
- Control plane and other network functions run on compute servers
- Leveraging Control-User-Plane-Separation (CUPS)
- Support leveraging programmable switching hardware

Phases: 1) S/P-GW  2) BNG  3) S/P-GW and BNG
Addressed by and realized within ONF COMAC and SEBA Reference Designs and Open Source implementations
- Future phases to potentially include disaggregated RAN components

Proof-of-Concept open source implementations for SPGW functions realized on a P4-programmable leaf-spine fabric, publicly demonstrated by Open Networking Foundation (ONF)

Source of figure: ONF/Use Case „SDN’ization and Convergence of the 3GPP and BBF User Plane with Programmable Switching Fabric“
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SUCCESS FACTORS AND CHALLENGES

▪ Device support
  ▪ Mobile Devices & Device Operating Systems (OS) – e.g. for ATSSS
  ▪ Home Gateways – e.g. for „5G RG“ (5G Residential Gateway)

▪ Cost efficient implementation, deployments and operations
  ▪ „Softwarization“ - role of Open Source?
  ▪ Universal or specialized compute hardware?
  ▪ Centralized or decentralized deployment topologies?

▪ Migration strategies
  ▪ Coexistence with legacy infrastructure
  ▪ Penetration of devices with new functionality
  ▪ Regulatory constraints

LET’S WORK TOGETHER AND MAKE FMC HAPPEN
THANK YOU!
Enabling Converged Connectivity by 5G

Dr. Gerhard Kadel
Senior Architect, Project Manager and Team Leader – Strategy & Technology Innovation
June 2-4, 2020
Den Haag, The Netherlands

THE DATE HAS BEEN SET!
An event by tech innovators for tech leaders!

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Thank you

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rheier@broadband-forum.org