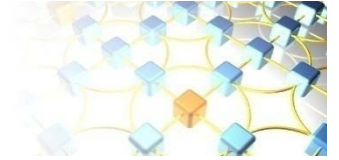




ETSI SUMMIT ON 5G NETWORK INFRASTRUCTURE

5G Infrastructure Work in 3GPP

Presented by Georg Mayer, 3GPP CT Chairman



5G Ancestors

- › 3G / UMTS
 - › from CS-Data to HSPA

- › LTE
 - › All IP
 - › Mobile Broadband
 - › Voice over LTE (IMS/VoLTE)

- › LTE Advanced Pro
 - › Cellular InterNet of Things
 - › Mission Critical Push To Talk
 - › Dedicated CoreNetworks, Traffic Steering, ...



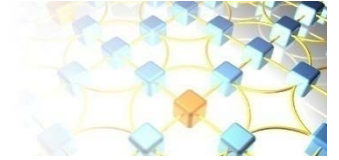
5G Timeline & Phasing

› Release timing



› Two phases for the normative 5G work

- › Phase 1 (Rel-15) to be completed by June 2018
addresses the more urgent subset for commercial deployments
- › Phase 2 (Rel-16) to be completed by March 2020
IMT 2020 submission, addresses all identified use cases & requirements



5G Requirements Documentation

- › Requirements
 - › General 5G Requirements
TS 22.261 <http://www.3gpp.org/DynaReport/22261.htm>
- › Studies on Requirments
 - › mMOT - massive Internet of Things
TS 22.861 <http://www.3gpp.org/DynaReport/22861.htm>
 - › CRIC – critical communications
TS 22.862 <http://www.3gpp.org/DynaReport/22862.htm>
 - › eMBB – enhanced mobile broadband
TS 22.863 <http://www.3gpp.org/DynaReport/22863.htm>
 - › NEO – network operations
TS 22.864 <http://www.3gpp.org/DynaReport/22864.htm>
 - › V2X – vehicle communication
TS 22.886 <http://www.3gpp.org/DynaReport/22886.htm>
 - › ...



5G Phase 1 (Rel-15) – Status & Documentation

› Architecture

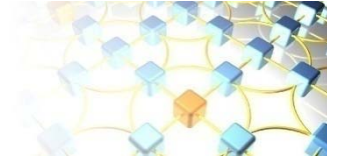
- › Completed study – TR 23.799 <http://www.3gpp.org/DynaReport/23799.htm>
- › *Architecture – TS 23.501* <http://www.3gpp.org/DynaReport/23501.htm>
- › *System Flows – TS 23.502* <http://www.3gpp.org/DynaReport/23502.htm>

› Security

- › *Ongoing study – TR 33.899* <http://www.3gpp.org/DynaReport/33899.htm>
- › Normative work – TS 33.501 <http://www.3gpp.org/DynaReport/33.501.htm>

› Protocols

- › *Study phase just started – normative work to follow in the next 3 to 6 months*
- › *Normative work needs to be completed by June 2018*



Requirements for a Basic 5G System

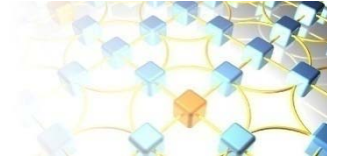
- › Mobility Management & Roaming
- › Session Management & Session Continuity
- › QoS & Policy Frameworks
- › Access Agnostic
- › Interworking & Migration – “Option 3”
- › IMS / VoLTE support



5G – Enabler Platform for Different Services

- › New Stakeholders ...
 - › Critical Communications (MCC)
 - › Internet of Things (IoT)
 - › Automotive (e.g. 5GAA), Railways (e.g. UIC)
 - › Energy Providers, Broadcast Agencies, Satellite Operators, ...

- › ... require a flexible enabler platform
 - › Open up the core – capability exposure
 - › On-demand resource allocation – local and end-2-end
 - › Internal architecture of the core needs to be service based
 - › Low latency

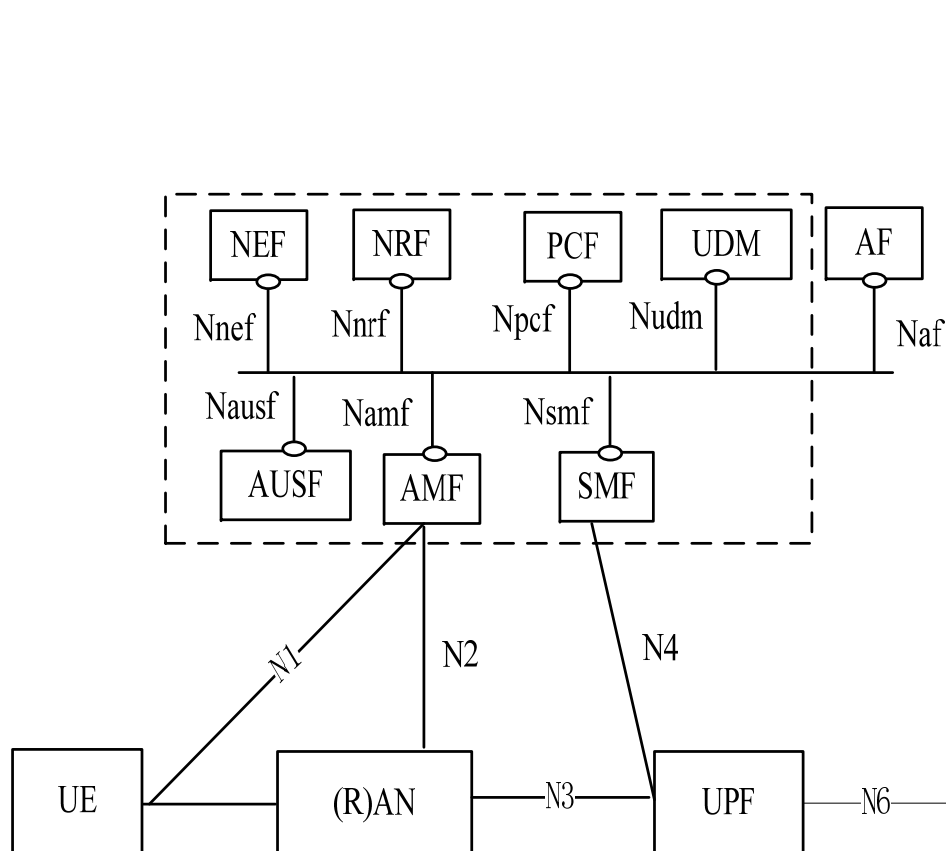


Key Technologies

- › Application Programming Interfaces (API)
- › Network Function Virtualization (NFV)
- › Network Slicing
- › Multi-Access Edge Computing (MEC)



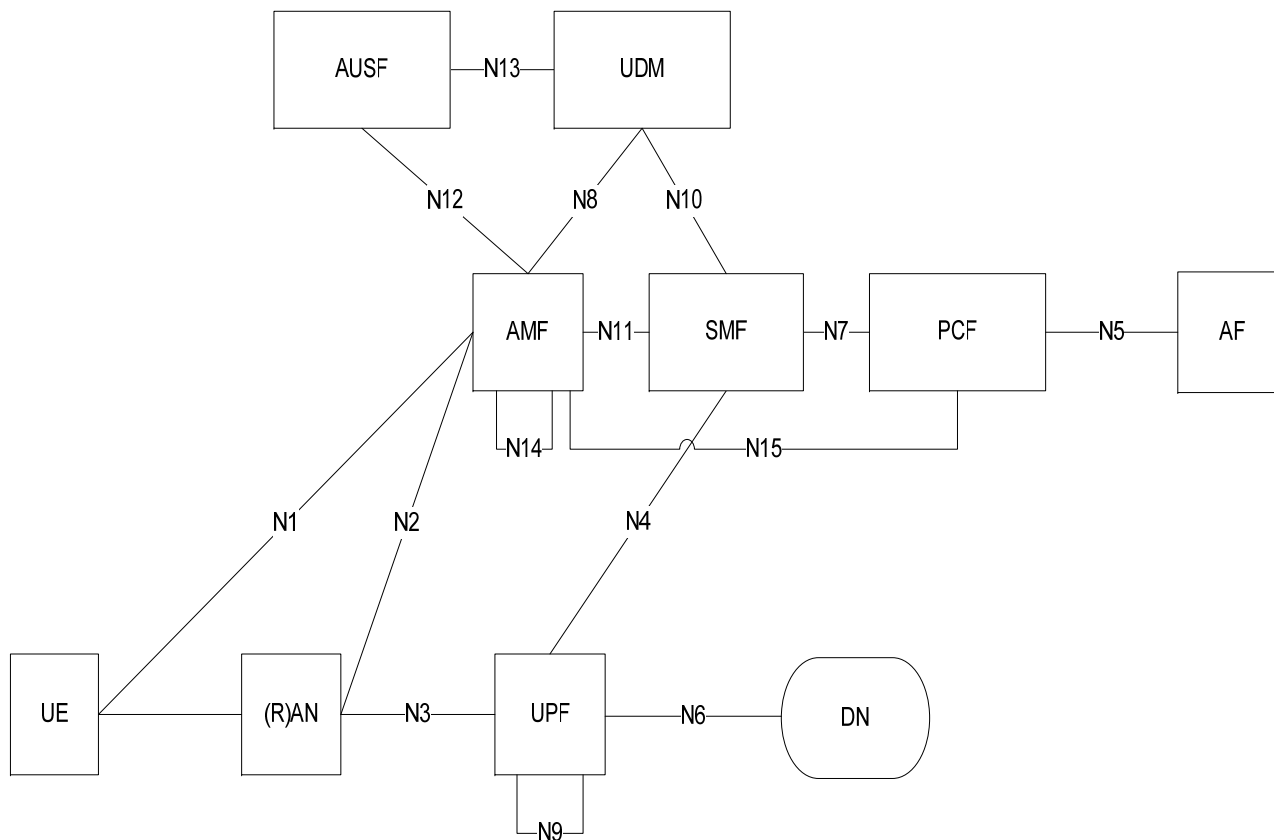
Service Based Architecture

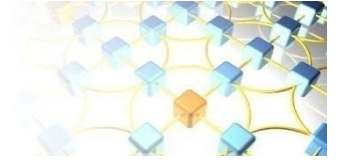


- NEF Network Exposure Function
- NRF Network Repository Function
- PCF Policy Control Function
- UDM Unified Data Management
- AF Application Function
- AUSF Authentication Server Function
- AMF Access & Mobility Management Function
- SMF Session Management Function
- UE User Equipment
- (R)AN (Radio) Access Network
- UPF User Plane Function
- DN Data Network



Reference Point Architecture





APIs – North & South

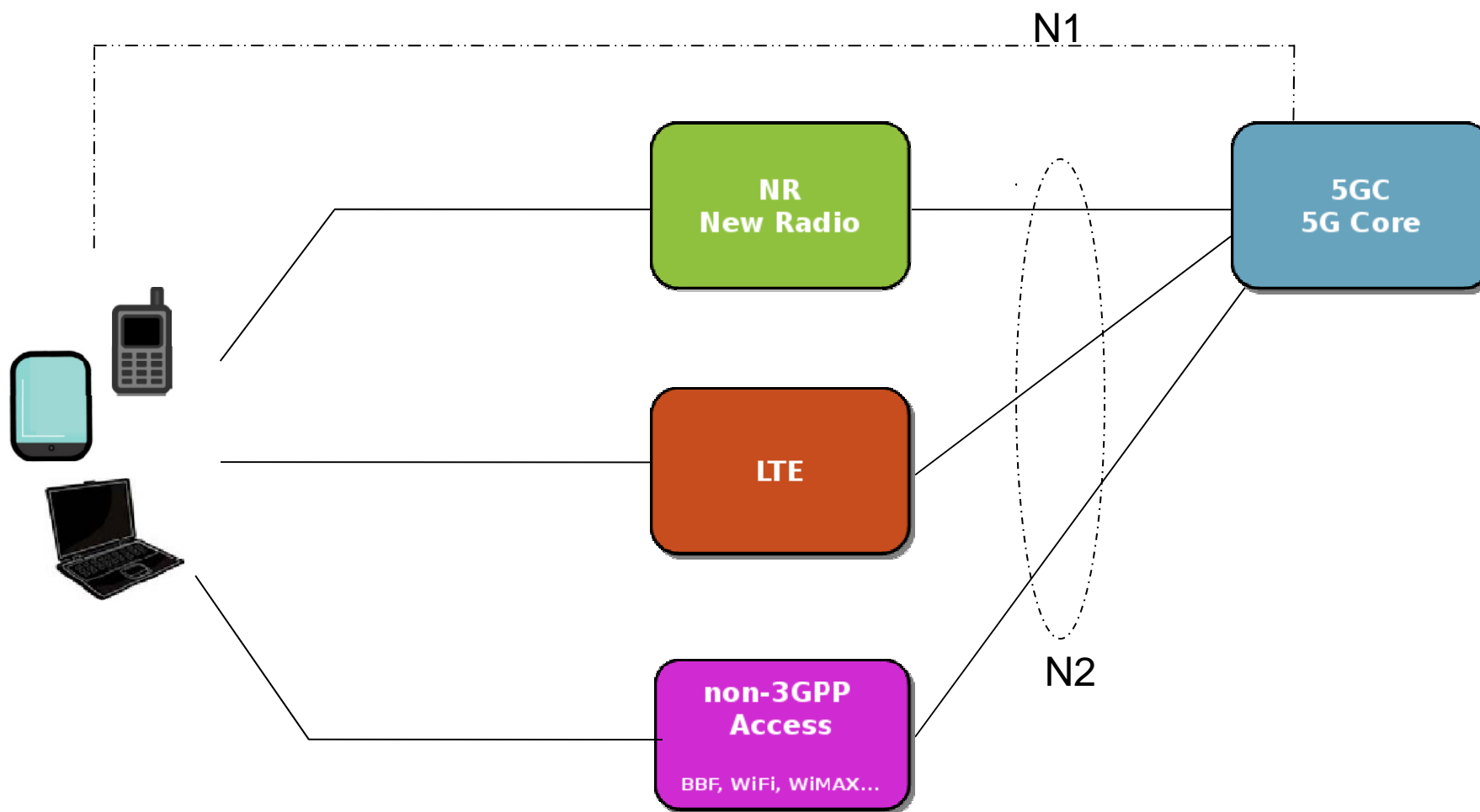
- › Northbound APIs
 - › Capability Exposure
 - › Service specific
 - › e.g. oneM2M specific (NAPS)

- › Service Based Architecture
 - › Network Functions communicate via APIs (“internal APIs”)
 - › Message Bus

- › Open Issues (SBA)
 - › To what level will SBA replace common procedural approach?
 - › What is a service?
 - › Harmonized SBA/northbound API frameworks?

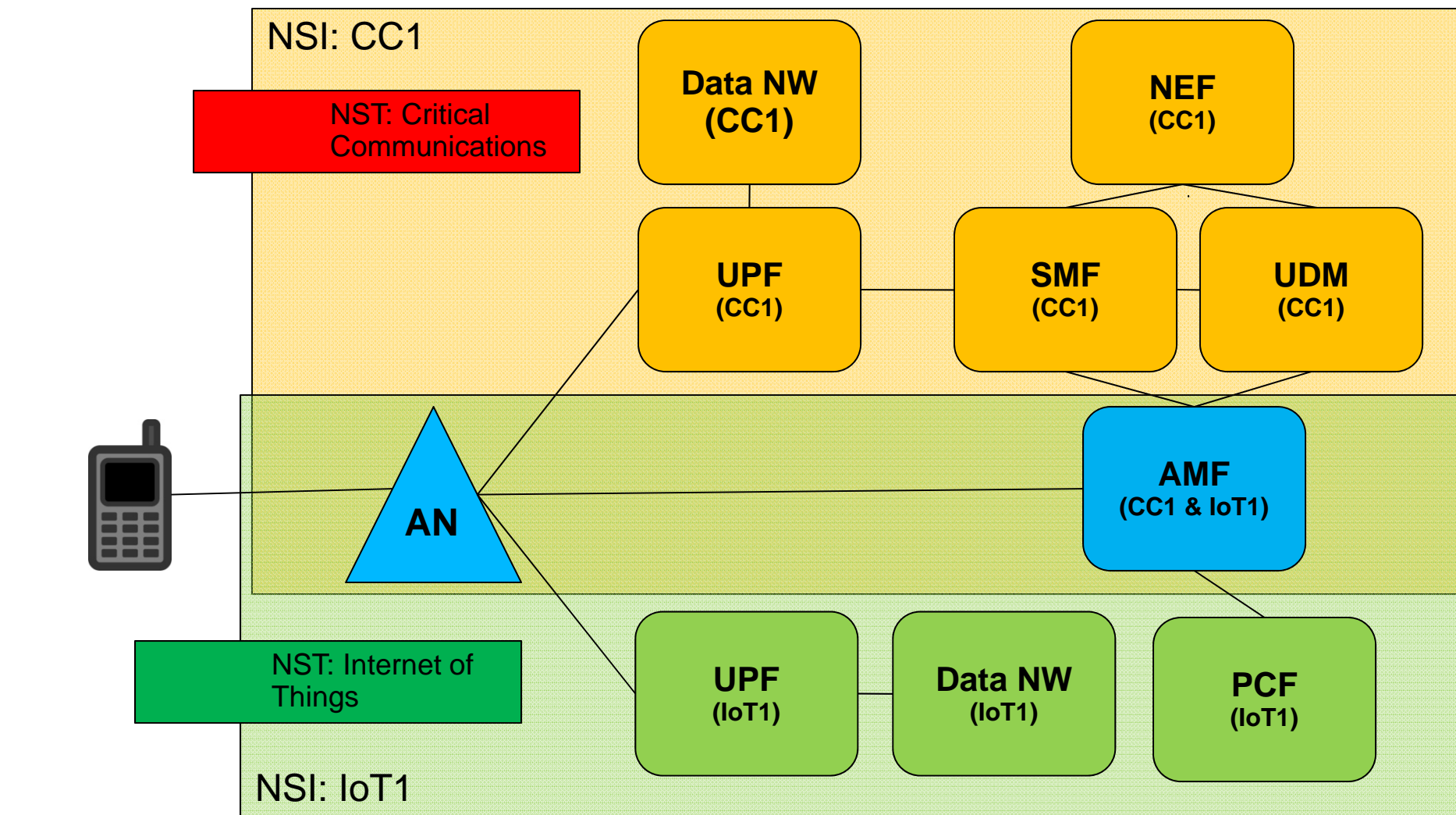


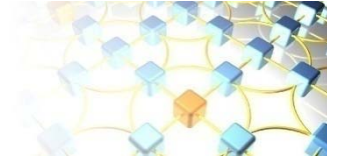
5G System (5GS) – Access Agnostic





5G Network Slicing



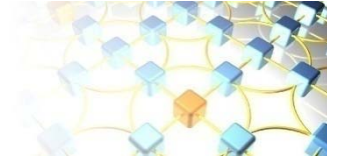


Protocol Challenges

- › Technical
 - › Transport Layer Optimization
 - › Access Agnostic – one protocol to bind them all?
 - › Service Based Architecture vs Protocols

- › Players
 - › IETF, ETSI, GSMA
 - › Verticals

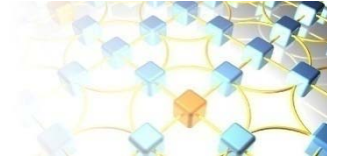
- › Time



Summary

- › Software & Service centric transformation
 - › Telecoms -> Multiple Stakeholders
 - › Bit Pipe -> Enabler Platform
 - › Phones -> Things
 - › Procedures -> Services
 - › Protocols -> APIs
 - › Dedicated Hardware -> Orchestrated Resources
 - › Network Function -> Virtualization
 - › Network -> Slice

- › Challenges: Timeline, Interaction with other SDOs



Thank You!

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