

Evolution of the Core Network in 5G

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Agenda



- About 3GPP TSG CT
- Rel-17: From where we were...
- Rel-17: ...To where we are
- CT activities for successful 5G rollout

About 3GPP TSG CT

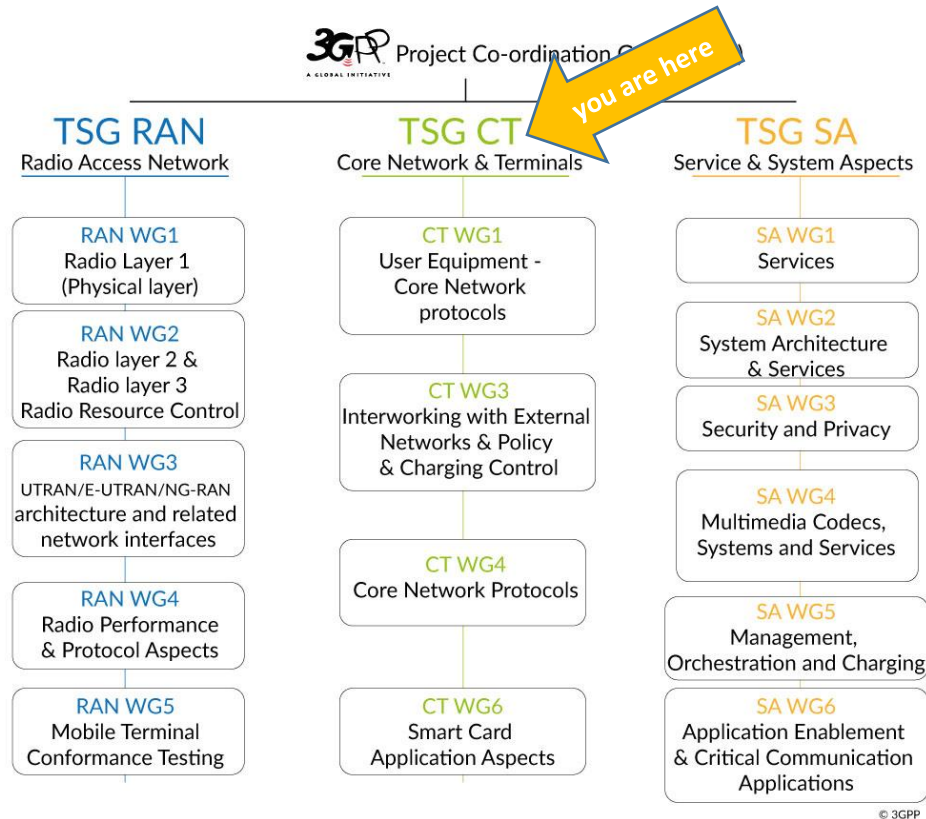
From circuit-switched network to IP-based system

From mobile terminal to any device...

From a telco-centric network to a flexible service enabler platform...



TSG Core Network and Terminals (TSG CT)



Network Enabler factory

- Transforming service functional requirements into network enablers

Responsible of detailed protocol specifications for:

- Control and user signaling planes
- User and terminal mobility management
- Call/session control
- Policy, charging QoS enforcement
- Interworking with external networks
- Network capabilities exposure
- 3GPP smart card applications, and the interface with the Mobile Terminal





Rel-17: From where we were...

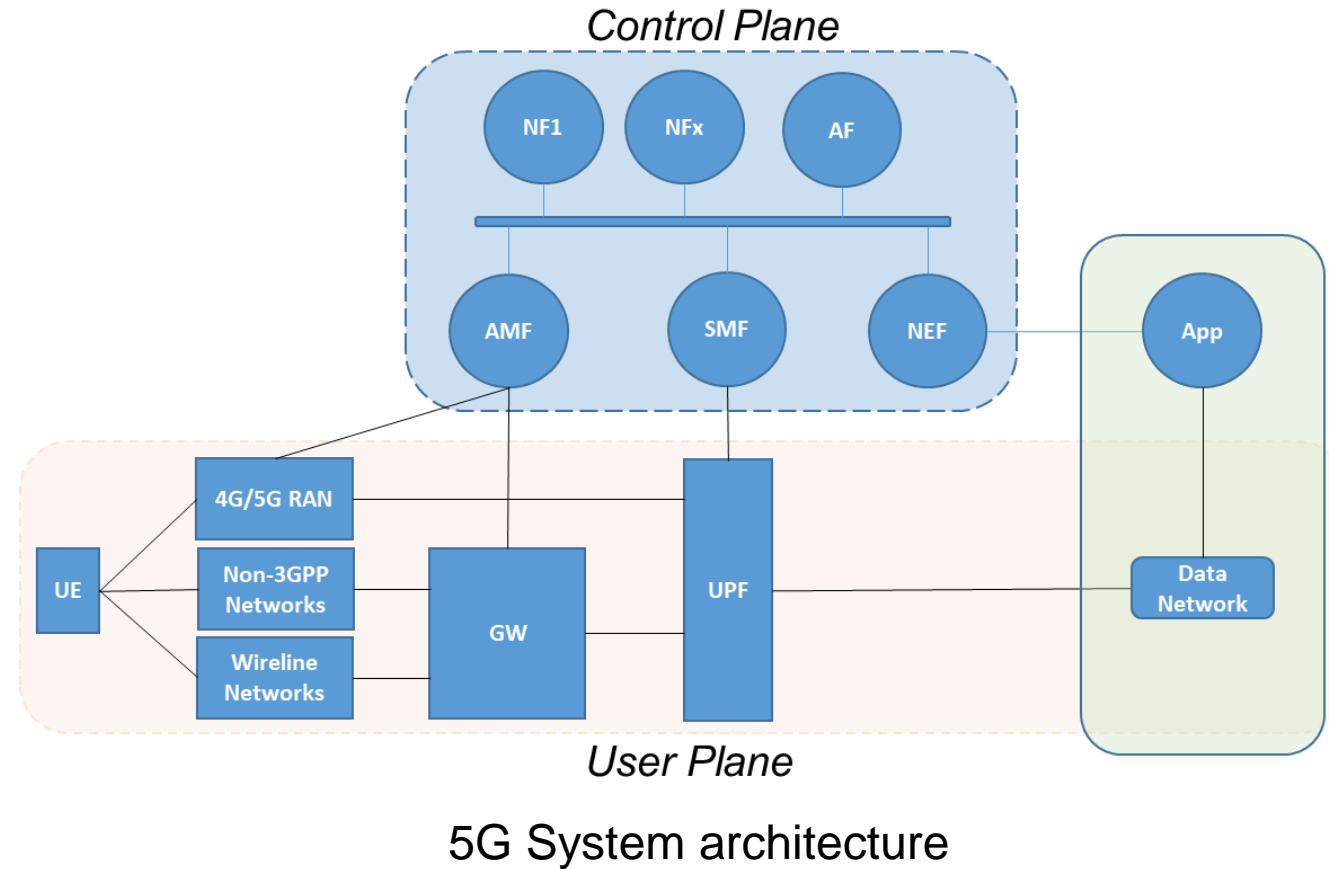
Release 15: New Paradigm with 5G

Not Everywhere...

- User Plane, UE/CN interfaces, CUPS inherited from 4G

But in the Control Plane:

- New Service-based Architecture
 - Virtualization, Cloud-friendly
 - Programmable, stateless, scalable
 - Ease the introduction of any new feature/service
- Main Decision: Define RESTful APIs to expose services offered by NF
 - Use of HTTP/2 as transport protocol
 - API Design based on the REpresentational State Transfer (REST) principles
 - JavaScript Object Notation (JSON) as a data format
 - Standardized versioning mechanism



Release 16: Building on core capabilities



Adding new features

- Introduction of additional services
 - New APIs for IMS integration, Steering of roaming, Location services, etc.
- Storage mechanism of stateless/dataless NF
 - New API to store dynamic state data in dedicated database (UDSF).
- User data interworking mechanisms between 4G and 5G
 - New API to interconnect HSS in EPC and UDR in 5GC
- Load and Overload Control mechanisms for 5GC
- Interworking between NR and UTRAN Voice Call Continuity

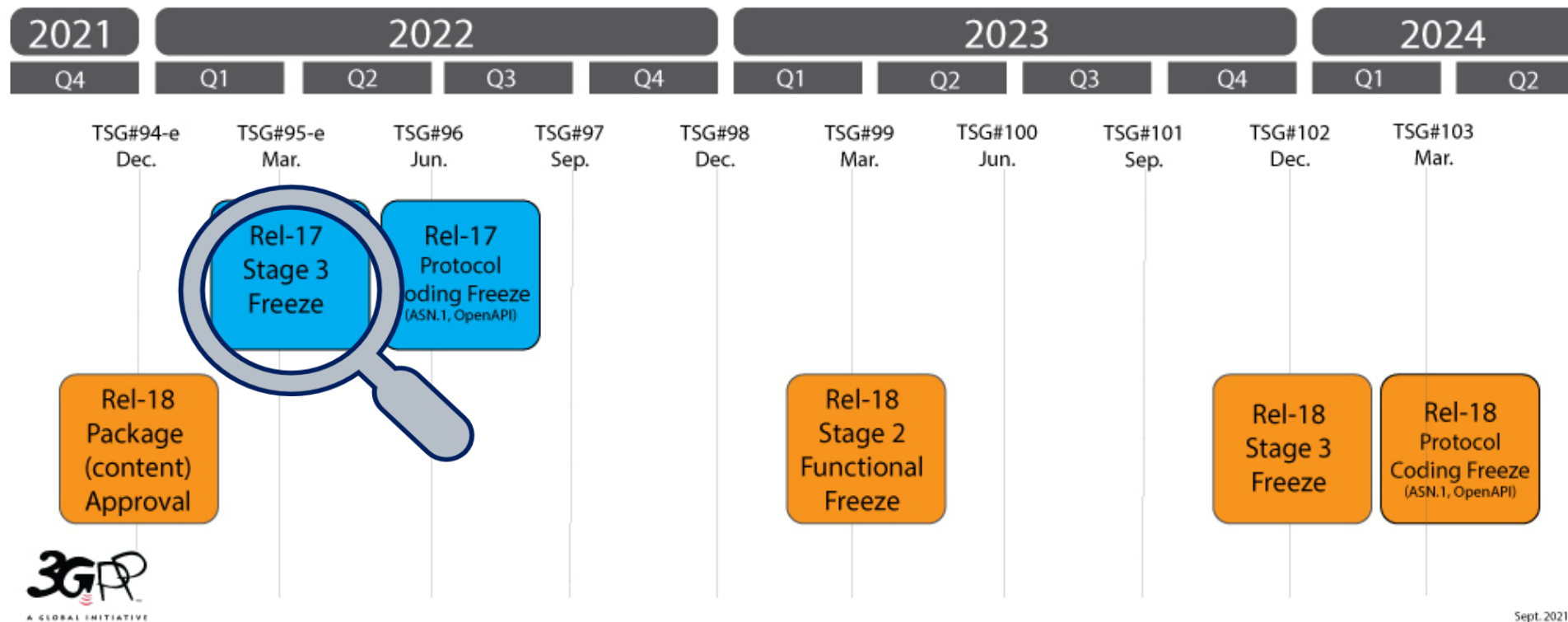
More support to Verticals

- 5G Enablers for Network Automation
- Support of time sensitive communication
- Common capabilities for a Service Enabler Architecture Layer
- Cellular IoT functionality for 5G System
- Support of advanced V2X services over 5G
- Further protocol enhancements for
 - Mission Critical Services
 - Public Warning System
 - Future Railway Mobile Communication System



Rel-17: ... To Where We Are

3GPP Release Timelines (current)



Rel-17 for CT:

- 49 work items, 7 small technical enhancements, 5 study items

Rel-17: New Features (non-exhaustive)



Support of new services:

- Mission Critical services over 5G
- Proximity based services (ProSe) in 5GS
- 5G multicast-broadcast services
- Multimedia Priority Service (MPS) Phase 2

Architecture enhancement

- 5GC architecture for satellite networks
- Enhanced support of Edge computing and deployment of edge applications
- Enabling Multi-USIM Devices
- Message service for MIIoT over 5G System
- Support of time-sensitive communication (TSC) for Industrial IoT
- Protocols for support of Application layer for Uncrewed Aerial System (drones)

Rel-17: New Features (non-exhaustive)



Security:

- Authentication and key management for applications based on 3GPP credential in 5G
- Integration of GBA into SBA
- PAP/CHAP protocols usage in 5GS

Protocol enhancements/improvement

- BEst Practice of PFCP (CUPS)
- Mission Critical Services
- Restoration of PDN Connections in PGW-C/SMF Set
- Support for Minimization of service Interruption
- Start of Pause of Charging via User Plane
- enhanced IMS to 5GC Integration Phase 2

CT activities for successful 5G rollout

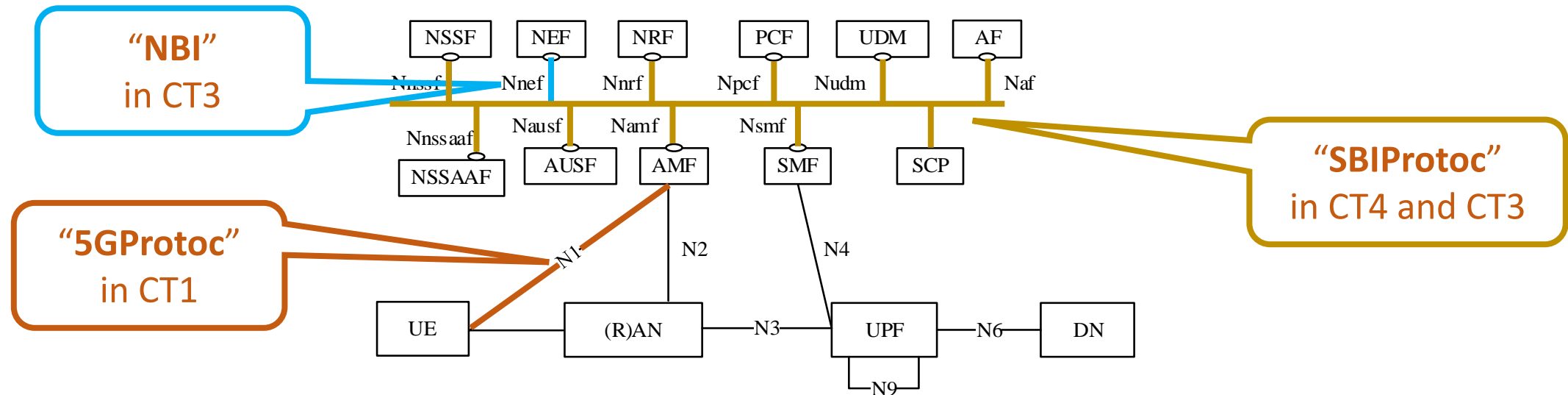


Tasks in CT for successful 5G rollout

- Standard solutions for multi-vendor interoperability
- Network high-reliability and resilience
- Ensure migration, interworking and roaming between networks
- Secure APIs for controlled access to network capabilities by service providers and application developers



5GC Protocol Enhancements

- Generic, continuous protocol enhancements framework in CT
- Various proposals addressing update to every 3GPP Release
 - 5GProtoc** Stage-3 5GS NAS protocol development
 - SBIProtoc** Service Based Interface Protocol Improvements Release
 - NBI** Enhancements of 3GPP Northbound Interfaces and Application Layer APIs



Some CT activities driven by operators



-  Not only vendors, but operators need to follow CT activities
 - Ensure service requirements from operators to be reflected in CT specifications
 - Dialogue between vendors and operators are essential to realise the solution in CT specifications
-  Illustration of the importance of the presence of operators in CT
 - **Steering of Roaming**
 - Operators have various business requirements
 - Vendor assumptions tend to be unique for all operators
 - Details were left to CT to specify and debate on how to reflect operator requirements with the vendor support on the feature
 - **IMS voice service support and network usability guarantee for UE's E-UTRA capability disabled scenario in SA 5GS**
 - Issue raised from operators providing service for a voice capable 5GS device under specific condition, while 5GS and EPS coverage are not fully spread out.
 - Requires additional handling at UE defined within CT specification, and agreed to start the work with support from several vendors and operators

Thank You!



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