SP-210649

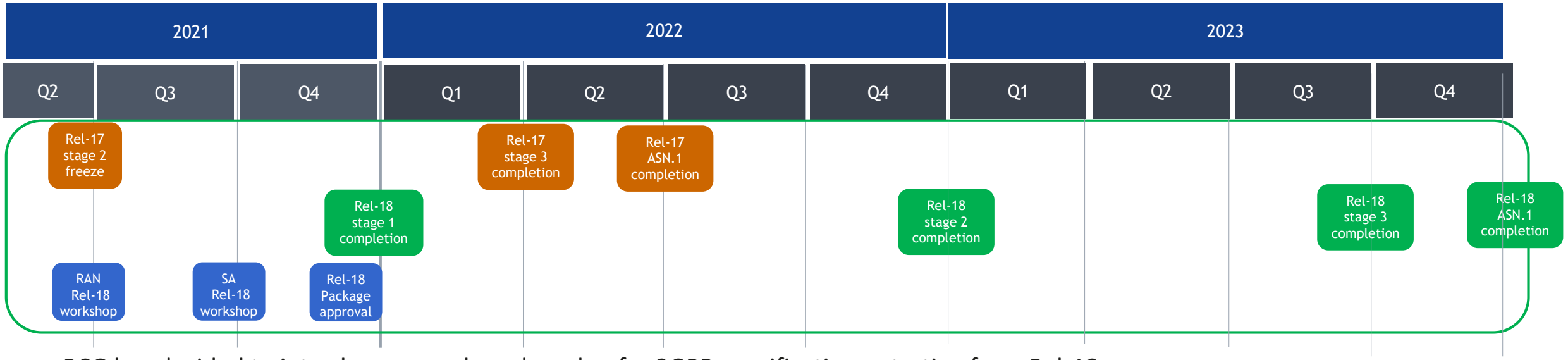
Huawei's perspective for Rel-18

5G-Advanced for industries

Source：Huawei，HiSilicon

Security Level: Proprietary

Rel-18 will mark mid-generation of 5G : 5G-Advanced



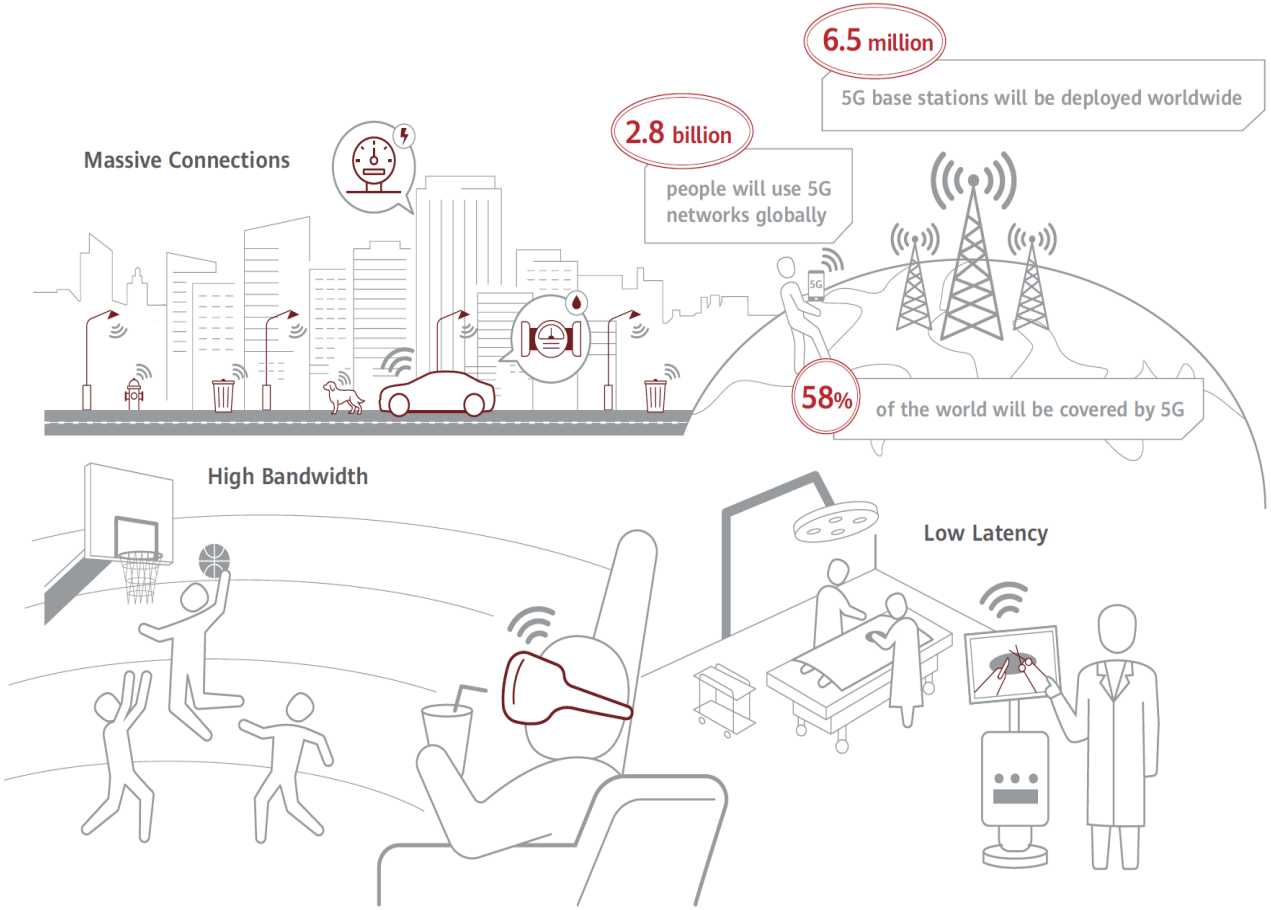
- PCG has decided to introduce a new brand marker for 3GPP specifications, starting from Rel-18:

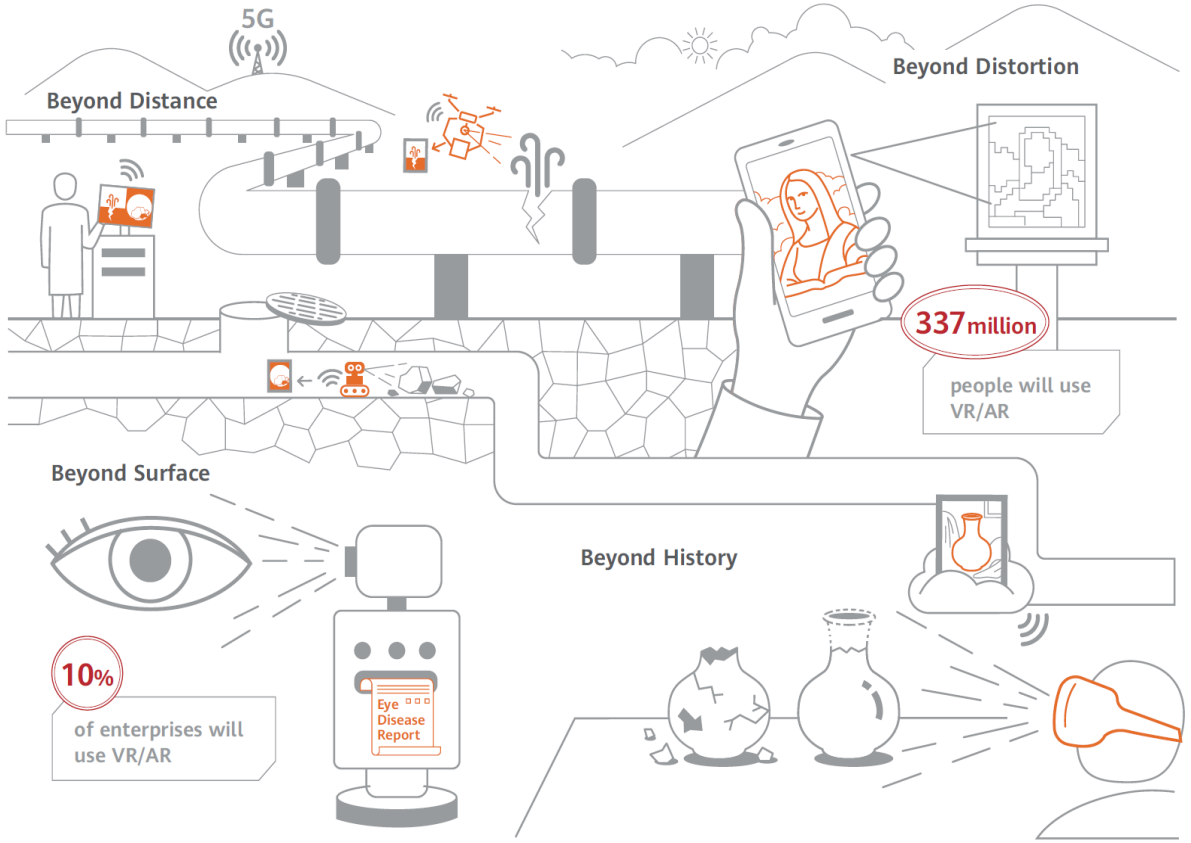
Decision PCG46/04: "5G-Advanced" to be used to identify 3GPP specifications and reports from Release 18 onwards, subject to the satisfactory completion of due diligence checks [**3GPP/PCG#46(21)22**].

- 5G-Advanced will mark a **new milestone** for the 5G Systems to answer the expectations of the telecom industry and of all the other industries that are in demand for more services and functionality from the 5G System to fulfil their needs.
- With the anticipation of the content of Release 18 matching those expectations, we believe that an **18-month** duration would be appropriate for Release 18. June RAN Rel-18 workshop has reached a preliminary agreement for an 18-month duration for Rel-18. SA, CT and RAN should synchronise with each other and decide the duration in SA#93e.
- It is expected that the final content for Rel-18 will be decided in December plenary meeting.

5G-Advanced for 2025

Rel-18 : an important milestone for starting 5G ADVANCED





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ref: Touching An Intelligent World, Global Industry Vision 2025, Huawei

Rel-18 key drivers for Huawei

New capabilities for consumers

- Architecture enhancements for XR and media services
- NG-RTC (next generation realtime communication services)

New capabilities for B2B

- LPHAP(Low power high accuracy positioning) — LCS3.0
- Group management, exposure and communication
- 5G Timing Resiliency and TSC & URLLC enhancements
- Passive IoT
- Harmonized Communication and Sensing

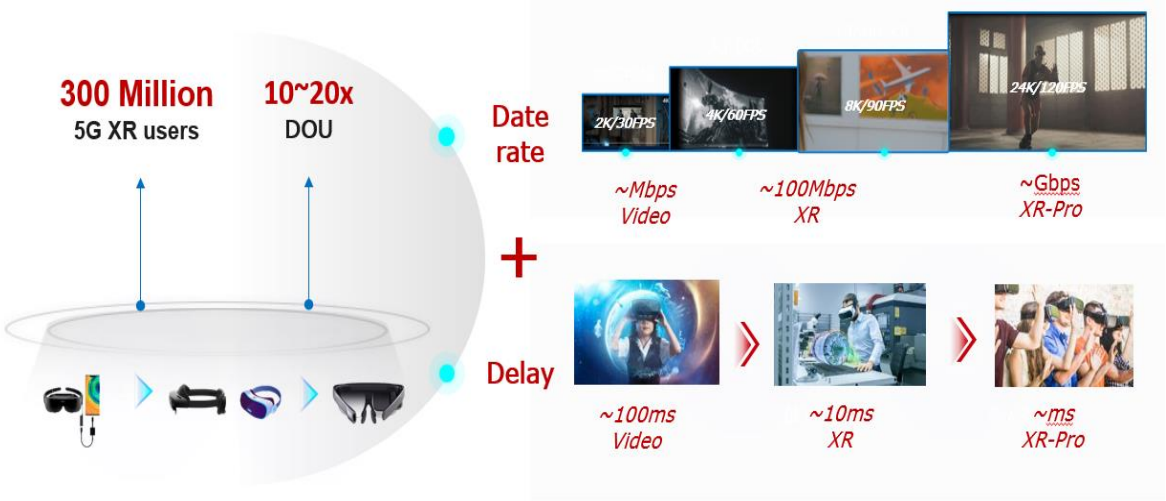
Completion of Rel-16/Rel-17 items

- Edge Computing 2.0 (Roaming, Exposure, GSMA OPG scenarios)
- 5MBS 2.0 (Free To Air, inactive mode)
- Redcap 2.0
- Policy enhancement (URSP enforcement checking, traffic categories)
- eNA 3.0 (finer granularity analytics, efficiency and accuracy improvement for analytics results)
- ATSSS 3.0 (traffic splitting for UDP)
- 5WWC 2.0 (enhancements for RG and for devices behind RG)
- eNPN 2.0, 5G Prose 2.0 …

Other WGs

- SA3 : supporting SA2 work with security aspects
- SA4 : 5GMS(media streaming) Evolution, Media/XR services
- SA5 : Autonomous Network(AON)
- SA6 : 5G Mission Critical,
  application layer enablers for smart-grid/railway/V2X

Architecture enhancements for XR and media services



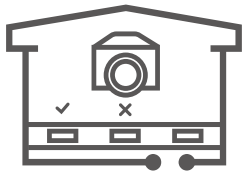
Key objectives

- Enhancement of QoS to support Media-Unit based QoS control
- Enhancement of QoS information exposure to enable quick rate adaptation of media service
- Enhancement of mobility and power saving considering traffic pattern of media service
- Network slicing for media service
- Coordination between multiple QoS Flows

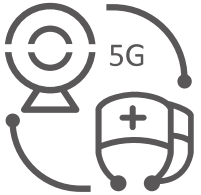
Cloud VR/AR

Live UHD streaming

Cloud Gaming


Machine Vision

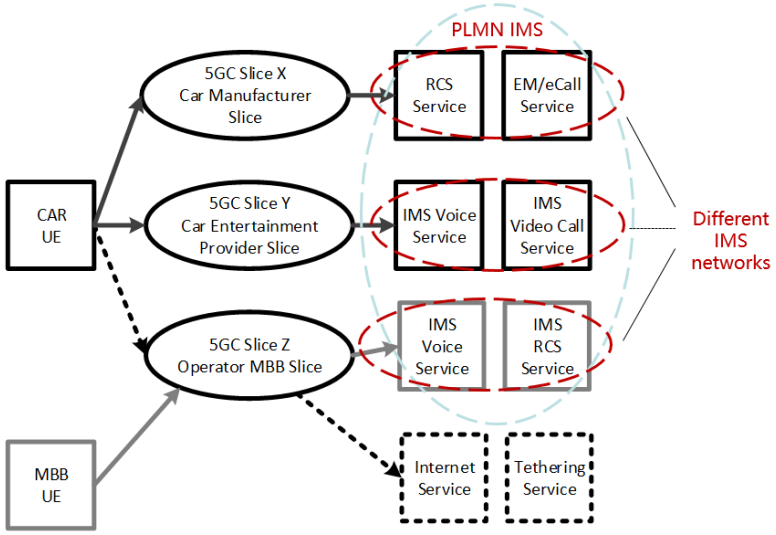
Remote Control



Remote Medical Diagnosis

NG-RTC (next generation realtime communication services)

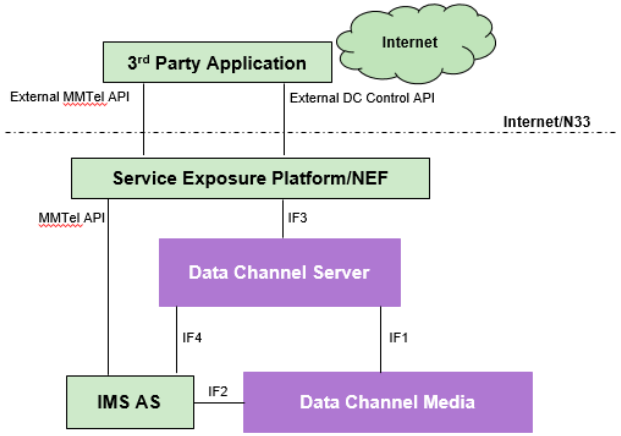
UE access to multiple IMS networks



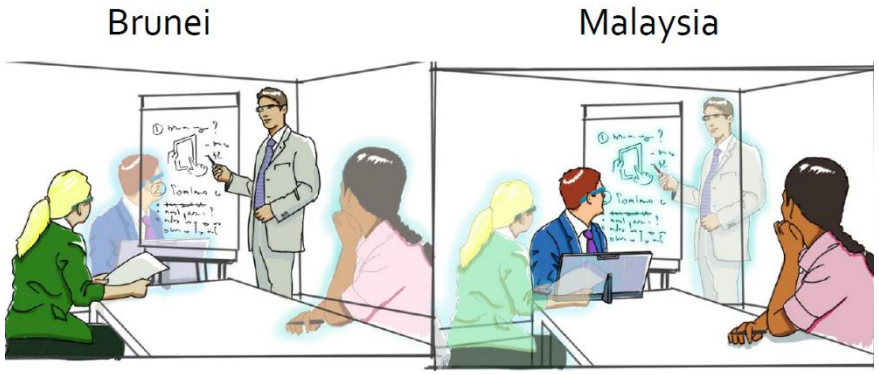
Key objectives

- Support IMS as part of a network slice, and support **UE with single USIM** to access multiple IMS in different 5G network slices.
- IMS architecture and procedure optimisation to shorten IMS call setup time.
- Support SA1 Rel-18 requirements (eMMTEL) for AR telephony communication and 3rd party specific user identities.
- Support Data Channel usage in IMS network.
- **Support SBIs for more IMS interfaces, besides Cx/Dx and Sh/Dh, maintaining SIP as core IMS signalling protocol.**

Data Channel support in IMS

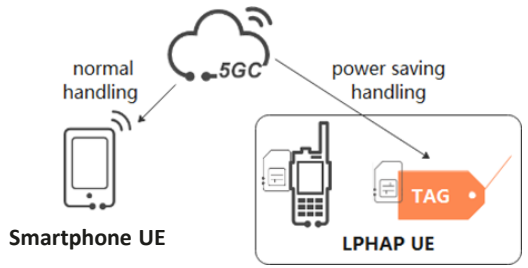


AR telephony communication



LPHAP (Low power high accuracy positioning) — LCS 3.0

1. **Introducing LPHAP UE: positioning-only UE, accuracy to sub-metre**



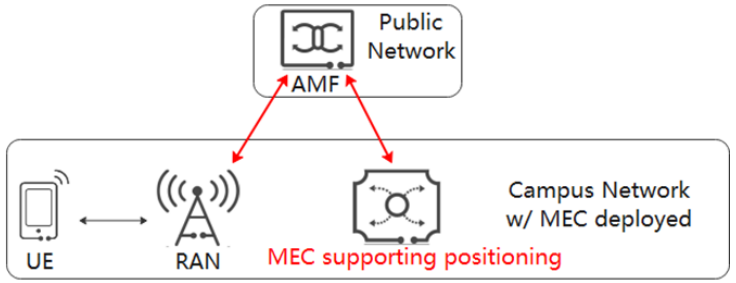
Manage LPHAP UE — increased power saving

E2E positioning method enhancement

Key objectives

- Identify LPHAP UE from normal UE
- Specific management for LPHAP UEs for power saving
- Determine specific positioning method for LPHAP UE

2. **Optimised LCS architecture for campus**

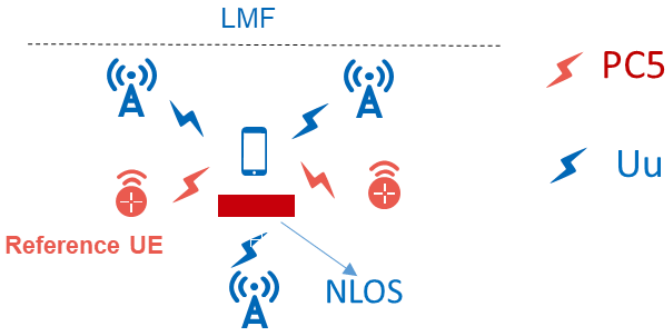


1. Latency reduction
2. LCS data security
3. UE location exposure

- Optimise LCS architecture for campus, including:
  - location data security, location service latency, reduce signaling overhead and location estimate exposure.

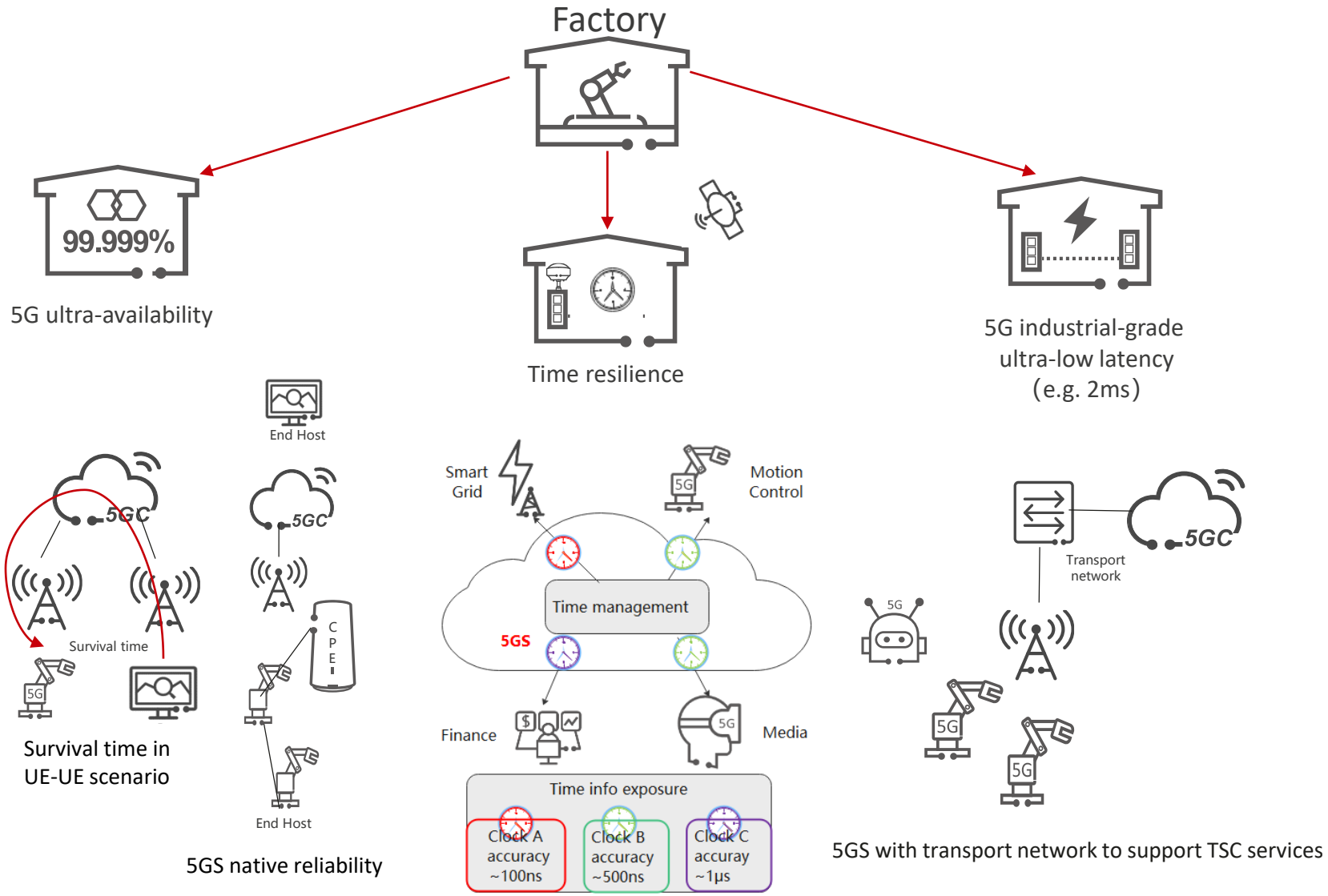
3. **Combined Uu+PC5 positionning measurement**

Leveraging reference UE for better LOS (line of sight) measurement



- Leverage specific UEs (i.e. Reference UE) to improve the accuracy of positioning, and reduce the signaling

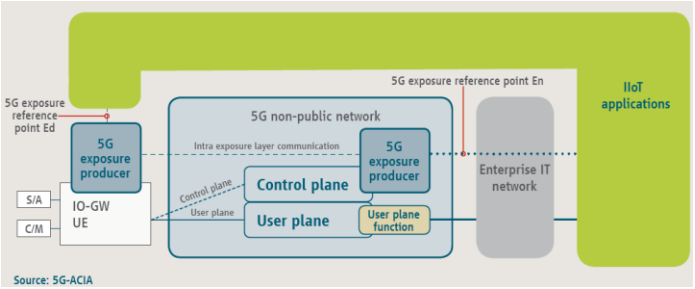
5G timing resiliency and TSC & URLLC enhancements



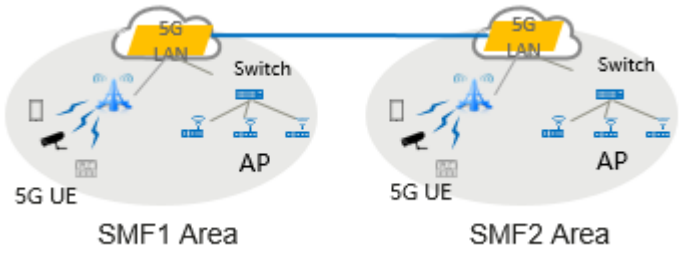
Key objectives

- 5G ultra-availability
  - 5G native reliability (considering the end hosts are outside 3GPP network)
  - survival time handling in UE-UE scenario
- Support for low latency and low jitter
  - interworking with TSN transport networks
  - burst sending time adjustment based on RAN feedback
- Reporting maximum delay via QoS Monitoring enhancements
- Support monitoring, detection and reporting of time source failure and timing holdover capabilities within 5GS and exposure of time info to 3rd party

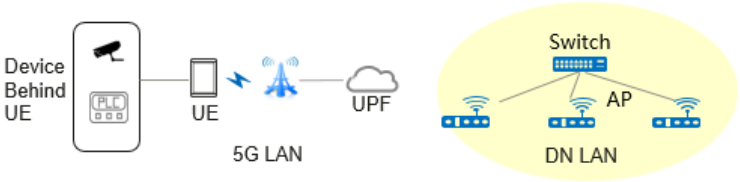
Group management, exposure and communication



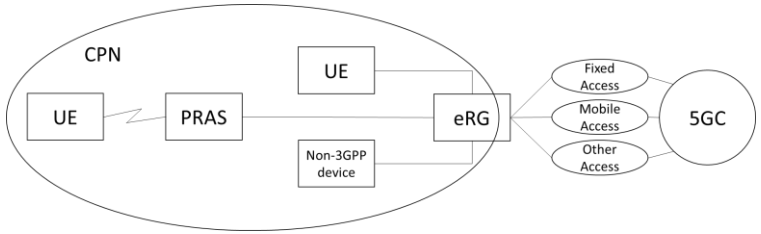
Dynamic group management and exposure to industrial application



Cross-SMF group communication for multi-sites campus



Integration of 5G-LAN and legacy DN LAN
→ Loop protection
→ Support of VxLAN



5G-VN communication for residential deployments

Key objectives

- Enhance dynamic group management
  - service area, group status event reporting
- Enhance capability exposure
  - monitoring of communication performance for a service data flow or UE or 5G VN (e.g. communication service availability)
  - provisioning of communication characteristics (e.g. transfer interval and the data volume per cycle time)
  - (de-)provisioning the group relevant UE information to the 5GC
- Support Cross-SMF 5G VN communication
- Enhancement of communication between 5G VN and device in the DN to prevent loops
- Support VxLAN-type communication by 5GS
- Support the use of 5G VN communication for residential deployments
  - scalability to support many small 5G-VN groups rather than some larger ones
  - connecting a residential gateway to a 5G VN group

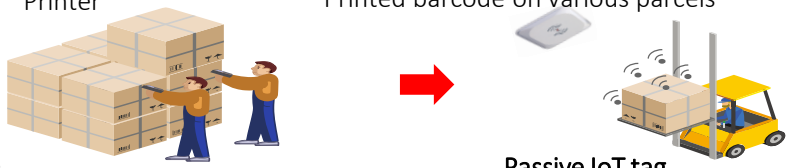
Support for Passive IoT

Automated asset management in factories

Current practice: Barcode on paper for inventory and tracking

Printer

Printed barcode on various parcels



Barcode
Handheld LOS scanning (labor intensive)
Slow one-by-one scanning (time consuming)

Passive IoT tag
Automatic remote reading
Hundred times faster reading

Sustainable sensor network

monitor environments, crops state, and equipment state for agriculture

Key objectives

A passive IoT device is 5G IoT device without battery.

- Study the general architecture for supporting Passive IoT in 5G system.
- Managing Passive IoT devices, including registration aspects
- Managing connectivity for the Passive IoT devices
  - establishing connectivity of Passive IoT devices for data transmission
  - QoS handling for the Passive IoT device data transmission
- Supporting mobility of Passive IoT devices.

Harmonized Communication and Sensing

Automated driving

case 1 (V2X & UAV)
Real time road traffic information sensing
Requirement
per-area sensing to generate dynamic 3D map.

case 2 (V2X & UAV)
Emergency event detection
Requirement
per-area sensing to detect the danger event, and notify the related vehicles.

case 3 (V2X & UAV)
Automated driving assistance
Requirement
High granularity sensing to assist automated driving.

Safety Supervision

case 1 (V2X & UAV)
Driving violation, e.g. vehicle occupies emergency lane, UAV flies away from the planned route.
Requirement
Per-area sensing to detect driving and flying violation

case 2 (Railway & UAV)
UAV/object intrusion into the forbidden area.
Requirement
per-area sensing to detect illegal UAV/object intrusion

Key objectives

- Gap analysis
- E2E architecture enhancements :
  - Overall HCS architecture, e.g. new network function, and new interface and new protocol
  - RAN and CN function split
  - E2E signalling interactions
  - Sensing service authorization and exposure.

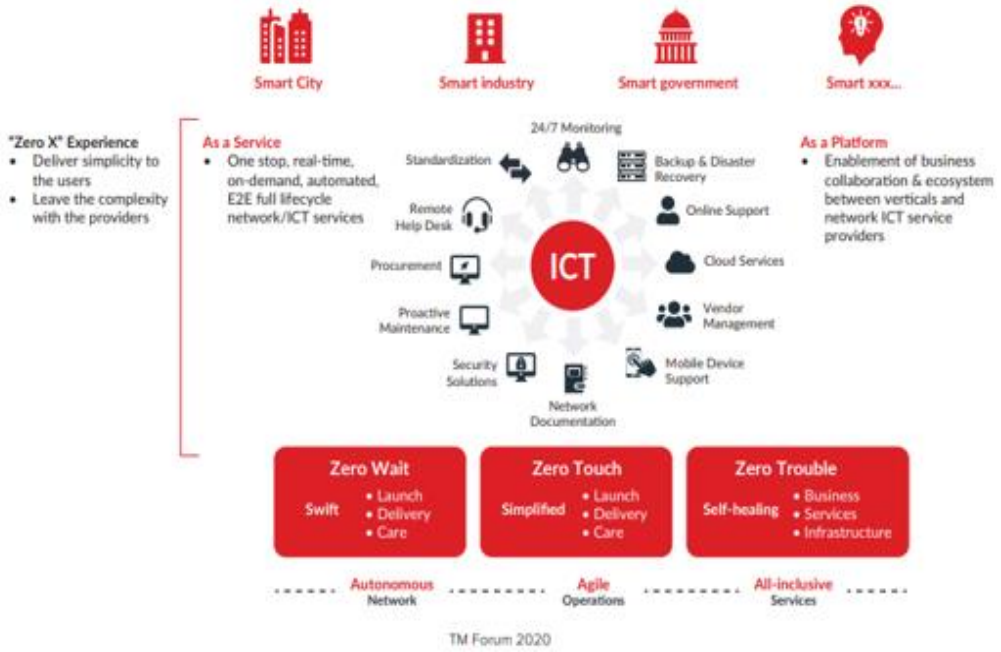
Note: RAN and CN coordination is expected focusing on the sensing signaling and data transmission between RAN and CN (RAN3 work)

SA5: Autonomous Network (AON)

Motivation

from TMF autonomous network whitepaper

The ultimate goal for autonomous network is to **enable telecommunication system (including management system and network) to be governed by itself with minimal to no human intervention by utilizing the autonomy mechanisms** (including intelligence mechanism, e.g. AI/ML, and automation mechanism, e.g. rule-based automatic control, and other mechanisms to enable the autonomous network).



Key topics to support up to Level 4 of autonomy

Network autonomy level		Task categories				
		Execution	Awareness	Analysis	Decision	Intent handling
L0	Manual operating network	Human	Human	Human	Human	Human
L1	Assisted operating network	Human & Telecom system	Human & Telecom system	Human	Human	Human
L2	Preliminary autonomous network	Telecom system	Human & Telecom system	Human & Telecom system	Human	Human
L3	Intermediate autonomous network	Telecom system	Telecom system	Human & Telecom system	Human & Telecom system	Human
L4	Advanced autonomous network	Telecom system	Telecom system	Telecom system	Telecom system	Human & Telecom system
L5	Full autonomous network	Telecom system	Telecom system	Telecom system	Telecom system	Telecom system

Note 1: Human reviewed decision have the highest authority in each level if there is any confliction between human reviewed decision and telecom system generated decision.
Note 2: The order of above five task categories does not reflect the workflow sequence.

1. Enhancement of autonomous network levels (eANL)
2. Enhancement of service-based management architecture(eSBMA)
3. Enhanced intent driven management services for mobile network(IDMS)
4. Further enhancements into Management Data Analytics (MDA)
5. Energy Efficiency of 5G(EE)
6. Enhancement management of non-public networks(eNPN):
7. Deterministic Service Assurance Management(DSAM)
8. Key Quality Indicators (KQIs) for 5G service experience KQI for typical services
9. Edge Computing Enhancement
10. Incident management

Thank you.

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