

# China Unicom's view on SA Rel-19

China Unicom

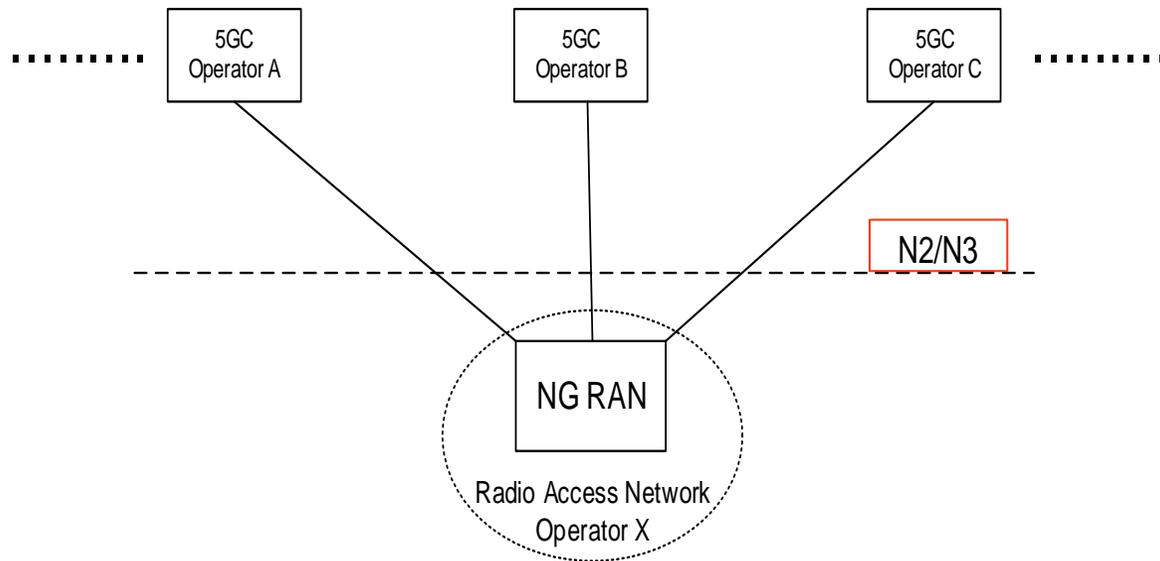
# Overall View on Rel-19 Content

| Priority for CUCC | S.NO. | Title  | Brief Description and Key Objectives   | Related Stage-1 Study/Work Item | Lead Stage-2 WG | RAN dependencies | Other WG dependencies |
|-------------------|-------|--|--|---------------------------------|-----------------|------------------|-----------------------|
| Top               | 1.    | <b>Indirect Network Sharing</b>                          | Defining new network sharing concept supporting Participating Operator's 5GC indirectly connected to Shared RAN via Hosting Operator 5GC.  | Yes, TR 22.851                  | SA2             | Yes              | SA3, SA5              |
|                   | 2.    | <b>Integrated Sensing &amp; Communications</b>           | 5GS enhancements for supporting NR-based sensing capabilities.   | Yes, TR 22.837                  | SA2             | Yes              | SA3, SA5              |
|                   | 3.    | Ambient IoT  | Supporting Ambient-power enabled IoT devices in 5G System.   | Yes, TR 22.840                  | SA2             | Yes              | SA3, SA5              |
|                   | 4.    | eNA & AI/ML evolution                                    | Further enhancements / extensions to eNA and AI/ML service architecture, e.g. Vertical FL, Sidelink based AI/ML operations, new AI/ML use cases, etc.  | Yes, TR 22.876 for AIML_MT_ph2  | SA2             | Don't know       | SA3, SA5              |
| High              | 5.    | XR enhancement / Metaverse                               | Enhancements to XRM service e.g. PDU Set handling, QoS framework, etc. Also take the output of SA1 Metaverse study into consideration.   | Yes, TR 22.856 for Metaverse    | SA2             | Yes              | SA3, SA4, SA5, SA6    |
|                   | 6.    | Satellite / NTN evolution                                | Supporting new architectures (e.g. MEC on board) and new service mode (e.g. S&F operation, UE-Satellite-UE communications, etc) for 5G satellite access.                                     | Yes, TR 22.865                  | SA2             | Yes              | SA3, SA5              |
|                   | 7.    | Next generation real time communication services phase 2 | Further enhancements to NG-RTC architecture for supporting interworking and roaming of IMS data channel. Enhanced IMS media plane architecture, interfaces and procedures for new use cases. | No                              | SA2             | Yes              | SA3, SA5              |
|                   | 8.    | Edge Computing Phase 3                                   | Supporting enriched edge computing scenarios, such as routing service traffic to MEC located in HPLMN in roaming cases.  | No                              | SA2             | No               | SA3, SA5, SA6         |
|                   | 9.    | Dual Streaming   | Extension of MA PDU Session for the cases with two 3GPP accesses, while 3GPP networks may use same or different RATs, e.g. NR (terrestrial or satellite) or E-UTRA.                          | Yes, TR 22.841                  | SA2             | Don't know       | SA5                   |

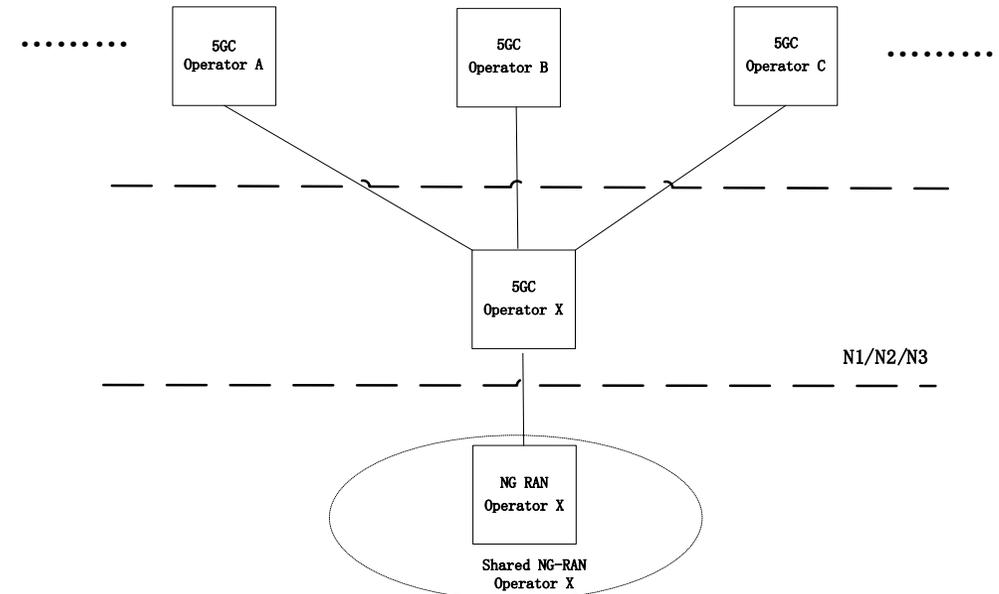
# Motivation for supporting Indirect Network Sharing

- Enabling new Network Sharing mechanism different from 5G MOCN (i.e. **Indirect Network Sharing defined in SA1**), which do not require the operators to maintain a large number of inter-PLMN interfaces, between hosting operator's NG-RAN and participating operator's 5GC (e.g. N2/N3).
- Roaming architecture can be reused as baseline for interactions between Hosting operator and Participating operator.

5G MOCN



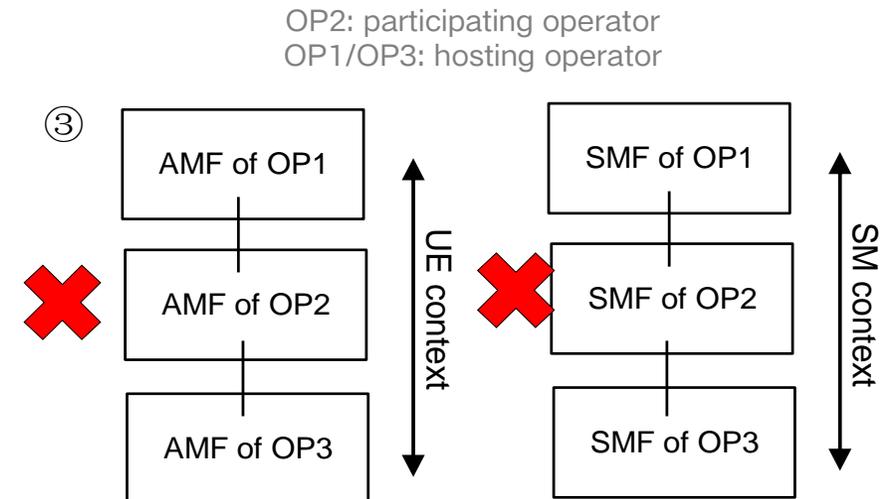
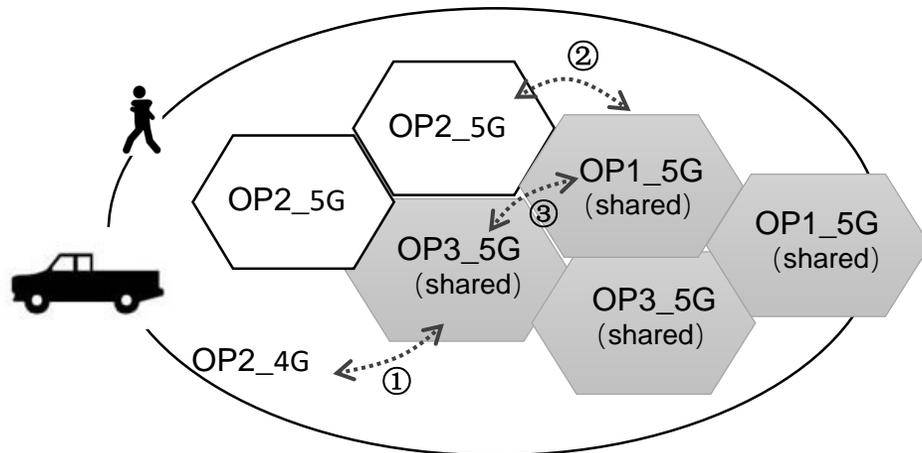
5G Indirect Network Sharing



# Enhanced End-to-End 5GS procedures

## Enhanced E2E procedures for supporting 5G Indirect Network Sharing

- Defining high level principle for UEs to select appropriate operator when Indirect Network Sharing is enabled, and defining enhanced E2E procedures for supporting Indirect Network Sharing e.g. Registration, PDU Session Management, etc.
  - ✓ Authorization mechanism specifically for the users subscribed to access or handover to a Hosting operator's shared network by 5G Indirect Network Sharing may need to be considered.
- Enhanced mobility management procedures (e.g. handover, idle mode mobility) for guaranteeing service continuity and/or minimizing the impact to user experience in different mobility situations (e.g. UE moving between a shared NG-RAN and a non-shared NG-RAN, or two shared NG-RANs belong to two different hosting operators respectively).
  - ✓ For the scenario that the UE moving between shared NG-RANs belong to two different hosting operators, there may have no interfaces configured between these two hosting operators.



- Other potential enhancements e.g. supporting Emergency Call, etc.

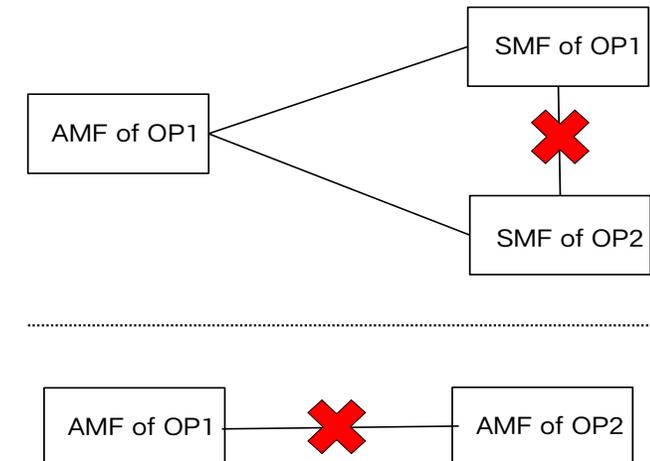
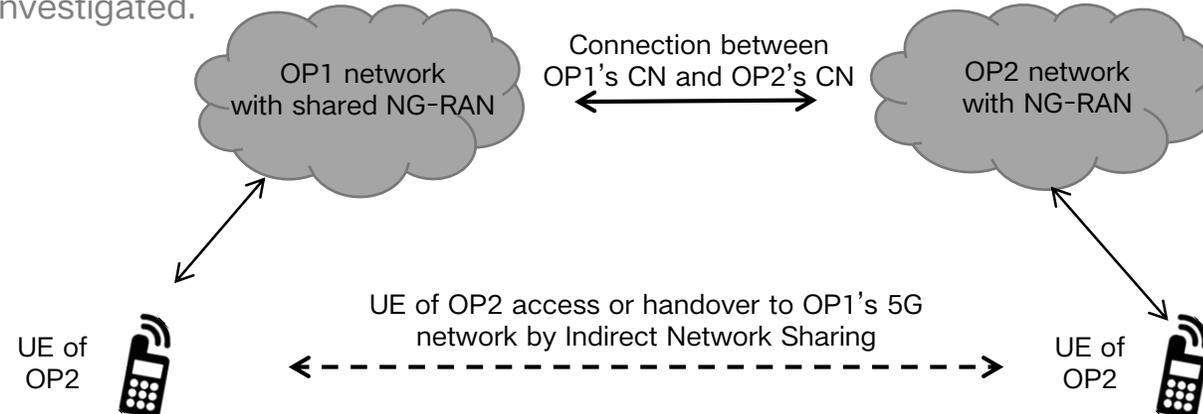
# NF Selection in Indirect Network Sharing scenario

## Enhancements to NF Selection mechanism for inter-PLMN scenarios

- For inter-PLMN scenarios, by existing NF discovery and selection procedures, the consumer NF may discover a target NF without configured inter-PLMN interface. For example:
  - At inter PLMN mobility, the source AMF selects an AMF instance(s) in the target PLMN by querying target PLMN level NRF via the source PLMN level NRF with target PLMN ID;
  - In the home-routed roaming case, the SMF selection functionality selects an SMF in VPLMN based on the S-NSSAI of the VPLMN, as well as an SMF in HPLMN based on the S-NSSAI of the HPLMN.

\*Note: The descriptions above are quoted from 3GPP TS 23.501.

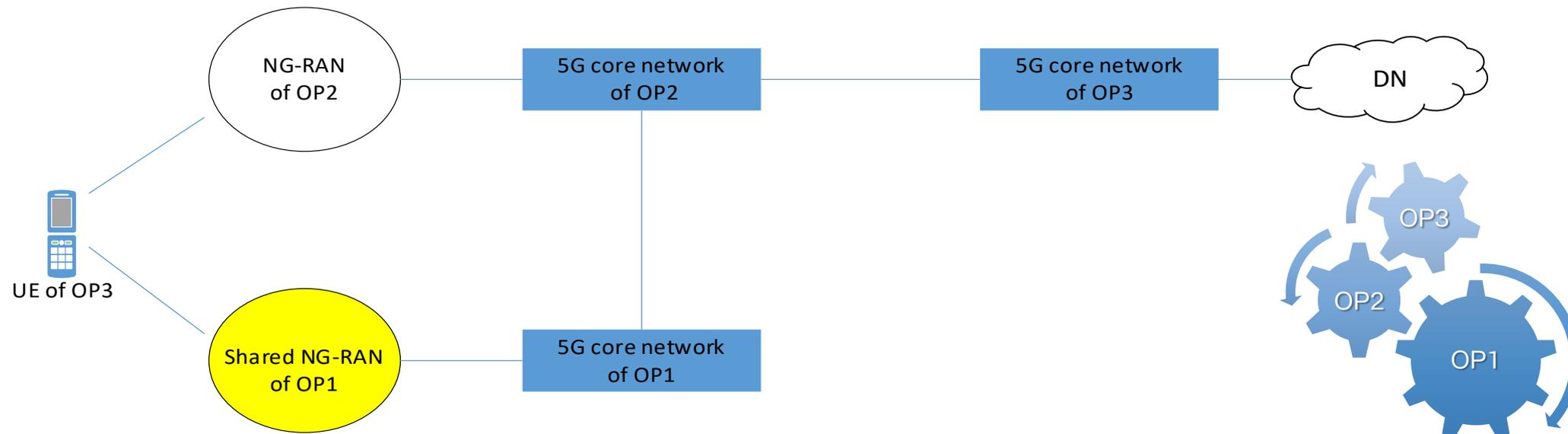
- Therefore how to enhance the NF selection mechanism to accurately select the optimal NFs in 5G Indirect Network Sharing scenario needs to be investigated.



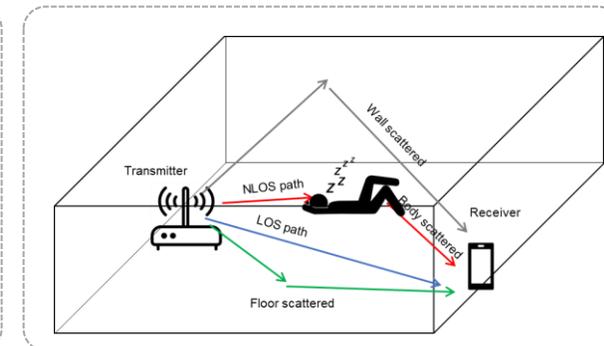
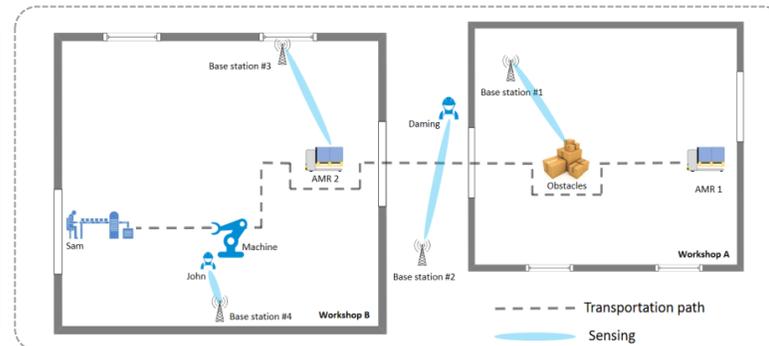
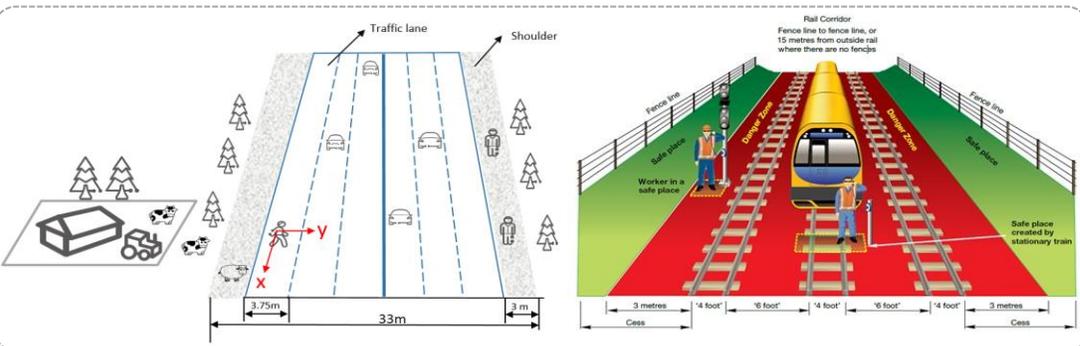
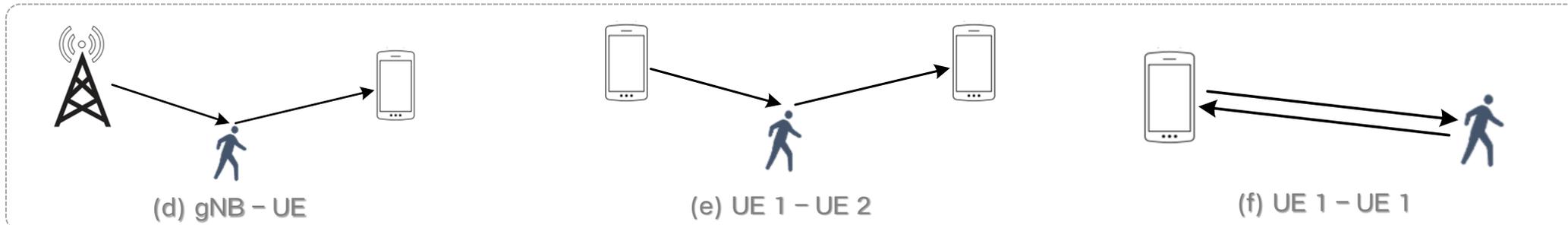
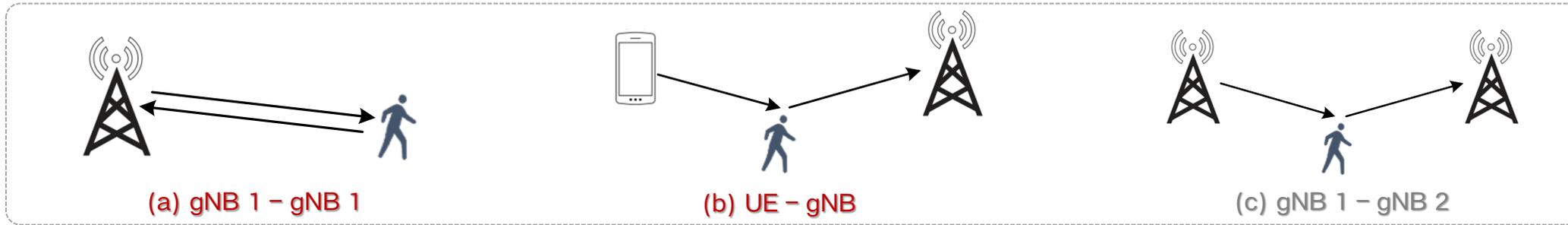
# International roaming cases

## Coordination between three operators

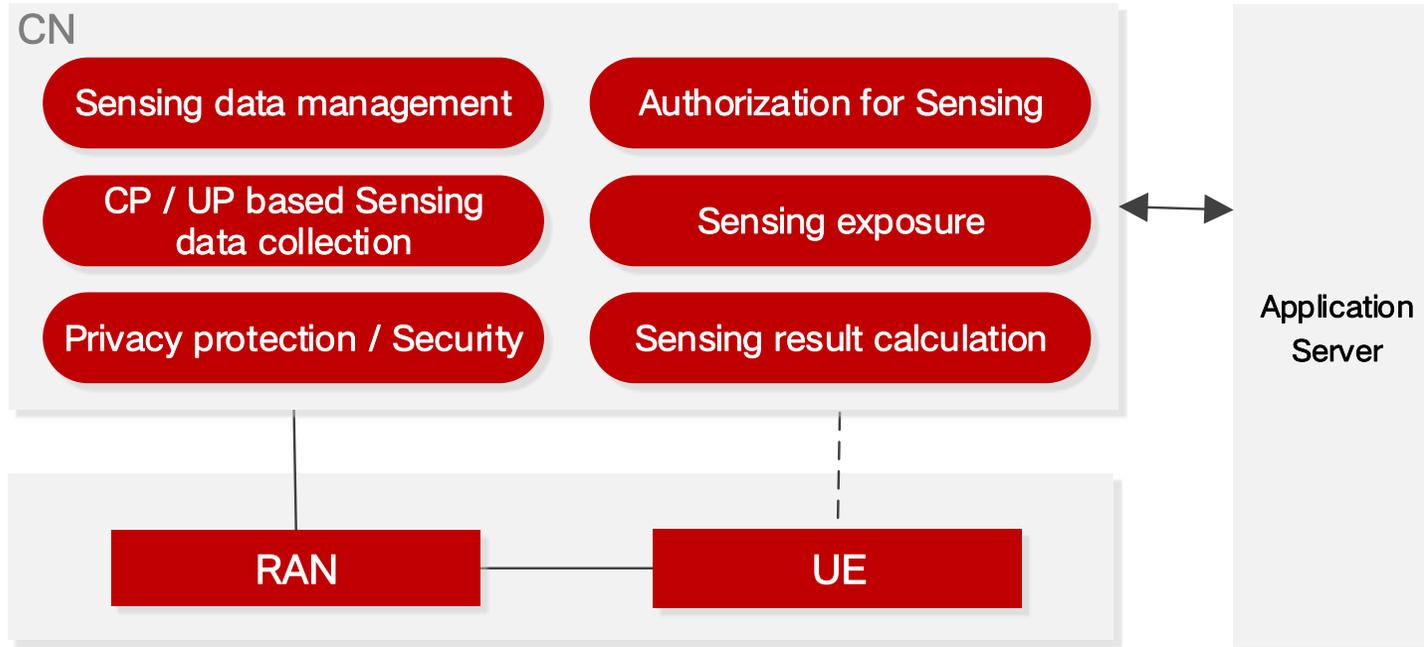
- Typical scenario: International roaming UE (belongs to OP3) roams into the coverage of local OP1, while:
  - ✓ OP1 is the hosting operator whose 5G network can be shared by OP2 with Indirect Network Sharing mechanism.
  - ✓ There is no roaming agreement between OP1 and OP3.
  - ✓ There is a roaming agreement between OP2 and OP3.
- Potential enhancements for supporting roaming UEs to access the subscribed network using 5G Indirect Network Sharing provided needs to be investigated, e.g. OP2 acting as a relay network.



# Integrated Sensing & Communication



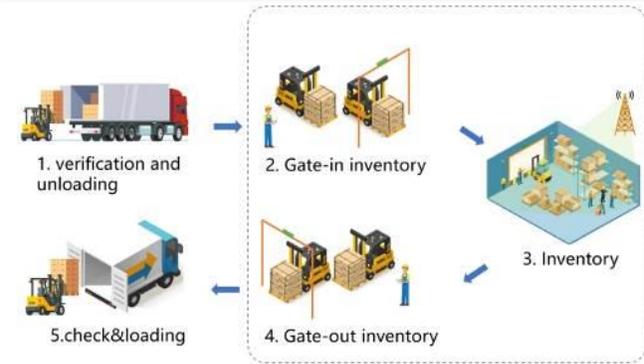
# Essential enhancements for supporting Sensing



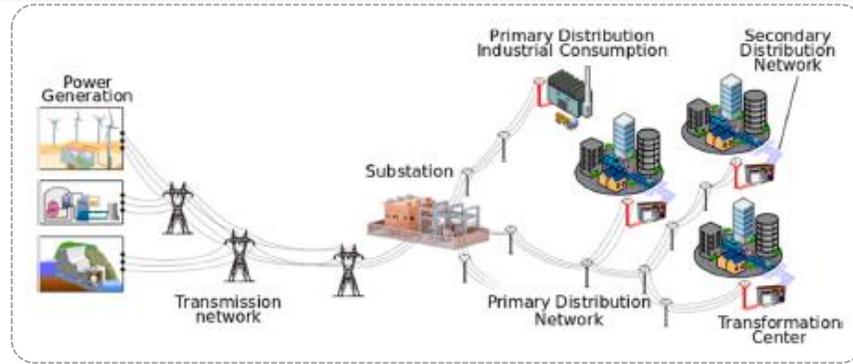
## Essential enhancements for supporting sensing in 5GS

- Defining new 5G logic functionality for the management of sensing services (e.g. Sensing Function).
- Defining end-to-end procedures for supporting sensing data collection / calculation / exposure.
- Sensing authorization for specific areas / objectives.
- Privacy protection of sensing areas / objects, security aspects of Sensing services.

# Ambient IoT



Automated Warehousing  
(Warehousing & Logistics)

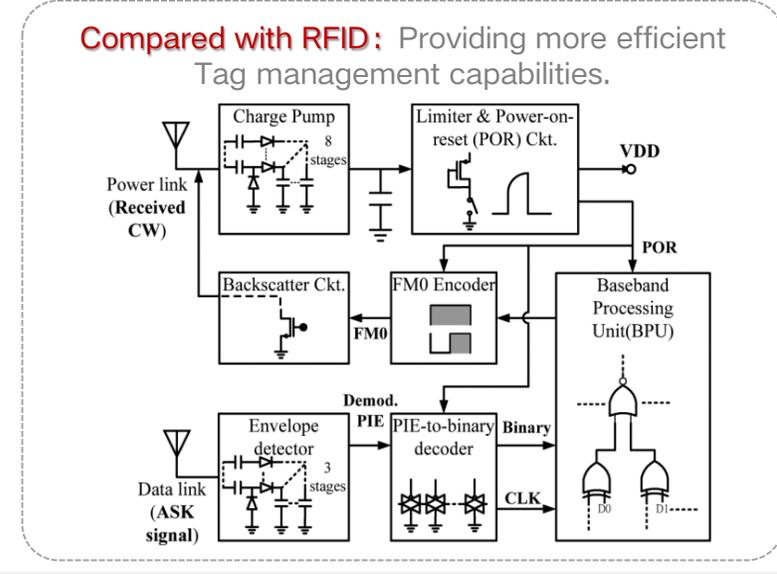
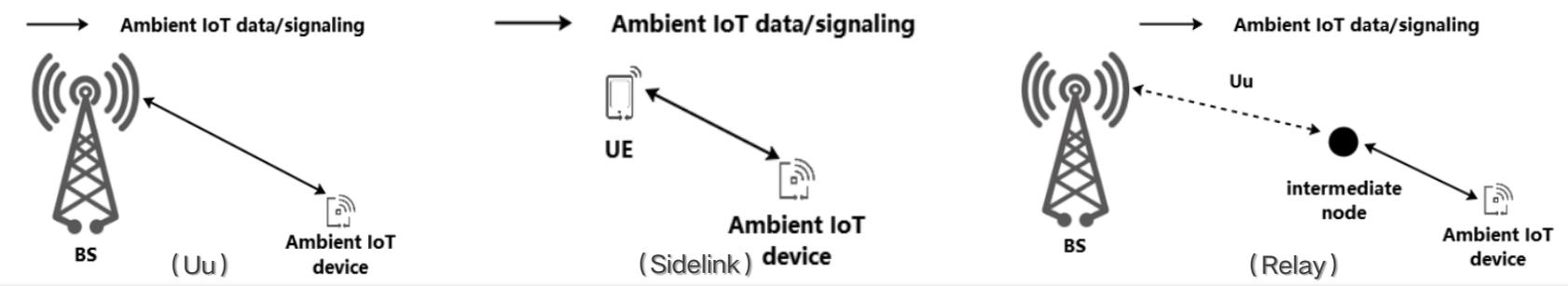


Smart Grid  
(Sensor)

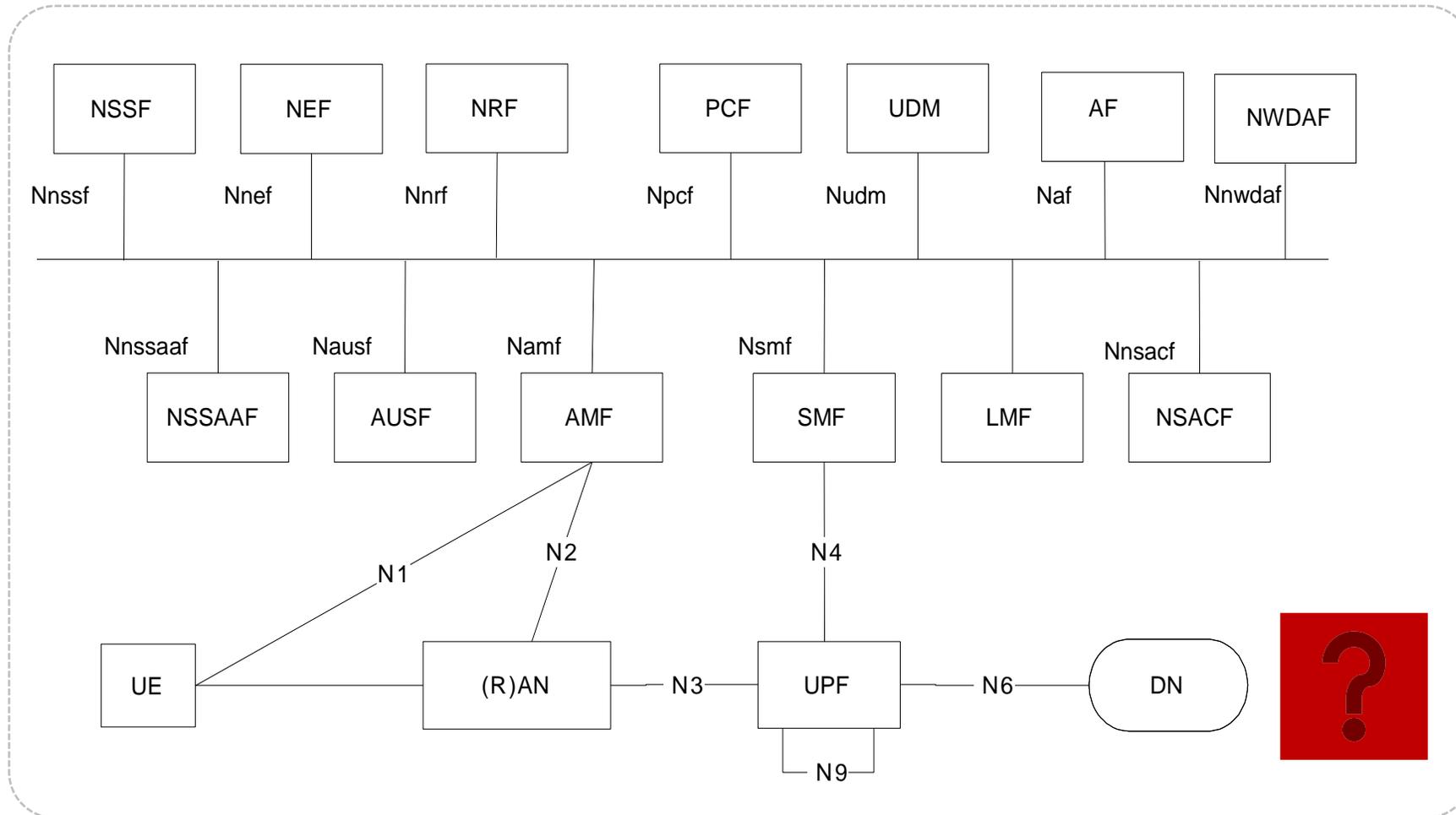


Smart Agricultural & Animal Husbandry  
(Sensor)

| Type     | Description  |
|----------|--|
| Device A | No energy storage, no independent signal generation, i.e. backscattering transmission  |
| Device B | Has energy storage, no independent signal generation, i.e. backscattering transmission. Use of stored energy can include amplification for reflected signals |
| Device C | Has energy storage, has independent signal generation, i.e. active RF component for transmission   |

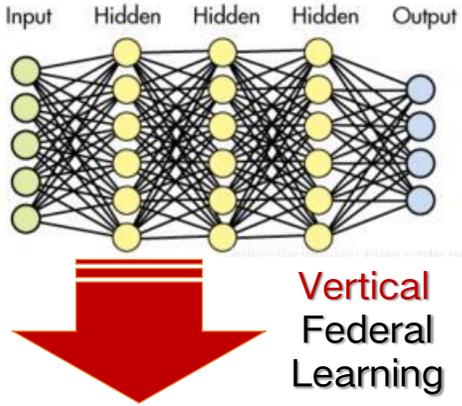


# Enhancements for enabling Ambient IoT



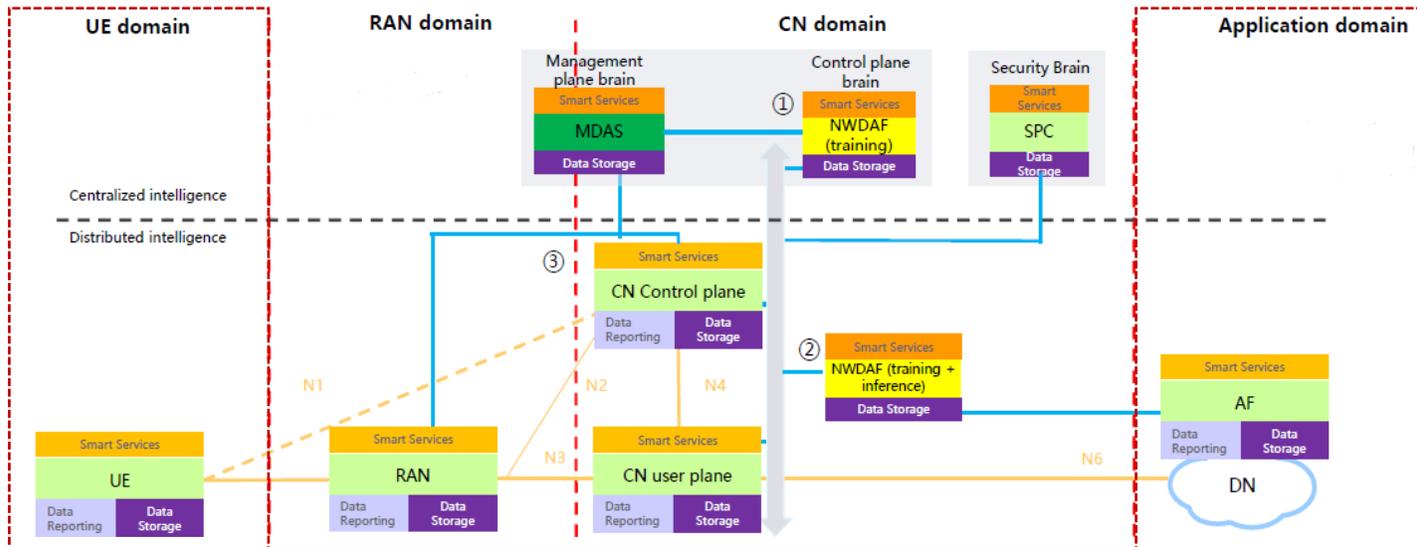
- Tag access / Reg.
- Tag data forwarding
- Mobility management
- LCS/Ranging
- Security
- Charging

# Continuous work on AI (eNA / AIMLsys)

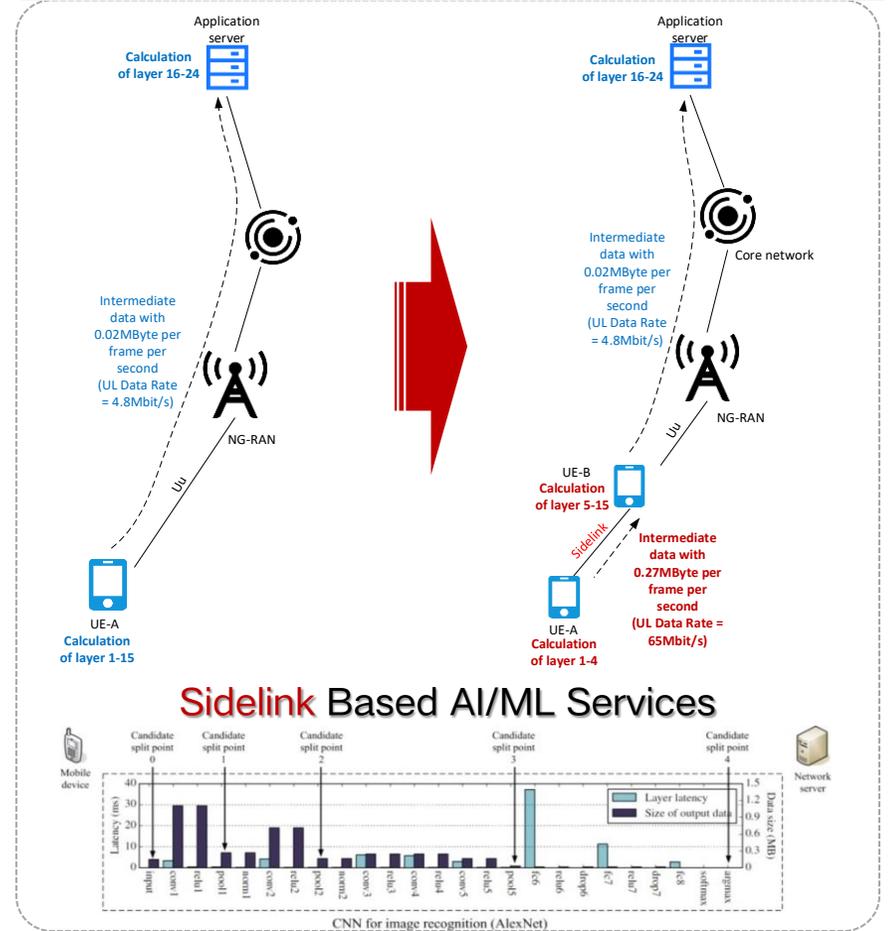


## E2E AI+ (5GC / UE / Application)

- **Vertical Federal Learning**
  - ✓ Bringing UE and Application domain into the scope of Federal Learning (i.e. ML Model Training).
- **New use cases for AI services**
  - ✓ AI based Energy Efficiency
  - ✓ Policy enhancements / recommendation driven by NWDAF



## UE Centric AI+ (UE / Application)



# High priority areas

## XR / Metaverse

- Supporting more protocols besides RTP/SRTP, e.g. HTTP/DASH, QUIC.
- Further enhancements to PDU Set QoS parameters (e.g. MDBV, Alternative PDU Set QoS, PSDB handling, etc).
- QoS control of traffic based on encrypted protocol e.g. QUIC.



## Real time communication - Phase 2

- Supporting the exposure of IMS real-time communication capabilities (audio, video, text, data) to the enterprises/verticals.
- Enhancements to IMS media plane for supporting new use cases of mobile Metaverse services and IMS based XR services.

## Satellite - Phase 3

- Regenerative payload generic architecture enhancements for supporting edge computing on board, communication delay reduction, Inter Satellite Link communication.
- Supporting S&F operations, UE-Satellite-UE communication, etc.



## Edge Computing - Phase 3

- Support in roaming case including HR roaming or LBO roaming scenario to always offload edge related traffic to one dedicated edge network located at the HPLMN.

## Dual Steering

- Enhancement to MA PDU session for supporting two 3GPP access

# Summary

5G

Rel-15

Rel-16

Rel-17

5G - Advanced

Rel-18

Rel-19

## • Considerations on SA Rel-19

- ✓ Based on the determined Rel-19 timeline (12-15 months), the ideal number of SID/WID can be no more than 15.
- ✓ The resource allocation for continuous improvements and new topics needs to be considered finely and carefully, since the total resource is quite limited in Rel-19.
- ✓ It is recommended that multiple dimensions to be considered during the prioritization process (if needed), e.g. maximum number of SIDs/WIDs, TU budget for Rel-19, TU requirement of individual SID, etc.



THANKS.