

Discussion on Enhancement for Supporting 5G Indirect Network Sharing in R19 (FS_5INS)

China Unicom

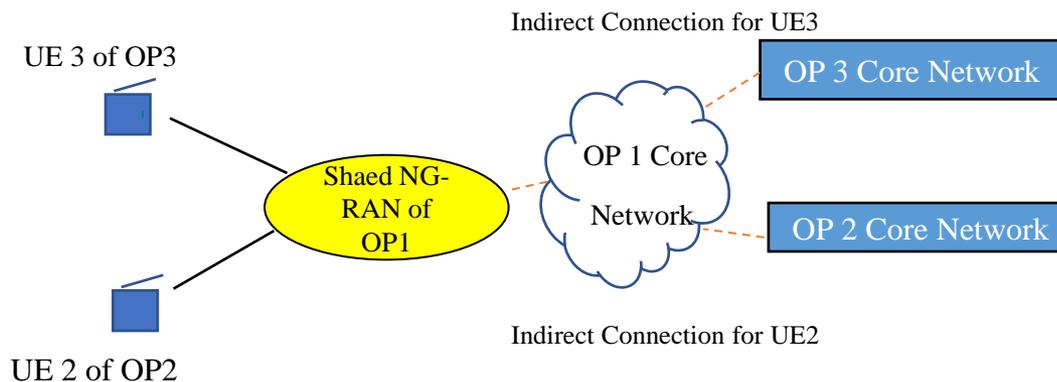
Overview

Concept

Indirect Network Sharing describes the communication between the shared access NG-RAN and the Participating NG-RAN Operator's core network being routed through the Hosting NG-RAN Operator's core network.

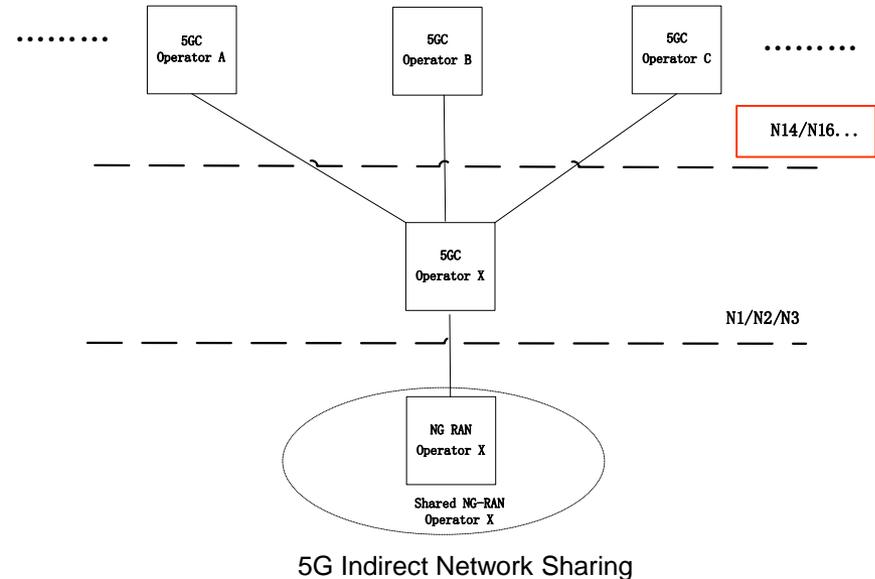
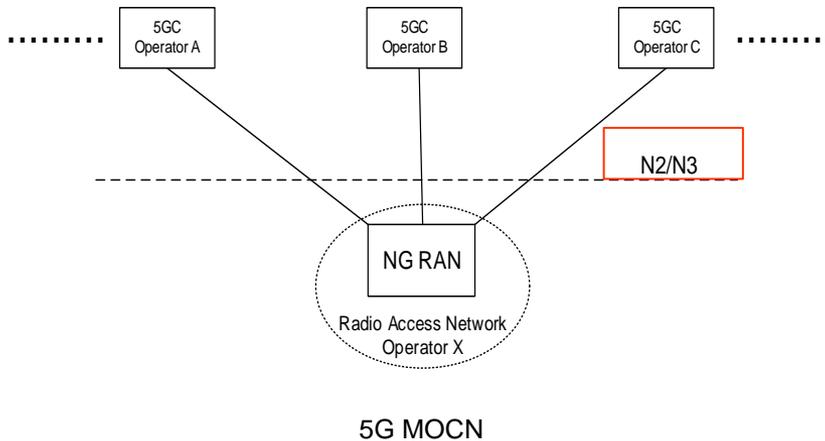
Motivation

Network Sharing mechanism enables the operators to maximize rollout and improve overall network quality. This study item aims at studying system enhancements for supporting new Network Sharing mechanism different from 5G MOCN in 5G System (i.e. Indirect Network Sharing defined in SA1), without the requirements for the operators to maintain a large number of interfaces between hosting operator's NG-RAN and participating operator's 5GC (e.g. N2/N3 interfaces).



General architecture

Architecture:

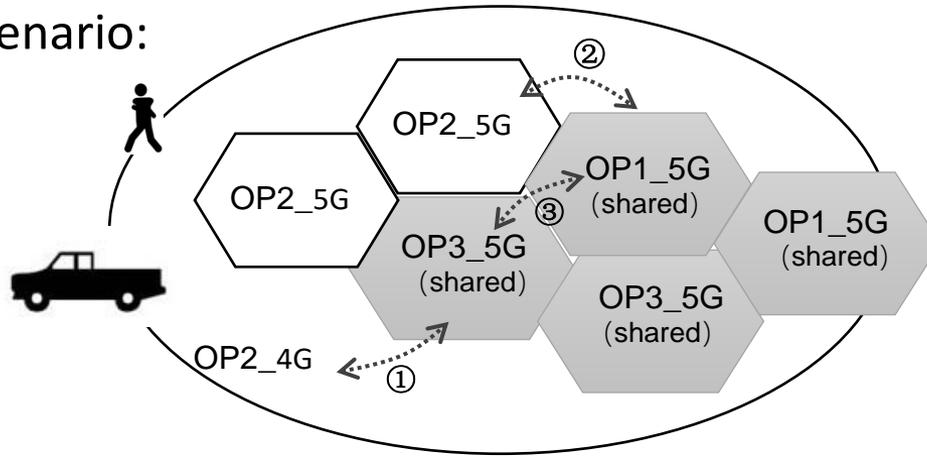


Observation:

- In the current specification, it does not support the specific 5G Indirect Network Sharing deployment scenarios, e.g., the network access control mechanism specifically for 5G Indirect Network Sharing scenario. Therefore the potential 5GC enhancement needs to be investigated to enable the authorized UEs to access the subscribed PLMN in 5G Indirect Network Sharing scenario.

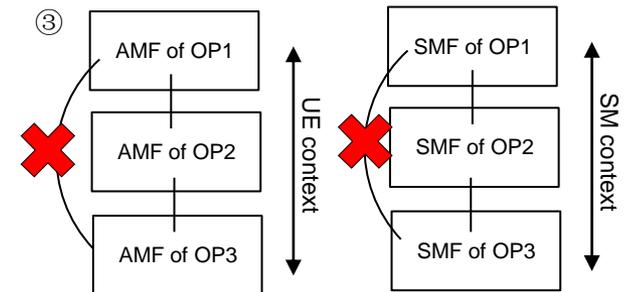
Mobility management

Scenario:



- ① no gap in existing 5G features: interworking with EPC
- ② gap: the authorization procedure specific to the 5G Indirect Network Sharing does not support in the inter PLMN handover case in the current specification, other mobility solutions (e.g., idle mode mobility between 5GS)
- ③ gap: the mobility solution considering non existing interconnection interface between OP1 and OP3 (but OP1 and OP3 have the N14/N16 interfaces with OP2 respectively)

OP2: participating operator
OP1/OP3: hosting operator
Shared area: allowed shared area

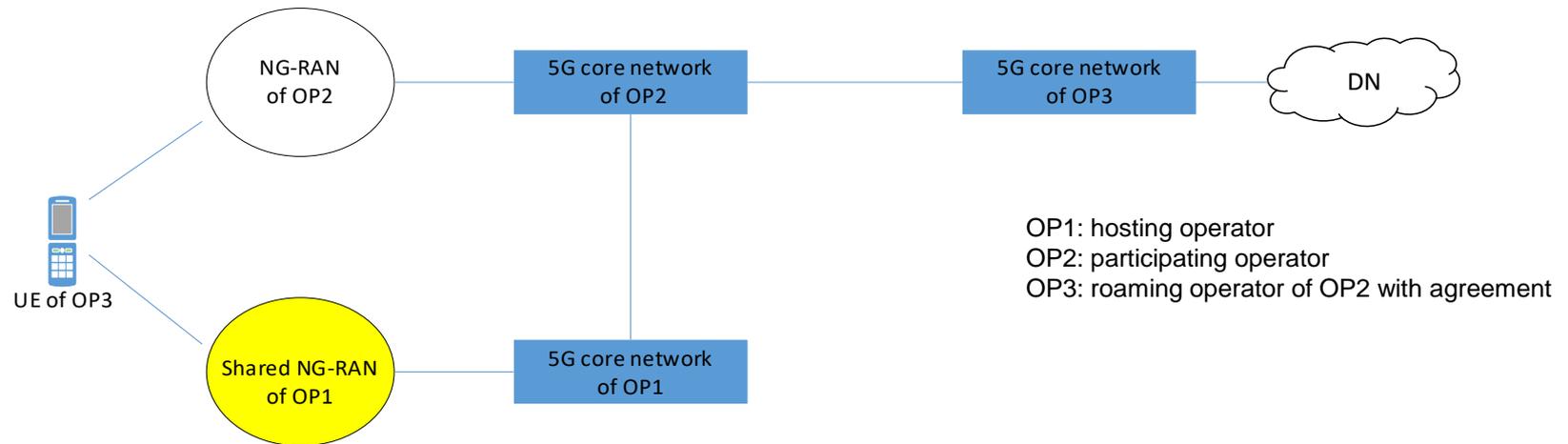


Observation:

- When the UE moves between two different PLMNs (e.g. between a shared NG-RAN and a non-shared NG-RAN, or two shared NG-RANs belong to two different hosting operators respectively), how to guarantee the service continuity and/or minimize the impact to user experience in different mobility situations needs to be investigated.

Roaming user in 5G Indirect Network Sharing scenario

Architecture:

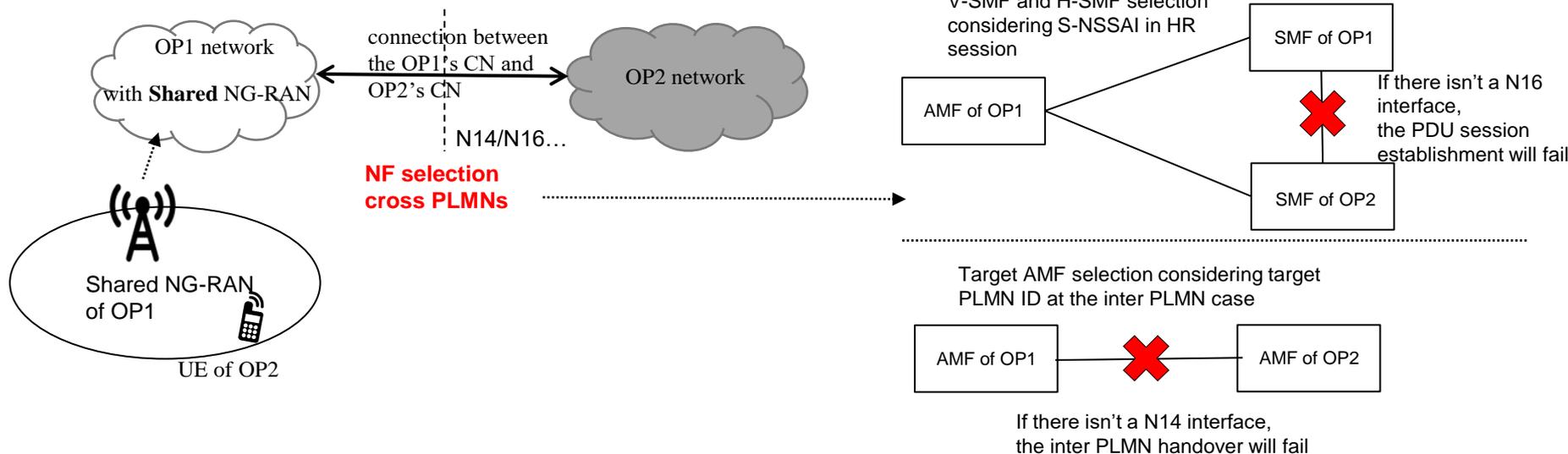


Observation:

- For international roaming cases, there is a potential scenario that the UE of the subscribed operator (operator 3) may roam into the coverage of an local operator's 5G network (hosting operator 1), which has no roaming agreement with operator 3. Operator 1's 5G network can be shared by another local operator (participating operator 2) which has roaming agreement with operator 3. Therefore the UE of operator 3 can use the 5G services via the operator 1's 5G network using 5G Indirect Network Sharing with operator 2 involved also. The potential enhancements to support the roaming UE to access the subscribed network using 5G Indirect Network Sharing needs to be investigated.

Network function selection

Scenario:



Observation:

- In existing specification, the NF selection mechanism cannot guarantee the selection of the optimal NFs in 5G Indirect Network Sharing scenarios, e.g. it cannot be guaranteed for the consumer NF to select a target NF which has an interconnection interface cross PLMNs (e.g. N14/N16 interfaces). Therefore how to enhance the NF selection mechanism to accurately select the optimal NFs in 5G Indirect Network Sharing scenario needs to be investigated.

Potential SA2 Impacts

- Investigate the enhancements to enable authorized UEs to access the subscribed PLMN in 5G Indirect Network Sharing scenario, e.g. network selection, identification of network sharing type, etc.
- Investigate the potential enhancements to guarantee service continuity and/or minimize the impact to the user experience for the different UE mobility situations.
- Investigate the potential enhancements for supporting roaming UE to access the subscribed data network in 5G Indirect Network Sharing scenario, whereas the subscribed operator has no roaming agreement with the hosting operator.
- Investigate the potential enhancements of NF selection mechanism for selecting the optimal NFs accurately in 5G Indirect Network Sharing scenario.

Potential impact in other WGs



- 📶 Security aspects will be coordinated with SA3
- 📶 Charging aspects will be coordinated with SA5

Proposed Way Forward



- It is proposed to start a study item of supporting 5G Indirect Network Sharing to investigate the aspects listed as above
- Work scope in different impacted SA WGs should be aligned on a high level

NOTE: The corresponding Tdoc of the SID (S2-2306489) has been submitted to SA2#157 also.