3GPP WG SA2#159
Xiamen, China, 09-13 October, 2023

S2-23xxxxx (Ericsson)

Network sharing Enhancement (analysis and solutions)

Ericsson

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Use Cases - Overview (TS 22.261 Annex I (informative))

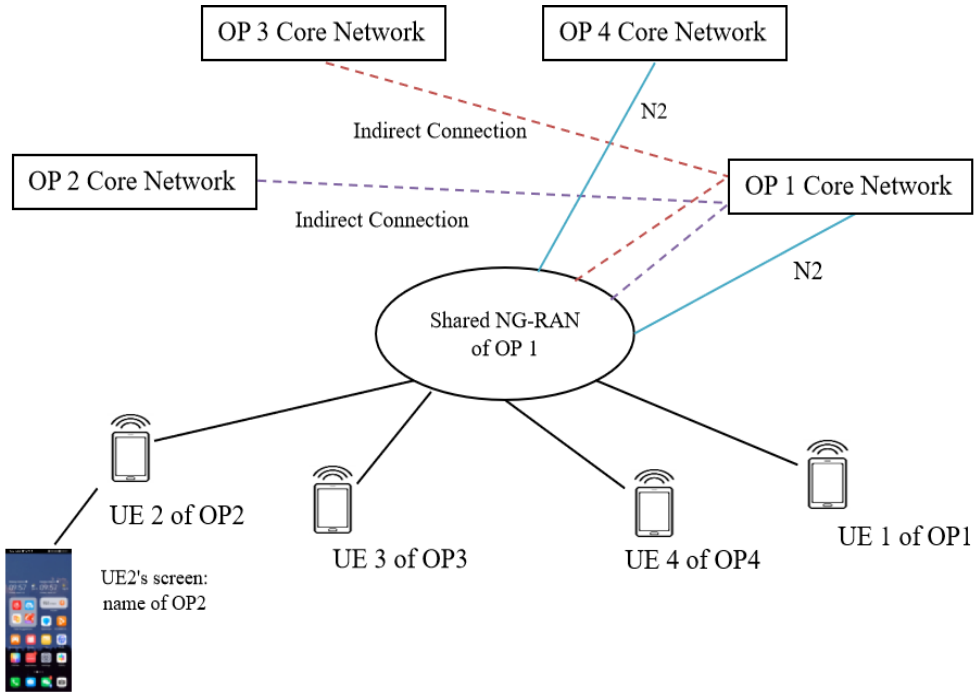

Figure I-1: Different options both direct and indirect connections between the Shared NG-RAN and the core networks of the participating operators.

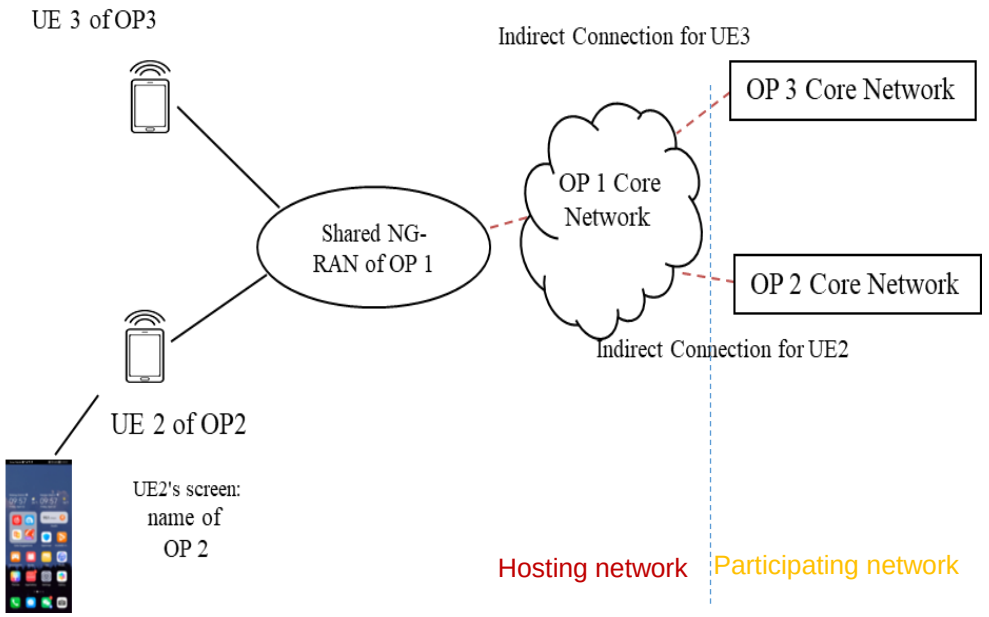

Figure I-2: Indirect Network Sharing scenario involving core network of Hosting NG-RAN Operator between the Shared NG-RAN and the core networks of the participating operators.

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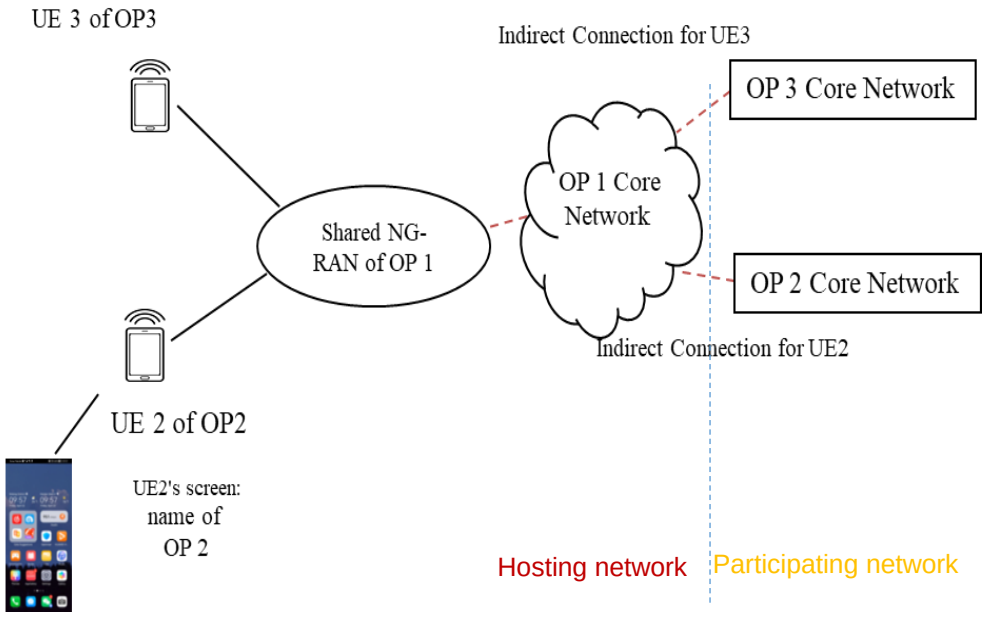
Aspects to consider



This can be achieved by 1) the Multiple PLMN support already as specified in TS 23.501 clause 5.18 and 2)ETSUN in TS 23.501 clause 5.34

- **PLMN visibility in shared NG-RAN of OP1 (hosting network/PLMN)**
  - Shared NG-RAN broadcast hosting PLMN ID + Participating PLMN IDs
  - UE selects the proper PLMN IDs (e.g. UE of OP1 selects OP1 PLMN ID)
  - TACs are managed by the hosting PLMN.
    - Coordination among PLMNs may be needed to avoid the TAI conflicts
    - Alternative is to broadcast different TACs for different PLMNs which may also need coordination between different PLMNs
  - In Registration accept message, the host AMF may provide proper Network name to be displayed (e.g. both hosting and participating network names)
- **Supported PLMNs in OP1 CN and handling of UEs from OP2/OP3 (participating PLMN):**
  - Both hosting PLMN ID and Participating PLMNs are supported by the hosting PLMN AMF
    - (e.g. AMF indicates multiple PLMNs/GUAMIs to NG-RAN during NGAP setup)
  - Hosting AMF supports all TAIs (hosting PLMN ID/participating PLMN IDs + TACs)
  - Hosting AMF handles participating PLMN UEs as
    - Visiting subscriber (handling as home subscriber and applying I-SMF/IUPF is considered not needed during offline discussion)
      - Applying V-SMF/V-UPF vs H-SMF/H-UPF concept
      - ServingNetwork/GUAMI/Sbi-original-network ID provided by AMF to SMF reflects the selected PLMN ID by UE.

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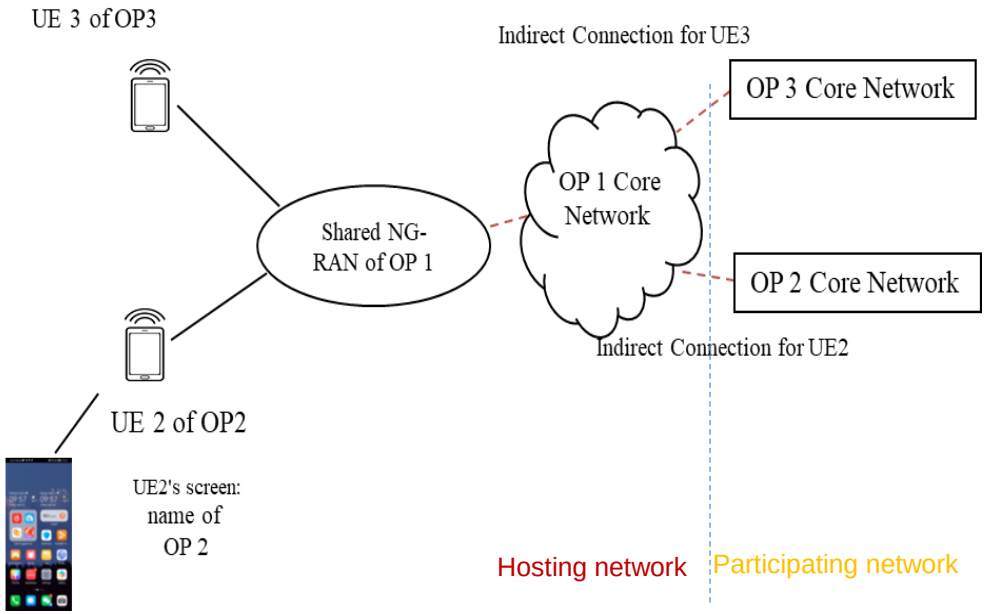
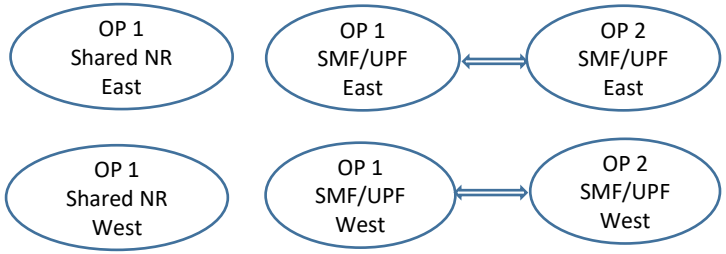
Aspects to consider



This can be achieved by the ETSUN function

- **NF selection coordination between participating PLMN and hosting PLMN**
  - locality matching between I-SMF/I-UPF and A-SMF/A-UPF may be needed during NRF query for SMF selection.
    - NRFs in both hosting and participating PLMNs supports locality based query. And the locality info between hosting PLMN and participating PLMNs are matched.
    - The alternative is to support TAI based A-SMF/A-UPF selection
  - Potential enhancement in subscription data for SMF selection with target PLMN.



Example operator deployment and SMF selection based on, e.g., regional separation

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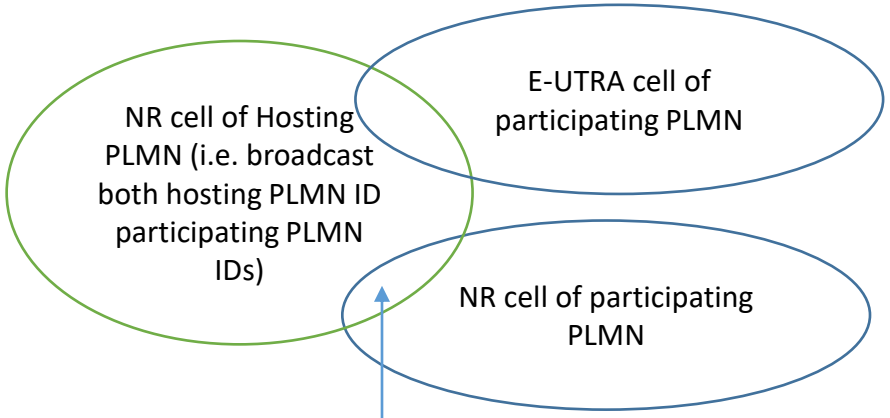
Aspects to consider



This can be achieved by proper UE configuration having preferred PLMNs with associated RATs based on TS 23.122

UE PLMN selection considering access technology

- It's expected that an **UE from participating PLMN** doing selection based on following order:
  - NR Cell of the participating PLMN
  - NR Cell of the hosting PLMN (i.e. participating PLMN IDs are visible to UE)
    - there is no extra logic needed besides the strength measurement and EHPLMN/EPLMN handling
  - E-UTRA cell of the participating PLMN
- If UE comes to undesired network, it's expected that existing RwR based on RFSP can be applied.

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