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

S2-23xxxxx (Ericsson)

Network sharing Enhancement

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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.
    - Broadcast extra TACs from participating PLMNs creates extra management complexity and not needed?
- **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
    - Home subscriber
      - Applying I-SMF/I-UPF vs A-SMF/A-UPF concept
      - ServingNetwork/GUAMI provided by AMF is the same as the PLMN ID in TAI.
    - Visiting subscriber (not needed?)
      - Applying V-SMF/V-UPF vs H-SMF/H-UPF concept
      - ServingNetwork/GUAMI provided by AMF to SMF may different from the PLMN ID in TAI or additional IE needed to reflect the hosting PLMN (is this really needed)?

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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.
    - 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 (not needed?)
  - Participating UDM provides proper UE subscription data
    - Any parameter steering from UDM needed (e.g. OI-Replacement as part of the DNN configuration)?

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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)
    - Is there any extra logic needed besides the strength measurement and EHPLMN/EPLMN handling?
  - E-UTRA cell of the participating PLMN

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Conclusions and Proposals

- Re-using existing functions/features with small potential enhancements can address the use case/scenario required by SA1
- LI/Charging can be handled based on available information communicated between NFs
- Some foreseen work:
  - General description update in 23.501 to address the use case/scenario named in SA1?
  - Further clarification in procedures (or informative text in Annex?), if such is needed?
  - Extra parameters for NF selection ?

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