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Discussion on the handling of NSSAI

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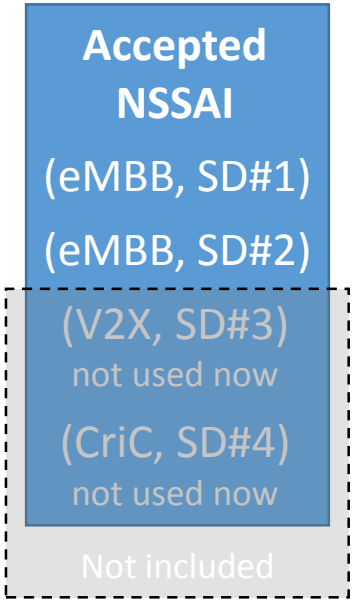
Introduction

- TR 23.799 includes the agreements on the general concept of the network slicing, especially regarding NSSAI:
  - UE may provide **network slice selection assistance information (NSSAI)** consisting of a set of parameters to the network to **select the set of RAN and CN part** of the NSIs for the UE
  - The NSSAI (which is used to select the CCNF) is **a collection of SM-NSSAIs**, each allowing the network to select a particular slice
    - **Configured NSSAI**: NSSAI configured by default in a UE to be used in a PLMN before any interaction with the PLMN ever took place
    - **Accepted NSSAI:** NSSAI used by the UE after the PLMN has accepted an Attach Request from the UE

- Still there are some issues which need to be clarified for feasibility.
- ***This paper will introduce some issues, and propose a solution for some of them.***

Issue #1: Requested NSSAI

- Requested NSSAI (one included in the registration request) can be:
  - The Accepted NSSAI, if the UE has Accepted NSSAI for the PLMN
  - The Configured NSSAI, if the UE has no Accepted NSSAI, but Configured NSSAI
  - No NSSAI (Empty), if the UE has neither configured nor accepted NSSAI
- If the NSSAI is a set of S(M)-NSSAI used for the CCNF (AMF) routing, **<u>it is unclear which S-NSSAI value should be included</u>** in the Requested NSSAI:
  - Even if the UE is not using some S-NSSAIs (e.g. CriC) at the moment sending Registration request, should they be included in the requested NSSAI
  - There are two options here
    - A) include all S-NSSAIs in the Accepted NSSAI the UE received last time
      - No consideration of choosing S-NSSAI, but unnecessary NSSAI will be transferred and is taken into account for AMF/CCNF selection
    - B) include specific S-NSSAIs that the UE intends to use after the Registration
      - Faster registration due to simpler AMF selection, which S-NSSAI will be included in the Requested NSSAI needs to be considered
  - **Proposal: choose option B, so the UE can include specific S-NSSAIs for the requested NSSAI based on the UE's service usage.**



Issue #2: Not accepted NSSAI

- If the UE needs to request a specific service **that is essential for the UE (e.g. IoT slice for NB-IoT UE)** at the time of registration, the UE may include this S-NSSAI in the NSSAI.
  - If the network doesn't allow the requested (S-)NSSAI, what can the UE do for that service?
  - Example Scenario can be:
    - The UE needs to use V2X service, but the V-PLMN A doesn't support V2X service for inbound roamer. The PLMN A give the basic NSSAI (e.g. MBB) instead of requested NSSAI (V2X)
      - The UE can use the allowed service, which may be limited for the originally intended service;
      - The UE can request to use V2X again with some other information (e.g. override); or
      - The UE can de-register with PLMN A and find another PLMN
  - This can be a UE implementation, but the network may reject the request from the UE if the network cannot provide the requested service for the UE.
  - See the slide 6 for the possible solution

Issue #3: NSSAI and AMF capability

- The main purpose of the (Requested) NSSAI in the registration request is to select proper CCNF (AMF) for avoiding unnecessary redirection of CCNF (AMF)
- *Can we assume that there is at least one CCNF (AMF) that supports every single slice type that the PLMN supports?*
  - If we consider the needs for isolated slice, **this shouldn't be mandated**.

- What if a single CCNF (AMF) **cannot** serve all S-NSSAIs in the accepted NSSAI?
  - Need **criteria** for which S-NSSAI needs to be considered first
  - See the slide 6 for the possible solution

Solution for issue #2 and #3

- The S-NSSAI or the NSSAI can have some information regarding **the priority** or **the characteristic whether that NSSAI is an required one or the preferred one**.
- For Issue 2,
  - If the service is essential, the UE may indicate S-NSSAI as a “required” value. The network may reject the UE if the requested service cannot be provided to the UE.
  - If the UE indicates its high-priority, the network may change the policy and provide the service.
- For issue 3,
  - If the UE indicates which S-NSSAI is “required”, the network can take the information into account when the serving AMF needs to be selected.
  - This also can be considered when the CCNF or Slice needs to be change:
    - If the “essential” slice is being used, then the CCNF change shall be avoided.

- **Proposal: Let the UE can provide additional information regarding the priority or the characteristic of the (S-)NSSAI whether it is “required” or “preferred”**
- <u>Sourcing company will provide necessary changes.</u>