

Motivations for WID on Enhancing Network Failure Tolerance (TEI19)

Background, Observations and Proposal

China Telecom



Existing work related to network failure tolerance

R17 MINT enables a UE to obtain service from a PLMN offering Disaster Roaming service when a Disaster Condition applies to the UE's determined PLMN. And the following constraints apply:

- Disaster Condition only applies to NG-RAN nodes, which means the rest of the network functions except one or more NG-RAN nodes of the PLMN with Disaster Condition can be assumed to be operational.
- EPS does not support Disaster Roaming.

Observations (1/4)

R19 MINT_Ph2 adds a new description in clause 6.31 of TS 22.261:

- Scenarios where network failures render the network subject to a disaster unable to authenticate its subscribers are excluded.

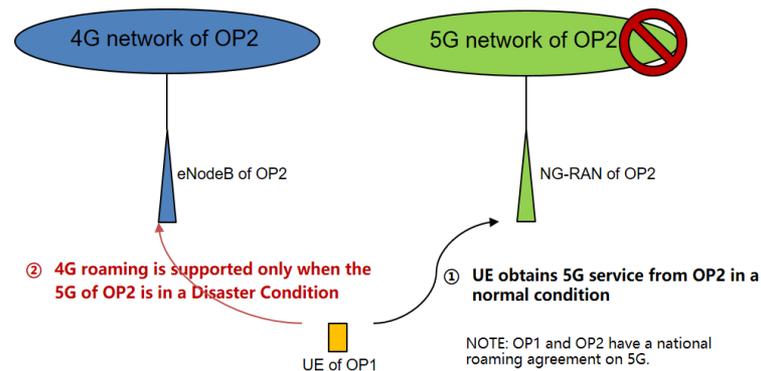
Observation 1: The application of MINT function should not be limited to RAN failure, but it should exclude any core network failure that includes the UDR, UDM and AUSF network functionality.

Observations (2/4)

R19 MINT Ph2 introduces two new requirements in clause 6.31 of TS 22.261:

- Subject to regulatory requirements, operator's policy or UE capabilities, the 3GPP system shall be able to support a UE, with 5G-only national roaming access to a VPLMN, to obtain 4G connectivity service (e.g. voice call, mobile data service) from that VPLMN in the area where a Disaster Condition applies.

Observation 2: This requirement allows 5G-national roaming UEs to register for Disaster Roaming service on 4G of the same VPLMN. As a result, the 4G system shall be able to provide Disaster Roaming service. It covers both RAN and core network failures. In this release, the core network failure is limited to VPLMN, so that the core network of HPLMN is functional to perform user authentication.



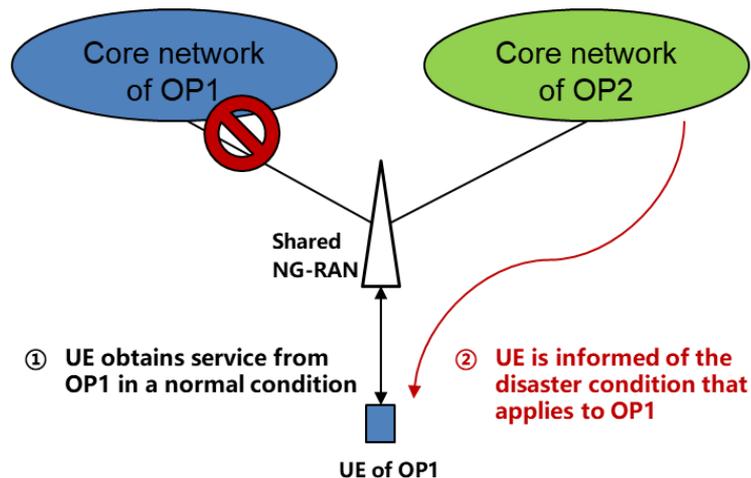
NOTE: From the perspective of 5GS, the existing R17 MINT is unchanged. That is, for a UE registered with Disaster Roaming, interworking with EPC is forbidden. To minimize the impact to EPC, UE configuration and provisioning for Disaster Roaming is performed by its 5G HPLMN or 5G VPLMN while roaming.

Observations (3/4)

Another new requirement in clause 6.31 of TS 22.261:

- Subject to regulatory requirements or operator's policy, in case of shared RAN between participating PLMNs, the 3GPP system shall be able to support a UE of a given PLMN to obtain connectivity service (e.g. voice call, mobile data service) from another participating network when a Disaster Condition applies to the UEs' PLMN.

Observation 3: Current Disaster Condition notification and determination procedures assume RAN failure. In the case of core network failure, the procedures can be improved to minimize the interval between a UE losing service and attempting Disaster Roaming. The MOCN scenario where the shared RAN is connected to an operational core network (of the participating PLMN) should be considered.



Observations (4/4)

In the case of UDM/AUSF failure:

- The UE in RM-REGISTERED state will be rejected for service due to unsuccessful authentication, when he performs Mobility Registration Update or a Periodic Registration Update.
- The UE in RM-DEREGISTERED state performing an Initial Registration cannot register to the network, even though he has a 5G-GUTI and the UE context is stored in the AMF.

Observation 4: Based on operator policy, UE authentication may be skipped in the case of UDM/AUSF failure. This scenario is not related to MINT.

This TEI19 aims to enable the following to enhance network failure tolerance. It contains two Work Tasks: WT1 is an enhancement of R17 MINT based on SA1 requirements, and WT2 is not related to R17 MINT. The WID is submitted as S2-2306752.

WT1.1: Support of providing Disaster Roaming service in EPS by

- Adding EPC as an allowed core network for Disaster Inbound Roamers
- Procedural updates similar to those for MINT in R17 5GC
- Introducing the MINT support in Attach/TAU procedure
- Enhancing MME to support MINT

WT1.2: Enhancing Disaster Condition notification and determination procedures in the case of core network failure

WT2: Bypassing UE authentication in the case of UDM/AUSF failure

- China Telecom is open to start from CT1 and then complete the alignment in SA2 for WT1.

THANKS

感谢聆听

