**3GPP TSG SA WG5 Meeting #140e S5-216129**

**Online, , 15 Nov 2021- 24 Nov 2021**

**Source: Samsung**

**Title: pCR 28.104 HO Optimization usecase and requirements**

**Document for: Approval**

**Agenda Item: 6.4.18**

# 1 Decision/action requested

***The group is asked to discuss and approve the proposals.***

# 2 References

None

# 3 Rationale

The pCR provides use case of HO Optimization.

# 4 Detailed proposal

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| **First modification** |

##### 7.2.5.2 Handover Optimization analysis

7.2.5.2.1 Description

3GPP management system shall be able to provide the handover optimization analysis.

7.2.5.2.2 Use cases

7.2.5.2.2.1 Handover Optimization

Current handover procedures are mainly based on radio conditions for selecting the target gNB upon a handover. The target gNB accepts or rejects the handover (HO) request depending on various conditions. In virtualized environment, the HO may be rejected due to inadequate available resources within the target gNB. The notion of resources may include virtual resources (e.g., compute, memory) and/or radio resources (e.g., PRB, RRC connected users). If the HO request is rejected, a UE will try to connect to a different gNB until the request is successfully accepted. Several target gNBs can be tried until the request is successfully accepted. This process can result in wastage of UE and network resources, while it may also introduce service disruption due to increased latency and radio link failures (RLFs). It also introduces inefficiency in the HO or other network procedures.

To address this handover optimization issue, it is desirable to use MDA (Management data analytics) to provision and/or select a particular target gNB for handover in order to reduce or even avoid HO rejections. The MDAS producer provides a HO optimization analytics output containing the current and future/predicted resource consumption, resources capabilities and other KPIs' status for the available target gNB(s). The analytics output also provides recommended actions to optimize the target gNB for handover. This may include resource re-configuration or the updated selection criteria for target gNB. Based on the output, the MDAS consumer adjusts (e.g., scale-out/up the virtual resource, re-schedule/optimize radio resource) the resources before continuing with the handover and/or adjusts the selection criteria of the target gNB by also considering the overlapping coverages of inter-frequency and inter-RAT deployments.

##### 7.2.5.2.2.2 Handover Optimization based on UE Load

The target node, eNB, may not have adequate resources to accept certain handover requests. In the context of network virtualization, these resources may include not only legacy radio resources, but also virtual resources such as processor and memory. Handover optimization can benefit from knowledge about the projected UE load on the target cell including additional radio and virtual resources.

#### 7.2.5.2.3 Requirements

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| **Requirement label** | **Description** | **Related use case(s)** |
| **REQ-MOB\_MDA-CON-x** | The MDAS producer should have a capability to provide the analytics output related to current statistics and future predictions of virtual resource consumption of gNB. | Handover Optimization |
| **REQ-MOB\_MDA-CON-x** | The MDAS producer should have a capability to provide the analytics output related to current statistics and future predictions of radio resource consumption of gNB. | Handover Optimization |
| **REQ-MOB\_MDA-CON-x** | The MDAS producer should have a capability to provide an analytics output indicating a selection priority for the target cell, among a set of candidate inter-frequency cells. | Handover Optimization |
| **REQ-MOB\_MDA-CON-x** | The MDAS producer should have a capability to provide an analytics output indicating a list of target cells to spare, i.e. avoid, a handover for an indicated time period. | Handover Optimization |
| **REQ-MOB\_MDA-CON-x** | The analytics output describing inter-frequency target cell selection for handover may provide information for provisioning or selecting a target gNB with respect to a specific service or slice, if the same Network Slice Instance (NSI) is available in both the current and target gNB. | Handover Optimization |
| **REQ-MOB\_MDA-CON-x** | The analytics output describing inter-frequency target cell selection for handover should provide indication of current and expected QoE (for the UE) at the current and target gNB. | Handover Optimization |
| **REQ-MOB\_MDA-CON-x** | The analytics output describing the resource consumption should contain the following information describing the current statistics and future predictions of resource consumption:  - Assigned virtual, radio, and transport resources for target gNB.  - Consumed virtual, radio, and transport resources for target gNB.  - Projected virtual, radio and transport resource usage in near future for target gNB.  - Indication on whether the target gNB is optimal for handover.  - Recommended action to optimize the target gNB and/or the selection of the target gNB for handover. | Handover Optimization |
| **REQ-MOB\_MDA-CON-x** | The MDAS producer should have a capability to provide an analytics output indicating the projected UE load with respect to virtual resource and radio resource on the target cell. | Handover Optimization based on UE Load |

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| **End of First modification** |