**3GPP TSG-SA5 Meeting #154 *S5-242012***

Changsha, China, 15 - 19 April 2024

**Source: Huawei**

**Title: Add disaster planning use case**

**Document for: Approval**

**Agenda Item: 6.19.5**

# 1 Decision/action requested

***For approval.***

# 2 References

[1] 3GPP TR 28.915: “Study on management aspects of Network Digital Twin”.

# 3 Rationale

This contribution proposes to add a use case for disaster planning.

# 4 Detailed proposal

It is proposed to make the following changes to TR 28.915 [1].

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| **1st change** |

# 5 Use cases

## 5.X Use case #n: Disaster planning

### 5.X.1 Description

A natural disaster (e.g. earthquake, tsunami) can cause major impacts to the services provided by a mobile network. The disaster may directly impact the network by causing loss of connectivity, and can also cause indirect effects such as a flood of calls to emergency services. It is important for a network operator to be able to estimate how the mobile network will be impacted by a natural disaster, and to optimize the network configuration (e.g. redundancy and routing) to reduce the impact to services.

Network Digital Twin allows the possibility to simulate a natural disaster in the twin network without risk of impacts to the mobile network. This allows the network operator to evaluate how the twin network responds to the natural disaster. If the response is not acceptable, the network operator may repeatedly reconfigure the twin network and replay the natural disaster until the response is acceptable. The network operator may then decide to apply the best-performing configuration to the mobile network.

As an example, the case of a natural disaster (e.g. earthquake, tsunami) is explored in more detail as follows:

1. The network operator wishes to check how the current network configuration will react to a natural disaster.

2. The network operator synchronizes the twin network with the mobile network to ensure that the twin network is up to date.

3. The network operator simulates the effects of the natural disaster (e.g. loss of connectivity, flood of calls to emergency services) to the twin network.

4. The twin network simulates the behavior of the mobile network.

5. The network operator measures the reaction of the twin network, for example the number of rejection responses.

6. If the reaction of the network does not achieve an expected threshold, the network operator reconfigures parameters of the twin network and retries from step 3. After a number of failed retries, the network operator may stop retrying.

7. If the reaction of the network achieves an expected threshold, the network operator records any reconfigured parameters.

8. The network operator may optionally decide to apply the reconfigured parameters to the mobile network.

By using the twin network as described above, the network operator may proactively check how the current network configuration will react to a natural disaster. This is much better than the alternative, which is to wait until an actual natural disaster occurs and then try to react in real time.

### 5.X.2 Potential requirements

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| Requirement label | Description | Related use case(s) |
| **REQ-NDT-xx** | It shall be possible to request Network Digital Twin to simulate the behaviour of the managed network. | Disaster planning |
| **REQ-NDT-xx** | It shall be possible to modify configuration data in the Network Digital Twin. | Disaster planning |
| **REQ-NDT-xx** | It shall be possible to collect performance data and KPIs from the Network Digital Twin. | Disaster planning |

### 5.X.3 Potential solutions

### 5.X.4 Evaluation of potential solutions

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| **End of changes** |