

Resource and Service Orchestration of 5G Network Slices

5G offers the Communication Service Providers (CSPs) the capability to slice the shared physical and virtualized resources across RAN and core networks so that they can support different industry verticals and IoT services for an associated SLA. Network slicing will allow 5G CSPs to offer differentiated and guaranteed services with varying traffic characteristics on the same infrastructure. The typical use cases are built around:

- Enhanced mobile broadband (eMBB) that delivers giga bytes of bandwidth
- Massive machine-type communication (mMTC) that connects billions of sensors and machines (1 million per square kilometre)
- Ultra-reliable, low latency communication (uRLLC) that allows immediate feedback with high reliability and enables real-time remote control.

Slices of the 5G network can be dedicated to such services to deliver on the QoS demands of associated SLAs. As the service and the required QoS characteristics are assigned to a slice or sub-slice as per the above configurations, it needs to be continuously monitored for the offered and guaranteed QoS/SLA so that closed loop management systems can orchestrate the network slice in real time and proactively manage dynamic demands and the failure conditions. It is important that CSPs maximize the usage of shared resources and network assets across all network slices guaranteeing all of the differentiated SLAs.

Closed loop assurance between assurance and orchestration functions enables such dynamic network slice management based on network/service QoS changes and the appropriate policies.

A TM Forum Catalyst '5G Service Operations: Real time Service Assurance' carried out by CSPs- AT&T, BT, NTT, Telenor, TIM, Orange and Vodafone and OSS vendors MYCOM OSI, Netcracker and TEOCO brings together a team of industry experts to showcase the integration of network and service orchestration function with closed loop assurance systems using TMF APIs and 5G simulated inventory, lifecycle and assurance data.

The catalyst will demonstrate agile closed loop operations to deliver 5G Network Slice Assurance capabilities for multiple industry verticals whilst continuously optimising infrastructure utilisation and meeting SLA commitments. The catalyst will demonstrate how 2 service classes for IoT – uRLL (ultra-reliable low latency) for connected factories and mMTC (massive machine-type communications) for connected cars are assured on a common 5G RAN and Core infrastructure.

In the TMF Catalyst, the Assurance systems will use policy-based automation and closed loop assurance, and also integrate with a domain/service Orchestrator using TOSCA-based modelling. The catalyst will illustrate how ecosystem integration can be carried out through TM Forum concepts and API operations in TM 628 Performance Management API, TR 255 Entity Provisioning API, (aka Resources Function Configuration and Activation API), Service

Assurance using intent based SLA/OLA approaches and use of standardized event streaming for metrics/counters based on use of Open Source vES (OPNFV/ONAP)