Active assurance testing is critical for complex services in 5G networks

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Service performance and reliability have always been top priorities in the telecoms industry. However, networks are becoming more complex due to innovation in cloud technology and virtualisation, which in turn is resulting in an increasing number of new network layers and services. Service assurance needs to be upgraded to ensure that networks and their associated services deliver the performance required within contracts and service-level agreements (SLAs). The challenge of correlating networks, IT infrastructure, cloud elements and services is becoming a complex issue to resolve, but is critical to the support of 5G enterprise services.

As services become more complex, so too will the infrastructure that delivers them

5G supports a range of diverse, new and complex use cases such as enhanced mobile broadband (eMBB), massive machine-type communications (mMTC) and ultra-reliable, low-latency communications (uRLLC). 5G also enables the provisioning of differentiated/specialised services for users with specific requirements. New services will need to support applications (such as virtual reality, gaming and immersive reality), mission-critical services (such as emergency response), connected autonomous vehicles, billions of IoT devices and Industry 4.0 initiatives. These services also come with high expectations for quality, speed and reliability because many are critical for businesses and any disruption may result in lost revenue or the possibility of a loss of life. These services will therefore require stringent SLAs. This means that communications service providers (CSPs) must not only deliver, monitor and assure an increasing number of complex services, but also validate the strict SLAs associated with each of them.

The emergence of advancements such as network cloudification, virtualisation and Open RAN introduce new network functions and layers and expands the vendor ecosystem. New strategies are required for delivering these technologies effectively and as planned. The disaggregation of networks using virtual network functions (VNFs) with cloud-native architecture means that network maintenance and assurance solutions must be significantly different to those used for legacy networks.

CSPs must therefore innovate and deliver on the service front, while also implementing and supporting new network architecture and functions that will deliver evolving services with exacting requirements. Service assurance will be critical to ensuring that the network delivers the appropriate level of performance.

Maintaining SLAs will be increasingly complex as service complexity rises

Separately monitoring each component of a service is a strategy that is widely used in service assurance. This approach partitions the service into its key components in order to isolate issues and address each service element as needed. It is vital for understanding network data and performance, but it does not fully address the holistic requirements of comprehensive service assurance. For example, networks can compensate for some issues, which means that service delivery will be unaffected even if the issue has not been resolved; the network may simply be rerouted or reconfigured to bypass the issue. Networks are also adapting all the time, which makes finding the fault even more challenging.

It becomes increasingly difficult and time-consuming to map out the implications for the service if certain components or combinations of components are affected as the number of functions and features that need to be measured, monitored and understood grows. This issue is even more pronounced with the complexity of 5G network architecture and new service provisioning.

Network performance must be continuously monitored and maintained to ensure SLA targets, so validating SLAs before service activation and maintaining real-time, end-to-end visibility of the network to spot potential issues before they become critical will be crucial for enduring and successful service delivery. It will therefore become increasingly important to test services holistically to ensure that SLAs are met.

Active testing and monitoring will help to address challenges and complexities around new services and their provisioning

The challenges associated with 5G may have significant implications for the reliability, quality of service and quality of experience of networks and users. 5G is not just a generation upgrade, but rather a paradigm shift that is enabling business transformation. The ability to proactively test services end-to-end is becoming an increasingly important part of addressing numerous challenges and complexities related to new services and their provisioning. Active assurance testing can be used to achieve this. It simulates real user traffic and enables the measurement of the true end-user experience by actively injecting simulated real-world traffic into the network. It is also flexible and enables different tests to be conducted at different locations within the network. Furthermore, the continuous 'always on' capability means that no user traffic is required; active assurance testing can proactively detect issues before the service is affected or noticed by a customer. It also provides real-time visibility into service-level performance, thereby making it the primary method for validating and policing SLAs.

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