Landslide CNF Testing

Validate and Optimize 5G Service Performance in Cloud-Native Environments

As service providers deploy standalone 5G networks, they are configuring and deploying these services in flexible, cloud-native environments. This approach offers scalability, reliability, and automation, enabling quicker and more cost-effective service delivery. It also changes network ownership, deployment, and management.

One area that can easily be overlooked is the testing and validation of 5G services within cloud-native, microservice architectures. Previously, carriers relied on network vendors for testing equipment and cloud services. Now, with multiple vendor solutions in a carrier-operated cloud, the responsibility for testing service performance also falls to the carrier.

Testing 5G workloads and infrastructure resiliency with real-world traffic is crucial to avoid performance issues and costly outages. Keysight provides the first solution testing 5G services in cloud-native environments, correlating cloud-native network function (CNF) performance, and issues with 5G services. The Landslide CNF Testing solution establishes baselines, identifies failure indicators, and continuously tests and ensures resilient design and performance.

Solution Overview

Landslide CNF Testing is a cutting-edge automated solution that evaluates and validates cloud-native functions' resiliency within 5G networks. It provides comprehensive testing capabilities to assess the robustness, fault tolerance, and performance of cloud-native functions in various real-world scenarios, enabling network operators and developers to ensure the reliability and stability of 5G deployments. Landslide CNF Resiliency Testing supports testing of microservices and containerized applications, ensuring fault tolerance, scalability, and failover capabilities.

Validating 5G CNF Resiliency

Landslide is designed to execute user-defined test scenarios to simulate real-world conditions and potential failure scenarios. These scenarios include network disruptions, infrastructure failures, and high-traffic loads, allowing users to validate the resiliency of their cloud-native functions under different stress conditions. Concurrently, the solution collects cloud-native metrics to monitor the impact on the 5G CNF and the cloud-native infrastructure.

Landslide determines the impact on an extensive array of 5G KPIs including sessions, registrations, handoffs, and more, bringing clarity to 5G cloud-native deployments and enabling faster innovation and rollout of 5G services.

KEYSIGHT

Landslide CNF resiliency testing supports a wide range of real-world impairments that can be combined in an unlimited set of scenarios. These impairments include Network Contention, Infrastructure Failures, and Resource Constraints. The tool collects container metrics, node metrics, and even Kubernetes metrics. The solution then directly correlates the effect of these impairments with the 5G KPIs to understand their impact on 5G services.

Highlights

- **First to test 5G in CNF environments:** Generate traffic and simultaneously impair 5G cloud core to assess and correlate its impact on 5G services
- **Accelerate time to revenue:** Speed up revenue generation for new 5G products and services
- **Prevent live network disruptions:** Cut costs by identifying issues in the lab, avoiding live network disruptions
- **Reduce testing costs:** Slash labor and energy costs with automated pre-built test libraries
- **Respond to issues quickly:** Use test results to quickly pinpoint where and why a CNF is not performing
- **Confidently deploy Standalone 5G:** Know that a dynamic 5G network can deliver desired service levels

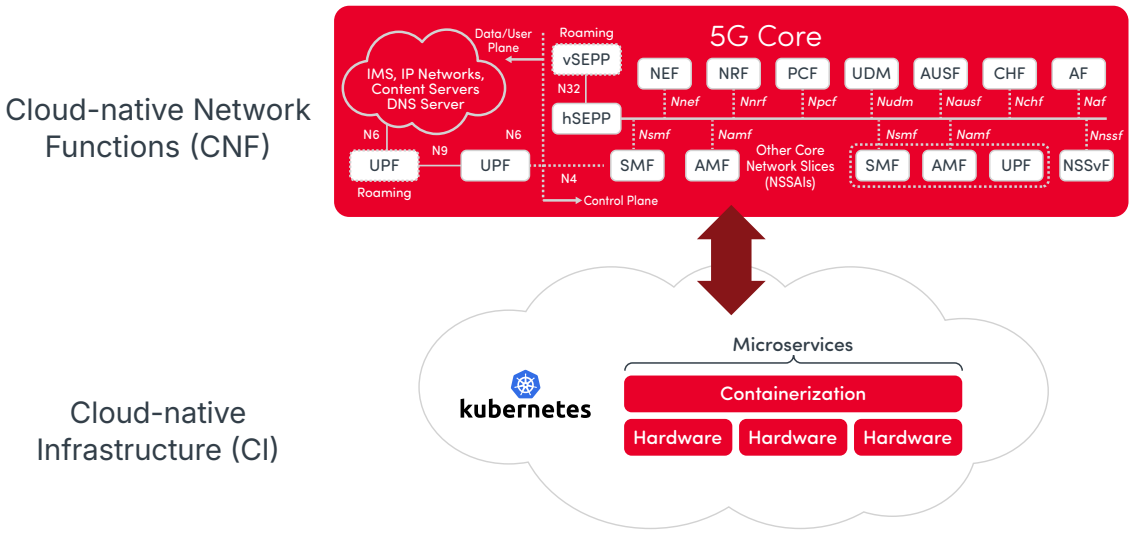

Figure 1. Proactively and continuously validate, optimize, and troubleshoot cloud-native infrastructure and the numerous 5G application workloads that run on them

Landslide CNF Impairments

Using Landslide, network and cloud teams can target and test a variety of cloud-native elements including namespaces, nodes, workloads, labels, pods, and/or containers. Impairments allow teams to execute common failure scenarios in the lab, evaluate how their 5G services perform, and optimize performance before placing the network functions into production.

Object Failures

- Container failure
- Pod failure
- Node failure

Network Contention

- Network latency
- Packet loss
- Bandwidth rate/limit
- Resource constraints
- Pod CPU hog
- Pod memory hog
- Pod disk full
- Node CPU hog
- Node memory jog
- Node disk gull
- Node drain
- Node taint

Correlating Impairments to 5G Performance

Keysight Landslide is the first solution to generate traffic and simultaneously impair the 5G cloud core to assess and correlate its impact on 5G services. In this example (Figure 2), two pod failure impairments represented by the red skull-and-crossbones symbol are initiated while Landslide is generating around one thousand session connections.

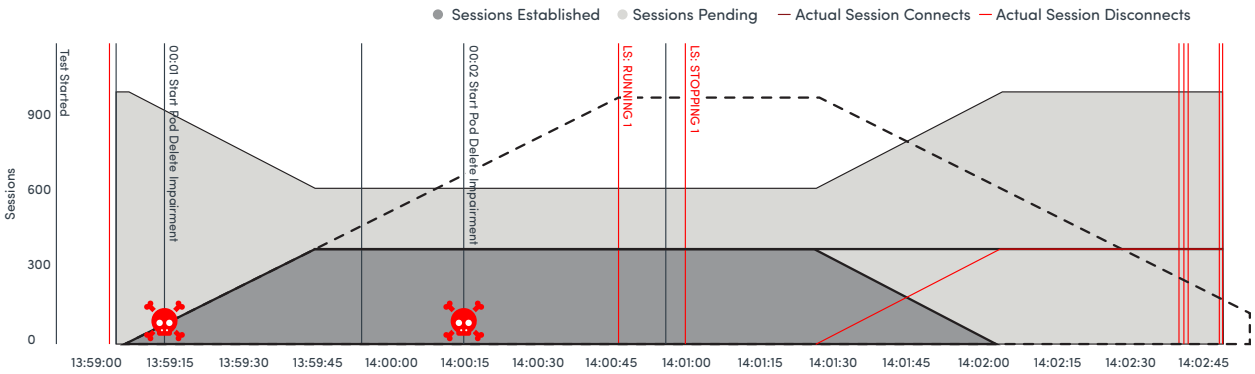

Figure 2. CNF Testing example showing pod impairments and reboot

The impact of the two pods failing and rebooting is a 60 percent reduction in the number of established sessions. The solid-green line shows the number of established sessions that occurred, compared to the expected number of established sessions represented by the dotted-green line. From this illustration, engineers can quickly assess the impact of the failing pods on session connections.