

Visualize Your 5G World with Telco Cloud Service Assurance

Monitor and Manage 5G Services and Networks with Automated, Multi-Layer Assurance from VMware

VMWARE TELCO CLOUD SERVICE ASSURANCE AT A GLANCE

VMware Telco Cloud Service Assurance™ monitors, analyzes, and pro-actively manages multi-vendor physical and virtual environments in a single platform.

Key Capabilities and Benefits

- Simplify NOC and SOC operations with a centralized, cross-domain view.
- Gain rapid insights with integrated fault and performance management, service management, root-cause analysis, and impact assessment.
- Reduce costs and complexity through automation and optimization for assurance across layers and domains.
- Use closed-loop automation and rapid remediation to reduce OpEx and optimize resources and workloads to meet surges in demand.
- Increase operational efficiency by using artificial intelligence and machine learning (AI/ML) for rapid problem isolation, automatic suppression of extraneous alarms, and automated rule updates.
- Remote Data collector gives access to customer managed devices that are located remotely under strict firewall rules.

As communications service providers strive to deliver mission-critical 5G services, end-to-end service assurance is essential. New services must be operationalized in real time and managed proactively to meet quality expectations and service-level agreements (SLAs). Downtime is not an option.

To deliver differentiated services with agility and scalability, CSPs are adopting a cloud-native approach. Meantime, with ultra-reliable low latency communications (URLLC) services, intelligence and data are moving to the edge.

Such changes require a new approach to service assurance. Existing tools are inadequate silos unable to monitor and manage a distributed multi-layer, multi-vendor, virtualized environment. Cloud-native deployments with thousands of components and network functions make it extremely difficult to get clear visibility of diverse infrastructure and to obtain the deep insights needed for root-cause analysis.

Traditional manual fault identification and remediation processes are incapable of rapidly handling this complexity or the large volumes of 5G network data, events, and alarms. Since traditional processes do not associate identified problems with impacted services and customers, real-time SLA commitments that require high reliability and availability are jeopardized.

Meeting SLA and service quality expectations in real time requires automated remediation across the infrastructure, orchestration, and service layers.

Operational intelligence and end-to-end automated 5G assurance

The cloud-native architecture of VMware Telco Cloud Service Assurance lets you monitor and manage 5G physical and virtual components from the mobile core to the RAN and edge. From a centralized location, you get integrated operational intelligence on 5G infrastructure and components across multi-vendor domains, including physical, virtualized and containerized environments.

Distributed deployment allows you to install collector components of the solution in a remote datacenter such as cell site, Distribution Unit (DU), or an edge node that is separated from the core services component. This enables administrators to navigate through firewalls and gain access to monitor devices in a managed customer environment.

VMware Telco Cloud Service Assurance combines fault management, performance management, service management, root cause analysis, and service impact analysis in a single platform. With actionable insights in near real time and end-to-end visibility of physical, virtual, and service layers, network operations centers (NOCs) and service operations centers (SOCs) can manage many networks as one to rapidly resolve network issues.

Closed-loop remediation cuts across infrastructure, orchestration and service layers to manage real-time SLA and service quality conformance. Automatic association of issues with customers enables you to automate the remediation of issues by priority and deliver a consistent level of service quality. The result of automated closed-loop remediation reduces costs, improves operational efficiency, boosts customer satisfaction, and improves network reliability.

INTEGRATION WITH OTHER VMWARE TELCO PRODUCTS

VMware Telco Cloud Service Assurance integrates with the network automation and orchestration capabilities of VMware Telco Cloud Automation™. VMware Telco Cloud Service Assurance also works with the underlying infrastructure and management layers of the following products:

- VMware Tanzu® Standard
- VMware Cloud Director™
- VMware Integrated OpenStack
- VMware Telco Cloud Infrastructure™

Interoperability with VMware Smart Assurance

VMware Telco Cloud Service Assurance can interoperate with VMware Smart Assurance to automatically import and aggregate metrics, alarms, and topologies built by the domain managers. You can automate actions to remediate anomalies based on filters and thresholds.

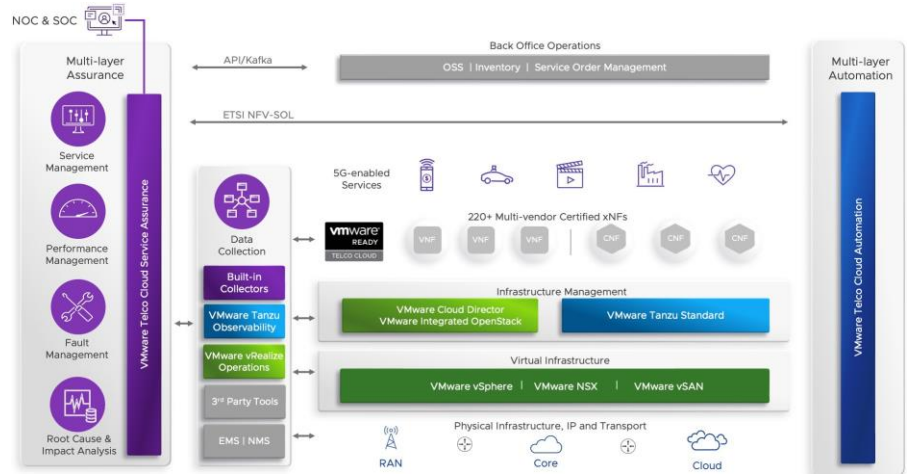


FIGURE 1: The multi-layer, cross-domain capabilities of VMware Telco Cloud Service Assurance.

Service management by associating operations with customers

5G services require reliable and consistent service quality, which makes it essential to monitor and manage the network from a service and customer perspective. That requires making the connection between a network fault or performance degradation with the services and SLAs impacted.

VMware Telco Cloud Service Assurance bridges the gap between operations and customer care by automatically associating infrastructure failures with service impacts affecting customers or tenants. The solution identifies the technology and business objects affected by each problem to connect the business context with the infrastructure issue.

To prioritize support efforts, the solution generates a service health impact analysis presented on a dashboard with an impact value associated with each problem.

- See at a glance the problems that require priority remediation.
- Correlate all the active, inactive and unknown alarms together with the network topology to rapidly identify the problem’s root cause instead of presenting the user with thousands of separate symptom alarms and alerts from a plethora of tools, VMware Telco Cloud Service Assurance .

The solution identifies the technology and business objects affected by each problem and then analyzes the failure’s impact on the service and customer, as shown in Figure 2. It also issues notifications and triggers actions.

By putting infrastructure problems in a business context, you can prioritize responses in real time and focus on tenants with priority services and SLAs.

Automated root cause and service impact analysis

The solution’s root cause and service impact analysis capabilities rapidly resolve problems by correlating symptoms from the following layers of the infrastructure stack and pinpointing the problem’s root cause:

- Physical and virtual
- Containers as a service and Kubernetes clusters
- CNFs and VNFs
- Services and applications

VIDEO: AUTOMATION FOR 5G NETWORKS



Automating 5G Networks: This video discusses network automation and the vital role it plays in infrastructure for 5G networks.

HOLISTIC ASSURANCE TO ASSOCIATE PROBLEMS WITH CUSTOMER IMPACTS

With VMware Telco Cloud Service Assurance, you can holistically monitor and manage complex 5G virtual and physical infrastructure and services end to end, from the mobile core to the RAN to the edge.

One Place, Many Devices

From a single pane of glass, VMware Telco Cloud Service Assurance provides cross-domain, multi-layer automated assurance in a multi-vendor and multi-cloud environment.

- Use operational intelligence to reduce complexity
- Perform rapid root-cause analysis
- See how problems impact services and customers

More than 4,000 physical and virtual devices are supported.

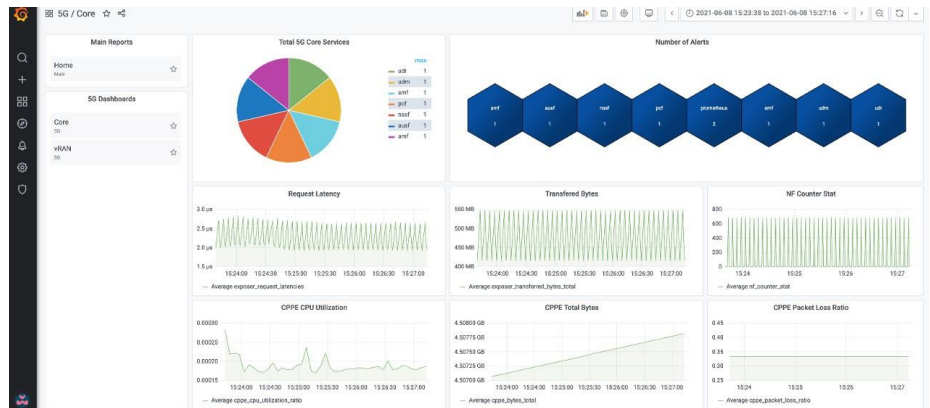


FIGURE 2: Service management.

Closed-loop automation and remediation

Business impact analysis results then drive closed-loop remediation through integration with resource, service and lifecycle management orchestrators that are based on SOL API standards, such as VMware Telco Cloud Automation.

The solution’s remediation policy framework automates the processes and procedures for common NOC faults that can be handled without human involvement.

- Define policies to allow automatic remediation actions when infrastructure faults occur that affect service.
- Define alarms and remediation rules based on live data collected across various layers of infrastructure and network functions. Users get to select and correlate one or more live events at a time based on a real-time condition.
- Take different automated remediation actions based on a problem’s duration.
- Drive closed-loop actions for infrastructure lifecycle management by making recommendations to orchestrators based on root cause issues, such as a need to allocate more vCPUs on a video to handle increasing traffic.

Automated discovery and topology mapping

Proactive service management carries several requirements:

- Automated discovery of network functions and their relationships to services
- Automated root-cause analysis
- Proactive remediation
- Service impact analysis.

The mix of physical, virtual and containerized network functions can obscure their interrelationships, dependencies, and relationships to a tenant or 5G service. Each network slice, for example, can use different resources.

To overcome this complexity, the solution automatically discovers on-premises and cloud network resources in real time by using standard APIs.

It then provides an end-to-end topology map, as illustrated below, that shows the physical and logical connectivity and relationships between the underlying network infrastructure and the software components that compose the 5G service.

AI/ML-driven fault and performance management

Using artificial intelligence and machine learning, VMware Telco Cloud Service Assurance automatically establishes dynamic performance baselines and calculates real-time performance metrics. It identifies anomalies or performance degradations, and alerts operators when anomalous behavior is detected.

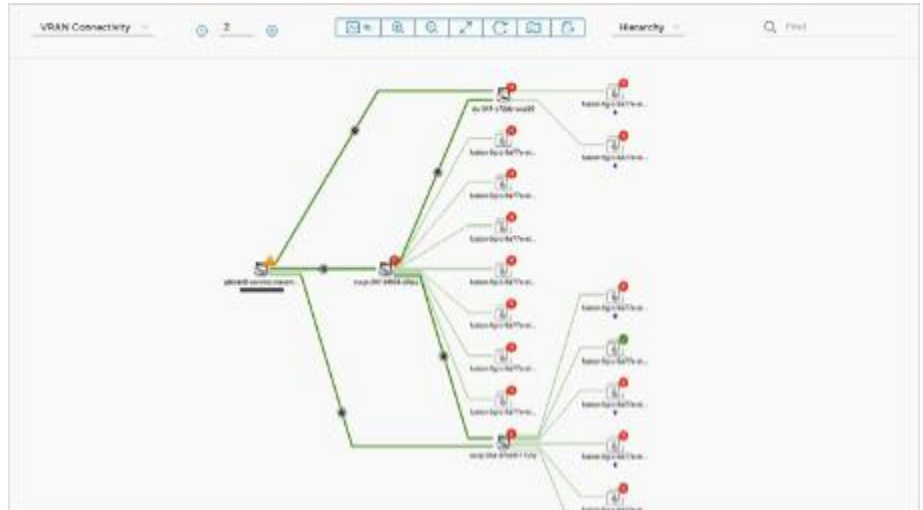


FIGURE 3: Topology discovery and mapping across core, transport and RAN infrastructure.

Operational efficiency is increased with automatic suppression of thousands of extraneous alarms and elimination of costly manual upkeep of static rules. Resources and workloads are optimized dynamically to meet ebbs and surges of edge and service requirements.

The results of the end-to-end fault and performance monitoring across physical and virtual layers are visualized graphically. Because VMware Telco Cloud Service Assurance has a contextual topological view of both the underlay and overlay networks, you can accurately triage situations and take proactive steps to prevent serious impacts to application performance.

Unified Data Collector SDK

The product's data collection framework collects data and alarms from different layers and sources, including third-party monitoring tools by using data collector software development kit. The SDK is built on a programmable Python-based framework that collects data for fault and performance monitoring from such sources as Kafka, REST, and SNMP. The collector SDK includes pre-packaged tools for development and validation.



FIGURE 4: Fault management and performance management with root-cause analysis.

Use cases

The use cases for VMware Telco Cloud Service Assurance include the following:

USE CASE	DESCRIPTION OF SOLUTION
5G RAN and core	Both CNFs and VNFs are automatically discovered. They are shown graphically in the network topology map, including how they are linked to the subscriber's services. When CNFs or VNFs are impacted by failures or exhibit performance degradation, operators are notified. With actionable insights and root cause analysis, operators can immediately respond and remediate the root cause.
CaaS, NFVI, and network functions	The solution communicates with Kubernetes to extend self-healing and remediation of the underlying root cause when it happens below the CaaS layer, in the VIM layer, or VNFs or CNFs.
Virtual EPC	The solution dynamically models vEPCs, performance KPIs and connectivity through the infrastructure. Analytics enable operators to identify trends and correlate root cause. VMware Telco Cloud Service Assurance can also automatically invoke orchestrators for remediation or to provide necessary resources.
IP addresses	The solution automates root cause analysis, correlation to upper layers of the infrastructure (e.g., the CaaS layer) and auto-remediation of virtual and physical network elements.
Transport backhaul network	The solution monitors complex L2, L3 networks and automatically determines causality of the physical and virtual network infrastructure and the end-to-end connectivity. Remediation is achieved by invoking the Element Management System (EMS), SDN controllers, or by running predefined scripts.
Pipeline reporting	The solution deploys and configures layers of RAN infrastructure (DU, node pools, pods, VMs, VMware vCenter, VMware ESXi,) on top of bare-metal servers. At each stage, scripts validate the health of the configuration and infrastructure. Pipeline reporting lets NOC operators see the stages of deployment, configuration, and operation in one place.
Network slicing assurance	The solution integrates with VMware Telco Cloud Automation to discover, monitor, and assure network slices. The solutions performs root-cause analysis, identifies service impacts, and automates closed-loop remediation.
Geo map connectivity views	The solution represents infrastructure connectivity in geographical views. Geo Map Connectivity is for physical connectivity; it supports offline and online map views. Location is identified by using latitude and longitude.

VIDEO: NETWORK SLICING ASSURANCE



Network Slicing Assurance: 5G has ushered in new consumer and enterprise use cases that demand high levels of connectivity with low latency. In this video demonstration, Network Slicing for VMware Telco Cloud Automation unlocks these new use cases, and you can monitor the network slices with VMware Telco Cloud Service Assurance.

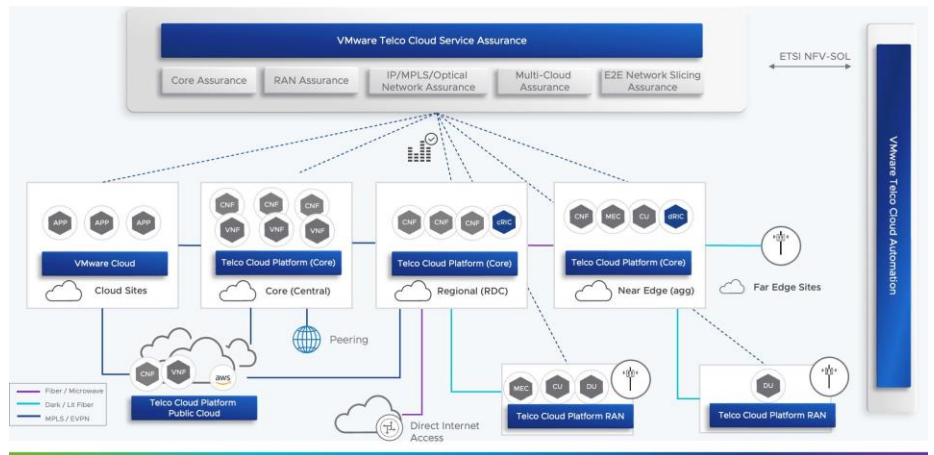


FIGURE 4: End-to-end service assurance for modern 5G networks.

Comprehensive service assurance for 5G

VMware Telco Cloud Service Assurance delivers end-to-end visibility across multi-vendor vertical tiers of physical, virtual, and cloud-native infrastructure as well as the horizontal domains of fixed line, transport, core, RAN, and edge.

- Discovery and topology mapping
- Business impact analysis
- Automatic suppression of extraneous alarms
- Automated root-cause analysis
- Automated closed-loop remediation
- Performance and fault management driven by AI/ML

The result improves efficiency, reduces operating costs, maintains the quality and reliability of 5G services, and ultimately boosts customer satisfaction.

LEARN MORE

For more information about VMware Telco Cloud Service Assurance, call 1-877-VMWARE (outside North America, dial +1-650-427-5000) or visit <https://telco.vmware.com/>

