Extend 5G Automated Assurance from the Cloud to the Radio Access Network

End-to-end service delivery with VMware Telco Cloud Operations and Cellwize CHIME

AT-A-GLANCE

- **Automation** of RAN configuration, optimization and remediation
- **Holistic monitoring and management** from RAN to edge to core networks
- **Automated root cause analysis** leveraging ML for faster, more accurate identification of true problems
- **Closed-loop actions** via VMware® Telco Cloud Operations and Cellwize CHIME integration including self-optimization and self-healing
- **Multi-vendor simplification** and standardization across all service delivery domains
- **Reduction in OpEx** through automation and intelligent operations
- **Improved customer experience** through predictive impact analysis based on ML and preemptive avoidance of issues

Assuring the radio access network

Tomorrow's 5G networks must be built from the ground up with automation and assurance at the forefront. Ultra-low-latency applications and services cannot wait for manual triage and remediation of problems, nor can the consumers of future top-tier network slices. Siloed operations make end-to-end (E2E) visibility nearly impossible, dampening the prospect of achieving the tailored services promised by 5G. An intelligent, collaborative and integrated approach is needed—one that takes advantage of machine learning (ML) to rapidly understand the complete landscape, predicts impacts of network changes via "what-if" scenarios and takes automated actions to continuously optimize the network. Only then will it be possible to meet the scale and agility required by the 5G networks of tomorrow.

5G assurance with VMware and Cellwize

5G assurance requires radio access network (RAN) intelligence mining combined with the mobile packet core and network transports interconnecting highly distributed clouds. VMware and Cellwize have partnered to provide an innovative, automated solution for 5G RAN and mobile packet core assurance. From the core to the edge to the RAN, now communication service providers (CSPs) have a holistic view of the network, from E2E, and can leverage advanced analytics to predict outcomes, optimize configurations and take corrective actions to ensure service resilience and superior customer experience.

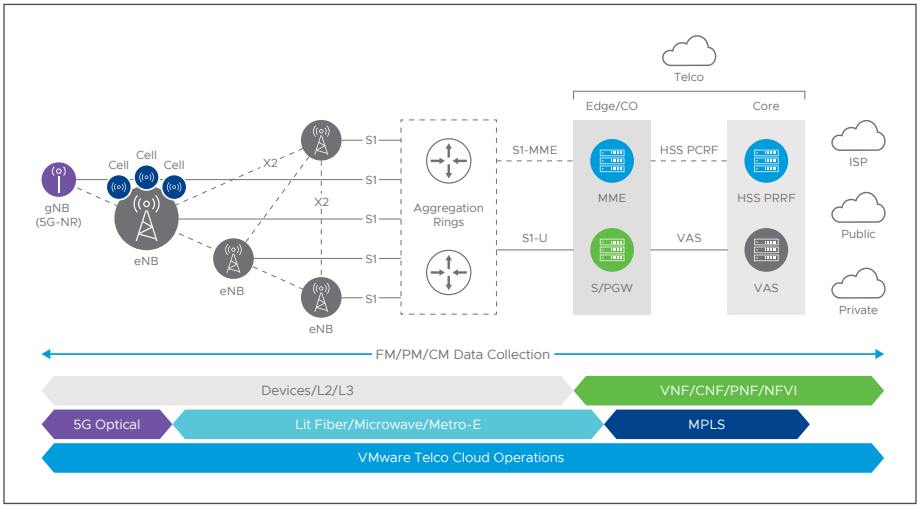

FIGURE 1: VMware Telco Cloud Operations Provides E2E Automated Assurance in a 5G Non-Stand-Alone (NSA) Environment

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Automated
remediations

Lower
OpEx costs

Gain 360°
visibility

How does it work?

With Cellwize CHIME and VMware Telco Cloud Operations platforms, CSPs can discover, monitor and manage network health and apply learned intelligence to drive 5G services.

VMware Telco Cloud Operations is an automated service assurance solution that gives CSPs the operational intelligence they need to holistically manage their optical, virtual, physical and RAN networks as one. Cellwize CHIME solutions are enabling CSPs' 5G journey by delivering an orchestrated, zero-touch deployment, configuration, optimization and healing of mobile networks across a multitude of vendor and wireless technologies.

Through the close integration of the two platforms, Telco Cloud Operations and Cellwize CHIME provide unprecedented visibility from the IP networks to the RAN, breaking down barriers between separate silos of operation. Using automated topology discovery and RAN actuation with E2E service and service path monitoring, operations teams can rapidly resolve any network performance issues and ensure consistent delivery of services to subscribers over a highly distributed edge-core topology. Automated root cause analysis based on ML, and impact analysis based on number of subscribers and services affected, help CSPs maximize quality of service (QoS) and give them better control of the network.

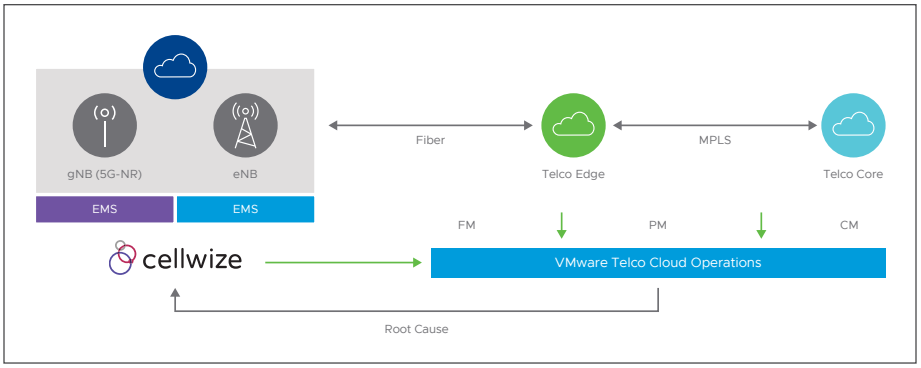


FIGURE 2: Prescriptive Root Cause Analysis in Both the RAN and IP Core Networks

E2E assurance use cases

Service quality automation

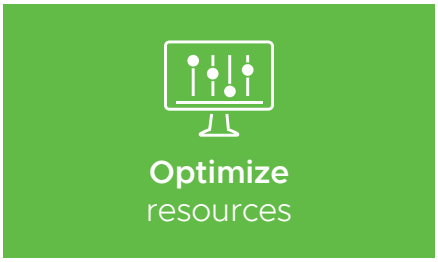
By using VMware Telco Cloud Operations and Cellwize CHIME together, operators now have E2E visibility of mobile services and service paths. Network operation teams have full visibility of the RAN topology together with the mobile packet core in its physical and virtual realization, and cloud interconnections over lit fiber and IP/MPLS backbones.

The Telco Cloud Operations platform cross-correlates this entire topology and technologies into a consistent model, providing real-time performance monitoring and prescriptive root cause analysis. Triggers from the Telco Cloud Operations engine are fed into the Cellwize CHIME solution to remediate and optimize RAN configurations. The net benefit is an unprecedented visibility into what is happening across the RAN and mobile packet core networks and automation to address remediation in the impacted domain. CSPs can now prioritize focus by customer, SLA impact and capital spend.

Service path discovery

VMware Telco Cloud Operations integrates with the Cellwize APIs to automatically discover the 5G/4G RAN domain (e.g. 5G RAN controllers including cell configurations and 4G anchoring cells). The APIs abstract away the specifics of each network equipment provider and present a normalized representation of the controllers, the cells, logical relationships and physical connectivity path between controllers, the termination to the mobile packet core control, and data plane S1 interfaces.

In addition, the L2/L3 networking infrastructure within the RAN domain is also discovered natively and stitched together with the mobile packet core, virtual, physical and backbone domains. Services and service paths are discovered using multiple QoS class identifiers in the RAN network, virtual network functions (VNFs) in the mobile packet core, customer/tenant cloud infrastructure isolation and overlay/underlay network parameters. All these mappings allow VMware Telco Cloud Operations to provide tenant-specific root cause, and impact analysis and cost score. The discovered information is continuously updated as the network topology and configurations change.



Service performance and SLA management

VMware Telco Cloud Operations presents a holistic view of temporal performance metrics across a correlated spatial context of RAN, mobile packet core and transport domains. It allows the operator to understand the QoS based on availability, reliability and performance measures, giving insight to mobility health, voice continuity and data session interruptions. Parameters such as access failure, 5G/4G interop, congestion, packet loss and latency are easily traced across services.

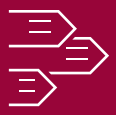
The 5G promise of massive bandwidth and low latency will require constant fine-tuning of the network, in an automated fashion, to ensure that SLAs are met. Telco Cloud Operations allows CSPs to understand SLA measurements for customers and tenants across the service delivery domains and prioritize impacts and spend intelligently. By providing context to events across the mobile packet core and RANs, ML algorithms can be utilized to identify anomalies and root cause the problem spaces across the RAN and mobile packet core.

Automated root cause analysis

By understanding the cross-domain relationships, VMware Telco Cloud Operations is able to actively monitor and manage the RAN network, L2/L3 backhaul and the mobile packet core as one entity. When problems arise, the self-adapting engine correlates events across all network domains to rapidly identify where the problem lies.

Operations teams do not need to spend valuable time trying to triage whether the problem is with a network infrastructure device, a service or within the RAN network. VMware Telco Cloud Operations figures out what the true cause of the problem is by correlating all alarms. It also evaluates the performance metrics for outliers. Operators are presented with a simple view of the root cause that allows them to drill down and see the extraneous alarms as radio, infrastructure and service impacts.

Once the cause is identified, operations and service teams are alerted and tickets are automatically generated for rapid resolution through API integration with third-party solutions such as ServiceNow. When required, closed-loop triggers are sent to network service orchestrators to heal impacted VNFs and to the Cellwize CHIME platform to actuate required changes in the RAN, addressing scenarios such as capacity discrepancies, coverage constraints, 5G anchoring, mobility management and load balancing.



Prioritize remediation based on impact

LEARN MORE

For additional information about VMware Telco Cloud Operations: 1-877-VMWARE

(outside North America, dial +1-650-427-5000)

telco.vmware.com

For additional information on Cellwize:

cellwize.com

Dynamic 5G network optimization

Mobile services are delivered over a very complex set of technology domains. Traditional methods instrument changes in individual domains independent of each other. VMware Telco Cloud Operations provides analytics as a cross-section through these domains, resulting in a "true" root cause prescription.

A poor QoS in the radio network may be attributed to an issue in the mobile packet core or the optical interconnections or traffic routing. Likewise, loss in availability or poor reliability in the transports can impact overall SLAs. This intelligence is utilized by the Cellwize CHIME platform, which applies advanced algorithms to assure service resilience. For example, cluster re-balancing in case of capacity discrepancies between RAN and mobile packet core can be achieved by re-anchoring 5G nodes and data plane traffic paths into the mobile packet core based on real-time consumption.

5G RAN densification and management

As CSPs massively roll out 5G networks, enabling high-capacity, low-latency networks, the need for automation becomes paramount. Legacy new cell integration methods are highly manual, encompassing thousands of parameters to be configured, and are not scalable to meet the velocity and agility requirements for 5G networks. Cellwize's zero-touch network densification solution automates this process, speeding up the time to market.

Once the new cell sites are active, Cellwize and Telco Cloud Operations can rapidly isolate any issues across services and service paths, proactively avoiding issues across the network via automated self-optimization and self-healing. All of this is done leveraging ML for right-time decisioning.

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VMware, Inc. 3401 Hillview Avenue Palo Alto CA 94304 USA Tel 877-486-9273 Fax 650-427-5001 vmware.com