

# Modernize Your Network with Assured Quality of Experience for the RAN

## Run Accedian Skylight on VMware Telco Cloud Platform™

### AT A GLANCE

- Assured Quality of Experience (QoE) for the RAN with enhanced service-level visibility and actionable insights across a 5G network from the core to the edge to the RAN
- Deliver QoS that meets service level agreement requirements for multi-services at the edge of the network with Accedian Skyline and the VMware Telco Cloud Platform™
- Maximize RAN investment by evolving a virtual RAN to Open RAN (ORAN), transforming it into a 5G multi-services hub on the same platform
- Fast service velocity to deploy and redeploy network services and service monitoring agents to thousands of RAN sites with VMware Telco Cloud Automation™
- Simplify network- and service-level performance management, fault management, business impact management and 1-click root cause analysis with VMware Telco Cloud Operations™ and Accedian Skylight Analytics

### Introduction

Cloud, 5G and edge computing technologies offer new capabilities and use cases, and are spawning the next generation of services. These new, high bandwidth services require low latency, which becomes possible by delivering them from the edge of the network.

Not all applications and services require the same level of quality of services (QoS) and quality of experience (QoE), however. For example, mission-critical emergency services that have a great impact in public safety situations, and autonomous driving and health care services where lives can be at stake, may have different latency and workload requirements. And while online and network gaming require high bandwidth and low latency for an immersive experience, they are not mission critical.

The cloud-native Accedian Skylight solution running on the VMware Telco Cloud Platform enables communication service providers (CSPs) to deliver enhanced service-level performance visibility, intelligence, and an assured QoE to the modernized radio access network (RAN).

This creates an opportunity for CSPs to build out a reliable and high-performing RAN and edge infrastructure to support new, high-bandwidth services with new workloads. They can also provide real-time visibility and monitoring capabilities to support the corresponding assured QoE for a variety of demanding applications.

### The Opportunity

CSPs can gain competitive advantages by transitioning to a modern, open and disaggregated RAN architecture. This transition to modern RAN architecture can enable CSPs to gain the flexibility to choose best-of-breed software components and deploy new services rapidly. New 5G services rely on CSPs to be able to host apps at the edge, closer to customers. A virtualized and open RAN allows CSPs to deliver these new edge services to customers directly from RAN sites. Appliance-based applications from single network equipment providers (NEPs) will not be able to deliver the flexibility required by newer applications.

As CSPs continue building up their RAN and edge networks, disaggregating the RAN opens up numerous use cases. Disaggregation also enables CSPs to elevate themselves in the value chain and offer superior and differentiated QoE to each customer, for both enterprise and consumer markets. Customizable QoE-based SLAs create revenue maximization opportunities with value-based pricing for performance.

New network-based services are launching based on the increased bandwidth and decreased latency of 5G networks, such as emergency medical and public safety services, autonomous or driverless vehicles, augmented and virtual reality media and

### VMWARE TELCO CLOUD PLATFORM

The VMware Telco Cloud Platform enables CSPs to accelerate 5G rollouts from core to edge to the RAN for both containerized network functions (CNFs) and virtualized network functions (VNFs).

### VMWARE TELCO CLOUD PLATFORM RAN

The VMware Telco Cloud Platform RAN is powered by field-proven virtualized compute coupled with VMware Telco Cloud Automation and VMware Tanzu for Telco, a telco-grade Kubernetes distribution.

- Use the same common platform to virtualize the RAN now
- Run virtualized baseband functions, virtualized distributed units (vDUs), and virtualized central units (vCUs) in accordance with stringent RAN performance and latency requirements
- Optimize the placement of DUs and CUs through programmable resource provisioning
- Deploy and operate both RAN and non-RAN workloads on a horizontal platform
- Transform the RAN into a 5G multi-services hub
- Reduce time-to-deploy by automating the provisioning of RAN sites
- Simplify the onboarding of vRAN functions with validated and standards-compliant packages
- Automate lifecycle management of infrastructure, Kubernetes clusters, vRAN functions, and 5G services
- Programmatically adjust the underpinning platform availability and resource configuration, based on the requirements of vRAN functions at the time of instantiation
- Automatically discover, register and create Kubernetes clusters from a centralized location to manage thousands of distributed components with ease

entertainment services, online mobile and network gaming, and low-latency industrial and manufacturing applications.

### The Challenge

Next generation services that are mission-critical rely on more reliable platforms to deliver immediate responses, and in some cases immersive experiences. Reliability and accountability in delivering the expected QoE are essential for the success of service providers launching these new services. CSPs need to be able to provide assurance and validation of performance for meeting their service-level agreements (SLAs).

Performance monitoring and management systems also become more complex. CSPs need to monitor network performance for point-by-point components, and also for end-to-end system and service levels. Management must become more service-centric and customer-centric beyond the data center and network operations center.

In addition, traditional RANs are only dedicated to supporting a single application. With limited resources at the RAN and edge sites, a RAN that has a minimal footprint, a single server that can support multi-services running both RAN and non-RAN workloads, is essential to enable CSPs to monetize their RAN investment and increase their ROI with these new services.

### The Solution

To accomplish these goals in thousands of RAN and edge sites, the VMware Telco Cloud Platform RAN™ (TCP RAN) reduces the footprint and resources required at the edge by supporting both RAN and non-RAN workloads on the same platform. VMware ESXi™ with VMware Tanzu™ for Telco can support both virtualized compute resources and Kubernetes at the cell and at aggregation sites.

This innovative, common and horizontal design provides the flexibility and adaptability that CSPs need. CSPs can now build out thousands of RAN sites using a pay-as-you-grow approach, by first virtualizing the RAN now.

With the VMware Telco Cloud Platform RAN, CSPs can accelerate the disaggregation of their proprietary RAN and modernize their RAN so they can maximize the monetization of the 5G services they deliver across their network.

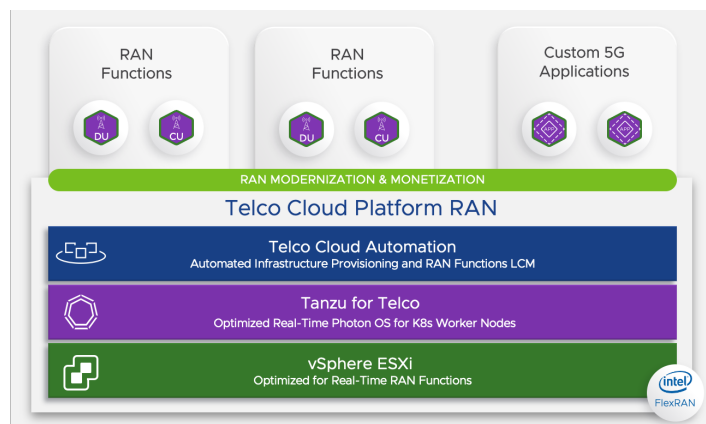


FIGURE 1: VMware Telco Cloud Platform RAN modernizes the RAN into a 5G multi-service hub that equips CSPs to monetize 5G at the edge

**ACCEDIAN SKYLIGHT**

Accedian Skylight is a virtualized performance assurance platform, delivering end-to-end network, application and service performance visibility—right from the user edge to the core network and the cloud.

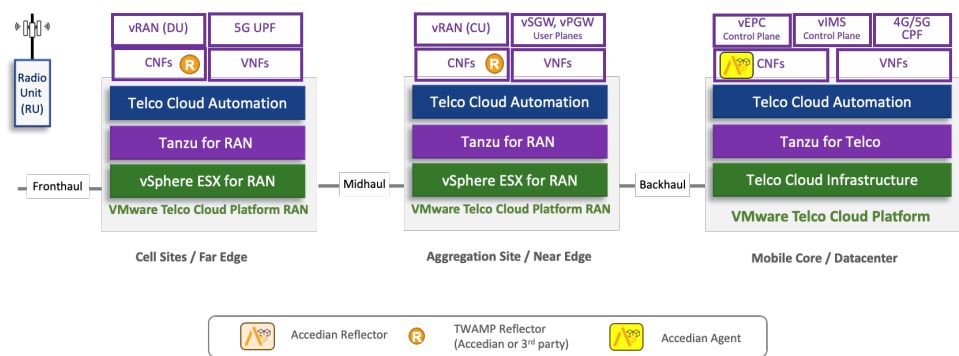
Skylight uses a composable architecture consisting of Accedian Active Agent (Generator & Reflector), Accedian SFP Compute, Accedian SFP/FPGA based Active Agent, and Accedian Skylight Analytics.

- Skyline proactively ensures networks and cloud applications to meet increasingly stringent performance requirements, optimize network capacity, and meet demanding customer expectations on quality of experience.
- Skyline leverages its high-quality performance data, analytics and machine learning to identify, predict and prevent customer-impacting issues.

In addition, with Accedian Skylight running on the VMware Telco Cloud Platform, CSPs can monitor key QoE characteristics at individual point in the network and know the real-time network and service-level performance that is available to individual customer—all on the same platform.

Accedian Skylight and VMware Telco Cloud Platform enable enhanced QoE visibility and actionable insight across 5G networks and edge cloud infrastructures. These enhanced capabilities will support CSP modernization initiatives as disaggregated RAN to accelerate the monetization of 5G services.

Accedian Skylight components can be deployed to meet CSP’s service assurance requirements. Testing is initiated from the active generator of Accedian Agent. Accedian Reflectors, the testing endpoints, are deployed in containers at any point along the service path.



**FIGURE 2:** Accedian Skyline running on VMware Telco Cloud Platform

**BENEFITS OF SKYLIGHT RUNNING ON VMWARE TELCO CLOUD**

- Deploy new 5G services faster
- Reduce risk of new services failure and negative brand impact with deeper visibility
- Assure service quality with granular monitoring of KPIs
- Protect revenue by confidently meeting strict SLAs with business customers
- Detect service degradations before customers are impacted
- Optimize capacity, deployment planning and mobile backhaul

As part of the VMware Telco Cloud Platform, VMware Telco Cloud Automation is a multi-cloud, multi-layer automation that can extend from the 5G core to the RAN, providing end-to-end operational consistency for CSPs to radically simplify how they provision and manage their 5G networks.

With VMware Telco Cloud Automation, CSPs can automatically provision, deploy and redeploy thousands of platform instances across distributed RAN sites. By understanding the requirements of vRAN function as well as non-RAN function, including corresponding characteristics (such as latency and bandwidth) that are intended to be instantiated, the platform can programmatically configure the underpinning resources for better utilization and to meet the requirements for QoS in SLAs. This intelligence enables CSPs to dynamically adjust where functions should be deployed with cloud-first lifecycle management, simplifying Day 0, Day 1 and Day 2 operations while providing the telco-grade resiliency and service availability needed for both RAN and next-generation 5G services.

CSPs can also pre-deploy Accedian, running on the VMware TCP for monitoring, and activate real-time data collection if and when it is needed on the specific component/link depending on the demands of the situation. The deployment can be automated by

**VMWARE TELCO CLOUD OPERATIONS**

VMware Telco Cloud Operations is a multi-layer service assurance to holistically manage multi-vendor virtual and physical networks with root cause analysis, performance management, fault management and business impact management all in one.

- Single pane of glass network management that correlates service health to virtual and physical network infrastructure
- Performance analytics based on machine learning reveal actionable insights, detect performance anomalies and trigger alerts
- Multi-tenant monitoring of multi-vendor cloud, LAN and WAN solutions in a unified view
- Automated root-cause analysis of issues across multiple network layers
- Prioritization of issues based on business priorities and impact
- Closed-loop actions and remediation of problems via integration with orchestration and OSS tools
- Multi-vendor SD-WAN monitoring

**ACCEDIAN SKYLIGHT ANALYTICS**

Skylight Analytics combines data from all of the Skylight sensors and other third-party data sources and analyzes high volumes of time-series data to provide near real-time, deeper visibility.

- Easily navigate from macro view of performance trends or dive into micro detail to quickly pinpoint a single site or class of service that's causing performance issues.
- Leverage to provide end-user performance visibility and predictive analytics to engineering, operations and planning teams to keep KPIs on track.

VMware Telco Cloud Automation as part of xNF deployments or via the Accedian Skylight Orchestrator.

Test measurements can be provisioned as either regularly scheduled tests or on-demand to add additional test points along a path or to user equipment (UE), in order to provide a more granular view to help solve specific performance problems.

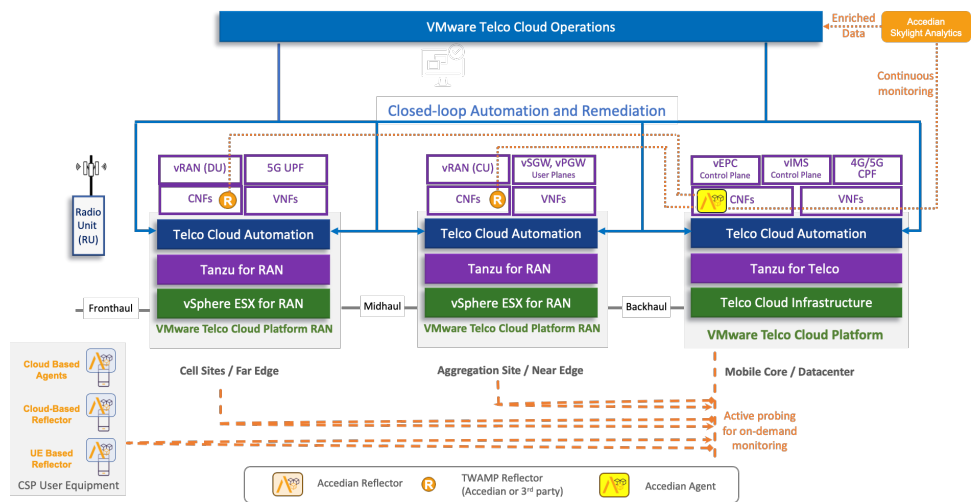
**Analytics and Monitoring**

To make the collected key performance indicators (KPIs) truly useful, a context for the data must be established. As the KPIs are collected by Accedian agents, they are enriched with user-provided metadata tags to allow intelligent reporting and the creation of useful dashboards.

After the collection and enrichment process, the data can be shared with the Accedian Analytics platform for analysis and reporting. The actionable results of the Accedian Analytics platform can be combined with defined workflows in an automation platform.

Performance data and KPIs can also be shared through standards-based APIs with third-party data management, reporting and analytics platforms, such as VMware vRealize® Operations or VMware Telco Cloud Operations. This data can be easily collected, integrated, analyzed and consumed. For these integrated solutions, Telco Cloud Operations will initiate the automated problem remediation.

Figure 3 demonstrates how the Accedian Skylight can be implemented to support continuous monitoring applied at the DU and CU locations. It can also support on-demand monitoring applied as required based on the problems observed, to gain greater insight into the problem link or equipment. For UE testing, it can monitor permanently stationed emulators and/or field technicians that carry test UE. These tests can be provisioned on demand while a technician is on site.



**FIGURE 3: Analytics and Monitoring Architecture**

The data can be shared with VMware Telco Cloud Operations for reporting on an operations console display, with automated and operator-initiated actions to remediate detected anomalies. Data can also be shared with VMware Telco Cloud Operations for analysis using its in-built anomaly detection for root cause analysis.

## Summary

With the combination of the VMware Telco Cloud Platform and Accedian Skylight, CSPs can maximize their RAN investment with faster and easier service deployment. CSPs will have the confidence to provide an assured class of service to the RAN and maximize monetization for the next generation of services that run on modernized disaggregated RAN architecture.

Running on the VMware Telco Cloud Platform, Accedian Skylight component installation is easily orchestrated, tests are easily provisioned, intelligent in-context analysis is easily accomplished, and dashboards are insightful and easily consumed.

For more information on VMware Telco Cloud Platform, please visit [telco.vmware.com](https://telco.vmware.com) or contact your VMware representative.