

# Modernize Wireline Broadband Service Provisioning and Pave the Path to Wireless Wireline Convergence

Run Benu Networks SD-Edge™ on VMware Telco Cloud Platform™

## AT A GLANCE

Benu Networks' SD-Edge Platform solutions running on VMware Telco Cloud Platform™ enable CSPs to modernize their wireline broadband services with VNF/CNF based solutions. For service providers making the leap to wireless wireline convergence, the SD-Edge makes the transition simple and rapid.

- The Benu SD-Edge Platform can operate as a BNG, PE Router, CGNAT Gateway, WAG, TWAG, SASE Gateway, and 5G Access Gateway Function (5G AGF).
- Both VNF and CNF deployment options on VMware.
- Simplifies scaling and capacity planning and future-proofs the network for the unknown – both in terms of scale and new advanced services.

## Introduction

Until recently, Communications Service Providers (CSPs) delivered network functions and services using purpose-built networking equipment. Typically running on proprietary hardware, the result was hardware/software that required specialized skills to maintain, had relatively inelastic scaling, and had a high cost.

To solve this problem, CSPs are increasingly turning to Virtual and Cloud-Native Network Functions (VNF/CNF). These functions run on industry-standard server hardware using modern operating systems and orchestration to make the deployment, maintenance, and scaling of service-provider networking functions efficient, cost-effective, and rapid.

Running Benu Networks SD-Edge solutions on the VMware Telco Cloud Platform is the robust way to establish that CSPs have a modern solution for delivering and managing fixed broadband and wireless wireline converged services. The solution provides the efficiency of a scalable, flexible, and agile solution that can be easily deployed in a proven virtualization platform.

## The Opportunity

CSPs can gain competitive advantages in transitioning from single-purpose monolithic network equipment to a modern cloud-native, open, and disaggregated architecture. This transition can enable CSPs to gain the flexibility to scale in multiple dimensions to handle unpredictable demands on the network and to add services to address yet unknown competitive pressures and market trends.

As CSPs continue to seek more efficient ways of rapidly deploying new services and scaling capacity quickly when needed, they have realized that purpose-built, closed-system networking equipment no longer meets their goals. CSPs are moving to VNF/CNF based solutions that run on Commercial-Off-The-Shelf (COTS) servers. Speed, flexibility, agility, and lower cost are the hallmarks of this new model.

## The Challenge

When provisioning any new service, the infrastructure must be able to establish operational readiness, security, and accessibility. VMware Telco Cloud Platform provides the capability to select and provision the appropriate virtual infrastructure. Today, the deployment of new services poses new challenges. 1) Need for flexible but proven virtualized infrastructure that's easy to scale and

### VMWARE TELCO CLOUD PLATFORM

The VMware Telco Cloud Platform enables CSPs to accelerate service rollout for both wireline and wireless subscribers with its ability to deliver solutions as containerized network functions (CNFs) and virtualized network functions (VNFs).

- Use the same common platform to virtualize the mobile core, RAN, and wireline network edge.
- Run virtualized network functions with high bandwidth performance and low latency requirements.
- Optimize the distributed placement of Benu’s SD-Edge Platform user planes for a better user experience while maintaining centralized control planes.
- Reduce time-to-deploy by automating the provisioning of Benu’s SD-Edge Platform.
- Simplify the onboarding of Benu’s network functions with validated and standards-compliant packages.
- Automate lifecycle management of infrastructure, Kubernetes clusters, wireline edge services, and other telco services.
- Programmatically adjust the underpinning platform availability and resource configuration based on the requirements of network 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.

manage and 2) Meeting business goals for efficiency in deploying service-providing components and provisioning services.

### The Solution

To accomplish these goals in thousands of locations – both wireline and wireless, the **VMware Telco Cloud Platform** reduces the footprint and resources required at each edge and central location. **VMware Telco Cloud Platform** supports all of the network functions supported on the Benu SD-Edge Platform. **VMware ESXi™** with **VMware Tanzu™ for Telco** supports both virtualized compute resources and Kubernetes at the edge, aggregation, and datacenter sites.

This innovative, common, and horizontal design provides the flexibility and adaptability that CSPs require. CSPs can now build out the infrastructure to support thousands of sites using a pay-as-you-grow approach. This approach simplifies CSP management tasks that allow the modernization of their wireline broadband and wireless services and accelerates the move to wireless wireline convergence.

VMware's experience and track record in virtualizing data centers and networks combined with Benu Networks' leadership in broadband and wireless wireline convergence at a global level makes both a natural choice and valuable partner for CSPs. Combined, they allow CSPs to monetize the services they deliver across their network. See Fig 1 below.

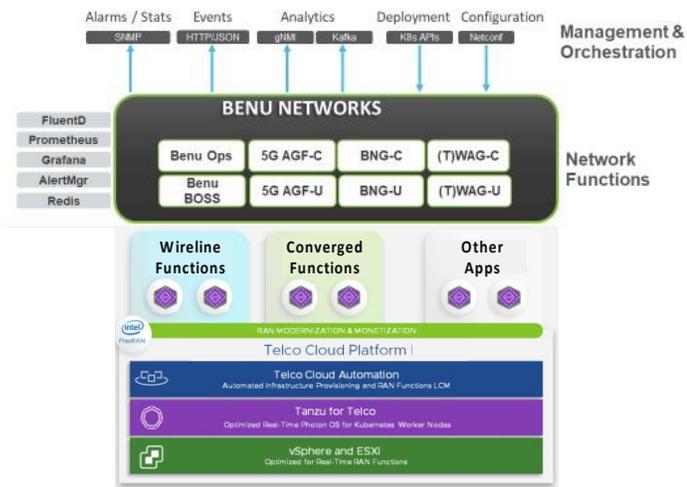


FIGURE 1: VMware Telco Cloud Platform and Benu Networks SD-Edge Platform

With VMware Telco Cloud Automation, CSPs can automatically provision, deploy and redeploy thousands of platform instances across distributed sites. By understanding the requirements of each Benu SD-Edge network function, including corresponding characteristics (such as latency and bandwidth) that are intended to be instantiated, the platform can select and automatically configure the underpinning resources to meet the service requirements in the SLAs and QoS. 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 wireless and wireline converged services.

VMware Telco Cloud Platform allows CSPs to accelerate the disaggregation of the IP network edge and take full advantage of Control and User Plane Separation (CUPS) as defined by the Broadband Forum (BBF) for Broadband Network Gateways (BNGs).

## BENU NETWORKS SD-EDGE PLATFORM

- Running on Commercial-Off-The-Shelf (COTS) servers provides better flexibility and the ability to match system sizing to bandwidth and session requirements driven by subscriber needs. It frees service providers from being locked into single-vendor hardware (ASIC-based).
- Network costs decrease while flexibility increases. Multiple user planes can be deployed where they are most geographically and functionally efficient and can be elastically scaled up or down as service demands require.
- The platform has open APIs to deliver third-party network functions and value-added services.
- Ability to create user plane “slices” for specific use cases like enterprise services, Wireless Wireline Convergence (WWC), or low latency applications.
- A centralized control plane simplifies subscriber management, management of IP address pools and eases the implementation of northbound integrations to OSS/BSS systems.
- The control plane and user plane not only scale independently but are independently resilient.
- Benu SD-Edge Platform can be seamlessly dropped into an existing VMware environment for the mobile core, therefore, enabling a common operational framework for both wireless and wireline subscribers and paving the path to 5G wireless wireline convergence.
- With VMware & Benu solution, edge computing becomes a natural evolution for a service provider’s network infrastructure, establishing a competitive advantage in their market.

With Benu Networks SD-Edge Platform running on VMware Telco Cloud Platform, CSPs can establish secure, consistent, and successful provisioning of new services and solutions over both their fixed wireline network and converged wireless wireline network.

As part of the VMware Telco Cloud Platform, **VMware Telco Cloud Automation** is multi-cloud, multi-layer automation that can extend from core data centers to the edge, providing end-to-end operational consistency for CSPs to radically simplify how they provision and manage their services.

## Benu SD-Edge – Certified on VMware Telco Cloud

Benu Networks is transforming the Service Provider Network Edge through the deployment of its Software-Defined Edge (SD-Edge) Platform. The SD-Edge is a cloud-native solution that can be configured through software to deliver critical network functions operating as a Broadband Network Gateway (BNG), Provider Edge Router (PE Router), Secure Access Service Edge (SASE) Gateway, Wireless Access Gateway (WAG), Trusted WAG (TWAG), CGNAT Gateway, or as a 5G Access Gateway Function (5G AGF) for Wireless Wireline Convergence (WWC). It empowers operators to deliver high-speed connectivity, with the ability to elastically scale to meet the needs of demanding customers while delivering value-added services.

The SD-Edge Platform has been tested and certified running in containers (CNFs) on the VMware Telco Cloud Platform 5G Edition 2.0. This supplements Benu’s existing certification to run Virtualized Network Functions (VNFs) in a VMware vSphere/ESXi environment.

The Benu SD-Edge Platform supports standard-based separation of the control plane from the user plane (BBF TR-459 “CUPS” architecture). This capability combined with cloud technology enables customers to deploy hundreds of resilient user planes in an automated fashion, all connecting to a pair of geo-redundant control planes. This allows capacity to be quickly scaled-in or scaled-out and enables the deployment of new revenue-generating services, but with the simplicity of a centralized control plane. It does not require specialized hardware but instead runs on commercial off-the-shelf processors (x-86 based).

Competition, economics, speed to market, subscriber growth, and new service evolution are working in concert to drive transformation at the network edge, which can only be delivered by deploying an open, cloud-native platform like Benu’s SD-Edge.

## The Use Cases

### Broadband – vBNG

The fixed broadband network has many critical components, but the linchpin of it all is the Broadband Network Gateway (BNG). User services have evolved to include live streaming, gaming, work from home, OTT applications, IOT -- even Augmented Reality and Virtual Reality applications. These new services are transforming the way residential subscribers and enterprises depend on connectivity in their personal lives and businesses. To meet these demands, CSPs need to transform their network edge.

The *Benu Networks virtual Broadband Network Gateway (vBNG)* is leading the transformation at the carrier edge with its cost-effective ability to elastically scale up or down, deliver advanced routing capabilities, provide edge MPLS VPNs, CGNAT, and advanced services to empower Communications Service Providers (CSPs) to become more agile, flexible, and able to respond more rapidly to their customers’ needs. Further, CSPs exceed user expectations by delivering lightning-fast connectivity and smart home management services, all at affordable rates.

## Wireless Wireline Convergence – 5G AGF

The *Benu Networks 5G virtual Access Gateway Function (5G vAGF)* delivers the capabilities that Communications Service Providers (CSPs) need to provide services from a 5G core to both wireless and fixed wireline subscribers. Not only does this enable consolidated fixed and mobile billing, but more importantly, it offers the full promise of fixed-mobile convergence so that the subscriber experience is consistent across home, business, and 5G networks for fixed and mobile services.

## Wireless Access Gateway – WAG

*Benu Networks WiFi Access Gateway (WAG) and Trusted WAG (TWAG)* can be used in a variety of deployments & uses cases including, Public & Community (Hotspot) WiFi, Education, Mobile Network Offload, Smart Cities, Venue WiFi, Hospitality WiFi, and Multi-Dwelling Units (MDUs). With its ability to manage bandwidth allocation, apply subscriber policies, improve mobility, and dramatically increase security, the Benu Networks' solution plays an important role in the delivery and management of services to and from WiFi networks.

## Summary

The solution with *Benu Networks SD-Edge Platform* running on the VMware Telco Cloud Platform is easily deployed and integrated into CSP's multi-cloud environment. It provides a modern and scalable solution for broadband and wireless services. For the future, it is the foundation to efficiently provide converged wireless wireline services.

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