

# Overcome RAN complexity with Red Hat, Intel, and HPE

## Gain traction in Open RAN

The joint solution from Red Hat, Intel, and HPE offers:

- ▶ Pretested and simplified deployment.
- ▶ Performance optimization.
- ▶ Global reach and technological expertise.
- ▶ Automation and scalability.

## Achieve enhanced performance, cost efficiency, and flexibility

The telecommunications landscape is rapidly evolving, propelled by demands for enhanced performance, cost efficiency, and flexibility. Open Radio Access Network (Open RAN) technology has emerged as a groundbreaking solution, championing the separation of hardware and software to foster interoperability and giving service providers greater freedom in vendor selection.

Red Hat, Intel, and Hewlett Packard Enterprise (HPE) are at the forefront of this transformation, collaborating to develop Open RAN solutions that not only aim to boost network performance, but also work to reduce the total cost of ownership (TCO).

This partnership uses the compact, high-density HPE ProLiant Compute DL110 Gen11 server, powered by 4th Gen Intel® Xeon® Scalable processors equipped with Intel® vRAN Boost™ acceleration technology, to revolutionize the telecommunications sector with efficient, flexible Open RAN solutions.

This approach, however, is not without its challenges. Integrating Open RAN into existing telecommunications infrastructure is a complex task, requiring significant adaptation and compatibility efforts.

In this overview, we will go over how the efforts of Red Hat, Intel, and HPE offer a solution that is tested to work in these complex environments.

## How a 3-way partnership offers triangulated benefits

**The collaboration between Intel, Red Hat, and HPE has produced a verified reference configuration (VRC) for RAN, outlining the essential hardware, software, and firmware to deliver a comprehensive solution for RAN applications. This configuration uses Intel FlexRAN™ reference software for complete layer 1 processing on Intel Xeon scalable processors.**

The collaboration between Intel, Red Hat, and HPE enhances the readiness of service provider platforms for deploying Open RAN solutions. The partnership uses the global reach and technological prowess of the 3 companies to deliver a cloud-native, power-efficient, and highly performant solution. Red Hat® OpenShift® and Red Hat Enterprise Linux® play crucial roles in this ecosystem, providing a standardized platform to meet the needs of various deployment scenarios, from private 5G to network equipment providers' test environments.

## **Purpose-built for telco Open RAN**

The HPE ProLiant Compute DL110 Gen11 server features a short depth, 1U/1P chassis designed specifically for edge computing and integrating with a service provider's infrastructure to simplify deployment.

## **Red Hat OpenShift as a RAN standard**

As the needs for a RAN server are as varied as the number of deployments, service providers need a software solution that works across all of their workloads, from the datacenter out to the edge of the network.

Red Hat OpenShift works as a foundational Kubernetes container technology for RAN solutions, supporting the deployment and management of RAN workloads in a stable, reliable, and scalable manner.

The HPE ProLiant Compute DL110 Gen11 is fully tested with Red Hat OpenShift at its core for a global standard for RAN configurations. At a base level, RAN configurations can integrate Red Hat OpenShift to provide a robust, container orchestration environment that facilitates the deployment, scaling, and management of cloud-native RAN applications. This integration supports the decoupling of hardware and software, so service providers can benefit from a more flexible, efficient, and scalable network infrastructure.

When using software-defined networking, having a tested solution such as Red Hat OpenShift is as important as the hardware.

## **Performance optimization and cost reduction**

The use of 4th Gen Intel Xeon Scalable processors, optimized for high throughput and low latency, directly addresses the performance needs of RAN deployments.

Intel vRAN Boost fully integrates RAN acceleration in the 4th Gen Intel® Xeon® system-on-a-chip (SoC), eliminating the need for external accelerator cards. It reduces both the complexity and the bill-of-materials cost of deployments. This aspect of the solution helps service providers achieve the desired performance levels in an energy-efficient manner, which is essential for handling real-time RAN workloads, as well as reducing the overall environmental footprint.

## **Scalability through automation**

Red Hat adds value by introducing automation and scalability into the solution. The inclusion of Advanced Cluster Management for Kubernetes helps service providers automate deployment processes and scale their RAN operations efficiently. This capability is vital for managing the complexity of decoupled RAN stacks, allowing for agile responses to network demands and future business opportunities.

Intel FlexRAN reference software allows for Red Hat OpenShift to be deployed and delivered in an automated fashion where a single hub cluster manages many managed (spoke) clusters. The hub cluster and the subsequent managed clusters will be based on Red Hat OpenShift, with the difference being that the hub cluster will manage, deploy, and control the life cycle of the managed clusters using Red Hat Advanced Cluster Management for Kubernetes.

This means that Red Hat OpenShift can be deployed with fewer manual interventions, and server configuration is standardized and repeatable, with less time-consuming bespoke deployments consuming precious IT resources.

## Powerful processors

Compute is backed by 4th Generation Intel® Xeon® Scalable processors, with support for high-powered vRAN accelerators.

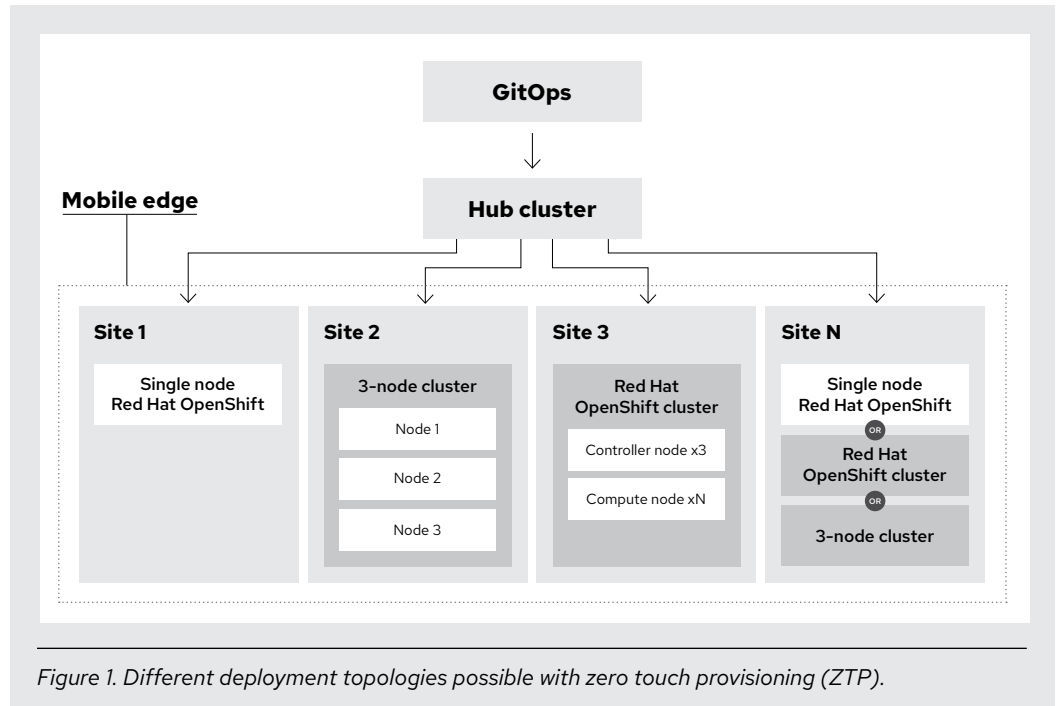


Figure 1. Different deployment topologies possible with zero touch provisioning (ZTP).

## Address hardware dependencies

This reference configuration addresses the complex hardware dependencies often associated with disaggregated RAN stacks.

By rigorously testing and validating the hardware and software components of the solution, this collaboration verifies compatibility and interoperability across different elements of the RAN ecosystem. This comprehensive testing approach mitigates the risks of hardware incompatibilities, which can be a significant challenge in disaggregated environments.

## Simplify using Verified Reference Configurations (VRC)

A tested configuration for delivery simplifies the deployment and management of RAN solutions by providing detailed guidance and predefined steps. This reduces the complexity involved in setting up and managing the network, making it accessible for service provider teams with varying levels of technical expertise.

Pretested recipes establish standardization across deployments, leading to compliance and consistency in performance and operational behavior. This standardization is crucial for service providers to maintain reliable and predictable network performance across various environments and deployments.

The predictability and tested status of the recipes help execute deployments that meet required performance standards and determinism needed for RAN workloads. This is critical for maintaining the quality of service and ensuring the network's responsiveness and reliability.

VRCs also support repeatability and scalability. They provide a foundation that can be adapted and scaled according to the specific needs of the deployment, whether it is for a small installation or a large-scale network.

These pretested solutions embody the collective knowledge and expertise of Red Hat, Intel, HPE, and other partners involved in their creation. This collaborative approach uses the strengths of each company, ensuring that the recipes reflect the latest technological advancements and best practices.

### **Examples of specific testing scenarios deployed**

The Intel-HPE VRC for RAN on the HPE ProLiant Compute DL110 Gen11 has gone through a rigorous set of testing scenarios.

These tests, conducted to validate low latency and deterministic behavior, included various measurements for latency, throughput, block error rate, and interrupt-mode throughput, helping the system's readiness for real-time RAN baseband processing workloads.

The full set of test scenarios for the Intel-HPE VRC for vRAN on the HPE ProLiant Compute DL110 Gen11:

- ▶ Foundational tests for assessing memory latency and jitter characteristics
- ▶ Cyclic tests aimed at measuring system latency and responsiveness
- ▶ Physical layer (PHY) acceleration tests that focus on the performance of forward error control (FEC) accelerators
- ▶ Wireless Baseband device library test (BBDEV-test) for evaluating functional capability parameters and the performance of FEC accelerators
- ▶ Various performance measurement tests for latency, throughput, block error rate, and interrupt-mode throughput

These scenarios establish the configuration's capability to handle real-time RAN workloads effectively.

### **[Read more about the tests.](#)**

### **Global collaboration and support**

Using the global presence and expertise of Red Hat, Intel, and HPE, the collaboration offers the support and scale of 3 expert companies to service providers worldwide.

This global collaboration makes certain that the RAN solutions are not only technologically advanced, but also backed by comprehensive support networks.

Such support spans from initial deployment to ongoing operations, helping service providers to deploy with confidence across various regions. This also helps make sure they have access to expert assistance and advice, thereby minimizing deployment risks and enhancing service reliability.

### **Versatility through integration and ecosystem compatibility**

Beyond performance optimization and deployment simplification, the collaboration ensures that the RAN solution is compatible across a broad ecosystem of network functions and services.

This joint certification helps service providers integrate the solution into their existing infrastructures, supporting a wide range of applications and services. Ecosystem compatibility is vital for service providers looking to adopt new technologies without disrupting current operations, facilitating smoother transitions to next-generation networks and services.

### Learn more

This verified reference configuration collaboration for RAN between Red Hat, Intel, and HPE on the HPE ProLiant Compute DL110 Gen11 solution empowers service providers to efficiently deploy and manage advanced RAN networks across hybrid cloud environments, at any scale.

Read more about this solution and the collaborative efforts between Red Hat, Intel, and HPE:

- ▶ [Intel-HPE Verified Reference Configuration](#)
- ▶ [An overview of FlexRAN software wireless access solutions](#)

**[Connect with a Red Hatter for more information on the HPE ProLiant Compute DL110 Gen11.](#)**



### About Red Hat

Red Hat is the world's leading provider of enterprise open source software solutions, using a community-powered approach to deliver reliable and high-performing Linux, hybrid cloud, container, and Kubernetes technologies. Red Hat helps customers develop cloud-native applications, integrate existing and new IT applications, and automate and manage complex environments. [A trusted adviser to the Fortune 500](#), Red Hat provides [award-winning](#) support, training, and consulting services that bring the benefits of open innovation to any industry. Red Hat is a connective hub in a global network of enterprises, partners, and communities, helping organizations grow, transform, and prepare for the digital future.

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