HPE Telco Validated Design with Canonical OpenStack

Introduction

HPE Telco Validated Design with Canonical OpenStack developed in close technical collaboration with Canonical is a virtualization technology solution to allow multiple and isolated applications to run on a single OS on top of the HPE ProLiant server family. This approach helps the service provider optimize resources such as memory and CPU. The solution also provides an integrated cloud-native platform that deploys an OpenStack cluster on dedicated physical servers to build and scale virtualized applications for telco companies.

What is Charmed OpenStack?

Canonical is a proud member of the OpenStack Foundation and a maintainer of the OpenStack Charms project, officially hosted by the OpenStack Foundation. It builds on available and commercially supported OpenStack distributions. Canonical provides an OpenStack distribution that's economically deployable, maintainable, and upgradable, with full automation around OpenStack deployments and exposed deployment operations.

Canonical's Charmed OpenStack is 100% open source, which provides absolute transparency and helps to stay compliant with the upstream community.

Canonical strips off layers of complexity, and the user has to handle only the OpenStack model. Users interact not just with the cloud but also with the model made possible through Charms, which provides OpenStack model-driven deployments and operations.

The main benefit is a smooth upgrade to new OpenStack versions, which is one of the key differentiators compared to other OpenStack platforms. It also allows organizations (given that the entire model is represented in the form of a YAML file) to integrate with various infrastructures, code solutions, continuous integration and continuous delivery (CI and CD) platforms.

Multiclouds and hybrid clouds

Although OpenStack is an essential part of a modern organization that leverages a private cloud, a multicloud strategy is increasingly a consideration. This is especially evident in the case of containers, as many are moving toward cloud-native applications. Therefore, how to run containers on top of OpenStack becomes an important question. Moreover, many organizations implement a hybrid approach, running sensitive workloads in the private cloud while outsourcing others to public clouds. How easily the private cloud can be integrated with public clouds becomes another decisive factor.

Canonical's Charmed OpenStack can be easily extended with the Charmed Kubernetes platform running on top of it, and the entire stack is supported under the same Ubuntu Pro support subscription. This means that organizations do not have to pay extra to support the container coordination platform, benefitting from a single platform for both virtual machines and containers. Canonical's Charmed OpenStack and Kubernetes can also be easily integrated with other Charmed applications running in public clouds, leading to a fully functional hybrid cloud based on the same software stack.

Benefits of Charmed OpenStack for telecom providers

Telco-grade performance

- Carrier-grade service-level agreements (SLAs)
- 24x7 active support by a team of experts
- On-request scaling for traffic peak
- Fast networking with Open vSwitch (OVS) hardware offloading
- Telco-preferred features such as SR-IOV, Data Plane Development Kit (DPDK), CPU pinning, and non-uniform memory access (NUMA)
- Passthrough technologies such as PCI passthrough and GPU passthrough

Security and stability

- Compliant with numerous standards, such as Center for Internet Security (CIS) or Defense Information Systems Agency (DISA), Federal Information Processing Standard (FIPS) for crypto modules, and other certification bodies
- Five years of software/security maintenance, plus an additional five years of security patches for every long-term support (LTS) release
- Predictable release cycle following the upstream OpenStack releases; quick and automated upgrade to the latest release

Cost

- Automated integration with public and private clouds, providing the best cost/performance from both worlds
- Per host (server) pricing model, regardless of the number of CPUs and cores inside of the host
- Predictable economics, full-stack monitoring, and clear responsibilities

Innovation

- Tailor-made Kubernetes deployments to address customer's use cases
- Follows hardware innovation with a wide range of hardware certifications, including Arm and x86 platforms

Software-defined network options

- Open source technologies are being promoted by default in Charmed OpenStack, so OVS and Open Virtual Network (OVN) as an evolution of OVS, providing a fully functional open source software-defined network (SDN) platform on top of OVS
- Integration with SDNs such as Cisco and Juniper

Deployment

- HPE is a Canonical-certified partner for the hardware and OpenStack deployments.

- Telco customers trust HPE for implementing and supporting the OpenStack platform.

Support

- Canonical uses a per-host (server) pricing model, regardless of the number of CPUs inside of the host; this means that if the number of workloads grows, Canonical's customers can switch to more powerful HPE ProLiant servers with high cores instead of purchasing additional support subscriptions.

- Adding and removing hardware is fully automated, including bare-metal provisioning

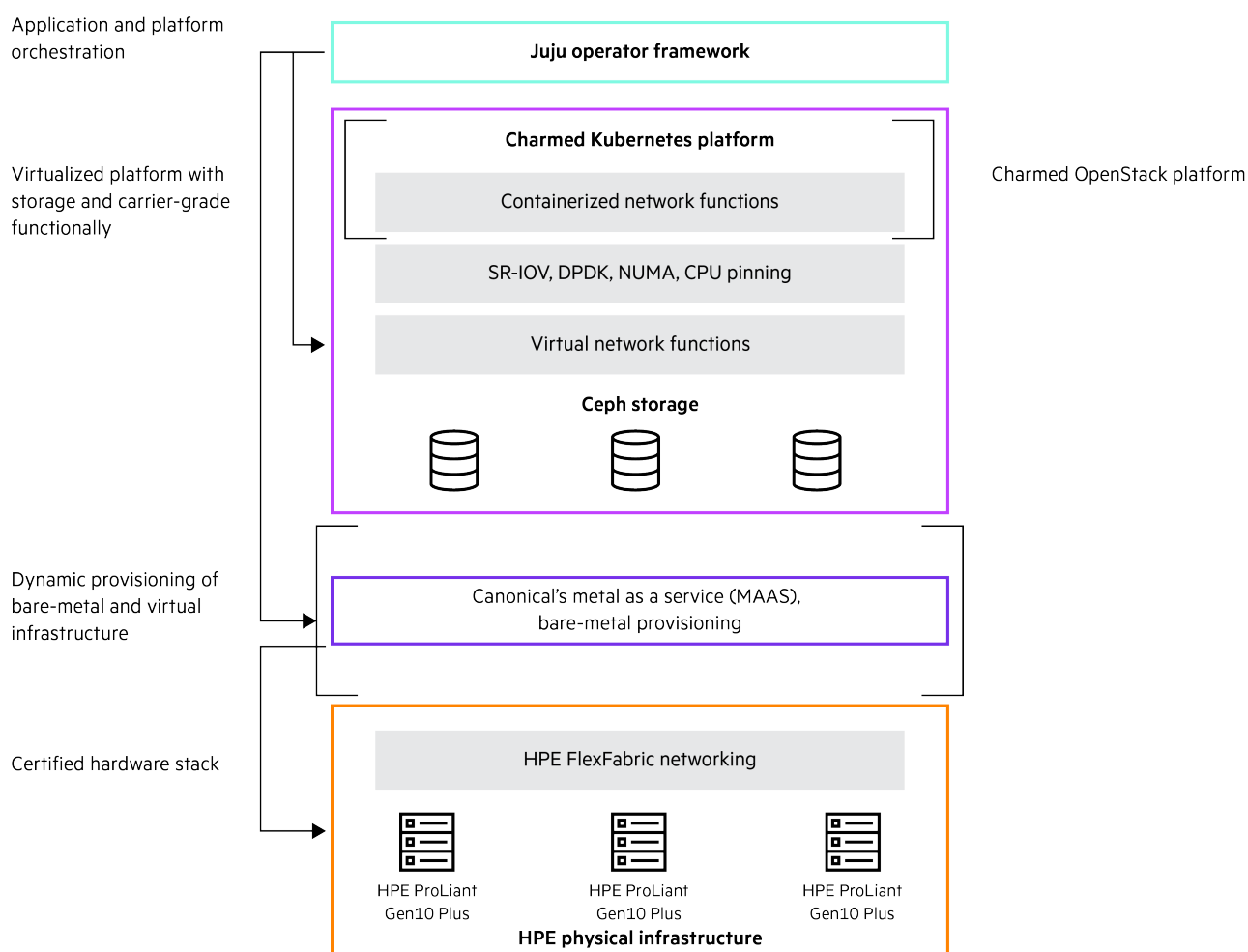- Our customers can purchase Canonical OpenStack support subscriptions through HPE

Fully managed OpenStack

HPE can also provide a fully managed service backed up by Canonical. This service includes daily OpenStack cluster maintenance, upgrades, monitoring, incident management, and problem resolution.

Telco infrastructure solutions from HPE provide leading, carrier-grade infrastructure based on industry-standard compute, storage, and networking resources to enable choice, flexibility, agility, and a lower TCO. Some of the benefits include:

- Broad telco-enabled industry portfolio, from core to edge

- NFV infrastructure (NFVI) leadership and expertise

- Compelling vision and road map for standards-based open telco infrastructure

- Global carrier-grade support and services

- An ecosystem of technology, application, and system integrator (SI) partners

- Network Equipment Building Systems (NEBS)-certified infrastructure

Figure 1 shows the complete architecture of HPE Telco Validated Design with Canonical OpenStack.

Application and platform orchestration

Virtualized platform with storage and carrier-grade functionally

Charmed OpenStack platform

Juju operator framework

Charmed Kubernetes platform

Containerized network functions

SR-IOV, DPDK, NUMA, CPU pinning

Virtual network functions

Ceph storage

Dynamic provisioning of bare-metal and virtual infrastructure

Canonical's metal as a service (MAAS), bare-metal provisioning

Certified hardware stack

HPE FlexFabric networking

HPE ProLiant Gen10 Plus

HPE ProLiant Gen10 Plus

HPE ProLiant Gen10 Plus

HPE physical infrastructure

Figure 1. Architecture of the HPE Telco Validated Design with Canonical OpenStack

HPE Telco Validated Designs are reference designs validated by HPE telecommunications experts leveraging infrastructure-as-code principles and our NFV best practices. Their key benefits are as follows:

• **Simple:** Simple to deploy, operate, support, scale, manage, and maintain.

• **Accelerated time to market:** NFVI cloud-native stack configurations are validated with partners. SI partners can customize these configurations as required.

• **Open ecosystem:** Our rich ecosystem of SIs, network equipment providers (NEPs), and independent software vendors (ISVs) provides CSPs with choices to avoid vendor lock-in.

HPE Telco Validated Design with Canonical OpenStack enables scalability via modularity and reliability with no single point of failure. System components can be NEBS Level 3 certified and tuned with peak BIOS settings.

The top use cases for the validated design are:

• Next-generation core (5G and beyond)

• Artificial intelligence at the edge

• Foundation for high-performance computing implementation

• Infrastructure for containerized network functions (CNF) and virtual network functions (VNF) development environments

Conclusion

CSPs can move to a more open and agile cloud model that allows for much faster innovation. As CSPs refocus their efforts from maintaining network stability to driving innovation, Hewlett Packard Enterprise and Canonical can help take them through a digital transformation for 5G. The HPE Telco Validated Design with Canonical OpenStack reduces complexity and risk while increasing CSPs' ability to compete in the digital era. Through HPE Pointnext Services and our portfolio of telco-focused solutions, HPE and Canonical enable CSPs to increase network agility, enhance operations efficiency, and leverage customer insights to successfully pursue new opportunities and embrace new business models.

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