HPE 3PAR StoreServ Storage integration with OpenStack

Enterprise flash storage for open-source cloud computing

HPE value-added OpenStack storage services

Prioritized storage QoS for application management
Enables quality of service (QoS) support in terms of maximum and minimum bandwidth and IOPS limits for management of storage pools.

HPE 3PAR Adaptive Flash Cache
Improves application performance and service levels by allowing solid-state drive (SSD) capacity to be used as a virtual extension to DRAM cache to reduce latency.

HPE 3PAR Thin Deduplication provisioning support
Inline deduplication increases capacity efficiency and extends flash media lifespan.

HPE Evaluator Scheduler
Improves management productivity and increases resource efficiency by automatically assigning storage resources to meet incoming requests based on workload requirements.

HPE 3PAR File Services (Manila) support
Enables a single storage system to address common block and file application needs using a single resource pool, all under the hood of one licensed file functionality.

The open cloud

OpenStack® offers a free and open-source cloud computing software platform that is commonly deployed as an infrastructure-as-a-service (IaaS) solution due to its ability to control large pools of compute, storage, and networking resources throughout the data center. In OpenStack environments, these various aspects of the data center can be managed through a dashboard known as the Horizon UI, which gives administrators end-to-end control and empowers users to provision resources through a single Web-based interface.

OpenStack is unique in giving customers flexibility to choose their desired infrastructure. For this reason, OpenStack—including HPE's own distribution, HPE Helion OpenStack—is primarily deployed to build general-purpose cloud environments where flexibility is paramount.

Why choose OpenStack?

Heterogeneous hardware support and a wide range of open-source technologies make OpenStack an excellent choice for open cloud environments where vendor lock-in is undesirable. Especially in cases where business needs demand investment protection via self-provisioning and easy access to compute, networking, and storage resources on demand, OpenStack is a perfect choice.

The absence of a predefined usage model with OpenStack technology empowers users to run a wide variety of applications without having to know application requirements in advance, thus enjoying the independence and flexibility that a structured cloud solution might not be able to offer. While OpenStack is still in its early stages, hundreds of the world's largest brands rely on OpenStack,[1] which has one of the strongest cloud ecosystems in the industry, backed by major technology contributors and financial supporters such as Hewlett Packard Enterprise with ongoing development work adding further scalability and enhanced functionality.

The OpenStack architecture

OpenStack solutions offer the flexibility and scalability to leverage various components in the stack, meaning that designing an OpenStack solution is solely dependent on user requirements. To design, deploy, and configure an OpenStack solution, an understanding of the conceptual and logical architecture of the solution is a must. While the conceptual architecture helps in understanding how the different facets of the OpenStack solution (named as OpenStack services) connect with and interact with each other, the logical architecture helps provide an understanding of how these OpenStack services are stacked and how they operate internally as individual entities.

Figure 1 on next page provides an overview of the OpenStack architecture.

Storage building blocks

OpenStack supports both **persistent** and **ephemeral** storage—meaning valid from a user's perspective for the life of a virtual machine (VM). The OpenStack Storage Architecture runs on virtualized infrastructure and resembles broader cloud computing in terms of accessible interfaces, scalability, multi-tenancy, and metered resources. OpenStack storage services support open application programming interfaces (APIs) for heterogeneous architecture and

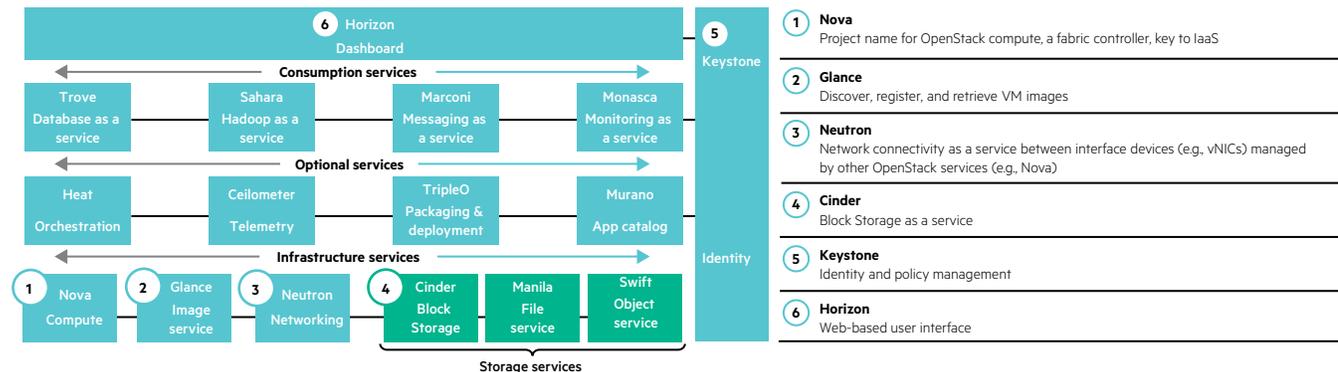**OpenStack architecture basics—key projects**

Figure 1: OpenStack architecture basics

vendor-specific, value-added services to provide access to a highly available and secured storage infrastructure.

OpenStack storage services are based on the following building blocks:

Cinder: A Block Storage service for OpenStack platform.

Manila: A file share service for an OpenStack multi-tenant cloud environment.

Swift: An OpenStack object store project, which provides storage to store and retrieve large data sets through simple APIs.

HPE 3PAR StoreServ Storage integration with OpenStack

Allows customers to maintain low infrastructure costs by leveraging the rich data services offered by HPE 3PAR StoreServ with the ability to essentially invest small and grow on demand, as required by business.

[2] For details, please refer to **HPE 3PAR Thin Technologies white paper**

[3] Based on a study using Thin Deduplication for VM images and virtual desktops

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Why use HPE 3PAR StoreServ Storage with OpenStack?

Hewlett Packard Enterprise is committed to bringing enterprise-class storage to OpenStack ecosystems. Because it is deployed as an IaaS solution, in order to be successful, OpenStack requires storage infrastructure designed for IT-as-a-service (ITaaS). HPE 3PAR StoreServ Storage is the only storage platform designed from the ground up to support the specific demands of virtualization, cloud, and ITaaS.

Use cases: HPE 3PAR StoreServ Storage and OpenStack

Converged block and file: With HPE 3PAR StoreServ Storage support for Manila file services, you can serve block and file workloads using a single, cost-efficient storage pool that reduces space requirements by 71 percent.[2]

With a single storage system capable of addressing multiple workloads in open cloud and hybrid environments, you can reduce space and cost inefficiencies, enhance capacity flexibility, and drive administrative efficiency. This is delivered by true convergence of block, file, and object access on HPE 3PAR StoreServ Storage, which offers flexible media choices ranging from all-flash to converged flash arrays that also support spinning media for additional scalability and cost control.

OpenStack for flash: Unique HPE contributions improve productivity and efficiency, extending flash media lifespan.

HPE 3PAR Adaptive Flash Cache extends system cache to accelerate workloads and improve service levels throughout OpenStack, reducing the overall cost of delivering I/O-intensive workloads in cloud environments. Inline, block-level deduplication with HPE 3PAR Thin Deduplication also increases capacity efficiency of drives hosting virtualized workloads running in OpenStack environments. This helps drives up capacity utilization and increases the life of flash drives used for virtualized workloads by up to 75 percent.[3]

Why choose HPE?

A Platinum Founding member of the OpenStack Foundation since 2012, HPE has been among the top contributors to each OpenStack release—including not just code contributions, but funding, reviews, testing, participation, training, and deployment.

HPE leverages OpenStack in its HPE Helion OpenStack distributions—HPE's own implementation of OpenStack for private and cloud self-computing. HPE offers a commercial distribution that provides an enterprise-grade cloud platform with the openness, flexibility, and additional IP to help you build, manage, and consume application-centric hybrid clouds.