Hewlett Packard Enterprise

HPE OneView architectural advantages

Contents

Technical white paper

Addressing the limitations of legacy management tools

Several years ago, Hewlett Packard Enterprise set out to understand the realities of the infrastructure management tools and processes that were in use at data centers. The architectural and product management staff conducted extensive customer interviews and made many data center visits to observe how IT was really managed today. We wanted to understand the diverse issues and challenges associated with existing infrastructure management tools as well as the processes in the user environment.

Our research revealed that IT operations management was stuck in an old paradigm with separate management tools for servers, storage, networking, and facilities. In many cases, these tools have different foundation services with different graphical user interfaces (GUIs) and management requirements. There may also be multiple authentication requirements for each tool. Figure 1 summarizes some of the difficulties with existing tools based on this old paradigm.
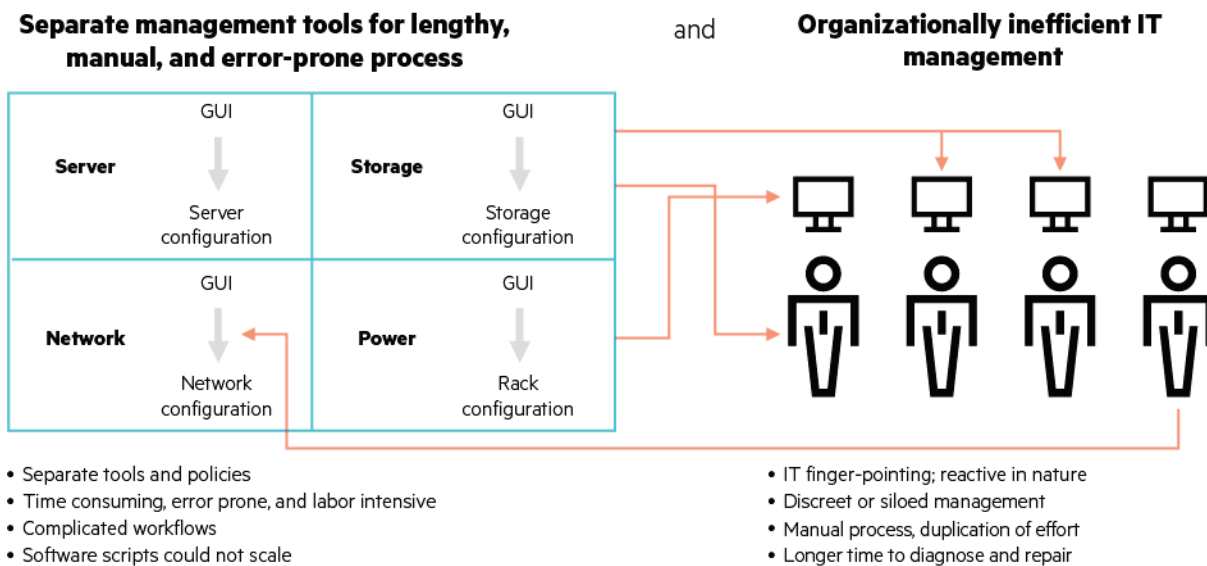
Separate management tools for lengthy,   and   Organizationally inefficient IT
manual, and error-prone process   management

Server — GUI → Server configuration	**Storage** — GUI → Storage configuration
Network — GUI → Network configuration	**Power** — GUI → Rack configuration

- Separate tools and policies
- Time consuming, error prone, and labor intensive
- Complicated workflows
- Software scripts could not scale

- IT finger-pointing; reactive in nature
- Discreet or siloed management
- Manual process, duplication of effort
- Longer time to diagnose and repair

Figure 1. Conceptual summary of the inefficiencies caused by using current tools to manage infrastructure

We realized we needed to establish a platform that addressed both the technical and organizational issues. In addition, we understand IT is making a fundamental shift that is being driven by virtualization, cloud, and software-defined technologies. A new paradigm is emerging. IT organizations need a management platform that will allow them to transition efficiently while allowing them to span multiple generations of infrastructure. We used the knowledge we gained when we developed the first generation of converged infrastructure (CI) management with the original HPE BladeSystem plus Virtual Connect and the Insight management suite.

During our research, we also analyzed the CI management tools offered by competitors to understand their approach to the new demands generated by changing technologies and users. Our analysis identified successful approaches as well as limitations. We also used information gained from industry analysts and market research to anticipate future requirements.

This technical white paper explains the issues that must be addressed in Composable Infrastructure management and why we developed the unique architectural features of HPE OneView. We will explain our approach to the following key requirements:

1. Provide fast time-to-value and intuitive ease of use

2. Must be inherently software-defined and automated

3. Unify previously isolated silos of compute, storage, and networking

4. Scale must be achieved without additional layers of management complexity

5. Enable a broad API ecosystem with open APIs and SDK

An integrated platform with a consistent, logical resource model

HPE OneView is a comprehensive, single platform designed from the ground up for CI management. An integrated platform increases the productivity of every member of the team, across servers, storage, and networking. By streamlining processes, incorporating best practices, and creating a new, holistic way to work, HPE OneView provides organizations with more efficient way to work. It is designed for open integration with existing tools and processes to extend these efficiencies.

HPE OneView is delivered as an appliance to make it easy to deploy. It can be either a virtual appliance to manage HPE infrastructure environments, or a hardware appliance (called Composer) to manage HPE Synergy environments. When it is fully implemented, the HPE OneView appliance manages servers, storage, networking, and power and cooling resources through their full lifecycle. It collapses infrastructure management tools into a single resource-oriented architecture that provides direct access to all logical and physical resources. Logical resources include server profiles and server profile templates; storage volume templates; logical enclosures and enclosure groups; logical interconnects and logical interconnect groups; and network connections and storage volume attachments that can be provisioned as a service. Physical resources include server hardware blades and rack servers, networking interconnects, storage systems, disks, and compute enclosures.

The HPE OneView CI platform offers a uniform way of interacting with resources by providing a RESTful API foundation. This integrated resource model removes the need for you to enter and maintain the same configuration data more than once. It keeps all versions up to date. It encapsulates and abstracts many underlying tools behind the integrated resource model, so you can operate with new levels of simplicity, speed, and agility to provision, monitor, and maintain your CI. The integrated resource model is critical for diagnosing problems or determining the risk of making a change by seeing affected resources and how they are interconnected before making the change.

HPE OneView also streamlines the process of bringing the enclosures, interconnects, and server hardware under management. When you add a device, HPE OneView automatically detects all the hardware and prepares it for monitoring and management. In HPE OneView, server hardware either has a server profile, which is allocated and fully configured, or it has no server profile and is available as raw hardware in a global pool awaiting a new configuration. This supports dynamic reconfiguration of hardware, while preserving the simplicity of provisioning a new server profile just like the last one. It guarantees the server profile will successfully deploy to the allocated hardware based on deep knowledge of the server hardware type and enclosure group.

Enhanced user experience

The HPE OneView UI approach is designed to enhance the interaction between IT staff and match your work practices in the data center. It is designed to be simple, efficient, and consistent. It features new capabilities inspired by Web technology commonly used in our consumer lives and re-thinks them for the data center. You also have the choice of programmatic interfaces based on REST APIs.

HPE OneView UI design builds functionality around administrators work practices and puts resources in the menu. The HPE OneView UI fully embraces the Web experience. Right click to open in a new tab, copy and paste browser bookmarks, easily email links to colleagues, and print diagrams and data. There are search capabilities, newsfeeds, and other functions that work as you've come to expect in a Web experience.

The HPE OneView UI works on desktops, tablets, and mobile devices. The combination of Java compatibility checks and security updates creates an operational burden, so HPE OneView uses HTML5. The UI is built on the modern Web, using HTML5, CSS3, JavaScript, and AJAX. It has been tested with modern Web browsers.

Designed for automation

A substantial portion of the work of operations consists of routine tasks related to infrastructure lifecycle management, including designing, provisioning, monitoring, and updating. HPE OneView is designed to automate day-to-day responsibilities by simplifying time-consuming tasks leading to increased productivity and reduced operational costs. It is an automated infrastructure provider under any environment including VMware®, Microsoft®, and OpenStack® that supports traditional, virtualized, and cloud workloads. We introduced the concept of the "automation hub" to explain the unique HPE OneView architecture.

The HPE OneView automation hub consists of the complimentary relationship between the REST API and the message bus, a messaging broker or intermediary for exchanging messages, that is well suited for large-scale management of virtualized and cloud environments. HPE OneView provides two message buses: one called the State Change Message Bus (SCMB) contains messages about any change in the resources managed by HPE OneView; the other called the Metric Streaming Message Bus (MSMB) contains metrics such as temperature and power or CPU utilization for managed resources.

We paired the message buses with an industry standard Representational State Transfer (REST) API. They form a symbiotic relationship that allows HPE OneView to serve as a closed-loop automation hub. HPE OneView "listens" to changes in the environment and publishes messages about the changes to all the consumers on the bus. Message bus consumers can then leverage the HPE OneView RESTful API to carry out CRUD operations or integrate with other systems. This powerful combination of the REST API and the message buses provides the foundation for building higher level IT automation and integration with a broad ecosystem of management partners. This includes service desk, orchestration, monitoring tools, configuration management database (CMDB), and more. Please see the partner open ecosystem section for further details.
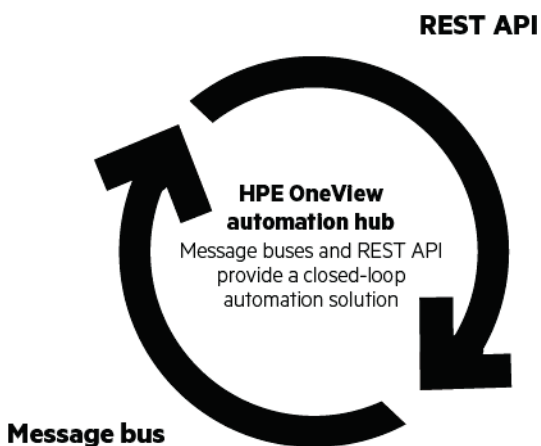

REST API

HPE OneView automation hub
Message buses and REST API provide a closed-loop automation solution

Message bus

Figure 2. Conceptual overview of automation hub

HPE OneView is designed as a set of cooperating resource managers that run on the HPE OneView management appliance. Resource managers focus on a specific type of resource, including servers, storage, and networking and provide the REST APIs for those resources, as well as publish state change messages (SCMs) and metrics to the message buses when their resources are changed in any way.

Resource managers detect state changes both in response to user-initiated changes and also by monitoring the actual environment using device-level APIs and protocols such as SNMP. Both types of changes are consistently reflected in the HPE OneView REST API and SCMs that are published to the state change message bus (SCMB) to notify interested parties such as partner integrations or higher-level automation.
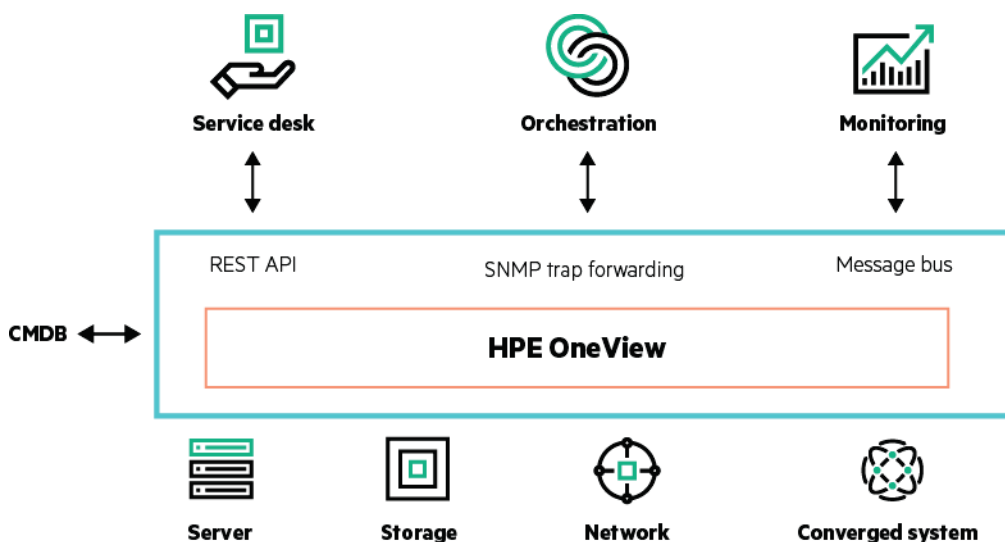
Figure 3. Examples of HPE OneView integrations with other tool

Figure 4 shows how the HPE OneView REST API and message bus are used heavily within the HPE OneView appliance for communication between resource managers and the foundation services. The message bus topic where SCMs are published is called the SCMB.
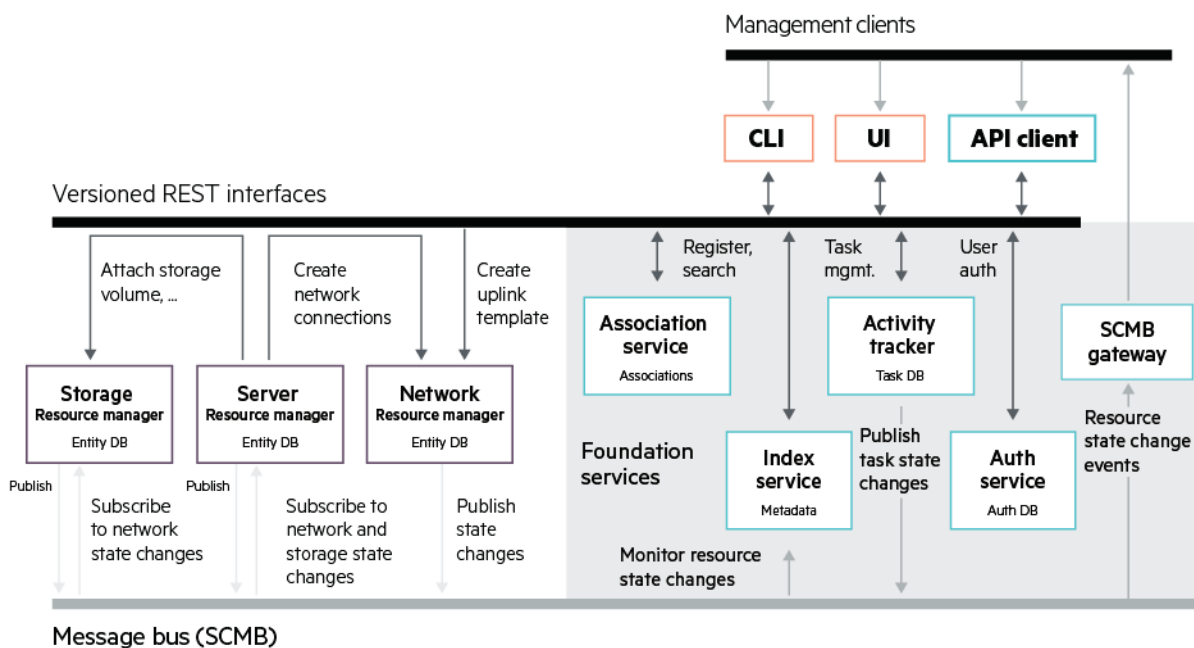

Figure 4. Interactions between the REST API, SCMB, resource managers, and foundation services

HPE OneView embeds RabbitMQ as a highly scalable and distributed message bus infrastructure, which supports the industry standard Advanced Message Queuing Protocol (AMQP). RabbitMQ offers a variety of features that are important to enterprise-class management. These include reliability and high availability, flexible routing, clustering, federation, guaranteed delivery, multi-protocol, and tracing.

There's a large underline community around RabbitMQ, producing all sorts of clients, plugins, guides, and more that make it easy to consume HPE OneView SCMs from the SCMB from a variety of languages including Java, Ruby, Python, C# .Net, PHP, Perl, C/C++, Erlang, Node.js, and so on. The SCMs produced by an HPE OneView resource manager are made available to external clients via an SCMB gateway as shown in figure 4. You can subscribe to a subset of SCMs using a routing key filter as described in this SCMB blog topic.

By subscribing to the SCMB, your automation can immediately respond to changes in the HPE OneView managed environment. There is a wealth of state changes you may be interested in, such as:

- Arrival of critical alerts such as disk drive or memory failure or pre-failure conditions

- Deployment of enclosures including associated firmware updates

- Updates to server, network, or logical interconnect profiles

Why REST is important

The advantages of the REST methodology include the ability to create Web services using an accepted and prevalent interface that is used to manage large-scale environments. This well-documented, public API is very useful for developers and end users who wish to create their own apps, or provide integration capabilities with other applications they use (see the Enterprise Information Library for more details). It includes five standard HTTP methods: GET, PUT, POST, PATCH, and DELETE.

REST has significant advantages over other well-known interface methods, such as SOAP, especially when combined with simple and widely adopted JavaScript Object Notation (JSON) payloads. Developers can use REST to easily create and modify resource without the heavy weight toolkits required for Simple Object Access Protocol (SOAP). REST has lighter bandwidth requirements—REST requests and responses can be short, unlike SOAP where such exchanges require data wrappers. REST with JSON describes a resource's configuration in a standard text-based format. Since REST is based on a simple use of the ubiquitous HTTP protocol, REST API calls can be made from a variety of tools and almost any programming language, including cURL (a common tool available on many Linux® platforms), Microsoft Windows® PowerShell, Python, Ruby, Perl, and other tools that support making calls to HTTP servers.

Security is always a key aspect of any enterprise product, so all REST API calls are required with HTTPS. HPE OneView generates self-signed certificates out of the box, but recommends uploading a certificate authority (CA) signed certificate to your management appliance.

The HPE OneView appliance supports an extensive number of REST APIs. Requests for these functions can be issued by any client, and not just a browser. HPE OneView REST APIs are fully documented in the Enterprise Information Library.

REST-based resource model

The resource is a fundamental concept of any RESTful API. The HPE OneView appliance uses a resource model that reduces complexity and simplifies management of your data center. This REST-based resource model provides logical resources, including templates, groups, and sets that when applied to physical resources provides a common structure across your data center. REST APIs identify an architectural class with simple principles that include a uniform interface and a fixed set of operations (such as the PUT, POST, GET, PATCH, and DELETE found in HTTP) and associated properties you can set or modify. The stateless APIs contain these common data elements:

- **Resource**—any meaningful information or model within the managed infrastructure

- **Resource identifier**—address of a resource, or uniform resource identifier (URI) representing a particular view of a physical or logical resource or some metadata; all resources are addressable

- **Representation**—how the resource is represented, for example using JSON or XML metadata and control information—HTTP headers such as an entity tag (ETag)

In the resource model, all information and state is exposed as a resource. This includes:

- All managed device information, control, and state (such as inventory, configuration, and statistics)

- All logical resources representing concepts or configurations (such as networks and connections)

- All metadata describing the physical and logical resources

The HPE OneView GUI and REST APIs are organized by resource. The online help for each screen in the UI describes the resources and, as needed, their configuration rules.

Software-defined resources

HPE OneView provides software-defined resources including templates, profiles, and groups that provide an innovative way to manage your entire data center. These logical constructs let you specify the desired configuration of your environment and let HPE OneView automate the process of making it so. Groups and templates enable you to define configurations that are specific to the environment you want to build, such as VMware vSphere® virtual hosts, Microsoft Exchange environments, Web servers, etc. They provide flexibility to simplify changes across your data center and controlled change management.

The HPE OneView appliance provides several software-defined resources, such as groups and server profiles. These reusable logical constructs mean that you can capture the best practices of your experts across a wide variety of disciplines, including networking, storage, compute hardware configuration, and operating system build and configuration. HPE OneView keeps your best-practice approaches intact as you grow, but it still allows for customization so that you maintain ultimate control. This facilitates faster provisioning, greater consistency, and fewer errors.

Server profiles and enclosure groups make it easier to prepare a bare-metal server for operating system deployment by defining and configuring the entire desired configuration, including firmware, BIOS settings, local storage configurations, SAN storage, and network connectivity. For example, you can use server profiles in conjunction with OS deployment tools, such as HPE Insight Control server provisioning (ICsp), to deploy hypervisor hosts from bare metal and add them to existing clusters automatically. (See the Enterprise Information Library for more details). Figure 5 summarizes some of the most frequently used resources and shows the relationships between them.
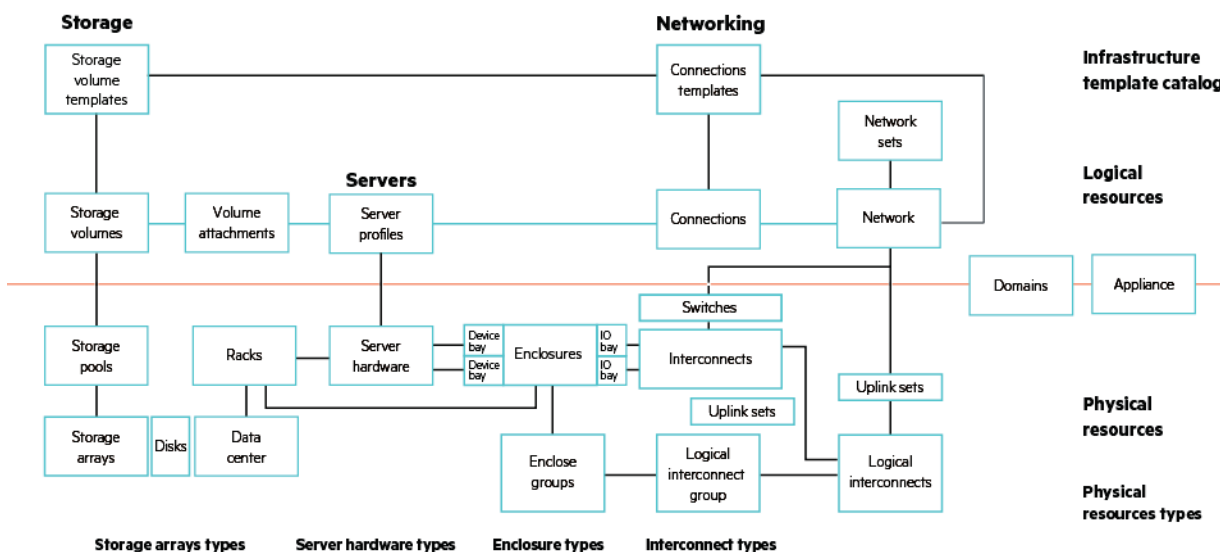

Figure 5. Resource model summary diagram

Resource relationships and Map View

The resource model in HPE OneView tracks the relationships between resources. It generates a Map View that replaces static diagrams with dynamic interactive visualizations. The Map View allows you to examine the configuration and understand the relationships between logical and physical resources in your data center. Map View gives you immediate visibility into your resources from the individual Ethernet and Fibre Channel networks all the way up to the enclosure, rack, and top-level physical data center. You can instantly see the big picture and what may be affecting the resource you're evaluating. The three-dimensional map of your data center allows you to identify areas where the temperature is too high or too low, and it lets you identify trends and plans for future data center expansion.
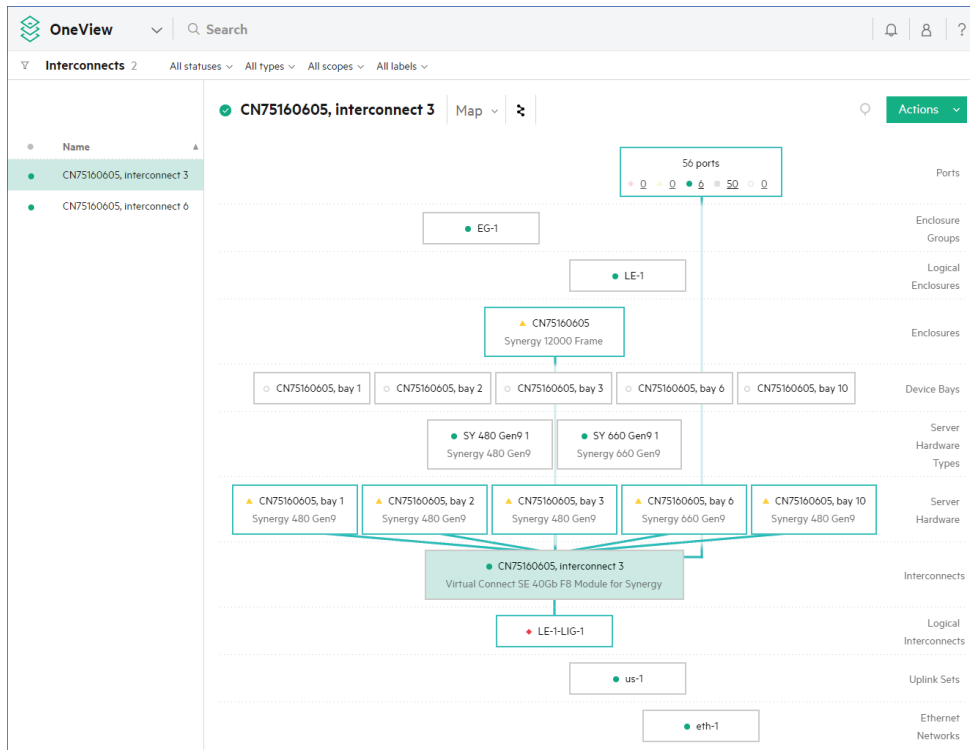

Figure 6. Screen capture of Map View in HPE OneView

An added benefit of Map View is that it helps minimize user errors caused by changing resources without understanding all the associations and potential impact. For example, HPE OneView automatically synchronizes physical and virtual networks as well as servers and associated SAN storage volumes. It can identify network connectivity issues (Layer 2) and notify the user of a potential problem, if they plan to make a change to the network that will have a negative impact. It will also warn the end user if they plan to delete storage volumes currently in use by servers in the environment.

Managing infrastructure at scale

As we developed the HPE OneView architecture, we analyzed legacy infrastructure management tools and competitive CI management products. We wanted to enhance the fault tolerance and scalability of HPE OneView while still making it easy to deploy and easy to use by providing good performance.

HPE OneView is deployed as a ready to run VMware® ESX® or Microsoft Hyper-V appliance or as a hardware appliance (HPE Synergy Composer) to expedite setup and implementation. Each appliance can support up to 640 servers, 40 C-Class Enclosures, or 21 frames in the case of Synergy. For customers with bigger environments, or heterogeneous environments with a combination of HPE Synergy and HPE BladeSystem or DL servers, multiple appliances can be aggregated under an HPE OneView Global Dashboard.

The HPE OneView Global Dashboard is delivered as an additional virtual appliance with HPE OneView that provides a web interface to unify up to ten HPE OneView appliances (either virtual appliances or HPE Synergy Composer or a combination thereof). The HPE OneView Global Dashboard provides:

1. Simple import of up to 10 management appliances or 6400 Synergy compute resources, BladeSystem, and/or ProLiant DL servers.

2. Dashboard with links to HPE OneView managed enclosures and frames, systems, and profiles.

3. Enclosure or system summary data and in-context, single sign-on launch to managed systems and enclosures and their embedded management controllers (e.g., Onboard Administrator and iLO).

4. Unified view of activities/alerts logged with all HPE Synergy Composers and HPE OneView virtual appliances.

5. Unified view of basic inventory data.

6. Search bar that enables rapid search for managed devices or device attributes and activities/alerts by name or other criteria.
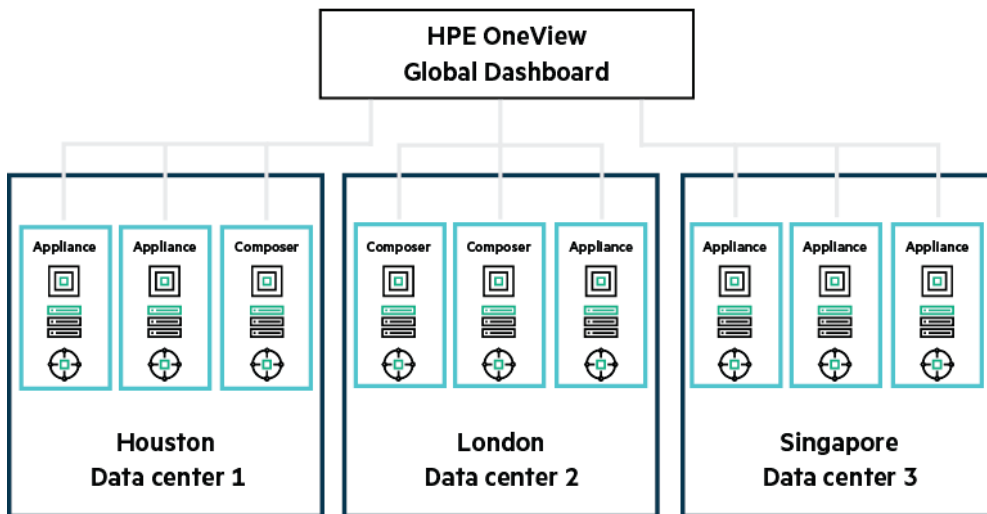

Figure 7. Example of HPE OneView Global Dashboard supporting large-scale deployments at multiple locations

HPE BladeSystem, ConvergedSystem, DL servers, HPE 3PAR storage, HPE Synergy, and other supported CI form an entire system viewed and managed through HPE OneView Global Dashboard. End users no longer need to understand which systems are managed by which HPE OneView management appliance. They can consolidate management of data from multiple management appliances into a single HPE OneView Global Dashboard instance or a small number of HPE OneView Global Dashboard instances in very large environments.

Expanding interoperability to a broader range of devices

HPE OneView is a Composable Infrastructure management platform that was architected to provide support for a wide range of devices from Hewlett Packard Enterprise and third parties. This allows organizations to preserve their investment in existing systems and operational processes while incorporating new technologies into their environment. It also reduces the risk of vendor lock-in by providing greater choice. The adaptability of HPE OneView is demonstrated by support for multiple types and generations of products. Table 1 summarizes the variety of devices that are currently supported. Refer to the latest support matrix at hpe.com/info/oneview/docs for a more current and exhaustive list.

Table 1. Summary of the infrastructure managed or monitored by HPE OneView

Device type	Models
Server	HPE ProLiant DL and BladeSystem Gen9, Gen8, G7, and G6 as well as BladeSystem c7000 Enclosure, HPE Synergy, Apollo
Converged system	HPE ConvergedSystem 700
Hyper-converged system	HPE Hyper Converged 380
Storage	HPE 3PAR StoreServ 7000, 7450, 8000, 10000, and 20000
Networking	HPE Virtual Connect FlexFabric, Flex-10 and FC Modules, and Cisco Fabric Extender for HPE BladeSystem and Nexus 5000 or 6000 series switches

The support for the Cisco Nexus Top of Rack (ToR) switch is an example of the interoperability of the HPE OneView architecture to support heterogeneous environments. This support includes the ToR switch associated with interconnects, specifically the Cisco Fabric Extender (FEX) for HPE BladeSystem modules within an enclosure. Cisco FEX information is obtained from the Onboard Administrator (OA), and relationships to the ToR Nexus 5000 or 6000 switch series are displayed in the HPE OneView Map View. HPE OneView includes the following support for the Cisco switches and modules:

- Modeling of the Cisco FEX B22HP interconnect as part of LIG and LI

- Monitoring of power state for the Cisco FEX B22HP interconnect

- Inventory and FRU data shown for both Cisco FEX B22HP and Nexus 5000 series switches

- The Map View shows relationship between Cisco FEX B22HP modules and parent ToR Nexus 5000 series switches

HPE OneView architecture and the evolution of the existing data center

While HPE OneView reduces the number of tools your system administrators need to use, most organizations will continue to use many other tools in their environment, including:

- Business service management tools such as HPE Operations Bridge

- Virtualization and systems management tools such as VMware® vCenter™ and Microsoft System Center

- Automation tools such as Docker, Chef, Puppet, and Ansible

- Facilities management tools such as Schneider Electric, Nlyte, and Eaton

HPE OneView is designed to interoperate with these other software environments. Applications can use HPE OneView to generate a baseline of information about infrastructure and capture data on any state or metrics changes that are relevant. To do this, they use the RESTful APIs to first discover what is in the infrastructure and then receive updates on any changes via subscription to the SCMB and the Metrics Streaming Message Bus (MSMB).

HPE OneView passes back the initial configuration information that it has already discovered, and then shares state changes. Applications can also use a software-defined approach of HPE OneView to control and automate changes in IT infrastructure directly from their applications. HPE OneView provides software-defined resources, including templates, profiles, and groups that serve as an innovative way to manage the entire data center.

For example, the majority of IT organizations use business service management tools to monitor and manage their existing IT operations. These solutions typically consolidate management information integrated from domain-specific element managers that are focused on individual technologies—servers, networks, storage, operating systems, and applications. This consolidation gives IT teams end-to-end visibility and enables prioritization based on business importance.

Even though service management tools provide an end-to-end view, remediation can be complex when organizations have designed management processes around the silos created by element management tools centered on the device. In contrast, HPE OneView was designed to be transformative while fitting into the complex data center landscape. HPE OneView easily plugs into business service management tools, letting organizations integrate infrastructure health into the resulting top-to-bottom service views to deal with issues faster. In fact, HPE OneView is a key enabling technology to help organizations transition their existing management software and processes to the SDDC and cloud.

For example, when you bring a new enclosure or rack of equipment online, HPE OneView automatically generates notifications to management tools that register as listeners on the message bus. An example of such a listener is the HPE Intelligent Management Center (IMC) that manages data center switches, which could configure the adjacent Ethernet switch ports to which the new enclosure is connected with the appropriate VLANs and LACP Aggregate. The integrations provide users with the advantage of managing their environment from a familiar console while taking advantage of the automation and the capabilities of infrastructure lifecycle management in HPE OneView.

Most monitoring tools rely on polling using SNMP or other methods that scan infrastructure periodically, say every 60 seconds. Most of the time, the tools collect vast amounts of data that may indicate no change. The SCMB in HPE OneView sends instantaneous messages on changes to the state of the infrastructure. Data that are more detailed can be provided for root-cause analysis, because it is generated on more of an exception basis.

HPE OneView provides SNMP trap forwarding capabilities to multiple external trap destinations. This can be configured via the HPE OneView REST APIs or UI. SNMP traps are forwarded verbatim as sent by the physical devices including HPE iLO, OA, and Virtual Connect. Additional SNMP sources will be supported as device support is provided, as will the generation of unique SNMP traps for HPE OneView logical resource alerts for server profiles, logical interconnects, and other logical resources.

The HPE OneView automation hub works with management tools from HPE Software and other independent software vendors (ISVs). We are working with partners to establish a broader, open ecosystem by leveraging the automation hub concept in the HPE OneView architecture. Figure 8 provides an overview of the emerging ecosystem at the time of this writing. HPE is actively working with partners to extend this ecosystem further.
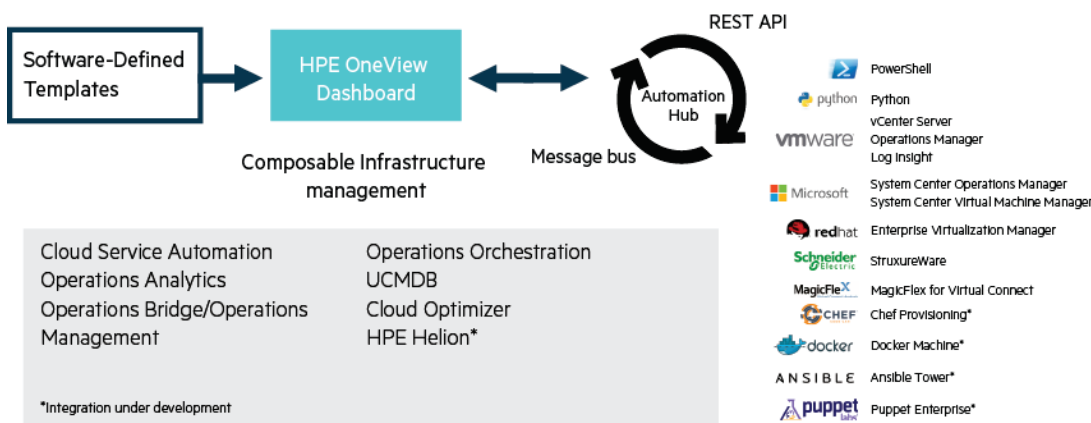

Figure 8. Currently available and planned HPE OneView integration

Ecosystem partners will integrate with HPE OneView in three different ways:

- Partners can establish a means to consume data from HPE OneView in their application. By consuming the comprehensive data on infrastructure configuration, topology, and health from HPE OneView, ISVs can ensure that customers have a consistent and reliable representation of the state of their infrastructure across multiple tools at any given moment.

- Partners can use the software-defined approach of HPE OneView to control and automate changes in IT infrastructure. In this way, they can help customers save time by automating processes that previously required manual work.

- Partners can feed information into their applications from HPE OneView automatically, such as alerts. This can streamline the troubleshooting and remediation process for customers.

Integrating Composable Infrastructure management with HPE Business Service Management

HPE Business Service Management (BSM) software is an enterprise management solution that provides end-to-end monitoring. It manages applications through infrastructure for heterogeneous environments of all sizes, as well as integrating data from traditional legacy infrastructure monitoring tools. HPE BSM incorporates a broad set of monitoring sensors, advanced analytics, automation, and a single pane-of-glass that enables IT operations teams to maximize the availability and performance of their applications and infrastructure. HPE BSM is a modular and open solution, and it can be integrated with other management software such as HPE OneView, which is the authoritative feed for infrastructure health data to HPE BSM and other tools.

You can use HPE BSM to gain visibility into your IT environment components, their availability and performance, as well as the dependencies between them, to optimize delivery of services to the business. You can also use HPE OneView to provision, configure, monitor, and manage the infrastructure within that environment.

By leveraging both solutions, you can:

- Increase application availability and performance provided by end-to-end monitoring—from applications through infrastructure. For example, you can correlate the status of a basic fan to the performance of the most-critical business service.

- Reduce mean time to diagnose problems leveraging application and infrastructure data, events, logs, and topology information. For example, you can save time by analyzing historical data from HPE BSM and HPE OneView to predict future issues using patented HP Labs analytics.

- Increase operations staff efficiency and productivity via extensive automation and seamless workflows. For example, you can automate IT processes such as opening and closing tickets, and provisioning from applications all the way down to infrastructure while still capitalizing on unique capabilities in HPE infrastructure such as Virtual Connect and HPE 3PAR.

Hewlett Packard Enterprise provides a number of out-of-the-box integrations between the HPE Software portfolio and HPE OneView to provide you with faster time-to-value. For example, you can:

- **Manage incidents automatically from detection to correction**

  Streamline the troubleshooting process as different administrators work from a common view of the IT environment. HPE OneView passes component failures directly to HPE BSM tools such as Operations Bridge, so organizations can assess the service impact of outages and automate IT process execution and remediation. HPE OneView continuously updates the mapping of the components along with all their relationships as changes are made to the supported hardware. The SCMB detects changes in the environment; HPE OneView serves as a publisher and Operations Bridge is a consumer on the bus.

- **Use smart analytics to predict problems before business impact**

  Pinpoint the root cause of system outages and performance problems using HPE Operations Analytics for HPE OneView by applying Big Data analytics to IT management. Consolidate and analyze events, logs, metrics, and topology to predict and diagnose problems using automated intelligent log analytics. In fact, a streamlined package for this software focused specifically on analyzing data within HPE OneView is available from Hewlett Packard Enterprise.

- **Construct a complete topology from application to infrastructure hardware**

  Automatically discover the infrastructure topology via HPE OneView to enrich the information in HPE Universal Configuration Management Database for IT service management and BSM.

- **Optimize capacity automatically**

  React to dynamic workloads and plan for future requirements by performing "what-if" analysis using HPE Cloud Optimizer (formerly Virtualization Performance Viewer), which pulls infrastructure data directly from HPE OneView. A streamlined package for planning based on just data from HPE OneView is also available.

- **Automate provisioning from applications down to physical infrastructure**

  Rapidly instantiate physical infrastructure by calling HPE OneView templates from workflows in HPE Operations Orchestration and HPE Cloud Service Automation.
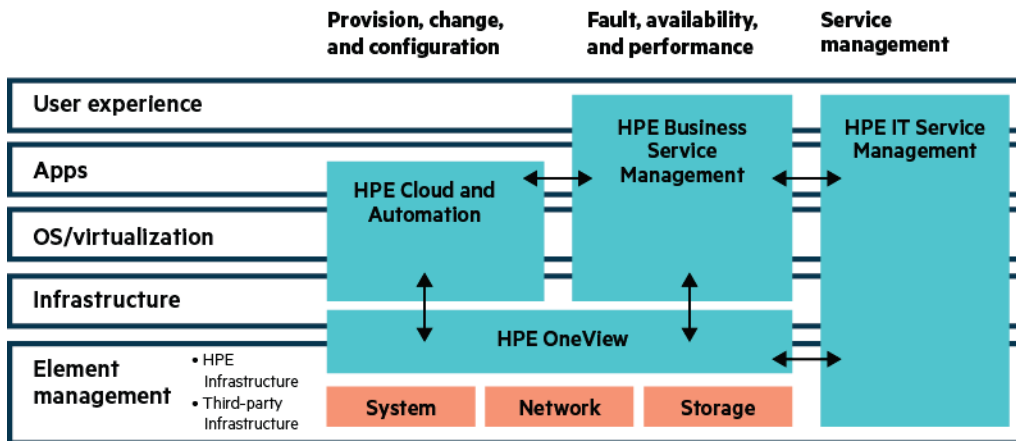
Figure 9. HPE OneView and HPE IT Operations Management

HPE Operations Analytics for HPE OneView

Operations Analytics (Ops Analytics) is a Big Data solution for managing the entire environment by analyzing data from a variety of infrastructure components and application-level silos. Ops Analytics can collect log file data as well as other machine data such as CSV or JMX collectors. It consolidates, manages, and analyzes massive streams of operational data, so it becomes actionable insight.

HPE Operations Analytics for HPE OneView is purpose built for ease of deployment with one click integration and pre-built dashboards to display the detailed metrics from HPE OneView. It provides dynamic behavioral learning and analysis of the current status of the infrastructure by generating historical trends and predicting future performance based on what has already been learned.

This expedites the troubleshooting of complex performance and availability problems that may have gone undetected previously. It prevents problems from developing that have not yet manifested themselves to HPE OneView or traditional monitoring tools by analyzing data from a variety of CI and application-level silos.

Figure 10. Integration with HPE Operations Analytics

Transitioning to cloud and the software-defined data center

The prior generation of legacy tools was primarily designed to be used by IT administrators and subject-matter experts. They did not necessarily provide APIs that allowed the tools to be controlled by users that were outside the IT organization or facilitate integration. A primary objective of cloud services is to give users greater control of infrastructure resources. This allows the control to move up the management stack from the IT administrators to the users. The software-defined data center is an evolution that moves the control even further up the stack, so the applications ultimately have control of the underlying infrastructure resources. This framework will take time for the technologies to mature, but it underscores the importance of making good architectural decisions. The cloud and application management layers will be built upon the management layer that provides the IT administrative control, so this is a critical component.

Figure 11. Conceptual overview of the role of HPE OneView in the management stack

Cloud and the SDDC require managing infrastructure as a pool of resources that can be dynamically allocated. The infrastructure is abstracted from the underlying hardware components using hypervisors. The cloud administrator can provision cloud infrastructure (compute nodes, storage nodes, controller nodes, etc.) dynamically from pools of physical infrastructure. HPE OneView provides a Composable Infrastructure management plane that supports software-defined compute, storage, and networking, so it unifies these previously isolated silos. HPE OneView's REST API allows for an open and extensible means of managing CI based on established industry standards. The lifecycle management of the infrastructure is automated to support rapid deployment or retiring of IT services, as they are required. Software-defined templates provide a structured, consistent means of implementing routine tasks and ensuring quality by establishing a common set of best practices.

HPE OneView was architected using newer, proven technologies that provide a fundamentally better foundation for the future. It provides a platform for software-defined management at the infrastructure level by delivering template-based policy automation. HPE OneView integrates cleanly as a physical infrastructure provider into a variety of environments including OpenStack and HPE Helion clouds using the REST API, SCMB, and SNMP trap forwarding capabilities.
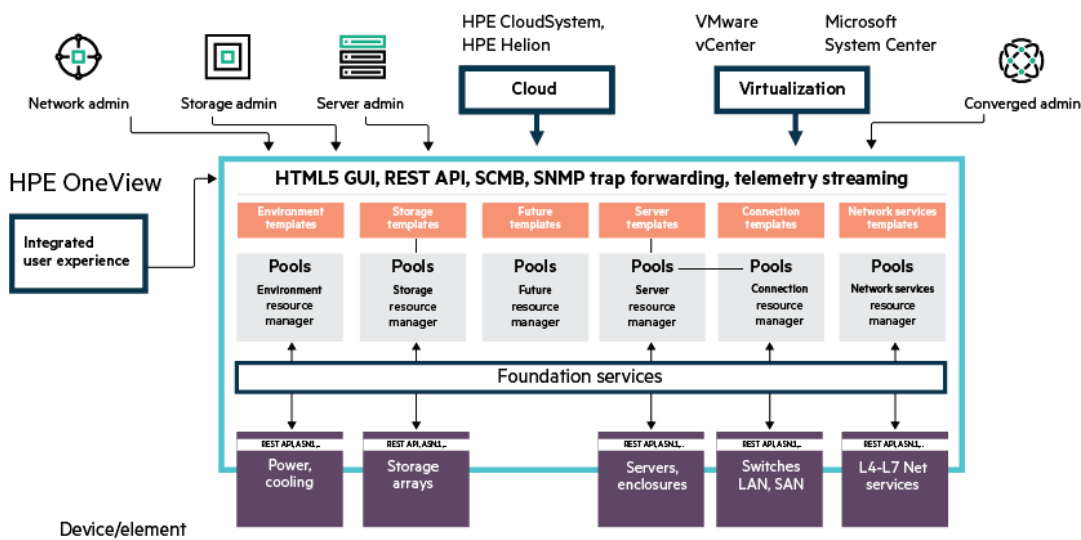
Figure 12. Overview of relationship between administrators, REST API, resource managers, and infrastructure

Conclusion

HPE OneView is an architecture that is designed for the long term, so you can build on it with confidence. It is a key enabling technology that can easily integrate into your existing environment while providing a management platform for cloud and the software-defined data center. HPE OneView features an automation hub consisting of a REST API and message buses, a consistent data model, control plane, modern GUI, and other important features and functions. Hewlett Packard Enterprise will continue to work with strategic partners and other ISVs to establish an open ecosystem that works efficiently with existing management tools and supports cloud as well as the SDDC. Future white papers in this series will explore this topic in greater detail.

Resources

HPE OneView documentation
hpe.com/info/oneview/docs

Download HPE OneView
hpe.com/downloads/oneview

HPE Composable Infrastructure partner program
hpe.com/info/composablepartners

Learn more at
hpe.com/info/hpeoneview

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