Hewlett Packard Enterprise

Technical white paper

HPE SimpliVity with VMware vRealize Automation design guide

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Executive summary

Enterprises need to roll out new applications quickly and cost-effectively to compete in today's fast-paced business environment. But many are hampered by legacy data center architectures composed of independent compute, storage, and networking platforms with distinct administrative systems. Deploying a new application can be a manually intensive, time-consuming proposition involving a number of different systems, management interfaces, and operations teams.

Turning up new IT services can take days or even weeks. Many organizations are also hindered by legacy data protection solutions that aren't well suited for today's highly virtualized IT environments. Everyday operations—cloning VMs, backing up, or restoring virtualized applications—can take hours or even days with inefficient monolithic data architectures designed around individual silos of infrastructure resources.

Overview

The HPE SimpliVity hyperconverged infrastructure is designed from the ground up for today's highly virtualized IT environments. The solution eliminates cost and complexity by consolidating a variety of IT functions—including compute, storage, network switching, replication, and backup—onto virtualized, industry-standard x86 hardware. Unlike legacy IT solutions based on monolithic data architectures, the HPE SimpliVity hyperconverged infrastructure performs inline data deduplication, compression, and optimization on all data at inception across all phases of the data lifecycle. By minimizing I/O and network traffic, routine operations such as application cloning, backup, and restore functions can be completed in seconds or minutes instead of hours or even days.

VMware® vRealize Automation

VMware vRealize Automation (vRA) streamlines the delivery and administration of private, public, and hybrid cloud applications and services. The solution helps IT organizations accelerate service velocity, boost business agility, and contain operations expenses by automating IT service deployment and lifecycle management tasks. Application developers and other users turn up compute resources and applications on-demand without IT involvement, using self-service portals and service catalogs.

HPE SimpliVity and vRA

HPE SimpliVity has fully integrated and rigorously tested HPE SimpliVity 380 with vRA, enabling HPE SimpliVity customers to fully experience the features and benefits of VMware's popular IT service delivery platform. The HPE SimpliVity hyperconverged infrastructure streamlines IT operations and accelerates service velocity by unifying administrative tasks—all resources and features are centrally provisioned from the VMware® vCenter™ management console. When integrated with vRA, HPE SimpliVity boosts business agility and improves IT operational efficiencies even further by allowing users (application developers) to deploy and manage applications and compute services on their own. With vRA, users can go online, request a new application or compute resource, and receive it in a matter of minutes, using simple service catalogs. The integrated solution—HPE SimpliVity and VMware vRA—enables IT organizations to mobilize and protect virtualized workloads at scale. Users can back up, restore, clone, and move their virtual machines on-demand via the vRA interface—all under strict administrative control of the central IT organization.

Target audience

Chief information officers (CIOs), chief technology officers (CTOs), data center managers, architectural/engineering decision makers, technologists, and others wishing to learn more about this reference architecture configuration from Hewlett Packard Enterprise. A working knowledge of server architecture, networking architecture, and storage design is recommended.

Document purpose: The purpose of this document is to describe a reference architecture/solution, highlighting recognizable benefits to technical audiences.

Introduction

This reference architecture provides examples for deploying VMware vRA with the HPE SimpliVity hyperconverged infrastructure. The recommendations are based on the vRA reference architecture, vRA best practices, and the HPE SimpliVity best practices. The vRA infrastructure architecture is largely unchanged from VMware's recommendations and best practices. This guide adheres to the VMware best practices unless it directly conflicts with the HPE SimpliVity recommendations or supported features regarding the implementation.

Typical vRA design scenarios

Development/Test configuration with single HPE SimpliVity Federation

This deployment example is considered the minimum requirement to get vRA up and running, as well as to manage a single HPE SimpliVity Federation. This deployment scenario is only appropriate for non-production environments, as it does not necessarily provide component redundancy or high availability of the VMware vCenter or vRA components.

This deployment consists of a single HPE SimpliVity Federation managed by a single VMware® vCenter Server™. VMware vRA is implemented as a single virtual appliance and a single infrastructure-as-a-service (IaaS) server. The single vRA IaaS server provides all the IaaS functions in a single Windows Server®, unlike the larger and more complex, distributed, and highly available deployments covered later in this document.

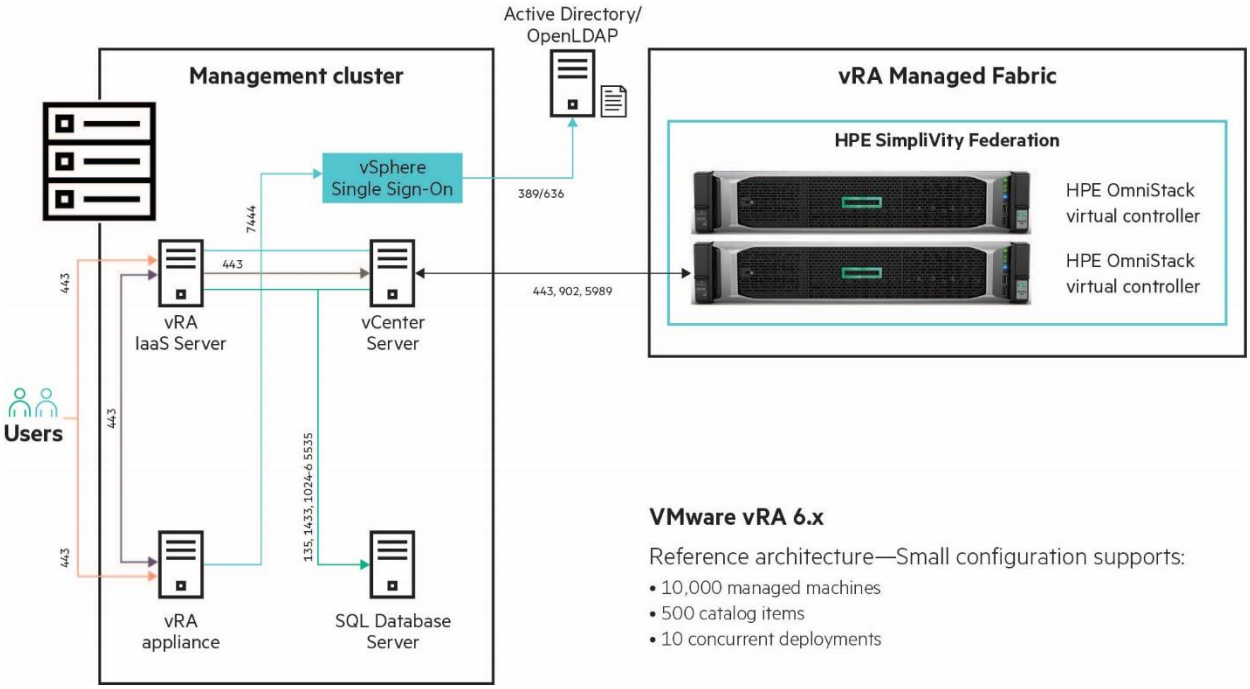

Figure 1: HPE SimpliVity and vRA dev/test deployment

The Microsoft® SQL Server databases required by VMware vCenter Server and the vRA IaaS components can be hosted on a shared Microsoft SQL Server and existing SQL Server previously deployed in the environment. By default, vCenter Server and vRA IaaS support Microsoft SQL Server Express, which may be a valid solution for a proof-of-concept environment, but the limitations of SQL Express should be understood. It is not considered a best practice for either production or larger non-production environments.

Development/test configuration with support for multiple HPE SimpliVity federations

The following deployments are identical to the development/test deployment with a single HPE SimpliVity federation. When creating larger-scale environments, multiple federations can be deployed with additional vCenter Servers for management. When designing in this fashion, Automation Proxy Agents must be deployed to support communications from the multiple vCenter. These can be installed on the single Microsoft Windows® vRA IaaS server, or on separate, dedicated vRealize IaaS Proxy Agent Servers. Both scenarios are depicted here.

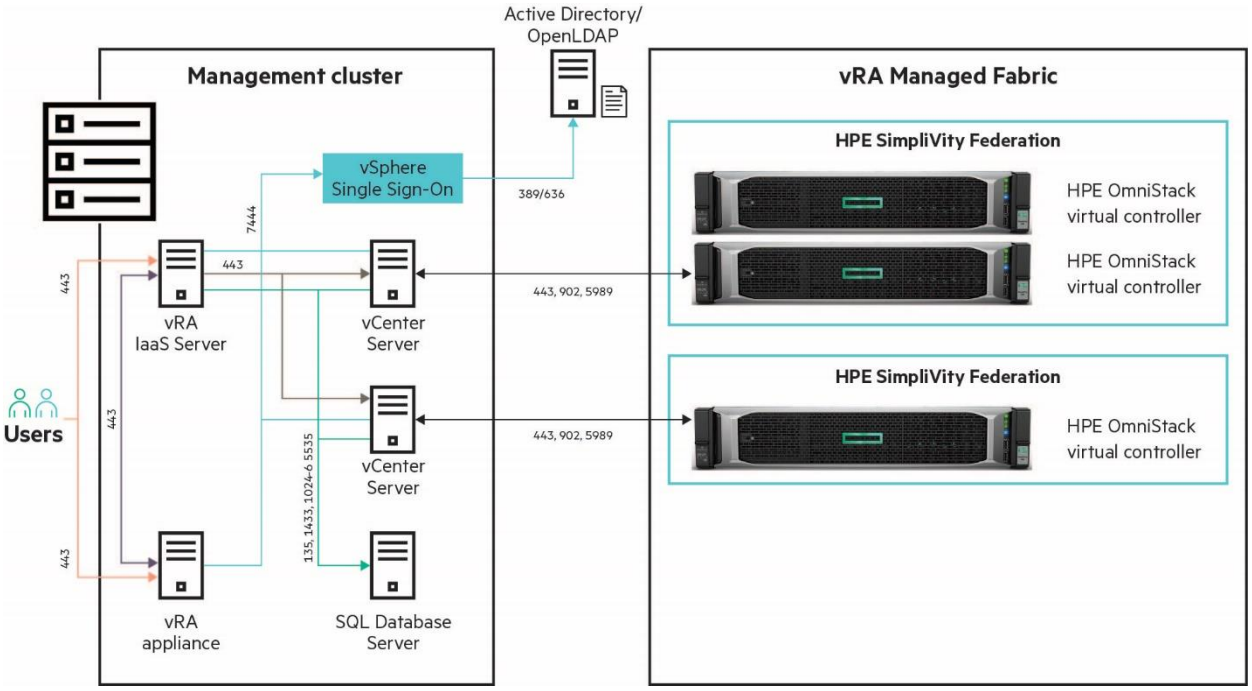

Figure 2: HPE SimpliVity vRA Dev/Test, Multiple Federations—Single IaaS Server

Table 1. Development/Test example: vRA machines

Server role	Description	Components	Quantity	Recommended
VMware® vCenter™ Single Sign-On	vCenter Server Single Sign-On 6.5 build 4944578	vCenter Server with an embedded Platform Services Controller Single Sign-On	Single	CPU: 2 vCPU RAM: 10 GB Disk: 250 GB Network: 10 Gbps
vRA Virtual Appliance	vRA Web UI, vPostgres SQL Server, and vRA Catalog	Web Server Model Manager Host Manager Service Host Distributed Execution Manager (DEM) Agent IaaS SQL Server vRealize Orchestrator	Single	CPU: 4 vCPU RAM: 18 GB Disk: 60 GB Network: 10 Gbps
vRA IaaS Server	IaaS Windows Server provides all vRA services	vRA IaaS website, Manager Service, DEM Orchestrator, DEM Worker, Proxy Agent	Single	CPU: 2 vCPU RAM: 16 GB Disk: 40 GB Network: 10 Gbps
Microsoft SQL database	Windows Server provides vRA IaaS database services	IaaS database	Single	CPU: 2 vCPU RAM: 8 GB Disk: 80 GB Network: 10 Gbps

The following figure indicates which components to install on each server profile in your deployment and includes their recommended quantity and hardware specifications. For additional detail regarding vCenter Server sizing refer to VMware's hardware requirements for vCenter Server.

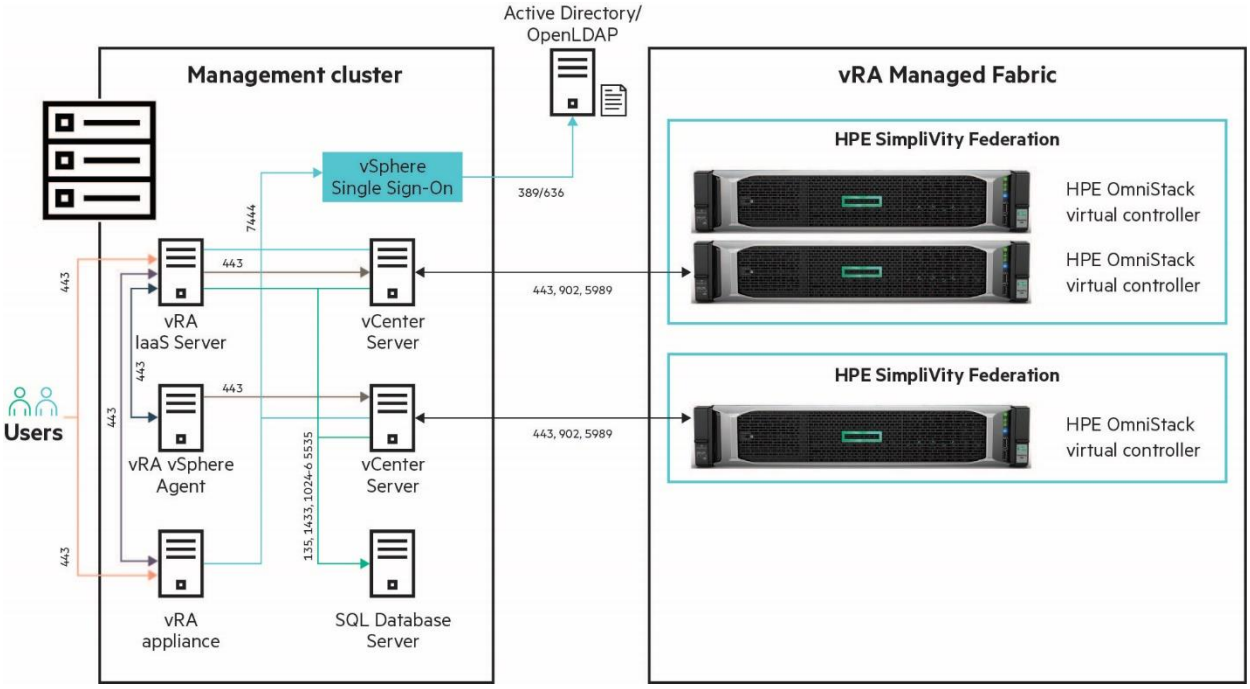

Figure 3: HPE SimpliVity vRA Dev/Test, Multiple Federations—Proxy Agent

Production configuration

This deployment example is considered the baseline production implementation of vRA. This deployment scenario provides component redundancy and high availability of the VMware vCenter and vRA components. This example also supports the deployment of multiple HPE SimpliVity Federations. This configuration deploys the vRealize Automation IaaS Web Server and vRealize Automation IaaS Manager Server on the same virtual machine. To deploy the vRA IaaS Web Server and vRA IaaS Manager Server are separate virtual machines, refer to the Large production configuration section.

For additional recommendations of vRA sizing, refer to the vRA reference architecture document.

In Figure 4, load balancers are utilized to provide redundancy between many components of the production configuration deployment. The production configuration employs multiple instances of each vRA component to provide load balancing and high availability.

Scalability, with respect to the number of HPE SimpliVity Federations, is achieved through the addition of vRA Proxy Agents. Proxy Agents can be installed on multiple servers with the same name to provide redundancy, and multiple Proxy Agents can be installed on a server to minimize the additional footprint of vRA servers.

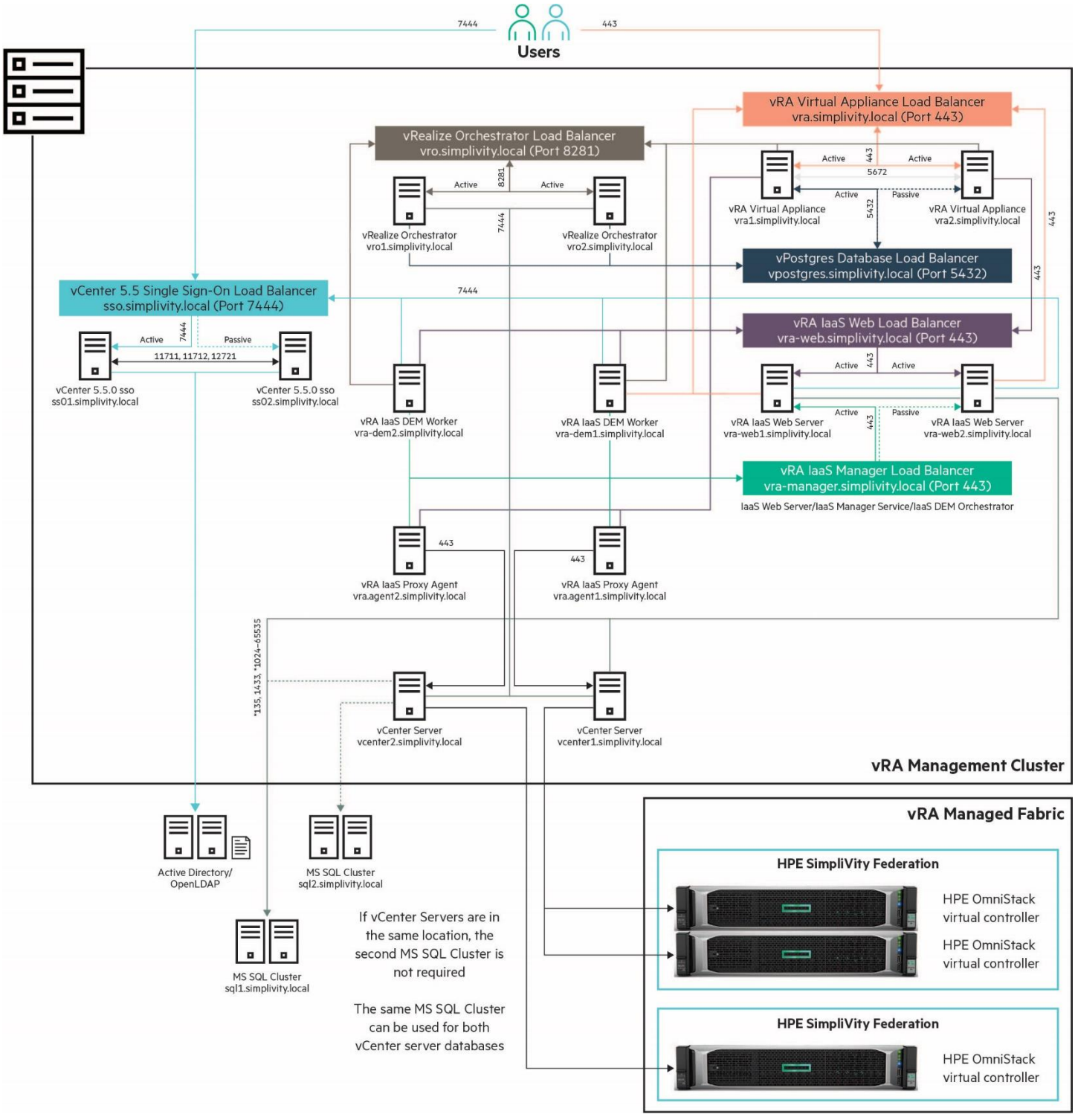

Figure 4: HPE SimpliVity vRA production, Multiple federations

Production configuration: vRA machines

The following table indicates, which components to install on each server profile in your deployment, and includes their recommended quantity and hardware specifications.

Table 2. Production configuration—Component requirements

Server role	Description	Components	Quantity	Recommended
vCenter Single Sign-On	vCenter Server Single Sign-On 6.5 build 4944578	Single Sign-On	2+ in an active/passive load balanced cluster	CPU: 2 vCPU RAM: 10 GB Disk: 250 GB Network: 10 Gbps
vRA Virtual Appliance	vRA IaaS Web UI, vPostgres SQL Server, and vRA Catalog	Web Server Model Manager Host Manager Service Host DEM Agent IaaS SQL Server	2+ in an active/active load balanced cluster vPostgres Cluster is active/passive	CPU: 4 vCPU RAM: 18 GB Disk: 60 GB Network: 10 Gbps
vRA IaaS Web/Manager Server	IaaS Windows Server provides all vRA services	vRA IaaS website, Manager Service, DEM Orchestrator, DEM Worker, Proxy Agent	2+ in an active/active load balanced cluster for the web service and active/passive for manager service	CPU: 2 vCPU RAM: 8 GB Disk: 40 GB Network: 10 Gbps
vRA IaaS DEM Worker	Windows Server provides vRA IaaS DEM Worker	vRA IaaS DEM Worker	2+ load balancing is provided by the DEM Orchestrator	CPU: 2 vCPU RAM: 6 GB Disk: 40 GB Network: 10 Gbps
vRA IaaS Proxy Agent	Windows Server provides vRA IaaS integration to external endpoints	vRA IaaS Proxy Agent	2+ multiple agents can be installed on a server; multiple servers provide redundancy	CPU: 2 vCPU RAM: 4 GB Disk: 40 GB Network: 10 Gbps
Microsoft SQL Database	Windows Server provides vRA IaaS Database Services	IaaS database	2+ in a Microsoft SQL Server cluster configuration	CPU: 8 vCPU RAM: 16 GB Disk: 80 GB Network: 10 Gbps
vRealize Orchestrator virtual appliance	Virtual appliance provides vRealize Orchestrator services	vRealize Orchestrator	2+ in an active/active load balanced cluster	CPU: 2 vCPU RAM: 4 GB Disk: 12 GB Network: 10 Gbps

For additional detail regarding vCenter Server sizing, refer to VMware hardware requirements for vCenter Server.

Large production configuration

This deployment example provides an expansion of the base production implementation of vRA, managing a number of HPE SimpliVity Federations. This deployment scenario is appropriate for larger production environments, as it does provide component redundancy and high availability of the VMware vCenter or vRA components. This configuration deploys separate virtual machines for the vRA IaaS Web Server and vRA IaaS Manager Server. For additional recommendations of vRA sizing, refer to the vRA reference architecture document.

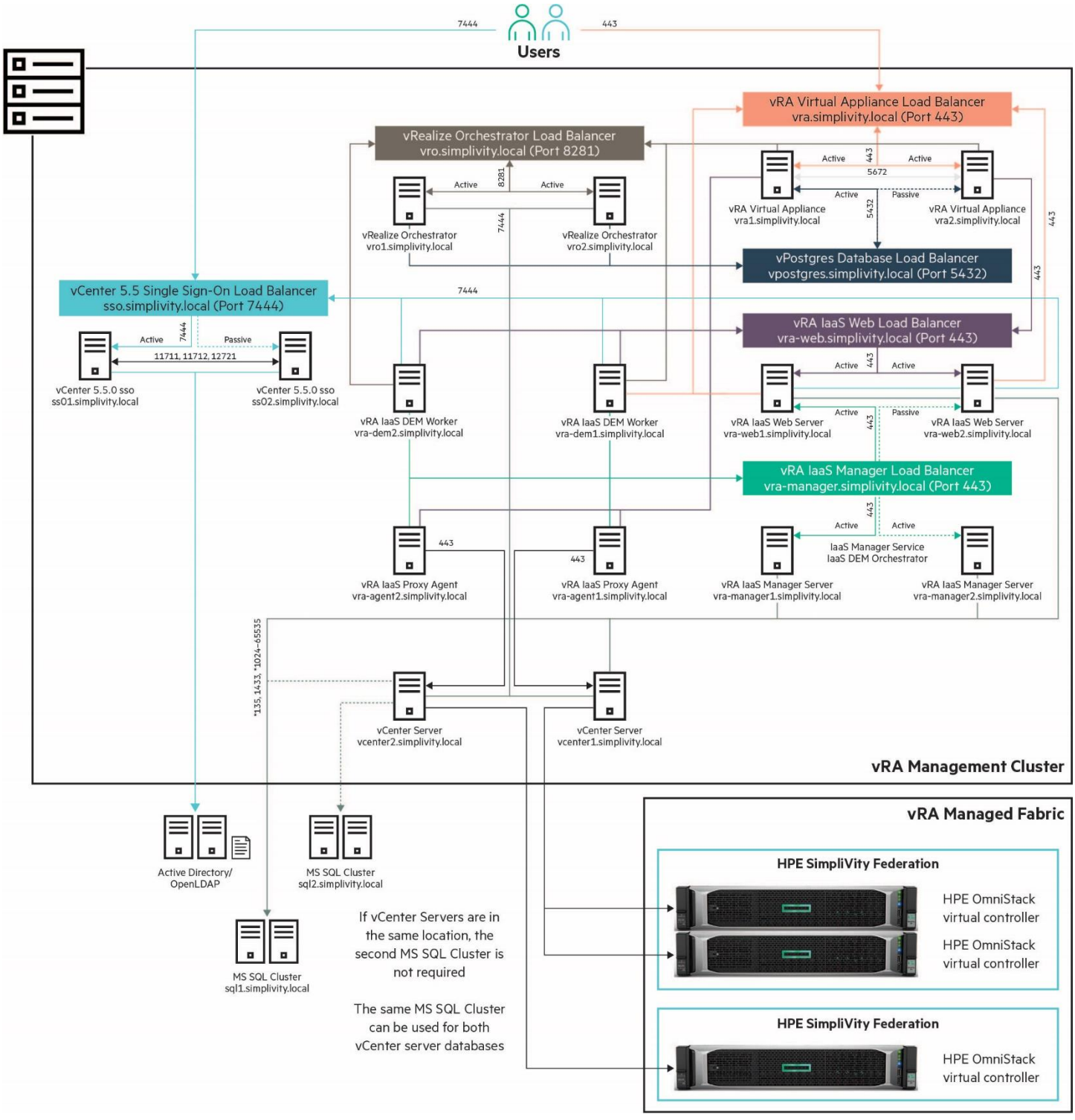

Figure 5: HPE SimpliVity vRA large production, multiple federations

Large production configuration: vRA machines

The following table indicates, which components to install on each server profile in your deployment, and includes their recommended quantity and hardware specifications.

Table 3. Large production configuration—Component requirements

Server role	Description	Components	Quantity	Recommended
vCenter Single Sign-On	vCenter Server Single Sign-On 6.5 build 4944578	Single Sign-On	2+ in an active/passive load balanced cluster	CPU: 2 vCPU RAM: 10 GB Disk: 250 GB Network: 10 Gbps
vRealize Automation Virtual Appliance	vRA IaaS Web UI, vPostgres SQL Server, and vRA Catalog.	Web Server Model Manager Host Manager Service Host DEM Agent IaaS SQL Server	2+ in an active/active load balanced cluster vPostgres cluster is active/passive	CPU: 4 vCPU RAM: 18 GB Disk: 60 GB Network: 10 Gbps
vRA IaaS Web Server	IaaS Windows Server provides all vRA services	vRA IaaS website, Manager Service, DEM Orchestrator, DEM Worker, Proxy Agent	2+ in an active/active load balanced cluster for the web service and active/passive for manager service	CPU: 2 vCPU RAM: 8 GB Disk: 40 GB Network: 10 Gbps
vRA IaaS Manager Server	IaaS Windows Server provides all vRA services	vRA IaaS website, Manager Service, DEM Orchestrator, DEM Worker, Proxy Agent	2+ in an active/active load balanced cluster for the web service and active/passive for manager service	CPU: 2 vCPU RAM: 8 GB Disk: 40 GB Network: 10 Gbps
vRA IaaS DEM Worker	Windows Server provides vRA IaaS DEM Worker	vRA IaaS DEM Worker	2+ load balancing is provided by the DEM Orchestrator	CPU: 2 vCPU RAM: 6 GB Disk: 40 GB Network: 10 Gbps
vRA IaaS Proxy Agent	Windows Server provides vRA IaaS integration to external endpoints	vRA IaaS Proxy Agent	2+ multiple agents can be installed on a server; multiple servers provide redundancy	CPU: 2 vCPU RAM: 4 GB Disk: 40 GB Network: 1 Gbps
Microsoft SQL Database	Windows Server provides vRA IaaS Database Services	IaaS Database	2+ in a Microsoft SQL Server Cluster configuration	CPU: 8 vCPU RAM: 16 GB Disk: 80 GB Network: 10 Gbps
vRealize Orchestrator virtual appliance	Virtual Appliance provides vRealize Orchestrator services	vRealize Orchestrator	2+ in an active/active load balanced cluster	CPU: 2 vCPU RAM: 4 GB Disk: 12 GB Network: 10 Gbps

vRA on HPE SimpliVity—Design considerations

The following considerations should be taken when deploying the HPE SimpliVity as a VMware vSphere® endpoint for vRA:

Virtual Extensible LAN

Virtual Extensible LAN (VXLAN) is a network virtualization technology that attempts to mitigate the scalability problems associated with large cloud computing deployments. It uses a VLAN-like encapsulation technique to encapsulate MAC-based OSI Layer 2 Ethernet frames within Layer 4 UDP packets. vRA supports virtualized networks based on the VMware vCloud® Networking and Security and VMware NSX™ platforms.

Network and security virtualization allows virtual machines to communicate with each other over physical and virtual networks securely and efficiently. VXLAN can be used by vRA (via vCNS or NSX) to provide network virtualization. HPE SimpliVity software version 3.70, supports the use of VXLAN for virtual machine traffic only. Using VXLAN for storage traffic is not supported.

Linked clones vs. HPE SimpliVity clones

Linked clones are space-efficient copies of virtual machines employed to save storage capacity. Linked clones are based on a snapshot of a VM and use a chain of delta disks to track differences from a parent machine. Linked clones require a persistent connection to the parent virtual machine, which can degrade disk performance under load. If you are focused on performance, you should employ a full clone instead of a linked clone.

In HPE SimpliVity software version 3.70, linked clones are supported but not recommended. HPE SimpliVity clones minimize I/O and network traffic and boost performance by performing inline data deduplication, compression, and optimization on all data at inception across all phases of the data lifecycle. HPE SimpliVity clones offer all the space-saving benefits of a linked clone with the performance of a full clone.

vRA design considerations

The following considerations should be taken when deploying vRA in conjunction with the HPE SimpliVity hyperconverged infrastructure:

1. The VMware vCenter, VMware vCenter Single Sign-On, vRA, and vRealize Orchestrator servers should be installed on a dedicated management cluster. User machines should be provisioned to HPE SimpliVity clusters that are separate from the management cluster to isolate the user workloads from the server workloads.
2. VMware recommends keeping the VMware vCenter Server Single Sign-On servers, VMware Identity Appliance (if used), and vRA servers in the same time zone with their clocks synchronized to prevent delays in data synchronization.
3. To increase geographic scalability, the vRA DEM Worker and Proxy Agent servers can be deployed across WAN links. All other vRA components should be deployed in a central location to prevent performance degradation.
4. The use of the VMware Identity Appliance is recommended only for simple deployments, as it does not provide any form of high availability of its service. For highly available production deployments, use load-balanced VMware vCenter 6.5 Single Sign-On clusters for identity services.

Database design considerations

1. Microsoft SQL Server

For production deployments, deploy a dedicated database server to host the Microsoft SQL Server (MS SQL) databases. vRA requires machines that communicate with the database server to be configured to use Microsoft Distributed Transaction Coordinator (MSDTC). By default, MSDTC requires port 135 and ports 1024 through 65535. See the VMware vRealize Automation Installation and Configuration guide for details.

vRA does not support AlwaysOn Availability Groups due to the MSDTC.

2. VMware vPostgres SQL

For production deployments, configure the vPostgres SQL Servers included with the vRA virtual appliances as an active/passive cluster. Provide a load balancer virtual IP (VIP) to ensure the vRA components can access the vPostgres SQL databases in the event of a failure of a virtual appliance.

Note
The failover of a vPostgres SQL cluster is a manual process.

Load balancer considerations

1. General load balancer considerations

Use only port 443, the default HTTPS port, when load balancing the vRA appliance, infrastructure web server, and infrastructure manager server together.

Although you can use other load balancers, NSX, F5 BIG-IP hardware, and F5 BIG-IP Virtual Edition have been tested and are recommended for use. For more information on configuring a F5 BIG-IP Load Balancer for use with vRealize Automation refer to Configuring VMware vRealize Automation High Availability Using an F5 Load Balancer.

2. **Web services**

   Use the least response time or round-robin method to balance traffic to the vRA appliances and infrastructure web servers. Enable session affinity or the sticky session feature to direct subsequent requests from each unique session to the same web server in the load balancer pool.

3. **Manager services**

   You can use a load balancer to manage failover for the manager service but do not use a load-balancing algorithm because only one manager service is active at a time. Do not use session affinity when managing failover with a load balancer.

   As two manager services cannot be active at the same time, disable the passive manager service in the cluster and stop the Windows service. If the active manager service fails, stop the Windows service (if not already stopped) under the load balancer. Enable the passive manager service and restart the Windows service under the load balancer. See the vRA Installation and Configuration documentation for more information.

4. **DEM Orchestrator**

   DEMs running under the Orchestrator role support active/active high availability. When a DEM Orchestrator starts, it searches for another running DEM Orchestrator. If none is found, it starts executing as the primary DEM Orchestrator. If it does find another running DEM Orchestrator, it monitors the primary DEM Orchestrator to detect an outage. If an outage is detected, it takes over as the primary. When the previous primary comes online again, it detects that another DEM Orchestrator has taken over its role as primary and monitors for failure of the primary Orchestrator.

5. **DEM Worker**

   DEMs running under the Worker role support active-active high availability. If a DEM Worker instance fails, the DEM Orchestrator detects the failure and cancels any workflows being executed by the DEM Worker instance. When the instance comes back online, it detects that the DEM Orchestrator has canceled the workflows of the instance and stops executing them. To prevent workflows from being canceled prematurely, a DEM Worker instance must be offline for several minutes before its workflows can be canceled.

6. **vCenter Single Sign-On**

   vCenter Single Sign-On cab be configured in an active-passive mode. To enable failover, disable the active node in the load balancer, and enable the passive node. Session information is not statefully maintained across SSO nodes, so some users might see a brief service interruption. For more information about how to configure vCenter Single Sign-On for active-passive mode, see the Configuring VMware vCenter SSO High Availability for vRealize Automation technical white paper.

7. **Development/Test configuration**

   When deploying a Development/Test configuration, create and use DNS CNAME records in place of the load balancers, and include these in your SSL Certificate Subject Alternate Name fields. Use the CNAMEs to connect the various vRA components. This will allow you to easily expand a development configuration to a production or large production configuration with minimal reconfiguration of the vRA components.

Scalability design considerations

By default, vRA processes only two concurrent provisions per endpoint.

1. **Data collection scalability**

   The time required for data collection to complete depends on the capacity of the compute resource, the number of machines on the compute resource or endpoint, the current system, and network load, among other variables. The performance scales at a different rate for different types of data collection.

   Each type of data collection has a default interval that can be overridden or modified. Infrastructure administrators can manually initiate data collection for infrastructure source endpoints. Fabric administrators can manually initiate data collection for compute resources. The following values are the default intervals for data collection.

Table 4. vRA data collection intervals

Data collection type	Default interval
Inventory	Every 24 Hours (Daily)
State	Every 15 Minutes
Performance	Every 24 Hours (Daily)

Important
The default intervals are appropriate for most deployments; however, the intervals must be specified for each Compute Resource on the Data Collection page within Infrastructure > Compute Resources for the HPE SimpliVity and vRealize Orchestrator workflows to function properly.

2. **Workflow processing scalability**

   Use the Distributed Execution Status page to view the total number of workflows that are in progress or pending at any time and use the Workflow History page to determine how long it takes to execute a given workflow.

   If there are a large number of pending workflows, or if workflows are taking longer to complete, add more DEM Worker instances to pick up the workflows. Each DEM Worker instance can process 15 concurrent workflows. Excess workflows are queued for execution.

   Additionally, workflow schedules can be adjusted to minimize the number of workflows scheduled to be kicked off at the same time. For example, rather than scheduling all hourly workflows to execute at the top of the hour, stagger their execution time so that they do not compete for DEM resources at the same time. For more information about workflows, see the vRealize Automation Extensibility documentation.

   Some workflows, particularly certain custom workflows, can be very CPU intensive. If the CPU load on the DEM Worker machines is high, consider increasing the processing power of the DEM machine or adding more DEM machines to your environment.

Geographic design considerations

1. **Proxy Agents**

   For maximum performance, Proxy Agents should be deployed in the same data center as the endpoint to which they are associated. The deployment can have multiple Proxy Agent servers that are distributed around the globe. Additional agents can be installed to increase throughput and concurrency.

2. **Distributed Execution Managers**

   Locate DEM Worker servers as close as possible to the Manager server. The DEM Orchestrator must have string network connectivity to the Manager Service at all times. Production deployments should have two DEM Orchestrator instances, on primary and one for failover, and two DEM Workers in the primary data center.

   If a DEM Worker must execute a location-specific workflow, install the instance in that location.

   You must assign skills to the relevant workflows and DEMs so that those workflows are always executed by DEMs in the correct location. For information about assigning skills to workflows and DEMs by using the vRA Designer console, see the vRealize Automation Extensibility documentation. Because this is advanced functionality, you must make sure you design your solution in a way that WAN communication is not required between the executing DEM and any remote services, for example, vRealize Orchestrator.

   For the best performance, DEMs and agents should be installed on separate machines.

Integrating HPE SimpliVity and vRealize Automation

Blueprints

A machine blueprint is the complete specification for a virtual, cloud, or physical machine and is used to determine a machine's attributes and how it is provisioned. When a business group member requests a machine, the machine is provisioned according to the specifications in the blueprint, such as CPU, memory, and storage. Blueprints specify the workflow used to provision a machine and include additional provisioning information such as the locations of required disk images or virtualization platform objects. Finally, blueprints specify policies such as the lease period and which operations are supported on machines provisioned from the blueprint. An example of a virtual blueprint might specify Windows Server 2008 R2 installed on a server with exactly two CPUs and at least 4 GB of memory.

Multiple machines

The multi-machine services feature of vRA allows users to provision the services and the component machines, in a virtual data center based on existing templates. Multi-machine services are compound services comprising multiple machines that can be provisioned and managed with vRA as a single entity. For example, in a tiered application deployment, you might have one or more database servers, one or more application servers, and multiple web servers. In addition to creating blueprints for each of the server types, you can also create a multi-machine blueprint that includes all the machines that are needed for the entire application deployment. Users can then provision the multi-machine service and perform actions, such as rebooting, on all the component machines with a single action.

vRealize Orchestrator workflow use cases

HPE SimpliVity has developed several workflows for vRealize Orchestrator that provide the integration mechanism that extends the functionality of the HPE SimpliVity to end users via VMware vRealize Automation (vRA). By utilizing the vRealize Orchestrator workflow package for the HPE SimpliVity, the following functionalities are extended to vRA:

- Create and delete backup policy
- Set backup policy on a virtual machine or multi-machine service
- Backup and restore a virtual machine or multi-machine service
- Move a virtual machine or multi-machine service
- Clone a virtual machine
- Create, delete, and resize HPE SimpliVity datastore
- Display the list of backups and its sizes associated with a virtual machine

Create backup policy

The **SimpliVity Create Backup Policy** workflow creates a new backup policy.

A backup policy enables the end user to schedule automatic backups of virtual machines by adding multiple rules to policy to specify where to store the backup, the frequency of the backup, and the backup retention period. Backup policies can be assigned to datastores and virtual machines depending on the requirements.

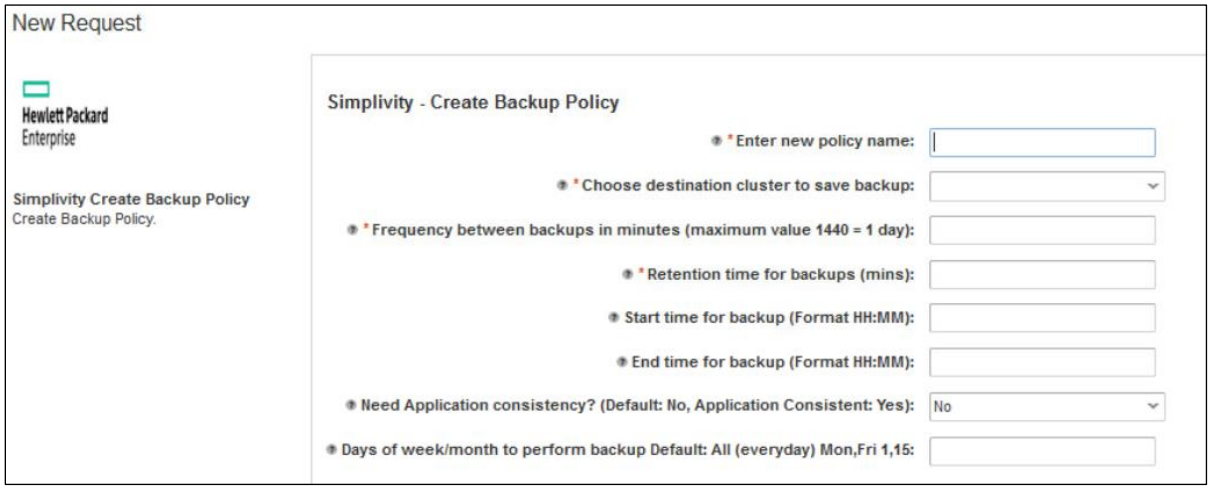

Figure 6: HPE SimpliVity Create Backup Policy vRA form

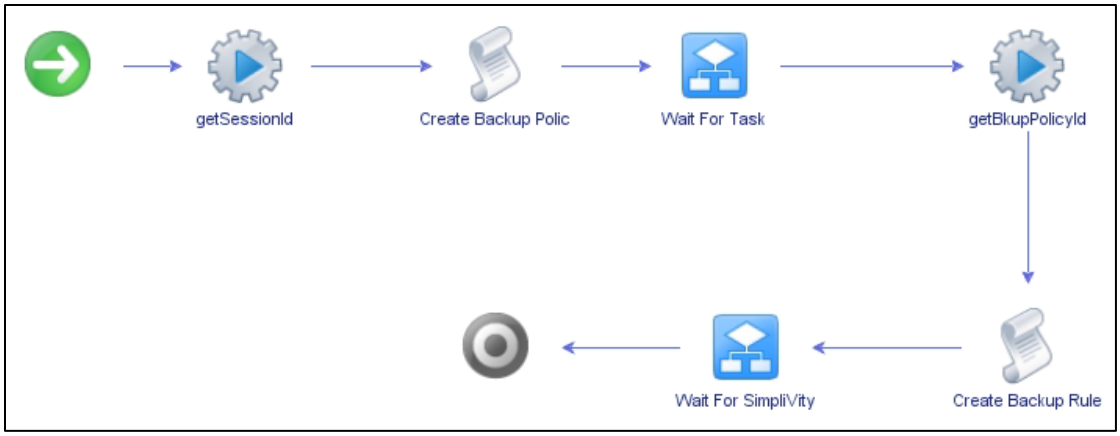

Figure 7: Create Backup Policy workflow

Delete backup policy

The SimpliVity Delete Backup Policy workflow deletes an existing backup policy. Backup policies that are used by virtual machines or datastore cannot be deleted.

Figure 8: HPE SimpliVity Delete Backup Policy vRA form

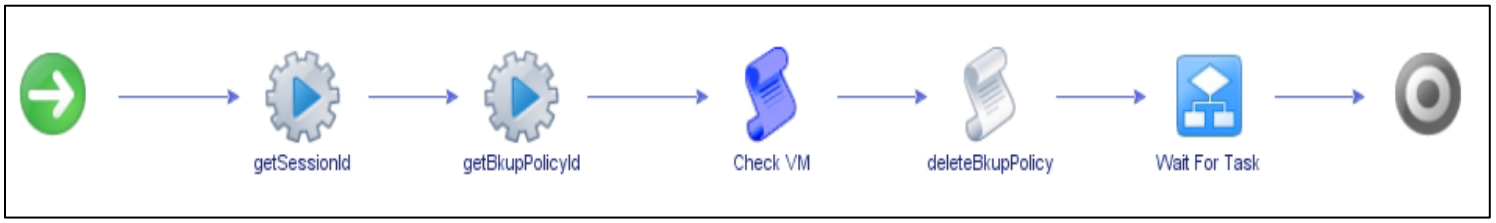

Figure 9: Delete Backup Policy workflow

Set backup policy on a virtual machine

The SimpliVity Set Backup Policy VM workflow sets the backup policy for a VM. A backup policy enables you to schedule VM backup operations and control the frequency and number of backups retained. You can also create a manual backup at any time.

By default, each VM inherits the backup policy assigned to the datastore in which the VM resides. If you change the VM's backup policy to a different policy from the datastore default, any changes to the datastore default policy are ignored by the VM.

Note

You can assign only one backup policy to a VM. However, a backup policy can have multiple rules.

Figure 10: HPE SimpliVity Set Backup Policy VM vRA form

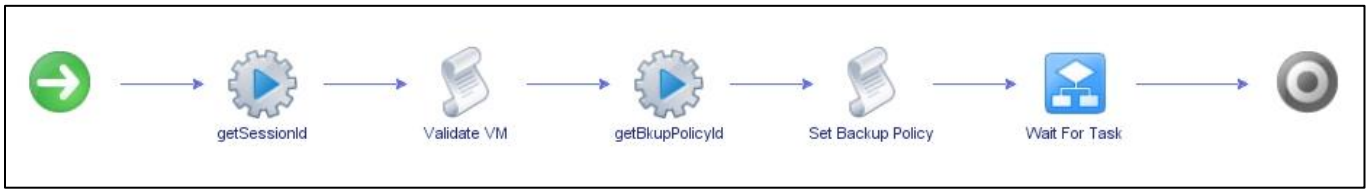

Figure 11: Set Virtual Machine Backup Policy workflow

Set backup policy on a virtual machine by name

This workflow will set the SimpliVity backup policy on a virtual machine by its name. This workflow can be integrated with vRA blueprints to set the backup policy of the virtual machines during its creation.

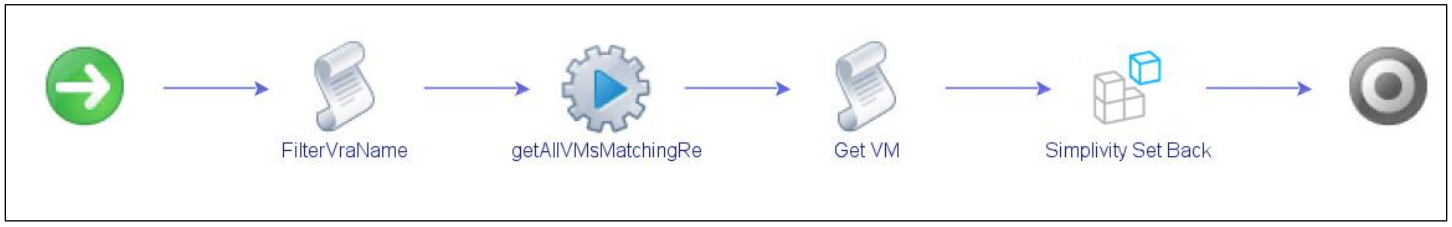

Figure 12: Set SimpliVity backup policy by VM name workflow

Set backup policy on a multi-machine service

The SimpliVity Set Backup Policy MM workflow sets the backup policy for each component VM comprising a multi-machine service consisting exclusively of virtual machines running on HPE SimpliVity. When running this workflow, every machine in the multi-machine service is assigned the specified backup policy. If you wish to specify a different backup policy for an individual component virtual machine, you can run the **SimpliVity Set Backup Policy VM** workflow on that component.

A backup policy enables you to schedule VM backup operations and control the frequency and number of retained backups. You can also create a manual backup at any time.

By default, each VM inherits the backup policy assigned to the datastore in which the VM resides. If you change the VM's backup policy to a different policy from the datastore default, any changes to the datastore default policy are ignored by the VM.

Figure 13: HPE SimpliVity Set Backup Policy MM vRA form

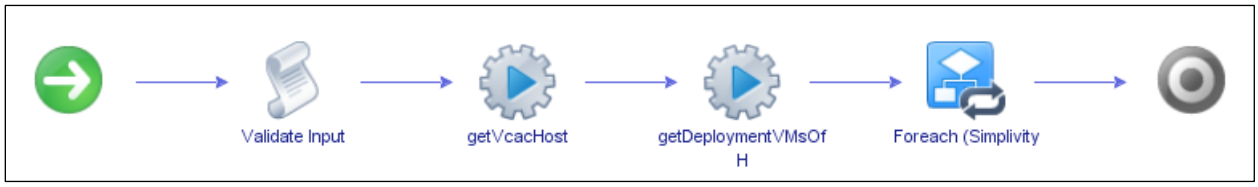

Figure 14: Set Backup Policy on Multi machine VMs of Deployment workflow

Backup a virtual machine

The **SimpliVity Backup VM** workflow creates a manual backup of a VM at the current time. A backup saves the state of the VM at the time you created the backup.

Unlike a policy backup, a manual backup is not deleted during the automatic cleanup performed by a backup policy. You must manually delete these backups to make sure that they do not consume excessive system resources.

The default operation is to take an instantaneous copy without using VMware operations. Manual backup options include:

- Name: By default, the command creates a unique name for the backup by appending a timestamp to the VM name. You can override the default by specifying a unique name for the backup.
- Remote data center: Specify a remote destination for the backup.
- Consistency type: Specify the consistency type of the backup instance. Acceptable values are default, none, and vss.
- Application consistent: Include a VMware application-consistent snapshot in the backup. This type of backup brings guest VM applications to a consistent state before taking a backup. Using application consistency increases the time required to complete a backup and you should not use it for guest VMs that have high I/O.
- Retention: Retain the backup, which never expires, unless you delete it or set a retention period and specify how long to retain the backup before deleting it automatically.

Note

To back up VMs by using a regular schedule (for disaster protection), use a backup policy.

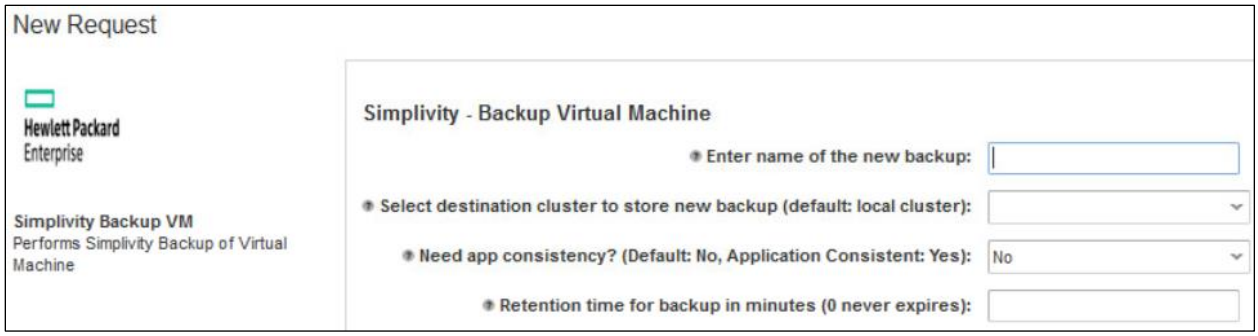

Figure 15: HPE SimpliVity Backup VM vRA form

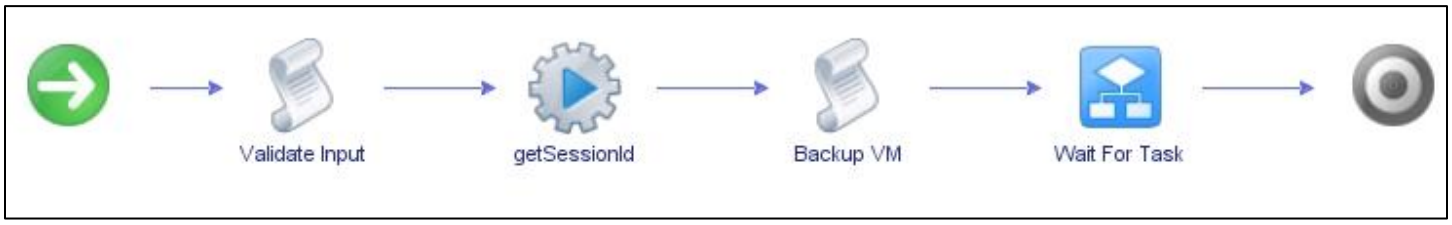

Figure 16: Backup Virtual Machine workflow

Backup a multi-machine service

The SimpliVity Backup MM workflow creates a manual backup of each of the virtual machines running on an HPE SimpliVity that comprise a multi-machine service at the current time. A backup saves the state of the VMs at the time you created the backup.

Unlike a policy backup, a manual backup is not deleted during the automatic cleanup performed by a backup policy. You must manually delete these backups to make sure that they do not consume excessive system resources.

The default operation is to take an instantaneous copy without using VMware operations. Manual backup options include:

Name: By default, the command creates a unique name for the backup by appending a timestamp to the VM name. You can override the default by specifying a unique name for the backup.

Remote data center: Specify a remote destination for the backup.

Consistency type: Specify the consistency type of the backup instance. Acceptable values are default, none, and vss.

Application consistent: Include a VMware application-consistent snapshot in the backup. This type of backup brings guest VM applications to a consistent state before taking a backup. Using application consistency increases the time required to complete a backup, and you should not use it for guest VMs that have high I/O.

Retention: Retain the backup, which never expires, unless you delete it or set a retention period and specify how long to retain the backup before deleting it automatically.

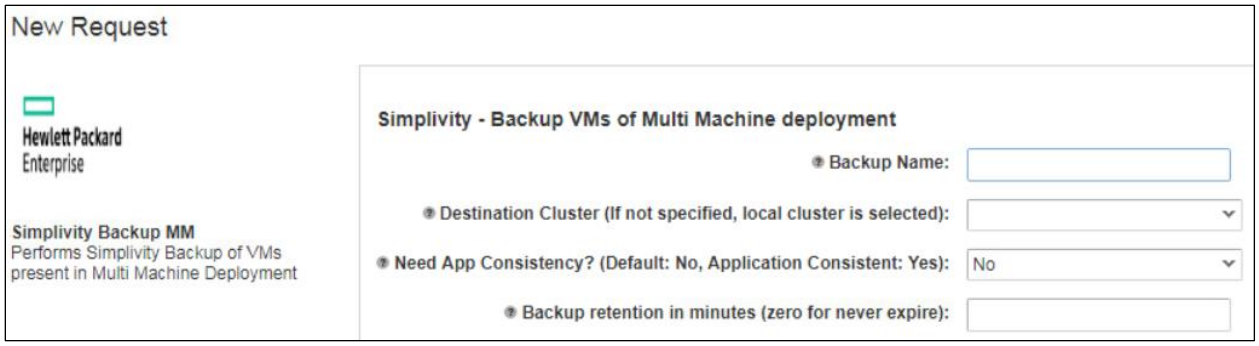

Figure 17: HPE SimpliVity Backup MM vRA form

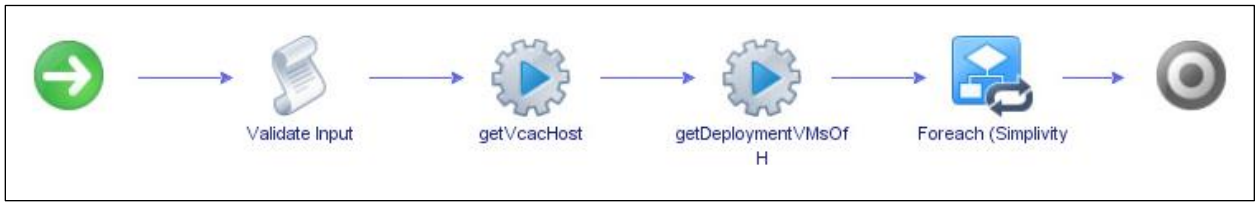

Figure 18: Backup VMs of Multi Machine deployment workflow

Restore a virtual machine

The SimpliVity Restore VM workflow restores the virtual machines from a backup. The backup still exists after the restore operation. Based on the input selection, this workflow replaces the contents of the existing virtual machine with the contents that existed at the time the backup was created, or creates a new virtual machine from the contents of the backup. There is an option to choose the datastore when a new VM is created from the backup.

If the restored VM was powered on at the time of the restore operation, it is powered off during the operation and is then powered on when the operation is complete.

Important
Restoring a VM deletes any data changes that have occurred since you created the backup.

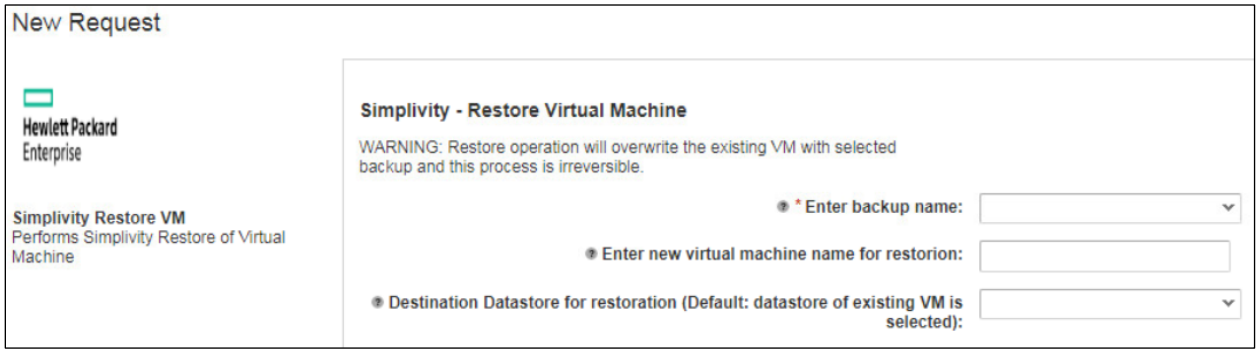

Figure 19: HPE SimpliVity Restore VM vRA form

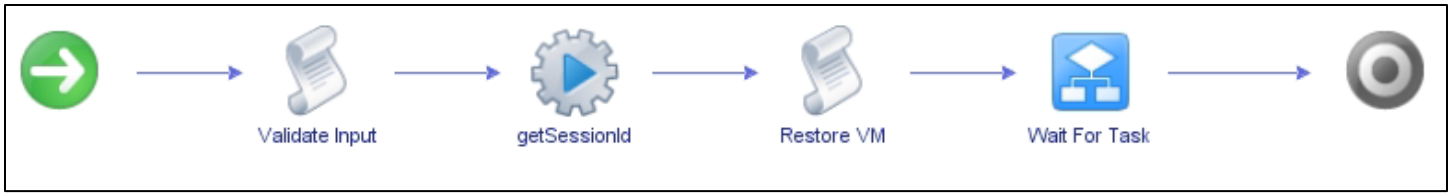

Figure 20: Restore Virtual Machine workflow

Restore a multi-machine service

The **SimpliVity Restore MM** workflow restores each of the virtual machines running on an HPE SimpliVity that comprise a multi-machine service from a backup. The backup still exists after the restore operation. The workflow replaces the contents of each VM with the contents that existed at the time the backup was created.

If the restored VMs were powered on at the time of the restore operation, it is powered off during the operation and is then powered on when the operation is complete.

Important
Restoring a VM deletes any data changes that have occurred since you created the backup.

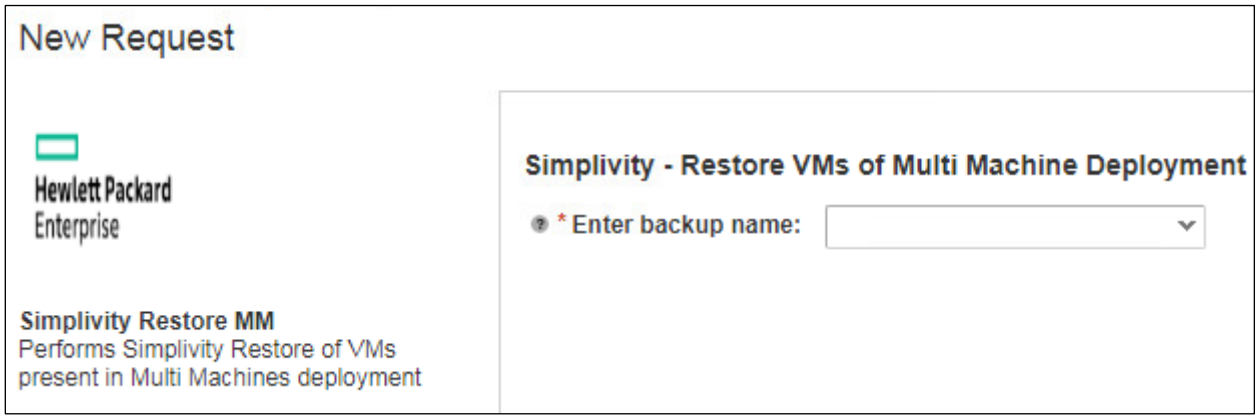

Figure 21: HPE SimpliVity Restore MM vRA form

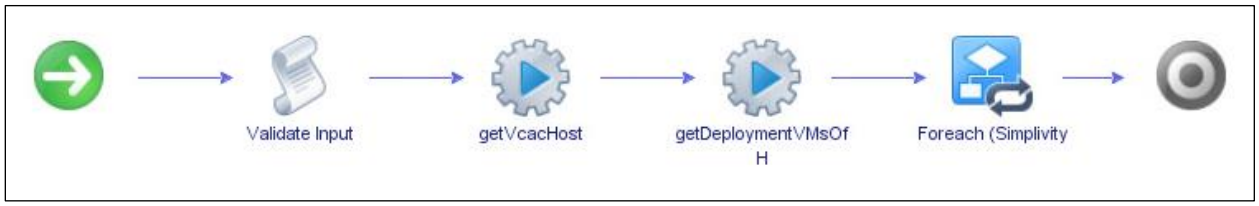

Figure 22: Restore VMs of Multi Machine Deployment workflow

Move a virtual machine

The **SimpliVity Move VM** workflow enables you to relocate a VM to a Federation datastore in a different data center or a different datastore in the same data center.

Considerations when moving VMs are:

The virtual machine's guest OS will be shut down and the VM powered off as part of the move operation. After moving a VM, set its boot sequence so that it powers on after the virtual controller during startup, and shuts down before the virtual controller during shutdown.

Any pre-move backups associated with the VM will show the VM as DELETED after the move completes. You can recover the VM from these backups. If the VM is subject to policy backups, you cannot move a VM while a policy backup is in progress.

By default, the command uses the original VM name to name the moved VM. You can override the default by specifying a unique name for the moved VM. You can move a VM to and from a remote data center.

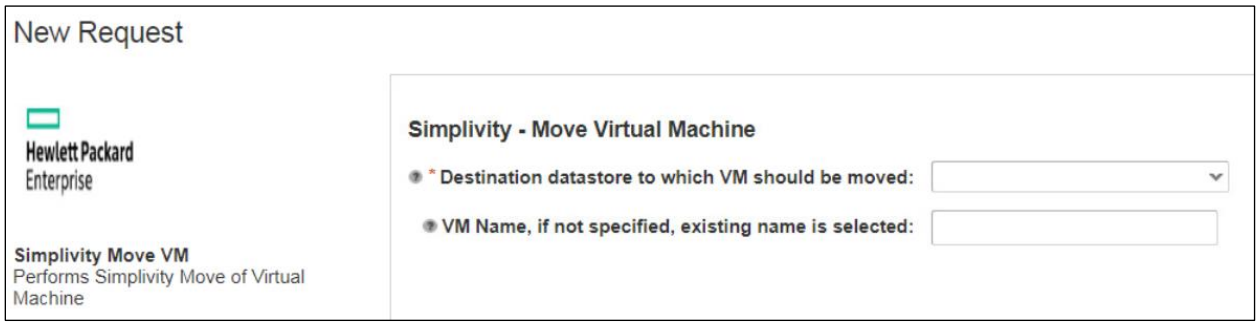

Figure 23: HPE SimpliVity Move VM vRA form

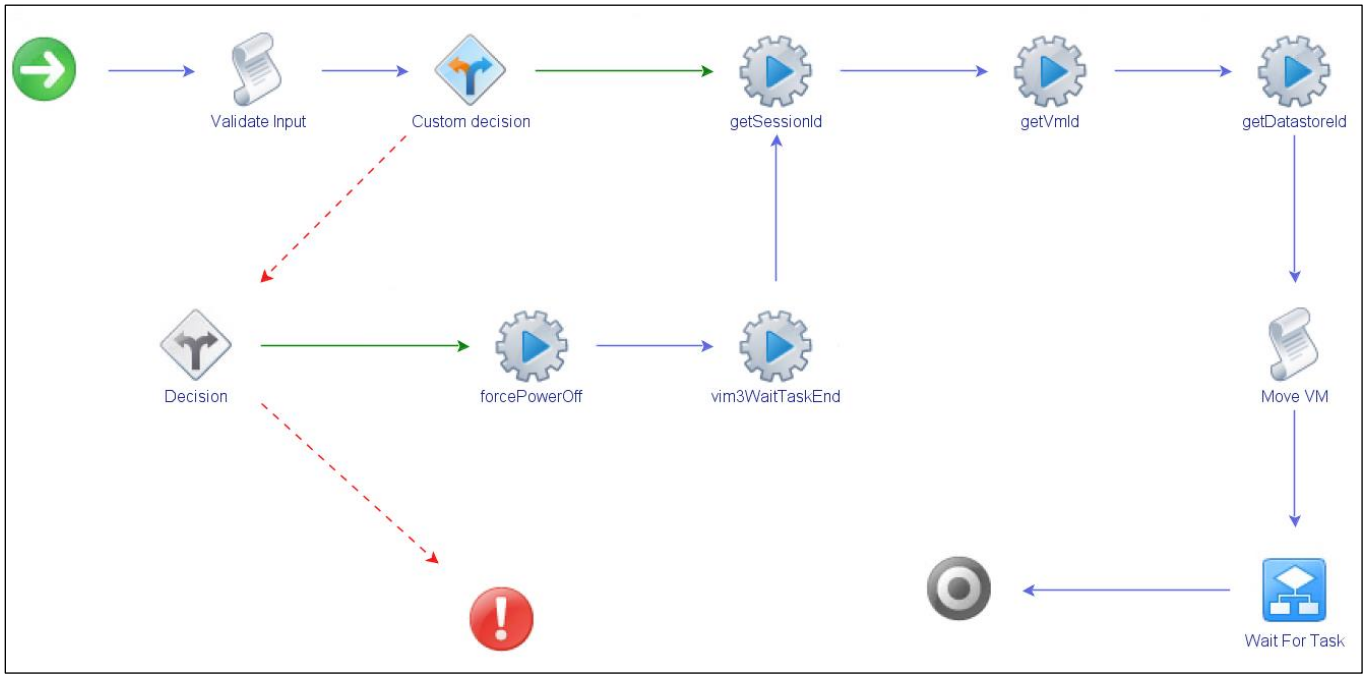

Figure 24: Move Virtual Machine workflow

Move a multi-machine service

The **SimpliVity Move MM** workflow enables you to relocate each of the virtual machines running on an HPE SimpliVity that comprise a multi-machine service to a Federation datastore in a different data center or a different datastore contained in the same data center.

Considerations when moving VMs are:

The virtual machine's guest OS will be shut down and the virtual machine will be powered off as part of the move operation.

After moving a VM, set its boot sequence so that it powers on after the virtual controller during startup and shuts down before the virtual controller during shutdown. Any pre-move backups associated with the VM will show the VM as DELETED after the move is completed. You can recover the VM from these backups.

If the VM is subject to policy backups, you cannot move a VM while a policy backup is in progress. You can move a VM to and from a remote data center.

Figure 25: HPE SimpliVity Move MM vRA form

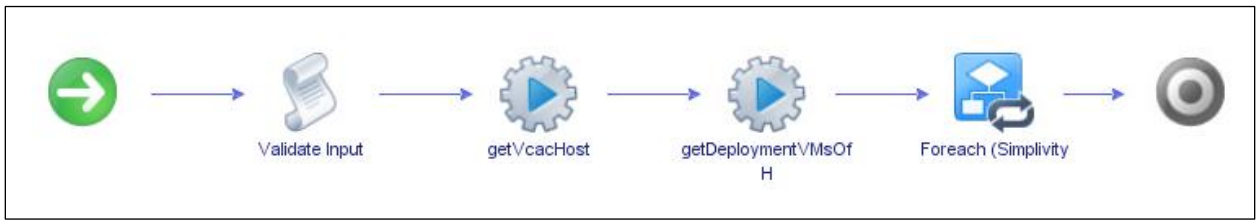

Figure 26: Move VMs of multi machine deployment workflow

Clone a virtual machine

The SimpliVity Clone VM workflow creates a new VM that contains the same contents of an existing VM. The new VM has a different name but resides in the same datastore as the original VM.

Characteristics of the cloned VM are:

Power status: The clone is powered off. Make sure you have sufficient CPU and memory resources before powering on the VM.

Backup: You can back up a cloned VM using a policy or a manual backup.

Figure 27: HPE SimpliVity Clone VM vRA form

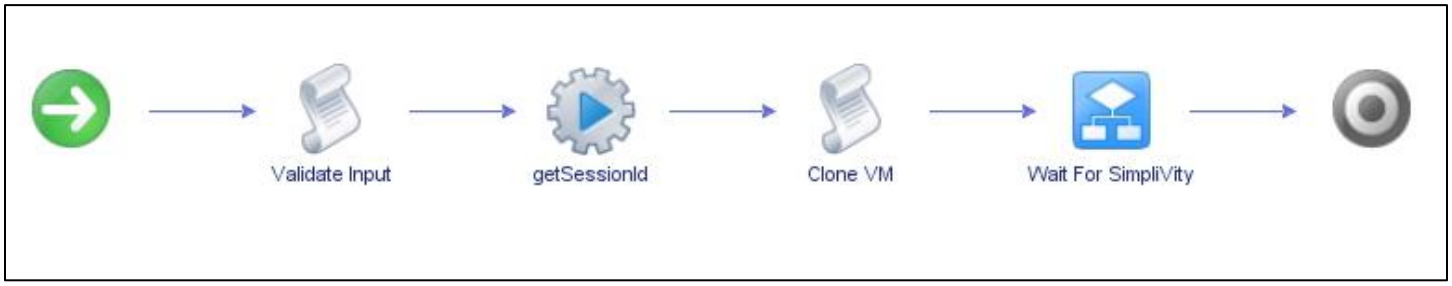

Figure 28: Clone Virtual Machine workflow

Create a datastore

The **SimpliVity Create Datastore** workflow creates a new datastore that is accessible by all HPE SimpliVity hosts in a cluster. At least one datastore per cluster is needed to store information of VMs. Each datastore is assigned a backup policy and it can be changed based on business needs.

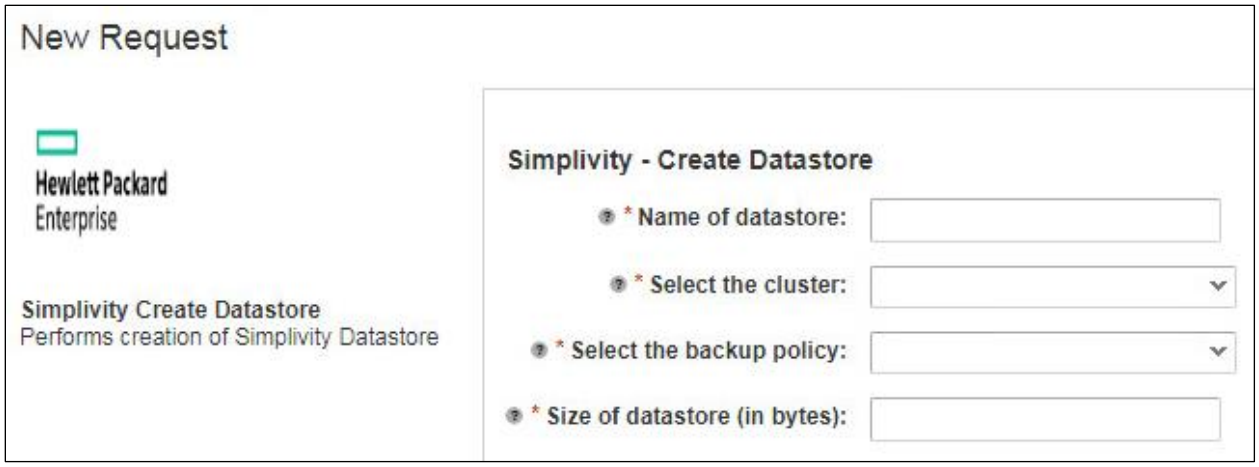

Figure 29: HPE SimpliVity Create Datastore vRA form

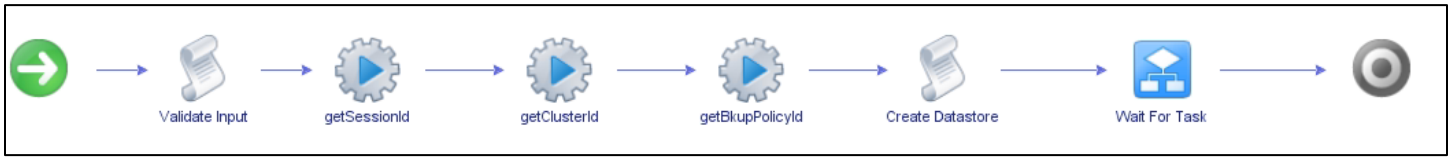

Figure 30: Create Datastore workflow

Delete a datastore

The **SimpliVity Delete Datastore** workflow deletes an existing datastore that is accessible by all HPE SimpliVity hosts in a cluster. At least one datastore per cluster is needed to store information of VMs. Each datastore is assigned a backup policy and it can be changed based on business needs.

Figure 31: HPE SimpliVity Delete Datastore vRA form

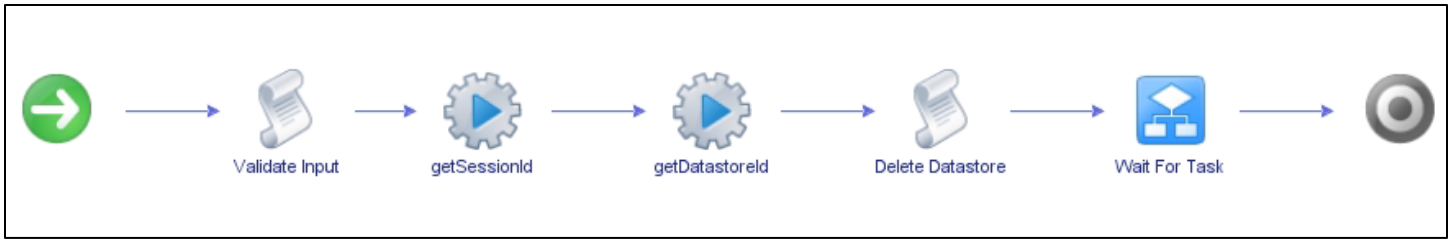

Figure 32: Delete Datastore workflow

Resize a datastore

The **SimpliVity Resize Datastore** workflow updates the storage capacity size of an existing datastore to accommodate the storage needs of the hosted virtual machines. During this resize operation, the virtual machines using this datastore can remain powered on.

Figure 33: HPE SimpliVity Resize Datastore vRA form

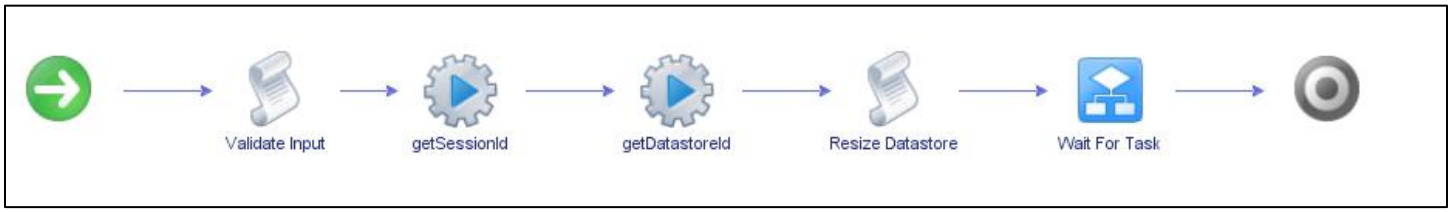

Figure 34: Resize Datastore workflow

Display VM backup sizes

The **SimpliVity List VM Backups** size workflow will list the backup of a virtual machine along with its size. This workflow contains two input steps. VM is selected in the first step, which fetches the list of backups and its sizes associated with the VM and displays in a text box as prepopulated tabular format.

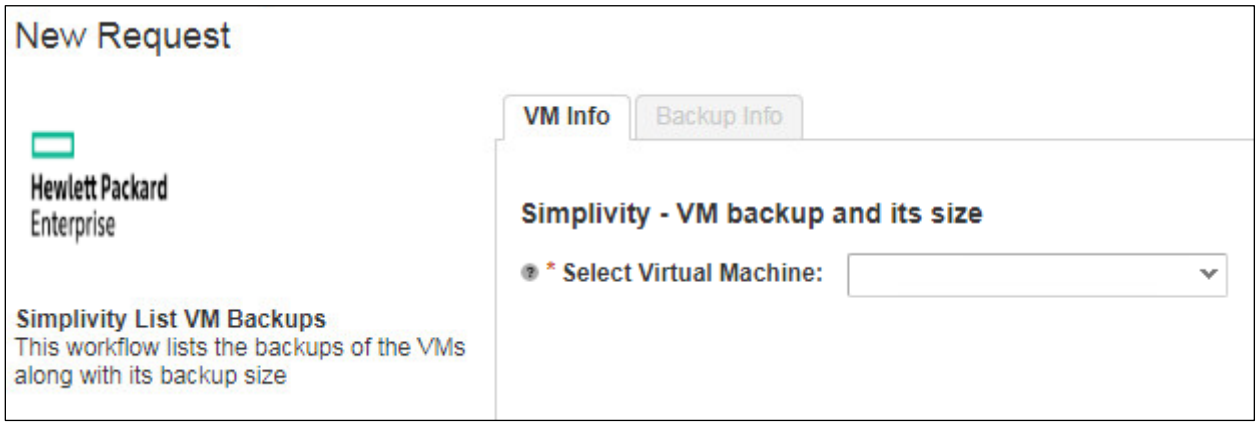

Figure 35: HPE SimpliVity List VM Backups vRA form

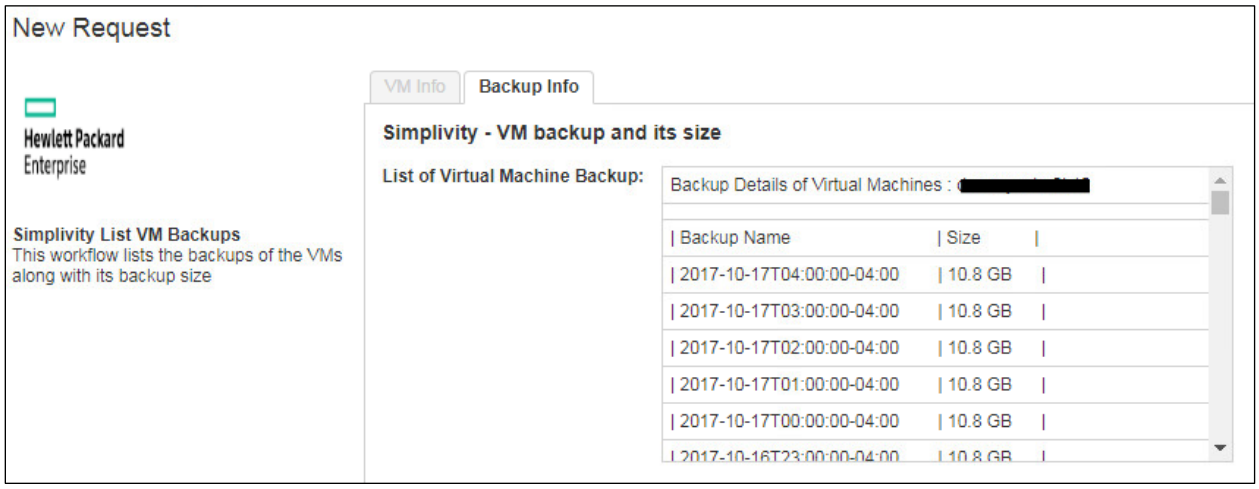

Figure 36: HPE SimpliVity List VM Backups vRA form with size information

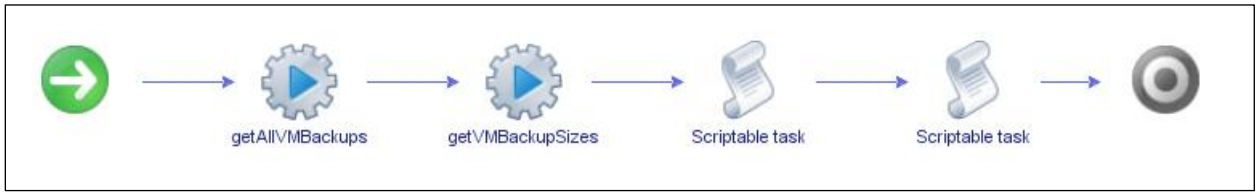

Figure 37: VM Backup and its size workflow

Installation of HPE SimpliVity and vRA integration

The installation of the vRA integration for the HPE SimpliVity includes the vRealize Orchestrator workflows and the vRA customizations. The installation process is performed from both the vRA UI and the vRealize Orchestrator client.

Requirements

The HPE SimpliVity and vRA integration require the following versions:

vRealize Automation 7.3.0 or later

vRealize Orchestrator 7.3.0 or later

HPE SimpliVity software 3.70 or later

vRA preparation

There are specific configuration requirements for vRA. These must be configured for the vRealize Orchestrator workflows to function properly.

Set data collection frequency

Some of the HPE SimpliVity and vRealize Orchestrator workflows perform data collection in vRA. The workflow used to perform this data collection on requires that the data collection frequency be set for all Compute Resources consisting of HPE SimpliVity nodes.

Installation

1. Download the vRA integration package from HPE SimpliVity
2. Launch vRealize Orchestrator and choose Design Mode
3. Click Packages on the left pane
4. Click the browse button and locate the folder to which the HPE SimpliVity and vRealize Orchestrator workflow is saved
5. Select the vRealize Orchestrator workflow package file and click Import Package

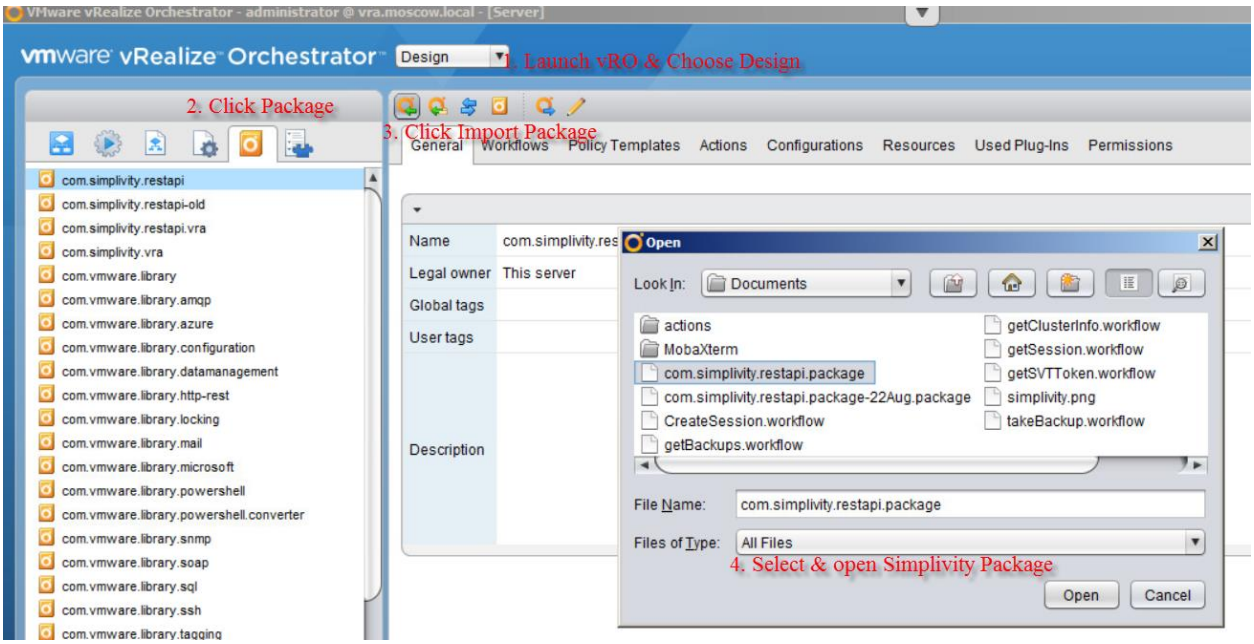

Figure 38: Import vRealize Orchestrator workflow package for HPE SimpliVity

Ensure the vRealize Orchestrator workflow package is imported successfully.

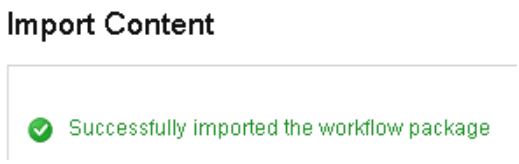

Figure 39: Importing workflow success message

Configure the HPE SimpliVity and vRealize Orchestrator workflow

1. Login to the vRealize Orchestrator client as an administrator
2. From the drop-down menu in the Orchestrator client, select Design
3. Select the Configurations tab, then expand the vRealize Orchestrator server and the SimpliVity folder

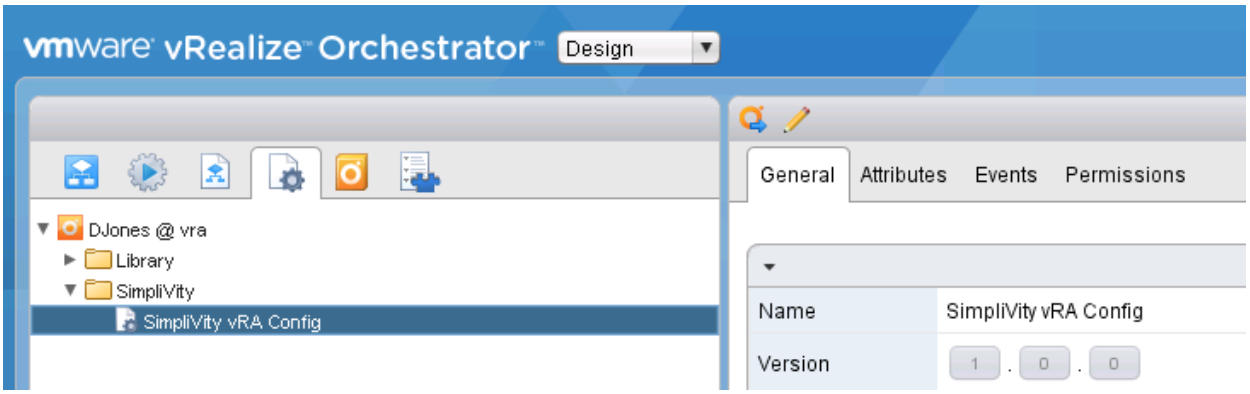

Figure 40: HPE SimpliVity and vRA configuration design page

4. Select the Attributes tab, then click the Edit button at the top of the screen.

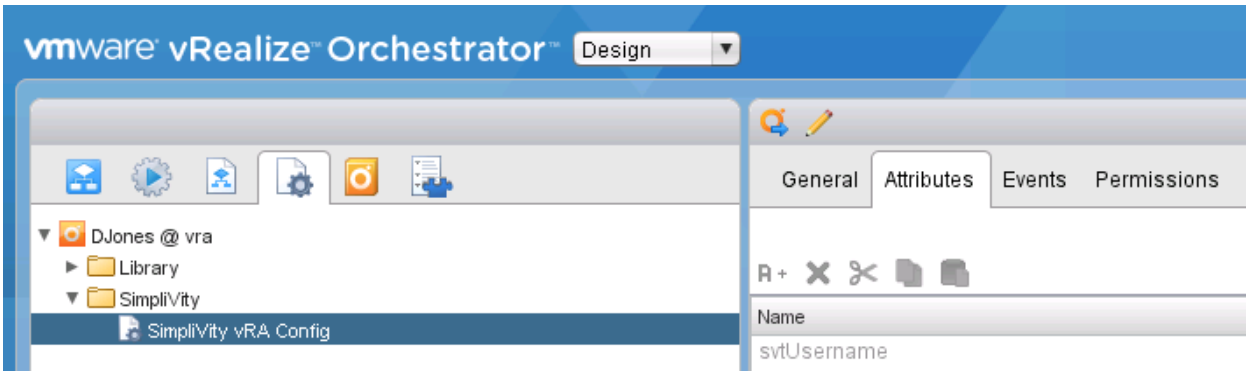

Figure 41: Edit configuration attributes

5. Provide the correct information for the following fields, then click OK.

Note

svtUsername: The HPE SimpliVity user account must be in the user@domain format

svtPassword: The password for the HPE SimpliVity user account

svtRESTHost: HPE SimpliVity REST API host in VRO
(Create by executing the HTTP-REST workflow in vRO with Simplivity OVC IP and credentials)

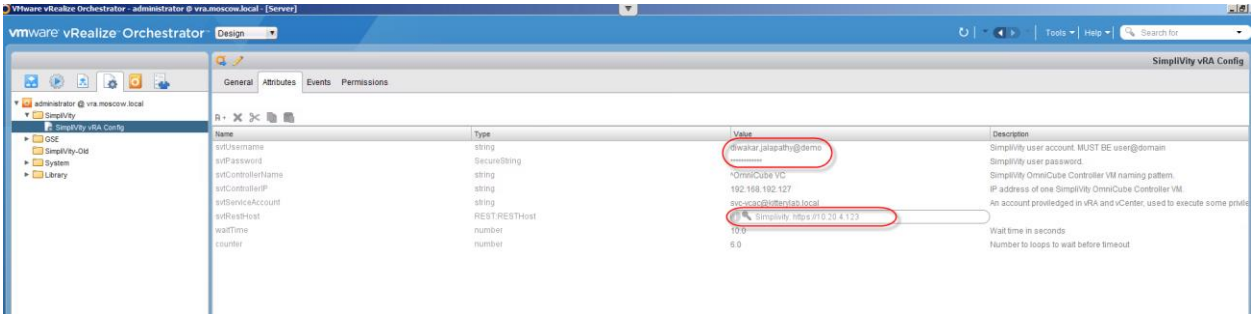

Figure 42: HPE SimpliVity and vRA configuration attribute values

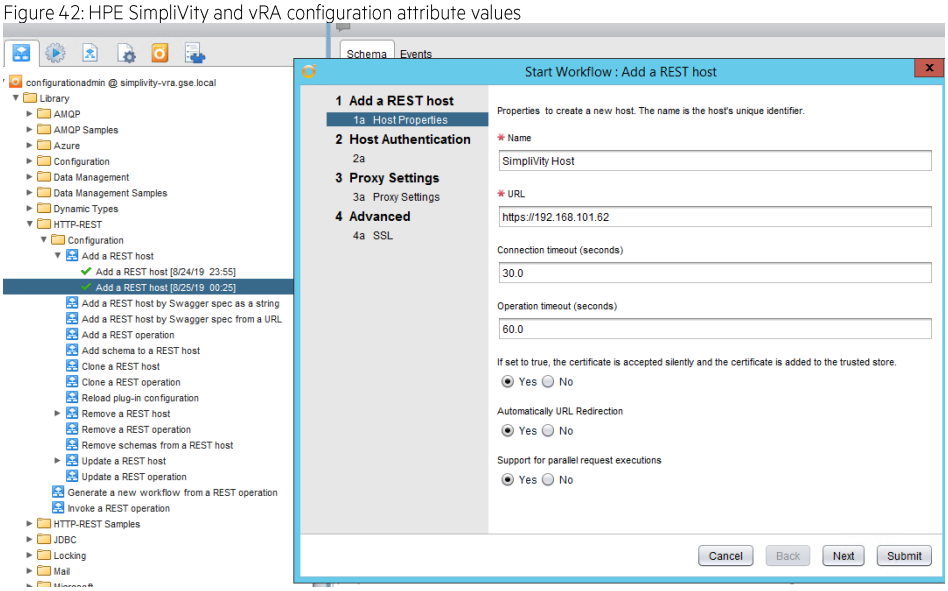

Figure 43: Adding SimpliVity Rest Host to vRO

vRA preparation

There are specific configuration requirements for vRA. The following operations publish Catalog Items to Infrastructure Admin.

1. Login to the vRA UI as an Infrastructure Administrator
2. Select Design -> XaaS (anything as a service)

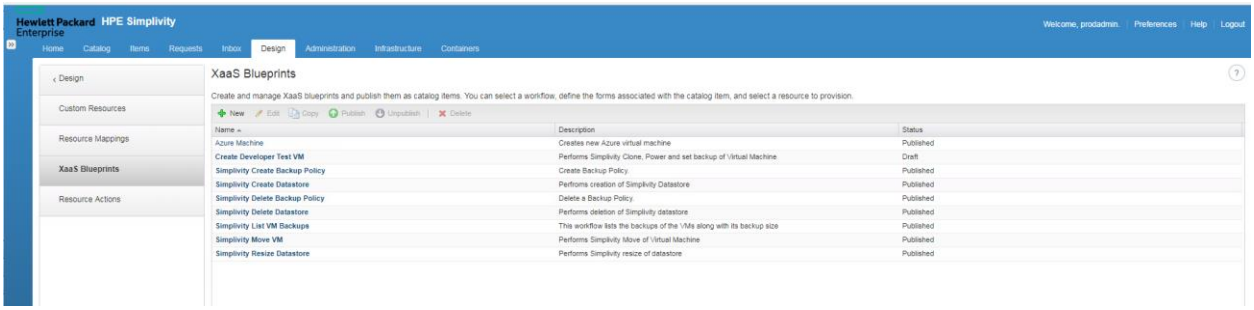

Figure 44:Design new XaaS

3. Select New and choose the workflow by expanding the Orchestrator -> SimpliVity -> vRA RESTAPI Provisioning Workflows and click Next

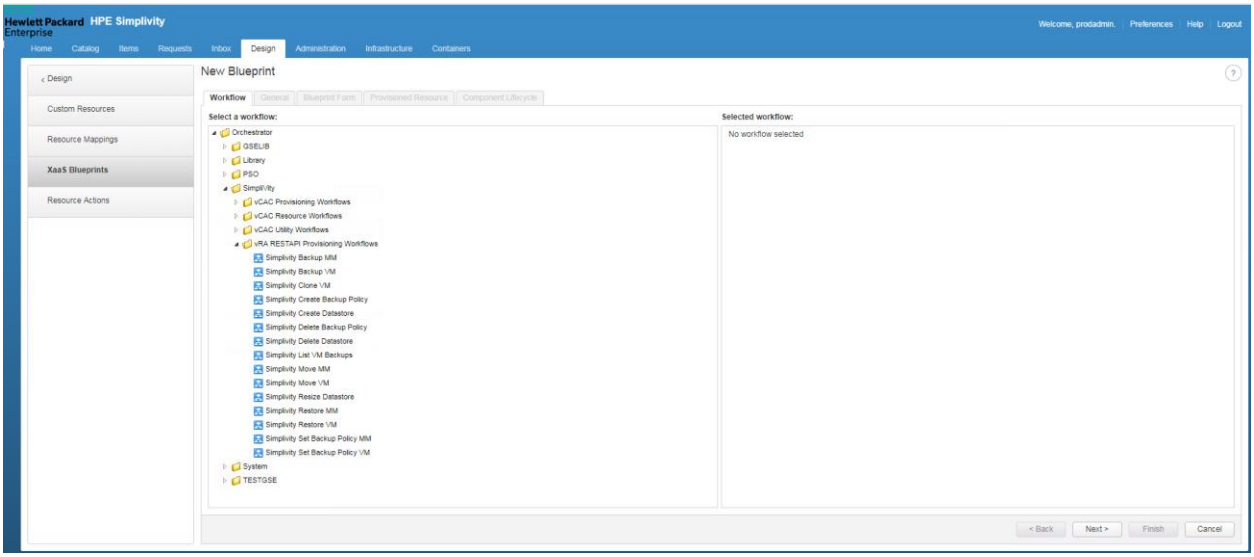

Figure 45: HPE SimpliVity workflow for XaaS

4. Follow the actions on the screen and publish the workflow, which is in Draft by default

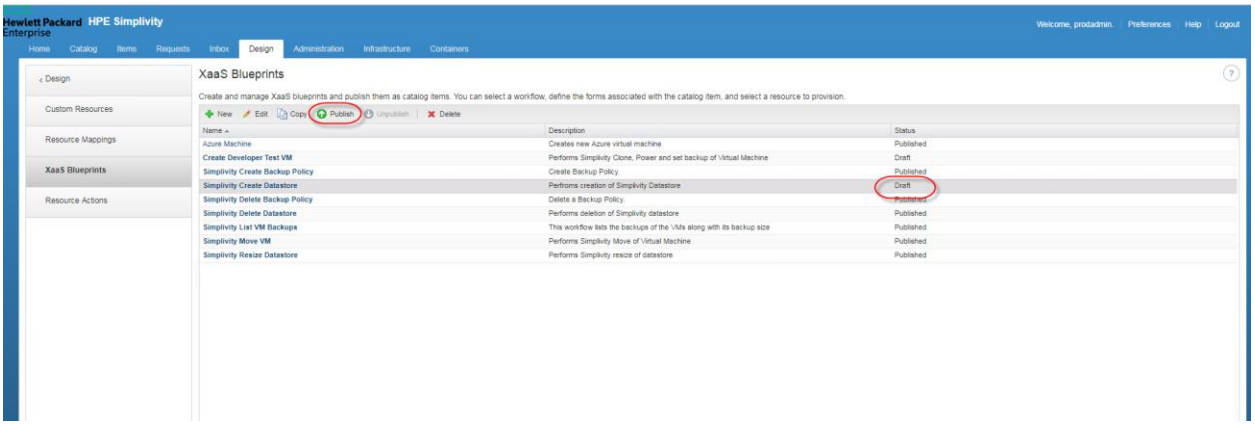

Figure 46: Publish workflow

Create a Service to publish the Workflows for Admin from Administration Tab

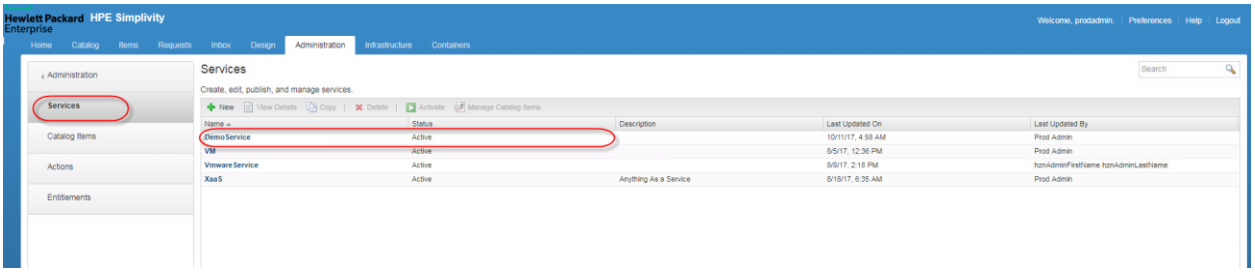

Figure 47: Create service

5. Create an Entitlement for the business group for which a Catalog item will be published

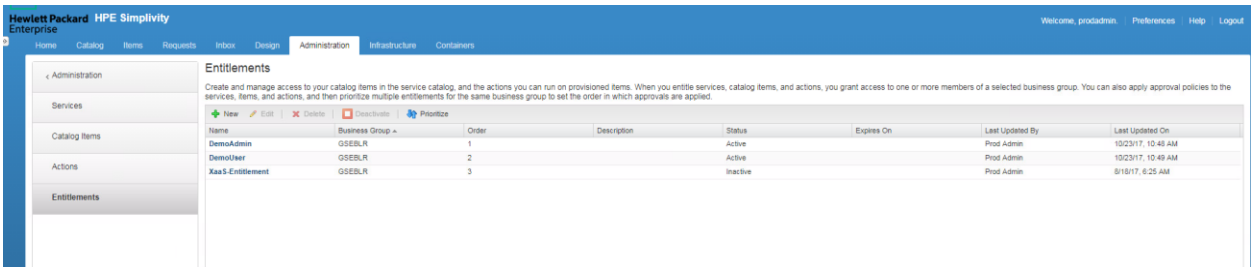

Figure 48: Create entitlement

The following are the DemoAdmin and DemoUser entitlements created for GSEBLR Business Group

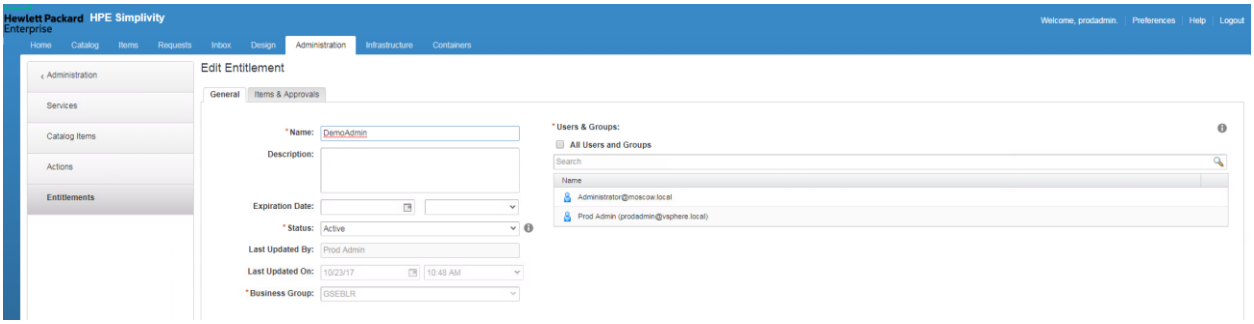

Figure 49: DemoAdmin entitlement

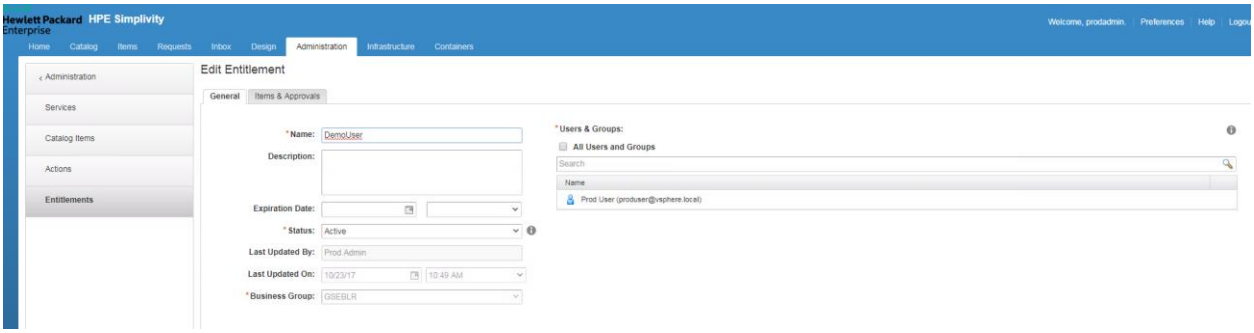

Figure 50: DemoUser entitlement

6. Select the Services, Items & Approvals to be included for “Admin” and “User” entitlements

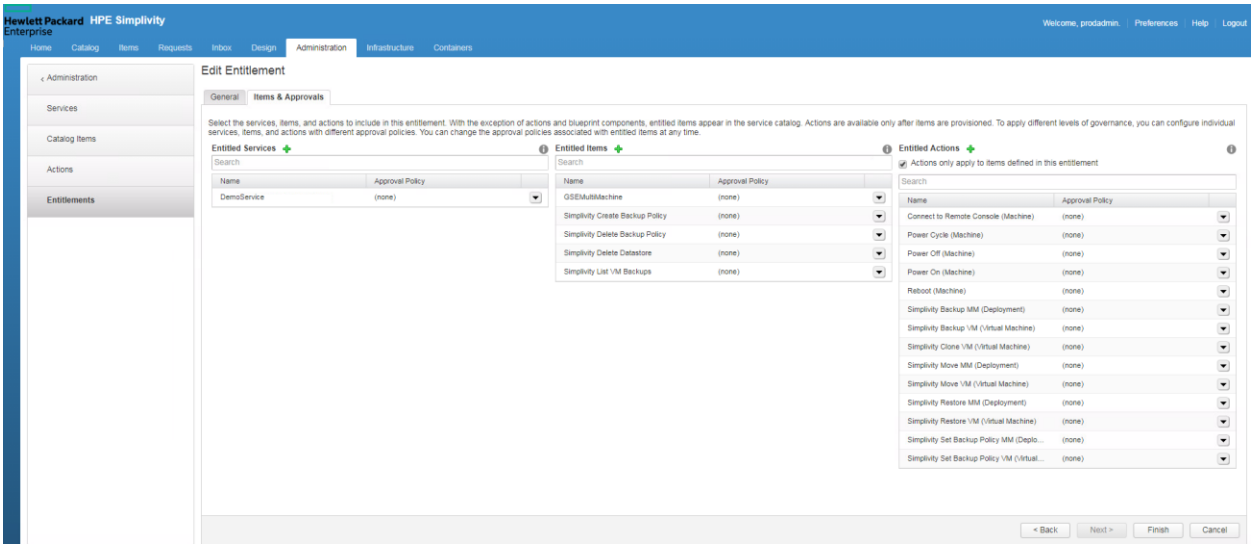

Figure 51: Entitlements for vRA users

.

7. To make catalog items available in the service catalog, add the item to a service and entitle the service with a business group

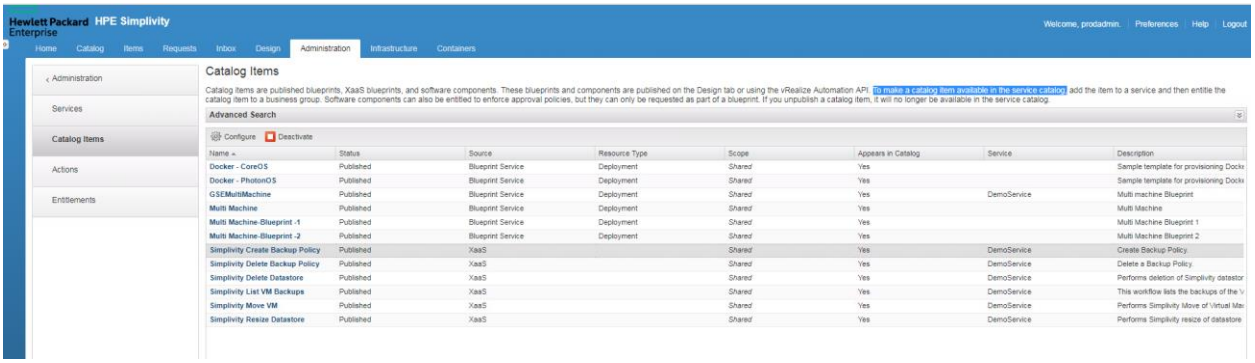

Figure 52: Catalog Items to service mapping

8. Choose the item Icon and Service from the drop-down list

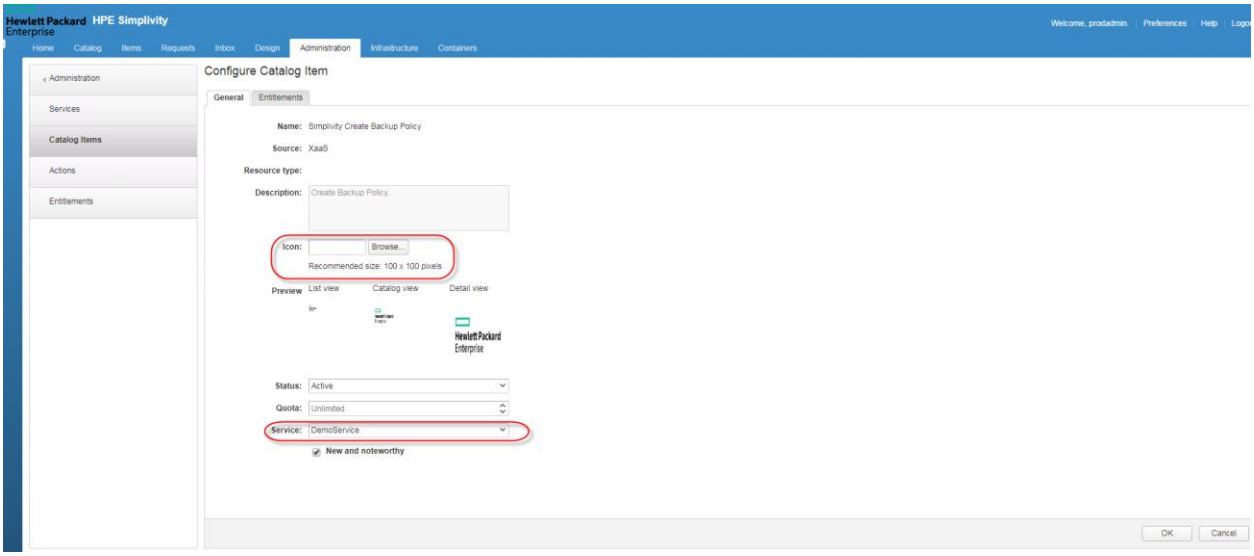

Figure 53: Configure Catalog Item

9. Now Catalog Item will have the published blueprint for use

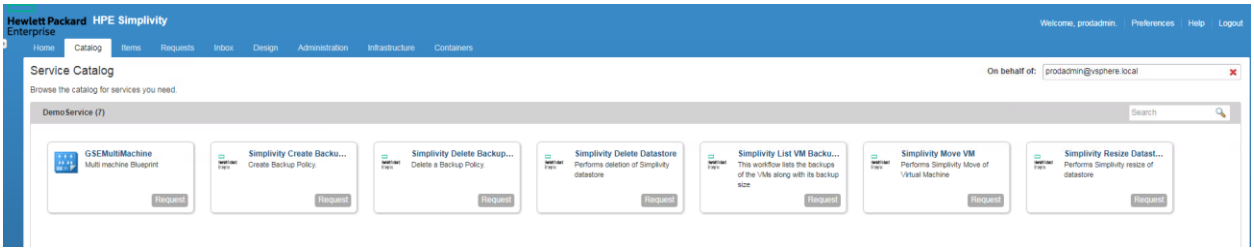

Figure 54: Service Catalog with HPE SimpliVity workflows

10. Navigate to Design -> Resource Actions to define the operations that can be performed on the provisioned items

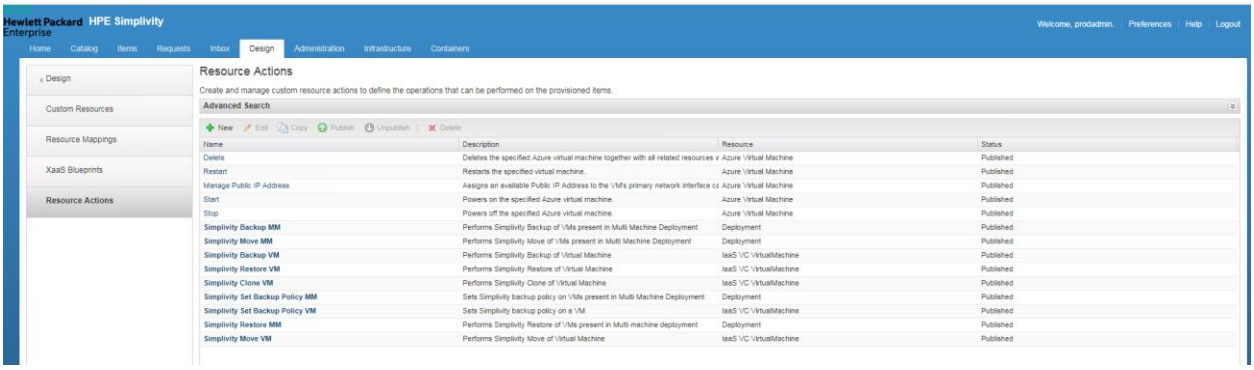

Figure 55: HPE SimpliVity Resource Actions

Summary

The HPE SimpliVity is a complete hyperconverged platform in the market. It is uniquely designed to provide superior deployment in a private cloud. Hewlett Packard Enterprise combines this powerful infrastructure platform with the self-service capabilities of vRA. HPE SimpliVity assimilates storage, compute, networking, hypervisor, real-time deduplication, compression, and optimization along with powerful data management, data mobility, data protection (storage HA, clones, and backup), and disaster recovery capabilities. Together with vRA, HPE helps customers realize fast, time-to-cloud value, and increased IT efficiency as well as respond to market demands quickly and economically.

This document has shown real-world customer-based strategies for self-service private cloud design and deployment and provides designs that are unique to HPE SimpliVity Federations. Built into the HPE SimpliVity platform are the following breakthrough technologies that enable a superior design:

Hyperconvergence: A single shared resource pool abstracting applications and virtual machines from the underlying hardware across not just server, storage, and network but also backup, disaster recovery, WAN optimization, and cloud enablement.

Scale-out architecture: The ability to grow the infrastructure by adding building blocks to an existing deployment while the application remains online.

Data virtualization platform: Inline deduplication, compression, and optimization of all data at inception, once and forever across all stages of the data lifecycle.

Global federated architecture: Manage all resources globally from a single pane of glass, provide VM-centricity, and mobility to backup, restore, and move virtual resources—and their associated data—with a click of a button. There are no manual efforts of the past around LUNs, shares, volumes, disk groups, masking, mapping, or others.

Glossary

HPE SimpliVity Federation	A network of two or more HPE SimpliVity that provides an elastic pool of shared resources
Multi-Federation	More than one HPE SimpliVity Federation
VMware vRealize Automation	An enterprise software tool that helps to enable customers to rapidly deploy and deliver cloud services across private and public clouds, physical infrastructures, hypervisors, and public cloud providers
VMware vRealize Orchestrator	An enterprise software tool that allows administrators to develop complex automation tasks, then quickly access and launch workflows

For more information

HPE SimpliVity
hpe.com/info/simplivity

HPE Converged Infrastructure Library
hpe.com/info/convergedinfrastructure

HPE SimpliVity Interoperability Guide
h17007.www1.hpe.com/us/en/enterprise/integrated-systems/info-library/index.aspx?cat=hyper_converged_systems&subcat=svt

vRealize Automation 7.x Reference Architecture
docs.vmware.com/en/vRealize-Automation/7.3/vrealize-automation-73-reference-architecture.pdf

Configuring VMware vCenter SSO High Availability for VMware vRealize Automation
vmware.com/files/pdf/products/vCloud/VMW-vCenter-SSO-HA-vRealize-Automation-61-Deployment-Guide.pdf

Configuring VMware vRealize Automation High Availability Using an F5 Load Balancer
docs.vmware.com/en/vRealize-Automation/7.3/vrealize-automation-load-balancing.pdf

VMware vRealize Automation Installation and Configuration
docs.vmware.com/en/vRealize-Automation/7.3/vrealize-automation-73-installation-and-configuration.pdf

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