

HPE Morpheus VM Essentials Software

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HPE Morpheus VM Essentials introduction

HPE Morpheus VM Essentials Software

- Reduce costs with HPE VM Essentials integrated hypervisor
- Simplify management across VMware and HPE clusters
- Future-proof IT with flexible consumption & upgrade paths
- Lower risk with enterprise-grade support & ecosystem

NEW: HPE VM Essentials Software to unify VMware & HPE VME hypervisor

- **Reduce costs with HPE VM Essentials integrated hypervisor**

Featuring core capabilities to diversity VM estates including storage optionality (local, NFS, iSCSI, Fibre Channel), distributed workload placement, VM HA and live migration, data protection via snapshots and native backup, and DR with Zerto*

- **Simplify management across VMware and HPE**

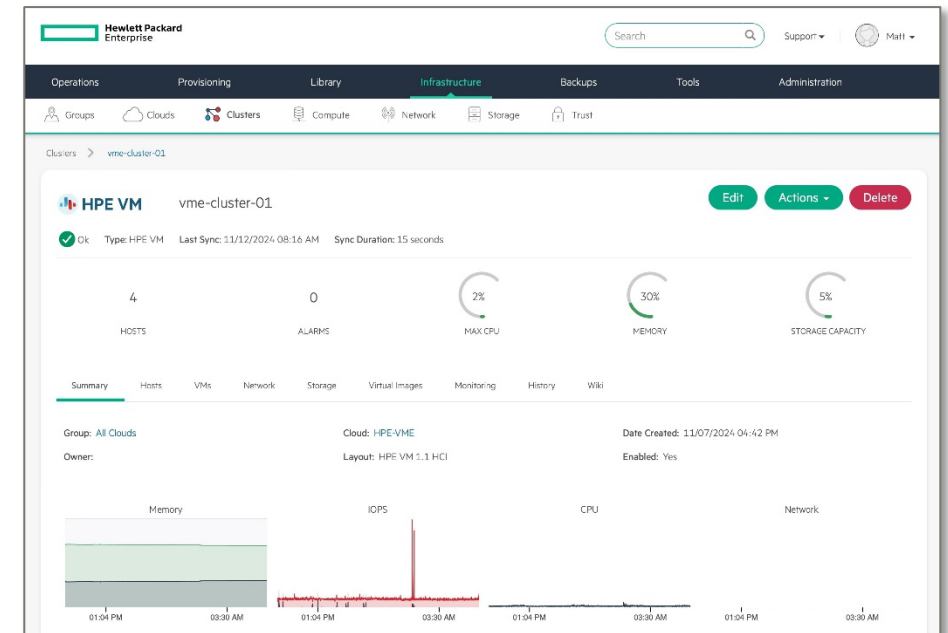
Connect existing VMWare® clusters for management and VM-vending into ESXi and HPE VME hypervisor from one interface. Also includes IPAM and DNS integration, automation execution, secrets management, and VMWare to KVM image conversion

- **Future-proof IT with flexible consumption & upgrade paths**

Available as standalone software and integrated into HPE Private Cloud. Customers can upgrade to full Morpheus PlatformOps for hybrid cloud management, K8s support, governance, and FinOps capabilities

- **Lower risk with enterprise-grade support & ecosystem**

Building on a proven KVM core, HPE VM Essentials includes HPE's enterprise-class global support. HPE is working with its ecosystem of ISVs to expand HPE VME hypervisor certification and support for Data Protection, VDI, ERP, etc.



* Zerto integration with HPE VM Essentials on roadmap for 1H 2026

HPE Morpheus VM Essentials Software



Subscription licensed per Socket:

S5Q81AAE	HPE VM Essentials Software per Socket 1-year E-LTU	€ 562,- List
S5Q82AAE	HPE VM Essentials Software per Socket 3-year E-LTU	€ 1.686,- List
S5Q83AAE	HPE VM Essentials Software per Socket 5-year E-LTU	€ 2.811,- List



HPE Morpheus VM Essentials Software

New since May 5th

HPE Morpheus Enterprise Software

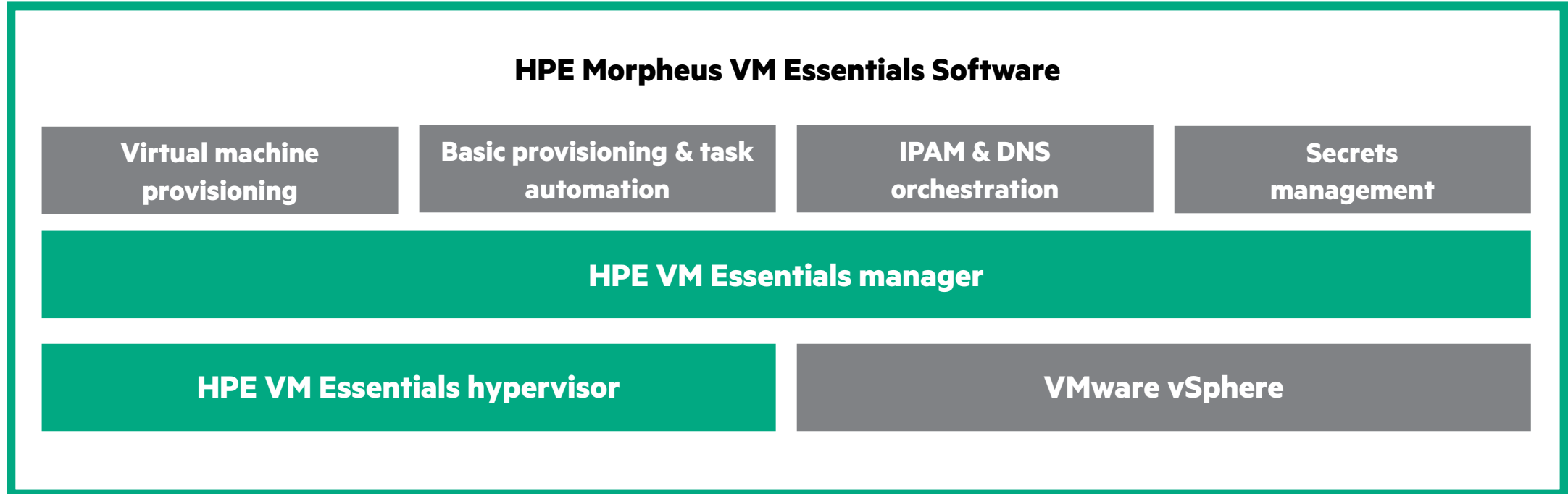
S6E64AAE HPE Morpheus Enterprise Software per Socket (15 WLE) 1-year 24x7 E-LTU	€ 2.342,-
S6E66AAE HPE Morpheus Enterprise Software per Socket (15 WLE) 3-year 24x7 E-LTU	€ 7.026,-
S6E68AAE HPE Morpheus Enterprise Software per Socket (15 WLE) 5-year 24x7 E-LTU	€ 11.710,-

Upgrade from HPE Morpheus VM Essentials to Morpheus Enterprise

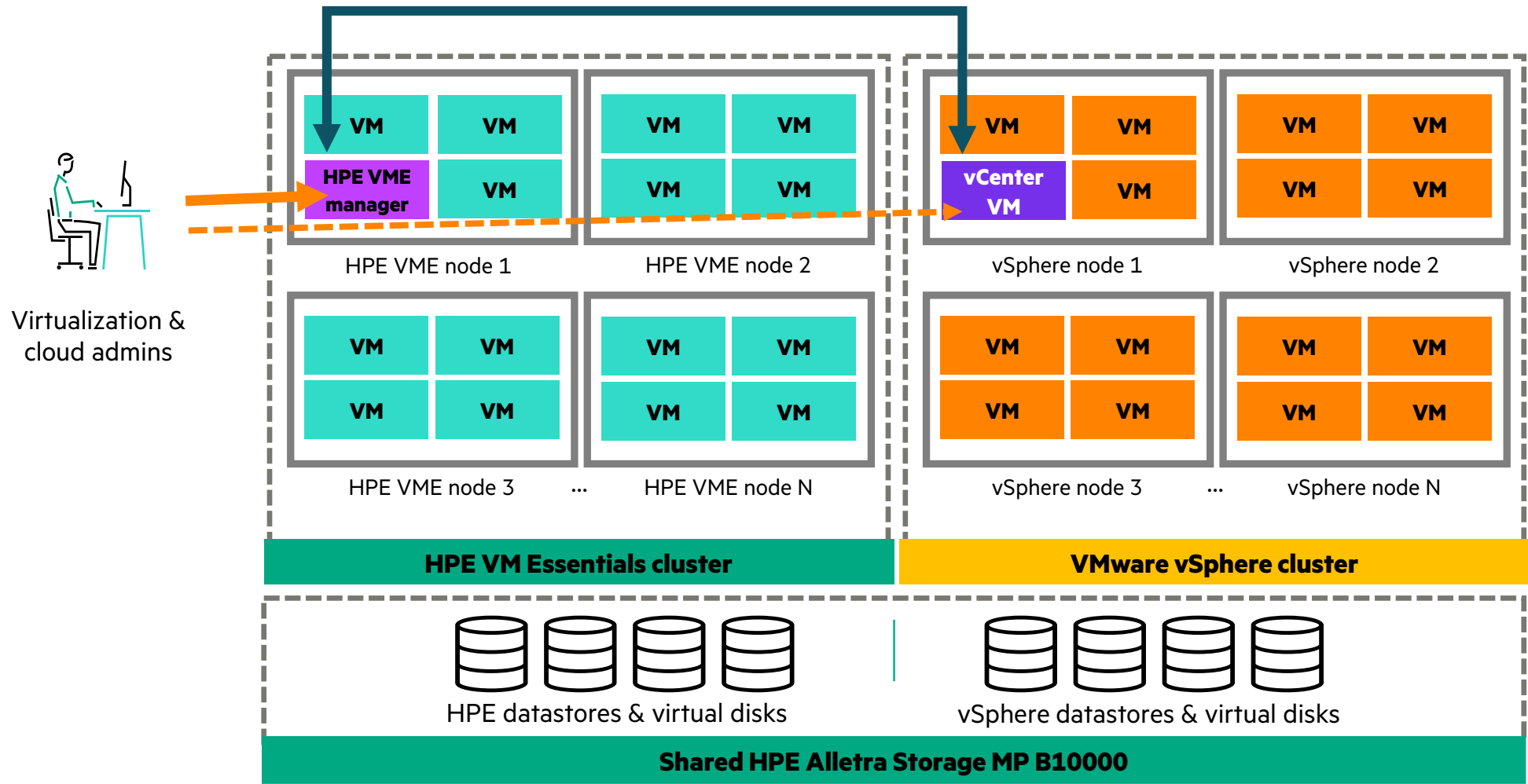
S6E69AAE HPE Morpheus VM Essentials to Morpheus Ent. SW Upgrade 1-year 24x7 E-LTU	€ 1.780,-
S6E71AAE HPE Morpheus VM Essentials to Morpheus Ent. SW Upgrade 3-year 24x7 E-LTU	€ 5.340,-
S6E73AAE HPE Morpheus VM Essentials to Morpheus Ent. SW Upgrade 5-year 24x7 E-LTU	€ 8.899,-



Solution overview



HPE Morpheus VM Essentials Software

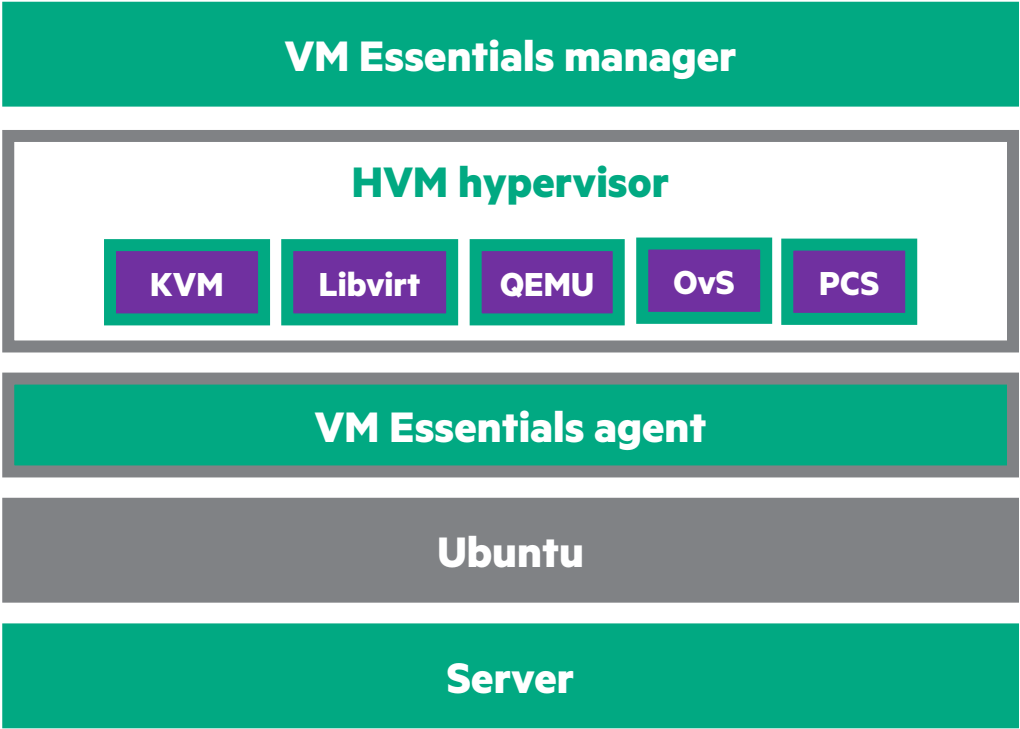


Architecture



Theory of operation - logical architecture

Ubuntu	Year of introduction
<ul style="list-style-type: none">• The base OS for the HPE VM Essentials hypervisor is Ubuntu 24.04• HPE provides a ready to use Installer ISO.	2004
KVM	
<ul style="list-style-type: none">• Underlying virtualization technology used in HPE VM Essentials	2006
QEMU	
<ul style="list-style-type: none">• Generic machine emulator and virtualize for running Windows and Linux operating systems	2003
Libvirt	
<ul style="list-style-type: none">• A hypervisor-independent API for managing platform virtualization	2005
Open vSwitch (OvS)	
<ul style="list-style-type: none">• Underlying virtual networking technology used in HPE VM Essentials	2009
Pacemaker Cluster Service	
<ul style="list-style-type: none">• A high-availability cluster resource manager, that enables clustering and clustered filesystem deployment and management	2004
Morpheus	
<ul style="list-style-type: none">• Management and orchestration services providing integration for all services, identity management, monitoring, logging, web UI, etc.	2010



Theory of operation - logical architecture

- **Manager deployment:**

- HPE VM Essentials manager runs on a single node

- **Local storage deployment:**

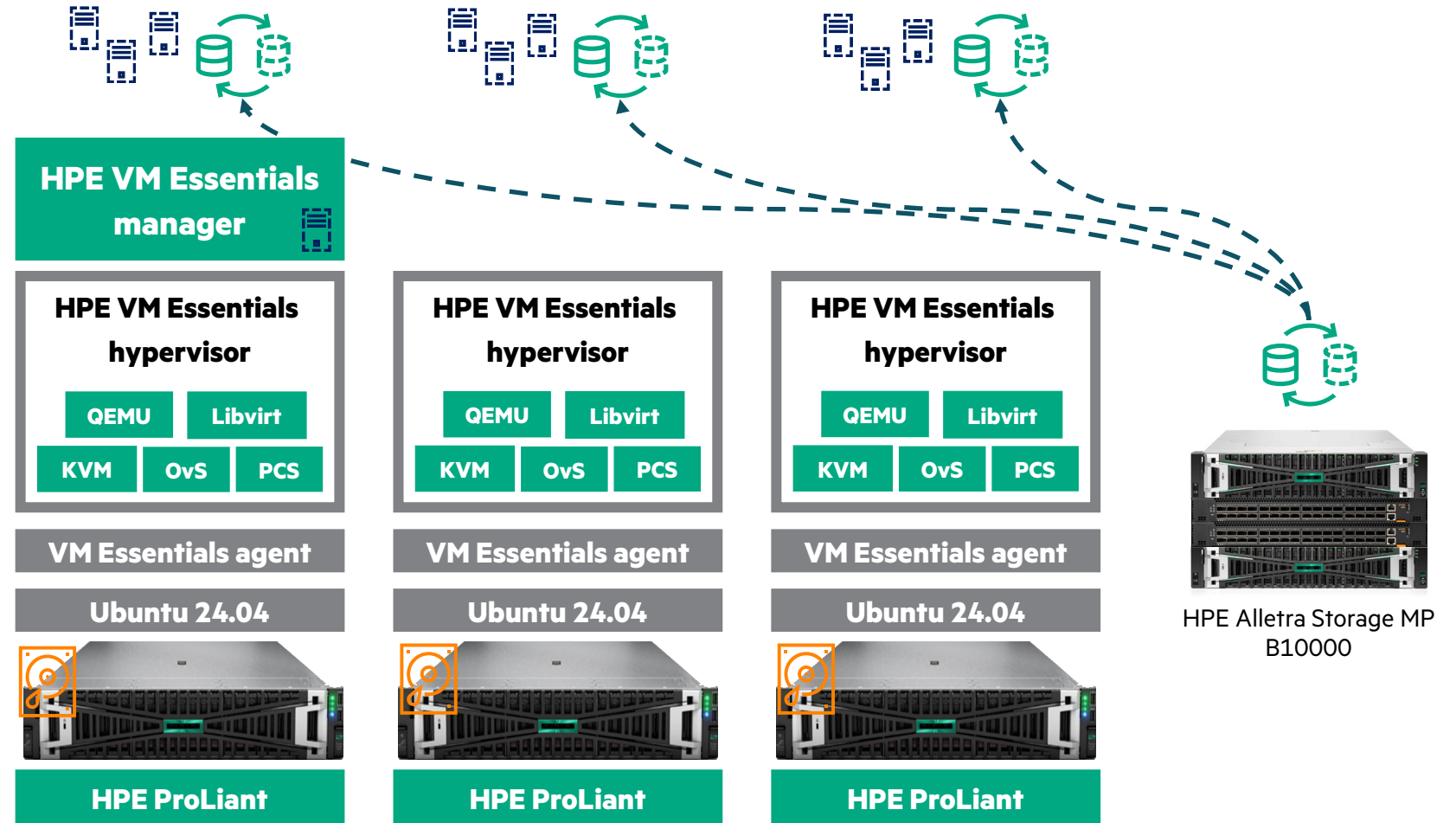
- OS, VM Essentials agent, and VME hypervisor elements operate from local storage

- **VM hosting:**

- VMs can be hosted on:
 - Local datastores
 - Shared datastores

- **Storage types:**

- **Local storage:**
 - Local disk directory pool
- **Converged storage:**
 - SimpliVity (or CEPH)
- **Shared storage:**
 - Supported via NFS, iSCSI, or FC
- **Enhanced storage integration:**
 - Optimized with HPE Alletra Storage MP B10000
- **HPE SimpliVity**



Requirements



Pre-requisites

- Prior to installing HPE VM Essentials:
 - Install Ubuntu 24.04 on each host of the cluster
 - Patch the Ubuntu OS
- Configure host networking
 - Set static management IP:
 - Recommended: configure more than one interface in bonded network interface, e.g. bond0
 - DNS, NTP, proxy
- Configure any storage networking
- Configure HPE VM Essentials management VM hostname in DNS
- Minimum node count:
 - Local storage or NFS: 1 node
 - CEPH, iSCSI, FC: 3 nodes (iSCSI & FC 2 nodes on the roadmap)



HPE Alletra Storage MP B10000 integration

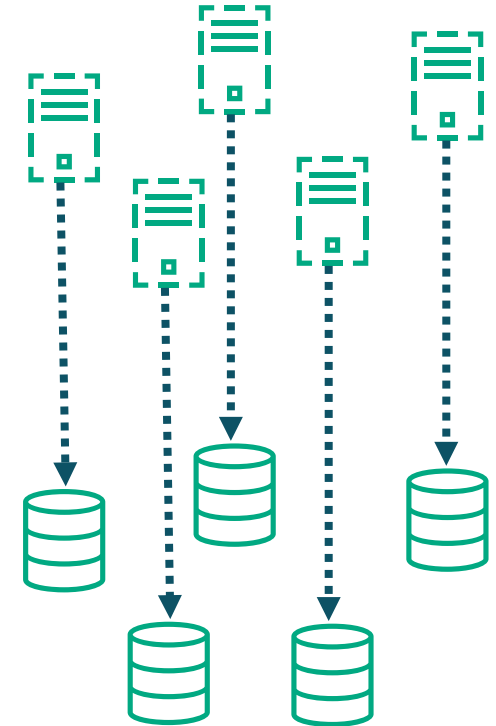
- HPE VM Essentials supports native integration with HPE Alletra Storage MP B10000
- Storage interaction enabled by storage plugin
 - VM granular storage management
 - Each VM is mapped to its own dedicate volume
 - Enables VM-native granular volume snapshots and storage management
 - VM granular replication



HPE ProLiant



**HPE Alletra Storage MP
B10000**

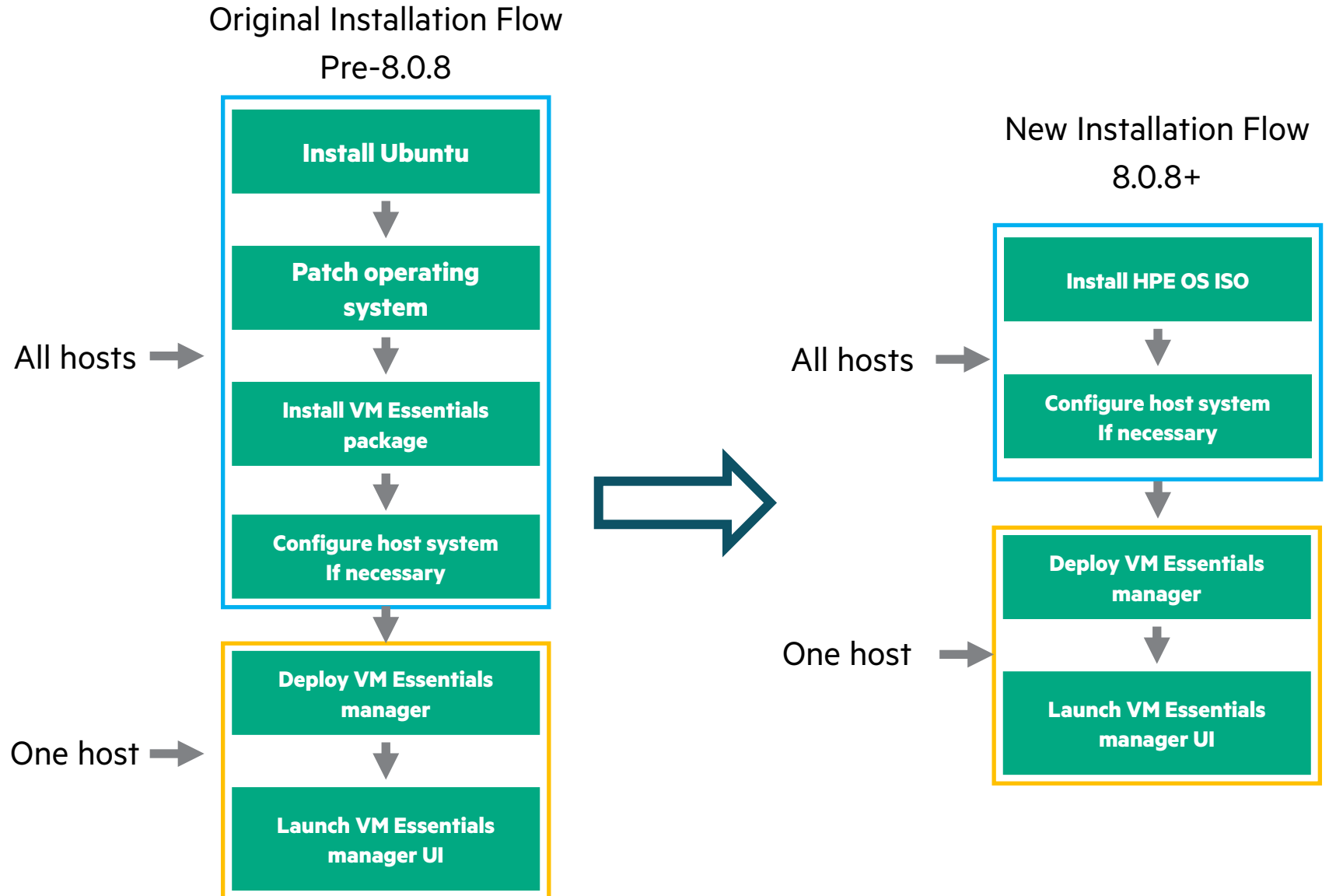


Installation and deployment



Unified installer ISO

- Unified ISO installer installs the underlying Ubuntu operating system and all necessary HVM components
- For ease of deployment and consistency, it is recommended to configure the bond and other interfaces during the installation wizard
- Ensure the same bond interface name is used on all hosts in a cluster for the management network
- Depending on external storage requirements, such as multipathing, additional host configuration may still be necessary



Unified installer flow

- Configuring the bond0 interface and any other interfaces at this stage is recommended
- Alternately, these interfaces can be configured via the HPE VM console tool or in the default netplan prior to deploying VM Essentials manager

Network configuration

[Help]

Configure at least one interface this server can use to talk to other machines, and which preferably provides sufficient access for updates.

(Ethernet 1Gb 4-port 331i Adapter)

[eno4 disabled 94:40:c9: (Ethernet 1

[ens1f0 disabled 08:f1:ea:

[ens1f1 disabled 08:f1:ea:

[ens2f0 disabled 08:f1:ea: Converged N

[ens2f1 disabled 08:f1:ea: Converged N

[ens5f0 disabled 08:f1:ea:

[ens5f1 disabled 08:f1:ea:

[eth0 disabled ea:3f:a3:

[Create bond ▶]

Create bond

Name: bond0

Devices: [] eno1
[] eno2
[] eno3
[] eno4
[X] ens1f0
[] ens1f1
[] ens2f0
[X] ens2f1
[] ens5f0
[] ens5f1
[] eth0

Bond mode: [balance-rr ▼]

XMIT hash policy: [layer2 ▼]

LACP rate: [slow ▼]

[Create]
[Cancel]

C1e

Gb

Gb

[Continue without network]
[Back]

Unified installer flow

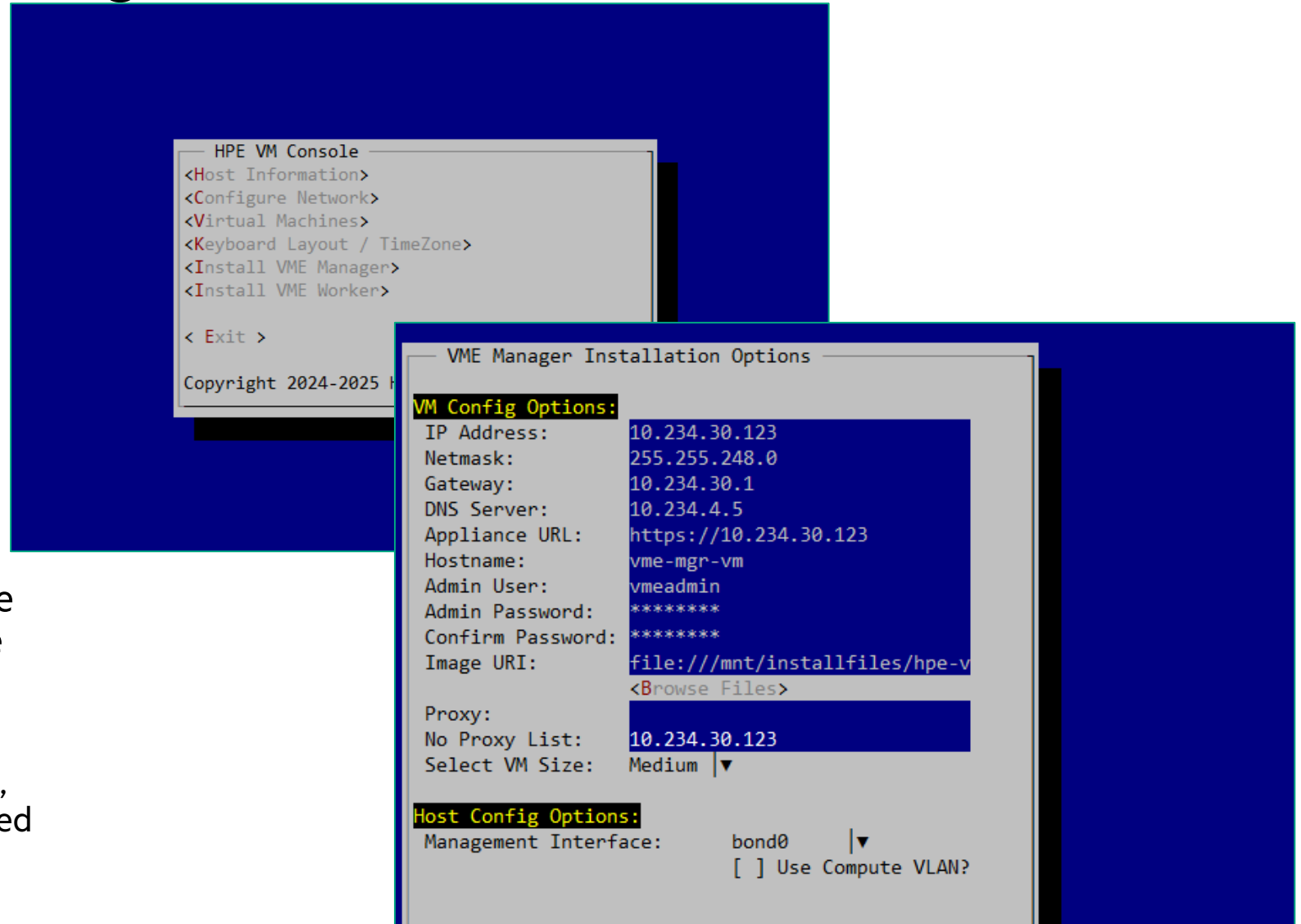
```
Installing system [ Help ]

subiquity/OEM/load_metapackages_list/wait_confirmation:
subiquity/Drivers/_list_drivers:
  subiquity/Drivers/_list_drivers/wait_apt:
subiquity/SSH/apply_autoinstall_config:
subiquity/SnapList/apply_autoinstall_config:
subiquity/Ad/apply_autoinstall_config:
subiquity/Codecs/apply_autoinstall_config:
subiquity/Drivers/apply_autoinstall_config:
subiquity/OEM/apply_autoinstall_config:
subiquity/Source/GET: |
configuring apt
subiquity/TimeZone/apply_autoinstall_config:
subiquity/Updates/apply_autoinstall_config:
subiquity/Late/apply_autoinstall_config:
subiquity/Mirror/cmd-apt-config: curtin command apt-config
curtin command in-target
installing system
executing curtin install initial step
executing curtin install partitioning step
curtin command install
  configuring storage
    running 'curtin block-meta simple'
    curtin command block-meta
      removing previous storage devices
      configuring disk: disk-sda
      configuring partition: partition-0
      configuring partition: partition-1
      configuring format: format-0
      configuring partition: partition-2
      configuring lvm_volgroup: lvm_volgroup-0
      configuring lvm_partition: lvm_partition-0
      configuring format: format-1
      configuring mount: mount-1
      configuring mount: mount-0
  executing curtin install extract step
  curtin command install
    writing install sources to disk
    running 'curtin extract'
    curtin command extract
      acquiring and extracting image from cp:///tmp/tmpun1knhyr/mount |

[ View full log ]
```

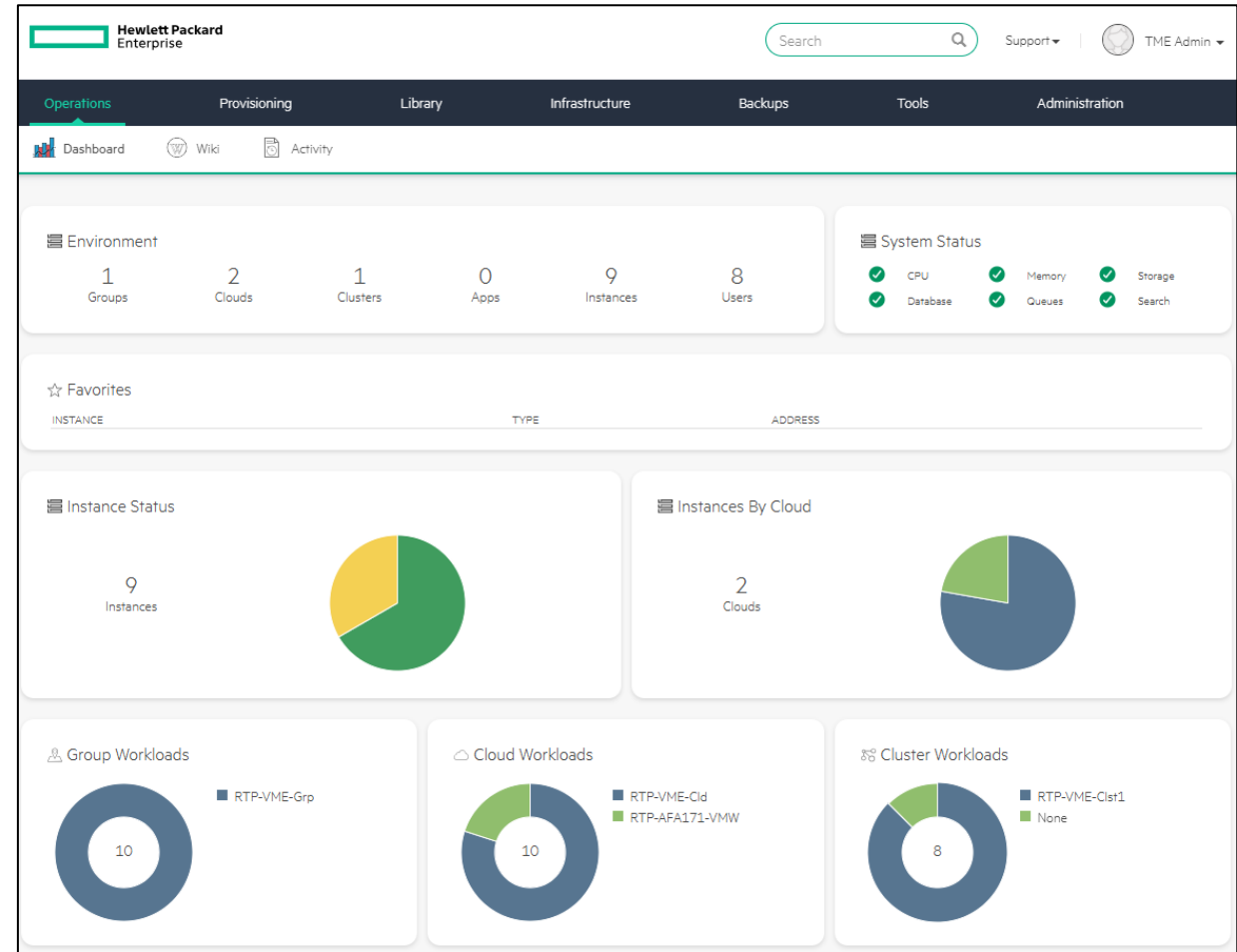
Install HPE VM Essentials management VM

- Open hpe - vm from the CLI
- Select Install VME Manager
- Specify the following:
 - Management VM IP address
 - Netmask
 - Gateway
 - DNS server
 - Appliance URL
 - Hostname
 - Admin credentials
 - Path to the appliance QCOW2 image on the ISO mount path – this can be typed or browsed to
 - Management interface:
 - If using a separate VLAN for Compute, the interface and VLAN can be specified here



Launch the HPE VM Essentials UI

- Access via the URL set during appliance deployment:
 - https://hpe_vme_manager_ip_address
- Configure the environment and create the HPE VME cluster:
 - First create an infrastructure group
 - Create a cloud resource associated with the infrastructure group

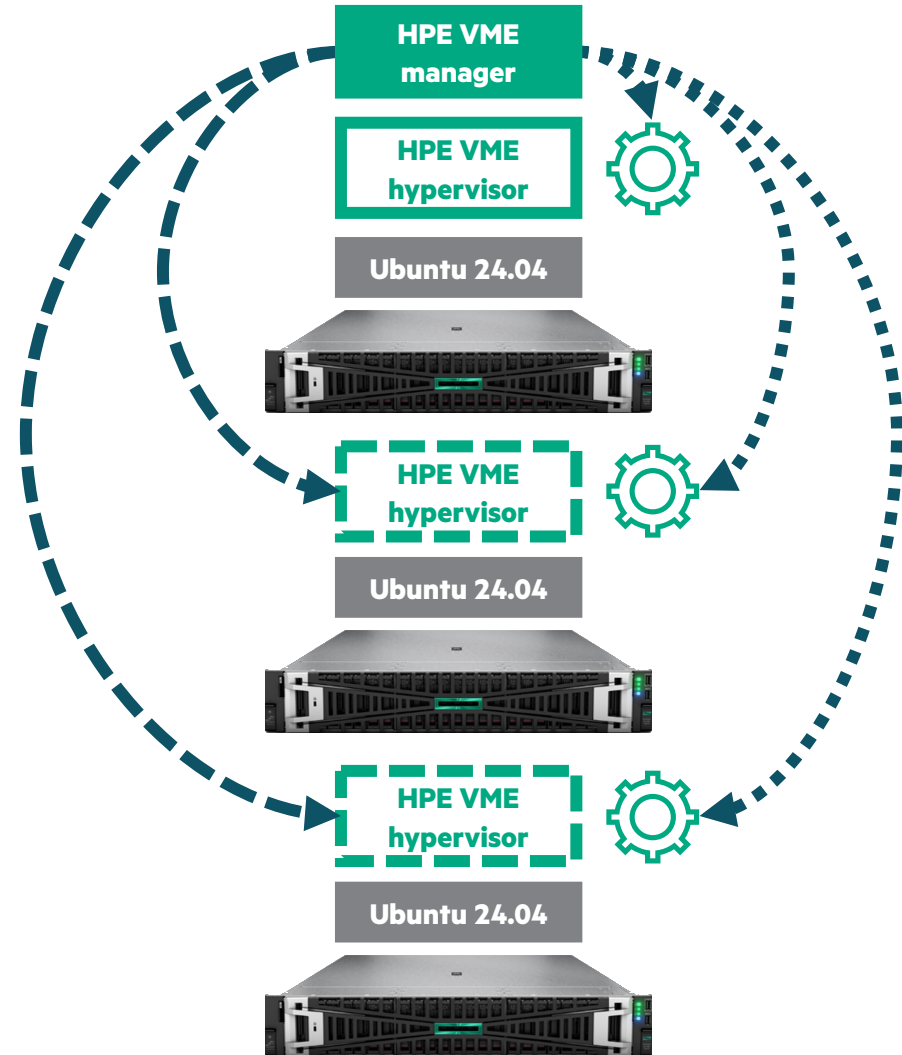


Cluster configuration



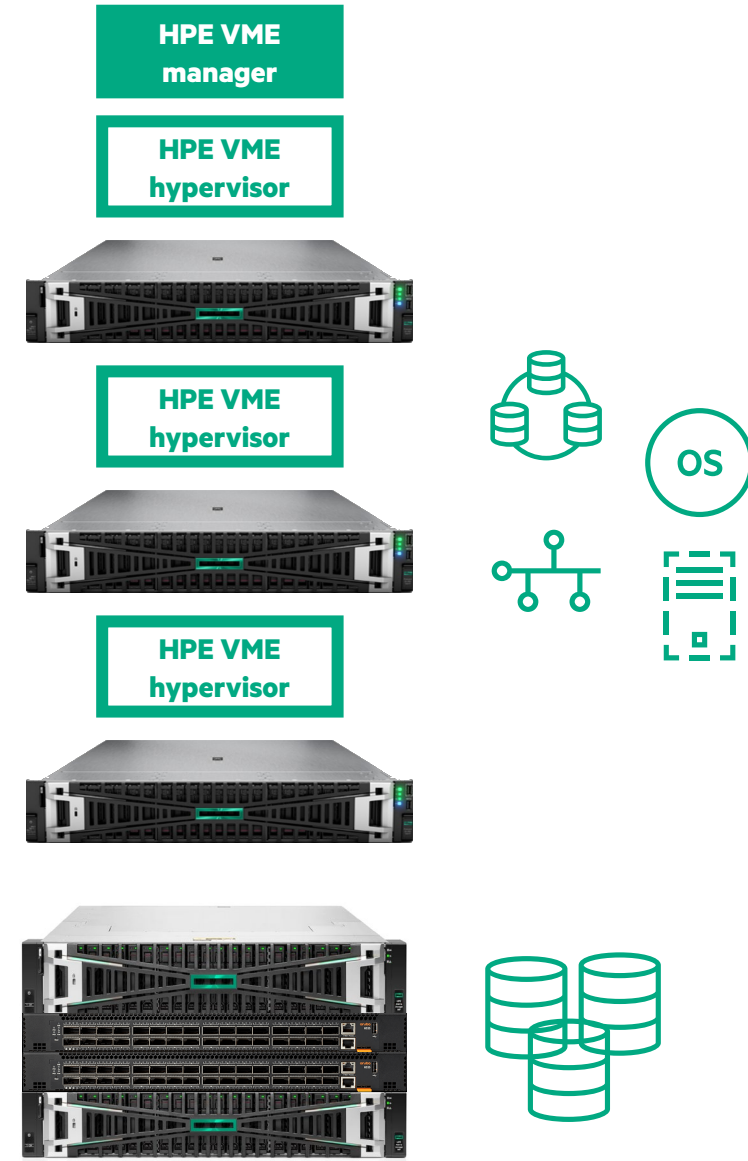
HPE VM Essentials cluster deployment

- From the HPE VME UI, a user initiates creation of a new HPE VME cluster:
 - Infrastructure -> Clusters -> Add Cluster
 - Select HPE VM cluster type
 - Select the created infrastructure group and cloud
- Specify the host names and management IP addresses of all hosts to add:
 - All hosts must have the same:
 - Credentials
 - Interface name(s)
- HPE VME manager orchestrates:
 - Installation of the HPE VME hypervisor stack on each host specified
 - Configuration of the compute cluster



Post-deployment steps

- Configure or adjust network access, if necessary:
 - Restrict access or configure additional networks
- Provision datastores if desired:
 - By default, local storage is configured
 - CEPH can optionally be configured during cluster deployment if there are spare data devices on each host
 - Supported storage protocols: NFS, iSCSI, FC
- Add ISOs, QCOW2 or VMDK images to the Virtual Images library:
 - Ensure the storage share has been configured in Infrastructure -> Storage



Storage



Storage overview

- Datastores are storage for virtual machines and optionally also virtual images (ISOs, QCOW2, VMDK, etc.)
- There are 3 type of datastores supported for hosting VMs and images:
 - Directory Pool:
 - Comprised of local storage on each server
 - The same directory path must exist on each node
 - NFS:
 - GFS2:
 - All nodes must have access to the share
 - iSCSI and FC supported
 - Clustered file system orchestrated by the *pacemaker* cluster service
 - Presented volumes must show with the same name on each host

ADD DATA STORE

NAME

New Data Store

TYPE

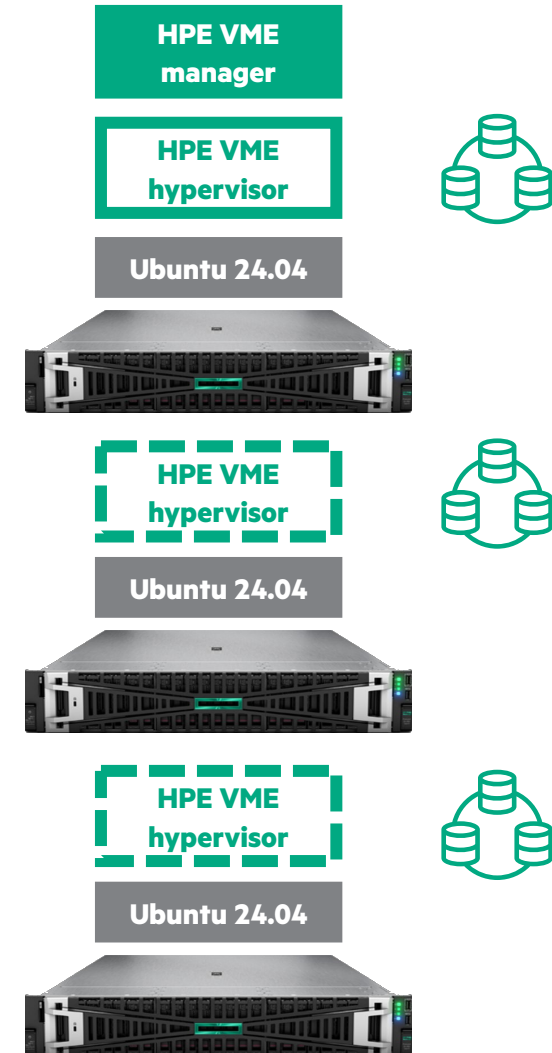
Select

Select

Directory Pool

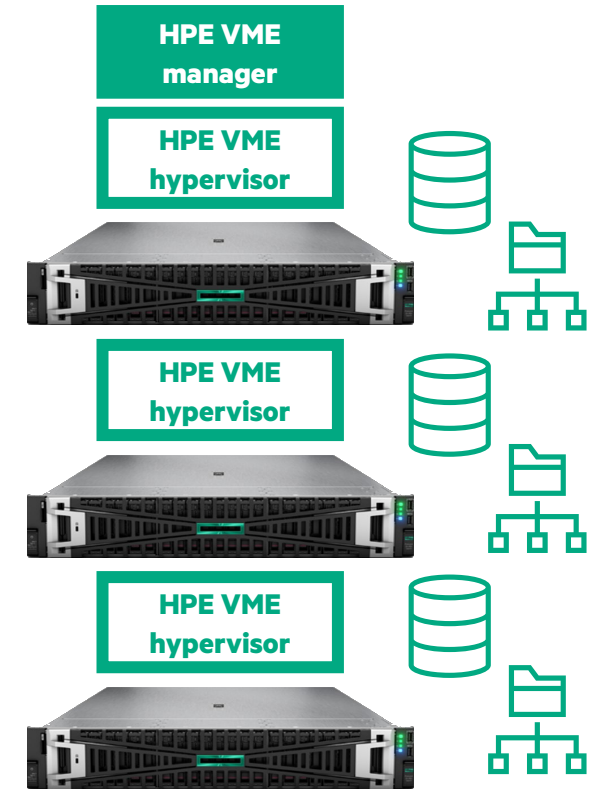
NFS Pool

GFS2 Pool (Global File System 2)



Storage – local

- Local storage on the servers
- If not leveraging CEPH:
 - VMs can be migrated between hosts, which will result in copying of the VM from one host's local storage to the destination host's local storage
 - Note that this is not shared nor HCI-type storage - if a host experiences a disruption, the VMs on that local storage will no longer be accessible
- By default, there are local directory pools created upon deployment:
 - `local`
 - `morpheus-cloud-init`
 - `morpheus-images`
- Additional directories can be specified:
 - The directory path must match on each host and the amount of available storage should be consistent across those hosts
- If CEPH was configured on initial cluster deployment, the local devices being used for that purpose on each host will act as a single large volume across all hosts:
 - Acts as converged storage



Summary

Hosts

VMs

Network

Storage

Virtual Images

Monitoring

History

Wiki

Data Stores

Volumes

Search

Add

NAME	TYPE	CAPACITY	ONLINE	
local	Directory Pool	14.3GiB / 97.9GiB	Yes	ACTIONS
morpheus-cloud-init	Directory Pool	14.3GiB / 97.9GiB	Yes	ACTIONS
morpheus-images	Directory Pool	14.3GiB / 97.9GiB	Yes	ACTIONS

Storage – NFS

- File shares presenting from NAS servers can also be mounted as datastores
- Present a share from the server, providing access to all hosts in the cluster
- Within the VME cluster, add a datastore, specifying the NFS host presenting the share and the share path
- This will mount the file share on all hosts within the cluster

ADD DATA STORE

NAME

NFS-Datastore

TYPE

NFS Pool

SOURCE HOST

nasserver.rtplab.hpecorp.net

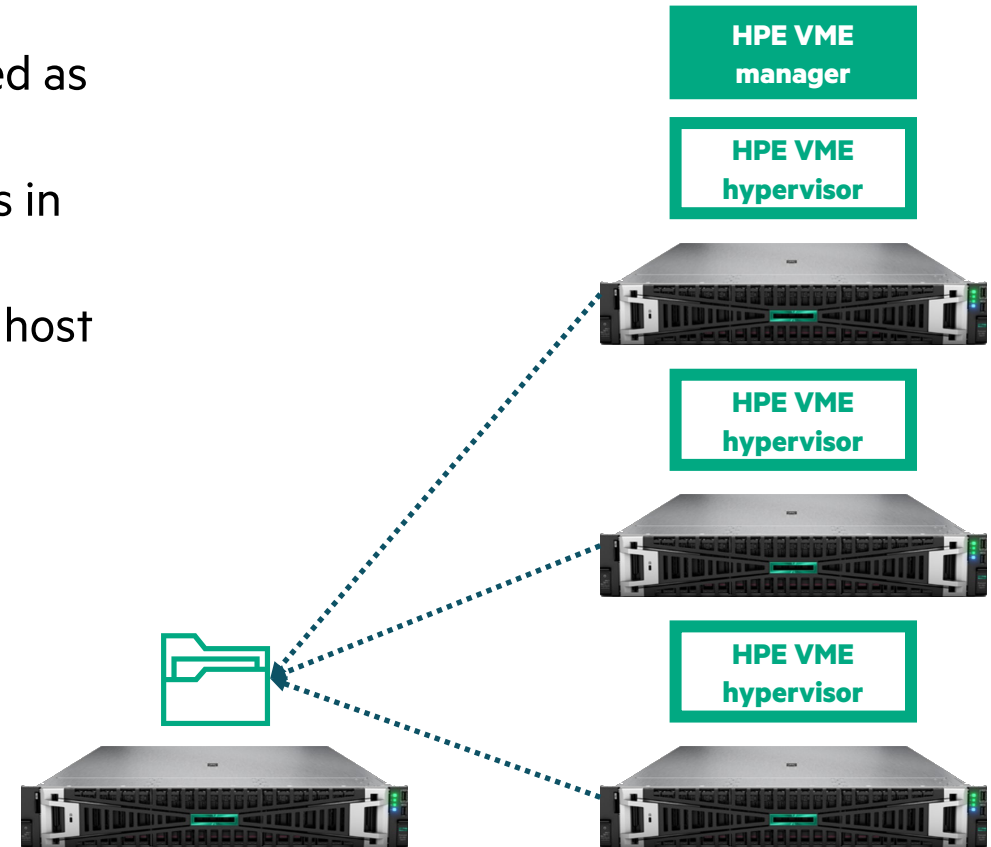
SOURCE DIRECTORY

/datashares/clusterds

☐ IMAGE TARGET

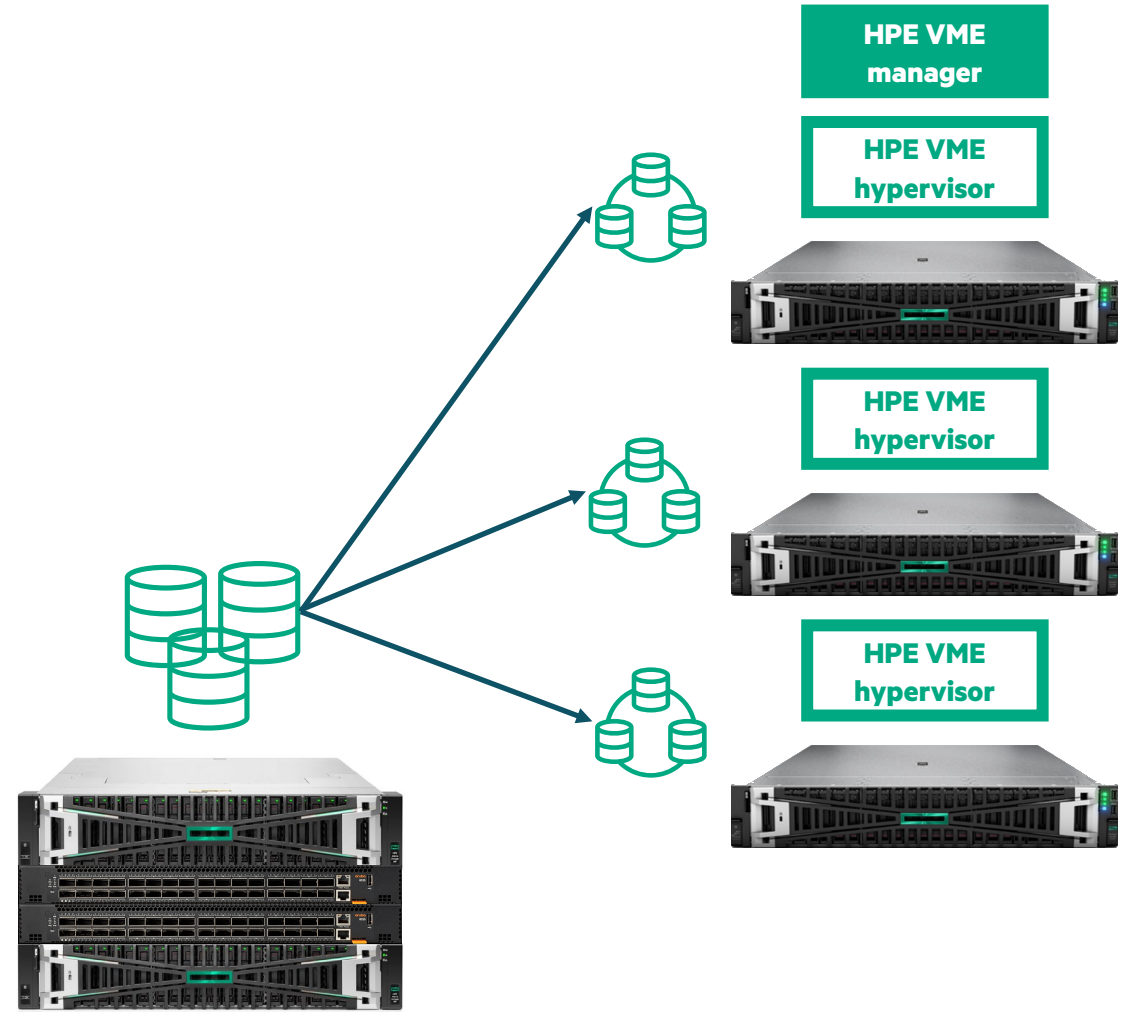
Cancel

Save



Storage – GFS2

- Global Filesystem 2 (GFS2) is a clustered filesystem that is used on shared SAN storage
- iSCSI and Fibre Channel supported at launch
- Volumes are presented from a storage array to all hosts in a cluster
- Note: a volume must appear with the same device name on all hosts in the cluster
- VME manager orchestrates mounting the device and creation of the filesystem during datastore creation

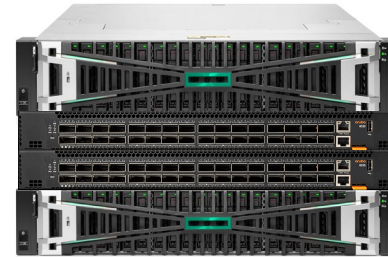


HPE Alletra Storage plugin

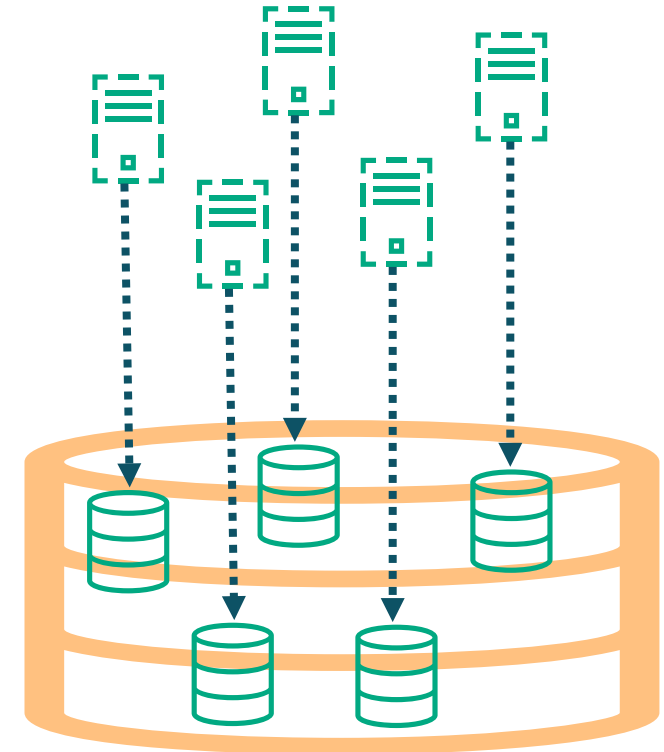
- An optional plugin for HPE Alletra MP B10000 storage arrays that acts as a storage abstraction layer between VM Essentials and the HPE Alletra MP array (via WS3 V3 APIs)
- During deployment, a logical datastore is created in VM Essentials
 - Each VM virtual disk gets a dedicated volume on the array
 - VM snapshot and backups leverage array volume snapshots
 - Operation is largely transparent in the VM Essentials UI
- Facilitated VM provisioning workflows:
 - Create VM
 - Clone VM
 - Resize VM
 - Migrate VM
 - Snapshot
 - Delete VM
 - Backup and Restore
 - Array snapshots are used as a consistency point while the backup is copied to its destination
- The plugin does not provide HA capabilities on its own. It is necessary to create a shared datastore on the cluster and enable heartbeat on that datastore to enable HA failover.



HPE ProLiant DL

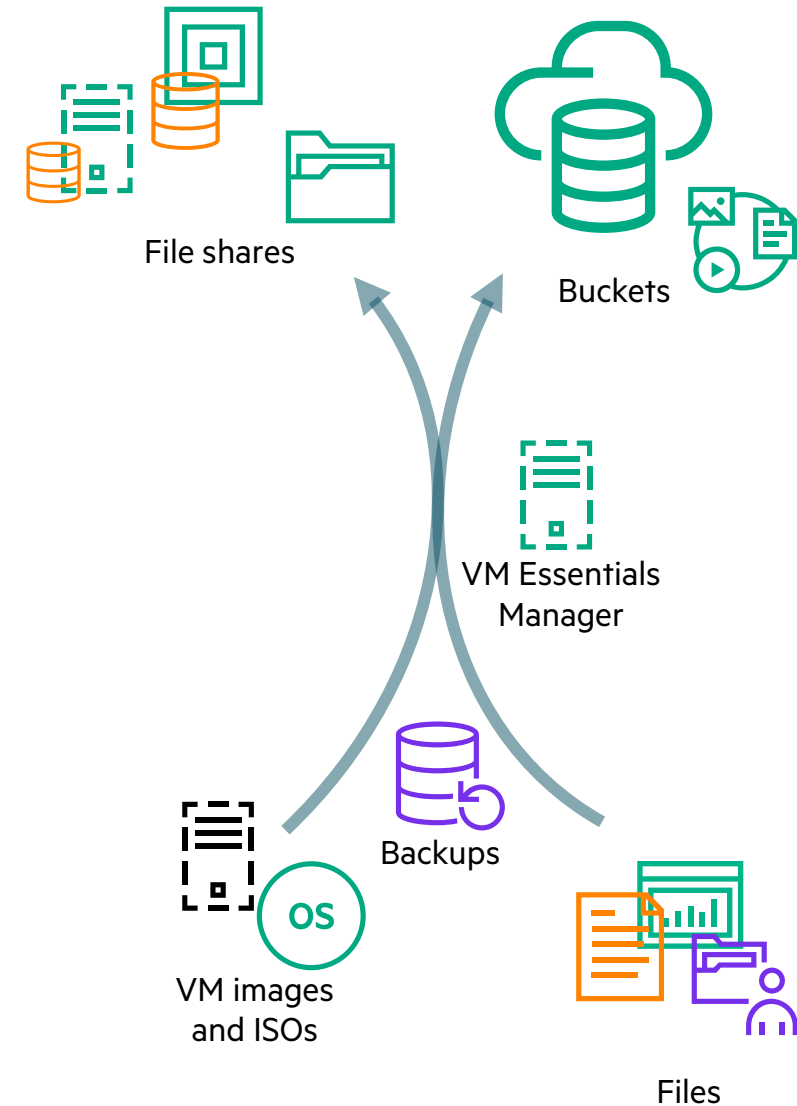


**HPE Alletra Storage MP
B10000**



Non-datastore storage

- Storage capabilities for:
 - Destination for built-in backup
 - Virtual image repository
 - Archive
- Types of storage supported
 - Buckets
 - Local or cloud object storage (S3, Google Cloud Storage, etc.)
 - File Shares
 - Local storage (directory on VM Essentials Manager VM)
 - NFS
 - CIFS
 - Azure bucket
- VM Essentials Manager is the connection and routing point to the various storages if the hosts are unable to directly access the destination storage



Networking



HPE VM Essentials – networking overview

- **Management network**

- The network used for managing the HPE VME hypervisor hosts

- **Compute network**

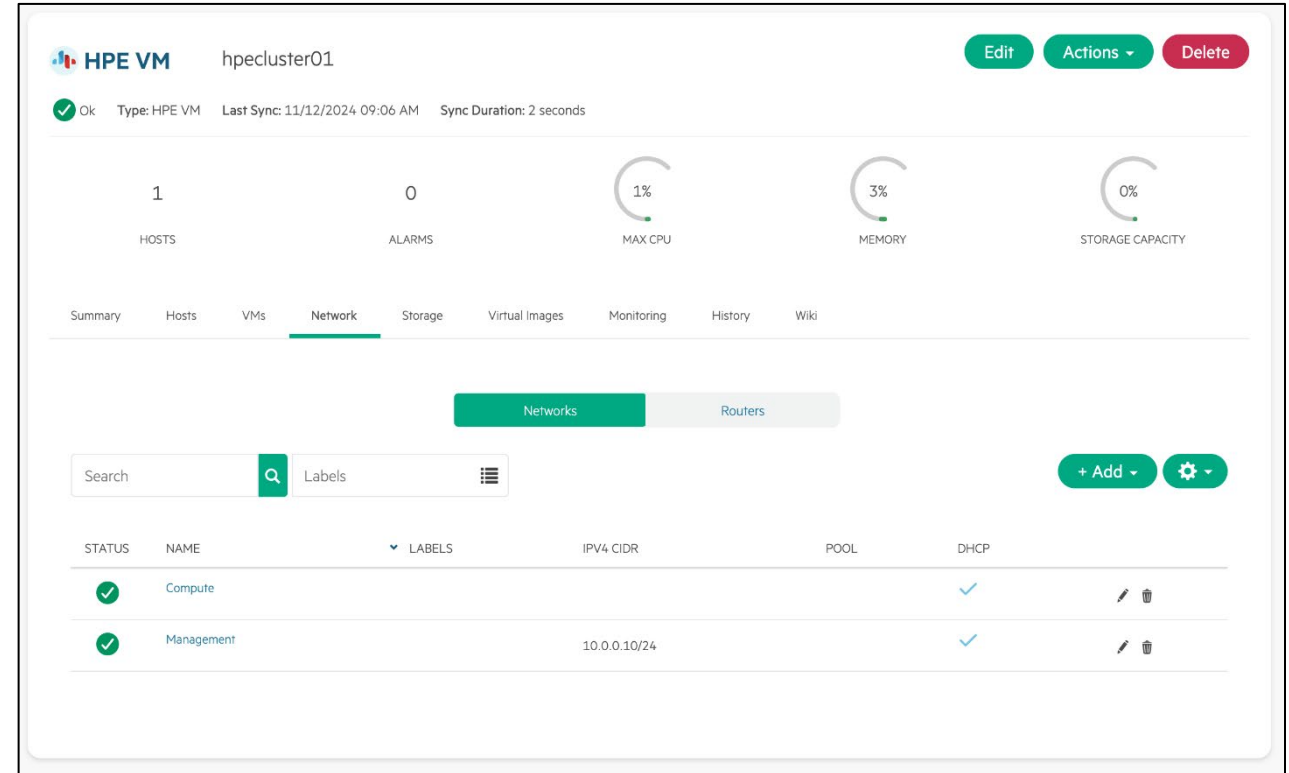
- The network used for VM traffic

- **Storage network**

- The network used to interact with external storage, such as NFS or iSCSI

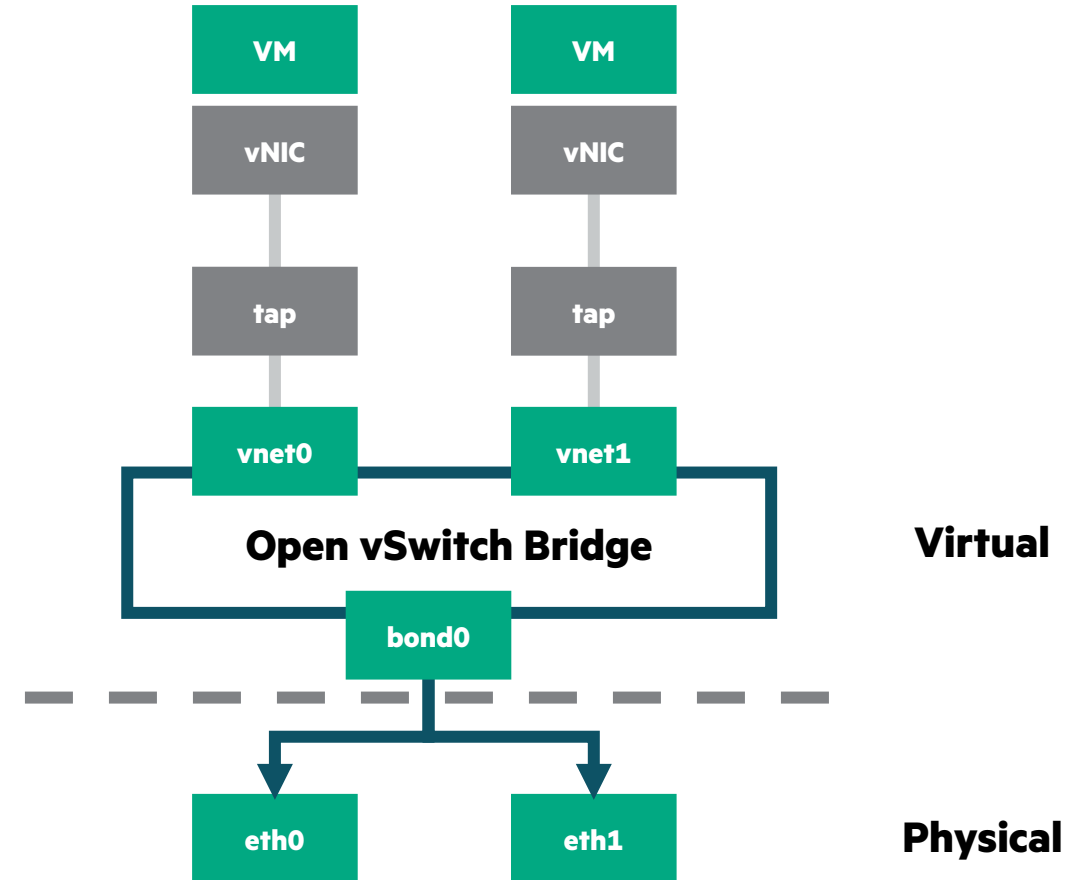
Note:

- Best practice is to have Compute and Management networks separate
- It is possible to deploy a cluster without a dedicated Compute network, running VM traffic over the Management network



HPE VME VM networking

- **VM network interface**
 - The network interface attached to the VM that is visible from within the VM
- **Tap interface**
 - The virtual connection used to connect the virtual machine to the Open vSwitch Bridge
- **Open vSwitch port**
 - The virtual port on the Open vSwitch bridge that a network interface connects to
- **Open vSwitch bridge**
 - A virtual switch used to connect VMs and the physical network
- **Bonded network interface**
 - A virtual network interface used to aggregate multiple physical network interfaces into a single virtual interface
- **Physical network interface**
 - The physical network interface that connects to the physical network



VM IP assignment and domain management

- Several options for VM network management:
 - IP addresses assigned via DHCP
 - IP addresses assigned from manually specified network pools within VM Essentials
 - Integration with third-party IPAM and DNS tools

ADD IPAM INTEGRATION

NAME

InfoBloxIPAM

☒ ENABLED

API URL

https://x.x.x.x/wapi/v2.2.1

Warning! Using HTTP URLs are insecure and not recommended.

CREDENTIALS

Local Credentials

USERNAME

adminuser

PASSWORD

••••••••••

THROTTLE RATE

0

CREATE NETWORK POOL

NAME

New IP Pool

GROUP

RTP-VME-Grp

POOL TYPE

Morpheus

IP Ranges

STARTING ADDRESS

192.168.0.2

ENDING ADDRESS

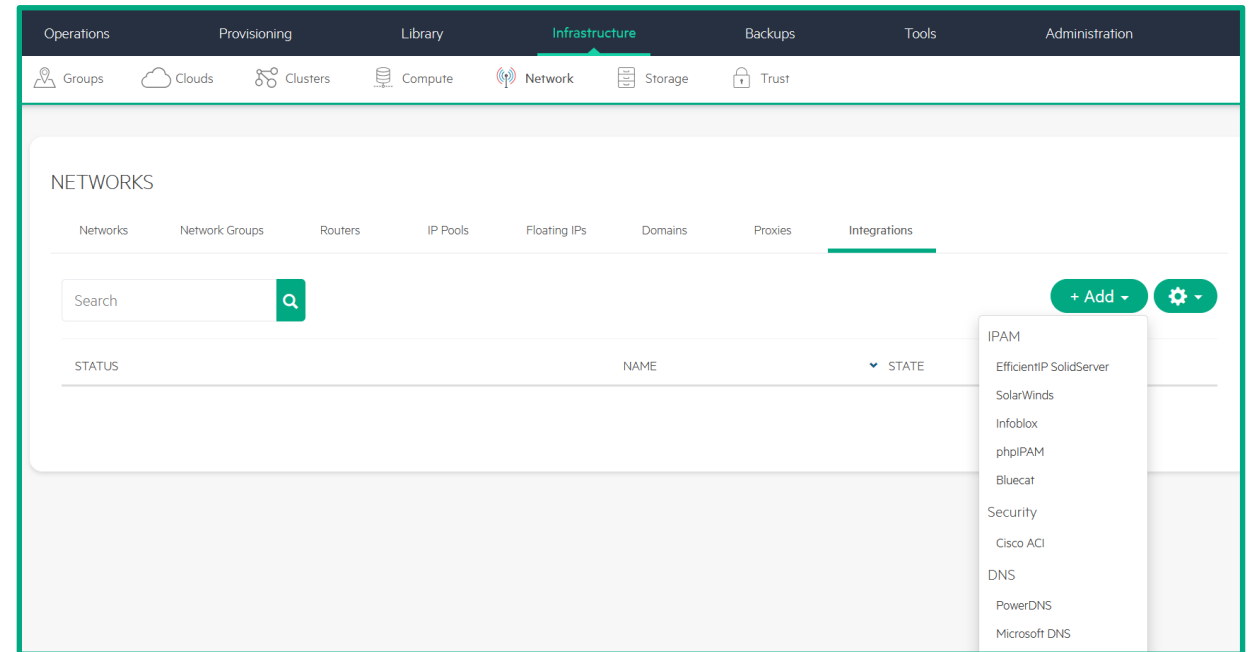
192.168.0.255

+

Save changes

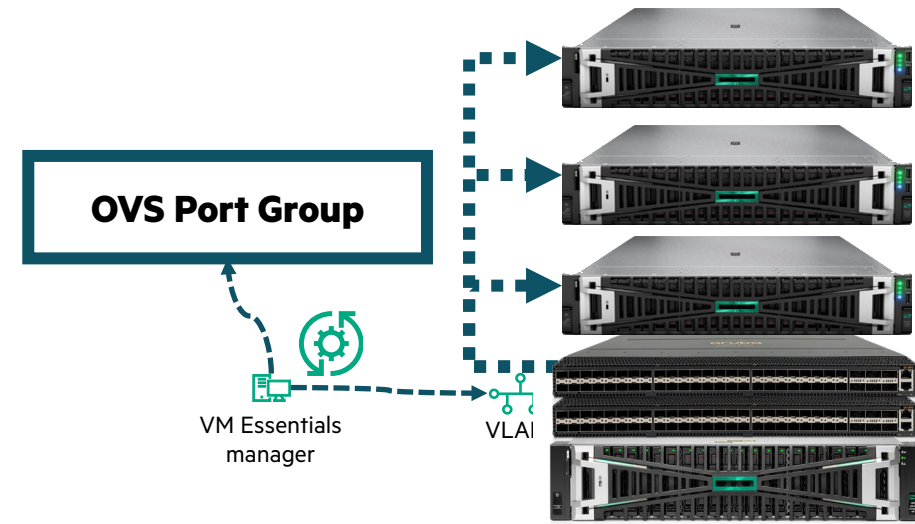
Network integrations

- Two main network integrations:
 - IPAM:
 - IP Address Management: automates management and assignment of IP addresses
 - Supported IPAM tools:
 - phpIPAM, Bluecat, Infoblox, SolarWinds, EfficientIP Solid Server
 - DNS:
 - Automates integration with Domain Name Services
 - Supported DNS tools:
 - PowerDNS, Microsoft DNS
- These help automate the management of hostnames and IP addresses when deploying VMs
- Additionally, there is built in IPAM and domain functionality
 - IP pools can be manually specified for assignment to VMs when deploying.



HPE Aruba CX network plugin

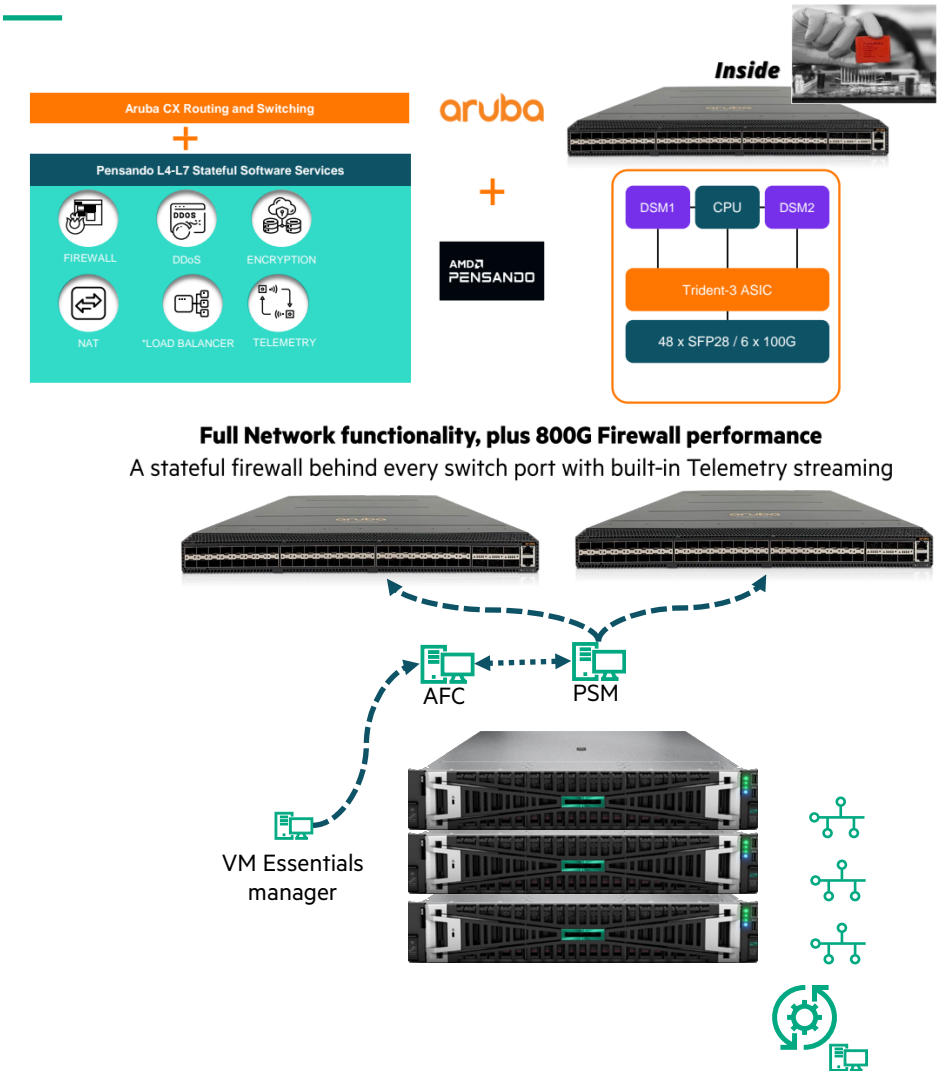
- An optional plugin for HPE Aruba CX switches that simplifies the over network provisioning process for users of certain Aruba CX models
- Configured and leveraged as part of the Network Automation feature
 - Also available separately for users leveraging Aruba CX switches but not Network Automation
- Acts as a network abstraction layer between VM Essentials and the HPE Aruba CX switches
 - Plugin interacts directly with Aruba CX switches
- Tasks managed as part of deployment
 - Integrate VM Essentials with the Aruba switch pair
 - Edit the cluster
- Tasks managed post deployment
 - Create/delete OVS port group
 - Creates/deletes associated VLANs on the switches
 - Assigns/unassigns VLANs to switch ports
 - Adds/removes VLAN to lag1 (uplink to the upstream network)
- The HPE Aruba CX network plugin is installed and leveraged by HPE Private Cloud Business Edition if the Network Automation feature is leveraged.



HPE Aruba DSS network plugin

- Dedicated plugin providing enhanced networking integration and automation capabilities through the VM Essentials UI
 - Supports Aruba CX10000 switch capabilities
 - Basic micro- and macro-segmentation
 - Automates interface creation, security groups, network and switch configuration
 - Plugin interfaces with Aruba Fabric Composer (AFC)
 - Automates network creation/deletion/modification and associated network actions for VM creation/deletion/modification
 - Both AFC and PSM run as VMs within VM Essentials

Distributed services switch – CX10000 Architecture

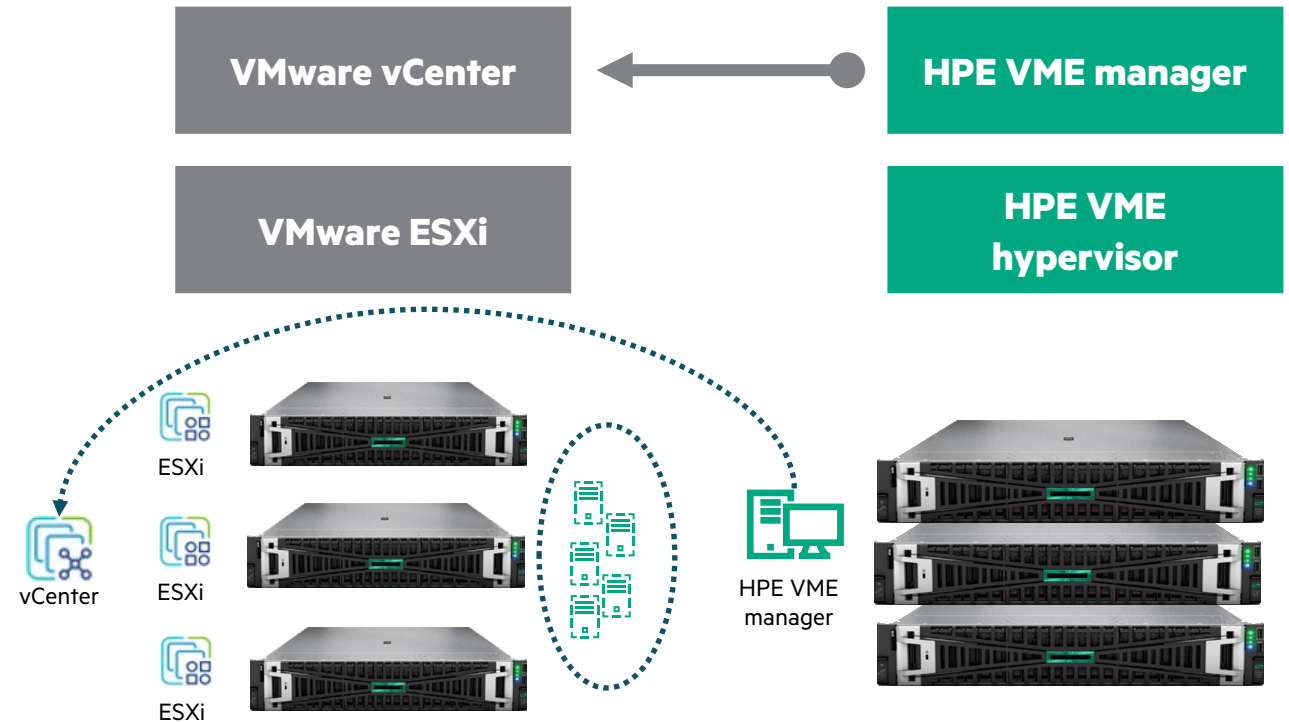


VMware Integration



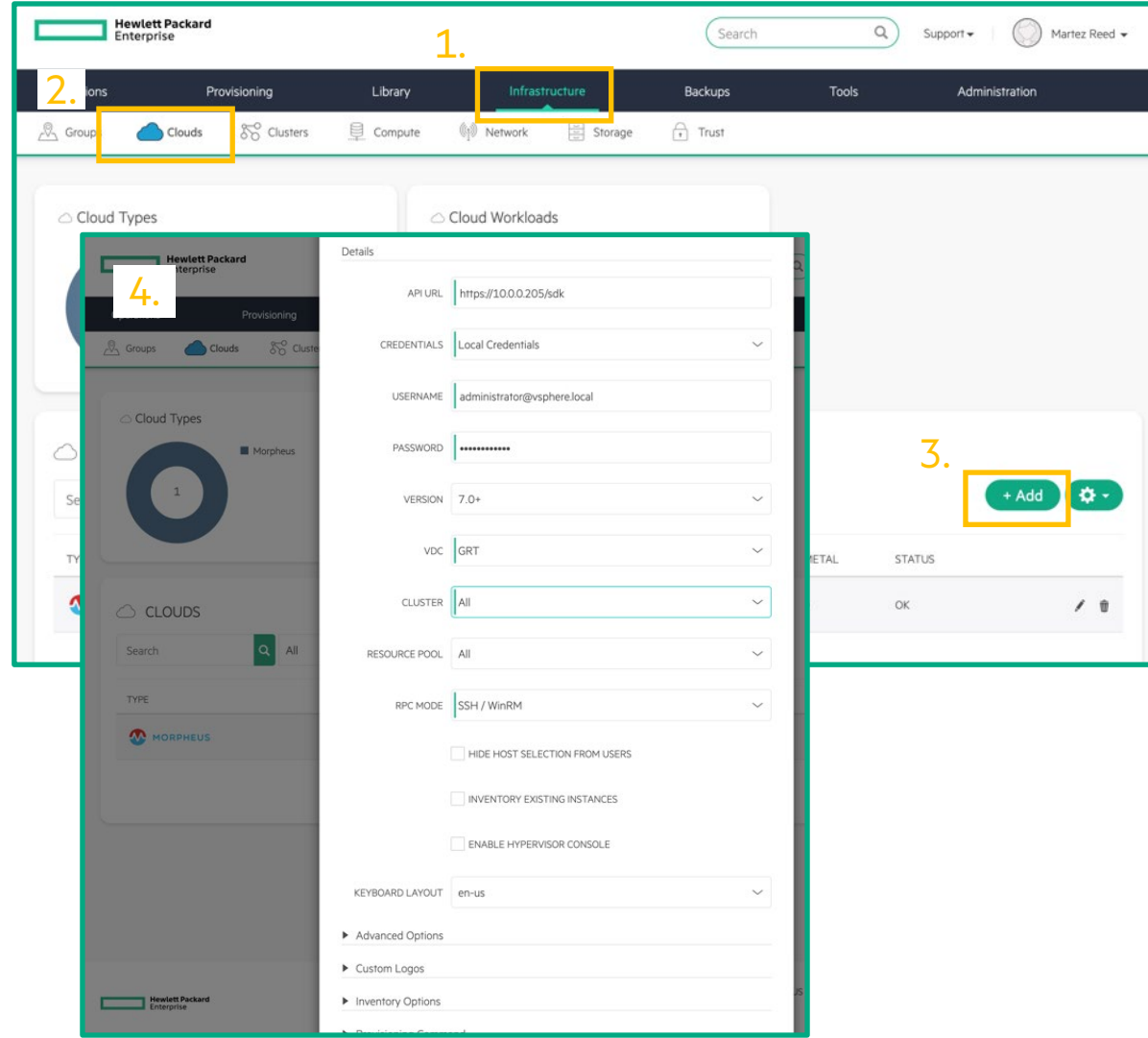
VMware integration overview

- Enables management of existing vSphere® clusters or datacenters through the VME UI
- **Integration functionality:**
 - Existing VM discovery and management
 - New VM provisioning and management
- **Cloud sync:**
 - The VMware integration performs a synchronization to collect information about the following resources every 5 minutes:
 - Networks
 - Datastores
 - VM Templates
 - Virtual Machines
 - Resource Pools
 - Folders



VMware integration – adding vSphere environment

- To add a vSphere environment:
 - VME UI -> Infrastructure -> Clouds -> +Add
 - Select VMware vCenter as the cloud type
 - Enter vCenter host information and administrator credentials
 - Select which resources in the environment to manage with VME
 - To manage existing virtual machines in the VMware environment, select Inventory Existing Instances
 - Select additional options if necessary
 - Assign to a group and submit



VMware integration

- The vSphere environment will show as a new cloud in Infrastructure -> Clouds
- Once added, access to vSphere networks and datastores can be modified

The screenshot displays the Hewlett Packard Enterprise Infrastructure console. The top navigation bar includes 'Operations', 'Provisioning', 'Library', 'Infrastructure' (selected), 'Backups', 'Tools', and 'Administration'. Below this, a secondary navigation bar shows 'Groups', 'Clouds', 'Clusters', 'Compute', 'Network', 'Storage', and 'Trust'. The main content area features two donut charts: 'Cloud Types' showing 2 items (Private Cloud and VMware vCenter) and 'Cloud Workloads' showing 18 items (RTP-VME-Cld and RTP-AFA171-VMW). Below these charts is a 'CLOUDS' section with a search bar, filters, and a table of cloud resources.

TYPE	NAME	LABELS	HOSTS	VMS	BARE METAL	STATUS	
vmware	RTP-AFA171-VMW		3	10	0	OK	
MORPHEUS	RTP-VME-Cld		3	17	0	OK	

VMware integration

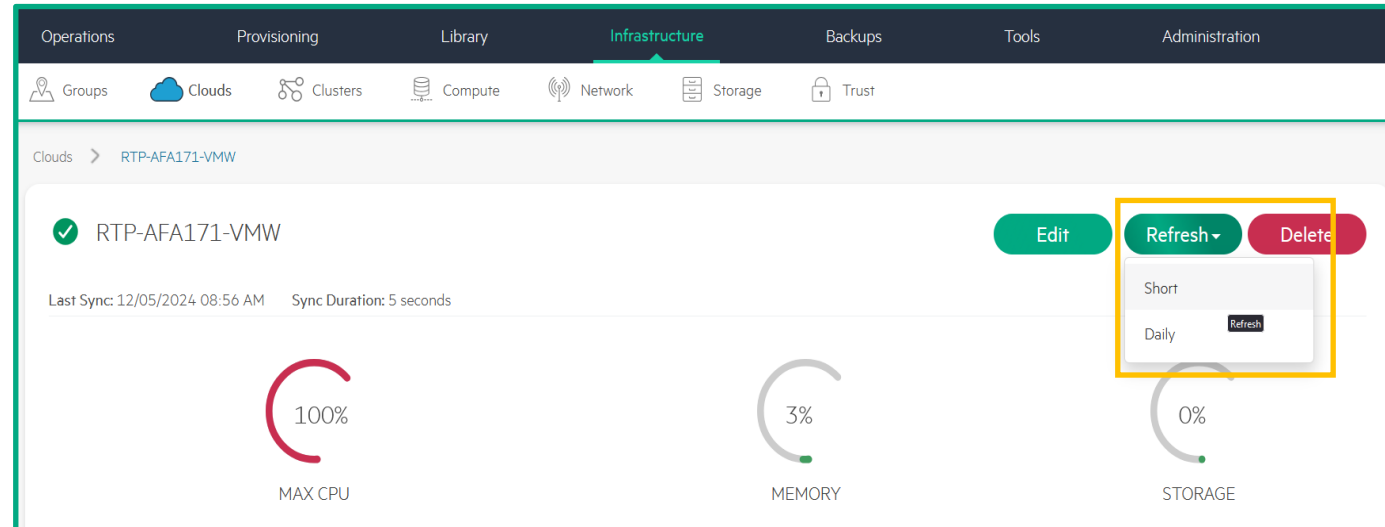
- If the option to inventory existing virtual machines was selected, the VMs in the selected vSphere resources will show as Discovered
- To manage a discovered VM through the VME manager UI, select the VM or VMs and select Convert to Managed from Actions

The screenshot displays the VMware vSphere UI's 'Infrastructure' tab. At the top, there are navigation tabs: Operations, Provisioning, Library, Infrastructure (selected), Backups, Tools, and Administration. Below these are icons for Groups, Clouds, Clusters, Compute, Network, Storage, and Trust. The main dashboard shows counts for various resource types: 0 Container Hosts, 3 Hypervisors, 0 Bare Metal, 10 Virtual Machines, and 7 Discovered. Below this is a sub-navigation bar with tabs: Summary, Clusters, Hosts, VMs (selected), Containers, Network, Data Stores, Resources, and Wiki. A search bar and a 'Labels' filter are present. The main table lists discovered VMs with columns for checkbox, power status, OS, name, type, host, cloud, IP address, and status. The 'Actions' menu is open for the selected VM 'testdiscvoerwh', showing options: Stop, Start, Upgrade Agent, Convert to Managed (highlighted), Retry, and Delete.

	POWER	OS	NAME	TYPE	HOST	CLOUD	IP ADDRESS	MEMORY	STORAGE	STATUS
<input type="checkbox"/>	⏻	🔒	DE-LocalTest	🔒	10.234	RTP-AFA171-VMW		0	0	✓
<input type="checkbox"/>	⏻	🔒	DE-TestVM-202408291036	🔒	10.234	RTP-AFA171-VMW		0	0	✓
<input type="checkbox"/>	🔌	🔒	DE-TestVM-202408291043	🔒	10.234	RTP-AFA171-VMW	Address 10.234.1	100	5	✗
<input type="checkbox"/>	🔌	🔒	DEVMTTest	🔒	10.234	RTP-AFA171-VMW	Address 10.234.1	0	8	✓
<input type="checkbox"/>	⏻	🔒	PCBE-Win16-Dev	🔒	10.234	RTP-AFA171-VMW		0	0	✓
<input checked="" type="checkbox"/>	🔌	🔒	testdiscvoerwh	🔒	10.234	RTP-AFA171-VMW	Address 10.234.1	0	2	✓

VMware integration

- Periodic cloud synchronizations will pull in changes within vSphere
- If there is a need to see those changes immediately, within the VMware cloud in VME, a user can select to initiate a manual refresh
- Selecting Short refresh will capture any relevant infrastructure changes, such as networks, VMs, datastores



VMware integration – storage and network access

- If desired, access to specific networks and datastores can be granted or denied at the group level
- This enables providing access to only the necessary infrastructure to various groups

The image shows two overlapping configuration windows from the VMware vSphere interface. The background window is the 'NETWORK POOL' configuration page, and the foreground window is the 'EDIT DATA STORE' page.

NETWORK POOL Configuration:

- NETWORK POOL:** Choose a pool
- DOMAIN:** Select
- Options:** IPv6 Options, Advanced Options, Guest Console Options
- Group Access Table:**

GROUP	ACCESS	DEFAULT
all	<input type="checkbox"/>	
Dev-Org-Grp	<input type="checkbox"/>	<input type="checkbox"/>
RTP-VME-Grp	<input checked="" type="checkbox"/>	<input type="checkbox"/>

EDIT DATA STORE Configuration:

- NAME:** RTP-AFA171-C1-VMFS-DS01
- ACTIVE:** ☒
- Group Access Table:**

GROUP	ACCESS
all	<input type="checkbox"/>
Dev-Org-Grp	<input checked="" type="checkbox"/>
RTP-VME-Grp	<input type="checkbox"/>

Both windows have a 'Save changes' button at the bottom right.

VMware integration – VM provisioning

- VMware VMs can be deployed from:
 - vSphere Content Libraries
 - VM Essentials Virtual Images library
- VMware-compatible image types:
 - ISO – for installing VM OS upon VM deployment
 - VMDK – standard VMware virtual disk format
 - OVA / OVF – open standard format for VMs

CREATE INSTANCE

Type Group **Configure** Automation Review

Configuration Options

LAYOUT: VMware VM

PLAN: 1 CPU, 512MB Memory
Cores: 1 Memory: 512 MB

RESOURCE POOL: RTP-AFA171-C1

VOLUMES: root | 10 GB | Auto - Datastore

NETWORKS: Select Network

IMAGE: [Open Dropdown Menu]

- Cent OS 8.1 ISO
- CentOS
- TestImportImageVMW
- Ubuntu 22.04.5 ISO
- WIN2016-OVF
- Windows Server 2016 ISO
- Windows Server 2022 ISO

User Config

Advanced Options

Operations Provisioning **Library** Infrastructure Backups Tools Administration

Automation Virtual Images

Search [Icon] All Types User Labels [Icon] [Add] [Settings]

<input type="checkbox"/>	TYPE	NAME	PLATFORM	LABELS	SIZE	SOURCE
<input type="checkbox"/>	QCOW2	Cent OS 7 Image	centOS 7 64-bit	centos	2.3GiB	UPLOADED

Actions: ISO, QCOW2, RAW, VMware (vmdk/ovf/ova)

VMware to VM Essentials image conversion

- Built into VM Essentials is the capability to deploy imported VMware virtual machine images that are in the VM Essentials Virtual Images library
 - VMs are converted to QCOW2 format upon deployment
 - VMware VM images can be added to the Virtual Images library either by importing the VM as an image through Instances or by uploading VMDK/OVA/OVFs directly to the library
- Prior to importing the VM image, some preparation of the VM is typically required, including VirtIO driver injection and modification of virtual disk mount points.
- Refer to the HPE Morpheus VM Essentials Software migration guide for more information.
- This feature is distinct from the VM migration feature

The screenshot displays the VM Essentials interface. The top navigation bar includes tabs for Operations, Provisioning, Library, Infrastructure, Backups, Tools, and Administration. The 'Provisioning' tab is active, showing the 'Instances' section. A specific instance, 'TME-LinuxJump', is highlighted, showing its status as 'Running', type as 'VMware', and plan as 'Custom VMWare'. An 'Actions' dropdown menu is open, showing options like 'Suspend', 'Stop Server', 'Start Server', 'Restart Server', 'Import as Image', and 'Clone to Image'. The 'Import as Image' option is highlighted.

Below the instance list, the 'CREATE INSTANCE' wizard is shown, with the 'Configure' step selected. The wizard includes configuration options for LAYOUT (Single HPE VM), PLAN (2 CPU, 8GB Memory), RESOURCE POOL (RTP-VMware-Cist1), VOLUMES (root, 150 GB), NETWORKS (Management, DHCP), IMAGE (TME-LinuxJump (VMDK)), and HOST (Select). The 'IMAGE' field is highlighted. At the bottom, there are 'Previous' and 'Next' buttons.

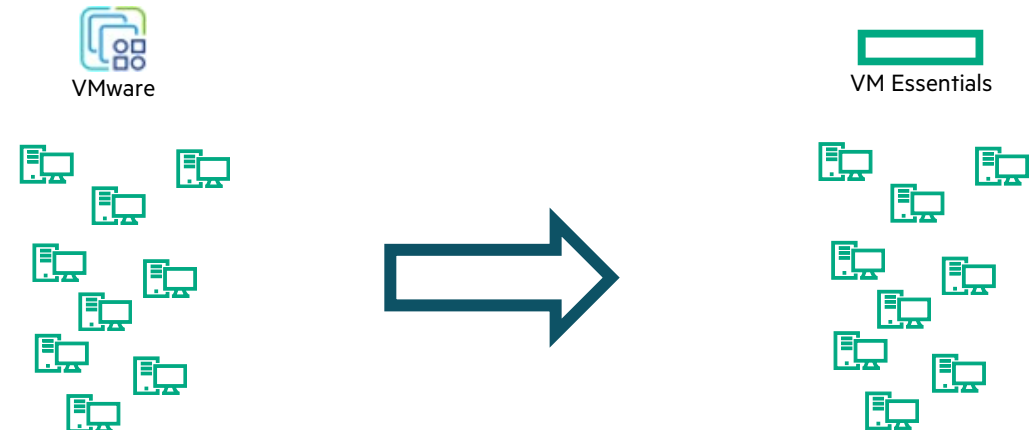
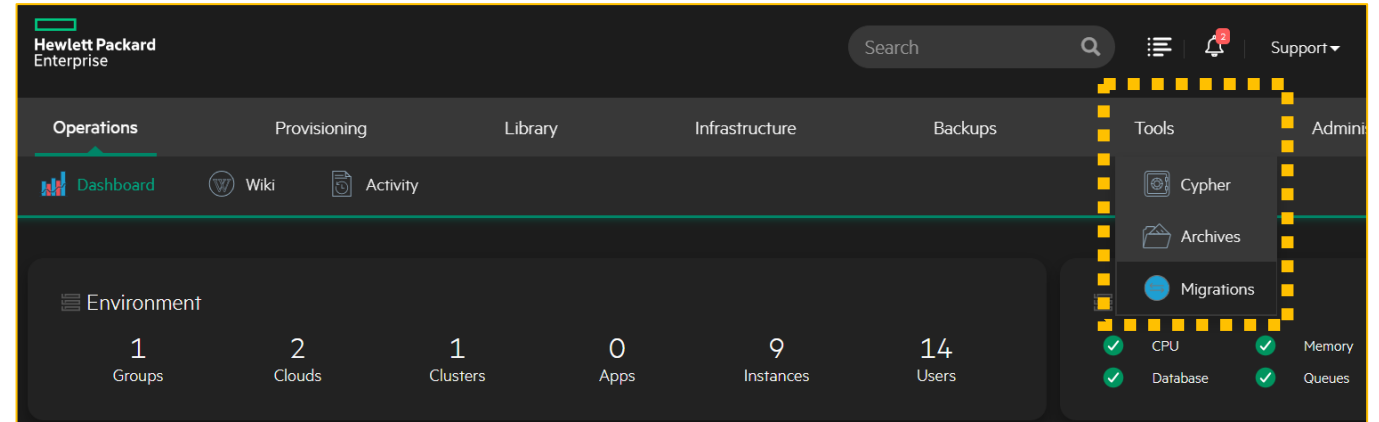
To the right, the 'Virtual Images' library is shown, listing various images. The 'Actions' dropdown menu is open, showing options like 'ISO', 'QCOW2', 'RAW', and 'VMware (vmdk/ovf/ova)'. The 'VMware (vmdk/ovf/ova)' option is highlighted.

VMware to VM Essentials migration feature



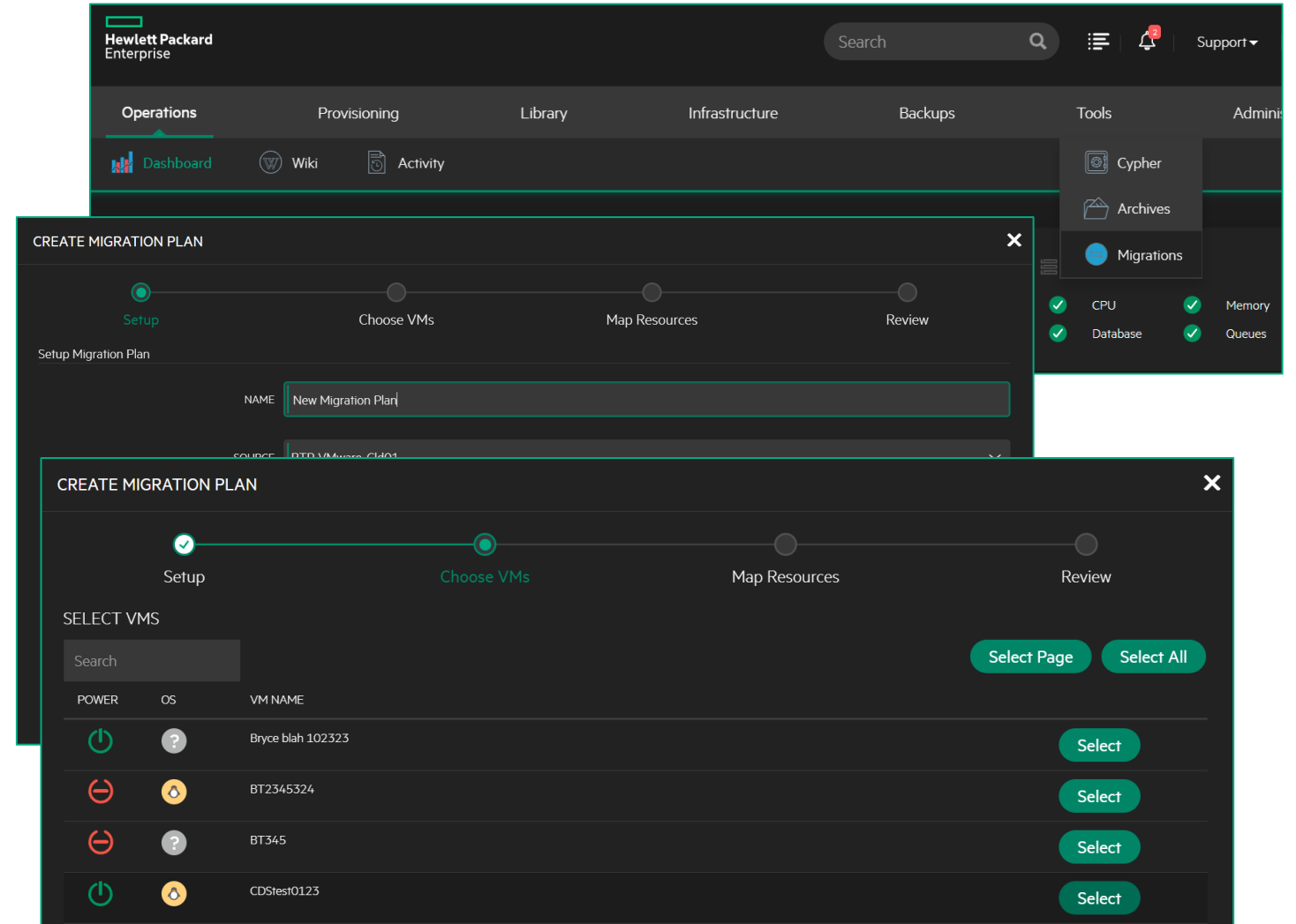
VM Migration feature

- Built in feature that facilitates conversion and import of VMware VMs into the HVM environment
- Can initiate multiple VM conversions simultaneously
 - Maximum of 20 simultaneous tested currently
- Depending on the guest OS, some preparation may be necessary before beginning migration
 - Verify virtio drivers are present and install if not
 - Verify qemu guest agent is present and install if not
 - Recommended to change mount points to utilize UUIDs.
 - /dev/sdX device names may change to /dev/vdX device names upon migration
 - If mount points are not changed to use UUID, it will be necessary to modify post migration to use the new device names
- The vCenter environment must have been added as a cloud to VM Essentials and the VMs inventoried
- Refer to the HPE Morpheus VM Essentials migration guide for more information



VM Migration feature workflow

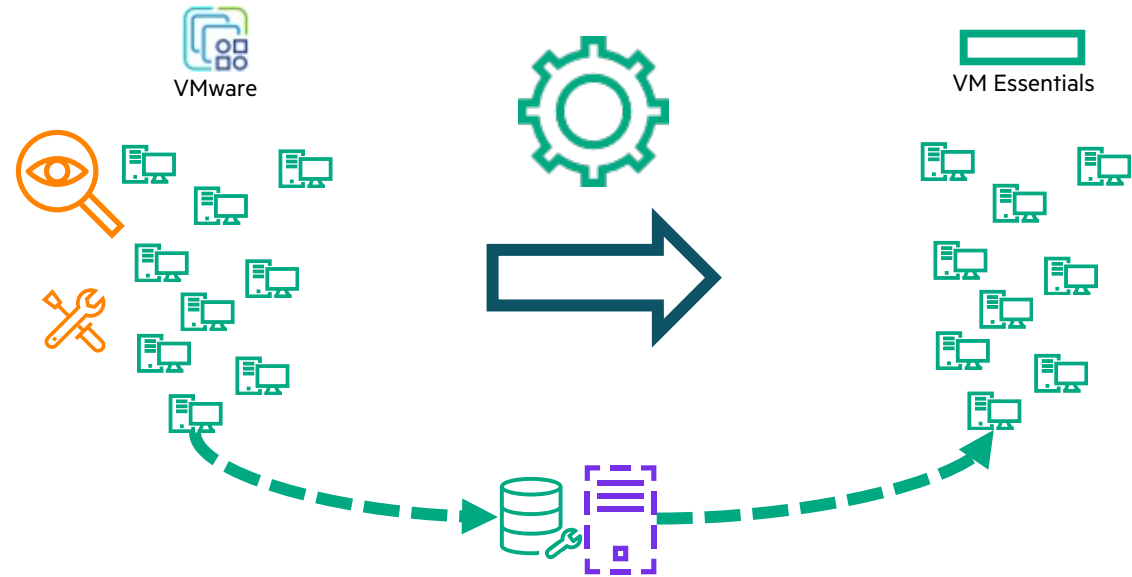
1. In VM Essentials UI, click Tools -> Migrations
2. Click +Add to create a new migration plan
3. Specify the plan name, the source (VMware), the destination cloud, cluster, and group (HVM)
4. Select one or multiple VMs to migrate
5. Select the destination VM network and datastore
6. If the VMs to be migrated have not yet been prepared for migration, perform necessary steps*
7. When ready to start migration, click Run to initiate



VM Migration feature sequence of operation

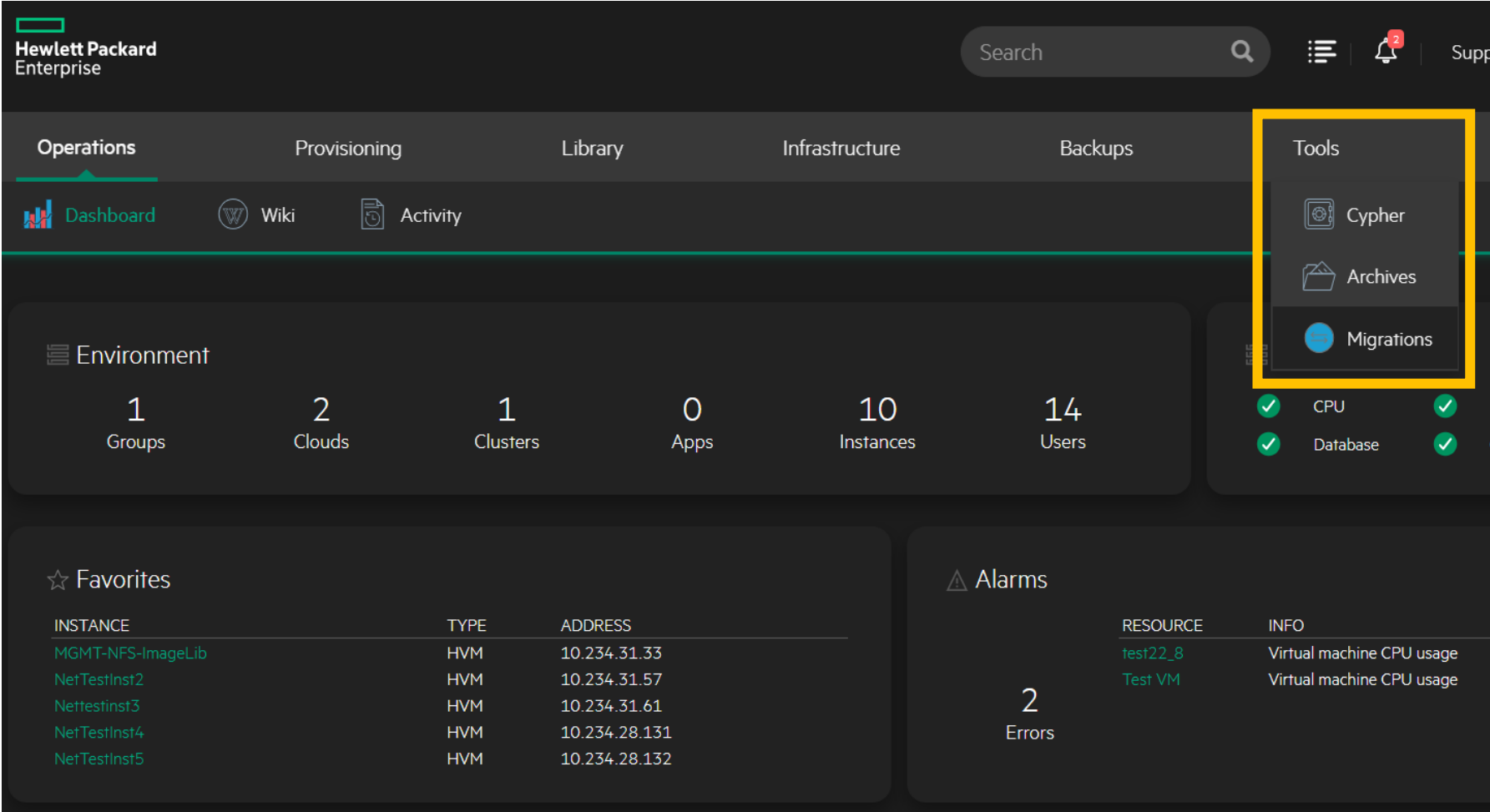
1. Migration plan is started
2. VM Essentials creates a VM on the destination HVM cluster
3. VM powered off on VMware side
4. Export of VM via OVF initiated
5. Virtual disk format is converted in transit and attached to the destination VM – the resultant VM disk format will be thick
6. Destination VM is powered on
7. VM guest agent installed, if not skipped
8. VM finalized and ready for use

- Note this is not a live migration and downtime is required



Initiating a migration - UI

- Introduced in VM Essentials 8.0.8
- The migration feature is available under the Tools drop down menu



Initiating a migration - UI

Hewlett Packard Enterprise

Search

2

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Cypher

Archives

Migrations

MIGRATIONS

Search

+ Add



Initiating a migration - UI

- Give the migration plan a name
- Select the source cloud (VMware)
- Select the target cloud and resource pool
- The resource pool will be the HVM cluster the VMs will be run on

CREATE MIGRATION PLAN

Setup

Choose VMs

Map Resources

Review

Setup Migration Plan

NAME

My VM Migration

SOURCE

RTP-VMware-Cld01

TARGET

RTP-VME-CLD-01

RESOURCE POOL

HPE-RTP-VME-Cluster01

GROUP

HPE-VME-GRP-Prod

Previous

Next

Initiating a migration - UI

- Select the VM or VMs to include in the migration plan
- It is recommended to create plans with VMs that are like each other
 - e.g. same datastores, VM networks, guest OS types

test22_8

Select

test22_9

Select

TME-Ubuntu-Filestore

Select

TME-WinJumpHost

Select

vCenter-grp-rtp-afa124

Select

vcenter7-tnz

Select

vCLS-1a84eb73-4d6f-410b-98f2-8aa4157163b7

Select

vCLS-2f67175d-c81a-4b81-975a-bf2b186cc56c

Select

vCLS-60155b33-beb2-4967-90e0-9ee91049ad33

Select

vCLS-d2465da5-56e4-4e17-9cdb-23fb2f0d18f5

Select

12»

SELECTED VMS

POWEROS

VM NAME

TME-LinuxJump

Deselect

Previous

Next



Initiating a migration - UI

- For each VM network on a VM or VMs on the source, a destination network is selected
- For each datastore that contains a VMDK of the VM or VMs a destination datastore would be selected
- Provide guest OS credentials to install guest tools if desired

CREATE MIGRATION PLAN

✓

✓

SetupChoose VMsMap ResourcesReview

Networks

SOURCE	TARGET
dvpg_mgmt-Alletra-dHCI-Clst-02-11294	<div>VM-VLAN3528</div>

Storage

SOURCE	TARGET
Mgmt-Datastore	<div>Select</div>

Linux Settings

USERNAME	vmeadmin	<div>Select</div>
PASSWORD	<div>Select</div>
SSH KEY	Select	<div>Select</div>

Migration Options

☐ SKIP PRECHECKS

☐ SKIP GUEST TOOLS



Initiating a migration - UI

- Review plan and complete
- The plan will not initiate until a user runs the plan

CREATE MIGRATION PLAN

✓

✓

✓

●

SetupChoose VMsMap ResourcesReview

REVIEW MIGRATION PLAN

Name: My VM Migration

Source: RTP-VMware-Clid01

Target: RTP-VME-CLD-01

Resource Pool: HPE-RTP-VME-Cluster01

Group: HPE-VME-GRP-Prod

VMs 1

●

●

TME-LinuxJump

Networks

From: dvpg_mgmt-Alletra-dHCI-Clst-02-11294

To: VM-VLAN3528

Storage

From: Mgmt-Datastore

To: Prod-DS-01 (6110.31 Gib)

Linux Settings

Username: vmeadmin

Password: *****

Migration Options

☐ Skip Prechecks

☐ Skip Guest Tools

PreviousComplete

Initiating a migration - UI

- The plan will not initiate until a user runs the plan
- Once run is initiated on the plan, the system initiates the migration process

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Migrations

Migrations > My VM Migration

My VM Migration

Run

Delete

Status: PENDING

Source Cloud: RTP-VMware-Clc01

Destination Cloud: RTP-VME-CLD-01

Destination Resource Pool: HPE-RTP-VME-Cluster01

Group: HPE-VME-GRP-Prod

1

PENDING

0

IN PROGRESS

0

FAILED

0

READY

1

TOTAL

Progress

Source

Destination

History

SERVICES

OS

SOURCE

DESTINATION

STATUS

TME-LinuxJump

Unknown

PENDING

NETWORKS

SOURCE

DESTINATION

dvpg_mgmt-Alletra-dHCI-Clst-02-11294

VM-VLAN3528

DATASTORES

SOURCE

DESTINATION

Mgmt-Datastore

Prod-DS-01

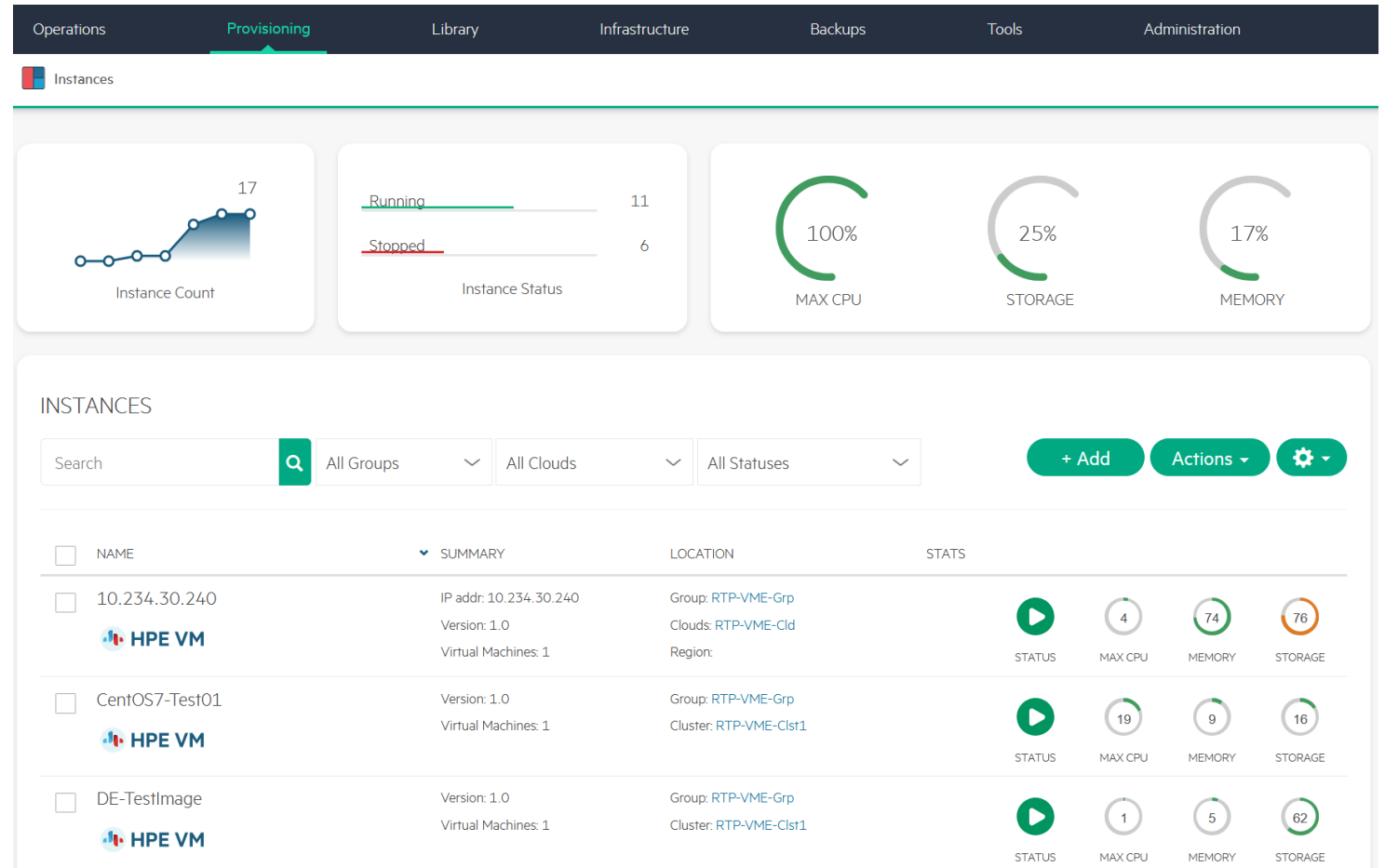


Virtual machine management



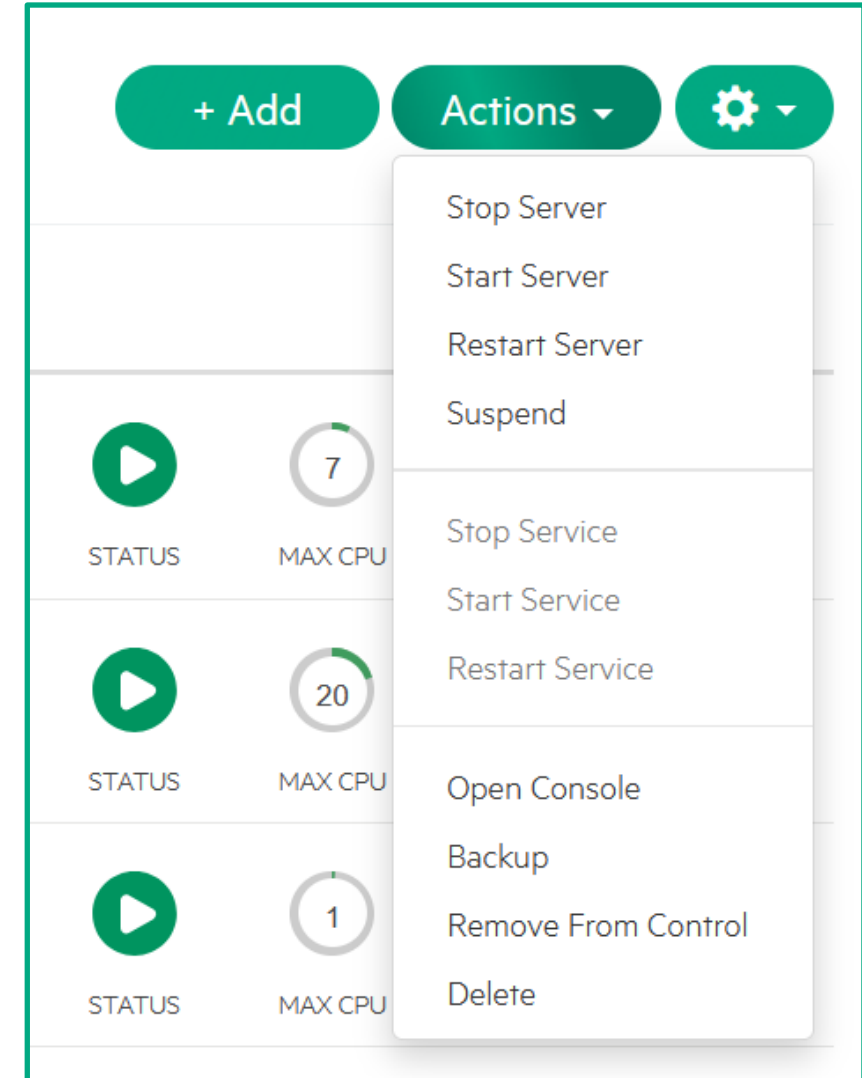
Virtual machine management

- Primary dashboard for VM management is Provisioning -> Instances
- An instance is not a VM, but contains one or more VMs that would correlate to a single horizontally scalable entity
- The VMs within an instance will be deployed from the same image
- Actions can be performed at the instance or individual VM level



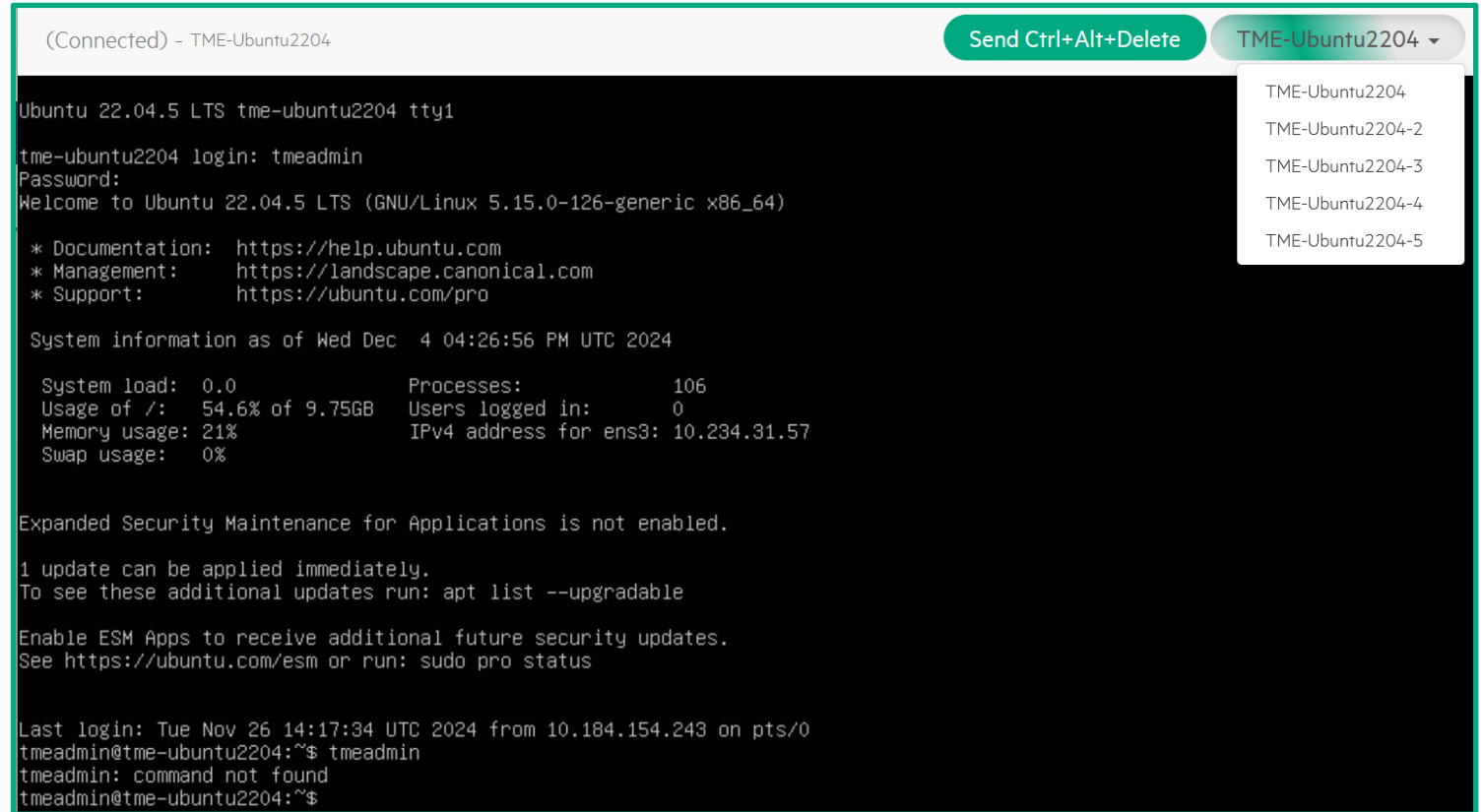
Instance main page actions

- From the main Provisioning -> Instance page, actions can be performed against one or more instances
- Actions performed against the instance are performed on any virtual machines associated with the instance:
 - Power operations
 - Open console
 - Backup initiation
 - Deletion
- Open Console performed at the Instance level will open a console to the first VM by default



Instance-level console behavior

- If the console is opened at the instance level, by default, the first VM listed is connected
- The specific VM can be selected in the upper right drop down
- VMs can also be accessed via typical SSH / RDP methods



```
(Connected) - TME-Ubuntu2204
Send Ctrl+Alt+Delete
TME-Ubuntu2204 ▼
TME-Ubuntu2204
TME-Ubuntu2204-2
TME-Ubuntu2204-3
TME-Ubuntu2204-4
TME-Ubuntu2204-5

Ubuntu 22.04.5 LTS tme-ubuntu2204 tty1
tme-ubuntu2204 login: tmeadmin
Password:
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 5.15.0-126-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:   https://landscape.canonical.com
 * Support:      https://ubuntu.com/pro

System information as of Wed Dec  4 04:26:56 PM UTC 2024

System load:  0.0               Processes:            106
Usage of /:   54.6% of 9.75GB   Users logged in:     0
Memory usage: 21%              IPv4 address for ens3: 10.234.31.57
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

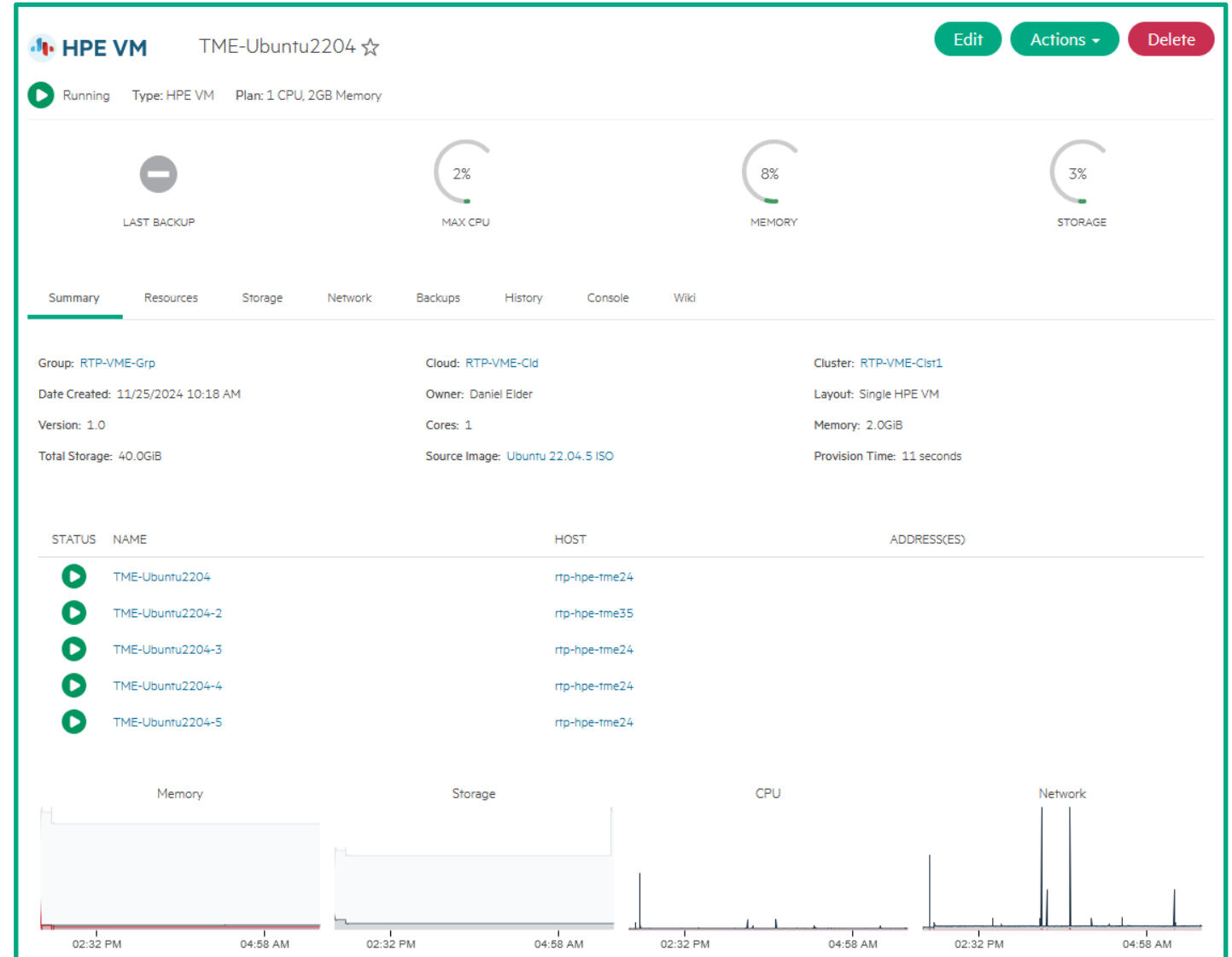
1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Tue Nov 26 14:17:34 UTC 2024 from 10.184.154.243 on pts/0
tmeadmin@tme-ubuntu2204:~$ tmeadmin
tmeadmin: command not found
tmeadmin@tme-ubuntu2204:~$
```

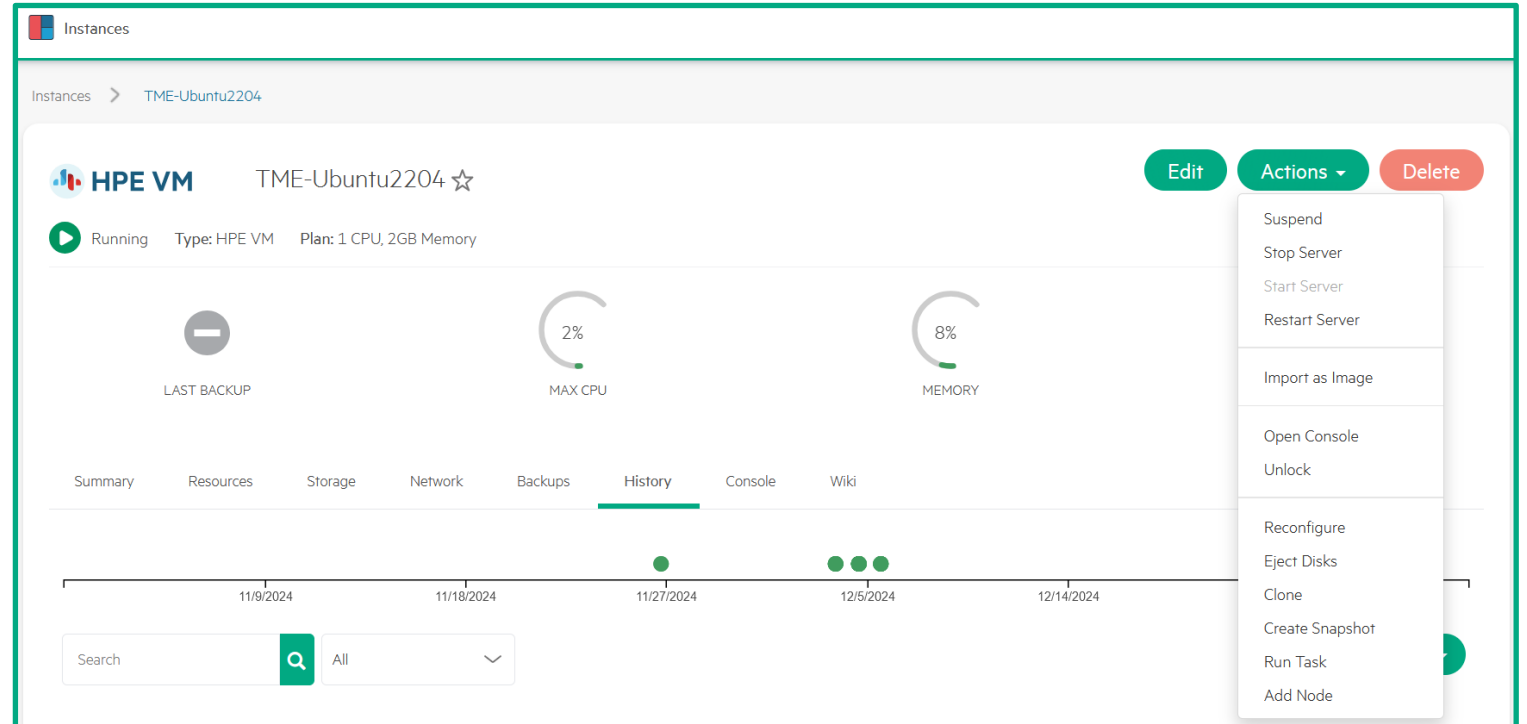
Instance internal dashboard

- Displays configuration and usage information of the instance:
 - CPU, memory, and storage utilization
 - Backup status
 - Summary
 - Resources – VMs running in instance
 - Storage – VM disks
 - Network – VM network interfaces
 - Backups – VM backups and snapshots
 - History – actions performed on the instance or VMs
 - Console
 - Wiki



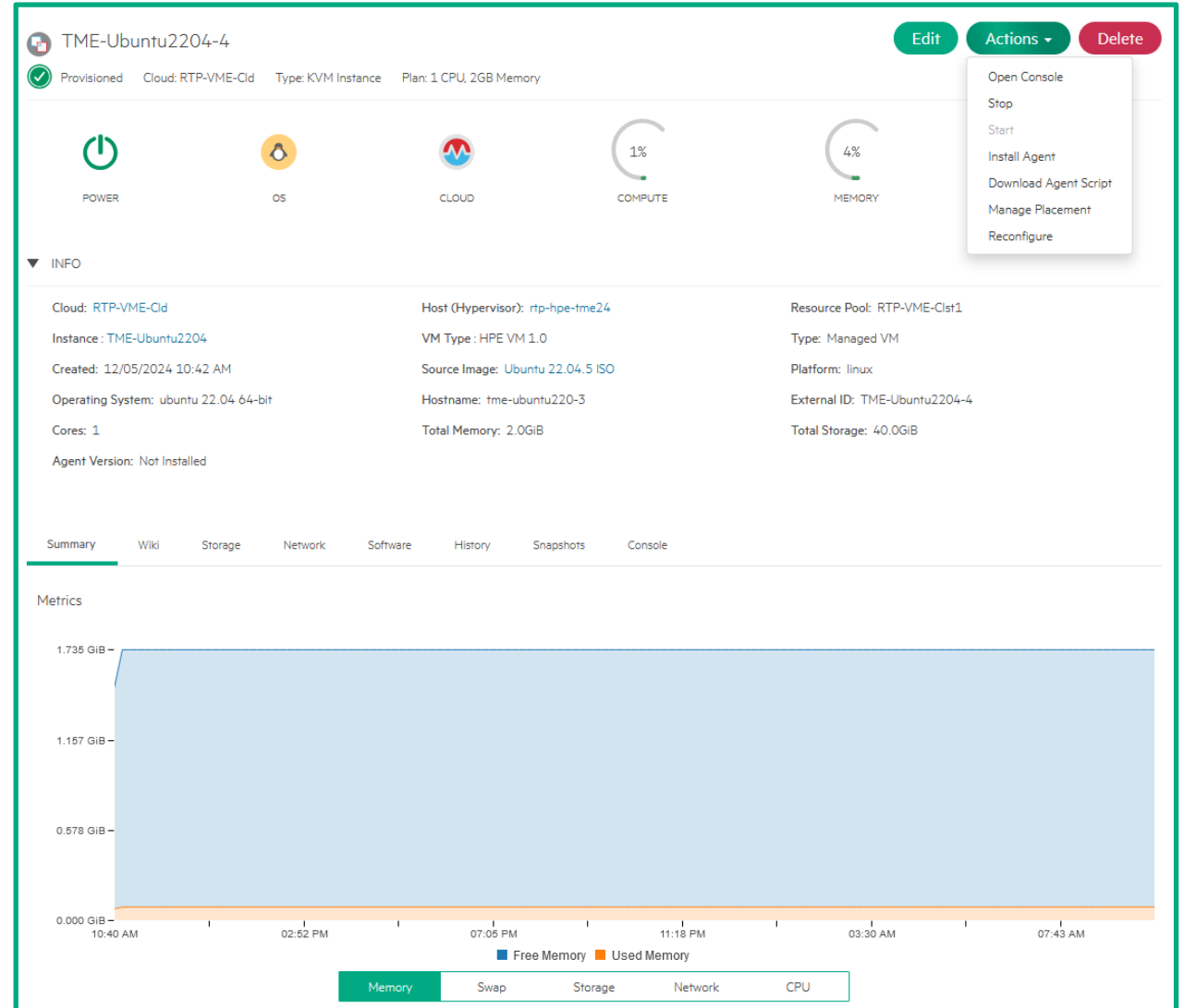
Instance internal actions

- From within an instance, additional actions are presented:
 - Import as Image – imports that instance as an image into the Virtual Images library
 - Reconfigure – modify virtual machine hardware configuration, some changes may require a reboot of the VM
 - Eject Disks – ejects and ISOs that were mounted during initial VM creation
 - Lock / Unlock – toggles lock, preventing instance deletion
 - Clone – creates a full, independent clone of the instance
 - Create Snapshot – creates a point in time snapshot of the instance (distinct from a backup job)
 - Run Task – execute tasks against the instance from Library -> Automation
 - Add Node – spins up additional VMs within the instance



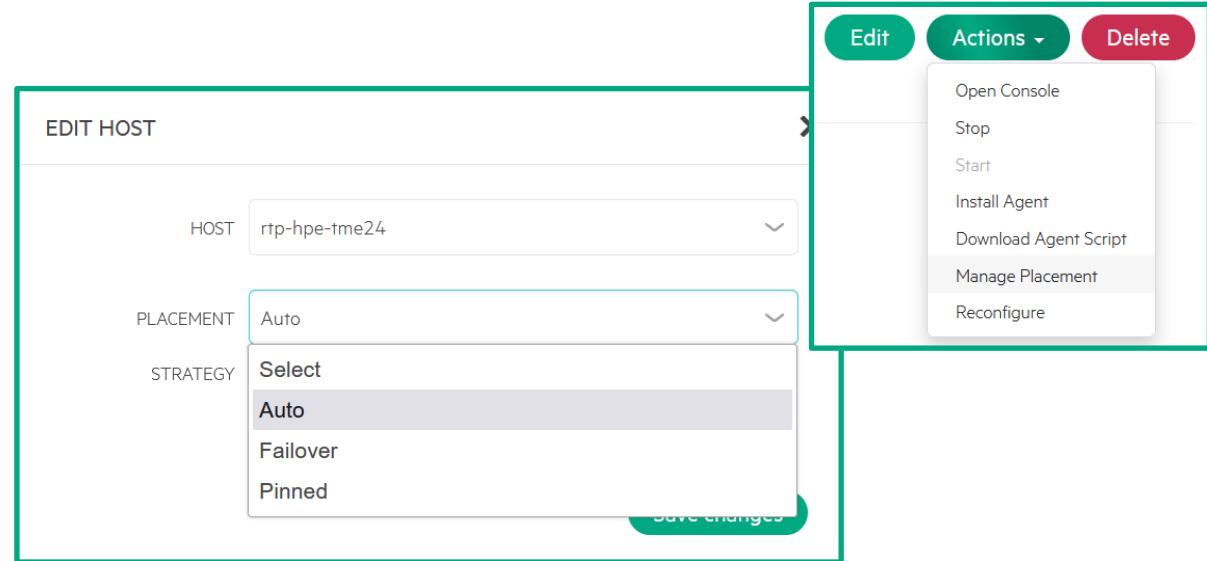
Resource (VM) actions

- Like the Instance view, but focused on the Resource (VM) level
- Actions are VM-specific:
 - Start / Stop – powers on or off that specific VM
 - Install Agent – installs Morpheus guest agent
 - Download Agent Script – provides a script for Morpheus guest agent install from within the VM
 - Manage Placement – migrate VM between hosts and adjust the placement strategy
 - Reconfigure – modify virtual hardware configuration of the VM, including:
 - Modify CPU and memory
 - Add, delete, or resize virtual disks
 - Change backing datastore of virtual disks
 - Modify, add, or delete virtual networks
- Guest agent:
 - Software agent that can be install within the guest OS
 - Bidirectional secure communication via command bus, no network connectivity
 - Provides enhanced statistics, resource utilization, monitoring, and log capabilities as well as task execution without traversing the network

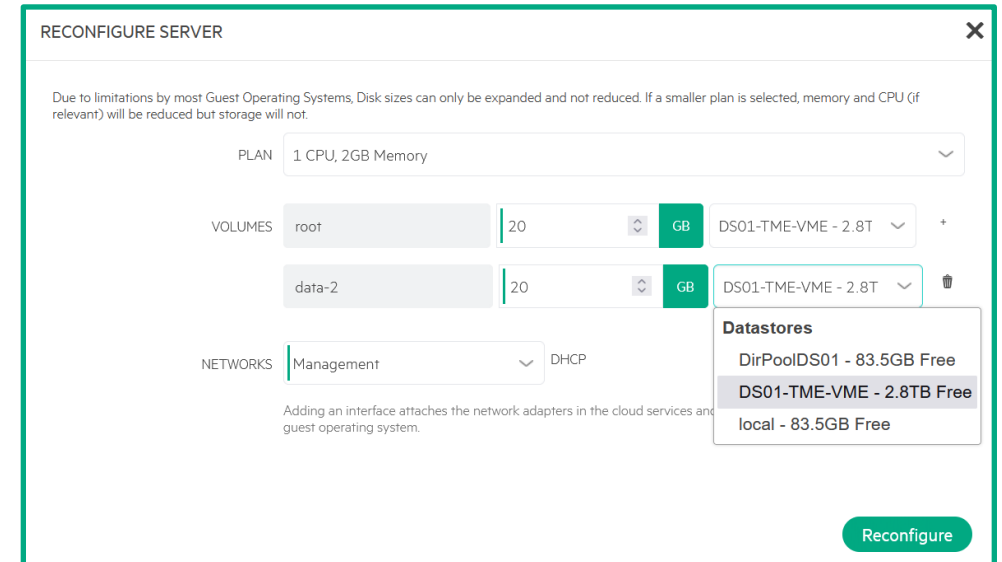


VM placement and migration

- When a VM is deployed, a host can be explicitly defined or left to VME manager to determine best placement
- Compute placement can be modified through the Manage Placement action
- The host the VM is running on can be changed by selecting a new host in the drop down
- Placement strategy defines how placement is handled:
 - Auto – VME will automatically migrate VM based on host workload or host failure
 - Failover – VM will remain on selected host until a host failure
 - Pinned – VM remains on selected host and will not migrate
- The datastore where the VM resides can be changed through the Reconfigure action and can be selected at the individual volume:
 - Changing this will migrate the data from one datastore to another
- Note that for proper failover handling and resiliency, the VMs should be on shared storage



The screenshot shows the 'EDIT HOST' interface. It has three main sections: 'HOST' with a dropdown menu showing 'rtp-hpe-tme24', 'PLACEMENT' with a dropdown menu showing 'Auto', and 'STRATEGY' with a dropdown menu showing 'Select', 'Auto', 'Failover', and 'Pinned'. A 'Save changes' button is at the bottom right. An 'Actions' dropdown menu is open, showing options: 'Open Console', 'Stop', 'Start', 'Install Agent', 'Download Agent Script', 'Manage Placement' (highlighted), and 'Reconfigure'.



The screenshot shows the 'RECONFIGURE SERVER' interface. It has a title bar with a close button. Below the title bar is a warning message: 'Due to limitations by most Guest Operating Systems, Disk sizes can only be expanded and not reduced. If a smaller plan is selected, memory and CPU (if relevant) will be reduced but storage will not.' The interface has three main sections: 'PLAN' with a dropdown menu showing '1 CPU, 2GB Memory', 'VOLUMES' with two rows: 'root' (20 GB) and 'data-2' (20 GB), and 'NETWORKS' with a dropdown menu showing 'Management' and 'DHCP'. A 'Reconfigure' button is at the bottom right. A 'Datastores' panel is open on the right, showing a list of datastores: 'DirPoolDS01 - 83.5GB Free', 'DS01-TME-VME - 2.8TB Free' (highlighted), and 'local - 83.5GB Free'.

Affinity / Anti-affinity

- HVM Clusters offer affinity groups and anti-affinity groups. These work similarly to affinity groups on other platforms, such as the affinity rules concept in VMware vSphere.
- An affinity group contains a type (either Keep Together or Keep Separate) and a list of servers which should have the rule applied.
- Whenever possible, servers configured to "Keep Together" will run on the same HVM Host. Servers (VMs) configured to "Keep Separate" will be balanced across HVM Hosts to the maximum extent possible.
- VM Affinity groups can also be created for VMware clouds

NEW AFFINITY GROUP

NAME

TYPE

Keep Separate

☒ ACTIVE

SERVERS

▶ Group Access

▶ Tenant Permissions

SAVE CHANGES

Monitoring

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History

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Affinity Groups

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+ ADD

NAME	TYPE	RESOURCE POOL	VISIBILITY	
Better Together	Keep Together	QA MVM Cluster	Private	ACTIONS ▼
Keep Separate	Keep Separate	QA MVM Cluster	Public	ACTIONS ▼
Keep Together	Keep Together	QA MVM Cluster	Public	ACTIONS ▼



Automation



Automation - tasks

- Automation capabilities within HPE VM Essentials provide a set of tools enabling powerful capabilities at and post deployment
- HPE VM Essentials supports the following automation task types:
 - Restart – a dedicated task to restart the target before executing the next task
 - Shell script – Bash shell script for Linux based targets
 - Powershell script – Powershell script for Windows-based targets
- These scripts can be used to apply configurations and install software
- Variables can be passed from HPE VME manager to the scripts:
 - Many default variables are available
 - Custom variables can be specified on resources for use
 - Example variable call in a script calling the vmetest secret entry from the Cypher store:
 - `<%=cypher.read('secret/vmetest')%>`

NEW TASK

NAME	Percona Install
CODE	perconaInstall
LABELS	<div>A comma separated list of labels that can be used to group/organize items.</div>
TYPE	Shell Script
RESULT TYPE	None
	<input checked="" type="checkbox"/> SUDO
SOURCE	Local
CONTENT	<pre>MYSQL_ROOT_PASSWORD=<%cypher.read('secret/mysql_root')%> apt-get remove apparmor -y apt-get install gnupg2 -y wget https://repo.percona.com/apt/percona-release_latest.\${lsb_release -sc}_all.deb dpkg -i percona-release_latest.\${lsb_release -sc}_all.deb apt-get update -y DEBIAN_FRONTEND=noninteractive echo "percona-server-server5.7 percona-server-server-5.7/root-pass password \$MYSQL_ROOT_PASSWORD" debconf-set-selections echo "percona-server-server5.7 percona-server-server-5.7/re-root-pass password \$MYSQL_ROOT_PASSWORD" debconf-set-selections apt install -y percona-server-server-5.7</pre>

Automation - Cypher

Example of using a variable to return an entry from the Cypher store:

1. Add key to Cypher store
2. Create task calling the variable
3. Execute task against a VM

2.

EDIT TASK

NAME

CODE

LABELS

A comma separated list of labels that can be used to group/organize items.

TYPE

RESULT TYPE

☐ SUDO

SOURCE

CONTENT

```
echo <%=cypher.read('secret/vmetest')%>
```

1.

ADD KEY

KEY

Keys can have different behaviors depending on the specified mountpoint.
Available Mountpoints:

- password - Generates a secure password of specified character length in the key pattern (or 15) with symbols, numbers, upper case, and lower case letters (i.e. password/15/mypass generates a 15 character password).
- tfvars - This is a module to store a tfvars file for terraform.
- secret - This is the standard secret module that stores a key/value in encrypted form.
- uuid - Returns a new UUID by key name when requested and stores the generated UUID by key name for a given lease timeout period.
- key - Generates a Base 64 encoded AES Key of specified bit length in the key pattern (i.e. key/128/mykey generates a 128-bit key)
- vault - This allows secret data to be fetched from a HashiCorp Vault integration. This can be configured in the vault/config key setup

VALUE

1	"VME Test secret"
---	-------------------

3.

TME-Ubuntu2204 - Run Task: VME Test Secret return
Start Date: 12/09/2024 08:20 AM Duration: 10s User: Daniel Elder

TME-Ubuntu2204 - Run Task: VME Test Secret return
Start Date: 12/09/2024 08:20 AM Duration: 10s

VME Test secret

TME-Ubuntu2204 - Complete Job Execution
Start Date: 12/09/2024 08:20 AM Duration: 0s

Automation - Archives

- Archives provide a way to store your files and make them available for download by your scripts and users
- Archives are created on buckets or file shares
- Buckets and file shares are created in Infrastructure -> Storage
- Supported storage types:
 - Local storage on VME manager appliance
 - Network storage
 - Public clouds:
 - Alibaba
 - Azure
 - Google Cloud Storage
 - OpenStack Swift
 - RackSpace CDN
 - S3

ADD ARCHIVE BUCKET

NAME

NewArchive

DESCRIPTION

BUCKET

Select

Permissions

Select

DE-TME-Azurebucketr

TMEFileShare

Enabling Public URL allows files to be downloaded without any authentication.

Save changes

OperationsProvisioningLibraryInfrastructureBackupsToolsAdministration

CypherArchives

Archives

+ Add

NAME	BUCKET	# FILES	SIZE	PUBLIC URL	
AzureArchive	DE-TME-Azurebucketr	0	N/A	No	ACTIONS

Automation - Archives

- Default Archives setting is private
- Archives can be set to public
 - Downloads require no authentication
- Expiring public download links can be created
- This enables programmatically generating download links that can be leveraged manually or via automation tasks

ADD FILE(S)

LocalBucket

installAgent.sh

0.13 KB

(application/x-sh)

Cypher Archives

Archives > LocalBucket > installAgent.sh

installAgent.sh

Download Delete

FILE INFO

Archive Bucket: LocalBucket

Owner: HPE-VM-Essentials

Downloads: 0

Content Type: application/x-sh

File Name: installAgent.sh

Size: 128.0B

File Path: installAgent.sh

DOWNLOAD URLS

Private: https://10.234.30.240/tools/archives/download/LocalBucket/installAgent.sh

Public: No

Links History Scripts

+ Add Link

LINK URL	CREATED	EXPIRES	DOWNLOADS	STATUS	
/public-archives/link?s=eae6bf495c3f4559	12/10/2024 08:40 AM	12/10/2024 09:00 AM	0	Active	Download



Features Comparison



HPE VM Essentials solution features

Multi-hypervisor support

HPE VM Essentials enables simple provisioning and management of HPE VM Essentials and VMware virtual machines

Centralized identity & single sign-on (SSO)

Enables external user authentication using Active Directory (AD) or LDAP. Optional SSO with Okta, OneLogin, Azure AD, or other SAML-enabled providers

IPAM integration

Integrate with external IP address management providers (Infoblox, phpIPAM, BlueCat) to automate the reservation of an IP address for the VM during the provisioning process

DNS integration

Integrate with external DNS providers (Infoblox, Microsoft DNS, BlueCat) to automate the creation of DNS records for a VM during the provisioning process

Provisioning automation

Execute Bash or PowerShell scripts during VM provisioning, to automate system bootstrapping operations

Day 2 automation

HPE VM Essentials supports the execution of Bash and PowerShell scripts on provisioned and discovered VMs

Secrets management

Securely store and retrieve secrets from the native secrets manager for use with the solution's task automation feature

HTML 5 virtual machine console

Access the dashboard of HPE VM Essentials and VMware virtual machines via the HTML 5 console



HPE VM Essentials hypervisor features

HPE-validated hardware

The HPE VM Essentials hypervisor will be validated on HPE servers to deliver an optimal experience and provide hardware compatibility assurance

VM live migration

Migrate a running HPE VM Essentials virtual machine from one host to another within the same cluster with zero downtime

VM high availability

Automatically restart HPE VM Essentials virtual machines on another host in the same cluster in the event of an unexpected host failure within the cluster

Dynamic workload scheduler

Dynamically schedule the placement of HPE VM Essentials virtual machines within a cluster, based upon optimal workload distribution across the cluster

Storage migration

Migrate the virtual disks of a running HPE VM Essentials virtual machine from one storage datastore to another with zero downtime

VMware VM migration

Convert existing VMware virtual machines to the HPE VM Essentials hypervisor using the Bulk Migration Tool



HPE VM Essentials hypervisor features

Virtual machine snapshots

Create and revert snapshots for HPE VM Essentials virtual machines

Native data protection

Backup and restore HPE VM Essentials virtual machines using the solution's native data protection feature

External storage support

The HPE VM Essentials hypervisor supports running virtual machines on external storage via iSCSI, NFS, and Fibre Channel

HPE Alletra Storage MP integration

HPE VM Essentials includes an integration with the HPE Alletra Storage MP B10000 storage array, that enables HPE VM Essentials virtual machines to natively reference the Alletra MP storage for their storage (1:1 VM-to-disk mapping)

HPE Alletra Storage MP array-based snapshots

The Alletra MP storage integration provides the ability to create and revert array-based snapshots for HPE VM Essentials virtual machines through the HPE VM Essentials UI



Value proposition

- **Competitively priced VMware alternative**

- Priced per socket on VME hosts for significant savings in most configurations, compared to per-core licensing found in VMware, eliminating un-needed software which is forced into VMware suites like VVF and VCF

- **Unified management experience**

- Connect existing brownfield VMware vCenter clusters for management and VM-vending into ESXi and HPE VME from one simple interface

- **Vertically integrated hardware and software solution**

- Integrated into the HPE hardware portfolio to leverage software and hardware synergy to deliver differentiating technical capabilities

- **Scalable path to HPE Morpheus Enterprise Software**

- Upgradable to full HPE Morpheus Enterprise Software to add support for other hypervisors, public clouds, and Kubernetes; governance policy enforcement, and cloud cost management and optimization capabilities (FinOps)



Virtualization Solution and Hypervisor Comparison

Category	Feature	HPE Morpheus VM Essentials	VMware vSphere Standard	VMware vSphere Ent. Plus	Nutanix Cloud Infrastructure	Microsoft Hyper-V	Red Hat OpenShift Virtualization	Proxmox Virtual Environment
Pricing structure	Pricing unit of measure	Socket	Core	Core	n/a	Core	Core-pair / socket-pair	Socket
Infrastructure Management	Centralized repo for VM templates and files	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Identity and Access Management Federation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security	Secure Communication Protocols (TLS 1.2/1.3)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Virtual Machine Encryption	No	No	Yes	Yes	Yes	Yes	No
	Virtual Trusted Platform Module (vTPM) 2.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Migration and Replication	Live migration of VMs (like host to like host)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Live migration of VM storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Built-in migration from VMware	Yes	No	No	Yes	Yes	No	Yes



Virtualization Solution and Hypervisor Comparison

Category	Feature	HPE Morpheus VM Essentials	VMware vSphere Standard	VMware vSphere Ent. Plus	Nutanix Cloud Infrastructure	Microsoft Hyper-V	Red Hat OpenShift Virtualization	Proxmox Virtual Environment
Networking	External IPAM and DNS integration	Yes	No	No	No	No	No	No
	Distributed Switch	Yes	No	Yes	Yes	Yes	Yes	Yes
	Micro segmentation (eg. VMW NSX)	Yes (CX10K)	No	No	Yes	Add-on	Add-on	No
Data Protection and DR	Stretch metropolitan cluster	Roadmap	No	Yes	Yes	No	Add-on	No
	Native VM snapshots	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Native VM backup and recovery	Yes	No	No	Yes	No	Add-on	Yes
	High Availability for automatic failover of VMs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	HA and Data protection for management server	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Workload Management	Distributed Resource Scheduler (DRS)	Yes	No	Yes	Yes	No	Yes	Yes
	Affinity / Anti-Affinity Groups	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Storage DRS	No	No	Yes	Yes	No	Yes	No



Resources

- [HPE VM Essentials Software documentation](#)
- [HPE VM Essentials Release Notes](#)
- [Download HPE VM Essentials \(includes 60 day, 6 CPU Trial\)](#)
- [HPE VM Essentials Landing Page](#)
- [HPE VM Essentials All Documents](#)
- [HPE VM Essentials product demo](#)
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Thank You

