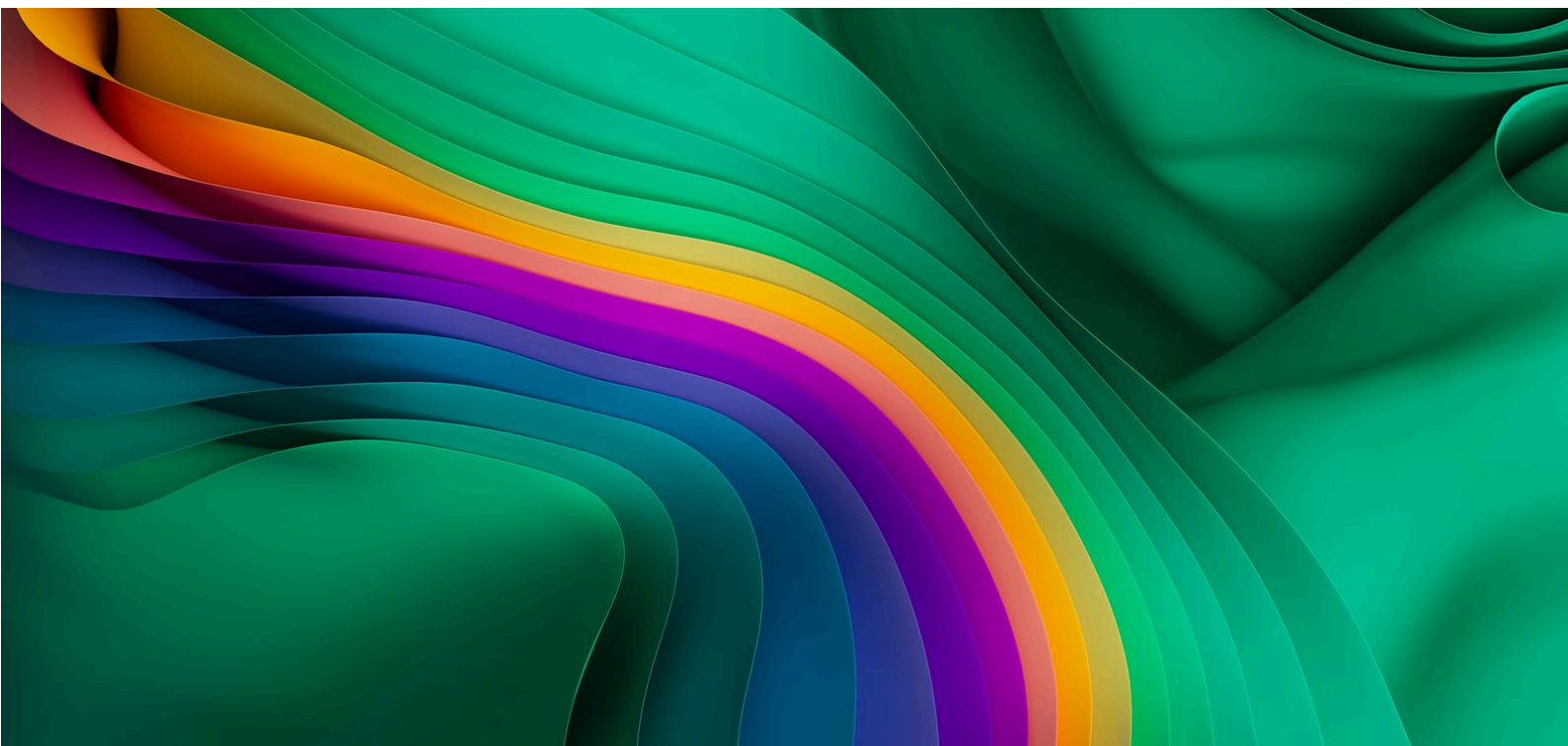


HPE GreenLake for Private Cloud Business Edition — Management for hybrid cloud

Transform, modernize, and simplify hybrid cloud infrastructure and workload management



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Executive summary

HPE GreenLake for Private Cloud Business Edition is a hybrid cloud management platform for deploying, managing, and using on-premises virtualization environments as well as public cloud virtual machine (VM) resources. This technical white paper reviews the features and benefits of Private Cloud Business Edition and describes the solution's architecture and use.

Target audience

This technical white paper is intended to assist IT planners, architects, system administrators, system integrators, and other technology professionals who are researching, evaluating, implementing, or using Private Cloud Business Edition. It explains key aspects of the solution's performance, scalability, availability, and manageability; provides a brief overview of the basic system design; and offers deployment and integration guidelines to help with project planning and development of best practices.

Introduction to HPE GreenLake for Private Cloud Business Edition

The management problem

As IT infrastructure has evolved and grown, the challenges surrounding deployment, management, and maintenance of these environments have similarly expanded. Legacy IT architectures consist of segregated compute, storage, network, management, and data protection platforms, each with its own administrative interfaces and support requirements. This fragmented setup demands separate support, maintenance, and licensing, along with dedicated team members for administration. When expanded across multiple sites, these challenges intensify. Past attempts to alleviate these issues have been limited in scope and often fail to integrate the entire solution stack, leaving enterprises with inefficiently utilized environments, stranded resources, and excessive licensing costs. As IT environments have grown in scale and complexity, management challenges and the need to scale accordingly have also grown. The modern IT estate must be able to provide compute, storage, and networking appropriate to workload and growth needs while minimizing administrative overhead, complexity, capital, and operational expenditures.

Enterprise IT organizations have invested in a variety of discrete data storage, data efficiency, and data protection solutions to cope with this ever-increasing data growth. Each of these solutions requires its own pool of knowledge and resources to deploy, administer, and maintain.

This siloed approach results in inefficient management and utilization of resources across the IT estate.

The solution: HPE GreenLake for Private Cloud Business Edition

HPE GreenLake for Private Cloud Business Edition solves these challenges through an industry-leading hybrid cloud management platform. It brings the ease of deployment enterprises need, as well as the global management and administrative capabilities they require, all with the ability to be appropriately sized and scaled as needed in order for enterprises to get the most out of their IT investment and react to evolving workload requirements.

Technology overview

This section introduces key terms related to the solution, describes the solution architecture, and provides an overview of deployment and management guidelines.

Terminology

The following terms define key elements and terms related to Private Cloud Business Edition:

- **HPE GreenLake platform** — The HPE cloud-based global management platform. This platform has various services that enable management of network, compute, and storage resources.
- **Data Services Cloud Console** — The storage-centric management portal. This is where Private Cloud Business Edition resides, in addition to Data Ops Manager, Block services, HPE GreenLake for Backup and Recovery, and other services.
- **Workspace** — The top-level organizational unit of the HPE GreenLake platform. Devices are assigned to a workspace and user accounts can be given access to perform necessary actions. A user account can be granted access to multiple workspaces.
- **HPE Alletra dHCI** — The HPE disaggregated hyperconverged infrastructure solution. This is a product comprising HPE Alletra 5000 or HPE Alletra 6000 storage arrays, HPE ProLiant DL servers, and HPE Aruba Networking, M-Series, FlexFabric, or even third-party network switches. This is all managed as a stack with the ease and simplicity of an HCI cluster, but with the flexibility and performance of three-tier architecture.



- **HPE SimpliVity** —The HPE true hyperconverged infrastructure offering. This is a comprehensive HCI solution known for its data efficiency features, including deduplication and compression, leading to significant storage savings with built-in high availability and data protection capabilities.
- **Amazon Web Services (AWS)** — An on-demand cloud platform provider. Through their platform, many services, functions, and utilities can be leveraged. In the context of Cloud Business Edition, the focus is on AWS virtual machines, referred to as **EC2 instances**.
- **Microsoft Azure** —The Microsoft on-demand cloud platform. Through their platform, many services, functions, and utilities can be leveraged. In the context of Private Cloud Business Edition, the focus is on Azure virtual machines.
- **HPE Alletra Storage** —The HPE line of storage arrays. Private Cloud Business Edition currently supports HPE Alletra 5000 hybrid flash storage arrays, and HPE Alletra 6000 all NVMe storage arrays.
- **HPE ProLiant** —The HPE line of servers. Private Cloud Business Edition supports certain models within the HPE ProLiant DL model lineup, including both AMD- and Intel®-based servers.

Architecture

The centerpiece of Private Cloud Business Edition is the cloud-based management console. This runs within the industry-leading HPE GreenLake platform, enabling you to manage environments from single clusters to global IT infrastructure footprints with ease and agility. The Private Cloud Business Edition management platform is used to manage virtualization infrastructure on HPE Alletra dHCI and HPE SimpliVity systems as well as within users’ public cloud instances on AWS and Microsoft Azure, providing a single global dashboard for managing hybrid cloud VM environments.

Cloud architecture

Private Cloud Business Edition is a service within the Data Services Cloud Console application platform, part of the HPE GreenLake platform. The HPE GreenLake platform is a cloud-based management environment for managing on-premises infrastructure. Within this platform, common services enable various applications and services to interact with each other.

You are granted access to Workspaces, which in turn have applications assigned to them in various regions. When you launch Data Services Cloud Console, you are routed to the region that the service runs within, for example, US West. Although the cloud management functions run from that region, that application can manage resources anywhere. It is important to note that although user data remains on the array in your data center, it is never sent to or stored on Data Services Cloud Console.

Figure 1 illustrates the security and authentication process in Data Services Cloud Console.

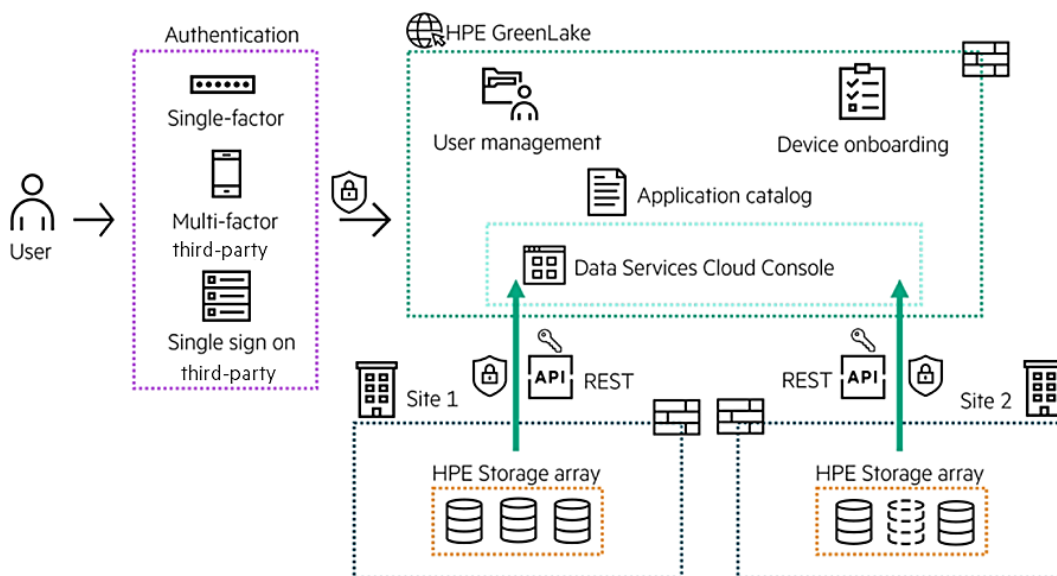


Figure 1. Security and authentication in Data Services Cloud Console



For more information on Data Services Cloud Console, refer to the [HPE GreenLake: Data Services Cloud Console](#) technical white paper and the [Data Services Cloud Console Security Guide](#).

How the connected, on-premises systems communicate with Private Cloud Business Edition depends on the specific system.

HPE GreenLake for Private Cloud Business Edition was launched with HPE Alletra dHCI support. With dHCI, the array is the locus of control. The array initiates communication with Data Services Cloud Console when it is deployed; all monitoring and management routes through the array.

HPE SimpliVity is the latest solution supported with Private Cloud Business Edition. Communication between Private Cloud Business Edition and the HPE SimpliVity environment is enabled and routed through a management VM called the **Data Services Connector** (DSC).

Within Data Services Cloud Console, there are common services that all applications leverage, as well as microservices specific to those individual applications (for example, Private Cloud Business Edition, Backup and Recovery, or Data Ops Manager). In addition to the services that enable on-premises management capabilities for HPE GreenLake for Private Cloud Business Edition, there are also public cloud-related services. These enable your Private Cloud Business Edition environment to integrate with your accounts in AWS or Azure to extend VM management to those public cloud providers.

An overview of the Private Cloud Business Edition architecture is shown in Figure 2.

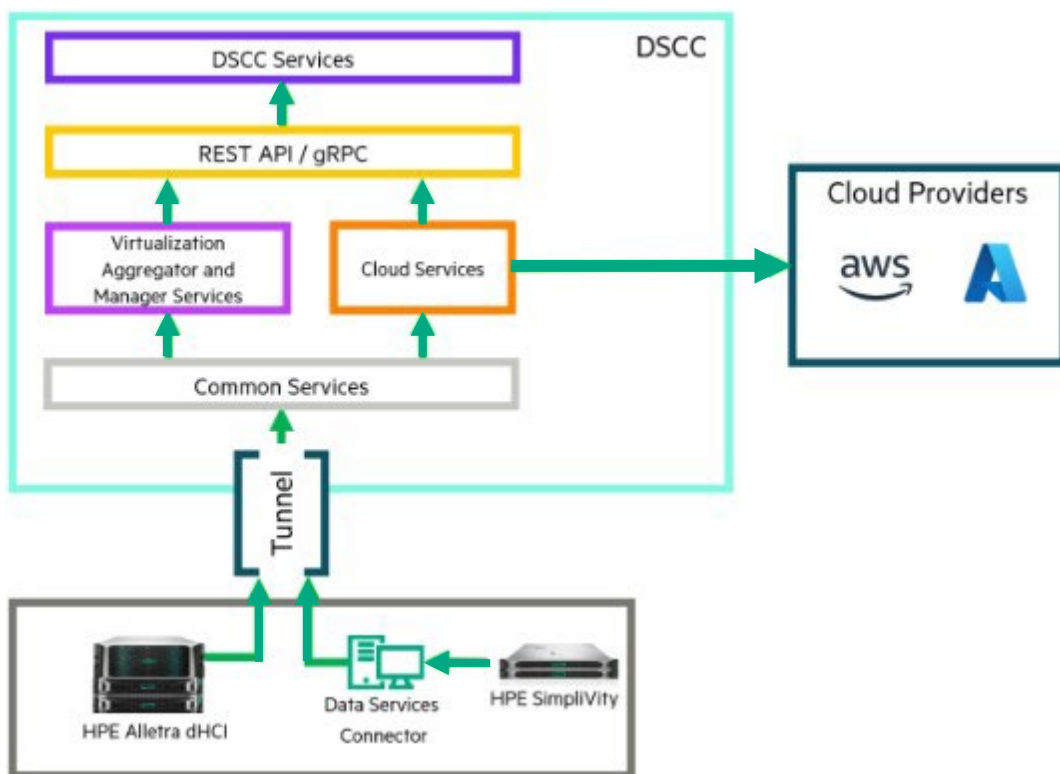


Figure 2. HPE GreenLake for Private Cloud Business Edition architecture overview

Supported platforms

Currently, Private Cloud Business Edition supports the management of on-premises HPE Alletra dHCI and HPE SimpliVity systems. By default, access to any new dHCI or HPE SimpliVity system is included. Systems purchased before Private Cloud Business Edition was introduced also are provided access if the systems still have valid support entitlements. This includes HPE Alletra dHCI systems running HPE Nimble Storage HF or AF Gen 5 storage arrays.

To be managed by Private Cloud Business Edition, the HPE Alletra 5000, HPE Alletra 6000, HPE Nimble Storage HF, or HPE Nimble Storage AF storage array must run a minimum version of NimOS 6.0.0.300. Certain features require later versions of NimOS.

HPE Alletra dHCI is a disaggregated three-tier architecture deployed and managed with the simplicity and automation of an HCI solution, with Private Cloud Business Edition and the array orchestrating deployment, monitoring, management, consumption, and updates. It comprises an HPE Alletra 5000 or 6000 storage array, HPE ProLiant DL servers, Ethernet network switches, VMware vSphere®, and the



Private Cloud Business Edition cloud console. Figure 3 shows the HPE Alletra dHCI components of Private Cloud Business Edition. You can find more information regarding HPE Alletra dHCI in the [HPE Alletra dHCI for VMware vSphere technical white paper](#).

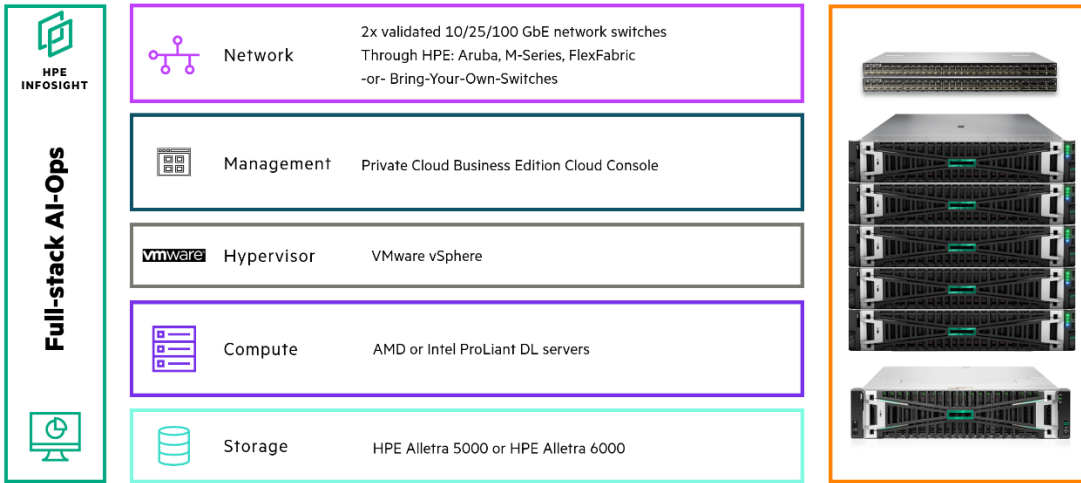


Figure 3. HPE GreenLake for Private Cloud Business Edition — HPE Alletra dHCI components

HPE SimpliVity is a true HCI solution, with compute, storage, and networking handled on a per-node basis. All existing HPE SimpliVity Gen10 hardware models are supported as long as they are running a minimum version of HPE SimpliVity software 4.1.3. Figure 4 shows the HPE SimpliVity components of Private Cloud Business Edition.

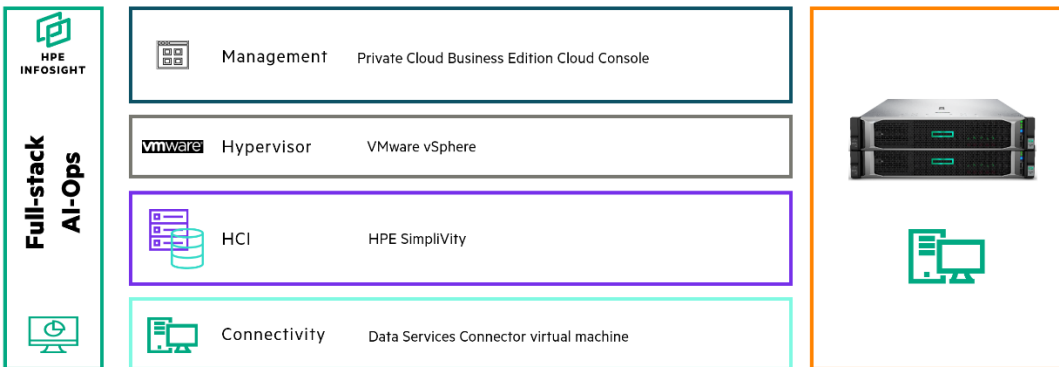


Figure 4. HPE GreenLake for Private Cloud Business Edition — HPE SimpliVity components

In addition to the on-premises systems, Private Cloud Business Edition also supports VM creation and management on both AWS and Azure. There is no additional cost within Private Cloud Business Edition associated with this functionality. All public cloud VMs would be charged and billed as normal through those users' public cloud provider accounts.

Data Services Connector

Communication and management of HPE SimpliVity systems by Private Cloud Business Edition is enabled by the Data Services Connector. The Data Services Connector is a VM, downloaded as an OVA file and deployed on-site. The Data Services Connector communicates with the VMware vCenter® server and HPE OmniStack virtual controllers as well as with Private Cloud Business Edition via a secure, encrypted tunnel. Figure 5 shows an overview of the Private Cloud Business Edition — HPE SimpliVity architecture.



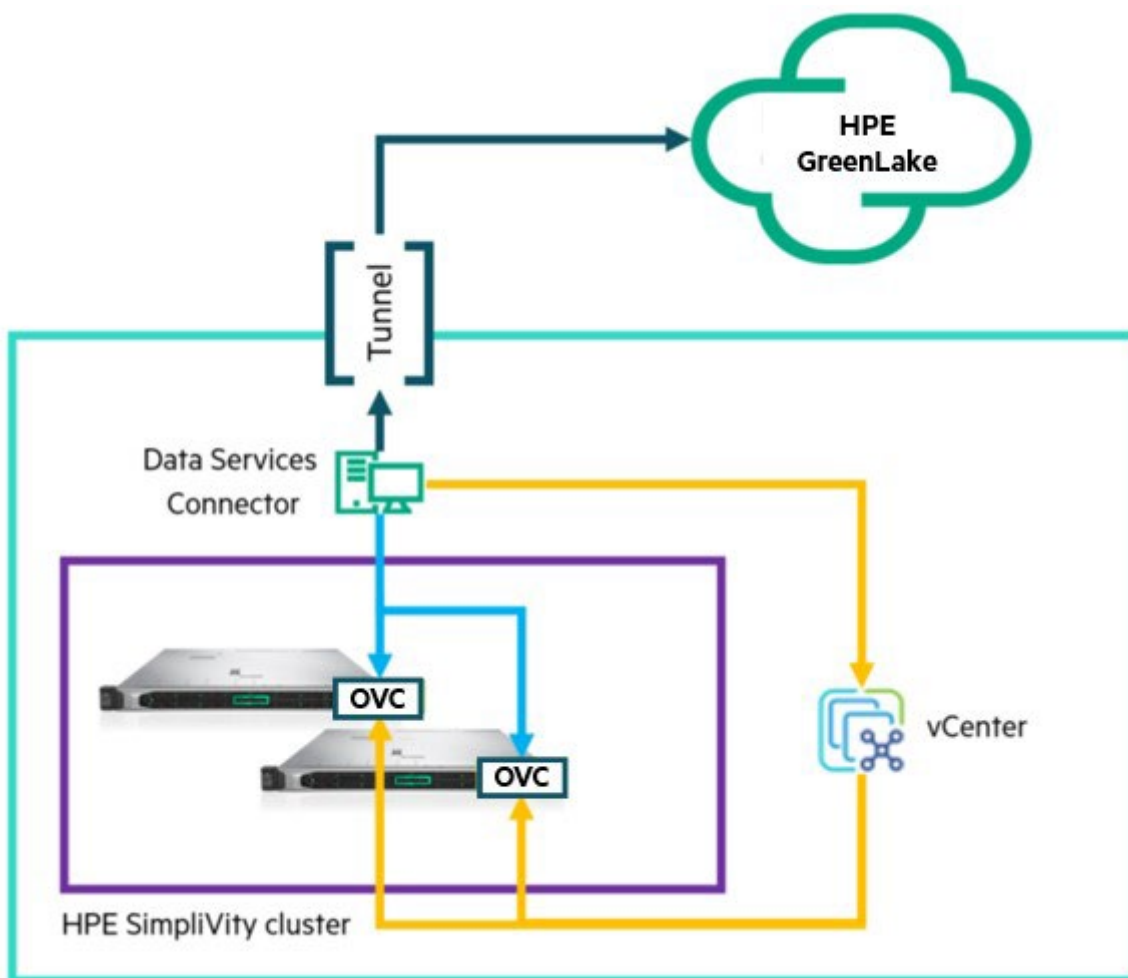


Figure 5. HPE GreenLake for Private Cloud Business Edition — HPE SimpliVity architecture overview

Deployment

To access and use Private Cloud Business Edition, some procedures need to be performed on both the HPE GreenLake platform/Data Services Cloud Console and on-premises. The specific procedures depend on the specific platform being used. There are several resources that can help with the planning and execution of these processes. The [Welcome Center](#) is the best place to begin this process; it guides you from HPE GreenLake platform account creation through deployment of the on-premises solution. Refer to the following documents for more details as well as these [additional resources](#).

- [HPE Storage — Welcome Center](#)
- [HPE GreenLake Edge-to-Cloud Platform User Guide](#)
- [Data Services Cloud Console Security Guide](#)
- [HPE GreenLake for Private Cloud Business Edition Getting Started Guide](#)
- [HPE Alletra dHCI New Installation Deployment Guide for New Installations on Array OS 6.1.x and Later](#)
- [HPE Alletra dHCI solution network considerations guide](#)
- [HPE OmniStack 4.1.3 for vSphere Deployment Guide](#)
- [HPE SimpliVity for vSphere networking best practices](#)
- [HPE OmniStack 5.0.0 for vSphere Administration Guide](#)



HPE GreenLake platform/Data Services Cloud Console preparation

The [Welcome Center](#) guides you through this process step by step in the Cloud Enablement section.

Users who do not yet have access to the HPE GreenLake platform must create an HPE account. This can be done via an HPE Cloud invitation email sent from another user or by going to the HPE GreenLake console and creating a user account through the Sign up link.

If there is not already an existing Workspace, one must be created. A Workspace is equivalent organizationally to a company or organization. A user account can be created or invited to multiple Workspaces. In turn, each Workspace can have services in multiple regions assigned to them.

After a workspace is created, it is necessary to add Data Services Cloud Console through Available Applications. During this process, you select which region this Data Services Cloud Console instance will run from. The on-premises systems do not need to be in the same geographic region as the Data Services Cloud Console instance to be managed by it.

Finally, you need to have the appropriate Data Services Cloud Console roles and permissions assigned to them before you can start using services within Data Services Cloud Console. There are already several preconfigured roles that can be used; custom roles can also be built if different levels of access are needed. For HPE GreenLake for Private Cloud Business Edition there are two prebuilt roles:

- Private Cloud Business Edition Administrator — Provides full access to all operations within HPE GreenLake for Private Cloud Business Edition.
- Private Cloud Business Edition Operator — Provides access to all HPE GreenLake for Private Cloud Business Edition operations except those that set up and modify systems.

Device onboarding

For HPE Alletra dHCI systems with HPE Alletra 5000 or 6000 arrays, an email containing the array serial number and Data Services Cloud Console subscription key is sent from HPE before deployment. The device serial number and subscription key must be added to Manage Devices within Data Services Cloud Console before it can be onboarded during deployment.

For existing HPE Nimble Storage dHCI customers, the subscription key is generated from the array UI. For existing dHCI system deployments, follow this guide: [HPE GreenLake for Private Cloud Business Edition access for existing HPE Alletra dHCI deployments](#).

When the solution has been racked and cabled, the person implementing the solution initiates the on-array Cloud Connectivity Wizard. In certain situations, it might be necessary to run the on-array deployment wizard; however, the cloud-orchestrated deployment is the method recommended by HPE for deploying systems.

The Cloud Connectivity Wizard configures networking on the array management interface, sets proxy and time zone information, and then initiates communication with Data Services Cloud Console. When the array contacts Data Services Cloud Console, it verifies that there is a valid subscription key associated with it. If it finds a valid subscription key, the array is activated, and you are directed to Setup Service to deploy the solution. After connectivity is established, you can perform all deployment steps remotely through Data Services Cloud Console.

Setup Service

Setup Service through Data Services Cloud Console is the method recommended by HPE for deploying new HPE Alletra dHCI systems through Setup Service within Data Services Cloud Console. Setup Service is a cloud-driven deployment engine for HPE Alletra Storage systems and HPE Alletra dHCI. Blueprints can be used to stage the configuration settings in advance to be applied when the device establishes connectivity with Data Services Cloud Console. The blueprints can also be downloaded, modified, and copied to help stage deployments at scale.

After the device is onboarded and connected to Data Services Cloud Console, the user deploying the system selects it within Setup Service and either selects **Apply Blueprint** to apply an existing blueprint configuration or **Set Up System** to specify all settings at the time of deployment. After all settings are provided, Setup Service orchestrates deployment of the system and applies all configurations. After that operation is complete, the initial inventory of the system runs and the HPE Alletra dHCI is available within HPE GreenLake for Private Cloud Business Edition. You can follow the full deployment process through this video: [Using HPE Data Services Cloud Console to deploy HPE Alletra dHCI](#).

Data Services Connector

To manage HPE SimpliVity systems with HPE GreenLake for Private Cloud Business Edition, it is necessary to download and deploy the Data Services Connector OVA. The OVA can be downloaded through Private Cloud Business Edition by going to **Systems**, clicking the plus sign (+) to add a system, and selecting **HPE SimpliVity** as the system type. Alternatively, you can go to **Administrator** → **Data Services Connectors** and click the plus sign (+) to register a new Data Services Connector. Either method presents a prompt to download the OVA package.



After the OVA is downloaded, deploy it to a VMware vCenter Server® where the HPE SimpliVity systems to be managed are present. The DSC virtual machine must have connectivity to the vCenter server, the HPE OmniStack virtual controllers in the managed cluster, and to Data Services Cloud Console. The VM must also be highly available through VMware vSphere® High Availability (HA) or Distributed Resource Scheduler (DRS).

After the VM is deployed, open a browser page to the IP address for the DSC VM, enters DNS, Proxy, and NTP information and submit it. This tests connectivity to Data Services Cloud Console, which generates an activation code.

After registration and initial inventory complete, the HPE SimpliVity clusters are displayed in Private Cloud Business Edition.

The process of deploying a DSC and importing HPE SimpliVity systems is documented here: [Enabling access to HPE SimpliVity systems using Private Cloud Business Edition](#).

Adding and managing public cloud accounts

To manage and deploy VMs in a public cloud provider, the public cloud provider account must be added to Private Cloud Business Edition and validated. Amazon Web Services and Microsoft Azure are the currently supported public cloud providers. Multiple accounts can be added to a given Workspace within Private Cloud Business Edition. Note that by adding an AWS account into Private Cloud Business Edition, that account is available within HPE GreenLake for Backup and Recovery to protect EC2 instances, EBS volumes, EKS clusters, and RDS Database instances. An appropriate HPE GreenLake for Backup and Recovery subscription is required.

The procedure to add public cloud accounts is documented in the contextual help articles within Data Services Cloud Console as well as on HPE Support Central documentation: [Using HPE GreenLake for Private Cloud Business Edition: Manage public cloud accounts](#).

Adding AWS accounts

To add an AWS account, you need to provide the 12-digit AWS account ID and a nickname for the account. This allows you to download an AWS Cloud Formation template YAML file. Using an AWS account with appropriate permissions, this template is then uploaded in AWS Cloud Formation, which builds a stack with all appropriate delegations, permissions, and access configured for the Data Services Cloud Console account.

Adding Azure accounts

Before you can add the Azure account, there needs to be an application registration with a known client secret associated with an Azure subscription. This application should have the privileged administrator role of Contributor assigned. To add this account within Private Cloud Business Edition, you need the application's client ID, tenant ID, and the client secret value. These are used to create a secret within Private Cloud Business Edition and link the accounts.

Management

This section is intended to give an overview of the features and functionality of HPE GreenLake for Private Cloud Business Edition. However, it is not intended to be a full administration guide. The best resource for all features and how they operate is the documentation available through the Articles section of Data Services Cloud Console, which is fully contextual, or through the HPE Support Center documentation: [Using HPE GreenLake for Private Cloud Business Edition](#). These documents contain the same information and are updated when new features are released, or updates are made to existing features.

HPE GreenLake platform/Data Services Cloud Console user management

For information on user and access management, refer to the [Data Services Cloud Console Security Guide](#) and [HPE GreenLake Platform User Guide: Identity & Access](#).

Dashboard

The dashboard within Private Cloud Business Edition provides a global view of any supported systems registered in the Workspace's Data Services Cloud Console application. This interface provides a high-level overview of compute and storage consumption, system health, performance, as well as any new announcements regarding new features and functionality. Figure 6 provides an example of a Private Cloud Business Edition global dashboard.



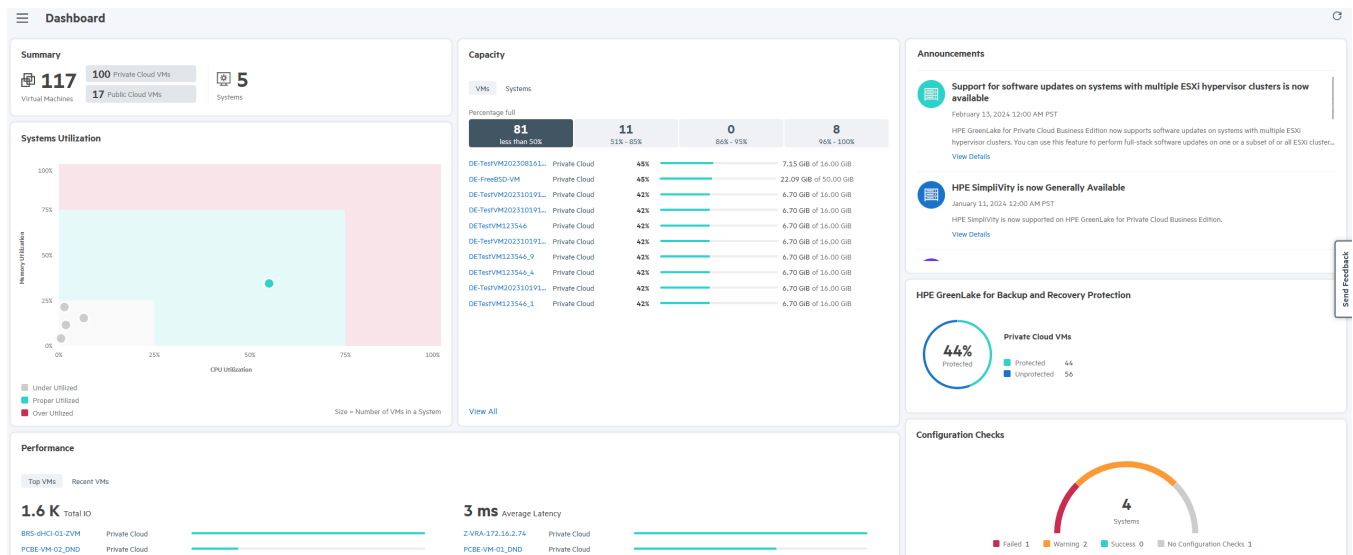


Figure 6. HPE GreenLake for Private Cloud Business Edition global dashboard

Systems

This section displays the managed inventory of on-premises systems. This can be composed of HPE Alletra dHCI, HPE SimpliVity, or a combination of both. On the initial page, some basic information such as hypervisor clusters present, system type, storage utilization, and configuration status are displayed when the Summary view is selected. From here, you can also initiate the addition of new systems and migration of all VMs in a datastore to another datastore within the vCenter environment.

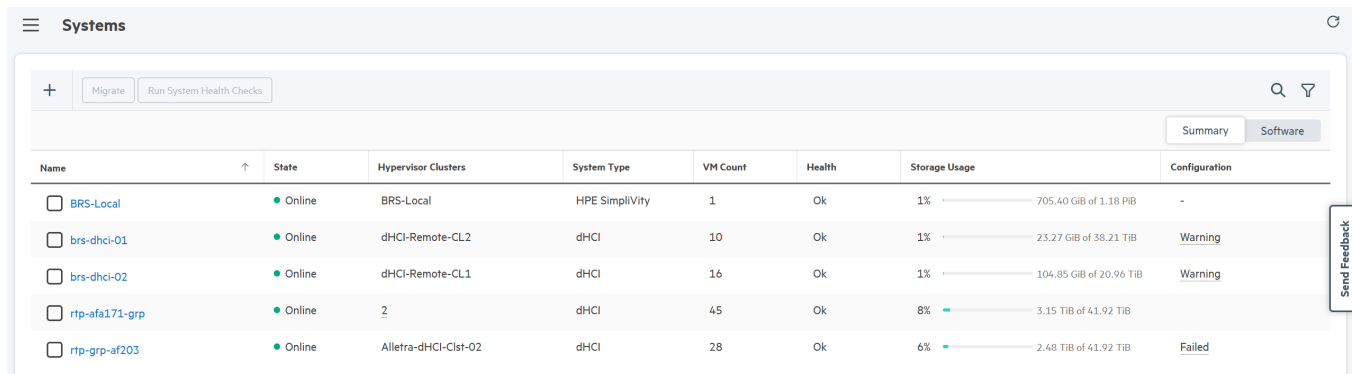


Figure 7. Systems view

For HPE Alletra dHCI systems, selecting the **Software** view reveals which versions are installed and in available update catalogs, as well as whether updates are available; it also enables the initiation of prechecks and updates via the One-Click Update functionality. The software updates catalogs comprise target versions to install for the array operating system, VMware ESXi™, Storage Connection Manager, and Service Pack for ProLiant. In addition to the target versions, there is a list of allowed software versions to update from. This ensures that for any given system, only catalogs with compatible versions and valid update paths are exposed. Figure 8 shows a sample Systems software update screen.

The entire update process is nondisruptive to the environment and running workloads.



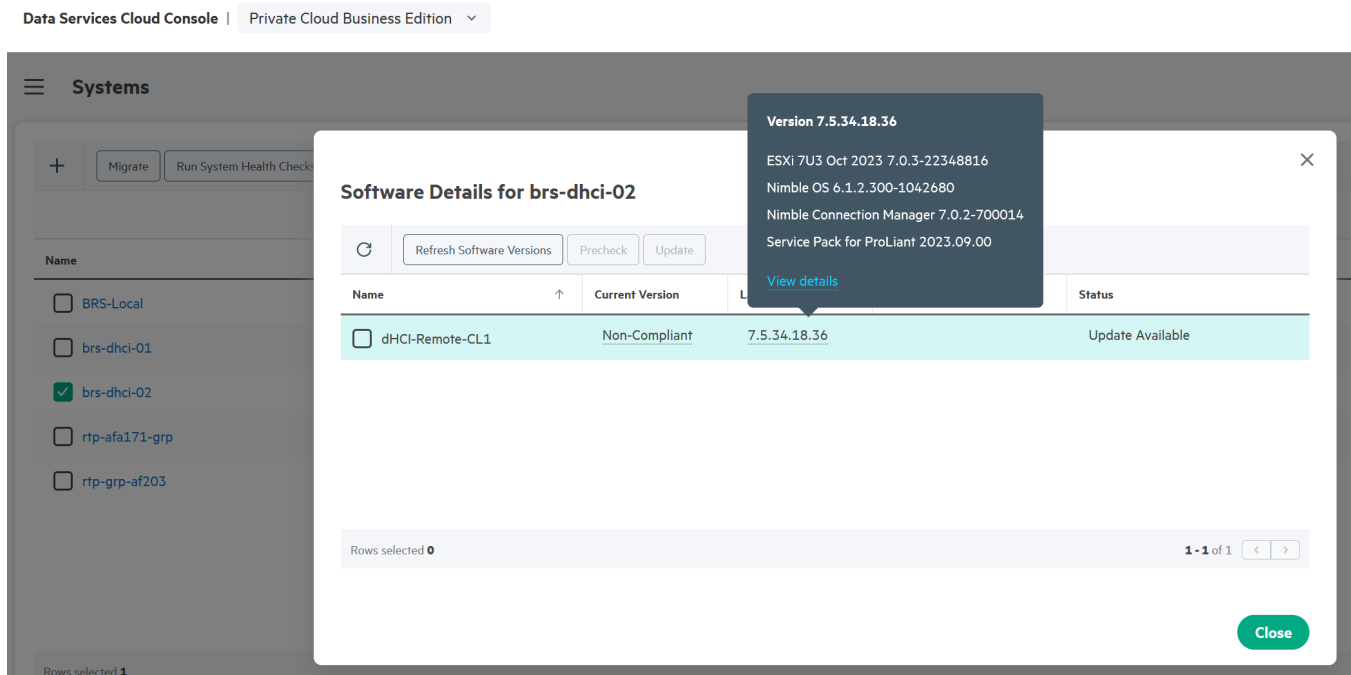


Figure 8. Systems software update

An overview of the One-Click Update process flow consists of the following steps:

1. The Administrator selects a cluster or clusters to perform pre-checks based on the versions in a given software catalog. Private Cloud Business Edition initiates the pre-check run and ensures the cluster or clusters are in a valid state. If the pre-checks pass, the administrator initiates the update.
2. Software components are downloaded from HPE repositories and staged on the storage array.
3. Additional pre-checks are performed to validate state of the environment.
4. The array operating system is updated one node at a time. Data traffic is not impacted.
5. If DRS is present and enabled, VMs are migrated off the first host in the cluster. If DRS is not present or is not enabled, the administrator is prompted in the Private Cloud Business Edition update status to migrate the VMs off that host. As soon as all VMs are off the first host, it is put into maintenance mode.
6. VMware ESXi and HPE Storage Connection Manager are updated, and then the host is rebooted.
7. HPE Services Pack for ProLiant is updated, and then the host is rebooted.
8. After the first host is finished with its final reboot, it is taken out of maintenance mode and steps 5 through 7 are repeated on each remaining host in the cluster, one at a time.
9. Post-update checks are run to ensure a successful update and good system health.

Figure 9 provides an illustration of the update process flow after it is initiated.



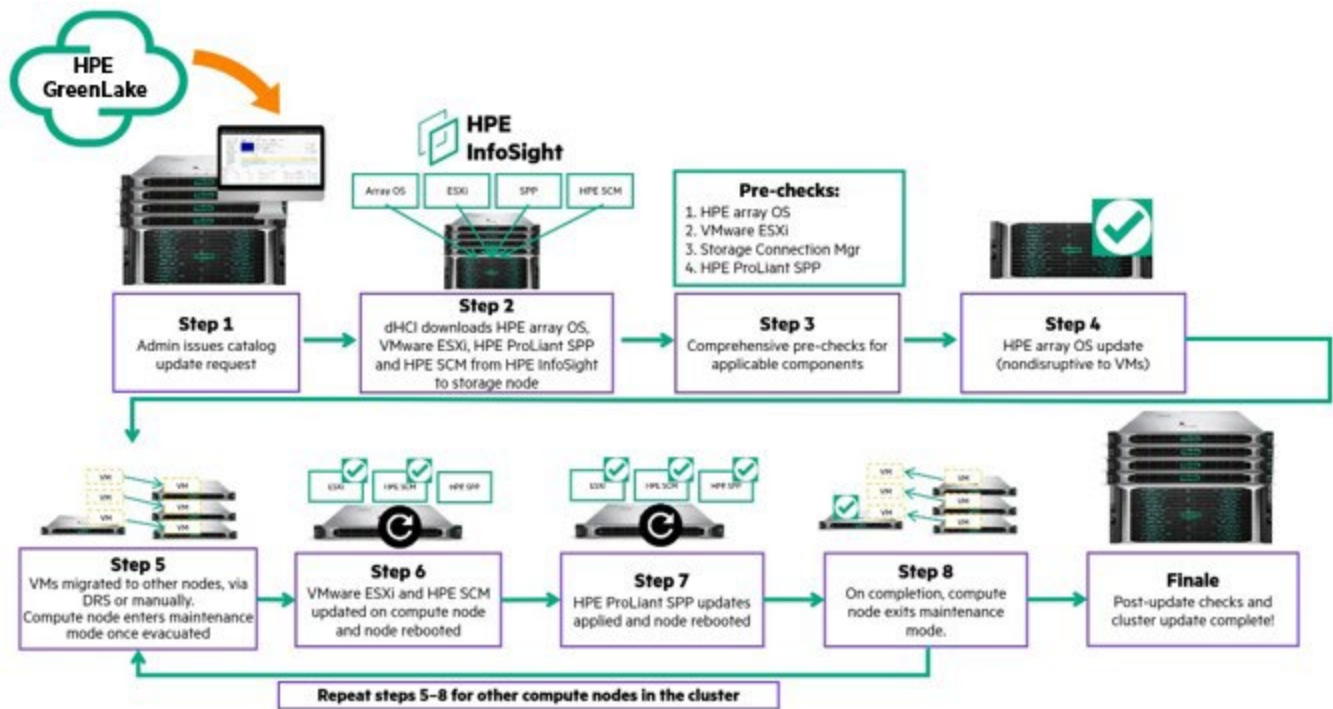


Figure 9. Update process flow after it is initiated

Navigating into a system from the main page provides a detailed view specific to that HPE Alletra dHCI or HPE SimpliVity deployment. Navigating into any of those systems from the Dashboard view also takes you to this detailed view.

This detailed view presents:

- Infrastructure inventory and configuration
- Compute and storage consumption
- Health, software, and protection status

In addition to monitoring the infrastructure, the virtualization stack can also be managed. VMs can be created, migrated, destroyed, and managed. Additionally, for HPE Alletra dHCI systems, datastores can be provisioned and additional hypervisor clusters can be created. This process is illustrated in Figure 10.

When management actions are initiated from Private Cloud Business Edition, the cloud-based microservices communicate with the on-premises components via the secure, encrypted tunnel. The on-premises components initiates the necessary local actions on the storage array and vCenter.



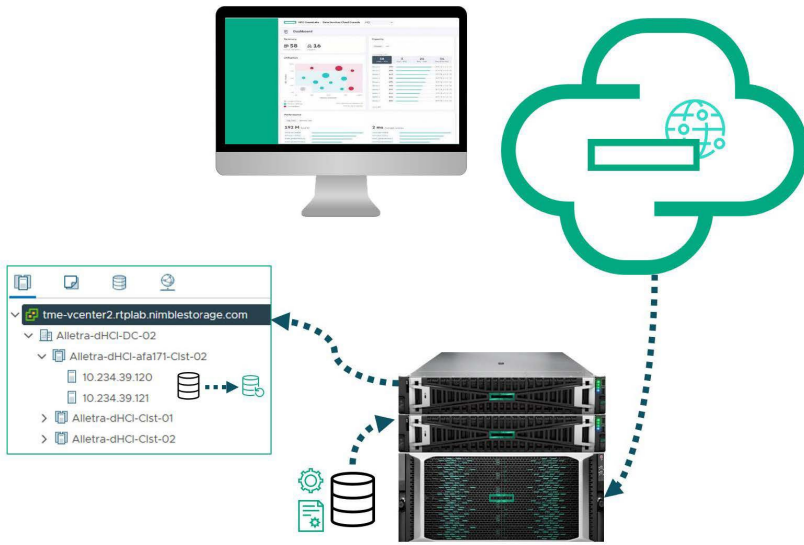


Figure 10. Datastore provisioning flow

Private cloud virtual machines

Within the Virtual Machines section of the interface, there are two tabs. The first is Private Cloud Virtual Machines, which is for deployment and management of on-premises VMs running on HPE Alletra dHCI and HPE SimpliVity systems. Whereas the Virtual Machines view within the detailed system view shows the system’s VMs, the main Private Cloud Virtual Machines section provides a global view of all VMs, regardless of the system, geographic locale, or virtualization environment in which they are running. VMs can be deployed from OVA/OVF templates within the content library in a vCenter environment, migrated between datastores or clusters within a vCenter environment, have power actions performed, or destroyed. If the Data Services Cloud Console workspace has a valid HPE GreenLake for Backup and Recovery subscription, the VMs can either have those Backup and Recovery protection policies applied at the time of creation through the Provisioning Policy that is selected or applied separately post-deployment through the Backup and Recovery interface.

Figure 11 provides a screenshot of Provisioning Policy selection in the Create private cloud virtual machine wizard. Figure 12 shows a screenshot of the Summary view in the Create private cloud virtual machine wizard.

Create Virtual Machine

General Hypervisor Cluster Target Datastore OS Template **Policy** Summary

Select Policy (preconfigured storage attributes)

Name	Deduplication	Encryption	All Flash	Protection Policy
<input type="radio"/> AAAAQOSTEST	Yes	Yes	Yes	
<input checked="" type="radio"/> ADMG-Nashville-HCI-Policy	Yes	Yes	Yes	ADMG-Nashville-Policy
<input type="radio"/> ANewTestPol12345	Yes	Yes	Yes	RTP-Cluster1-LocalSnap-PSG-Cloud
<input type="radio"/> AllFlash-Dedup-Encrypted-DailyR11	Yes	Yes	Yes	DF-LocalSnap

Cancel Back Next

Figure 11. Create private cloud virtual machine wizard — Provisioning Policy selection



Create Virtual Machine

Progress bar: General (checked), Hypervisor Cluster (checked), Target Datastore (checked), OS Template (checked), Policy (checked), Summary (active)

Number of VMs: 1
VM Name: PrivateVMTest
Power on VMs created: No
System: rtp-grp-af203
Hypervisor Cluster: Alletra-dHCI-C1st-02
Target Datastore: HPE-VMFS-CL02-DS01
Template: FreeBSD-14
Policy: ADMG-Nashville-HCI-Policy

Buttons: Cancel, Back, Create

Figure 12. Create private cloud virtual machine wizard — Summary view

The Virtual Machines view also shows details of the status, location, and performance of the VM, as well as CPU, memory, and storage utilization, as shown in Figures 13 and 14.

Name	Status	State	Power State	Protection Policy	Hypervisor Cluster	System	System Type	Datastores	Type	vCenter Server
Customer_demo_1	✓	Ok	Off	DE-LocalSnap	Alletra-dHCI-afa171-C1st-02	rtp-afa171-grp	dHCI	HPE-VVOL-a...	VVOL	tme-vcenter2.rtplab.nimblest.orage.com
Customer_demo_2	✓	Ok	Off		Alletra-dHCI-afa171-C1st-02	rtp-afa171-grp	dHCI	HPE-VVOL-a...	VVOL	tme-vcenter2.rtplab.nimblest.orage.com
Customer_demo_3	✓	Ok	Off		Alletra-dHCI-afa171-C1st-02	rtp-afa171-grp	dHCI	HPE-VVOL-a...	VVOL	tme-vcenter2.rtplab.nimblest.orage.com
DE-BlankVM	✓	Ok	Off		Alletra-dHCI-C1st-01	rtp-afa171-grp	dHCI	HPE-VMFS-...	VMFS	tme-vcenter2.rtplab.nimblest.orage.com

Figure 13. Private cloud VM summary view



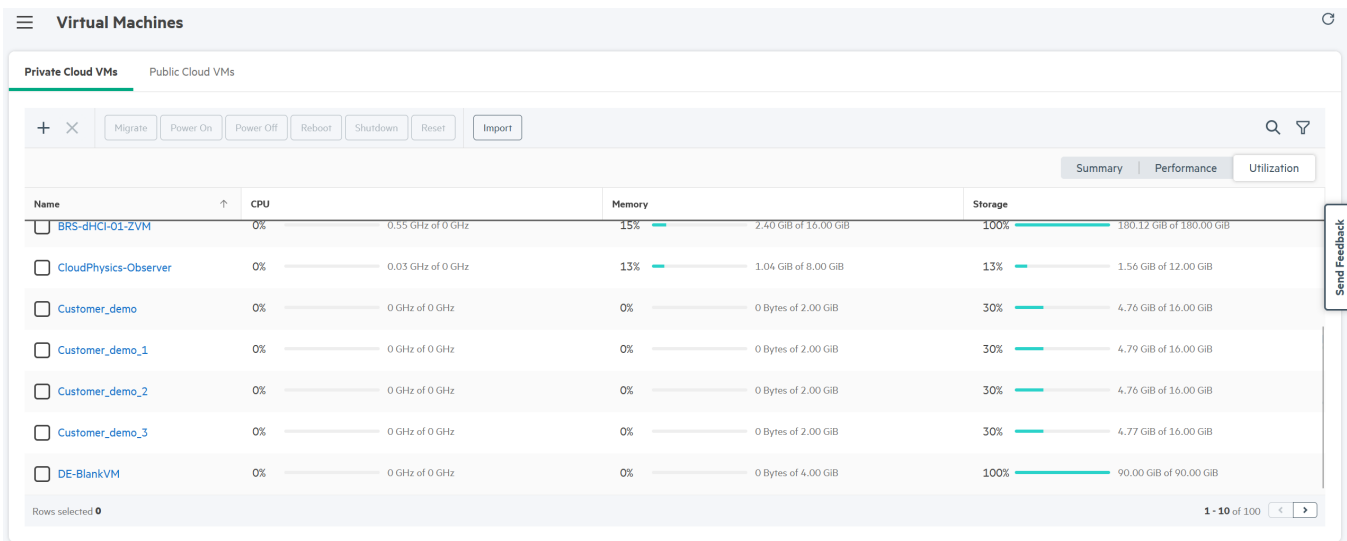


Figure 14. Private cloud VM utilization view

Clicking into any private cloud VM shows details relevant to that VM. This includes network address, VM type and configuration, capacity and performance information, vSphere and storage location, as shown in Figure 15.

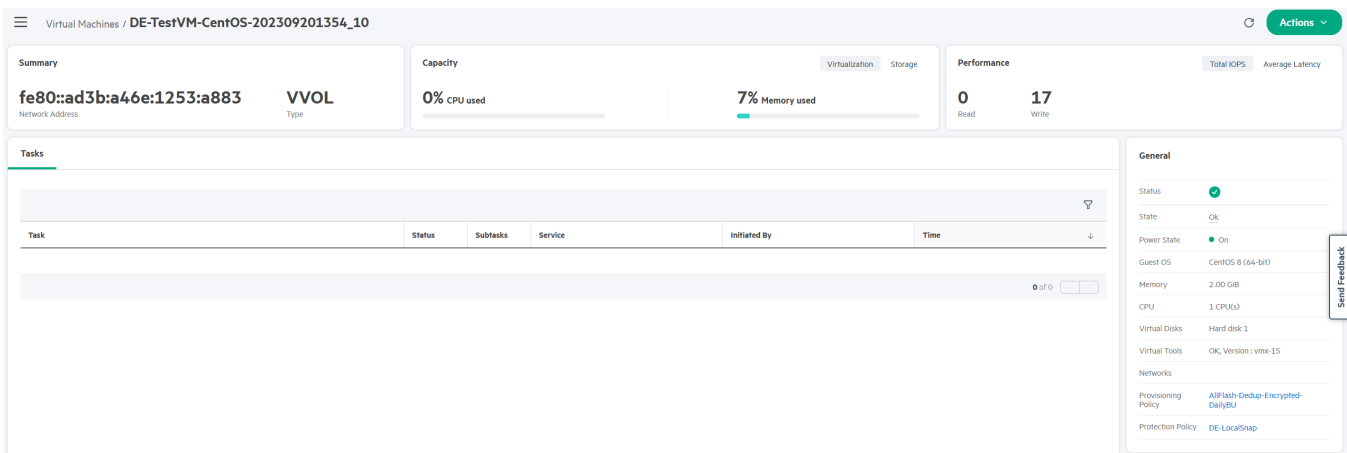
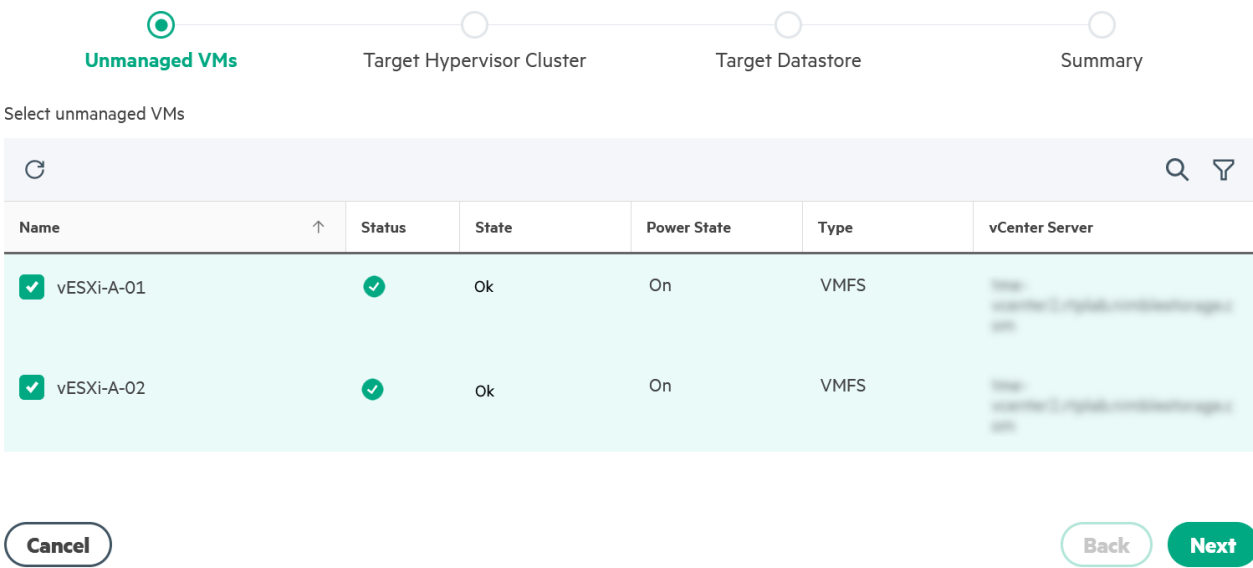


Figure 15. Private cloud virtual machine detailed view

Importing VMs from non-managed systems is also possible in this section. Clicking the **Import** button displays any VMs in connected vCenter environments that reside on clusters that are not managed HPE Alletra dHCI or HPE SimpliVity systems. This view allows you to easily select one or multiple VMs and migrate them to a target cluster and datastore on a managed HPE GreenLake for Private Cloud Business Edition system. Figure 16 shows a screen in the Import Unmanaged VM wizard.



Import Unmanaged VM



The wizard progress bar shows four steps: **Unmanaged VMs** (active), Target Hypervisor Cluster, Target Datastore, and Summary.

Select unmanaged VMs

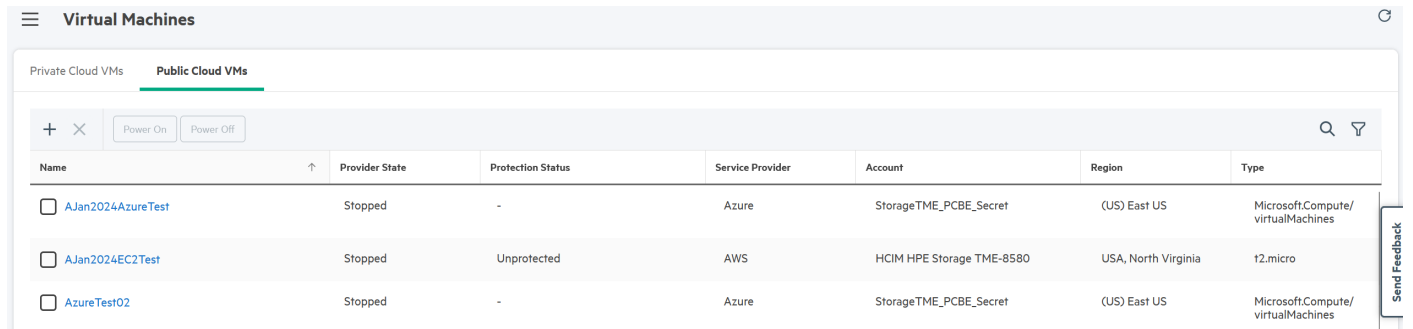
Name	↑	Status	State	Power State	Type	vCenter Server
<input checked="" type="checkbox"/> vESXi-A-01		✓	Ok	On	VMFS	
<input checked="" type="checkbox"/> vESXi-A-02		✓	Ok	On	VMFS	

Buttons: Cancel, Back, Next

Figure 16. Import Unmanaged VM wizard

Public cloud virtual machines

Managing public cloud VMs across multiple accounts and public cloud providers is possible through this section of Private Cloud Business Edition. These VMs can be powered on or off, created or destroyed. Basic information for the VMs is displayed here, including the state, the public cloud provider, the account the VM is associated with, the region the VM is deployed in, and the type of VM instance. Figure 17 shows the Public Cloud VMs pane in the Virtual Machines view.



Virtual Machines view showing Public Cloud VMs. The table lists VMs with their provider, account, region, and type.

Name	↑	Provider State	Protection Status	Service Provider	Account	Region	Type
<input type="checkbox"/> AJan2024AzureTest		Stopped	-	Azure	StorageTME_PCBE_Secret	(US) East US	Microsoft.Compute/virtualMachines
<input type="checkbox"/> AJan2024EC2Test		Stopped	Unprotected	AWS	HCIM HPE Storage TME-8580	USA, North Virginia	t2.micro
<input type="checkbox"/> AzureTest02		Stopped	-	Azure	StorageTME_PCBE_Secret	(US) East US	Microsoft.Compute/virtualMachines

Buttons: Power On, Power Off, Search, Filter

Figure 17. Public Cloud VMs pane

Going into a specific public cloud VM displays information specific to that VM and provider, including IP address, state, CPU, virtual private cloud (VPC) and network details, security group, and the root device, as shown in Figure 18.



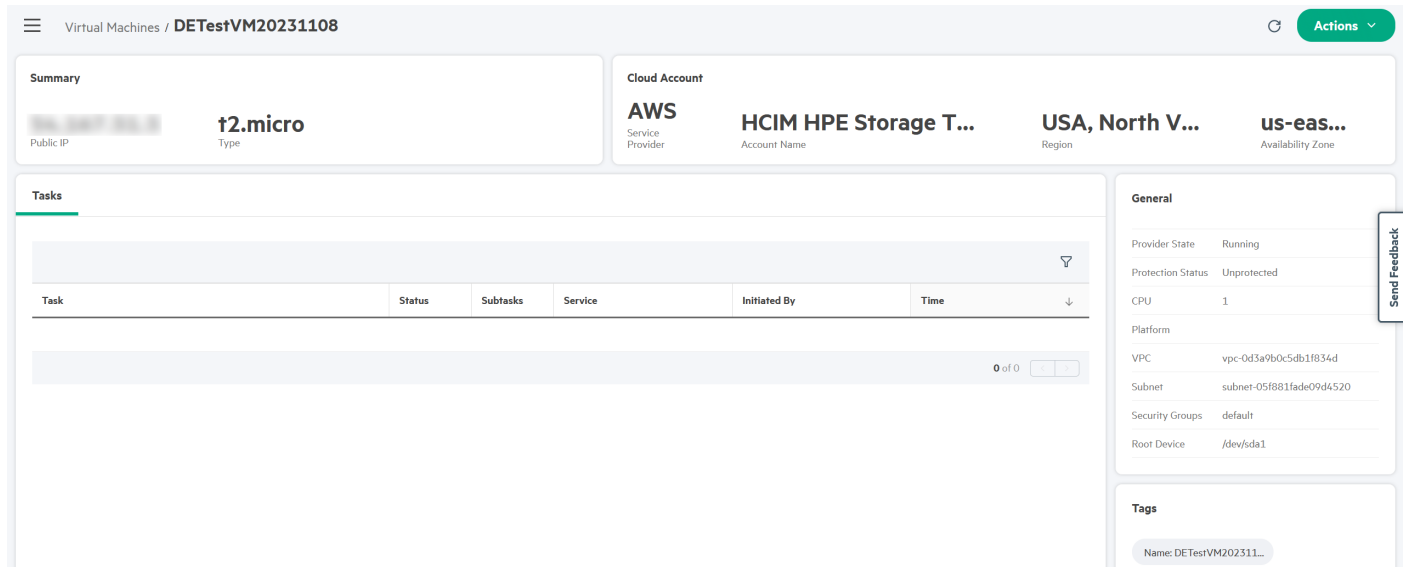


Figure 18. Public cloud VM detailed view

The VM creation workflow is similar between the cloud providers. For AWS virtual machines, newly created VMs are deployed into the default VPC. Regardless of which AWS VPC existing VMs reside in, they can be seen within Private Cloud Business Edition. When deploying Azure virtual machines, you can select the specific resource group into which the VM is deployed from among those associated with the subscription. The tiles for the two cloud providers are shown in Figure 19.

Create Virtual Machine (Public Cloud)

Select Service Provider

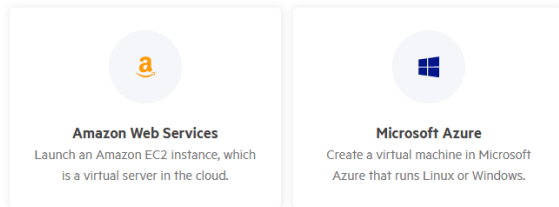


Figure 19. Public cloud providers

Figure 20 shows a summary from the AWS virtual machine creation wizard and Figure 21 shows a summary from the Azure virtual machine creation wizard.



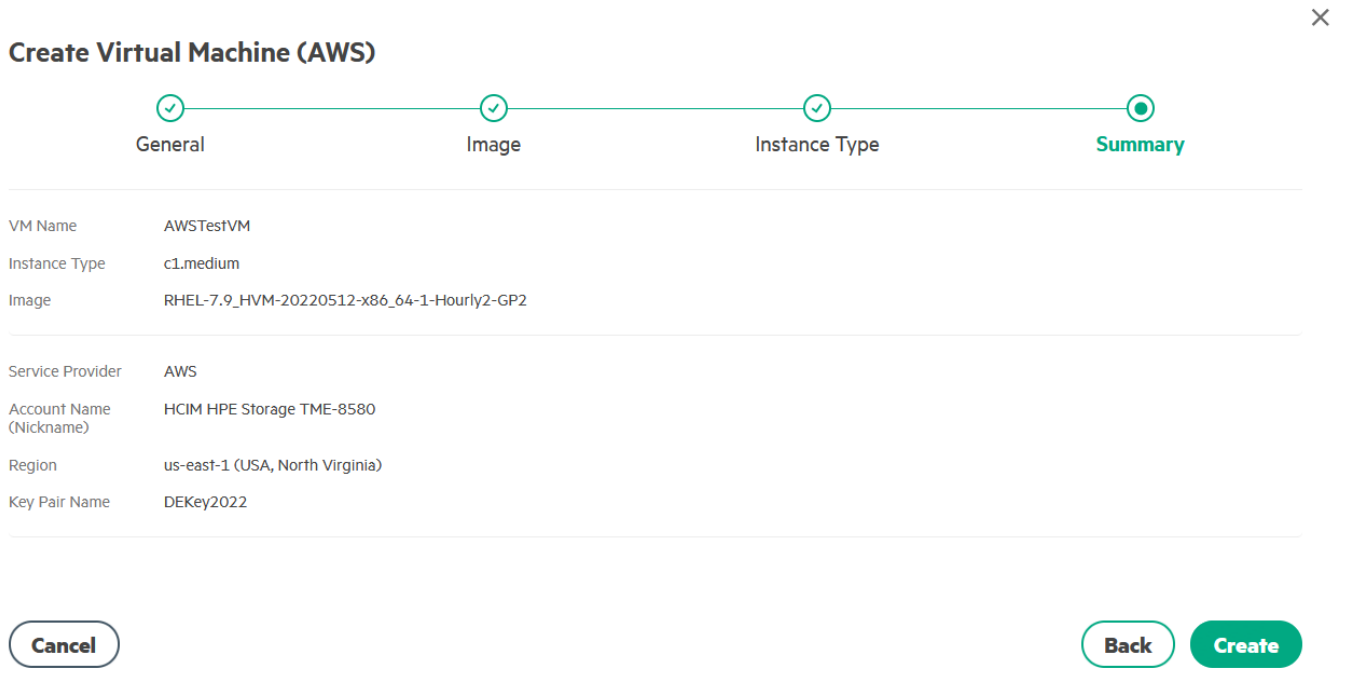


Figure 20. AWS virtual machine creation wizard summary

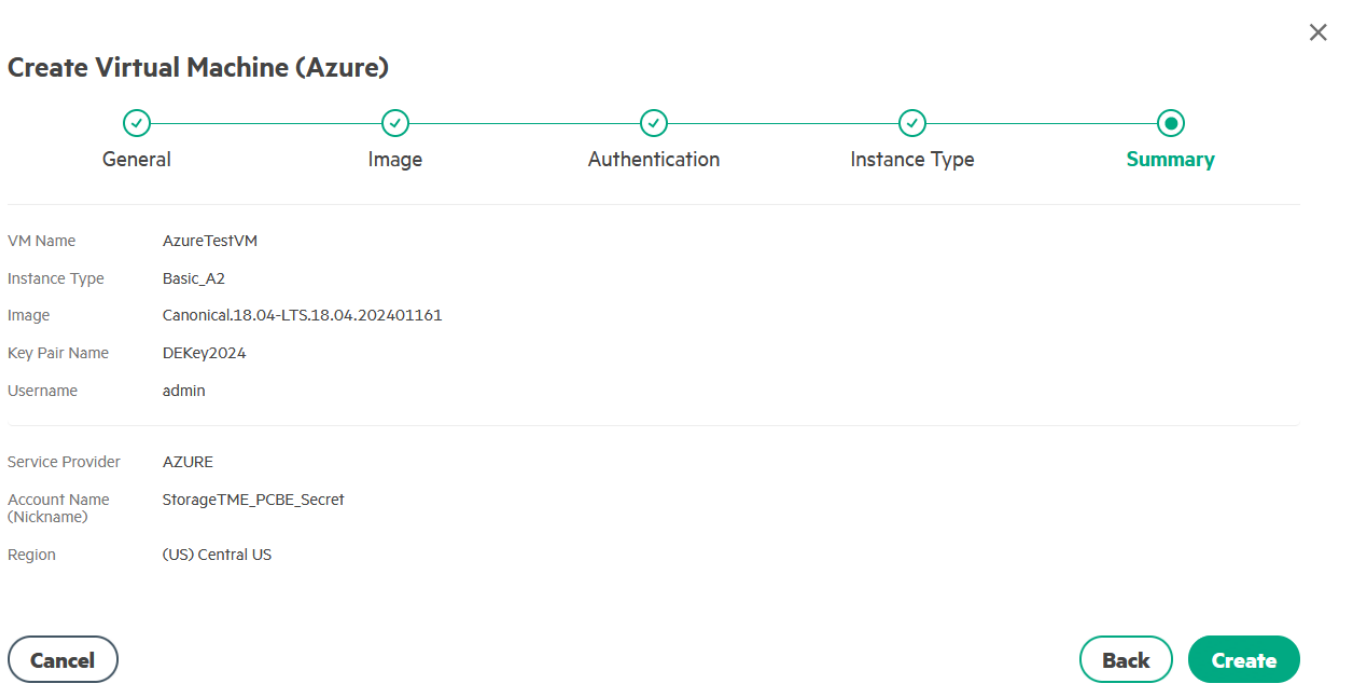


Figure 21. Azure virtual machine creation wizard summary

Provisioning Policies

The Provisioning Policies define storage, performance, and protection attributes that can be assigned to a VM or datastore at time of creation. When a VM or datastore is created, any created Provisioning Policies that match the storage characteristics of the selected storage are displayed. These policies can also set Quality of Services (QoS) limits on throughput and IOPS on vVol VMs as well as at the datastore level when provisioning VMware vSphere® Virtual Volumes™ and VMware vSphere® VMFS datastores.



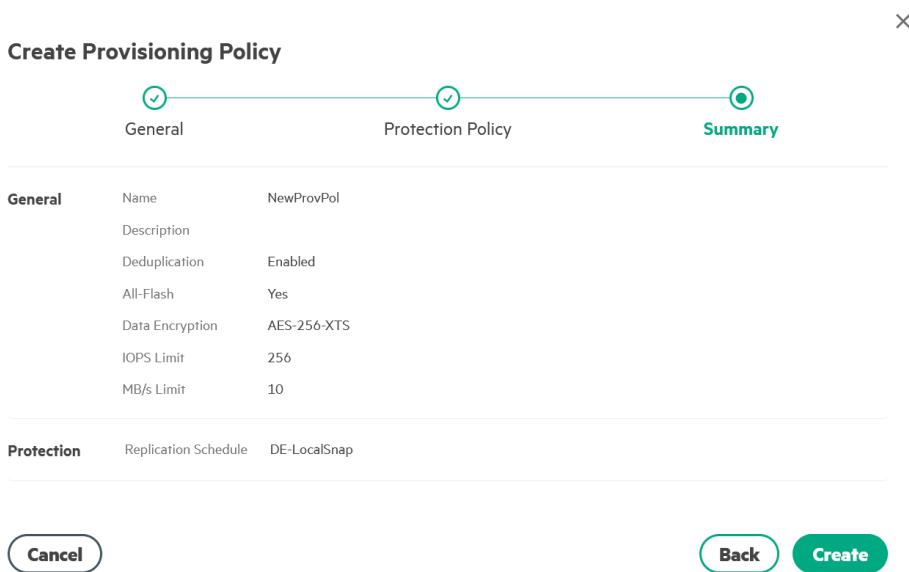


Figure 22. Creating a Provisioning Policy

VM Provisioning Policies are applicable to provisioning VMs and datastores on systems based on HPE Alletra dHCI and must be selected during the provisioning of those elements. A summary screen of this process is shown in Figure 22.

If the Data Service Cloud Console workspace has a valid HPE GreenLake for Backup and Recovery subscription, any VMware® protection policies can be added to a Provisioning Policy. When a VM or datastore is created and that Provisioning Policy is selected, the Backup and Recovery protection policy is automatically applied.

REST APIs

The architecture of the Data Services Cloud Console is based on REST APIs. The services and components within the platform communicate with each other through these APIs. Many of these APIs, including for Private Cloud Business Edition, are also exposed so that they can be leveraged by other tools, enabling greater integration and potential for automation. This provides a common API end point for any HPE solution managed through Data Services Cloud Console.

The primary platform for documentation, guides, services, tools, and the developer community is the [HPE GreenLake Developer Portal](#), shown in Figure 23. Figure 24 shows the page in Data Services Cloud Console for API documentation.

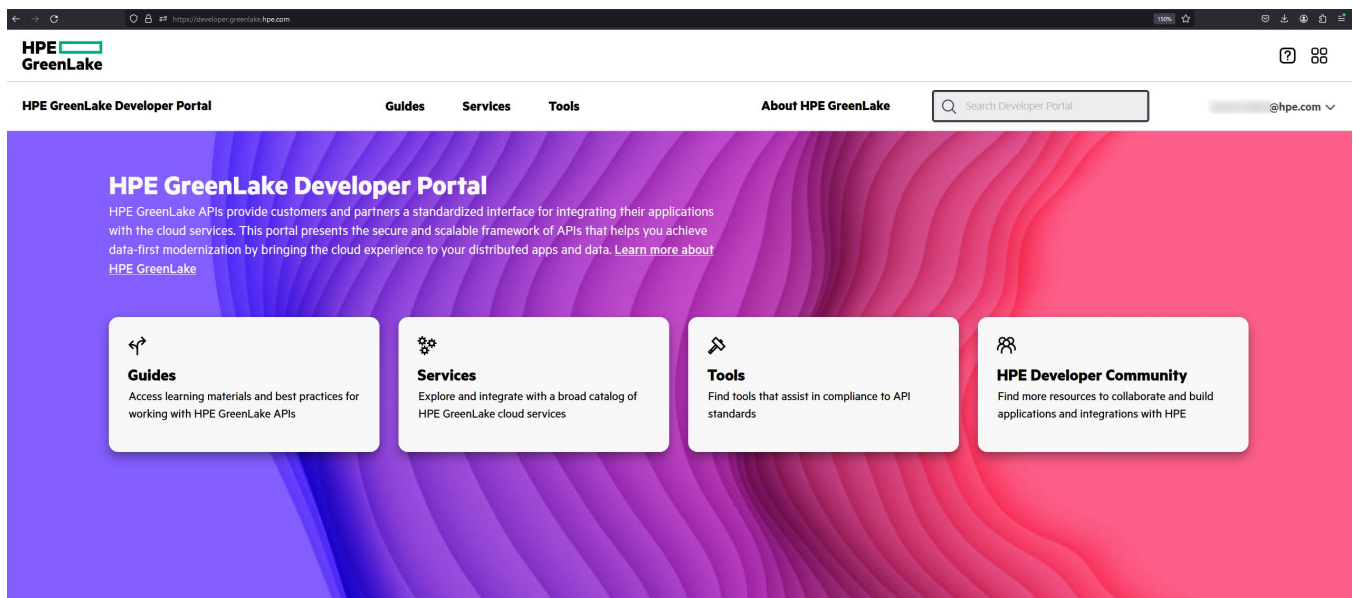


Figure 23. HPE GreenLake Developer Portal



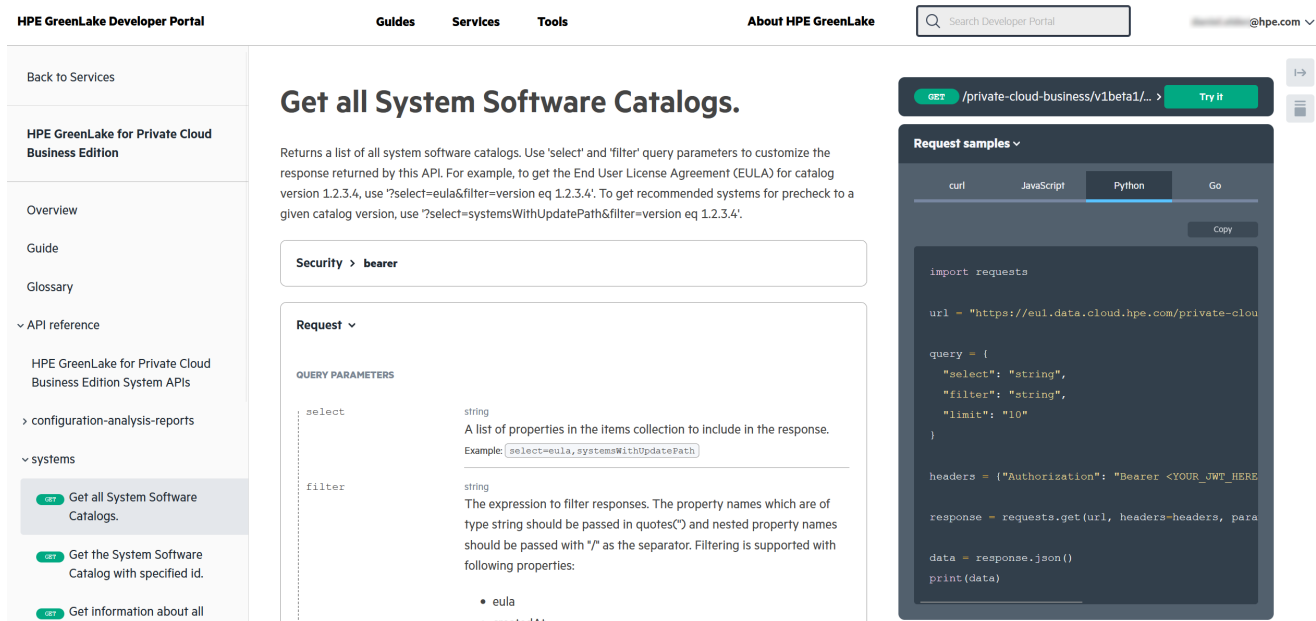


Figure 24. Data Services Cloud Console API documentation

HPE GreenLake for Backup and Recovery integration

Protecting data is a vital part of any environment. HPE GreenLake for Backup and Recovery provides enterprise-level data protection for a variety of workloads including VMware and AWS EC2 instances. Data protection is enabled through protection policies, and it is through these policies that Cloud Business Edition integrates with Backup and Recovery. A protection policy can specify local snapshot schedule, trigger replication between arrays, replicate those backups to a local Protection Store Gateway virtual machine or HPE StoreOnce appliance, as well as give the option to replicate those encrypted backups to the HPE cloud repository for off-site protection.

Backups are managed and directed through an on-premises VM called the **Data Orchestrator**. An optional repository VM, called the **Protection Storage Gateway**, can also be deployed. This can act as a local backup target and gateway for cloud-protected backups.

For HPE SimpliVity systems managed by HPE GreenLake for Private Cloud Business Edition, the desired protection policy is selected when provisioning VMs. HPE Alletra dHCI systems can have a protection policy applied to VMs or datastores at creation time by selecting a provisioning policy with the desired protection policy.

Protection policies, as well as actions including protecting VMs post-deployment, VM cloning, and VM and file-level recovery are all managed through the Backup and Recovery application in Data Services Cloud Console.

For more information on HPE GreenLake for Backup and Recovery, refer to these [additional resources](#).

HPE GreenLake for Private Cloud Business Edition best practices

Adherence to best practices is vital in any solution to ensure optimal security, performance, resiliency, and reliability. Many best practices are applied as part of the standard deployment process of HPE Alletra dHCI and HPE SimpliVity. To ensure successful deployment and operation, refer to the following collection of guides and papers relevant to Private Cloud Business Edition and its supported solutions:

- [HPE GreenLake — Data Services Cloud Console Security Guide](#)
- [Using HPE GreenLake for Private Cloud Business Edition: Data Services Connectors](#)
- [HPE Alletra dHCI Deployment Guide for New Installations on Array OS 6.1.x and Later](#)
- [HPE Alletra dHCI solution network considerations guide](#)
- [HPE Alletra dHCI solution security guide](#)
- [HPE SimpliVity — HPE OmniStack 4.1.3 for vSphere Deployment Guide](#)
- [HPE SimpliVity for vSphere networking best practices](#)
- [HPE SimpliVity Security Best Practices technical white paper](#)



HPE GreenLake for Private Cloud Business Edition use cases

With a variety of platforms and configurations supported by HPE GreenLake for Private Cloud Business Edition, deployments can be sized to meet current and future workload demands in the most efficient, cost-effective way possible.

Some examples of workloads on which Private Cloud Business Edition platforms deliver enterprise-class performance, resiliency, and efficiency include:

- Private cloud/data center consolidation
- Tier 1 applications
- Mixed workloads
- VDI
- Dev/test environments
- Databases
- Virtual server workloads
- Unified protected remote office/branch office (ROBO)
- Containers/Kubernetes
- Data center migration

Summary

With its unified global dashboard, Private Cloud Business Edition provides a single point from which to manage on-premises infrastructure and VM workloads across multiple private and public cloud environments. Integration with other applications within the HPE GreenLake platform greatly simplifies managing, monitoring, consuming, and protecting your data. From deployment to lifecycle management to scaling out, Private Cloud Business Edition removes administrative and management burdens.

Resources

[HPE GreenLake Platform Edge-to-Cloud User Guide](#)

[HPE GreenLake: Data Services Cloud Console technical white paper](#)

[Data Services Cloud Console Security Guide](#)

[HPE GreenLake Edge-to-Cloud Platform User Guide: Identity & Access](#)

[HPE GreenLake for Private Cloud Business Edition Getting Started Guide](#)

[Using HPE GreenLake for Private Cloud Business Edition](#)



Technical white paper

[Video: HPE GreenLake for Private Cloud Business Edition Technical Demo](#)

[Video: Using HPE Data Services Cloud Console to deploy HPE Alletra dHCI](#)

[Video: Deploying additional VMware host clusters using HPE GreenLake for Private Cloud Business Edition](#)

[Video: HPE GreenLake for Private Cloud Business Edition System Update Overview](#)

[Video: HPE GreenLake for Private Cloud Business with HPE SimpliVity Demo](#)

[Video: HPE GreenLake for Private Cloud Business Edition and Backup and Recovery Lightboard Overview](#)

HPE Alletra dHCI

- [HPE Alletra dHCI for VMware vSphere technical white paper](#)
- [HPE Alletra dHCI Deployment Guide for New Installations on Array OS 6.1.x and Later](#)
- [HPE Alletra dHCI solution network considerations guide](#)
- [HPE Alletra dHCI solution security guide](#)
- [HPE GreenLake for Private Cloud Business Edition access for existing HPE Alletra dHCI deployments](#)

HPE SimpliVity

- [HPE OmniStack 5.0.0 for vSphere Deployment Guide](#)
- [HPE OmniStack 5.0.0 for vSphere Administration Guide](#)
- [HPE SimpliVity for vSphere networking best practices](#)
- [HPE SimpliVity Security Best Practices technical white paper](#)
- [HPE SimpliVity Hyperconverged Infrastructure for VMware vSphere](#)
- [Enabling access to HPE SimpliVity systems using Private Cloud Business Edition](#)


HPE GreenLake for Backup and Recovery

- [HPE GreenLake for Backup and Recovery](#)
- [HPE GreenLake for Backup and Recovery — Backup-as-a-Service built for the hybrid cloud](#)
- [HPE GreenLake for Backup and Recovery — Deployment considerations guide](#)

Learn more at

[HPE Storage Welcome Center](#)

Explore **HPE GreenLake** 

 **Chat now (sales)**

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