

VMWARE CLOUD FOUNDATION

General FAQ

GENERAL

Q. Where can I find more information and resources?

A. Product Page: www.vmware.com/products/cloud-foundation.html

Documentation Page: www.vmware.com/support/pubs/sddc-mgr-pubs.html

Hands-on-Labs: www.vmware.com/go/cloud-foundation-HOL

Hardware Compatibility Guide: www.vmware.com/resources/compatibility/vcl/cloudfoundation.php

Q. What is VMware Cloud Foundation?

A. **VMware Cloud Foundation™** is VMware's new unified Software-Defined Data Center (SDDC) platform for private and public clouds. Cloud Foundation brings together VMware vSphere® (compute), vSAN™ (storage), and NSX® (network) virtualization into a natively integrated stack through automation and lifecycle management capabilities of the new VMware SDDC Manager™. Cloud Foundation can be deployed on-premises in a private cloud or run as a service from the public cloud.

Q. How can I consume Cloud Foundation for public cloud?

A. Select service providers from the VMware vCloud® Air™ Network will offer cloud services powered by Cloud Foundation. **IBM Cloud** is the first partner to provide Cloud Foundation as a service. Reach out to the specific service providers for more information.

VMware Cloud on AWS (currently in tech preview) is a new on-demand service operated, managed and sold by VMware. VMware Cloud on AWS will be powered by VMware Cloud Foundation. Invite-only betas are expected to start in the beginning of 2017 with availability expected to be in the mid-2017 time-frame. If you are interested in applying for the beta, please fill out [this interest form](#).

VMware vCloud Air will soon offer services powered by VMware Cloud Foundation. If you are interested in applying for the beta, please fill out [this interest form](#).

Note: All following Q & A focus on Cloud Foundation for on-premises deployment

Q. How can I deploy Cloud Foundation for private cloud?

A. There are two main options for private cloud deployment: (1) Purchase a turnkey integrated system solution that includes Cloud Foundation SW pre-loaded on qualified HW from select OEM vendors, currently available in the form of **Dell EMC VxRack SDDC** or (2) Deploy Cloud Foundation software on qualified Ready Systems (i.e, combination of qualified vSAN™ Ready Nodes and qualified switches) from leading hardware OEMs. Refer to the [Compatibility Guide](#) for more information. In this case, the deployment can be achieved either through self-installation or working with your Solution Provider / System Integrator.

Q. What Ready Systems hardware is supported?

A. Cloud Foundation is supported on qualified vSAN Ready Node server hardware from select vendors, including Dell, HPE and QCT, and on qualified hardware switches from select switch vendors, including Cisco and Arista. Refer to the [Compatibility Guide](#) for the current list of qualified hardware. We will continue building out our partner ecosystem over time.

Q. Does the VxRack SDDC integrated system support all the features of the latest version of Cloud Foundation?

A. Dell EMC must undertake a qualification process of the integrated system hardware upon new releases of the Cloud Foundation software. For specific information about supported software versions and features in VxRack SDDC, refer to the Dell EMC product documentation on their [product page](#).

Q. Who supports Cloud Foundation software and hardware?

A. When purchasing a Cloud Foundation integrated system, such as one from Dell EMC, the OEM partner will be the Single Point of Contact (SPOC) for support of both hardware and software. When Cloud Foundation software is purchased from VMware separately from the qualified hardware, the support model will follow the standard practice of other VMware products with VMware GSS delivering support for the Cloud Foundation software.

Q. How can I purchase Cloud Foundation software?

A. There are four ways to purchase Cloud Foundation software:

(1) directly from VMware, (2) from VMware channel partners (3) as part of an integrated system from OEM vendors and (4) as a subscription service from a service provider.

Q. Can I install the Cloud Foundation software myself?

A. Yes. VMware provides documentation for customers to deploy the Cloud Foundation software on their own. You can also work with VMware Professional Services or your Solution Provider to receive assistance with your deployment. Visit the [Documentation page](#) for more information on how to deploy Cloud Foundation.

Q. How does Cloud Foundation differ from vRealize Suite?

A. To build a private cloud, IT needs to:

- 1) Modernize infrastructure by virtualizing compute, storage, network and security with a software-defined approach.
- 2) Automate the delivery and ongoing management of the virtualized infrastructure, enabling end users to consume it as a service.

VMware allows customers to accomplish this through Cloud Foundation and vRealize Suite.

Cloud Foundation helps customers quickly and efficiently stand-up and manage the cloud infrastructure foundation through SDDC Manager. SDDC Manager automates the lifecycle management of the cloud infrastructure stack (from bring-up, to configuration, infrastructure provisioning, upgrades/patches, etc.), making it extremely simple for the cloud admin to build and maintain the cloud stack.

vRealize Suite plugs on top of Cloud Foundation and provides the management layer that helps customers to efficiently manage their virtualized infrastructure and workloads and offer them as service. vRealize Suite provides Day 1 automation capabilities (self-service catalogue, automated workload provisioning, policy based governance, API functionality) and Day 2 operations capabilities (workload monitoring, troubleshooting, capacity management, business planning).

Cloud Foundation is the cloud infrastructure platform that delivers the software-defined foundation, whereas vRealize Suite is the cloud management platform that automates the delivery and ongoing management of the cloud infrastructure to apps and VMs using a service model approach. The two complement each other and are the key ingredients to build a VMware based private/hybrid cloud.

Note that both Cloud Foundation and vRealize Suite are hybrid cloud solutions that extend to public clouds. Cloud Foundation is offered via IBM Cloud today. vRealize today manages vCloud Air Network clouds, AWS and Azure (via Professional Services support) end-points.

Q. Why is vRealize Suite not part of Cloud Foundation?

A. VMware is all about choice. VMware Cloud Foundation can be used in conjunction with other 3rd party Cloud Management Platforms. Similarly, vRealize Suite can be used with other cloud infrastructure platforms, including other hypervisors, as well as multiple public cloud vendors.

Q. What is the difference between SDDC Manager, part of Cloud Foundation, and vRealize Automation, part of the vRealize Suite?

A. SDDC Manager and vRealize Automation automate different aspects of building and running private and public clouds. SDDC Manager automates the lifecycle management of the cloud infrastructure stack (from bring-up, to configuration, infrastructure provisioning, upgrades/patches, etc.), making it extremely simple for the cloud admin to build and maintain the cloud stack (vSphere, VSAN and NSX). vRealize Automation automates the delivery and management of the virtual machines and apps enabling end users to consume these as services and at scale.

Q. Does SDDC Manager replace other existing management tools, such as vCenter Server, vRealize Operations Manager, vRealize Log Insight?

A. No. SDDC Manager complements VMware vCenter Server® and vRealize Suite products by delivering new functionality that helps cloud admins build and maintain the cloud infrastructure software stack. The cloud admin will continue to leverage vCenter Server and the cloud management platform of choice for VM management, monitoring, alerting, provisioning, etc.

Q. For which software components can SDDC Manager automate the deployment?

A. The automation capabilities of SDDC Manager extend beyond the core components of the Cloud Foundation stack. This means that SDDC Manager can provide lifecycle automation for VMware products that are sold separately from Cloud Foundation. Currently, SDDC Manager automates the deployment for all the following VMware software components: VMware vSphere®, vSAN™, NSX®, vCenter Server, vRealize Log Insight™, vRealize Operations™ and Horizon®. vCenter Server, vRealize products and Horizon are sold and licensed separately from Cloud Foundation.

Q. Can I deploy SDDC Manager on top of existing vSphere environments that don't use the entire Cloud Foundation stack?

A. No. The lifecycle automation capabilities of SDDC Manager start and are predicated on the fact that SDDC Manager automates the bring up process of the entire Cloud Foundation stack. This means that SDDC Manager cannot be used to manage existing deployments.

Q. How is Cloud Foundation different from the VMware Validated Designs?

A. VVDs are documented reference designs that define blueprints and guidelines on how to build and operate an SDDC. VVDs are technical implementation designs for customers that choose to build their own SDDC, either by assembling the software components themselves or through assistance from professional services from VMware or VMware partners.

Cloud Foundation is a software product that integrates multiple components of the VMware SDDC stack and that implements a prescriptive design and software BOM. Cloud Foundation embeds a validated design, but it deploys and maintains this design using unique lifecycle management automation capabilities in the form of the SDDC Manager. The Cloud Foundation design is developed and tested against the same set of best practices and tested with the same rigor as the VVDs.

Q. What happened to EVO SDDC?

A. VMware Cloud Foundation builds from and expands the capabilities offered by VMware EVO™ SDDC™. As such, going forward Cloud Foundation will replace EVO SDDC, which starting from September 1, 2016 will no longer be available.

PRICING AND PACKAGING

Q. What are the software components in Cloud Foundation?

A. The Cloud Foundation stack includes VMware vSphere, vSAN, NSX and SDDC Manager. Customers can purchase separately a VMware Horizon add-on for Cloud Foundation, and any edition of the VMware vRealize Suite. Note: while these additional components are licensed separately, the SDDC Manager will always deploy and configure, the Horizon, vRealize Operations and vRealize Log Insight software components as part of a Cloud Foundation implementation.

Q. What is the licensing model for Cloud Foundation?

A. Cloud Foundation is sold on a per processor (CPU) licensing metric with a perpetual license model.

Q. Can I transfer existing licenses for components of Cloud Foundation I already own?

A. Yes. Customers who possess unused licenses for individual components (vSphere, vSAN or NSX) can transfer them towards a Cloud Foundation deployment, and complete the licensing of the Cloud Foundation environment by purchasing the missing components of the stack.

Q. Can I buy SDDC Manager separately?

A. SDDC Manager is only available through Cloud Foundation. In situations where the customer brings his/her own licenses of vSphere, vSAN and NSX, an SDDC Manager licenses can be purchased incrementally.

Q. Is vCenter Server included with Cloud Foundation?

A. No. Customers must provide their own vCenter Server licenses to a Cloud Foundation environment. However, only one vCenter Server license is needed per SDDC Manager instance, regardless of the number of vCenter Server instances (e.g workload domains) that are deployed in the environment. Note: while licensed separately, SDDC Manager deploys and configures vCenter Server as part of each workload domain.

Q. Do I need to renew SnS for all the components of Cloud Foundation?

A. In order to continue to use Cloud Foundation, all underlying components must be properly licensed and have active SnS contracts. However, if a customer should want to move away from Cloud Foundation, they have the option to renew the support contract of just a subset of the Cloud Foundation components.

Q. Is SDDC Manager part of vCloud Suite?

A. No. SDDC Manager is not part of VMware vCloud Suite®. SDDC Manager is available for use only with Cloud Foundation deployments.

TECHNICAL GENERAL

Q. What is VMware SDDC Manager?

A. The SDDC Manager is the centralized SDDC management component used to automate the entire lifecycle of the SDDC stack, from bring-up, to configuration, to infrastructure provisioning, to upgrades/patches, etc..

Q. What are the Hardware Management Services?

A. The Hardware Management Services (HMS) is a feature in SDDC Manager that is responsible for hardware discovery, bootstrap, configuration and monitoring. The HMS uses vendor aware plug-ins to interface with qualified hardware components.

Q. What is the VIA?

A. The VIA is an imaging appliance used to perform the initial imaging of a new Cloud Foundation rack in preparation to being configured by the SDDC manager. Visit the [Documentation page](#) for more information about the VIA.

Q. How are multiple physical racks managed?

A. In a multiple rack configuration, the separate racks are interconnected using a high-speed network topology. All the systems across the different racks are managed as a logical pool of resources from a central instance of the SDDC Manager.

Hardware

Q. What are the physical hardware requirements for a Cloud Foundation private cloud?

A. A Cloud Foundation private cloud is comprised of between 1 to 8 physical racks. Each rack is comprised of between 4 to 32 1U or 4 to 16 2U qualified servers (subject to power constraints), a pair of redundant Top-of-Rack (ToR) switches and a single management switch. In a multi-rack configuration, a pair of redundant rack-interconnect switches is used to interconnect the racks.

Q. What are the physical scalability limits of a Cloud Foundation private cloud deployment?

A. Each Cloud Foundation private cloud deployment can span up to 8 physical racks with each rack consisting of 32 servers (subject to power constraints), for a total of up to 256 servers across 8 racks.

Q. What are the physical server requirements?

A. The building block of the Cloud Foundation private cloud is the vSAN Ready Node. Cloud Foundation provides flexibility when selecting vendors and server models as well as when choosing CPU speeds, core counts, memory sizing, as well as physical disk capacity and SSD caching capacity. Refer to the [Compatibility Guide](#) for a list of qualified vSAN Ready nodes.

Q. What are the physical network requirements?

A. Cloud Foundation implements a self-contained network topology using redundant Top-of-Rack switches in each rack that are interconnected using a pair of redundant rack-interconnect switches. Access to external networks is achieved through a pair of redundant uplinks configured on the ToR switches in the first rack.

Q. Can the qualified ready nodes be used with any of the qualified networking switches?

A. Yes. The qualified ready nodes can be used with any of the qualified switches. The only requirement is for both the ToR and rack-interconnect switches to be from the same vendor.

Q. Are rack-interconnect switches required even if there is only one rack?

A. No, rack-interconnect switches are only required when expanding beyond a single physical rack.

Q. What are the physical switch requirements for the Top-of-Rack (TOR) and Rack-Interconnect switches in a Cloud Foundation private cloud?

A. Only qualified ToR and rack-interconnect switches can be used with Cloud Foundation. Refer to the [Compatibility Guide](#) for a list of qualified switch vendors.

Q. What are the physical switch requirements for the management switch in a Cloud Foundation private cloud?

A. Only qualified management switches can be used with Cloud Foundation. Refer to the [Compatibility Guide](#) for a list of qualified switch vendors.

Q. What does the Cloud Foundation server qualification involve? Why can't all vSAN Ready Nodes be automatically certified for Cloud Foundation?

A. Cloud Foundation uses the VIA (imaging appliance) to image the server with the appropriate version of ESXi including the server specific configuration e.g., the appropriate VIBs to be included for that server (this information is obtainable from the server vendor). Other server specific configuration includes how to number the NICs for Cloud Foundation operation. This server specific information is validated and then included as part of the imaging bundle for Cloud Foundation.

In addition, the server needs to be validated with HMS. This involves server configuration and management using both the inband and out of band management interfaces. To perform this validation, a pre-requisite is for the server to be imaged with the correct ESXi version and the appropriate VIBs as indicated earlier.

After tests are run successfully with both the VIA and HMS based management using the bundle updated with the server specific VIBs, the server is a candidate for certification. The bundles are published by VMware and the server added to the Hardware Compatibility Guide.

Workload Domains

Q. What is a workload domain?

A. A workload domain is a subset of resources carved out of the Cloud Foundation infrastructure based on specific capacity, performance, and availability characteristics. Each workload domain comprises a single vSphere cluster and can span multiple physical racks.

Q. What is a management domain?

A. The management domain is a special purpose workload domain that is used to host the infrastructure components needed to instantiate, manage, and monitor the Cloud Foundation private cloud infrastructure. The management domain is automatically created using SDDC Manager when the first rack is initially configured.

Q. How many nodes are required for the management domain?

A. The management domain leverages vSAN for storage and requires a minimum of 4 nodes.

Q. What types of workload domains can be created?

A. There are two types of workload domains at this time:

1. A Virtual Infrastructure (VI) workload domain which consists of a single vSphere cluster with a dedicated vCenter Server instance.
2. A Virtual Desktop Infrastructure (VDI) workload domain which consists of a dedicated vSphere cluster with a dedicated vCenter Server Instance along with the Horizon software components.

Q. How many vSphere clusters can I have in a workload domain?

A. Currently, Cloud Foundation supports one vSphere cluster per workload domain.

Q. How many vCenter Server instances can be deployed in a workload domain?

A. Each workload domain has one dedicated vCenter Sever instance. (Pricing and Packaging note: Only one vCenter Server license is needed per SDDC Manager instance)

Q. What is the minimum and maximum number of vSphere hosts that can be in a Virtual Infrastructure Workload Domain?

A. Workload domains leverage vSAN and as such require a minimum of three hosts. The current maximum is 64 hosts.

Q. What is the minimum and maximum number of vSphere hosts that can be in a Virtual Desktop Infrastructure Workload Domain?

A. Workload domains leverage vSAN and as such require a minimum of three hosts. The current maximum number of hosts in a VMware Horizon® cluster is 20 hosts.

Q. How does Cloud Foundation determine how many hosts to use when creating a workload domain?

A. The number of hosts assigned to a workload domain is based on two factors: (1) the capacity parameters provided by the administrator during the workload domain creation and (2) the vSAN Availability Policies.

Q. Can I extend/delete a workload domain after it has been created?

A. Yes, Cloud Foundation provides a fully automated process for creating, extending, and deleting workload domains using SDDC Manager.

Q. Can I reduce the size of a workload domain?

A. Cloud Foundation does not yet provide an automated capability for reducing the size of a workload domain. This is currently on the roadmap. In the meantime, a manual process can be implemented to manually evacuate hosts from a workload domain.

Networking

Q. In the network topology, do the ToR to rack-interconnect links use L2 or L3? Is Spanning Tree used?

A. In Cloud Foundation all the physical racks are on the same L2 network. The ToR switches are dual connected to two rack-interconnect switches through redundant 40Gbps links configured in a Multi-Chassis Link Aggregation Group (MC-LAG). There is no Spanning Tree Protocol used as looping is avoided using MC-LAG. In the future, the network configuration may be modified to use L3 so that each rack is on its own L2 network and you need to route/Layer 3-switch inter-rack traffic. This will enable efficiencies like ECMP (Equal Cost Multipath forwarding).

Q. Do all the switches (ToR, Rack-Interconnect and Management) need to be from the same vendor?

A. The ToR and rack-interconnect switches must be from the same vendor so that the plugins can work seamlessly. The management switch can be from any supported vendor as listed on the [Compatibility Guide](#).

Storage

Q. Is vSAN required with Cloud Foundation?

A. Yes, vSAN is required.

Q. Does Cloud Foundation support all-flash vSAN storage?

A. Yes, Cloud Foundation supports both the Hybrid and All-Flash vSAN configurations.

Q. Can I use Network Attached Storage (NAS) with Cloud Foundation?

A. Yes, you can connect to external IP based storage (NFS/iSCSI) from a Cloud Foundation based deployment. Design and implementation of the networking paths for access to external storage needs to be done outside of the Cloud Foundation automaton/management.

Q. Can I use FCoE or Fibre Channel with Cloud Foundation?

A. No, FCoE and Fibre Channel are not currently supported with Cloud Foundation.

Patching and Upgrades

Q. What software components can be patched/upgraded using SDDC Manager Lifecycle Management?

A. Currently, all vSphere, vSAN, NSX, and SDDC manager components are patched/upgraded as part the SDDC Manager Lifecycle Management. Other software components will be added in the future.

Q. How am I notified when patches/upgrades become available?

A. Users are automatically notified from SDDC Manager when patches and upgrades become available.

Q. How often will VMware release software updates?

A. Patches are released as they become available and based on criticality (e.g. a security patch). Upgrades are typically released on a quarterly cadence.

Q. Can I schedule when patches and upgrades are applied?

A. Yes, SDDC Manager allows patches and upgrades to be scheduled as to coincide with regular maintenance windows.

Q. Can I patch/upgrade workload domains independent of each other?

A. Yes, patches and upgrades are scheduled on a per-workload domain basis allowing updates to be "rolled-in" over time.

Miscellaneous

Q. What about other components of the vRealize Suite like vRealize Automation and vRealize Business for Cloud, will SDDC Manager automate the deployment of these components as well?

A. Currently, SDDC Manager does not automate the deployment of vRealize Automation or vRealize Business for Cloud. These components can be manually deployed and externally integrated with Cloud Foundation.

Q. How are management packs for the physical switches used with vRealize Operations in a Cloud Foundation private cloud environment?

A. Customers can manually install and configure relevant vRealize Operations Management packs pertinent to their Cloud Foundation private cloud environment. Note that it may be required to re-install and reconfigure management packs following Cloud Foundation Lifecycle Management (LCM) activities such as patching and upgrades.

Q. Does Cloud Foundation perform firmware updates?

A. No. Firmware updates are not included as part of the Cloud Foundation capabilities. Use vendor provided tools to update firmware.

Q. What logs are sent to the vRealize Log Insight in the Cloud Foundation management cluster?

A. Cloud Foundation sends event logs for ESXi™, vSAN, NSX, SDDC Manager, vCenter and Horizon into vRealize Log Insight.

