

VMware Cloud Foundation 4.1

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Q1. What's New with VMware Cloud Foundation 4.1?

A1. Here are the new features in Cloud Foundation 4.1:

- **Data Persistence Platform** provides a framework for modern stateful service providers to build deep integration with the underlying virtual infrastructure leveraging the Kubernetes operator method and vSphere Pod Service, allowing customers to run their stateful applications with lower TCO and simplified operations and management.
- **VCF Remote Clusters** extend the VCF operational capabilities to remote locations to support edge computing models with VMware Cloud Foundation. Support for remote configurations now extend VCF workload domains to remote locations to improve operational efficiency via centralized management of remote clusters running at edge locations and branch office sites, minimizing the requirement for skilled technical resources to be staffed at these remote sites.
- **Parallel NSX-T and Skip-Level Cluster Upgrades** simplifies upgrade operations of the components of Cloud Foundation through enhancements to SDDC Manager, including skip-level updates, parallel NSX-T updates and vSAN pre-checks to further automate and streamline the upgrade process.
- **vVols 2.0 Support** delivers enhanced unified storage management and native integration with external storage using the vVols specification which is new within VMware Cloud Foundation.
- **Skyline Integration** provides collection, aggregation and analysis of customer-specific product usage data to proactively identify potential issues and improve time-to-resolution. With Cloud Foundation 4.1, Skyline becomes VCF-aware, providing integrated, proactive support enhancements including automated software compatibility checks specific to VCF environments.
- **vRealize 8 Integration** is enhanced by automated deployment of vRealize Suite Lifecycle Manager (vRSLCM) by SDDC Manager. vRSLCM is now VCF aware, providing simplified installations and

deployments. Once installed, all of the vRealize components are deployed from vRSLCM.

Q2. What is being delivered in Cloud Foundation 4.1?

A2. VMware Cloud Foundation 4.1 provides hybrid cloud infrastructure with consistent management for both VM-based and container-based applications. By integrating vSphere 7 with Tanzu, container orchestration is now delivered natively within the Cloud Foundation SKU. VMware Cloud Foundation 4.1 includes the following components:

- vSphere 7.0 Update 1 with Tanzu
- vSAN 7.0 Update 1 supporting enhanced cloud native storage, integrated file services.
- vRealize Suite 2019 provides numerous enhancements to vRealize log insight and vRealize Operations 8.1 and vRealize Automation 8.1. Note: VMware Cloud Foundation 4.1 deploys vRealize Lifecycle Manager (vRSLCM), then vRSLCM deploys and provides ongoing life cycle management of other vRealize Components.
- NSX-T 3.0 operating in both management and workload domains, giving VMware Cloud Foundation better consolidation and efficiencies for cloud scale deployments.

Q3. How can customers deploy the new vSphere with Tanzu functionality?

A3. This is included in VMware Cloud Foundation 4.1 Standard, Advanced and Enterprise editions. The VMware Cloud Foundation Starter edition does NOT include vSphere 7 with Tanzu. The vSphere 7 with Tanzu functionality is not supported by previous releases (3.X) of VMware Cloud Foundation.

Q4. Will existing VMware Cloud Foundation 3.X deployments be able to upgrade to VMware Cloud Foundation 4.X?

A4. No. At this time, VMware Cloud Foundation 4.1 is to be deployed in 'greenfield' Cloud Foundation deployments only, so upgrades from

3.9.X to Cloud Foundation release 4.1 are not supported at this time.

Q5. Does VMware Cloud Foundation 4.1 support automated deployment of vRealize Suite?

A5. VMware Cloud Foundation 4.1 supports automated deployment for vRealize Suite Lifecycle Manager (vRSLCM) and then vRLCM provides deployment of the underlying vRealize components as well as ongoing life cycle management of the vRealize Suite. VMware provides manual guidance to ensure that the vRealize Suite updates are successful.

Q6. Does VMware Cloud Foundation 4.1 support VMware PKS (TKGi)?

A6. Yes. VMware Cloud Foundation 4.1 will support VMware TKGi (formerly VMware PKS). For more information, see: <https://docs.pivotal.io/tkgi/1-8/vsphere-vcf.html>.

Q7. Is VMware Horizon VDI integration supported on VMware Cloud Foundation 4.1?

A7. VMware Horizon automation is not provided with VMware Cloud Foundation 4.1; VMware Horizon 7 is supported via prescriptive guidance only. VMware Horizon 7 automation is supported with previous versions of VMware Cloud Foundation (3.x).

General

Q8. Where can I find more information and resources?

A8. You can find additional Cloud Foundation information here:

- VMware Cloud Foundation Resource Center: <http://vmware.com/go/CloudFoundationrc>
- Product Page: vmware.com/go/cloudfoundation
- Documentation: vmware.com/go/cloudfoundation-docs
- Community: vmware.com/go/cloudfoundation-community
- Talk to your VMware Partner or VMware Sales team.

Q9. What is VMware Cloud Foundation?

A9. VMware Cloud Foundation™ provides the simplest path to hybrid cloud through an integrated software platform that is the

foundation for both private and public cloud environments. Cloud Foundation provides a complete set of software-defined services for compute, storage, network and security, along with cloud management capabilities. The result is simple, secure and agile cloud infrastructure that can be deployed on premises and consumed as a service from public cloud.

Q10. How can I use Cloud Foundation in the public cloud?

A10. Select service providers from the VMware Cloud Provider program offer cloud services powered by VMware Cloud Foundation, including CenturyLink, OVH and Rackspace. Reach out to the specific service providers for more information.

VMware Cloud on AWS is an on-demand service operated, managed and sold by VMware. VMware Cloud on AWS is powered by VMware Cloud Foundation.

Additional solutions such as *Azure VMware Solution* and *Google Cloud VMware Engine* are also powered by VMware Cloud Foundation.

Note: The following questions and answers focus on Cloud Foundation for on-premises deployment.

Q11. What types of OEM integrated systems are available with Cloud Foundation from OEMs?

A11. Integrated Systems from OEMs can be either:

- Jointly Engineered Solutions VMware Cloud Foundation on Dell EMC VxRail
- Global Partner Appliances which includes Fujitsu PRIMEFLEX and the Hitachi Unified Compute Platform UCP-RS, HPE and Lenovo.
- Composable Cloud Foundation on HPE Synergy and Cloud Foundation on Dell MX
- VMware Ready Nodes available from 15 OEMs

Q12. What is the unique integration of a jointly engineered solution?

A12. Jointly engineered systems, such as Cloud Foundation on VxRail, provide unique integration with Cloud Foundation components. VxRail integration with Cloud Foundation includes, but is not limited to, lifecycle management of the hardware and software subsystems using native SDDC Manager orchestrated workflows

integrated with VxRail Manager. Note that VxRail does require Dell professional services for installation.

Q13. How does VMware Cloud Foundation integrate with composable systems?

A13. Composable systems, such as Dell MX and HPE Synergy integrate with Cloud Foundation through the Redfish API that enables the ability to compose and decompose hardware resources under control of VMware Cloud Foundation.

Q14. Who supports Cloud Foundation software and hardware?

A14. When purchasing an OEM Solution, the OEM partner will be the single point of contact for support of both hardware and software. When Cloud Foundation software is purchased from VMware, the support model will follow the standard practice of VMware products with VMware Technical Support delivering support for the Cloud Foundation software.

Q15. What are the recommended VMware Technical Support options for Cloud Foundation?

A15. The VMware Technical Support matrix lists the following support options for VMware Cloud Foundation:

- Basic
- Production
- Business Critical
- Healthcare Critical
- Mission Critical
- U.S. Federal Production

We recommend purchasing at least **Production** support, or better **Business Critical** or **Mission Critical** with VMware Cloud Foundation.

Q16. How can I purchase Cloud Foundation software?

A16. 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 public cloud service provider.

Q17. Can I install the Cloud Foundation software myself?

A17. Yes. VMware provides documentation for customers to deploy the Cloud Foundation software on their own. It is highly recommended that you 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.

Q18. What is the difference between SDDC Manager and vRealize Automation?

A18. SDDC Manager and vRealize Automation automate different aspects of building and running private and public clouds. SDDC Manager automates the installation and lifecycle management of the vSphere, vSAN, and NSX from bring-up and configuration to patching and upgrading, making it simple for the cloud admin to build and maintain the SDDC. For VCF 3.X, SDDC Manager also automates the installation and configuration of vRealize Log Insight, vRealize Operations, and vRealize Automation. (not supported in VCF 4.1)

On the other hand, vRealize Automation automates the delivery and management of the virtual machines and apps, enabling end users to consume these as services and at scale. vRealize Automation also has integration with SDDC Manager via QuickStart.

Q19. Does SDDC Manager replace other existing management tools, such as vCenter Server?

A19. No. SDDC Manager complements vCenter Server by delivering new functionality that helps cloud admins build and maintain the SDDC. The cloud admin will continue to use vCenter Server as the primary management interface for the virtualized environment.

Pricing and Packaging

Q20. What is Cloud Foundation with VMware Tanzu Standard?

A20. The VMware Cloud Foundation **Standard**, **Advanced** and **Enterprise** editions will be offered with VMware Tanzu Standard to run and manage Kubernetes across multiple clouds. The VMware Cloud Foundation **Starter** edition does not include Tanzu Standard, but this can be purchased as an add-on.

Note that these are initially only available from VMware direct and channel partners sales (no OEMs yet). Contact your VMware account team for more information.

Q21. What capabilities are added when Tanzu Standard is sold with VMware Cloud Foundation?

A21. VMware Tanzu Standard includes a Kubernetes based container management (Tanzu Kubernetes Grid), global policy management (Tanzu Mission Control) and support for monitoring (via Prometheus and Grafana). This can be added to VMware Cloud Foundation Standard, Advanced and Enterprise editions. VMware Cloud Foundation with Tanzu Standard delivers consistent operations across on-premises and public clouds through a single integrated architecture that is easy to deploy with centralized control of multiple clusters across multiple teams.

Q22. Where can I go for additional information on Cloud Foundation Pricing and Packaging?

A22. Consult with your VMware Sales Representative, channel partner or qualified OEM partner for more pricing and packaging information.

Technical

Q23. What is VMware SDDC Manager?

A23. SDDC Manager is the centralized management software in Cloud Foundation used to automate the lifecycle of vSphere, vSAN, NSX Data Center and vRealize Suite*, from bring-up, to configuration, to infrastructure provisioning to upgrades/patches. (* limitations noted)

Q24. Can I use the SDDC Manager with existing deployments?

A24. No. To benefit from SDDC Manager's automation capabilities you do a fresh install of the full SDDC software stack.

Q25. What is the Cloud Builder?

A25. Cloud Builder is a Photon OS VM that is delivered as an OVA file and includes a virtual imaging appliance (VIA). It contains all code and product bits to automate the deployment of the full SDDC stack for the management domain for your VMware Cloud Foundation instance. The VM can be deployed on any physical device that has

connectivity with the ESXi hosts, including laptops and external hosts. Follow the Cloud Builder UI on the VM to deploy the SDDC stack. Input parameters are passed in via a deployment parameters file import.

Q26. What is Multi-Instance Management?

A26. Multi-instance Management allows the ability to have multiple Cloud Foundation instances managed within a single management plane.

Q27. Can Cloud Foundation Multi-Instance Management be used in a deployment based upon a consolidated architecture?

A27. Yes, Multi-instance Management is supported in both a consolidated and standard architecture. The management cluster within a consolidated architecture is managed using resource pools. A standard architecture can be scaled easily by adding more compute and storage.

Hardware

Q28. What are the physical server requirements?

A28. VMware Cloud Foundation is supported on vSphere-compatible server hardware which meets the minimum requirements for VMware Cloud Foundation and the desired workloads. If vSAN is used as the principal storage system, the servers must be vSAN ReadyNodes. See the vSAN Compatibility Guide and the VMware Cloud Foundation product documentation for details.

Q29. What switching hardware is supported?

A29. You can use those Enterprise-grade network switches that meet the requirements of vSAN and which are capable of meeting the scale demands of a highly-connected set of vSAN hosts.

Q30. How does Cloud Foundation leverage Composable Infrastructure?

A30. Composable Infrastructure allows building physical servers on the fly using an API. Cloud Foundation has a composability plug-in which uses the "RedFish API" to do this integration. This API talks to the composable hardware manager to request physical infrastructure on demand.

Q31. Which Composable Infrastructure systems are supported?

A31. VMware Cloud Foundation supports Dell MX and HPE Synergy as composable infrastructure systems.

Workload Domains

Q32. What is a workload domain?

A32. Workload Domains are a logical abstraction of private Cloud capacity that is provisioned automatically by SDDC Manager and administered and patched independently. Workload Domains provide a unit of consumption at the SDDC level by presenting an integrated selection of compute, storage and network resources for business workloads to run in.

Q33. Why would a user create another workload domain?

A33. In order to scale deployments, assign unique characteristics and maintain workload isolation, it is a best practice to create additional workload domains for new workloads.

Q34. What is a management domain?

A34. 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 infrastructure. The management domain is automatically created using the Cloud Builder appliance when it is initially configured.

Q35. How many nodes are required for the management domain?

A35. The management domain leverages vSAN for storage and requires a minimum of 4 nodes.

Q36. How many vCenter Server instances can be deployed in a workload domain?

A36. Each workload domain has one dedicated vCenter Server instance. (Note: Only one vCenter Server license is needed per Cloud Foundation instance or 15 workload domains)

Q37. What is the minimum number of vSphere hosts that can be in a Virtual Infrastructure Workload Domain?

A37. Workload domains require a minimum of three hosts.

Q38. Can I extend/delete a workload domain after it has been created?

A38. Yes, Cloud Foundation provides a fully automated process for creating, extending, and deleting workload domains using SDDC Manager. If supplemental storage has been added to the workload domain, manual processes may be required to provision or un-provision this storage accordingly.

Q39. Can I reduce the size of a workload domain?

A39. Yes, Cloud Foundation allows removing hosts and clusters from workload domains.

Storage

Q40. What is the difference between Principal storage and Supplemental storage within VMware Cloud Foundation?

A40. Principal storage is selected when creating a management domain, workload domain, or when creating a new cluster within a workload domain. Supplemental storage may be added to management or workload domain clusters after their creation. Principal storage is required for every cluster. Supplemental storage can be used for additional storage options. Both principal and supplemental storage can be used for primary workloads/use-cases.

Q41. Can I change the principal storage selection after creating a workload domain cluster?

A41. No, you must create a new cluster within the workload domain or a new workload domain to change the principal storage selection. vMotion can be used to move the VMs to the newly created cluster. Supplemental storage can be manually added or removed without re-creating the cluster.

- Q42. Does VMware Cloud Foundation support external Fibre Channel Storage Arrays as a principal storage within a Cloud Foundation Workload Domain?
- A42. Yes, while vSAN the preferred and most integrated storage choice for workload domain clusters, administrators have the option to provision external FC storage systems using VMFS on FC as the principal storage. In addition, vVols and NFSv3 storage systems may also be used for workload domain principal storage. vVols, VMFS on FC, NFS v3 or v4, and iSCSI may also be used as supplemental storage. vSAN is the only principal storage option for the management domain. Management domain supplemental storage can be any of the supplemental storage options available to workload domains. For all storage options, the system must appear on the vSphere SAN/NAS Compatibility Guide: <http://vmw.re/storageevcg>.
- Q43. Is vSAN required with Cloud Foundation?
- A43. vSAN is required for the Cloud Foundation management domain principal storage. It is possible to add supported storage options as supplemental storage for the management domain (see A41). The workload domains may use vSAN or a supported storage option for principal storage, with a variety of additional storage options available as supplemental storage (see A41).
- Q44. Which principal storage options are supported with VMware Cloud Foundation?
- A44. VMware Cloud Foundation can consume and is validated against vSAN, vVols, NFS v3, and VMFS on FC. vSAN is the only principal storage option for the management domain. VMware recommends using vSAN as the principal storage for all workload domains to leverage the benefits of managing and maintaining a full software defined stack. vSAN is also updated and patched by SDDC Manager. Updating and patching non-vSAN storage is a manual task and falls outside of the lifecycle management offered by SDDC Manager. To ensure supportability, the storage system will need to be validated on the vSphere SAN/NAS Compatibility Guide: <http://vmw.re/storageevcg>.
- Q45. Which supplemental storage options are supported with VMware Cloud Foundation?
- A45. VMware Cloud Foundation supports the use of NFS (v3, or v4.1), VMFS on FC, iSCSI and vVols as supplemental storage. Supplemental storage is not integrated to or shown within SDDC Manager.
- Q46. Does Cloud Foundation support all-flash vSAN storage?
- A46. Yes, Cloud Foundation supports both the Hybrid and All-Flash vSAN configurations. Note that clusters within a multi-cluster workload domain can have both Hybrid and All-Flash vSAN configurations, mixing Hybrid and All-Flash nodes within a single cluster is not supported.
- Q47. Can I use Network Attached Storage (NAS) with Cloud Foundation?
- A47. VMware Cloud Foundation supports the use of NFS (v3, or v4.1), VMFS on FC, iSCSI and vVols as supplemental storage. Supplemental storage is not integrated to or shown within SDDC Manager.
- Q48. Can I use any server to create a workload domain when utilizing non-vSAN storage?
- A48. Yes, any vSphere-compatible server can be used for a workload domain cluster not using vSAN. They do not need to be vSAN ReadyNodes in this case.
- Q49. Does VMware Cloud Foundation 4.1 support vSAN Stretched Clusters?
- A49. vSAN stretched clusters are currently only supported on workload domains using vSphere Upgrade Manager (VUM) vs. vSphere Lifecycle Manager (VLCM).
- Q50. Is stretched clustering supported for a workload domain configured for Kubernetes?
- A50. No. vSAN Stretched Clustering for workload domains that are configured for Kubernetes Workload Management is currently not supported.

Networking

- Q51. Can I connect the NSX-T Manager in Cloud Foundation to other non-Cloud Foundation infrastructure?
- A51. No. This is not supported. NSX-T is only aware of the corresponding Cloud Foundation Workload Domains
- Q52. Does VMware Cloud Foundation support Bare Metal Edge Servers in NSX-T?
- A52. Yes. The overwhelming majority of customers deployment use case can be fulfilled with VM form factor edge nodes. Support for Bare Metal Servers configured as NSX-T Edge Nodes is provided for customers specific use cases which cannot be supported on an VM form factor edge node.
- Q53. Does VCF support Bare Metal Servers (i.e. Windows or Linux servers) or KVM as NSX-T transport nodes??
- A53. No, VCF does not support hosts which are not managed by SDDC manager to be part of the NSX-T installation. Today, SDDC manager does not support KVM or other NSX-T bare metal servers as transport nodes.

VCF Remote Clusters

- Q54. Is there a hard requirement of 3-4 nodes per VCF Remote Cluster site?
- A54. VCF only supports a minimum of 3 nodes and a maximum of 4 nodes per VCF Remote Cluster.
- Q55. What is the license requirement for VCF Remote Clusters?
- A55. VCF standard pricing applies to VCF Remote Clusters, no special pricing or licensing is required.
- Q56. Is there any hardware specific requirements for VCF Remote Clusters?
- A56. No, any vSAN Ready Nodes or Dell VX Rail system will support VCF Remote Clusters.

- Q57. Why is the requirement to have two active WAN links from the remote sites to the central site?
- A57. VCF Remote Cluster is designed to optimize for cost in the remote sites. The SDDC Manager & NSX Manager is in the central, so if the WAN link between the central site and remote sites fails when a node in the remote site reboots, resulting in a dual failure state, the VMs running on the node at the remote site will not be operational until the WAN link becomes active. This can cause application instability in the remote sites. To avoid, it is strongly recommended to use dual active WAN links across sites

Patching and Upgrades

- Q58. What software components can be patched/upgraded using SDDC Manager?
- A58. VMware vSphere, vSAN, NSX, vCenter Server and SDDC Manager components are patched/upgraded
- Q59. How am I notified when patches/upgrades become available?
- A59. Users are automatically notified from the SDDC Manager user interface when patches and upgrades become available.
- Q60. Can I schedule when patches and upgrades are applied?
- A60. Yes, SDDC Manager allows patches and upgrades to be scheduled to coincide with regular maintenance windows.
- Q61. Can I patch/upgrade workload domains independent of each other?
- A61. Yes, patches and upgrades are scheduled on a per-workload domain basis allowing updates to be "rolled-in" over time. With VMware Cloud Foundation 3.10, you can apply cluster level upgrades from version 3.9.x and parallel upgrades. With VMware Cloud Foundation, you can only apply cluster level upgrades from Cloud Foundation 4.0.
- Q62. Customers are given an option to choose vSphere Update Manager (VUM) or vSphere Lifecycle Manager (vLCM) when

creating a workload domain. When should I use VUM vs. vLCM?

- A62. VUM is the preferred solution when your hardware is not yet supported by vLCM. Note that VUM is required for the Management Domain and when running vSphere with Tanzu. Use vLCM when supported by your hardware platform. vLCM supports firmware updates with more vendors to follow in coming releases. NSX-T Instances cannot be shared between VUM and vLCM.

Configuration Minimums and Maximums

Q63. What is the minimum size of a Cloud Foundation environment with a consolidated deployment?

- A63. You need at least 4 servers to run Cloud Foundation in a consolidated architecture. Workload VMs are placed in dedicated resource pools in the Management Domain

Q64. What is the minimum size of a Cloud Foundation environment to use VI workload domains?

- A64. With a standard architecture, you need at least 7 servers to run Cloud Foundation with a VI workload domain. 4 What is the maximum size of a Cloud Foundation environment? Cloud Foundation inherits configuration maximums from the component products. For information on sizing VMware Cloud Foundation refer to <https://configmax.vmware.com>

Q65. What is the maximum size of a workload domain?

- A65. Each workload domain has its own vCenter Server and it can have as many hosts and clusters as a single vCenter Server can handle. Within Cloud Foundation 4.1., you may also size the vCenter Server instance during VI WLD creation via the API or change the vCenter size after deployment. vCenter Server limits apply, see <https://configmax.vmware.com> for more information.

Q66. How many workload domains can a Cloud Foundation instance have?

- A66. Cloud Foundation always has 1 management domain and up to 14 VI workload domains. Each workload domain can contain multiple ESXi host clusters. This limit is imposed by the max number of vCenter Server instances that can be configured in enhanced linked

mode which supports up to 15 vCenter Servers, and each workload domain has its own vCenter Server. See

<https://configmax.vmware.com> for more information.

Advanced Security for VMware Cloud Foundation Addon

Q67. What is VMware Advanced Security for Cloud Foundation?

- A67. VMware Advanced Security for Cloud Foundation brings together world-class workload protection, intrusion detection and prevention, advanced load balancing, and web application firewall for public and private clouds based on VMware Cloud Foundation.

Q68. How is VMware Advanced Security for Cloud Foundation sold?

- A68. VMware Advanced Security for Cloud Foundation is sold as an add-on to VMware Cloud Foundation. The first add-on bundle, Network and App Security Add-on for Cloud Foundation, is now available.

Q69. What is included with the Network and App Security Add-on for Cloud Foundation?

- A69. The Network and App Security Add-on for Cloud Foundation includes NSX Advanced Load Balancer (Avi), NSX Distributed IDS/IPS, and Carbon Black Endpoint Workload.

Q70. Can the security bundle be added to previous versions of Cloud Foundation?

- A70. The Network and App Security Add-On for Cloud Foundation is available on Cloud Foundation 4.0 and above.

Q71. Will Network and Security Add-On for Cloud Foundation work in a vSphere environment?

- A71. Only as part of a VMware Cloud Foundation environment running NSX-T 3.0 or later.

Miscellaneous

Q72. Does SDDC Manager automate the deployment of other management components, such as vRealize Network Insight (vRNI)?

A72. vRNI can be manually deployed and externally integrated with VMware Cloud Foundation

Q73. What logs are sent to the vRealize Log Insight in the Cloud Foundation management cluster?

A73. Cloud Foundation can be configured to send event logs for vSphere, vSAN, NSX, SDDC Manager, vCenter and Horizon into vRealize Log Insight.

Q74. How can SDDC Manager be protected by backup?

A74. In Cloud Foundation 4.1, SDDC Manager backup and recovery capabilities have been enhanced, allowing VMware backup solution provider partners to easily protect and restore SDDC Manager.