



FlexPod And You *Navigating To and Thru the Core of the Modern Datacenter*

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Course Modules

This course focuses on enabling you to do the following:

Module 4:





- FlexPod Design
- FlexPod Architecture
- FlexPod Customer support





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FlexPod Datacenter with vSphere 7.0



FlexPod® Datacenter with VMware 7.0 and ONTAP 9.7

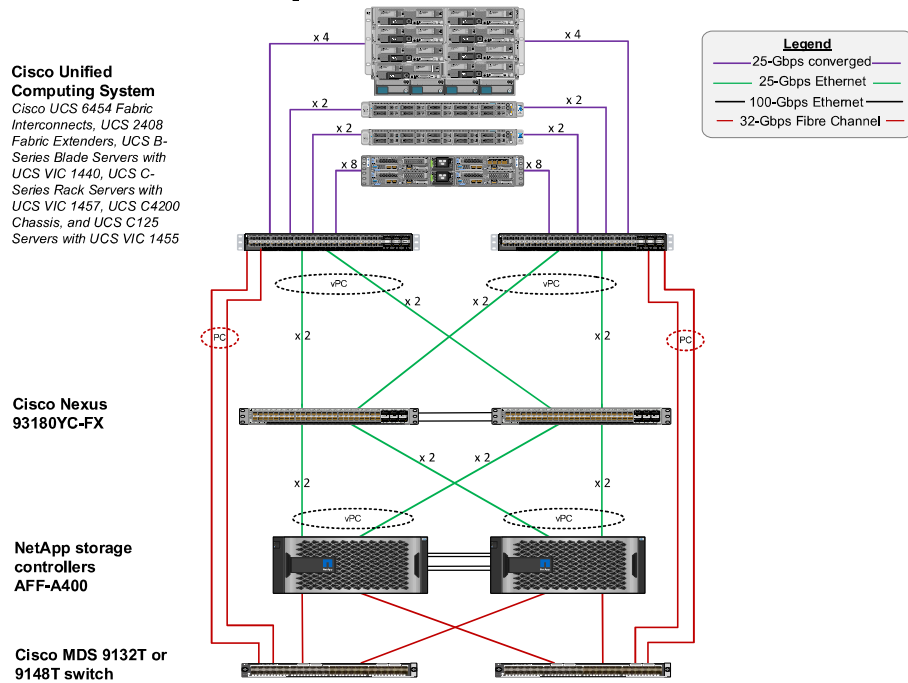


https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/UCS_CVDs/flexpod_VMware_vs_7_design.html

Customer Value

- Customers can enjoy new features and capabilities in vSphere 7.0
 - vMotion performance, vCenter scalability, NVMe
- Expand customer choice with new support for UCS C125 M5 AMD-based server
 - high density, high performance, energy efficient
- Cisco Intersight cloud-based management
 - continuous enhancements, non-disruptive
- Increase scalability for ActiveIQ Unified Manager
 - consolidate AIQUM instances for large ONTAP cluster
- Support all AFF and FAS storage systems
 - consistent data services, simplify user experience

FlexPod with VMware vSphere 7 25GE Core Networking Topology

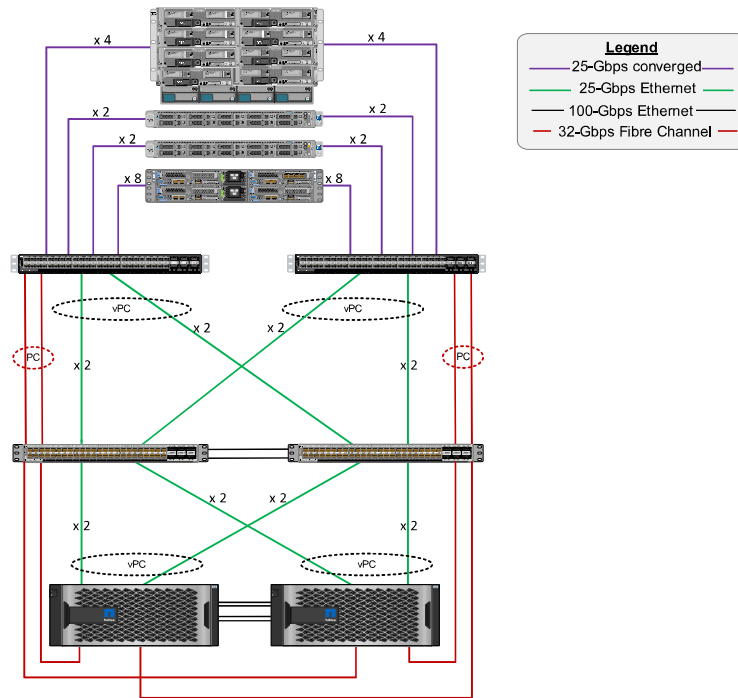


FlexPod with VMware vSphere 7 Nexus 93180YC-FX SAN Switching

Cisco Unified Computing System
 Cisco UCS 6454 Fabric Interconnects, UCS 2408 Fabric Extenders, UCS B-Series Blade Servers with UCS VIC 1440, UCS C-Series Rack Servers with UCS VIC 1457, UCS C4200 Chassis, and UCS C125 Servers with UCS VIC 1455

Cisco Nexus 93180YC-FX

NetApp storage controllers AFF-A400



Introducing Cisco UCS C125 Servers in C4200 Chassis

Front View



Rear View



AMD EPYC 2nd Generation CPUs in Cisco UCS C125 Servers

- 4 AMD EPYC 2nd Generation CPUs Currently Supported

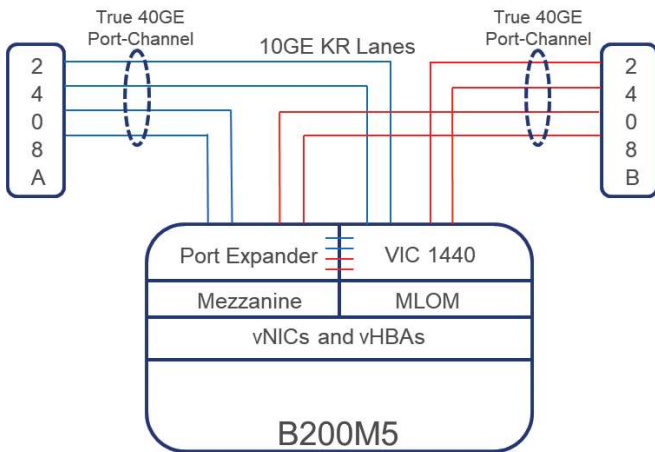
Product ID (PID)	Description
UCS-CPU-A7702	2.0GHz 7702 180W 64C/256MB Cache DDR4 3200MHz
UCS-CPU-A7552	2.2GHz 7552 180W 48C/192MB Cache DDR4 3200MHz
UCS-CPU-A7532	2.4GHz 7532 180W 32C/256MB Cache DDR4 3200MHz
UCS-CPU-A7352	2.3GHz 7352 155W 24C/128MB Cache DDR4 3200MHz

- 8x 3200MHz Memory Slots per CPU with 16, 32, and 64GB RAM Module Options
- CPUs With More Than 32 Cores Require 2 VMware ESXi Licenses
- Option to Use a Single 64 Core CPU Instead of 2x 32 Core CPUs to Save Power and Cooling
- See <https://www.amd.com/en/processors/epyc-7002-series> for More Info on CPUs
- Cisco UCS C125 Spec Sheet: <https://www.cisco.com/c/dam/en/us/products/collateral/servers-unified-computing/ucs-c-series-rack-servers/c125m5-rack-server-node.pdf>

Intel Optane DC Persistent Memory in Intel-Based B and C-Series

- Intel Optane Persistent Memory Introduces a New Category that Sits between Memory and Storage
- Available in Capacities of 128, 256, and 512GiB (DRAM Caps at 128GiB)
- Used With DRAM
- Two Modes of Operation: Memory Mode and App Direct Mode
- Memory Mode: Uses DRAM as Cache and Greatly Extends the Amount of Volatile Memory
- App Direct Mode: Non-Volatile Memory that Modern OSs Can Talk to Directly. Legacy Storage APIs Can Also Be Used. Currently, Few Applications Take Advantage of App Direct Mode.
- vSphere 7 Supports Memory Mode in Certain Memory Configurations: [vSphere Support for Intel's Optane Persistent Memory \(PMEM\) \(67645\)](#)
- For the Medium Configuration, Using List Prices, 1TB Intel Optane PMem + 384GB DRAM is 20% Less than 1TB DRAM, Although Memory Speed is 2666MHz Instead of 2933 MHz

Support of Port Expander with VIC 1440 in UCS B-Series



- Cisco UCS Port Expander is Now Supported with UCS 4.1(2), 6400 Series FI, IOM 2408, and VIC 1440
- The 4 10GE KR Lanes are Timed to Produce a True 40GE Port-Channel Between Server and IOM
- 25GE Links Between IOM and FI Provide Effective 25Gbps vNICs and vHBAs
- Looking Forward to FC-NVMe 25G vHBAs are Much Closer to 32G FC and 10G vHBAs
- Port Expander Support Puts B-Series on Par with C-Series Networking

Backplane Ports

Name	Oper State	Port Channel	Speed	Fabric ID
Backplane Port 1/1	↑ Up	sys/chassis-1/slot-1/host/pc-12...	40 Gbps	A
Backplane Port 1/2	↓ Admin Down	sys/chassis-1/slot-1/host/pc-12...	Auto	A
Backplane Port 1/3	↓ Admin Down	sys/chassis-1/slot-1/host/pc-12...	Auto	A
Backplane Port 1/4	↓ Admin Down	sys/chassis-1/slot-1/host/pc-12...	Auto	A

VMware High Traffic Adapter Policy

Delete
Show Policy Usage
Use Global

Name : **VMware-HighTrf**
Description :
Owner : **Local**

Resources

Pooled : Disabled Enabled

Transmit Queues : [1-1000]

Ring Size : [64-4096]

Receive Queues : [1-1000]

Ring Size : [64-4096]

Completion Queues : [1-2000]

Interrupts : [1-1024]

Options

Transmit Checksum Offload : Disabled Enabled

Receive Checksum Offload : Disabled Enabled

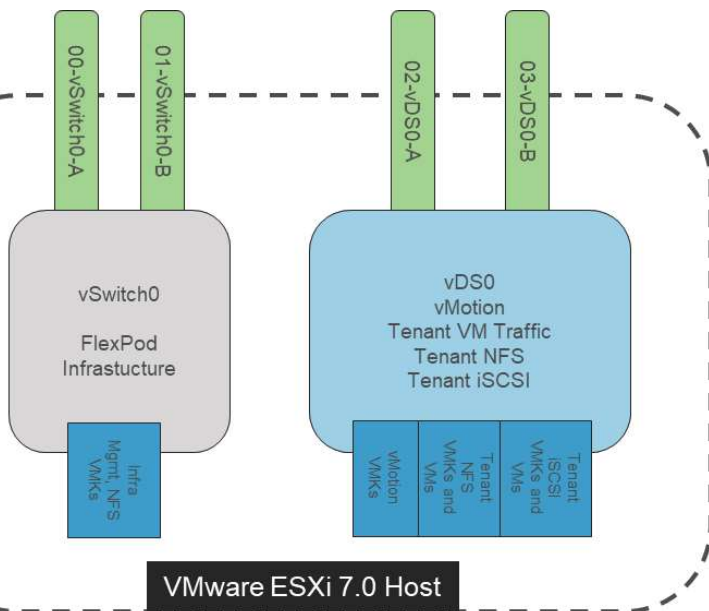
TCP Segmentation Offload : Disabled Enabled

TCP Large Receive Offload : Disabled Enabled

Receive Side Scaling (RSS) : Disabled Enabled

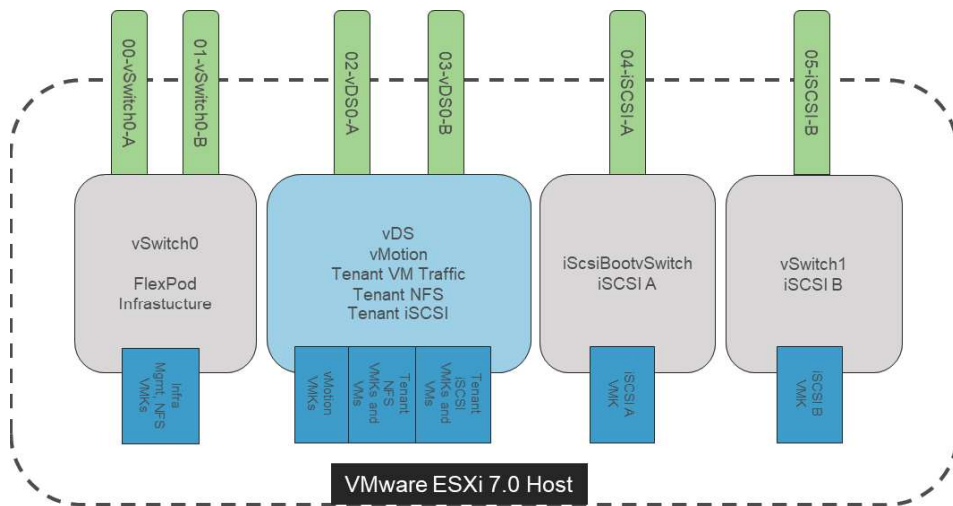
- For high speed vNICs, additional read queues can be added to the interface to increase performance
- Receive Side Scaling (RSS) is enabled to allow queues to be serviced by multiple CPU cores
- Receive Queues can be set up to 16 with proper adjustment of Completion Queues and Interrupts
- Testing has shown that this policy improves performance

Recommended ESXi Host vNIC/vSwitch Layout – FC Boot



- We leave standard vSwitch0 in place with the ESXi management interface, the infrastructure management VLAN port group for management VMs, and infrastructure management NFS for the datastore with management VMs
- The Virtual Distributed Switch (vDS) contains vMotion and all tenant traffic and the vNICs have the VMware High Traffic Adapter Policy
- With 40 and 50GE vNICs, we create 3 vMotion VMkernel ports in a port group pinned to Fabric B
- It is critical that vCenter stay on vSwitch0

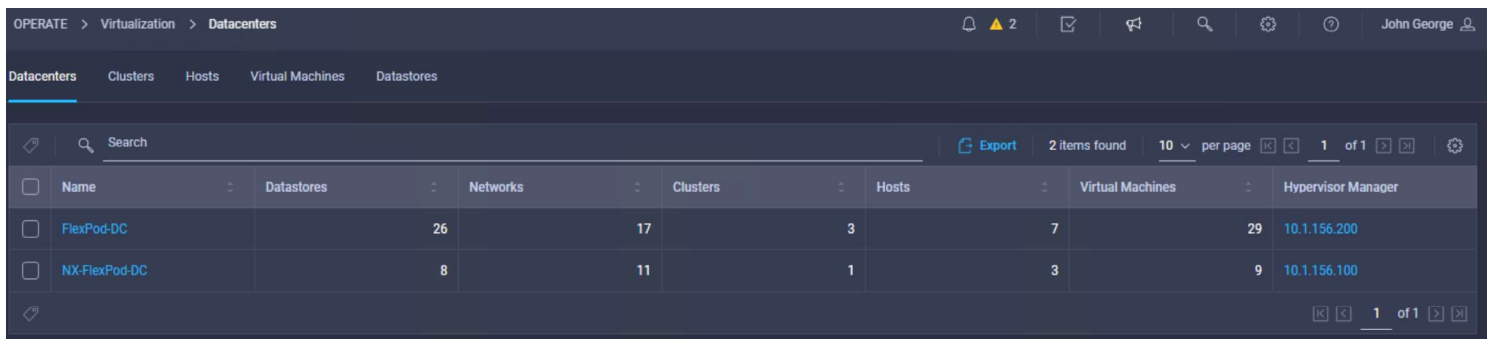
Recommended ESXi Host vNIC/vSwitch Layout – iSCSI Boot



- This is the simplest way to add the iSCSI Boot interfaces
- It is optional to combine to a single iSCSI boot vSwitch with interface pinning, create a separate iSCSI vDS, or move the iSCSI VMkernel ports to vDS0

Cisco Intersight Features Supported

- Cisco UCS Server Monitoring and Inventory
- Upgrade of UCS Infrastructure Software and Firmware
- Server UCS Hardware Compatibility List (HCL) Check
- VMware vCenter 7 Information Through Intersight Assist
- VMware vCenter 7 Orchestration (Tech Preview Not to Be Used on Production Systems)



The screenshot shows the Cisco Intersight interface for Datacenters. The breadcrumb navigation is OPERATE > Virtualization > Datacenters. The user is John George. The table displays the following data:

Name	Datastores	Networks	Clusters	Hosts	Virtual Machines	Hypervisor Manager
FlexPod-DC	26	17	3	7	29	10.1.156.200
NX-FlexPod-DC	8	11	1	3	9	10.1.156.100

 FlexPod®

New with ONTAP 9.7

Hardware Support

Feature Support

ActiveIQ

ActiveIQ Unified Manager

Virtual Appliance for vSphere 7

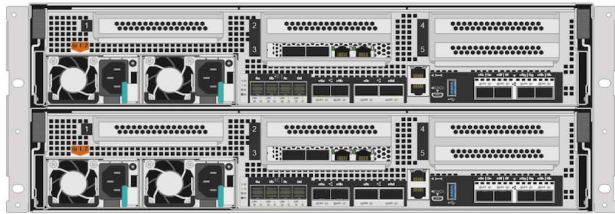
SnapCenter support for vSphere 7



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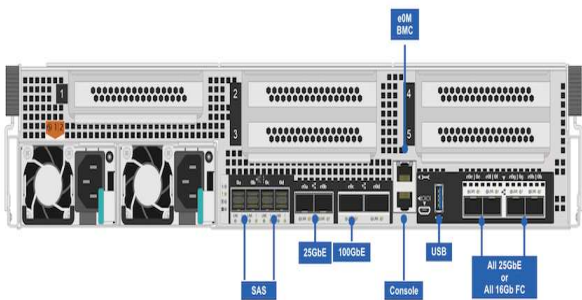
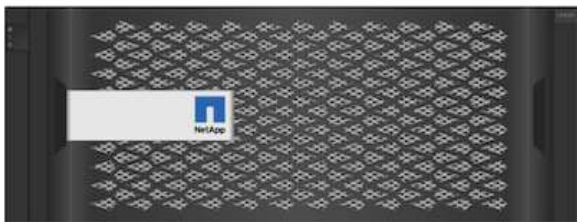


Hardware Support: AFF A400



Model	A400
Best for	Most enterprise applications that require best balance of performance and cost
Maximum scale-out	24 nodes
Maximum SSD	5760
Controller Chassis Form Factor	4U

Hardware Support: FAS 8700/8300



Models	FA8700	FA8300
Max Raw Capacity per HA pair	14.7PB	7.3PB
Max Drives per HA pair	1440	720
NAS scale-out	1-24 nodes (12 HA Paris)	1-24 nodes (12 HA Paris)
SAN scale-out	1-12 nodes (6 HA Paris)	1-12 nodes (6 HA Paris)
Max Raw Capacity per cluster	176PB	88PB
Controller chassis form factor	4U	4U
OS version	ONTAP 9.7 RC1 or later	ONTAP 9.7 RC1 or later
Storage Protocols supported	FC, iSCSI, NFS, pNFS, CIFS/SMB	FC, iSCSI, NFS, pNFS, CIFS/SMB

New with ONTAP 9.7



Automatically enable Data-at-rest encryption if a key manager is configured.



Hardware offload for better performance and Storage Efficiency.

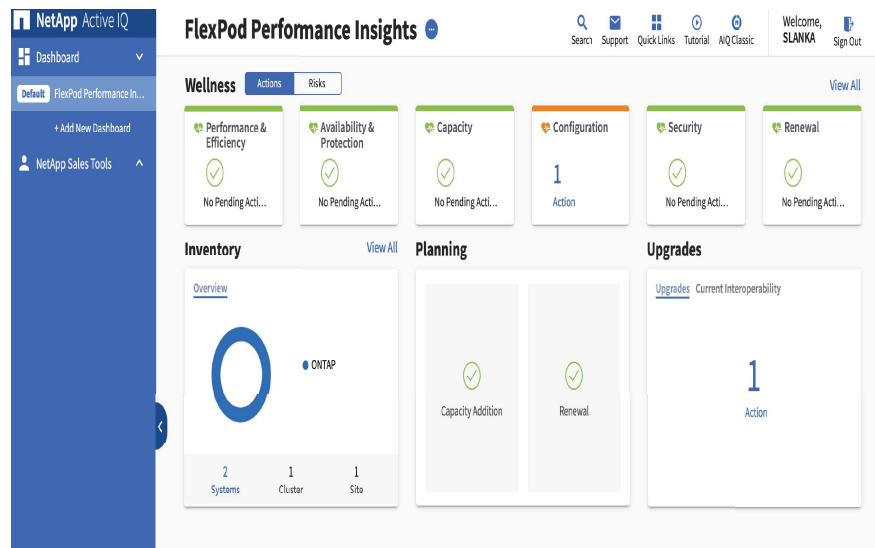


Enhancements to ONTAP Systems Manager



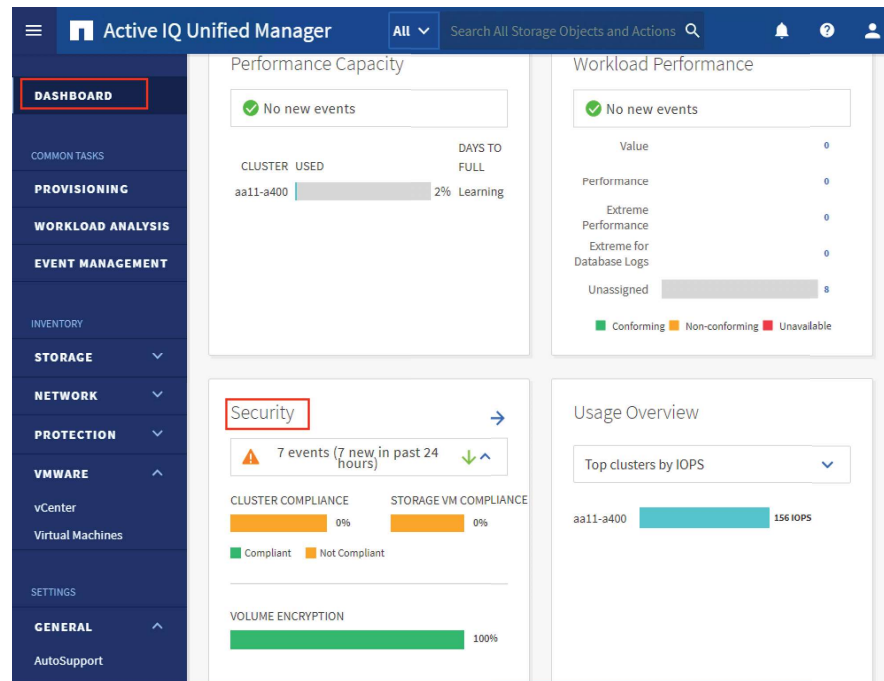
ActiveIQ

Active IQ offers an enhanced User Interface and a personalized experience with AIQ Digital Advisor Dashboards.



ActiveIQ Unified Manager

- comprehensive monitoring and proactive management tool.
- a new security risk panel.
- provides API offerings for storage management through RESTful API service interface for third party integration.



Virtual Appliance 9.7.1 for vSphere 7

Virtual Storage Console (VSC)

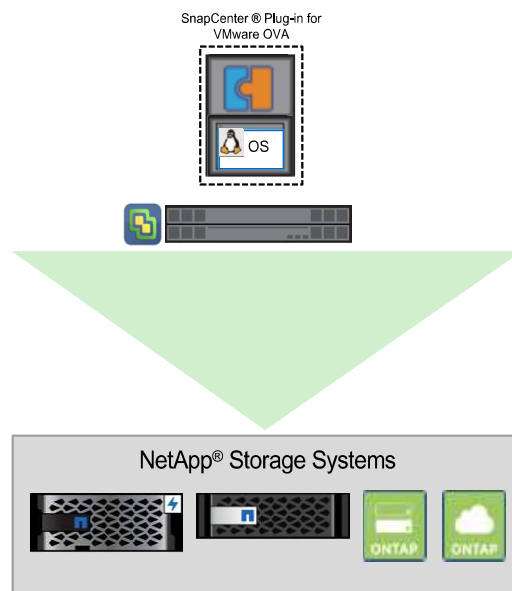
VASA Provider

Storage Replication Adapter (SRA)

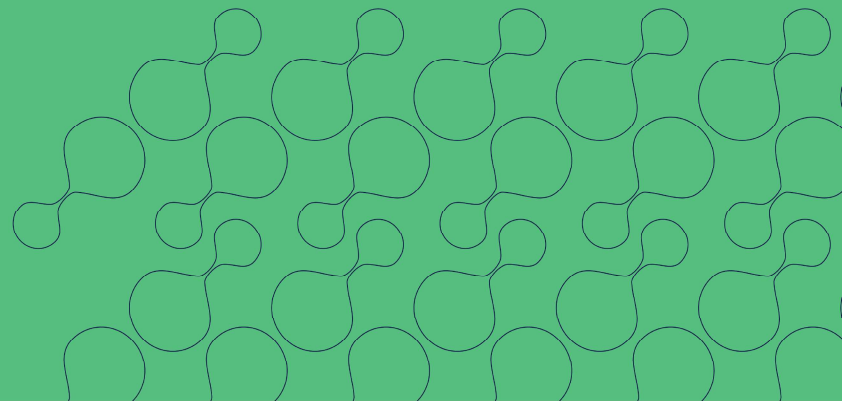
- Improved performance for large scale environments
- Configuration of ONTAP role-based access control (RBAC) by using ONTAP System Manager
- Use of ONTAP REST APIs to obtain vVols metrics for SAN storage systems that use ONTAP 9.7 and later releases, so that NetApp OnCommand® API Services is no longer required
- SRA support for Site Recovery Manager Appliance (Photon OS-based) as well as Windows based version

SnapCenter Plug-in for vSphere 7

- Easily back up VMs and datastores from vSphere
- Restore or mount from primary or secondary storage
- Create and reuse policies
- Centralized job monitoring and reporting



VMware

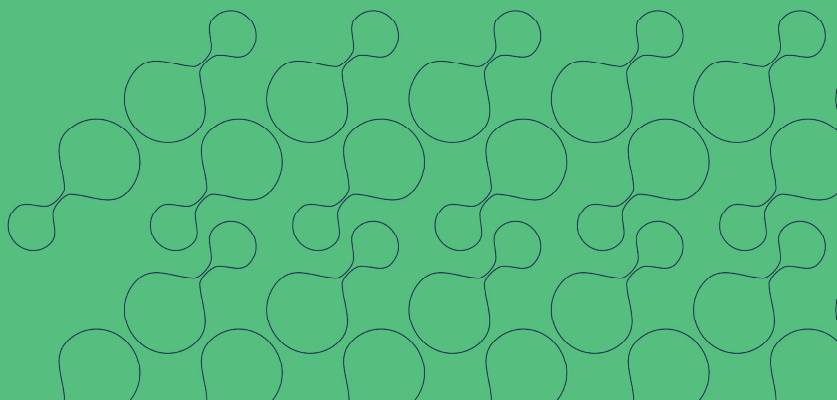


vSphere 7.0

- VMware vSphere is a virtualization platform for holistically managing large collections of infrastructure (resources-CPU, storage and networking) as a seamless, versatile, and dynamic operating environment. Unlike traditional operating systems that manage an individual machine, VMware vSphere aggregates the infrastructure of an entire data center to create a single powerhouse with resources that can be allocated quickly and dynamically to any application in need.
- vSphere 7.0 brings several improvements including, but not limited to the following:
 - Fully featured vSphere Client (HTML5) client. The Flash-based vSphere Web Client has been deprecated and is no longer available.
 - Improved Distributed Resource Scheduler (DRS) – a very different approach that results in a much more granular optimization of resources.
 - Assignable Hardware – a new framework that was developed to extend support for vSphere features when customers utilize hardware accelerators.
 - Introducing vSphere Lifecycle Manager – a replacement for VMware Update Manager, bringing a suite of capabilities to make lifecycle operations better.
 - Refactored vMotion – improved to support today’s workloads.

For more information about VMware vSphere and its components, see: <http://www.vmware.com/products/vsphere.html>.

Solution Support



Three Support Options

FlexPod Cooperative Support

You decide which vendor to call



FlexPod partner product experts provide Cooperative Support via a defined engagement model

Included with FlexPod

FlexPod Solution Support

Contact NetApp OR Cisco directly



Primary point of contact owns case management and coordinates vendor support

Purchase from NetApp or Cisco or your partner

FlexPod Partner Authorized Support

Contact your partner



Each partner provides unique support services

Purchase from your partner



Support Your Way FlexPod Technical Services

Sept 2020



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Get the support you need,
your way, by choosing from
variety of FlexPod support
services that meet your
technology and business
requirements.



Three Support Options

FlexPod Cooperative Support

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FlexPod Partner Authorized Support

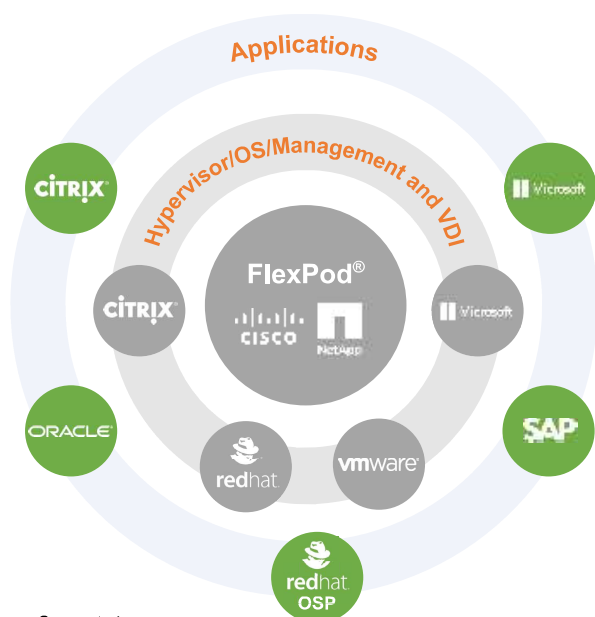
Contact your partner



Each partner provides unique support services

Purchase from your partner

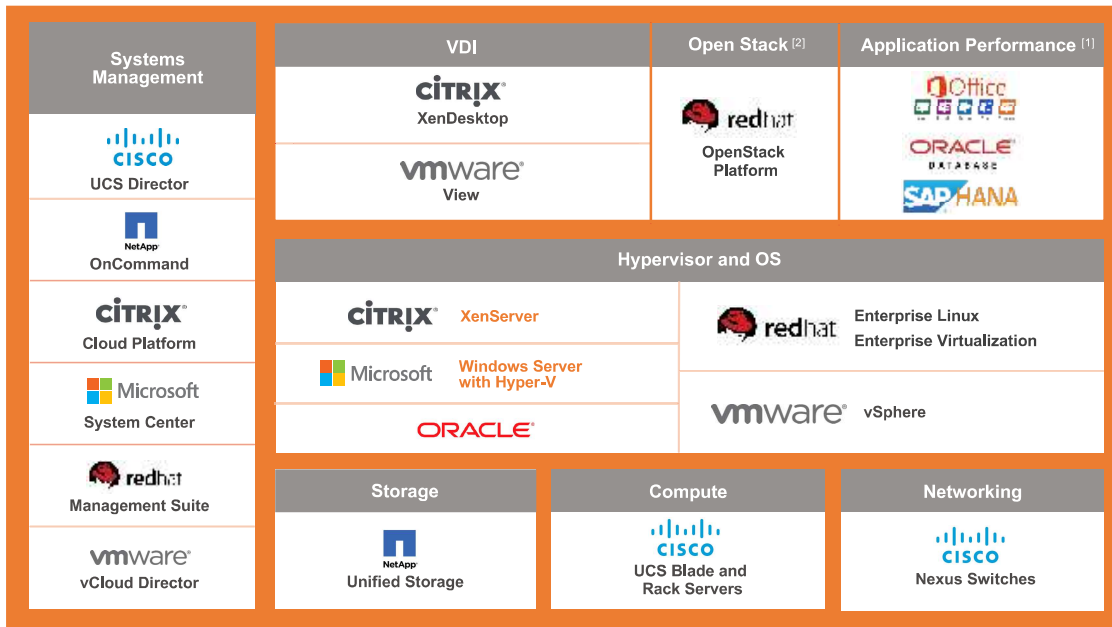
Whatever Your Choice, Engineer Experts from the Ecosystem Drive Issue Resolution



Green = Support via
FlexPod Cooperative

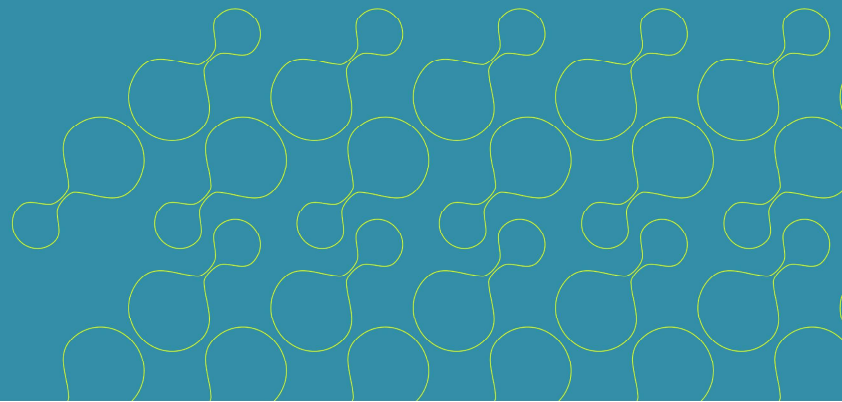
Blue = Support via
TSANet or Vendor contact

Across the Spectrum of FlexPod Technologies

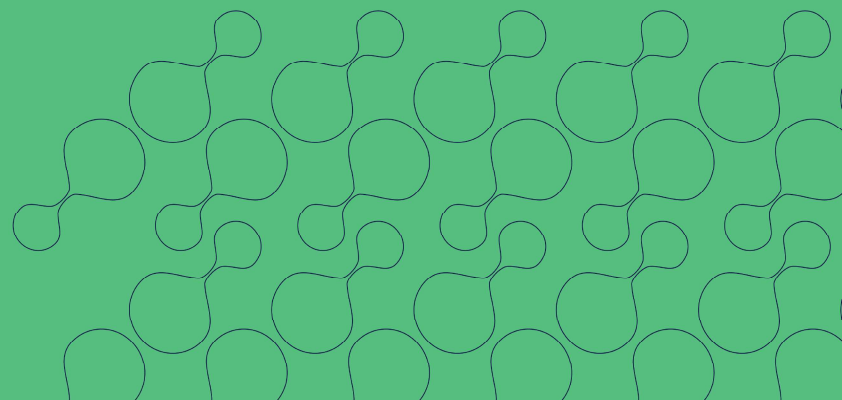


[1] Support is provided for application performance on the FlexPod infrastructure, not for the applications themselves.
 [2] Engagement initiated by Cooperative Support, or coverage through Cisco Solution Support.

Choose Your Engagement Model



FlexPod Cooperative Support



FlexPod Cooperative Support

Smooth resolution of issues through a defined, cooperative process between Cisco, NetApp, Citrix, Microsoft, Red Hat, and VMware.

Direct Access



Flexibility to contact any of the product experts at the ecosystem vendors and partners that you need, whenever you need them

Cooperative Support



Labs with ecosystem equipment enables vendors and partners to recreate issues and expedite issue resolution

FlexPod Expertise



Strong relationships and ongoing training and communications across ecosystem vendors and partners provide a common basis for issue resolution

How You Benefit from FlexPod Cooperative Support



CHOICE

Direct access to product experts from any of the ecosystem vendors to quickly get to issue resolution



CONVENIENCE

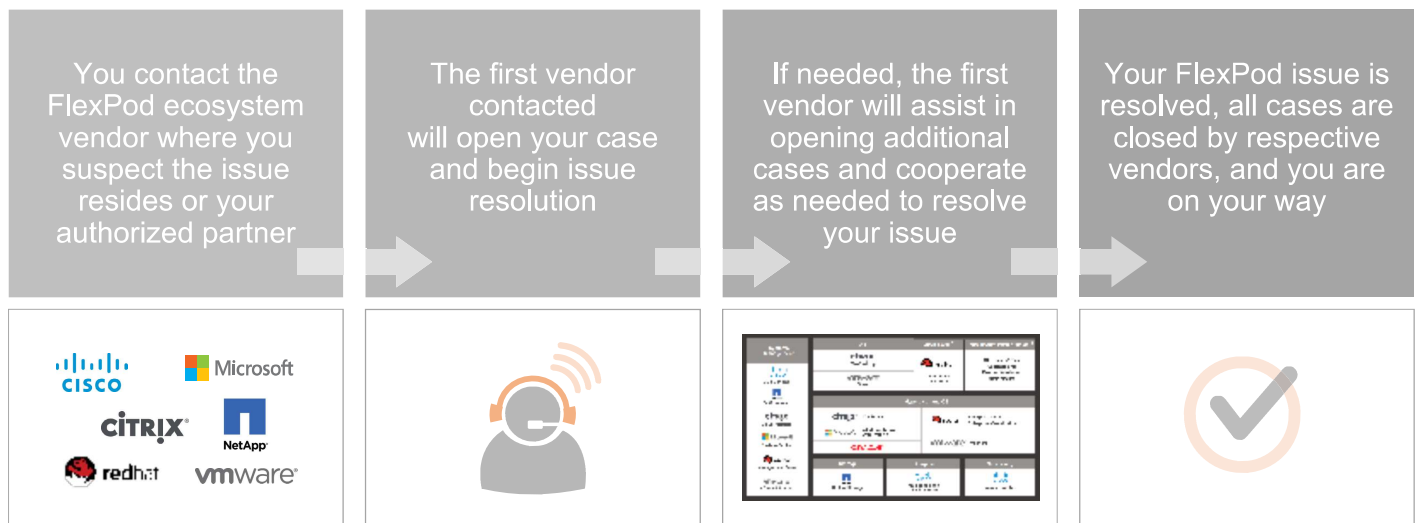
No additional contracts; FlexPod Cooperative Support is included with your FlexPod premium product support purchase



FULL SERVICE

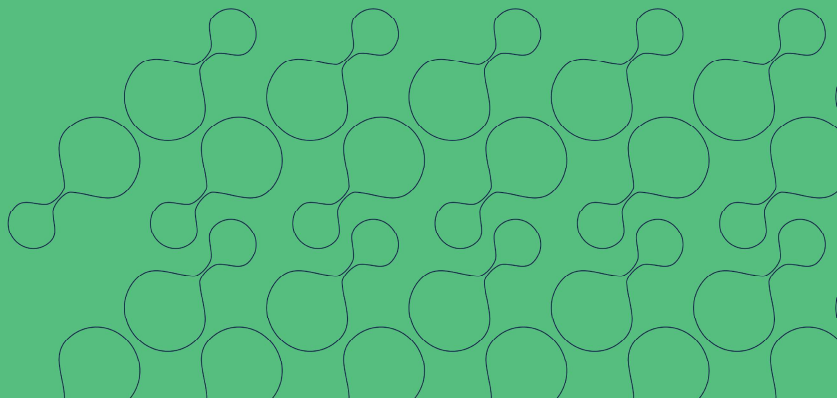
No need to manage vendors or watch them finger point – our engagement model ensures vendor cooperation to resolve your issue

How FlexPod Cooperative Support Works



Note: Red Hat Linux and Red Hat Virtualization fall under Cooperative Support. Red Hat OSP support is provided as best effort by the Cisco Technical Assistance Center.

Solution Support



Solution Support for FlexPod Overview

A 1-800 number connects you to NetApp or Cisco expert engineers who are focused on FlexPod and accountable for issue management and resolution.



How You Benefit from Solution Support

Primary point of contact >> Accountability and continuity of service from first call until you close your case

Deep FlexPod expertise >> Often results in immediate issue resolution so you get back to business sooner

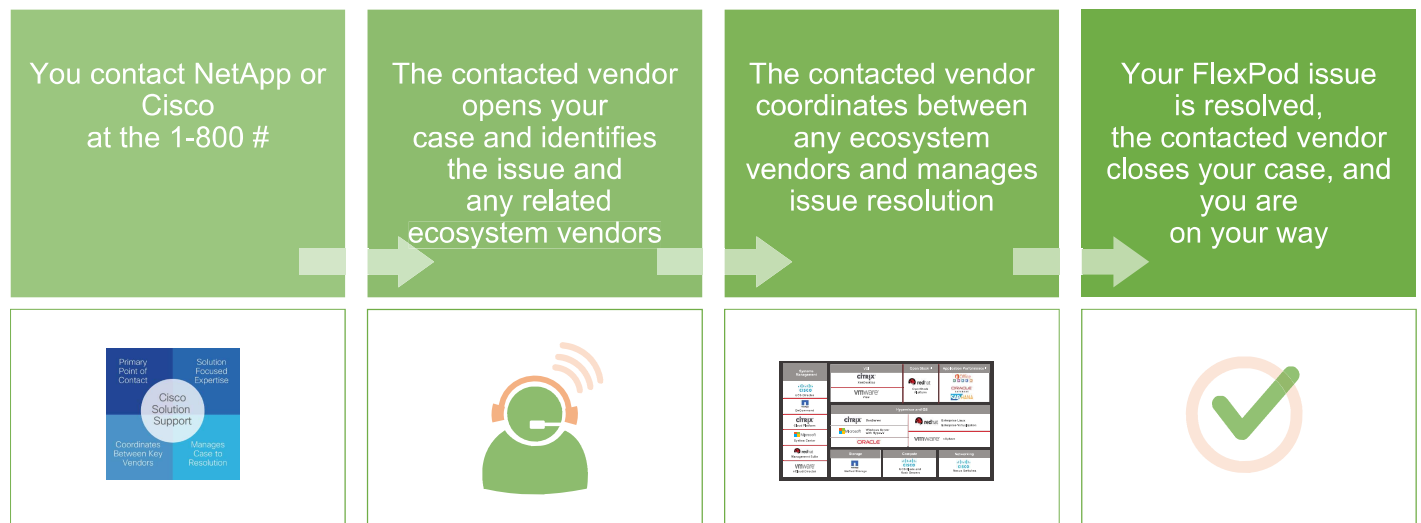
Coordination between FlexPod ecosystem vendors >> Eliminates your need to manage vendors and your case

Open door approach >> No need to diagnose a problem before contacting our FlexPod experts

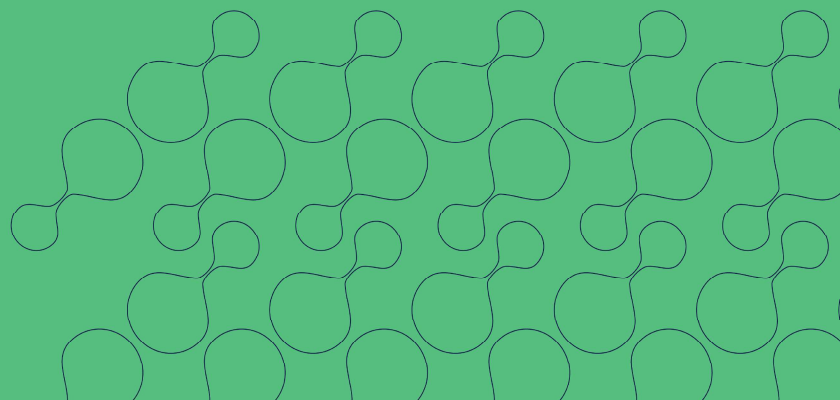
One service, broad coverage >> Get FlexPod ecosystem support and Cisco product support in one service that's easy to order and renew

Reliable cost of expansion >> Standardized pricing gives predictable costs when expanding your FlexPod solution

How Solution Support for FlexPod Works



Partner Support

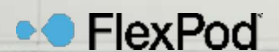


Authorized Partner Support for FlexPod

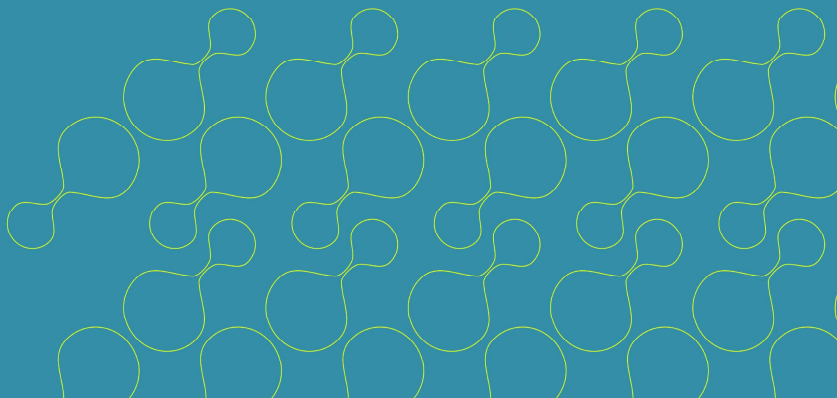
Cisco and NetApp authorize a network of global partners to provide support for your FlexPod architecture.

Each partner offers a unique value proposition.

To find a partner near you, contact
www.cisco.com/web/partners or
www.netapp.com/partners



Getting Started



Get Started by Purchasing Required Support Contracts

FlexPod Cooperative Support

NetApp and Cisco Solution Support for FlexPod

Partner Authorized Support for FlexPod



Purchase product support below



Purchase Solution Support with Smart Net Total Care plus 3rd party product support below



Purchase partner authorized product support FlexPod



Cisco® Servers and Switches:

- Product-focused (Cooperative Support): Cisco Smart Net Total Care Onsite Premium (OSP)
- Solution-focused: Any level of Cisco Solution Support



NetApp® Storage

- SupportEdge Premium
- SupportEdge Secure



VMware vSphere® Enterprise Plus

- Production SnS



Microsoft Services Premier Support

- Premier Third Tier Support Windows Server (includes Hyper-V)
- Premier Third Tier Support System Center



RedHat Premium Support

- RedHat Enterprise Linux
- RedHat Enterprise Virtualization
- Red Hat Enterprise Linux OpenStack Platform



XenDesktop, XenServer (6.1 and earlier)

- Citrix Premier Support

CloudPlatform, XenServer (6.2 +)

- Citrix Select Services
- Citrix Software Maintenance

New simplified, proactive, predictive services

SupportEdge Expert

SupportEdge Advisor

SupportEdge Protect for Government

SupportEdge Expert

Get the most value from your NetApp solutions with our highest level of predictive, proactive technical support:

- Optimize security, availability, and operation of your NetApp solutions with access to the new Active IQ Digital Advisor and its AIOps capabilities.
- Enhance your support experience with personalized services such as managed software upgrades and periodic system health reviews.
- Accelerate issue resolution with priority queuing and direct routing to level 2 support for software issues.
- Control costs with flat-rate, predictable pricing across the lifecycle of your NetApp solution.

[Learn more](#) [Service description](#)



SupportEdge Premium

For customers who want a high level of support, SupportEdge Premium combines innovative remote troubleshooting and resolution capabilities with expert on-site resources as needed.

[Service description](#)

SupportEdge Standard

For systems that do not require Premium support but need to be up and running for other applications, SupportEdge Standard delivers service options to assure availability.

[Service description](#)

SupportEdge Secure for Government

SupportEdge Secure Government is tailored to the needs of government organizations worldwide, offering Premium support while meeting security requirements.

[Service description](#)

Software Support Plan

Get software support for your NetApp system and host-based software—including remote technical support, access to the NetApp Support site, and software updates. Software Support Plan is also included in any of our SupportEdge service plans.

[Service description](#)

<https://www.netapp.com/services/support/supportedge/>

 FlexPod®

Q&A



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Thank You