

Dell EMC VxBlock™ Systems 340, 350, 540, and 740 for VMware NSX 6.4

Architecture Overview

Document revision 1.3

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Revision history

Date	Document revision	Description of changes
September 2019	1.3	Added support for VMware vSphere 6.7 with NSX 6.4. <ul style="list-style-type: none">• Made a small change from NSX 6.4.x to NSX 6.4.• Added a note that Cisco UCS B-Series edge servers have been deprecated for new deployments.
April 2019	1.2	Updated to support Cisco Nexus C220 M5 servers at the NSX edge.
December 2018	1.1	Generalized for NSX 6.4.x on vSphere 6.0
September 2018	1.0	Initial release

Introduction

This document describes the high-level design of VMware NSX network virtualization technologies for standalone VxBlock Systems.

This document covers VMware NSX with VMware vSphere running on Cisco UCS C-Series Rack Mount servers and B-Series Blade Servers for the edge VMware vSphere cluster. Refer to the Release Certification Matrix (RCM) for more information about supported hardware and software with VMware NSX.

The target audience for this document includes sales engineers, field consultants, and advanced services specialists who want to deploy a virtual infrastructure using VMware NSX.

The [Glossary](#) provides related terms, definitions, and acronyms.

VMware NSX 6.4 on a VxBlock System

Introduction to VMware NSX 6.4 network virtualization

VMware NSX network virtualization is part of the software-defined data center that offers cloud computing on VMware virtualization technologies.

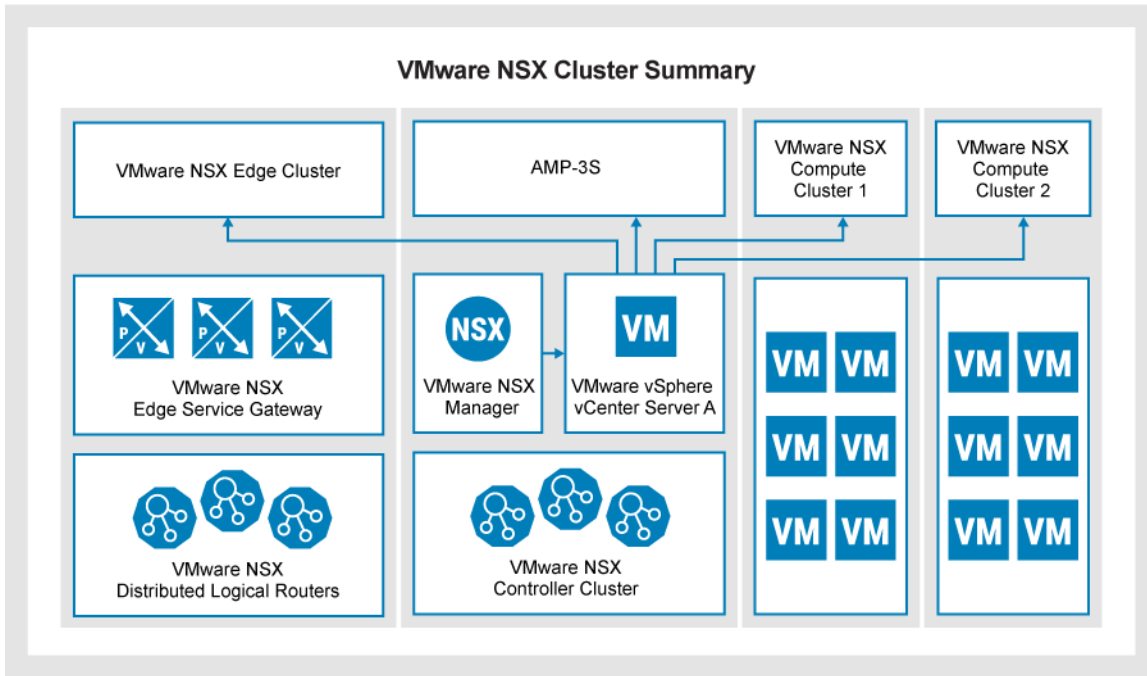
With VMware NSX, virtual networks are programmatically provisioned and managed independently of the underlying hardware. VMware NSX reproduces the entire network model in software, enabling a network topology to be created and provisioned in seconds. Network virtualization abstracts Layer 2 switching and Layer 3 routing operations from the underlying hardware, similar to what server virtualization does for processing power and operating systems.

VMware vSphere cluster summary for VMware NSX

The following table describes the VMware vSphere clusters for VMware NSX:

Cluster	Description
Management	<p>Includes the VMware NSX manager appliance and three VMware NSX controllers that reside in the second generation of the Advanced Management Platform, specifically, AMP-2HA, AMP-2S , and AMP-3S. The VMware NSX controllers provide failover and scalability. The management cluster also includes the VMware vCenter Server, which attaches to the edge and compute clusters and provides the following functionality:</p> <ul style="list-style-type: none"> • Allows the VMware NSX manager appliance and the VMware NSX controllers to be deployed into the management cluster. • Allows the VMware NSX edge services gateway (ESG) and VMware NSX distributed logical routers (DLRs) to be deployed in the edge cluster, which resides on either the Cisco UCS C-Series Rack Mount servers or the B-Series Blade servers.
Edge	Includes the ESGs that provide external connectivity to the physical network and the DLRs that provide routing and bridging.
Compute	Includes the production VMs. There can be more than one compute cluster.

The following illustration provides the components and functions in each VMware NSX cluster:



Note: More than one compute cluster can exist in the VMware vCenter Server.

VMware cross-vCenter Server option

VMware NSX 6.4 running on VMware vSphere allows the data plane to span multiple VMware vCenter Server instances in the same domain. Universal objects (transport zone, logical switches, DLRs, and transit network logical switch) are created on the primary VMware vCenter Server instance and replicated across the secondary VMware vCenter servers. Up to seven secondary VMware vCenter servers are supported in a cross VMware vCenter deployment.

For more information on the VMware cross-vCenter Server option, refer to the following sections of the [Cross-vCenter NSX Installation Guide](#):

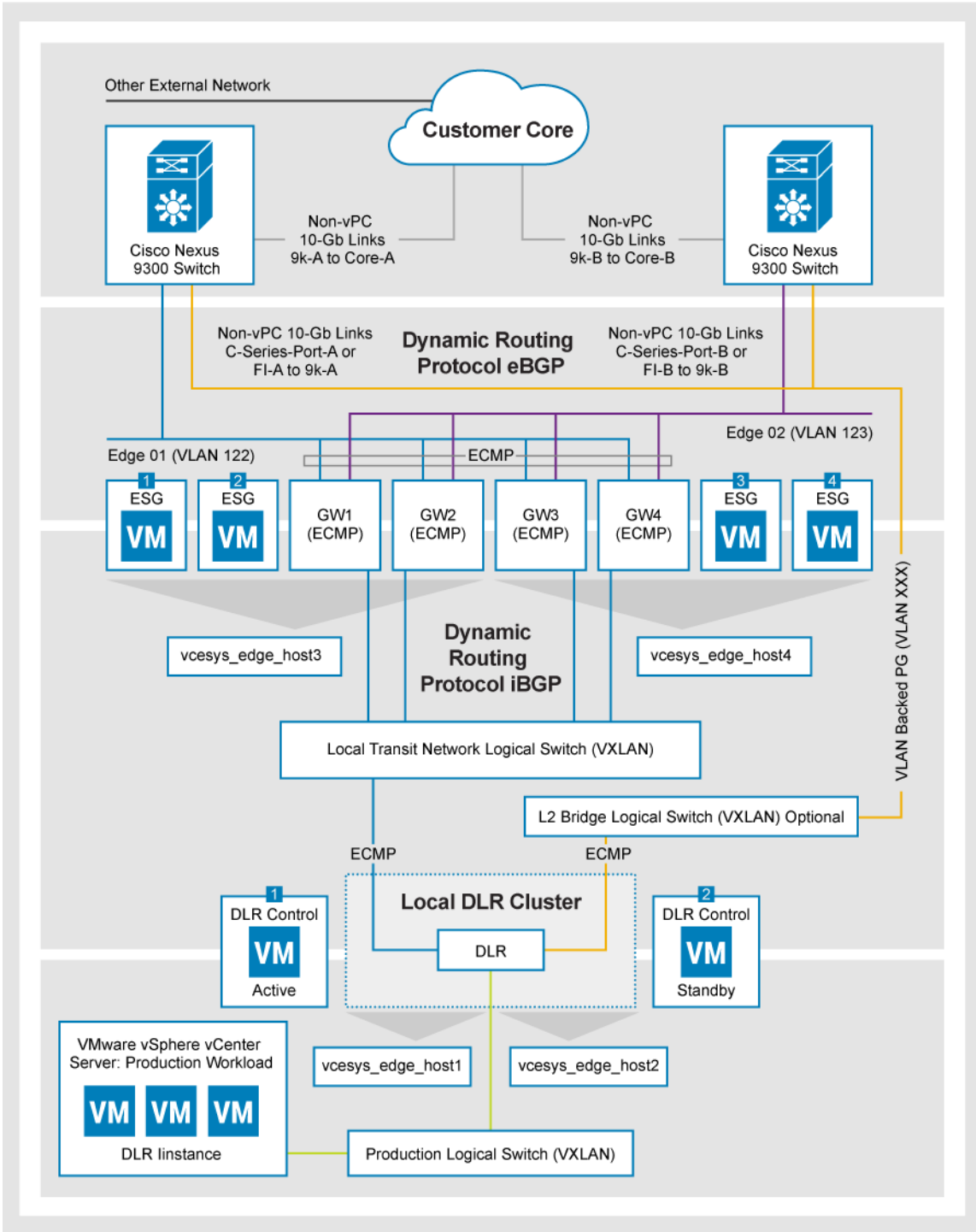
- *Benefits of cross-vCenter NSX*
- *Support Matrix for NSX Service in cross-vCenter NSX*

Local objects reside on a single VMware vCenter Server. Local objects do not replicate across multiple VMware vCenter Servers, but can use features like Layers 4 through 7 services and Layer 2 bridging.

VMware NSX logical topology with local objects

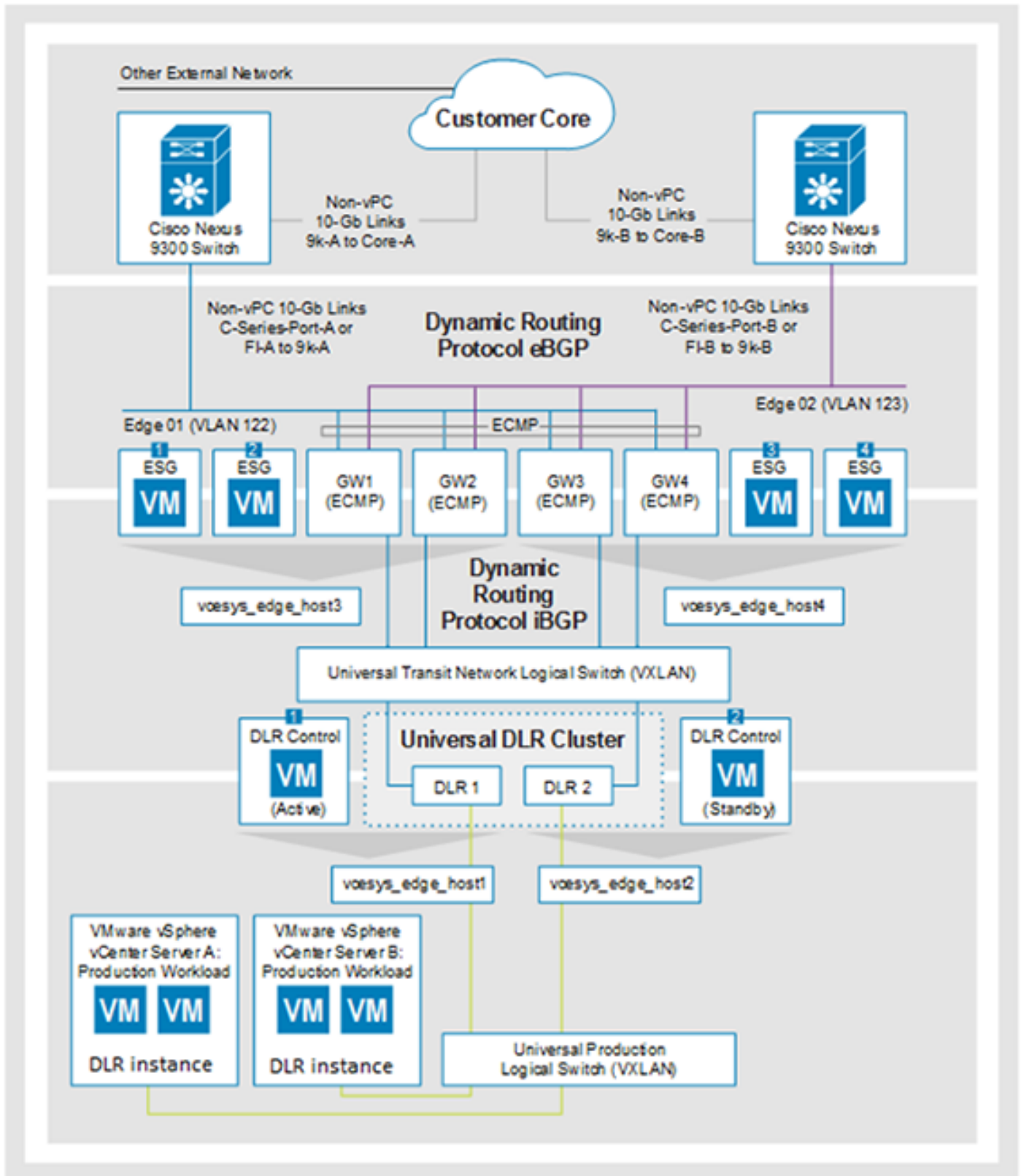
The local VMware vCenter Server environment supports Layers 4 through 7 services and Layer 2 bridging.

The following illustration shows local objects, Distributed Logical Routers (DLRs) and local transit network logical switch, integrated in the VMware NSX single VMware vCenter Server topology:



VMware NSX local topology with universal objects (cross VMware vCenter Server option)

The following diagram illustrates a cross VMware vCenter Server with universal objects, DLRs and universal transit network logical switch, integrated in the VMware NSX topology. This topology cannot support Layers 4 through 7 services and Layer 2 bridging. However, the universal production logical switch spans VMware vCenter Servers A and B.



VMware NSX management cluster

The management cluster consists of the management and control planes for VMware NSX. The VMware NSX manager handles the management plane and the VMware NSX controllers handle the control plane.

VMware NSX Management cluster components

The VMware NSX management cluster on AMP-2HA Performance, AMP-2S, and AMP-3S consists of the VMware NSX Manager Appliance, VMware NSX Controllers, and universal components.

Management component	Description
VMware NSX Manager Appliance	Each instance of VMware NSX Manager is paired with a dedicated VMware vCenter Server in a one-to-one relationship, which is true even in a cross-vCenter NSX environment. The VMware vSphere web client is used to configure VMware NSX Manager. A single domain can span multiple VMware vCenter Servers running VMware vSphere, and supports one primary VMware NSX manager and up to seven secondary VMware NSX managers.
VMware NSX Controllers	NSX Controllers work by distributing network information to hosts. Three VMware NSX controllers are joined in a cluster to provide failover and scalability. Having three controller nodes ensures data redundancy in case a single NSX Controller node fails. VMware NSX controllers are deployed in hybrid mode to support both small and large virtual extensible LAN (VXLAN) environments. In a cross-vCenter Server configuration, the controllers are deployed only on the primary VMware NSX manager. The controller metadata is replicated across the secondary VMware NSX managers to allow synchronization of the control plane across the VMware vCenter Servers.
Universal components	The universal components consist of the universal transport zone, universal logical switches, and universal DLR. These components are created on the primary VMware NSX Manager and not on the secondary VMware NSX Managers.

Management cluster specifications

Use the specifications in the following table for the VMware NSX Manager and VMware NSX Controller.

Specification	VMware NSX manager	VMware NSX controllers
Quantity	One to eight VMs (With VMware NSX 6.4, more than one VMware NSX manager can be deployed in a single domain.)	Three VMs
Location	Management cluster	Management cluster
Hardware	AMP-2HA Performance or AMP-2S with a minimum of three servers AMP-3S with a minimum of 3 servers	AMP-2HA Performance or AMP-2S with a minimum of three servers AMP-3S with a minimum of three servers

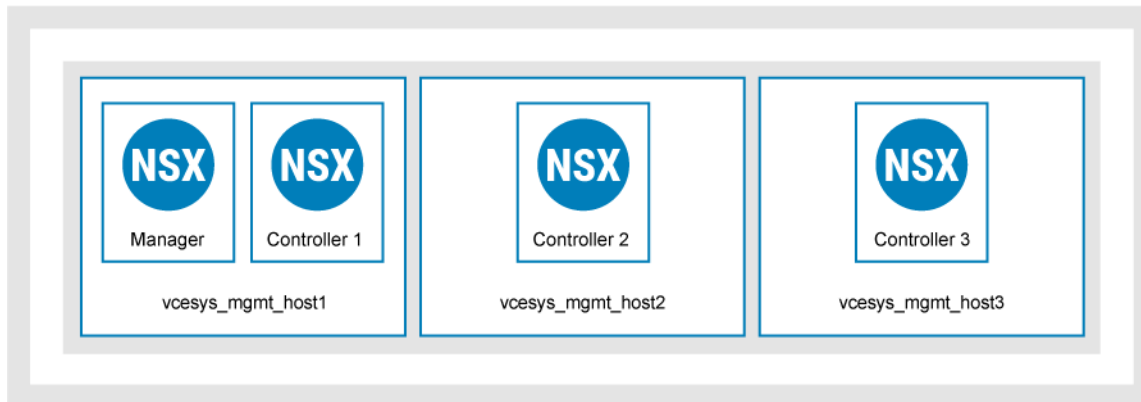
Specification	VMware NSX manager	VMware NSX controllers
Size	Four vCPU (Four vCPU if there are more than 256 hypervisors) 16 GB RAM (24 GB RAM if there are more than 256 hypervisors) 60 GB disk	Four vCPU (2048 MHz reservation) Four GB RAM 20 GB disk
Network	vcesys_esx_mgmt (105) or amx_esx_mgmt (205) depending on which is available on the AMP platform	vcesys_esx_mgmt (105) or amx_esx_mgmt (205) depending on which is available on the AMP platform
Availability	VMware High Availability	VMware High Availability
Distribution	OVA	OVA

Note: VMware creates a vCPU by assigning one or more physical CPUs to each VM. The vCPU processes the workload of an assigned VM, with a specific CPU varying in the time spent dedicated to a VM. Spreading the processing tasks across multiple CPUs and varying the time each CPU is assigned to a VM, allows a small number of physical cores to host a larger number of VMs.

Hardware requirements

VxBlock Systems support VMware NSX virtual networking with AMP-2HA Performance, AMP-2S, and AMP-3S with three servers minimum. No other AMP types are supported with VMware NSX. AMP-2HA Performance, AMP-2S, and AMP-3S dedicates the VMware NSX Manager and the three VMware NSX Controllers to a VMware vSphere ESXi host for redundancy and scalability, without requiring special cabling.

The following illustration shows the VMware NSX manager and the three VMware NSX controllers:



VMware vSphere cluster requirements

The management cluster requires VMware High Availability (HA) and VMware vSphere Distributed Resource Scheduler (DRS) to provide VM protection against a VMware vSphere ESXi host failure and to balance VM workloads in the cluster.

The following table shows the rules applied to the DRS:

Rule	VMware NSX Manager	VMware NSX Controllers
DRS affinity rules (same host)	Affinity rules are not applied to the management cluster, regardless of the numbers of VMware NSX Managers.	Affinity rules are not applied to the management cluster, because each VMware NSX Controller is on a different VMware vSphere ESXi host.

Rule	VMware NSX Manager	VMware NSX Controllers
Anti-affinity rules (separate host)	Anti-affinity rules are applied to the management cluster if more than one VMware NSX Manager exists.	Anti-affinity rules are applied to the management cluster for each VMware NSX Controllers on separate VMware vSphere ESXi hosts.

Custom resource pool requirements

The VMware NSX management cluster does not require custom resource pools. However, for heavy workloads, create memory reservations for the VMware NSX Manager.

Storage requirements

The management cluster does not require a specific disk layout other than the standard disk layout of the AMP-2HA Performance, AMP-2S, or AMP-3S.

The VMware vSphere ESXi hosts that are connected to the management cluster use the Dell EMC Unity storage array. All the VMware NSX components, including the VMware NSX Manager and Controllers, are deployed across three separate data stores to protect against LUN corruption and improve performance and resilience.

Networking requirements

No special network requirements besides AMP-2HA Performance, AMP-2S, and AMP-3S are required. The VMware NSX management traffic from the VMware NSX Managers and control plane traffic from the VMware NSX Controllers are on the same network segment as the VMware vSphere ESXi management traffic to improve performance.

VMware NSX Edge cluster

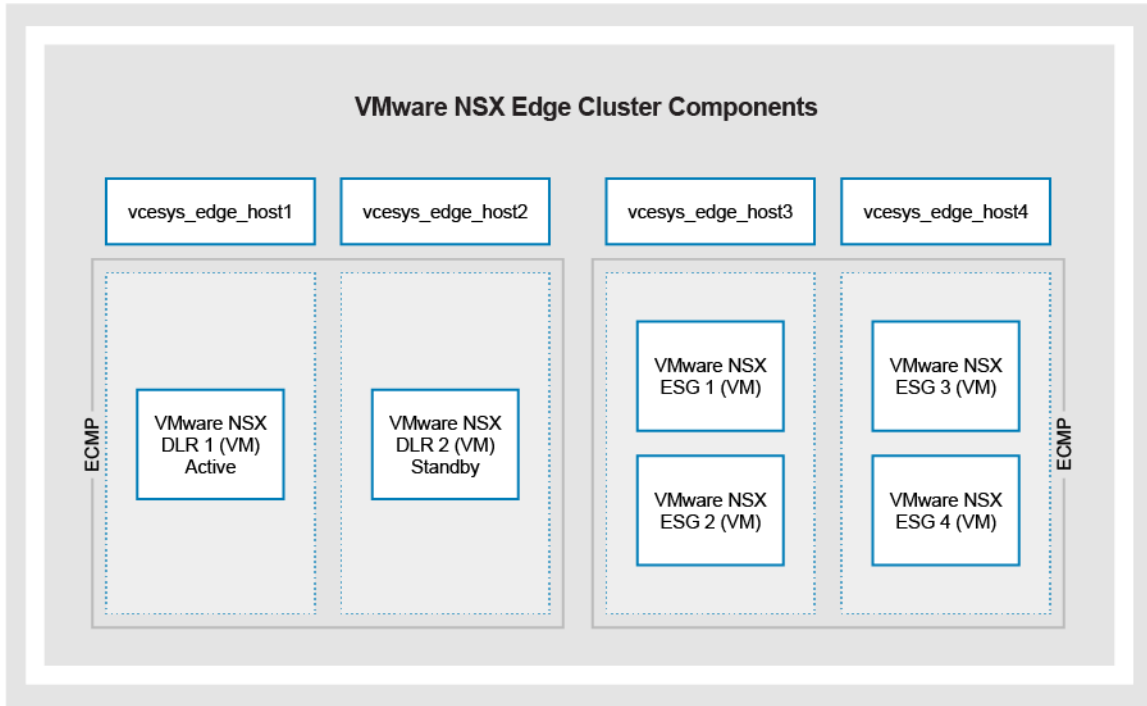
The VMware NSX Edge cluster connects to the physical network and provides routing and bridging. The edge cluster supports either the Cisco UCS C-Series Rack Mount servers (recommended) or B-Series Blade Servers.

VMware NSX Edge cluster components

The following table explains VMware NSX Edge cluster components:

Component	Description
Edge Service Gateway (ESG)	Provides connectivity to the physical network.
Direct Logical Routers (DLRs)	Provides routing and bridging.
Universal components	The only universal object in the edge cluster is the DLR. The ESGs support multiple internal connections that connect to a local and universal DLR at the same time.

The following illustration shows the VMware NSX components that belong to the edge cluster and components assigned to each VMware vSphere ESXi host. The illustration shows the minimum number of four ESGs.



Edge cluster specifications

The following table lists the specifications for the VMware NSX ESGs and VMware NSX DLR:


Specification	VMware NSX ESG	VMware NSX DLR
Quantity	Four VMs (Four or Six are optional) Active/active with ECMP	Two VMs Active/Standby with ECMP
Location	Edge cluster	Edge cluster
Hardware	Cisco UCS C-Series Rack Mount Servers (Recommended) or Cisco UCS B-Series Blade Servers	Cisco UCS C-Series Rack Mount Servers (Recommended) or Cisco UCS B-Series Blade Servers
Size	Four vCPU One GB RAM 2.15 GB Disk	Four vCPU 512 Mb RAM 2.15 GB Disk
Network	Two external interfaces for connections to north-south physical switches One internal interface for the connection to the local DLR One internal interface for the connection to the universal DLR (if the universal DLR is deployed)	One uplink interface for connection to the ESG (for local and universal DLRs)
Availability	VMware HA	VMware HA

Specification	VMware NSX ESG	VMware NSX DLR
Distribution	<p>Anti-affinity rules are enabled to separate the ESG VM pairs in the edge cluster.</p> <p>Affinity rules maintain two ESGs per host, except for the first two hosts.</p>	<p>Anti-affinity rules are enabled to keep both DLR VMs separate in the edge cluster.</p> <p>Anti-affinity rules are enabled across the first two hosts in the edge cluster.</p>

Hardware requirements: Cisco UCS C-Series Rack Mount Servers



The following table describes the hardware requirements for VMware NSX on the Cisco UCS C-Series Rack Mount Servers.

Component	Requirements
Cisco UCS C-Series Rack Mount Servers	The edge cluster uses four Cisco UCS C-Series Rack Mount Servers, regardless of the number of ESGs. However, the number of CPU sockets and Intel X520 or XXV710-DA2 cards and the amount of memory depends on the number of ESGs.
Performance enhancements	Each edge server uses a dual-port Intel NIC card to support full line rate speeds for the ESGs (VXLAN offloading). Two Intel NIC cards are installed in each edge server, if more than four ESGs are deployed. Having a second Intel NIC card provides a consistent 40 GB of line rate with NIC level redundancy.
CPU and memory	<p>Configuration A (Typical for most installations)</p> <ul style="list-style-type: none"> • Four ESGs • Single socket CPU per edge server • 64 GB of memory per edge server <p>Configuration B</p> <ul style="list-style-type: none"> • Six or eight ESGs • Dual socket CPU per edge server • 128 GB of memory per edge server
UCS-FEX	Each edge server includes a Cisco VIC card to take advantage of the Cisco Single Connect technology. Each edge server connects directly to the Cisco Fabric Interconnect. Cisco UCS Manager can manage the Cisco UCS C-Series Rack Mount servers using service profiles. Only the VMware vSphere core management infrastructure uses the service profiles.

Component	Requirements
Physical cabling	<p>Server to Cisco Nexus 9300 Series Switch connectivity:</p> <p>Each edge server uses the Intel NIC card's ports to connect to the Cisco Nexus 9300 Series Switches. The number of ESGs determines if one or two Intel NIC cards are installed in each server. The physical cable configuration types are shown below:</p> <p>Configuration A (Typical for most installations)</p> <ul style="list-style-type: none"> • Four ESGs • One Intel X520 card per edge server • Two connections per Intel X520 card <ul style="list-style-type: none"> ▪ Intel X520 port A connected to Cisco Nexus 9300 Series Switch A ▪ Intel X520 port B connected to Cisco Nexus 9300 Series Switch B • Eight connections from all four edge servers to the Cisco Nexus 9300 Series Switches (four per switch) <p>Configuration B</p> <ul style="list-style-type: none"> • Six or eight ESGs • Two Intel X520 or XXV710-DA2 cards per edge server • Two connections per Intel NIC card <ul style="list-style-type: none"> ▪ Intel NIC-A port A connects to Cisco Nexus 9300 Series Switch A ▪ Intel NIC-A port B connected to Cisco Nexus 9300 Series Switch B ▪ Intel NIC-B port A connected to Cisco Nexus 9300 Series Switch A ▪ Intel NIC-B port B connected to Cisco Nexus 9300 Series Switch B • 16 connections from all four edge servers to the Cisco Nexus 9300 Series Switches (eight per switch) <p>Server to Cisco UCS Fabric Interconnect Connectivity</p> <p>Each edge server uses the Cisco VIC 1227 (SFP+) or VIC 1457 card to connect to the Cisco Fabric Interconnects. The physical cable configuration types are:</p> <ul style="list-style-type: none"> • VIC 1227 or 1457 port 1 connects to Cisco Fabric Interconnect A • VIC 1227 port 2 or 1457 port 3 connects to Cisco Fabric Interconnect B • Two connections per edge server • Eight connections from all four edge servers to the Cisco UCS Fabric Interconnects (four per Cisco Fabric Interconnect) <p> Note: For the DRS rule, the DLR is hosted on 0/1 and the ESGs are hosted on 03/04.</p>

Hardware requirements: Cisco UCS B-Series Blade Servers

The following table describes the hardware requirements for VMware NSX on the Cisco UCS B-Series Blade Servers.

Component	Requirements
Cisco UCS B-Series Blade Servers	<p>The edge cluster uses four to six Cisco UCS B-Series Blade Servers, depending on the number of ESGs deployed, as specified below:</p> <p>Configuration A (Typical for most installations)</p> <ul style="list-style-type: none"> • Four ESGs • Four Cisco UCS B-Series Blade Servers <p>Configuration B</p> <ul style="list-style-type: none"> • Six ESGs • Five Cisco UCS B-Series Blade Servers <p>Configuration C</p> <ul style="list-style-type: none"> • Eight ESGs • Six Cisco UCS B-Series Blade Servers <p> Note: Cisco UCS B-Series edge servers have been deprecated for new deployments.</p>
Performance enhancements	<p>Cisco does not support Cisco VIC cards that provide full line rate speeds. Each edge Cisco UCS B-Series Blade Server uses a Cisco VIC 1340 and 1380 card to support the VXLAN offloading capabilities, which provide VXLAN TCP checksum and segmentation to improve CPU performance. In addition, using two VIC cards allows the load balancing of traffic types to provide extra network performance. Using the VXLAN offloading capabilities provides up to half the full line rate at speeds of about five GB of bandwidth per ESG. To provide full line speeds, use the Cisco UCS C-Series Rack Mount Server for the edge cluster.</p> <p> Note: The VXLAN offload feature is not enabled due to a driver limitation. In the meantime RSS is enabled on the card to provide the best performance.</p>

Component	Requirements
Physical cabling	<p>Each edge server uses the Cisco VIC 1340 and 1380 cards to virtually connect to the Cisco Fabric Interconnects. Physical 10 GB/s cables connect the Cisco Fabric Interconnects to the Top-of-Rack (ToR) Cisco 9300 Series Switches in a non-virtual port channel used for external traffic. (A Cisco limitation exists where dynamic IP routing with peers on the virtual port channel (vPC) VLAN is not supported.) The number of ESGs determines the number of 10 GB/s cable links, as follows:</p> <p>Configuration A (Typical for most installations)</p> <ul style="list-style-type: none"> • Four ESGs • Four 10 GB/s cables connect the Cisco Fabric Interconnect A to Cisco Nexus 9300 Series Switch A • Four 10 GB/s cables connect the Cisco Fabric Interconnect B to Cisco Nexus 9300 Series Switch B • A total of eight connections exist from the Cisco Fabric Interconnects to the Cisco Nexus 9300 Series Switches (four per switch). <p>Configuration B</p> <ul style="list-style-type: none"> • Six ESGs • Six 10 GB/s cables connect the Cisco Fabric Interconnect A to Cisco Nexus 9300 Series Switch A • Six 10 GB/s cables connect the Cisco Fabric Interconnect B to Cisco Nexus 9300 Series Switch B • A total of 12 connections exist from the Cisco Fabric Interconnects to the Cisco Nexus 9300 Series Switches (six per switch). <p>Configuration C</p> <ul style="list-style-type: none"> • Eight ESGs • Eight 10 GB/s cables connect the Cisco Fabric Interconnect A to Cisco Nexus 9300 Series Switch A • Eight 10 GB/s cables connect the Cisco Fabric Interconnect B to Cisco Nexus 9300 Series Switch B • A total of 16 connections exist from the Cisco Fabric Interconnects to the Cisco Nexus 9300 Series Switches (eight per switch).

VMware vSphere cluster

The edge cluster requires VMware HA and VMware vSphere DRS to provide VM protection against a VMware vSphere ESXi host failure and to balance VM workloads in the cluster.

The following table provides the DRS rules:

Rule	ESGs	DLR
Affinity rules (same host)	Affinity rules are applied to the edge cluster to allow each pair of VMware NSX ESGs to be assigned to its own VMware vSphere ESXi host.	For local DLRs, DRS affinity rules are not configured because only two DLRs exist in HA mode. For local and universal DLRs, DRS affinity rules are applied to the edge cluster to allow one local and one universal DLR as a pair to be assigned to its own VMware vSphere ESXi host.

Custom resource pool

The edge cluster does not require custom resource pools.

Storage requirements

The VMware NSX Edge cluster has the following storage requirements:

- **Data stores:** The VMware vSphere ESXi hosts that are connected to the edge cluster use the VNX, XtremIO, Unity, or VMAX storage arrays. The VMware NSX components, including the ESGs and DLRs, are deployed across two separate data stores to protect against LUN corruption and improve performance and resilience.
- **Disk layout:** No specific disk layout is necessary. VMware NSX supports the standard disk layout of VNX, XtremIO, Unity, or VMAX storage arrays.

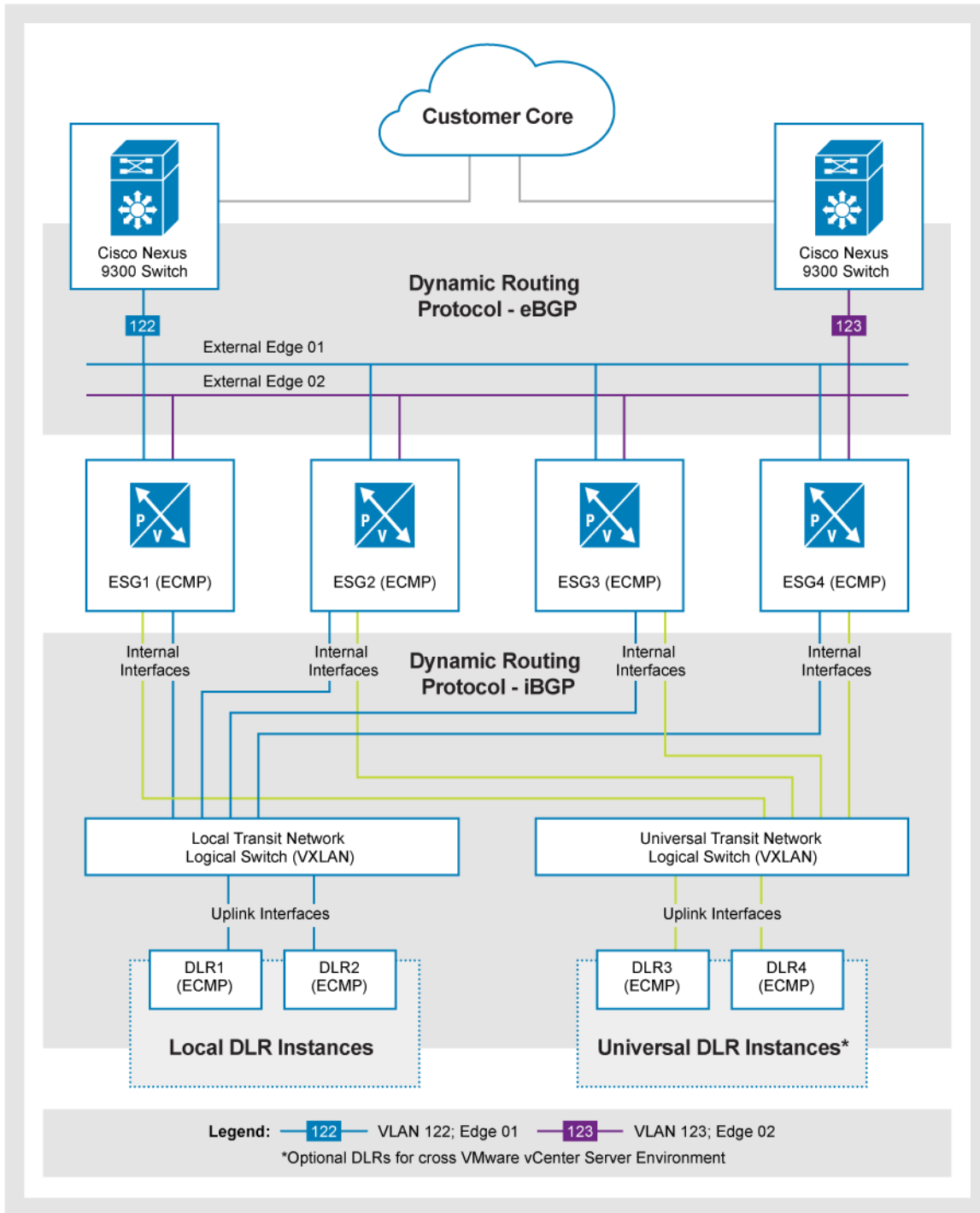
Networking requirements

The following table describes the network connectivity for the VMware NSX Edge components:

Connectivity type	Description
External	North-south connectivity exists between the ESGs and the Cisco Nexus 9300 Series Switches. Each ESG uses two separate uplink interfaces that connect to an uplink edge distributed port group independently on the edge VMware VDS.
Internal and uplink	The internal connectivity between the ESG and the DLR is as follows: <ul style="list-style-type: none"> • Each ESG uses one internal interface connected to the internal VXLAN local transit logical switch to reach the local DLR. If NSX uses the cross-vCenter Server option, a second internal interface connects to the internal VXLAN universal transit logical switch to reach the universal DLR. By default, the local and universal DLRs are deployed only in the primary VMware vCenter Server. • The local DLR uses an uplink interface connected to the VXLAN local transit logical switch to reach the ESG. If NSX uses the cross-vSphere vCenter Server option, an uplink interface connects the universal DLR to the uplink VXLAN universal transit logical switch to reach the ESG.
Dynamic routing and Layer 3 termination	The ESGs use Equal Cost Multi-Pathing (ECMP) to increase bandwidth by load balancing traffic across equal cost multiple paths, providing fault tolerance for failed paths. The ESGs use eBGP to peer with the ToR Cisco Nexus 9300 Series switches. On the Cisco Nexus 9300 Series switches, the two edge VLANs have switch virtual interfaces (SVI): <ul style="list-style-type: none"> • Edge01 SVI on switch A • Edge02 SVI on switch B The DLRs use iBGP to peer with the ESGs. All other VLANs internal to the VxBlock System terminate at the ToR Cisco Nexus 9300 Series switches.
Layer 2 bridging	Layer 2 bridging is an optional configuration to support VXLAN-to-VLAN connectivity. Layer 2 bridging works with a local DLR. Layer 2 bridging is not supported with a universal DLR.

Logical topology of VMware NSX 6.4 local objects

The NSX edge cluster uses the local DLR for single vCenter and Universal DLR for Cross vCenter deployments as shown in the following illustration:



Network requirements for the Cisco UCS Servers

The following table describes the network requirements for Cisco UCS C-Series Rack Mount Servers and Cisco UCS B-Series Blade Servers:

Component	Cisco UCS C-Series Rack Mount Servers	Cisco UCS B-Series Blade Servers
VLAN IDs	VMware NSX requires three VLAN/SVIs on the Cisco Nexus 9300 Series Switches: <ul style="list-style-type: none"> • Two external edge VLAN and SVIs are used for external traffic (on/off ramp) • One transport VLAN is used to pass VXLAN traffic. The external traffic traverses north-south between the edge servers and the Cisco Nexus 9300 Series Switches. The transport VLAN is Layer 2 and does not have an SVI on the Cisco Nexus 9300 Series Switches.	
	With Cisco UCS C-Series Rack Mount Servers, do not create the external edge traffic VLAN IDs in Cisco UCS Manager. However, because the compute blades pass VXLAN traffic, add the VXLAN Transport VLAN ID in Cisco UCS Manager.	With Cisco UCS B-Series Blade Servers, create the external edge traffic and VXLAN transport traffic VLAN IDs in Cisco UCS Manager.
VXLAN Tunnel End Points (VTEPs)	The number of VTEPs deployed to each VMware vSphere ESXi host depends on the number of dvUplinks configured on the VMware VDS where the transport distributed port group was created. Given more than one VTEP is on each host, enable Load Balance SRCID mode to load balance VXLAN traffic.	
	Although the link aggregation control protocol (LACP) is supported on the Cisco UCS C-Series Rack Mount Servers, Load Balance SRCID mode ensures a consistent compute blade configuration. The number of ESGs determines the number of uplinks (one or two Intel NIC cards) created on the edge VMware VDS. Configuration A (Typical for most installations) <ul style="list-style-type: none"> • Four ESGs • One Intel NIC card per host, which provides two dvUplinks • Two VTEP/VMkernel distributed port groups per edge host Configuration B <ul style="list-style-type: none"> • Six or eight ESGs • Two Intel NIC cards per host, which provides four dvUplinks • Four VTEP/VMkernel distributed port groups per edge 	LACP is not supported for the Cisco B-Series Blade Servers. Regardless of the number of ESGs, two uplinks are created on the edge VMware VDS. Configuration A (Typical for most installations) <ul style="list-style-type: none"> • Four ESGs • Four Cisco UCS B-Series Blade Servers Configuration B <ul style="list-style-type: none"> • Six ESGs • Five Cisco UCS B-Series Blade Servers Configuration C <ul style="list-style-type: none"> • Eight ESGs • Six Cisco UCS B-Series Blade Servers

VMware virtual network for Cisco UCS servers

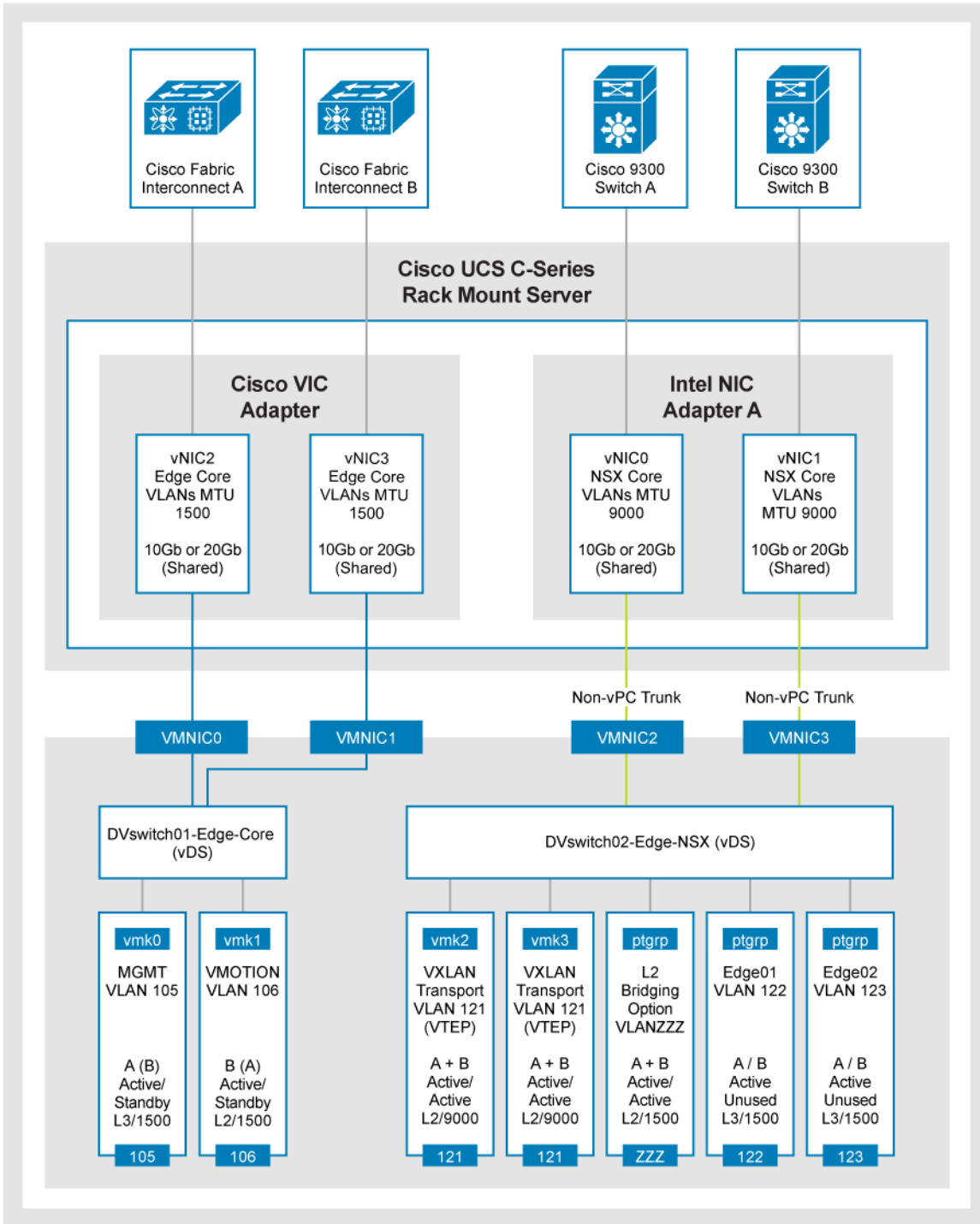
For Cisco UCS C-Series Rack Mount Servers, two VDS are created for the edge cluster. For Cisco UCS B-Series Blade Servers, three VDS are created for the edge cluster.

The following table describes each VDS:

VDS	Cisco UCS C-Series Rack Mount Servers	Cisco UCS B-Series Blade Servers
DVswitch01-Edge-Core	<p>Manages the VMware vSphere ESXi management and VMware vSphere vMotion traffic types.</p> <p>VMware vSphere ESXi Management is on a VMware VDS instead of a VMware vSphere Standard Switch to improve VMware NSX network performance.</p>	<p>Manages the VMware vSphere ESXi management and VMware vSphere vMotion traffic types.</p> <p>VMware vSphere ESXi Management is on a VMware VDS instead of a VMware vSphere Standard Switch to improve VMware NSX network performance.</p>
DVswitch02-Edge-NSX	<p>Manages the external edge (Edge01 and Edge02), transport, and the optional Layer 2 bridging traffic types.</p> <ul style="list-style-type: none"> For four ESGs, VMware VDS requires two dvUplinks to connect to the Cisco Nexus 9300 Series Switches, which creates two VTEP VMkernel distributed port groups per edge host. For more than four ESGs, VMware VDS uses four dvUplinks to connect to the Cisco Nexus 9300 Series Switches, which creates four VTEP VMkernel distributed port groups per edge host. <p>Jumbo frames (9000) are enabled on the DVswitch-Edge-NSX switch and on the VXLAN transport distributed port group for VXLAN transport traffic.</p>	<p>Manages the VXLAN transport (east-west) and optional Layer 2 bridging traffic types.</p> <p>Jumbo frames (9000) are enabled on the DVswitch-NSX-Edge switch and on the VXLAN transport distributed port group for VXLAN transport traffic.</p>
DVswitch03-NSX-External		Manages edge traffic for north-south connectivity.

Logical network for the Cisco UCS C-Series Rack Mount Servers using four ESGs

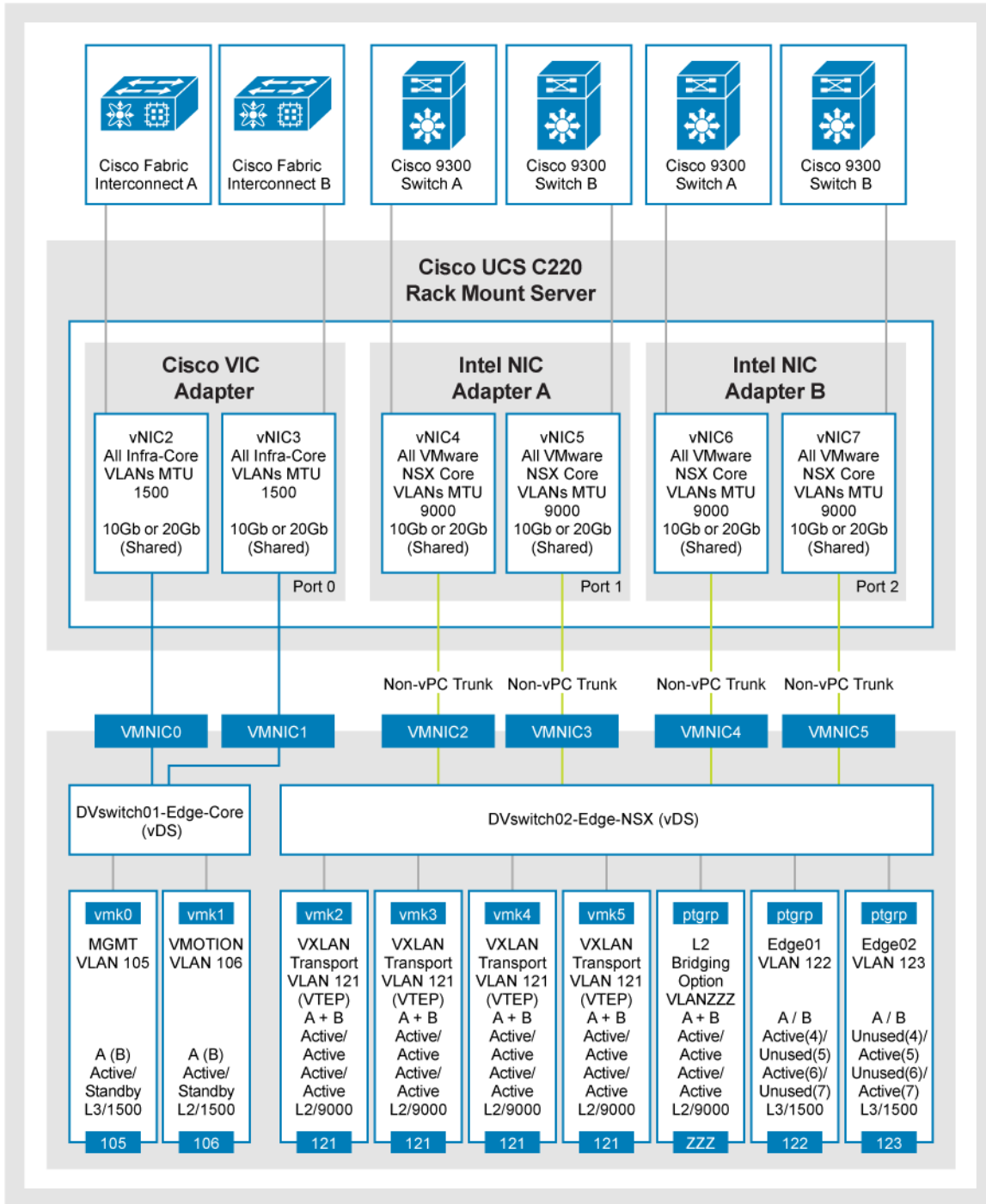
The following illustration shows the network layout for the hosts running on Cisco C-Series Rack Mount Servers in the edge cluster with four ESGs:



Logical network for the Cisco UCS C-Series Rack Mount Servers using more than four ESGs

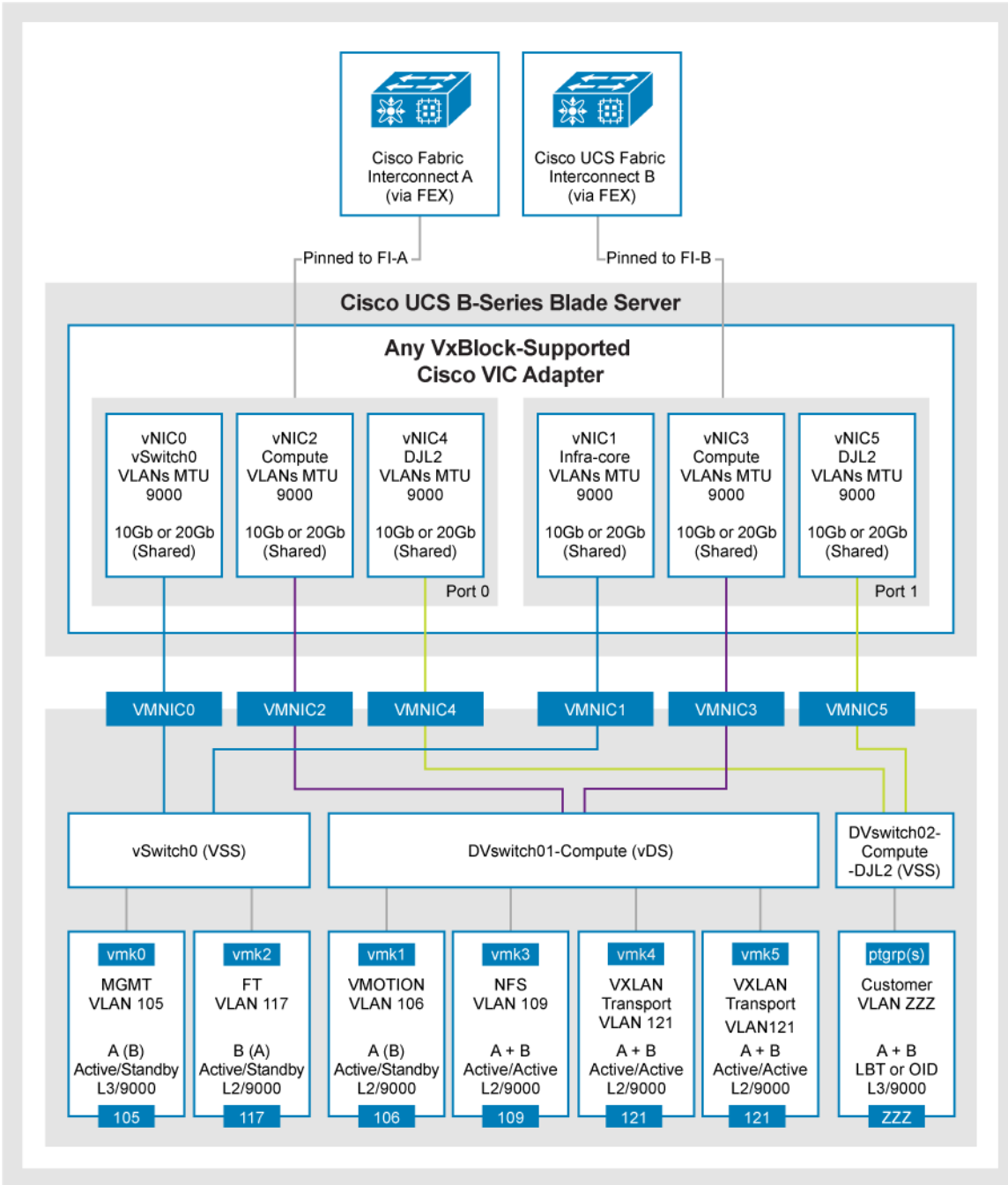
Adding more than four ESGs requires a second Intel NIC card within each of the edge Cisco UCS C-Series Rack Mount Servers, which adds four uplinks instead of two to the VMware VDS.

The number of VTEPs is based on the number of uplinks on the VMware vSphere Distributed Switch, which is four VTEPs in this design. The following illustration shows the network layout for the hosts running on Cisco UCS C-Series Rack Mount Servers in the edge cluster with six or eight ESGs:



Logical network for the Cisco UCS B-Series Blade Servers (edge cluster)

The following illustration shows the VMware virtual network layout for the hosts running on Cisco UCS B-Series Blade Servers in the edge cluster:



VMware NSX compute cluster

The VMware NSX compute cluster contains all of the production VMs.

Hardware requirements

For the best performance, make sure each VMware NSX compute cluster uses network adapters supporting VXLAN offload capabilities, such as the Cisco VIC 1340 and 1380.

VXLAN tunnel end point

The number of VTEPs deployed to each VMware vSphere ESXi host depends on the number of dvUplinks configured on the VMware VDS where the transport distributed port group was created. Given more than one VTEP is on each host, enable **Load Balance SRCID** mode to load balance VXLAN traffic.

The Cisco UCS B-Series Blade Servers are designed with two VTEPs deployed to each VMware vSphere ESXi host within the compute cluster.

LACP is not supported. Regardless of the number of ESG deployed, the number of dvUplinks is two.

VMware virtual network for the compute cluster

A single VMware VDS spans across multiple compute clusters. However, additional VMware VDS can be deployed for a compute cluster or a set of compute clusters. More than one compute cluster can exist in the VMware vCenter Server.

The single compute VDS manages the VMware vSphere vMotion, NFS, and VXLAN transport traffic types. The VXLAN transport NFS port groups and the VMware VDS are configured for jumbo frames (MTU 9000).

Note: By default, the VMware vSphere ESXi management traffic resides on the VMware standard switch. However, you can put the VMware vSphere ESXi management traffic on the VMware VDS.

Logical network for the Cisco UCS B-Series Blade Servers (compute cluster)

The following illustration shows the VMware virtual network layout for the hosts in the compute cluster:

