Nimble Storage SmartStack for Microsoft Windows Server

Contents

Purpose

The Nimble Storage SmartStack for Windows Server with Cisco and Microsoft provides a excellent solution for implementing Microsoft Private Cloud. The solution consists of compute, networking, storage and management layers provided by Nimble Storage, Cisco and Microsoft. The solution is sized based on the customer production environment to provide a pre-validated configuration that can be quickly deployed and easily managed. The support process is also easier because the solution leverages best practices from all vendors and integrated by trained VARs that provide local hands-on assistance with the global support infrastructure of Nimble Storage, Cisco and Microsoft backing them up.

Small Business Hardware Architecture

Here are the front and back views of the server, network and storage in the reference architecture.
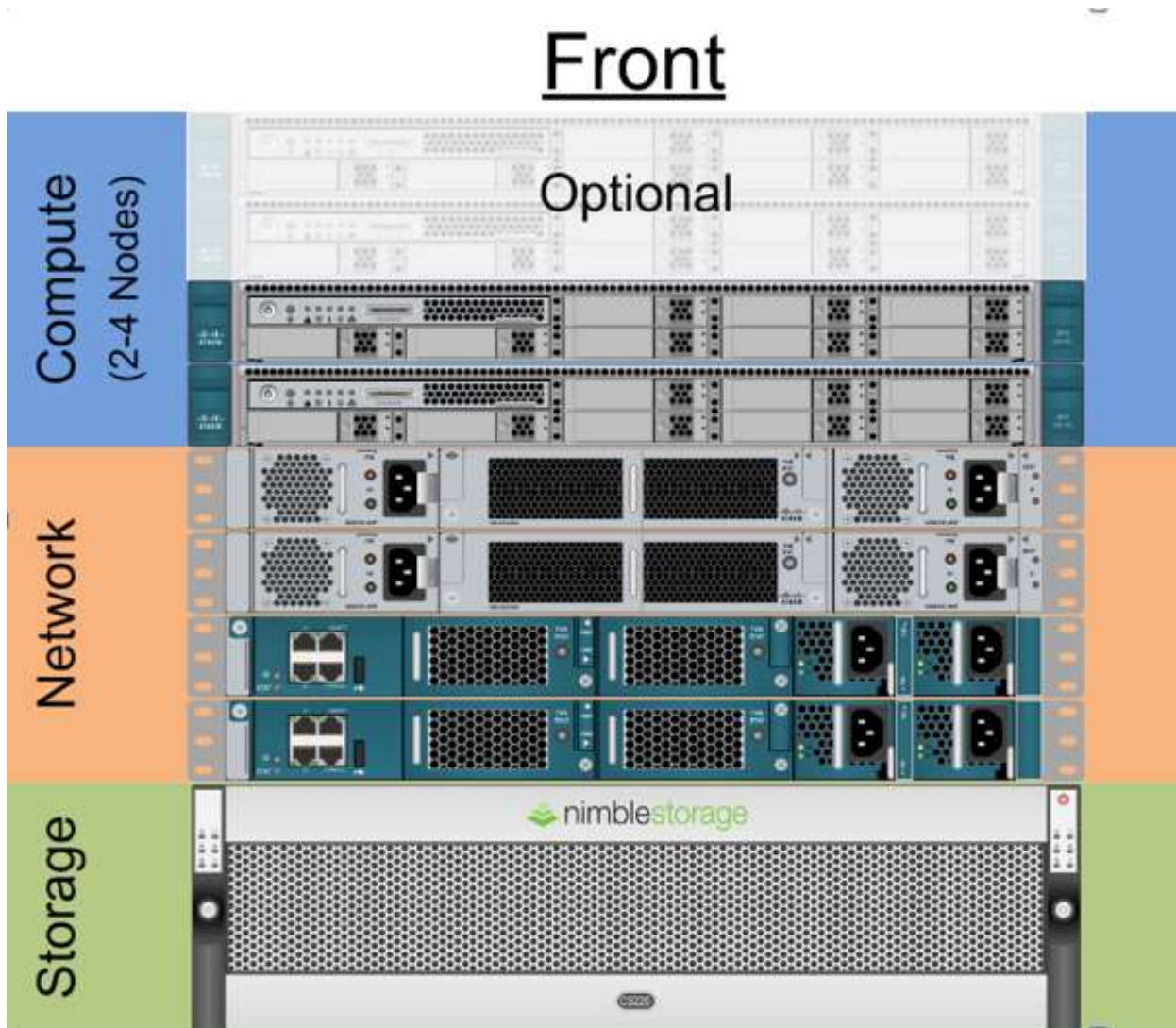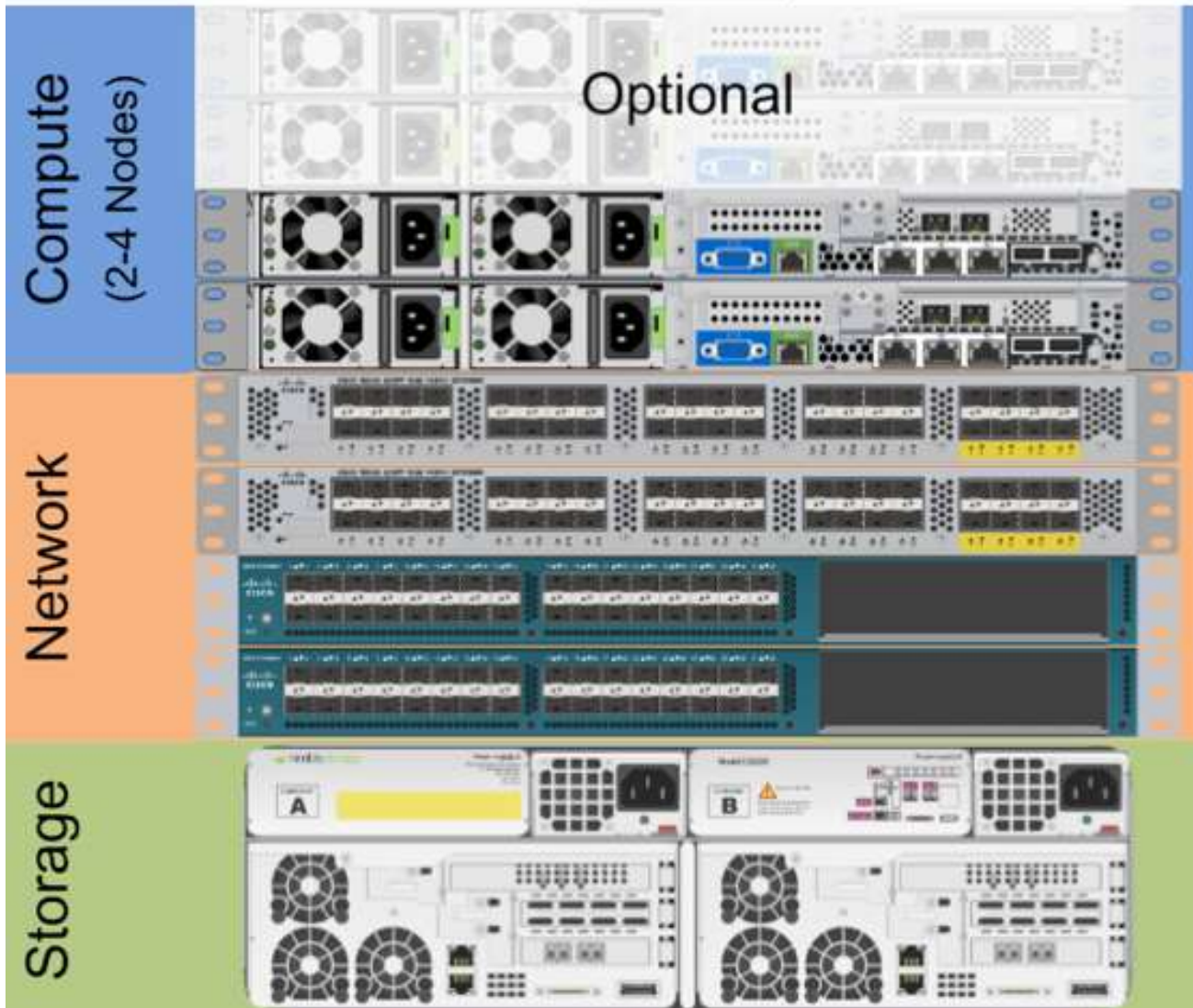
Compute and Network Layer

The compute layer uses Cisco UCS servers. The small business architecture uses C-Series rack servers while the medium business and enterprise reference architecture uses B-Series blade servers. Cisco UCS Fabric Extenders and Fabric Interconnect and optionally Cisco Nexus switches are used to provide network services between the compute and the iSCSI storage layer.

Storage Layer

Nimble Storage provides the hybrid storage solution that intelligently merges Flash SSDs and Hard Disk drives to deliver high-performance and high-capacity in a 3U that delivers unrivaled efficiency.

Small Business Parts List

Reference Architecture for Small Business

The small business Nimble Storage SmartStack for Microsoft Windows Server uses at least two Cisco UCS C-Series rack servers for the base configuration and as many as four C-Series rack servers—depending on the compute workload. The following is a sample parts list that can be used to order a validated configuration. Note that some quantities are ranges based on the number of compute nodes with 2 being the minimum number of compute nodes and the ability to scale the small business solution to 3 or 4 compute nodes.

| Vendor	Mfg Part Number	DESCRIPTION	QTY
Microsoft		Windows Server 2012 Data Center Edition	2-4
Cisco	UCSC-C220-M3S	UCS C220 M3 SFF W/O CPU, MEM, HDD, PCIE,	2-4
Cisco	UCSC-PCIF-01H	HALF HEIGHT PCIE FILLER FOR UCS	2-4
Cisco	UCSC-PCIE-CSC-02	CISCO VIC 1225 DUAL PORT 10GB SFP+ CNA	2-4
Cisco	UCS-MR-1X162RY-A	16GB DDR3-1600-MHZ RDIMM/PC3-12800/DUAL	16-32
Cisco	UCS-CPU-E5-2665	• 2.40 GHZ E5-2665/115W 8C/20MB CACHE/DDR3	4-8
Cisco	N20-BBLKD	UCS 2.5 INCH HDD BLANKING PANEL	16-32
Cisco	UCSC-RAIL1	RAIL KIT FOR C220, C22, C24 RACK SERVERS	2-4
Cisco	UCSC-HS-C220M3	HEAT SINK FOR UCS C220 M3 RACK SERVER	4-8
Cisco	UCSC-PSU-650W	650W POWER SUPPLY FOR C-SERIES RACK SERV	4-8
Cisco	CAB-C13-C14-2M	POWER CORD JUMPER, C13-C14 CONNECTORS, 2	4-8
Cisco	CON-OSP-C220M3SF	ONSITE 24X7X4 UCS C220 M3 SFF W/O	4
Cisco		Cisco UCS 6248UP Fabric Interconnect	2
Cisco		Cisco SFP+ 10-Gigabit Ethernet (10GbE) Twinax Cable (1M used)	4
Cisco	N2K-C2232PP-10GE	N2K 10GE, 2 AC PS, 1 FAN (STD AIR), 32X1	2
Cisco	CAB-C13-C14-2M	POWER CORD JUMPER, C13-C14 CONNECTORS, 2	4
Cisco	CON-SNTP-N2232P	SMARTNET 24X7X4 N2K 10GE, 2PS, 1 FAN MOD	2
Cisco	COPQAA4JAB	NEXUS 5010 10GBASE-CU SFP+ 1M CA	4-8
Nimble Storage		Nimble Storage CS200 Series	1
		1 Meter SFP+ 10-Gigabit Ethernet (10GbE) Twinax Cable	4

Small Business Hardware Cabling

The following diagram illustrates the cabling design that provides complete redundancy. Each UCS C-Series server has two 10 Gigabit ports that are each connected to a different Cisco Fabric Extender using Cisco cables that is described as "NEXUS 5010 10GBASE-CU SFP+ 1M CA" in the Small Business Parts List. These Cisco cables are only required to connect the C-Series servers to the fabric extender, standard SFP+ cables are used for all other 10 Gigabit Ethernet connections.

Each Fabric Extender is then connected to a different Fabric Interconnect. The Nimble Storage array provides redundant controllers, each with two 10 Gigabit ports that are connected to different Fabric Interconnect switches. Notice that the Nimble's "left" 10 Gbps port on Controller A is connected to the same switch as the "left" 10 Gbps port on Controller B. This

is important to facilitate proper fail-over of IP addresses. Both network paths are color-coded in the diagram below with Green and Orange cabling.

Another important consideration is to use redundant power connections and uninterruptable power supplies with the solution to further eliminate single points of failure.
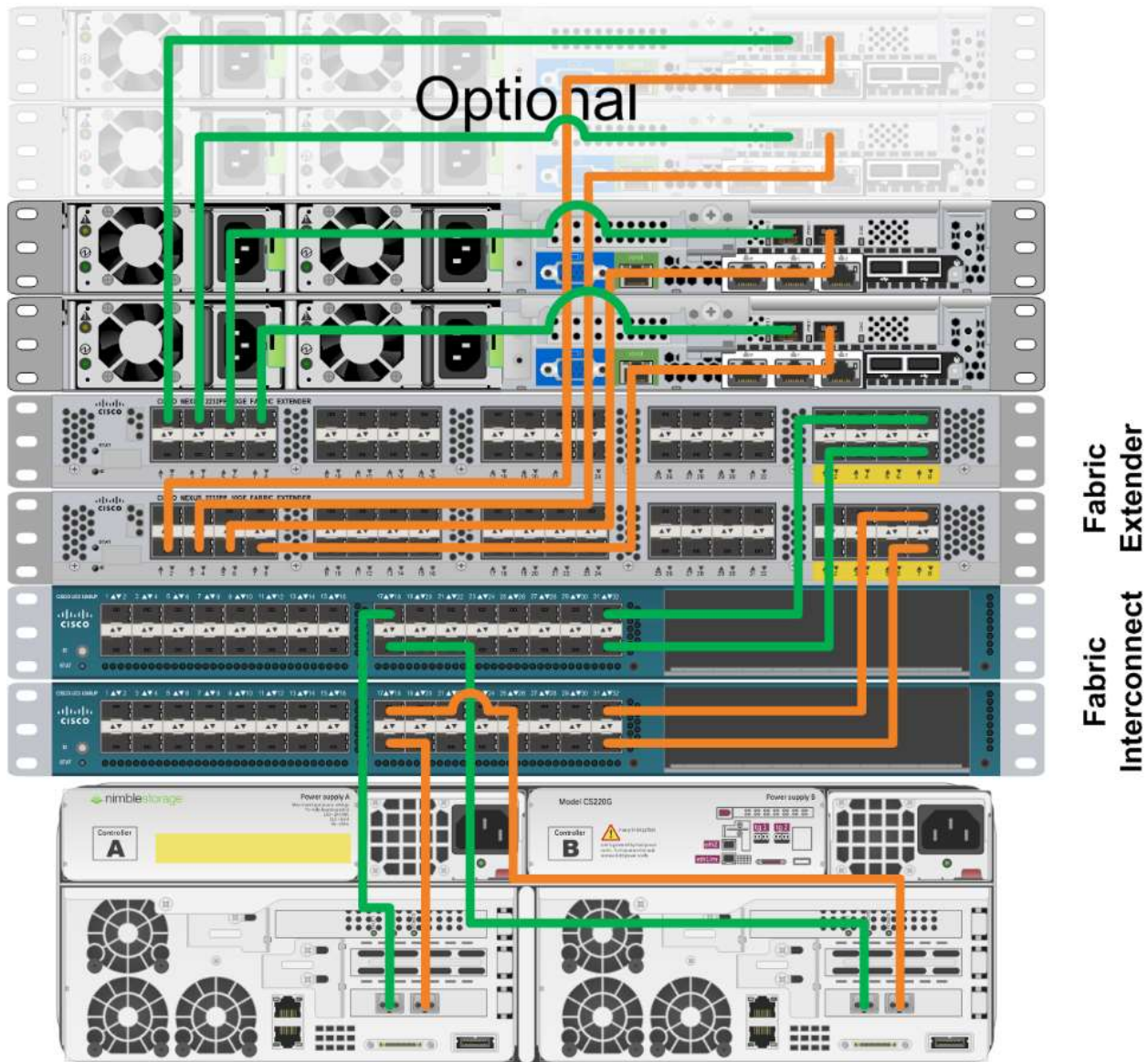
Cisco UCS C-Series Server Profile

Host Server vNIC Configuration

Cisco UCS servers permit the creation of virtual network interface cards that eliminate the network path limitations imposed by physical NIC ports. When configuring the server profile for a Microsoft Windows Server Hyper-V cluster, use the following guidelines. You should also note that any network fail-over functionality should be configured at the UCS level rather than using Microsoft Windows network bridging. Each port represents a separate subnet that is not routed to the other port networks.

Port Description	Network Visibility
Management	Host-only, externally routable
Cluster Communications	Host-only
Hyper-V Live Migration	Host-only
Virtual Machines	Host and Guest, externally routable
iSCSI Fabric-A	Host and Guest
iSCSI Fabric-B	Host and Guest

Nimble Storage Configuration

Network Configuration

The Nimble Storage array network configuration in this reference architecture leverages the 10 GbE data path connectivity of the arrays connected to the Cisco Fabric Interconnect using standard SFP+ network cables. Use the following table:

Port	Port Usage	Speed	Description
Eth1	Management	1 Gbps	Array Management
TG1	Data	10 Gbps	iSCSI Fabric-A
TG2	Data	10 Gbps	iSCSI Fabric-B

Volume Configuration

The Nimble Storage reference architecture currently uses Cluster Shared Volumes (CSV) for holding operating system virtual hard drives (Nimble Storage Operating System 1.4.5.0 and up is required for CSV support with Windows Server 2012) . Data volumes should be created separately on the array and attached directly to the Guest operating system using its' iSCSI Initiator to ensure proper quiesce during snapshot backup operations. Use Nimble Storage best practices when creating the data volume for best results such as specifying the type of application data that will be stored on the data volume by using performance policies.

High Availability

The Nimble Storage reference architecture leverages active-standby controllers for high availability. This includes allowing for non-disruptive software upgrades. This is transparently handled if the best practices for network connectivity are followed.

Small Business Server Software Configuration

Windows Server 2012 Datacenter Edition Installation and Configuration

The Nimble Storage SmartStack for Microsoft Windows Server leverages boot from iSCSI to reduce management complexity and improve protection of the host server. You will need to use the Cisco drivers during Windows Server 2012 setup to permit installation on the iSCSI boot volume.

Roles and Features

Install the following roles and features on each node of the Hyper-V cluster:
- Failover Clustering
- Hyper-V
- MPIO

Hyper-V Configuration

Virtual Network Switch	Usage
Virtual Machine	Public
iSCSI Fabric-A	Private SAN
iSCSI Fabric-B	Private SAN

If the existing production network does not have a domain already configured, then you will need to create domain controllers as required when configuring Microsoft Failover Clustering. We recommend creating a virtual machine on each local physical host server to configuring it to always start automatically. You should configure each domain controller to attach to the virtual machine network along with the host servers to provide authentication services to the hosts and Microsoft Failover Clustering purposes.

Example Configuration
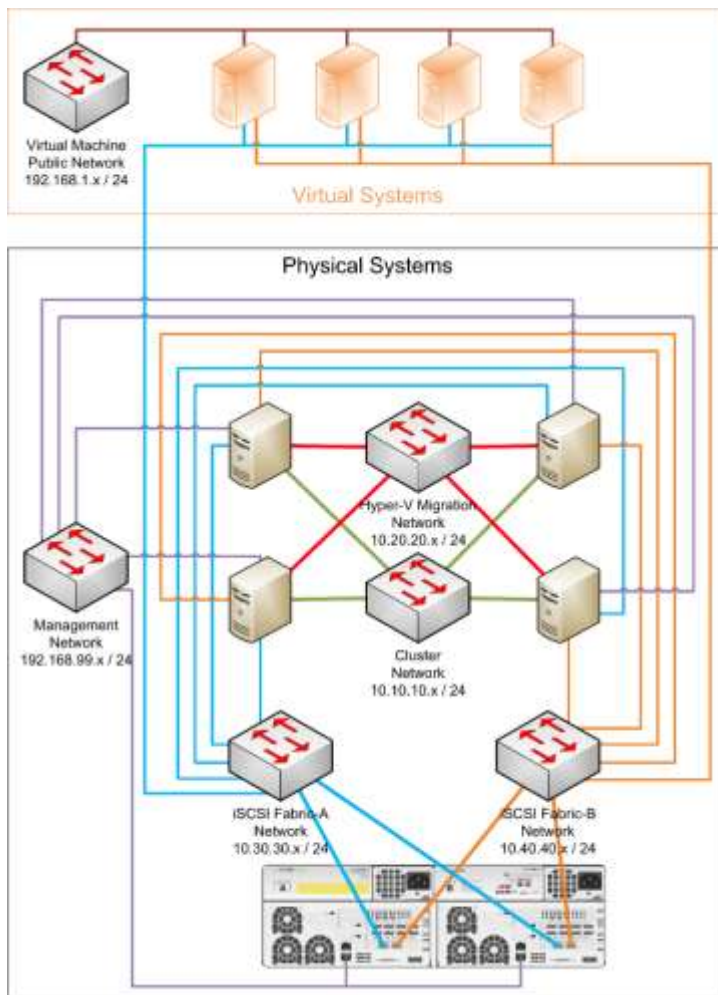
nimblestorage

Nimble Storage, Inc.

2740 Zanker Road., San Jose, CA 95134

Tel: 877-364-6253 | www.nimblestorage.com | info@nimblestorage.com