CHAPTER 5

Infrastructure Management Tools

The following Information management tools were used in VMDC DCI.

UCSM

Cisco Unified Computing System (UCS) Manager provides unified, embedded management of all software and hardware components in the Cisco UCS. It controls multiple chassis and manages resources for thousands of virtual machines.

Through its unified, embedded, policy-based, and ecosystem-friendly approach, Cisco UCS Manager helps reduce management and administration expenses, which are among the largest items in most IT budgets.

Cisco UCS Manager supports data center automation, helping increase operational agility and scalability, while reducing risk. It provides policy-based management with service templates and service profiles.

Cisco UCS Manager offers the following benefits:

- A unified embedded management interface that integrates server, network, and storage access
- Policy and model-based management with service profiles that improves agility and reduces risk
- Auto discovery to detect, inventory, manage, and provision system components that are added or changed
- A comprehensive open XML API, which facilitates integration with third-party systems management tools
- Role-based administration that builds on existing skills and supports collaboration across disciplines

For further details refer to the Cisco UCS Manager Configuration Guides.

Critical UCSM Features for Multi-Site Topologies

Service Profiles

An important feature of Cisco UCS Manager is its use of service profiles to provision and manage Cisco UCS blade servers and rack servers and their I/O properties within a single management domain. Service profiles are created by server, network, and storage administrators and are stored in the Cisco UCS 6200 or 6100 SeriesFabric Interconnects. Infrastructure policies needed to deploy applications are encapsulated in the service profiles. The policies coordinate and automate element management at every layer of the hardware stack, including RAID levels, BIOS settings, firmware revisions and settings, server identities, adapter settings, VLAN and VSAN network settings, network quality of service (QoS), and data center connectivity.

The service profile consists of a software definition of a server and the associated LAN and SAN connectivity that the server re-quires. When a service profile is associated with a server, Cisco UCS Manager automatically configures the server, adapters, fabric extenders, and fabric interconnects to match the configuration specified in the service profile. Service profiles improve IT productivity and business agility. With service profiles, infrastructure can be provisioned in minutes instead of days, shifting the focus of IT from maintenance to strategic initiatives. Service profiles enable preprovisioning of servers, making it possible to configure new servers and associated LAN and SAN access settings even before the servers are physically deployed.

Service profiles benefit both virtualized and non-virtualized environments. Workloads may need to be moved from one server to another to change the hardware resources assigned to a workload or to take a server offline for maintenance. Service profiles can be used to increase the mobility of non-virtualized servers. They also can be used in conjunction with virtual clusters to bring new resources online easily, complementing existing virtual machine mobility. Service profiles are also used to enable Cisco Data Center Virtual Machine Fabric Extender (VM-FEX) capabilities for servers that will run hypervisors enabled for Cisco Data Center VM-FEX.

Service Profile Templates

Service profile templates are used to simplify the creation of new service profiles, helping ensure consistent policies within the system for a given service or application. Whereas a service profile is a description of a logical server and there is a one-to-one relationship between the profile and the physical server, a service profile template can be used to define multiple servers. The template approach makes it just as easy to configure one server or hundreds of servers with perhaps thousands of virtual machines. This automation reduces the number of manual steps needed, helping reduce the opportunities for human error, improving consistency, and further reducing server and network deployment times.

Management Interface Options

Cisco UCS Manager has a GUI as well as a CLI for use by server, network, and storage administrators. Cisco UCS Manager also provides a powerful XML API for integration with existing data center systems management tools. Some examples of additional management interfaces are Intelligent Platform Management Interface (IPMI); keyboard, video, and mouse (KVM); serial-over-LAN (SoL); and Simple Network Management Protocol (SNMP). The XML interface allows the entire system to be monitored or configured externally by higher-level systems management tools from Cisco's many ecosystem partners.

VNMC

Cisco Virtual Network Management Center (VNMC) provides centralized multi device and policy management for Cisco network virtual services. The product addresses those issues by automating processes, freeing staff to focus on optimizing the network environment. Cisco VNMC supports greater scalability along with standardization and consistent execution of policies.

When combined with the Cisco Nexus 1000V Switch, ASA 1000V Cloud Firewall, or the Cisco Virtual Security Gateway (VSG), you can implement the solution to provide

- Rapid and scalable deployment through dynamic, template-driven policy management based on security profiles
- Easy operational management through XML APIs to help enable integration with third-party management and orchestration tools
- A non-disruptive administration model that enhances collaboration across security and server teams while maintaining administrative separation and reducing administrative errors

Cisco VNMC operates in conjunction with the Cisco Nexus 1000V Virtual Supervisor Module (VSM) to improve operations and collaboration across IT. It streamlines the services performed by security, network, and server administrators.

This solution allows the security administrator to author and manage security profiles and Cisco Virtual Security Gateway (VSG) instances through the VNMC programmatic interface with Cisco Nexus 1000V. Cisco VSG provides trusted multi-tenant access with granular, zone-based, and context-aware security policies.

Cisco VNMC also manages the Cisco ASA 1000V Cloud Firewall to enable rapid and scalable security at the edge through dynamic, template-driven policy management.

For more information refer to the Cisco Virtual Network Management Center.

DCNM

Cisco Prime Data Center Network Manager (DCNM) is designed to help you efficiently implement and manage virtualized data centers. It includes a feature-rich, customizable dashboard that provides visibility and control through a single pane of glass to Cisco Nexus and MDS products. DCNM optimizes the overall uptime and reliability of your data center infrastructure and helps improve business continuity. This advanced management product:

- Automates provisioning of data center LAN and SAN elements
- Proactively monitors the SAN and LAN, and detects performance degradation
- Helps secure the data center network
- Eases diagnosis and troubleshooting of data center outages
- Simplifies operational management of virtualized data centers

This provides the following benefits:

- Faster problem resolution
- Intuitive domain views that provide a contextual dashboard of host, switch, and storage infrastructures
- Real-time and historical performance and capacity management for SANs and LANs
- Virtual-machine-aware path analytics and performance monitoring

- Easy-to-use provisioning of Cisco NX-OS features with pre configured, customized templates
- Customized reports which can be scheduled at certain intervals

DCNM can be used to configure and manage VMDC technologies such as:

- Cisco virtual PortChannel (vPC)
- Virtual device context (VDC)
- Cisco FabricPath
- Fibre Channel over Ethernet (FCoE)
- Fabric zoning
- Virtual SANs (VSANs)

For further details refer to Cisco Prime Data Center Network Manager Configuration Guides.

VMware vCenter

VMware vCenter Server provides centralized visibility and proactive management for the VMDC virtual infrastructure.

Centralized Control and Visibility

- vSphere Web Client enables managing the essential functions of vSphere from a browser
- Hardware monitoring with CIM SMASH enables alarms when hardware failures of key components
- Storage maps and reports convey storage usage, connectivity and configuration.
- Customizable topology views give you visibility into storage infrastructure and assist in diagnosis and troubleshooting of storage issues.

Proactive Management

- Host Profiles standardize and simplify how you configure and manage ESXi host configurations
- Capture the blueprint of a known, validated configuration—including networking, storage and security settings; and deploy it to many hosts, simplifying setup
- Host profile policies can also monitor compliance

Configuration, Compliance Chores

- **Resource Management for Virtual Machines**—Allocate processor and memory resources to virtual machines running on the same physical servers.
- Establish minimum, maximum, and proportional resource shares for CPU, memory, disk and network bandwidth.
- **Dynamic Allocation of Resources**—vSphere DRS continuously monitors utilization across resource pools and intelligently allocates available resources among virtual machines based on pre-defined rules that reflect business needs and changing priorities.
- **Energy Efficient Resource Optimization**—vSphere Distributed Power Management continuously monitors resource requirements and power consumption across a DRS cluster.

Automatic restart of virtual machines with vSphere HA

For more information on VMware vCenter Server refer to VMware vSphere 5.1 vCenter Documentation.

Microsoft System Center Virtual Machine Manager (SCVMM)

System Center 2012 R2 Virtual Machine Manager (VMM) provides management for Windows Server environments. The infrastructure provisioning capability in System Center supports:

- Best-in-class management for Windows Server environments and first-party Microsoft workloads such as SQL, Exchange, and SharePoint
- At-scale management of storage technologies in Windows Server
- The copying and moving of applications and workloads across multi-site Windows environments

A single VMM server can support up to 1,000 hosts and 25,000 virtual machines. VMM enables flexible storage management across a variety of approaches including remote file storage (NAS-based), Storage spaces, Windows File Server, as well as block-based storage such as storage area network (SAN). VMM supports a number of critical functions required for multi-site topologies supporting Business Continuity and Workload Mobility including:

- Hyper-V Virtual Machine Mobility including Live/Cold Migration, Storage Migration, and extended Failover Clusters
- Hyper-V Storage including virtual FC interfaces and virtual Hard Disk Format
- Hyper-V Replica providing asynchronous data replication to support Business Continuity and Disaster Recovery

For more information on Microsoft System Center and Virtual Machine Manager refer to Microsoft System Center documentation.

NetApp OnCommand System Manager

NetApp OnCommand® System Manager is a simple yet powerful browser-based management tool that enables administrators to easily con?gure and manage individual NetApp storage systems or clusters of systems. System Manager is optimized for IT generalists who need streamlined management, an easy-to-use GUI, and best-practice work flows so they can manage their storage like an expert.

System Manager lets administrators easily control the powerful capabilities and components of NetApp storage systems: flash, disks, pooled storage, shares/exports, deduplication, compression, Snapshot™ copies, SnapMirror®, SnapVault®, and network configuration. Storage management of both SAN (iSCSI, FC, FCoE) and NAS (SMB/CIFS, NFS) protocols is provided within same interface.

OnCommand System Manager provides:

- A single management interface for all NetApp FAS or V-Series storage running 7-mode or clustered Data ONTAP
- Simple-to-use, workflow-based wizards to automate the most common storage configuration and management tasks
- A dashboard unifying important system information including system alerts, alarms, and storage capacity
- Real-time system performance displayed in a single pane including CPU utilization, I/O throughput, operations, and latency

System Manager is included without charge with the purchase of NetApp FAS or V-series storage hardware.

Additional information on OnCommand System Manager is available (Datasheet, Documentation Production Library).