CHAPTER 1

VMDC 3.0 Introduction

The Cisco Virtualized Multiservice Data Center Solution provides design and implementation guidance for enterprises deploying private cloud services and service providers building public and virtual private services. With the goal of providing an end-to-end system architecture, the Cisco VMDC solution integrates various Cisco and third-party products that are part of the cloud computing ecosystem.

Audience

This document is intended for, but not limited to, system architects, network design engineers, system engineers, field consultants, advanced services specialists, and customers who want to understand how to deploy a public or private cloud data center infrastructure. This design guide assumes that the reader is familiar with the basic concepts of IP protocols, QoS, and HA. This guide also assumes that the reader is aware of general system requirements and has knowledge of enterprise or service provider network and data center architectures.

Introduction

Virtualized Multiservice Data Center (VMDC), Cisco's reference architecture for cloud deployment, has been widely adopted by service providers and many enterprises worldwide. In previous releases, VMDC provided design guidance for scalable, secure, resilient, public and private cloud infrastructures serving multiple consumers or tenants. Within the Data Center portion of the architecture, these designs were centered on traditional hierarchical infrastructure models incorporating leading Cisco platforms and Layer 2 resilience technologies such as Virtual Port Channel (vPC), providing network containers or "tenancy" models of different sizes and service profiles, with necessary network based services as well as orchestration and automation capabilities to accommodate the varying needs of cloud providers and consumers.

In system release 3.0 VMDC introduces Cisco FabricPath, as an optional Layer 2 alternative to a hierarchical vPC-based design, for the intra-DC network. FabricPath simplifies and expands Layer 2 network design by removing the complexities of Spanning Tree Protocol (STP) and thus enabling more extensive, flexible, and scalable Layer 2 designs. This release is the first VMDC release of FabricPath-based designs. Other releases will follow as Cisco develops and evolves FabricPath. While FabricPath comprises an improved Layer 2 multipathing technology, vPC based resiliency remains a valid option in the VMDC portfolio. As such, customers will be able to choose between vPC-based and FabricPath-based designs in order to meet their requirements.

Problem Statement

The architecture described in this document addresses the following customer challenges:

- Need for design guidance on implementing FabricPath-based Data Centers.
- Need to address application of network services over FabricPath-based topologies.
- Need for multi-tenancy design guidance over a FabricPath-based topology in private enterprise “cloud” environments.

The following use cases are specifically addressed in this release:

- DC and PoD design
- Inter-PoD communication (multi-PoD or DC wide)
- Inter-PoD clustering
- Inter-PoD VM mobility
- Inter-PoD/Inter-building (intra-campus) Service Resilience
- Split N-tiered applications
- Multi-tenancy

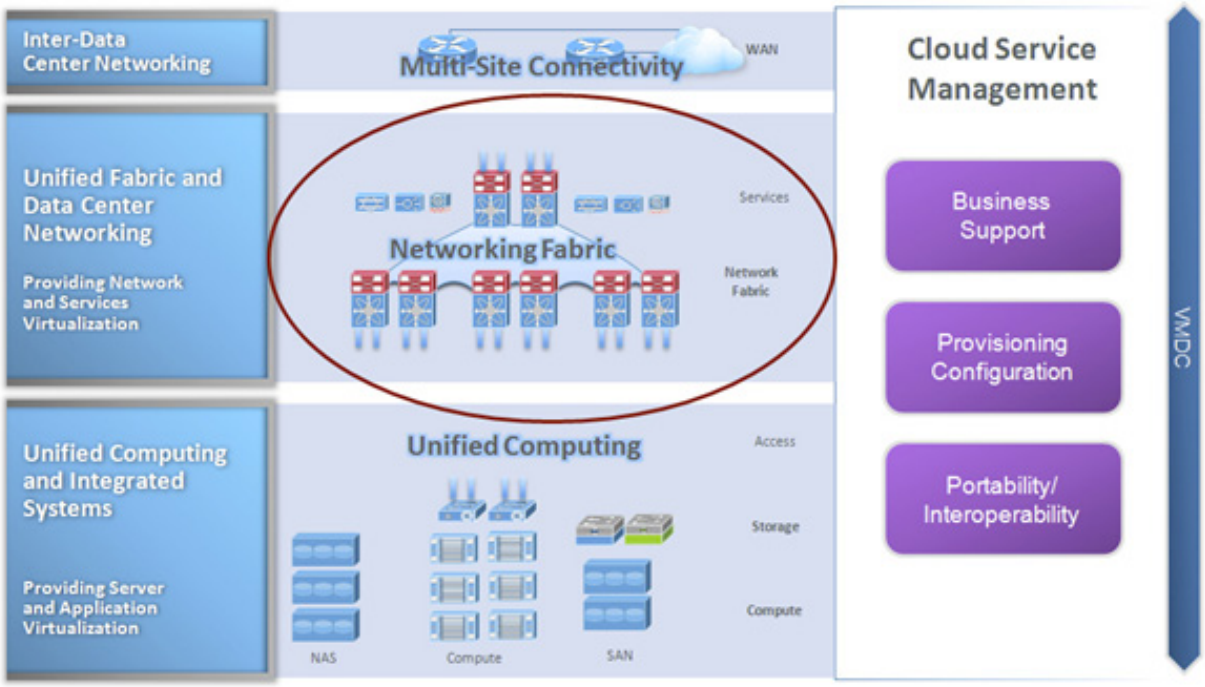
Solution Proposal

In addressing the identified requirements we modified the Unified Data Center Networking component of the VMDC architecture, replacing it with a FabricPath-based design. Figure 1-1 shows a high level diagram of the overall VMDC solution.

In general, the solution consists of three modular layers:

1. Unified Computing and Integrated Systems (UCIS) providing server and application virtualization, currently consisting of FlexPods or Vblocks.
2. Unified Fabric and Data Center Networking (UCDC) providing network and network based services virtualization.
3. Data Center Interconnect (DCI) providing seamless multi-site connectivity. The solution is complemented by Cloud Service Management components that enable end to end provisioning and orchestration, as well as monitoring and assurance.

Figure 1-1 High Level VMDC Solution



In this design we replace only the UCDC layer of the architecture, allowing us to leverage existing design guidance for UCIS and DCI layers. As such the following assumptions can be maintained:

- Previous design guidance for UCIS (Flexpod, Vblock) components remains the same. VMDC 3.0 validation is performed on the latest releases of Flexpod and Vblock. Applications validated on FlexPod or Vblock will continue to function on the overall VMDC architecture.
- Previous design guidance for DCI components remains the same. Use of FabricPath for long distance multi-site DCI is not covered in VMDC 3.0, however this release does address shorter distance, inter-building resilience in a campus environment.
- There are no complementary management and orchestration components in VMDC 3.0. The reason for this gap is that release 3.0 is an introductory FabricPath-based design which will be followed by subsequent enhancement releases. We intend to address this gap in a future release.
- Cisco (“XaaS”) applications such as Unified Communication, Hosted Collaboration Systems, Media Data Center, Video Surveillance, and Telepresence, use VMDC architecture as the infrastructure basis for their validation efforts. The latest release used for these validations is VMDC release 2.2. No specific Cisco application validations are in scope for VMDC 3.0. However, given the level of validation performed thus far, we are confident that these will work on a VMDC 3.0 infrastructure without major issues.