



Preface

The Cisco® Virtualized Multiservice Data Center (VMDC) solution provides design and implementation guidance for Enterprises deploying private cloud services and Service Providers building virtual private and public cloud services. The Cisco VMDC solution integrates various Cisco and third-party products that are part of the cloud computing ecosystem.

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Introduction

Interest in cloud computing over the last several years has been phenomenal. For cloud providers, public or private, it will transform business and operational processes, streamlining customer on-ramping and Time to Market (TTM), facilitating innovation, providing cost efficiencies, and enabling the ability to scale resources on demand.

Infrastructure as a Service (IaaS) simplifies application development and implementation by virtualizing underlying hardware resources and operating systems. This allows IaaS users to significantly cut development and deployment times by cloning the environments best suited for an application without having to factor in the underlying hardware environment. Units of this infrastructure, including compute, storage, and networks, collectively form a cloud infrastructure.

This guide describes design details for a reference architecture that brings together core products and technologies from Cisco, NetApp, EMC, BMC, and VMware to deliver a comprehensive end-to-end cloud solution. Focused on IaaS cloud deployment, the Cisco VMDC solution provides customers with robust, scalable, and resilient options for cloud Data Center (DC) deployments.

Cisco’s VMDC system defines an end-to-end architecture, which an organization may reference for the migration or build out of virtualized, multitenant data centers for new cloud-based service models such as Infrastructure as a Service (IaaS).

The system builds upon these foundational pillars in terms of architectural approach:

- **Secure Multitenancy**—Leveraging traditional security best practices in a multilayered approach to secure the shared physical infrastructure and those logical constructs that contain tenant-specific resources, while applying new technologies to provide security policy and policy mobility to the Virtual Machine (VM) level ensures the continued ability to enforce and comply with business and regulatory policies, even in a highly virtualized multitenant environment.
- **Modularity**—A pod-based modular design approach mitigates the risks associated with unplanned growth, providing a framework for scalability that is achievable in manageable increments with predictable physical and cost characteristics, and allowing for rapid time-to-market through streamlined service instantiation processes.
- **High Availability**—Building for carrier-class availability through platform, network, and hardware and software component level resiliency minimizes the probability and duration of service-affecting incidents, meaning that Private IT and Public Cloud administrators can focus on supporting the bottom line rather than fighting fires.
- **Differentiated Service Support**—Defining logical models around services use cases results in a services-oriented framework for systems definition, ensuring that resources can be applied and tuned to meet tenant requirements.
- **Service Orchestration**—Dynamic application and re-use of freed resources is a key aspect of a Cloud-based operations model, thus the ability to properly represent abstractions of the underlying tenant-specific resources and services is a fundamental requirement for automated service orchestration and fulfillment. This is accomplished in the VMDC architecture through continued evolution of network container definitions which can be leveraged by in-house middleware and partner management solutions.

Audience

This guide is intended for, but not limited to, system architects, network/compute/storage design engineers, systems engineers, field consultants, advanced services specialists, and customers who want to understand how to deploy a public or private cloud DC infrastructure. This guide assumes that the reader is familiar with the basic concepts of IP protocols, Quality of Service (QoS), High Availability (HA), Layer 4 (L4) - Layer 7 (L7) services, DC platforms and technologies, SAN and VMware hypervisor. This guide also assumes that the reader is aware of general system requirements and has knowledge of Enterprise or Service Provider network and DC architectures and platforms and virtualization technologies.

Document Organization

Table 1 provides the organization of this guide.

Table 1 **Document Organization**

Topic	Description
Chapter 1, “Design Overview”	This chapter provides an overview of this solution.
Chapter 2, “Design Details”	This chapter provides the design details of this solution.
Glossary	This glossary provides a list of acronyms.

Related Documents

The VMDC design recommends that general Cisco DC design best practices be followed as the foundation for IaaS deployments. The following Cisco Validated Design (CVD) companion documents provide guidance on such a foundation:

- [VMDC 2.0 Solution Overview](#)
- [VMDC 2.0 Solution White Paper](#)
- [VMDC 2.1 Design Guide](#)
- [VMDC 2.1 Implementation Guide](#)
- [VMDC 2.2 Design Guide](#)
- [VMDC 2.2 Implementation Guide](#)
- [VMDC 2.2 EoMPLS DCI for Hybrid Cloud with vCloud Director](#)
- [VMDC 2.3 Implementation Guide](#)
- [VMDC 3.0 Design Guide](#)
- [VMDC 3.0 Implementation Guide](#)
- [Previous VMDC System Releases](#)
- [Data Center Designs: Data Center Interconnect](#)
- [VMDC Hybrid Cloud with vCloud Director Design and Implementation Guide](#)
- [Data Center Design - IP Network Infrastructure](#)
- [Data Center Service Patterns](#)
- [Data Center Interconnect](#)
- [Security and Virtualization in the Data Center](#)
- [Vblock Infrastructure Solutions](#)

Cloud Enablement Services from Cisco Advanced Services and partners can help customers realize the full business value of their IT investments faster. Backed by our networking and security expertise, an architectural approach, and a broad ecosystem of partners, these intelligent services enable customers to build a secure, agile, and highly automated cloud infrastructure.

About Cisco Validated Designs

The Cisco Validated Design Program consists of systems and solutions designed, tested, and documented to facilitate faster, more reliable, and more predictable customer deployments. For more information visit <http://www.cisco.com/go/validateddesigns>.