Preface

This document provides design guidance and Cisco recommended best practices for deploying a Virtualized Workload Mobility solution, allowing the live migration of virtual machines between data center sites located at a distance up to 100 Km (usually named “Twin Data Centers”). The paper highlights the various functional components of a holistic Data Center Interconnection (DCI) Solution, and the corresponding technologies validated in the context of a Virtualized Workload Mobility deployment.

More specifically, technologies discussioned are divided into DCI functional components:

- The use of virtual PortChannel (vPC) over dedicated connection is introduced for providing LAN Extension services. Additionally, an alternative and innovative Cisco approach named Overlay Transport Virtualization (OTV) is introduced as another LAN Extension option.
- Integration of Cisco Application Control Engine and Global Site Selector with VMware vCenter server is positioned to provide traffic inbound path optimization between clients and mobile workload entities. This will be combined with First Hop Redundancy Protocol (FHRP) filtering to optimize also the outbound traffic direction and ensure avoidance of asymmetric routing.
- Specific considerations on the deployment of virtualized workload mobility leveraging VMware vMotion functionality will be made, highlighting the Cisco added value of integrating Cisco Nexus 1000V virtual distributed switch and Cisco Virtual Security Gateway (VSG) to ensure that network and security profiles can be easily and seamlessly migrated together with each specific workload.
- Finally, the discussion will move to addressing the specific storage requirements that a workload mobility solution brings up. In this context, advanced Intelligent Storage solutions provided by Cisco partners will be highlighted.

The goal of this paper is mainly to highlight the overall solution architecture and provide design guidance for the specific technologies above mentioned. A separate deployment guide will accompany this design guide, providing more specific implementation details and configuration guidelines.

DCI Design History

The DCI design history focuses on 3 main LAN Extension options.

- Ethernet – The Ethernet LAN Extension option extends Ethernet natively over a dark fiber / DWDM optical transport with Virtual Switching Services (VSS) or Virtual Port Channels (vPC), using the Catalyst 6500 and Nexus 7000 hardware platform respectively.
- MPLS
  - Point-to-Point – The MPLS LAN Extension option includes MPLS point-to-point Pseudowires using the ASR 1000 or Catalyst 65000.

Note The Catalyst 6500 also supports multipoint MPLS solutions using VPLS.

  - Multipoint – The MPLS LAN Extension option also includes VPLS, a multipoint ethernet LAN solution using MPLS as transport. The ASR 9000 provides VPLS using Multi-Chassis Link Aggregation (MC-LAG) and vPC to the data center aggregation layer.
- IP – The IP LAN Extension options includes Overlay Transport Virtualization (OTV) on the Nexus 7000 platform, a dynamic MAC routing technology where Layer 2 MAC address reachability information is exchanged between network layer devices.

This document builds upon the DCI design history by introducing a specific use case, Virtualized Workload Mobility that utilizes the DCI enabled infrastructure. The Virtualized Workload Mobility use case has defined requirements that provide clear guidance when designing the DCI enabled system. Additionally, this document highlights the Nexus 1000v as a distributed virtual switch for stretched clusters, the Virtual Security Gateway for virtual machine protection and isolation, and intelligent storage systems for synchronous replication and storage content availability. Finally, this document discusses two different LAN extension options, further highlighting the modularity of the DCI solution components and the utilization of Virtualized Workload Mobility under different LAN extension technologies.

Refer to the follow link for Cisco Validated Designs using Data Center Interconnect.
http://www.cisco.com/en/US/netsol/ns749/networking_solutions_sub_program_home.html

Audience

This document is intended for, but not limited to, network architects, systems engineers, field consultants, advanced services specialists, and customers who want to understand how to deploy a workload mobility solution.

Organization

This document is organized as follows:

- Chapter 1, Cisco Virtualized Workload Mobility Introduction, provides an overview of the business requirements behind the deployment of a workload mobility solution and introduces the different functional components of a holistic Data Center Interconnect (DCI) solution.
- Chapter 2, Cisco Virtualized Workload Mobility Design Considerations, discusses various technologies that can be deployed in each DCI functional component and provides specific design guidance around this type of implementation.

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