



Overview

This chapter contains the following sections:

- [About EMC VPLEX, page 1](#)
- [Cisco UCS Director, page 5](#)

About EMC VPLEX

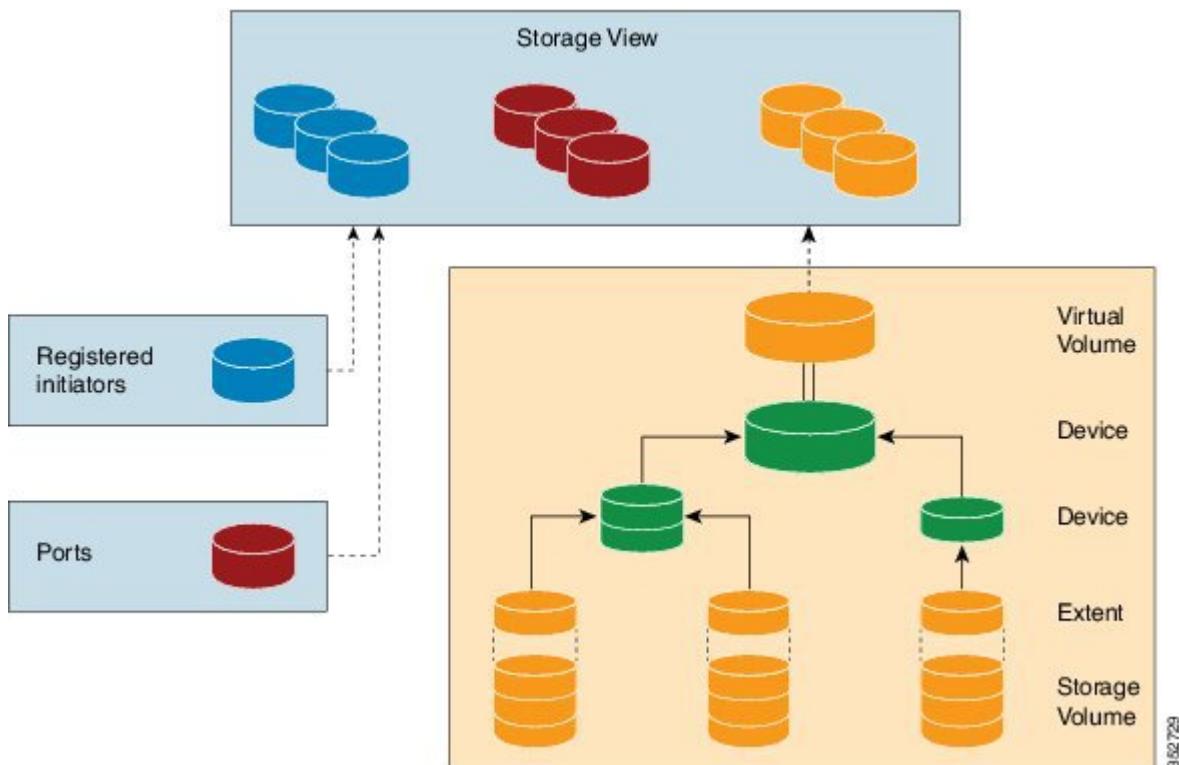
VPLEX is an EMC technology that provides a virtual storage system and access to data in the private cloud. A VPLEX can be implemented on Cisco UCS Director through a pod deployment such as Vblock, or as a standalone device. VPLEX has the following capabilities:

- Uses a single interface for a multi-vendor high-availability storage and compute infrastructure to dynamically move applications and data across different compute and storage locations in real time, with no outage required. VPLEX combines scaled clustering with distributed cache coherence intelligence within the same data center, across a campus, or within a specific geographical region. Cache coherency manages the cache so that data is not lost, corrupted, or overwritten.
- Dynamically makes data available for organizations. For example, a business can be sustained through a failure that would have traditionally required outages or manual restore procedures.
- Presents and maintains the same data consistently within and between sites, and enables distributed data collaboration.
- Establishes itself between ESX hosts that act as servers for virtual machines (VMs) and storage in a storage area network (SAN) where data can be extended within, between, and across pods.

EMC VPLEX Technology

EMC VPLEX encapsulates traditional physical storage array devices and applies three layers of logical abstraction to them. The logical relationships of each layer are shown in the Figure below.

Figure 1: VPLEX Logical Storage Structures



VPLEX uses extents to divide storage volumes. Extents can be all or part of the underlying storage volume. VPLEX aggregates extents and applies RAID protection in the device layer. Devices are constructed using one or more extents.

At the top layer of the VPLEX storage structures are virtual volumes, which are created by underlying devices and inherit their size. A virtual volume can be a single contiguous volume that is distributed over two or more storage volumes.

VPLEX exposes virtual volumes to hosts that need to use them with its front-end (FE) ports, which are visible to hosts. Access to virtual volumes is controlled through storage views. Storage views act as logical containers that determine host initiator access to VPLEX FE ports and virtual volumes.

VPLEX can use a Local or Metro external hardware interface depending on the network implementation described in the following sections. For more information on VPLEX solutions for VPLEX Local or Metro see the [Data Center Interconnect Design Guide for Virtualized Workload Mobility with Cisco, EMC, and VMware](#).

VPLEX Local

Use VPLEX Local when homogeneous or heterogeneous storage systems are integrated into a pod and data mobility is managed between the physical data storage entities.

VPLEX Local has the following attributes:

- Up to four engines
- Up to 8000 logical unit numbers (LUNs)
- Single site
- Single pod

VPLEX Metro

Use VPLEX Metro when access and data mobility is required between two locations that are separated by synchronous distances. VPLEX Metro allows a remote site to present logical unit numbers (LUNs) without needing physical storage for them. VPLEX Metro configurations help users to transparently move and share workloads, consolidate a pod, and optimize resource utilization across pods.

VPLEX Metro has the following attributes:

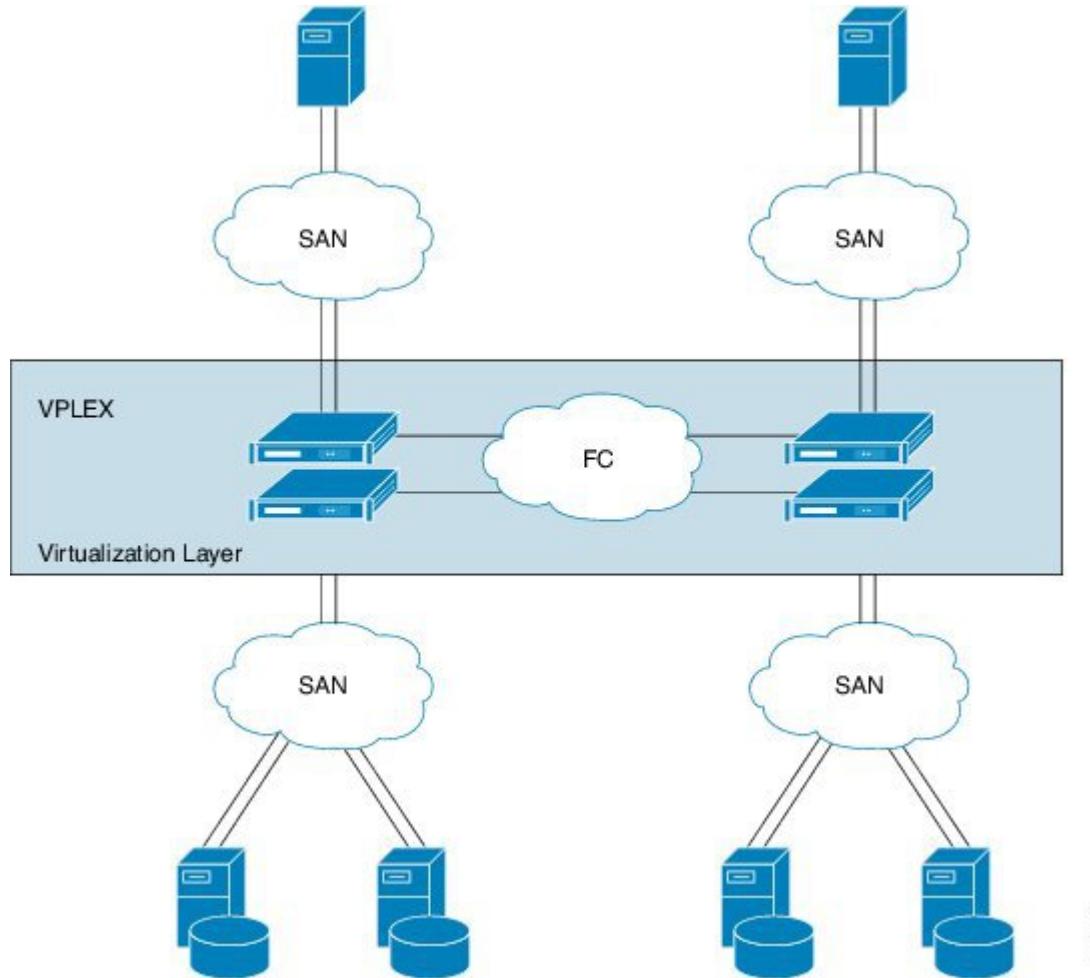
- One to eight engines
- Up to 16,000 LUNs
- Two sites
- Up to 100 kilometers

VPLEX Clustering Architecture

VPLEX uses clusters to break the boundaries of the pod and allow servers of multiple pods to have concurrent read and write access to shared block storage devices. The VPLEX cluster, shown in the Figure below is scalable. You can add up to four engines and connect multiple clusters to form a VPLEX Metro configuration. The engine is responsible for virtualizing the input and output stream and for connecting to hosts and storage using Fibre Channel connections to transfer data. VPLEX Metro currently supports up to two clusters in the

same pod to provide nondisruptive data mobility, heterogeneous storage management, and improved application availability.

Figure 2: VPLEX Cluster Configuration



Managing the VPLEX Storage System for a Pod

The VPLEX virtual storage system technology for accessing data in the private cloud is associated with and supported by a pod. Cisco UCS Director collects data through the VPLEX Element Manager API and connects to the VPLEX server through HTTPS. After you establish a VPLEX account and associate a pod with a VPLEX cluster (made up of one, two, or four engines in a physical cabinet), you can configure, manage, and monitor the following VPLEX features in Cisco UCS Director:

- Cluster inventory of ESX hosts and reports for two or more VPLEX directors that form a single fault-tolerant cluster and that are deployed as one to four engines.
- VPLEX engine inventory and reports for an engine that contains two directors, management modules, and redundant power.

- Director inventory and reports for the CPU module(s) that run GeoSynchrony, the core VPLEX software. Two directors are in each engine; each has dedicated resources that can function independently.
- Port inventory and reports for Fast Ethernet ports and initiator ports.
- VPLEX (local, metro, or global) data cache report for the temporary storage of recent writes and recently accessed data.
- Storage volume inventory and reports for a logical unit number (LUN) exported from an array.
- Extent management (create, delete, report) for a slice (range of blocks) of a storage volume.
- Device management (create, delete, attach/detach mirror, report) for a RAID 1 device whose mirrors are in geographically separate locations.
- Virtual volume management (create, modify, delete, report) for a virtual volume that can be distributed over two or more storage volumes that are presented to ESX hosts.
- Storage views management (create, modify, delete, report) for a combination of registered initiators (hosts), front-end ports, and virtual volumes that are used to control host access to storage.
- Recovery point for determining the amount of data that can be lost before a given failure event.

For more information about VPLEX use cases, see the EMC VPLEX Metro Functional Overview section of the Cisco Virtualized Workload Mobility Design Considerations chapter in the [Data Center Interconnect Design Guide for Virtualized Workload Mobility with Cisco, EMC, and VMware](#).

Cisco UCS Director

Cisco UCS Director is a complete, highly secure, end-to-end management, orchestration, and automation solution for a wide array of Cisco and non-Cisco data infrastructure components, and for the industry's leading converged infrastructure solutions based on the Cisco UCS and Cisco Nexus platforms. For a complete list of supported infrastructure components and solutions, see the [Cisco UCS Director Compatibility Matrix](#).

Cisco UCS Director is a 64-bit appliance that uses the following standard templates:

- Open Virtualization Format (OVF) for VMware vSphere
- Virtual Hard Disk (VHD) for Microsoft Hyper-V

Management through Cisco UCS Director

Cisco UCS Director extends the unification of computing and network layers through Cisco UCS to provide you with comprehensive visibility and management of your data center infrastructure components. You can use Cisco UCS Director to configure, administer, and monitor supported Cisco and non-Cisco components. The tasks you can perform include the following:

- Create, clone, and deploy service profiles and templates for all Cisco UCS servers and compute applications.
- Monitor organizational usage, trends, and capacity across a converged infrastructure on a continuous basis. For example, you can view heat maps that show virtual machine (VM) utilization across all your data centers.
- Deploy and add capacity to converged infrastructures in a consistent, repeatable manner.

- Manage, monitor, and report on data center components, such as Cisco UCS domains or Cisco Nexus network devices.
- Extend virtual service catalogs to include services for your physical infrastructure.
- Manage secure multi-tenant environments to accommodate virtualized workloads that run with non-virtualized workloads.

Automation and Orchestration with Cisco UCS Director

Cisco UCS Director enables you to build workflows that provide automation services, and to publish the workflows and extend their services to your users on demand. You can collaborate with other experts in your company to quickly and easily create policies. You can build Cisco UCS Director workflows to automate simple or complex provisioning and configuration processes.

Once built and validated, these workflows perform the same way every time, no matter who runs the workflows. An experienced data center administrator can run them, or you can implement role-based access control to enable your users and customers to run the workflows on a self-service, as needed, basis.

With Cisco UCS Director, you can automate a wide array of tasks and use cases across a wide variety of supported Cisco and non-Cisco hardware and software data center components. A few examples of the use cases that you can automate include, but are not limited to:

- VM provisioning and lifecycle management
- Network resource configuration and lifecycle management
- Storage resource configuration and lifecycle management
- Tenant onboarding and infrastructure configuration
- Application infrastructure provisioning
- Self-service catalogs and VM provisioning
- Bare metal server provisioning, including installation of an operating system