



EMC Backup and Recovery for
Microsoft Exchange 2007

Enabled by EMC CLARiiON CX4-120,
Replication Manager, and Hyper-V on
Windows Server 2008 using iSCSI

Reference Architecture

EMC Global Solutions



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Published May, 2009

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Part number: H6239

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Reference architecture overview

Document purpose This document describes the reference architecture of the EMC® backup and recovery solution for Microsoft Exchange 2007 with EMC CLARiiON® CX4-120 (600 users) enabled by EMC Replication Manager 5.2.1, and Hyper-V on Windows Server 2008 using Microsoft iSCSI Software Initiator with local data protection. The solution was tested and validated by EMC Global Solutions.

Solution purpose The purpose of this reference architecture is to build an Exchange solution using EMC's CLARiiON CX4-120 platform and integrate all the components required to run a complete messaging system. This reference architecture validates the performance of all aspects of the solution and provides guidelines and best practices for building similar solutions. Performance is optimized using the Microsoft MPIO framework and EMC PowerPath® Device Specific Module (DSM) to aggregate bandwidth and dynamically load balance across all paths.

This reference architecture is not intended to be a comprehensive guide to every aspect of the EMC backup and recovery for Microsoft Exchange 2007 enabled by EMC CLARiiON CX4-120, Replication Manager, and Hyper-V on Windows Server 2008 using iSCSI solution.

The business challenge The business challenge is to provide customers with the ability to use Microsoft Exchange Server 2007 SP1, with local data replication, to allow for fast data recovery in the event of database loss or corruption. The storage architecture for this solution is based on a design that utilizes a "building block" approach, which repeatedly builds upon itself as customers' requirements grow and additional space and fault tolerance are required.

This solution uses a *Building Block 1* design with 600 users. The challenge was to ensure that at the smallest building block level all components worked as expected and within Microsoft Exchange database latencies at all times, while running local data replication.

The technology solution A consolidated Microsoft Exchange infrastructure can be the first step towards meeting the challenges of managing e-mail. This solution demonstrates the testing completed in a Microsoft Exchange environment. The solution described in this reference architecture utilizes EMC's CLARiiON CX4-120 with iSCSI, which is a simple, easy-to-manage storage system.

Key components

Introduction

The key components of this solution are:

- EMC CLARiiON CX4 networked storage
 - Windows Server 2008 Hyper-V
 - Microsoft MPIO
 - Microsoft iSCSI Software Initiator
 - EMC Replication Manager
 - EMC PowerPath
-

EMC CLARiiON CX4 networked storage

EMC's CLARiiON CX4-120 provides entry-level networked storage for departmental applications or for midsize organizations. CLARiiON CX4-120 combines the CLARiiON system's proven five 9s (99.999 percent) availability with innovative technologies like Virtual Provisioning™, a 64-bit operating system, and multi-core processors. The CX4-120 scales from 5 to 120 TB of capacity.

The features and benefits of the CLARiiON CX4-120 storage system are listed below.

Feature	Benefit
Flash drives	Extends your tiering capabilities by establishing a new tier 0 for ultra-high performance.
Fibre Channel (FC)/iSCSI connectivity	Deploy flexibly with four 4 Gb/s FC and four 1 Gb/s iSCSI host ports.
Tiered storage	Mix low-power SATA drives and high-performance FC drives in the same system to meet your needs and budget.
MetaLUN technology	Increase performance and capacity utilization with online LUN expansion.
Virtual LUN technology	Easily manage tiered storage deployments with nondisruptive data migration within the array.
Three-year enhanced support	Get unlimited online self-help, proactive remote support, software upgrades, 24x7 call center response, and 9x5 onsite support.
Data-in-place upgrade	Protect your investment with our unique data-in-place upgrade to the CX4 model 240, CX4 model 480, or the CX4 model 960.

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Key components, Continued

EMC CLARiiON CX4 networked storage (continued)

CLARiiON CX4 EMC-related products include the following:

- **CLARiiON Virtual Provisioning**
Provides additional benefits beyond traditional “thin” provisioning, including simplified storage management and improved capacity utilization, delivering on maximum storage efficiency with Windows Server 2008.
- **MirrorView™**
Protects your business with synchronous and asynchronous remote replication options across IP and FC networks.
- **Navisphere® Management Suite**
Helps businesses to discover, monitor, configure, and report on multiple EMC CLARiiON storage arrays from a browser. Navisphere integrates with Windows storage platform management interfaces to deliver a seamless management solution for Windows.
- **Navisphere Quality of Service Manager**
Helps businesses to manage application service levels more effectively by measuring, monitoring, and controlling I/O requests from applications.
- **PowerPath Encryption with RSA**
Protects sensitive data against unauthorized access if a disk drive or array is removed.
- **RecoverPoint/SE**
Ensures continuous data protection and continuous remote data replication for EMC CLARiiON networked storage.
- **SAN Copy™**
Enables high-speed data mobility, migration, and protection between EMC CLARiiON networked storage and qualified storage systems.
- **SnapView™**
Enables businesses to increase application availability and reduce backup windows with CLARiiON-based local snapshots and full volume clones.

Windows Server 2008 Hyper-V

Microsoft's Windows Server 2008 Hyper-V is a powerful virtualization tool combined with EMC's CLARiiON CX4-120 system delivering added benefits in all areas of IT infrastructure. The solution benefits customers from broad segments including large enterprises, midsize enterprises, and small businesses. Utilizing the building blocks method, customers can quickly and correctly size their environments while consolidating their data centers.

Microsoft MPIO MPIO is a Microsoft-provided framework that allows storage providers to develop multipath solutions that contain the hardware-specific information needed to optimize connectivity with their storage arrays. These modules are called Device Specific Modules (DSMs). The Microsoft MPIO solution is protocol independent and can be used with FC, iSCSI, parallel SCSI, and Serial Attached SCSI (SAS) interfaces on the following operating systems:

- Windows Server 2008
- Windows Server 2003*

*Failover Clustering in Windows Server 2008 does not support the use of parallel SCSI storage.

Source: White Paper: Windows Server High Availability with Microsoft MPIO
<http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=cbd27a84-23a1-4e88-b198-6233623582f3>

Microsoft iSCSI Software Initiator The Microsoft iSCSI Software Initiator enables connection of a Windows host to an external iSCSI storage array using Ethernet NICs. This download can be installed on Windows Server 2003, Windows XP, and Windows 2000. For Vista and Windows Server 2008, the iSCSI initiator is included in-box. The Microsoft iSCSI Software Initiator makes it possible for businesses to take advantage of existing network infrastructure to enable block-based storage area networks without having to invest in additional hardware.

Source: Microsoft iSCSI Software Initiator Version 2.08
<http://www.microsoft.com/downloads/details.aspx?FamilyID=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en>

EMC Replication Manager EMC Replication Manager manages EMC point-in-time replication technologies through a centralized management console. Replication Manager coordinates the entire data replication process, from discovery and configuration to the management of multiple-application, consistent, disk-based replicas. Replication Manager allows customers to auto-discover their replication environment and enable streamlined management by scheduling, recording, and cataloging replica information, including auto-expiration.

With Replication Manager, customers can put the right data in the right place at the right time, on-demand or based on schedules and policies that they define. This application-centric product allows customers to simplify replica management with application consistency.

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Key components, Continued

EMC Replication Manager (continued)

Benefits

Replication Manager software delivers point-and-click replica management for business continuity:

- Creates a “gold” copy of production data for an instant restore should corruption occur.
- Streamlines the backup of production data without affecting performance, which is ideal for backup acceleration.
- Enables copies of production data to be created for testing, development, and reporting to minimize the impact to production.

Features

Replication Manager is designed for ease of use through the following features:

- Management and automation of snapshots and clones for EMC’s point-in-time replication products on CLARiiON using SnapView and SAN Copy.
- Auto-discovery of applications, their associated storage, the replication technology available, Virtual Machine File System (VMFS) data stores, VMs, and their replication configuration during each replica cycle.
- Intelligence to place applications in the proper state for application-consistent replicas through integration with Volume Shadow Copy Service (VSS) for Microsoft Exchange Server.
- Instant recovery back to production application data for Exchange, SQL Server, and Oracle running on VMs using virtual disks, physical RDM, or Microsoft iSCSI Software Initiator discovered disks.

For a Virtual Machine File System (VMFS) containing VMs, create replicas for backup and instant restore through Replication Manager or perform a simple restore via the VMware vCenter Server of a single VM from a mounted replica created by Replication Manager.

EMC PowerPath

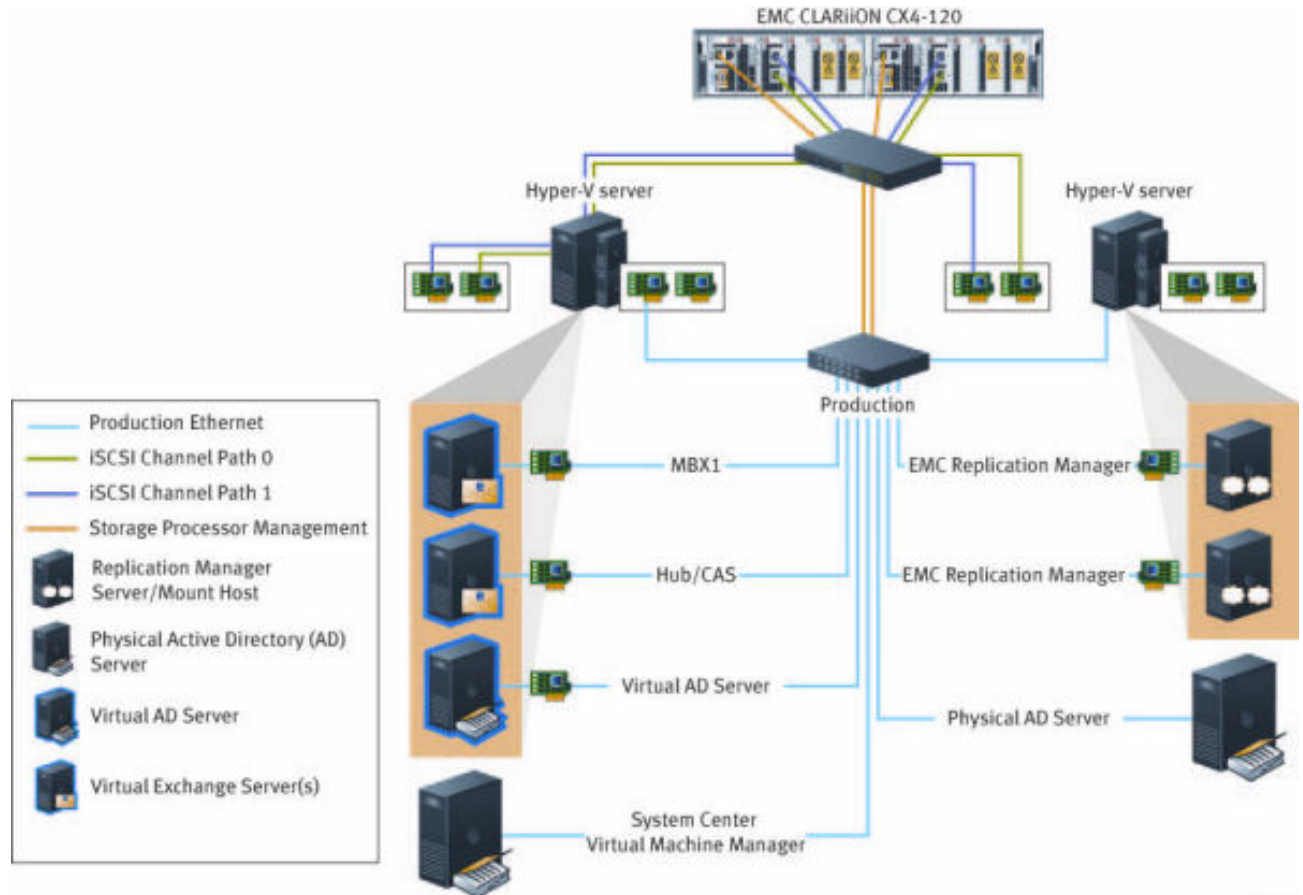
PowerPath is a server-resident software solution designed to enhance performance and application availability. PowerPath combines automatic load balancing, path failover, and multiple path I/O capabilities into one integrated package.

PowerPath for Windows is an intelligent path management application specifically designed to work within the Microsoft Multipathing I/O (MPIO) framework. PowerPath enhances application availability by providing load balancing and automatic path failover and recovery functionality.

Physical architecture

Architecture diagram

The following illustration depicts the overall physical architecture of the solution.



CL4332

Validated environment profile

Profile characteristics This configuration is based on previous testing that was run on Exchange 2007 SP1 and 300 GB 15k FC drives. This configuration was tested with virtualization with no seen issues. More information on this testing can be found on EMC.com and the Microsoft website under the Exchange Solutions Review Program (ESRP).

The solution was validated with the following environment profile.

Profile characteristic	Value												
Number of Exchange 2007 users	600												
Exchange 2007 SP1 servers	1												
Number of Exchange 2007 users per server	600												
Number of Exchange 2007 storage groups per server	4												
Number of Exchange 2007 mail databases per storage group	1												
Number of Exchange 2007 users per mail database	150												
Size of Exchange 2007 user mailbox	300												
Exchange 2007 production data	<table border="1"><thead><tr><th>Type</th><th>Value</th></tr></thead><tbody><tr><td>RAID type</td><td>1_0</td></tr><tr><td>Drive size</td><td>300 GB</td></tr><tr><td>Speed</td><td>15k</td></tr><tr><td>Drive type</td><td>FC</td></tr><tr><td>Host interface</td><td>iSCSI direct</td></tr></tbody></table>	Type	Value	RAID type	1_0	Drive size	300 GB	Speed	15k	Drive type	FC	Host interface	iSCSI direct
Type	Value												
RAID type	1_0												
Drive size	300 GB												
Speed	15k												
Drive type	FC												
Host interface	iSCSI direct												

Test bed profile

Overview

The solution validates the performance of the array and the functionality and performance of Microsoft Windows Server 2008 with Hyper-V as follows:

- Two Windows 2008 Hyper-V Servers hosting five virtual machines
- One Microsoft Windows 2008 Active Directory (AD) Server
- One Microsoft Exchange 2007 SP1 Hub/CAS Server on Windows 2008
- One Microsoft Exchange 2007 SP1 Mailbox Server on Windows 2008
- One EMC Replication Manager Server
- One EMC Replication Manager mount host
- Dual paths from Window Server 2008 to EMC CLARiiON storage using Microsoft MPIO and EMC PowerPath

A physical domain controller (DC) also exists. This is solely for fault tolerance, having a DC available in the event that the virtual AD server is not accessible. It is recommended to always have a minimum of two DCs per site. Having one DC virtualized allows for the consolidation of resources.

EMC's Replication Manager was also used to protect the data and allow for two rolling backups to disk. This was also validated from both a functionality and performance standpoint.

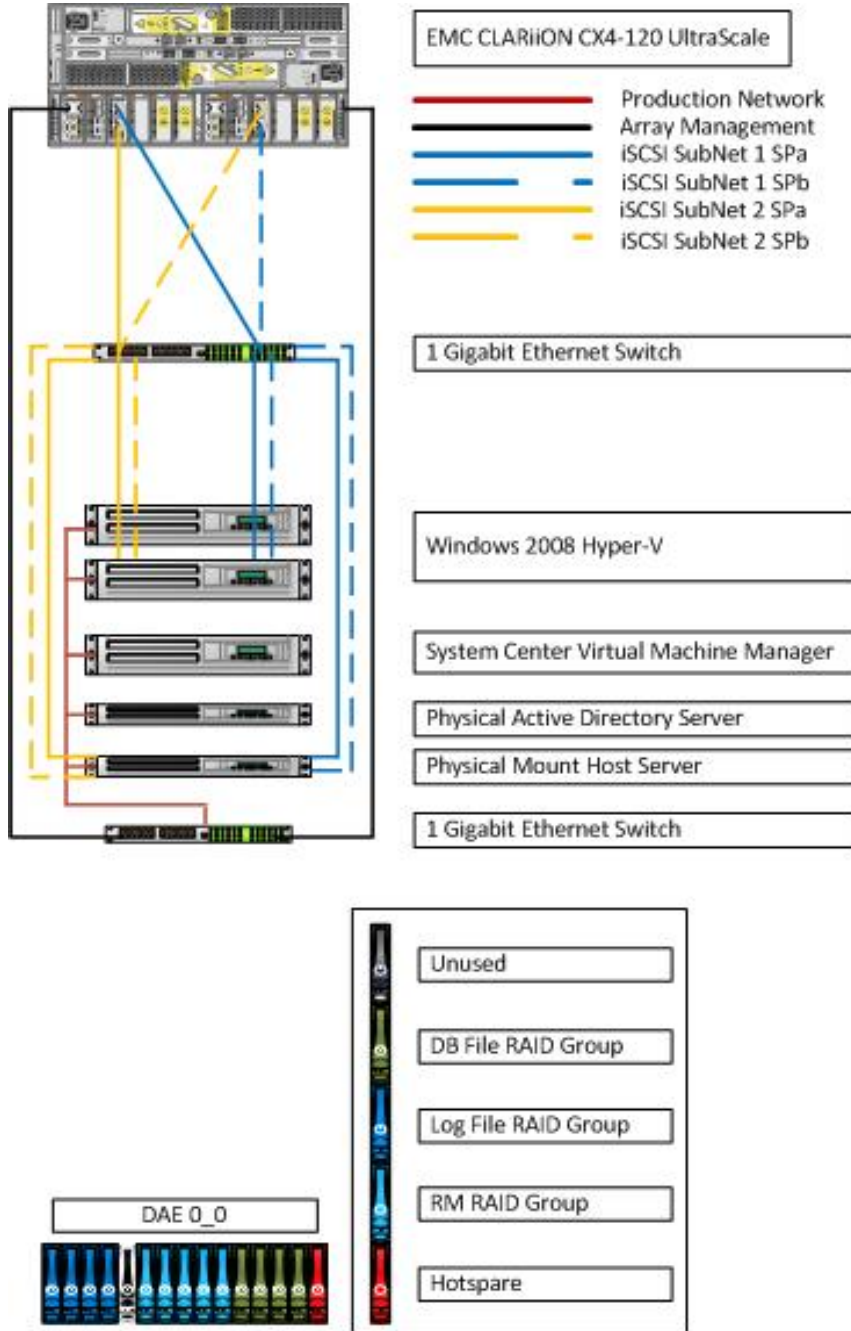
All hardware including the storage array, the servers, and two network switches are all physically located in the same rack as shown in the following diagram.

Continued on next page

Test Bed Profile, Continued

Hardware layout diagram

The following diagram describes the hardware layout used in this solution.



Hardware and software resources

Hardware The hardware used to validate the solution is listed below.

Equipment	Quantity	Configuration
Rack	1	42 U Rack
EMC CLARiiON CX4-120	1	2 service processors 2.879 GB mirrored cache DAE0: 15: 15k 300 GB FC HDD FLARE® 6.28.0 (4.30)
Windows 2008 Hyper-V Server	2	1: 1 Gb/s NIC production 4: 1 Gb/s NIC iSCSI 1: Microsoft virtual network switch adapter 64 GB RAM 4: Intel64 Family 15 Model 6 Stepping 8 GenuineIntel ~2992 MHz processors Microsoft Windows Server 2008 Enterprise Edition OS Version: 6.0.6001 Service Pack 1 Build 6001
Windows 2008 System Center Virtual Machine Manager Server	1	1: 1 Gb/s NIC production 64 GB RAM 4: Intel64 Family 15 Model 6 Stepping 8 GenuineIntel ~2992 MHz processors Microsoft Windows Server 2008 Enterprise Edition OS Version: 6.0.6001 Service Pack 1 Build 6001
Windows 2008 Active Directory Server	1	1: 1 Gb/s NIC production 8 GB RAM 2: Intel64 Family 15 Model 4 Stepping 8 GenuineIntel ~2793 MHz processors Microsoft Windows Server 2008 Enterprise Edition OS Version: 6.0.6001 Service Pack 1 Build 6001

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Hardware and software resources, Continued

Hardware (continued)

Equipment	Quantity	Configuration
Windows 2008 Replication Manager Mount Host	1	1: 1 Gb/s NIC production 8 GB RAM 2: Intel64 Family 15 Model 4 Stepping 8 GenuineIntel ~2793 MHz processors Microsoft Windows Server 2008 Enterprise Edition OS Version: 6.0.6001 Service Pack 1 Build 6001
Ethernet Switch	2	24 Port 1 Gigabit Ethernet Layer 3 switch with 4 combo ports

Software The software used to validate the solution is listed below.

Software	Version
Microsoft Windows Server 2008 Enterprise x64	OS version: 6.0.6001 Service Pack 1 Build 6001
Microsoft Windows Server 2003 Enterprise x32 (to support Replication Manager)	Service Pack 2 Build 3959
Windows Server 2008 Hyper-V	Built in with Windows 2008 - RTM 6.0.6001.18016
Microsoft Exchange Server 2007	2007 SP1
EMC PowerPath	5.2 64-bit
Microsoft iSCSI Software Initiator	Built in with Windows 2008/6.0 - 2.07
EMC Replication Manager	5.2 server/mount host
Microsoft MPIO	Not applicable
EMC Solutions Enabler	6.5.2.5-891 64-bit
Navisphere ADMSnap	2.28.0.0.4
Navisphere CLI	6.28.0.4.4
Microsoft System Center Virtual Machine Manager	2008
Microsoft LoadGen	08.02.0045

Conclusion

Summary

Midsized customers face backup challenges in proactively managing exponential information growth, reducing operational budgets, and delivering predictable service levels back to the business. The adoption of virtual backup and replication technology is the key to meeting these challenges.

Using Microsoft Hyper-V for consolidation, midsized customers can improve their operational efficiency and deliver high availability of their messaging environment with better server capacity utilization and power and cooling savings.

The advanced features of Replication Manager allow it to integrate directly with mission-critical operating systems, applications, and databases. In addition, Replication Manager simplifies management with a single centralized console, and a wizard-driven and point-and-click user interface.

This testing verifies that using Microsoft Exchange Server 2007 SP1, with local data replication, allows fast data recovery in the event of database loss or corruption. The storage layout for this solution is based on a design that utilizes a building block approach, which repeatedly builds upon itself as the customer's requirements grow and additional space and fault tolerance are required.

Testing confirmed that at the smallest building block level all components worked in a single system, as expected, and within Microsoft Exchange database latencies, while running local data replication.

Next steps

EMC can help accelerate assessment, design, implementation, and management while lowering the implementation risks and costs of a backup and recovery solution for a Microsoft Exchange 2007 environment.

To learn more about this and other solutions contact an EMC representative or visit www.EMC.com/solutions/microsoft.
