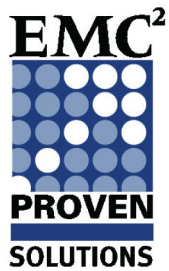


**EMC Backup and Recovery for
Microsoft Exchange 2007 SP2**

Enabled by EMC Celerra and
Microsoft Windows 2008

Reference Architecture

EMC NAS Product Validation



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Table of Contents

Reference architecture overview.....	4
Solution architecture	6
Key components	9
Validated environment profile.....	11
Hardware and software resources	12
Conclusion.....	13

Reference architecture overview

Document purpose

EMC's commitment to consistently maintain and improve quality is led by the Total Customer Experience (TCE) program, which is driven by Six Sigma methodologies. As a result, EMC has built Customer Integration Labs in its Global Solutions Centers to reflect real-world deployments in which TCE use cases are developed and executed. These use cases provide EMC with an insight into the challenges currently facing its customers.

This document describes the reference architecture of the EMC® Backup and Recovery solution for Microsoft Exchange 2007 SP2 enabled by Windows Server 2008 backup and EMC Celerra®. The solution is tested and validated by the EMC network-attached storage (NAS) product validation team.

Solution purpose

The purpose of this reference architecture is to build and demonstrate the functionality and performance of the Backup and Recovery solution for Microsoft Exchange 2007. This solution utilizes an Exchange 2007 SP2 backup plug-in along with Windows Server 2008 backup to create an application-consistent backup.

This reference architecture validates all aspects of the solution and provides guidelines for building similar solutions.

This reference architecture is not intended to be a comprehensive guide to every aspect of the Backup and Recovery for Microsoft Exchange 2007 solution.

EMC Backup and Recovery for Microsoft Exchange 2007 SP2 - Enabled by EMC Celerra and Microsoft Windows Server 2008 — Proven Solution Guide available on Powerlink® provides comprehensive information about this solution. This is a confidential document available to EMC employees and partners on Powerlink.

The business challenge

Managing a company's growing e-mail requirement, while lowering backup data cost without compromising valuable data or service level agreement, presents a large challenge for IT departments. It is also important to restore Exchange data efficiently with minimal impact to other users regardless of the user mailbox size.

This demands a solution that is both effective and affordable while maintaining the performance of the Exchange environment.

The technology solution

It is important to work with an experienced provider of backup and recovery solutions — one with a strong track record and the ability to deliver high-quality solutions. EMC has designed various solutions for protecting Microsoft Exchange environments using a wide range of backup technologies and EMC storage platforms.

This solution demonstrates how an EMC Celerra platform can be used to design a robust Microsoft Exchange 2007 environment. In this solution, Windows Server 2008 backup is used with an Exchange 2007 backup plug-in to take application-consistent backups of the Exchange 2007 mailbox data on a Celerra Common Internet File System (CIFS) share.

This solution demonstrates how an EMC Celerra platform can be used to build a robust Exchange 2007 infrastructure using the native VSS backup plug-in introduced in SP2. This reference architecture describes how EMC Celerra can provide multi-protocol support for Exchange. Internet Small Computer System Interface (iSCSI) is provisioned to the database and log files and CIFS is provided for the Exchange backup target.

The solution benefits

Reduces the number of physical servers — Using VMware to virtualize servers helps in reducing the number of physical servers required in an Exchange environment, while improving the manageability and flexibility of the Exchange environment. In this solution, the number of physical server is reduced by 33 percent.

Improves backup storage utilization using EMC Celerra deduplication — With EMC Celerra's deduplication feature, the physical disk space required is largely reduced for backup data. In this validated solution, the EMC Celerra deduplication feature reduces the backup storage space by 69 percent.

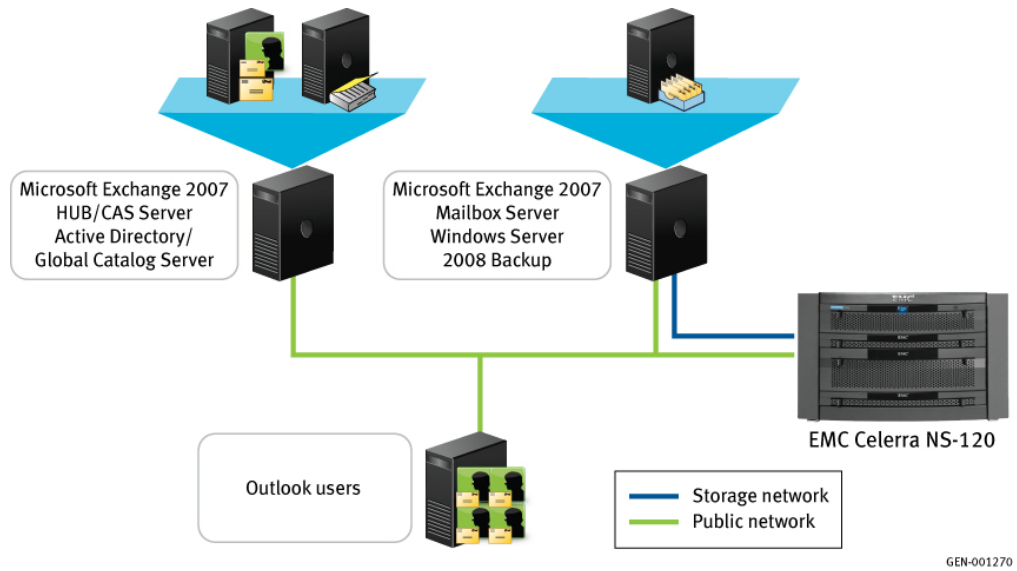
All in one solution — EMC Celerra has the capability to host FC (Exchange database and logs) and Advanced Technology-Attached (backup file system) drives in one system. It also has the capability to access storage using iSCSI (Exchange database and logs) and CIFS (backup target) connectivity. This makes EMC Celerra an ideal platform to host both the Exchange and backup data.

Low-cost solution — This solution uses built-in backup components in Exchange 2007 SP2 and Windows Server 2008. This reduces the cost of the backup solution.

Solution architecture

Architecture diagram

The following figure shows the overall physical architecture of the solution.



Reference architecture overview

The validated solution is built using a virtualized Exchange 2007 environment on the EMC Celerra platform.

The key components of the reference architecture are:

- Microsoft Exchange 2007 SP2
- EMC Celerra storage
- VMware vSphere4
- Microsoft Windows Server 2008 backup
- EMC Celerra dedupe

A Microsoft Exchange 2007 mailbox server is installed on a VMware ESX 4.0 virtual machine. A Microsoft Exchange 2007 SP2 HUB/CAS server and Microsoft Active Directory are created on another VMware ESX 4.0 server.

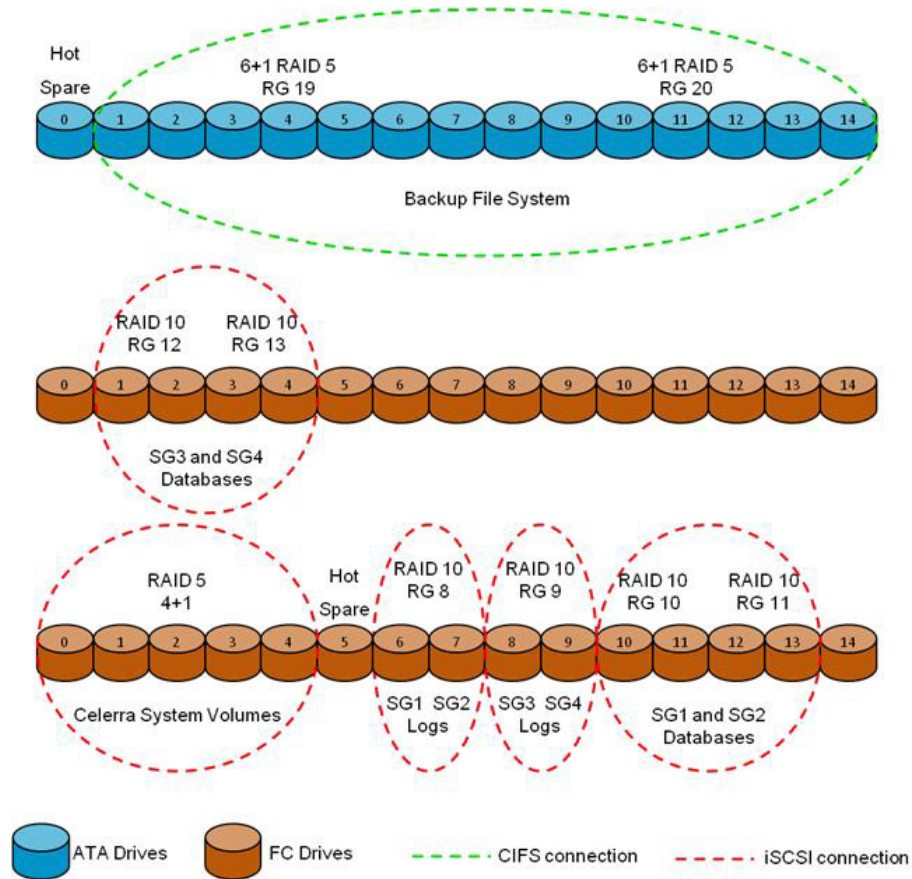
EMC Celerra NS-120 is used for storing the Exchange database, log files, and backup data.

The different connectivity methods used in this solution are:

- The Exchange database and log drives are accessed by the Exchange mailbox server using the iSCSI protocol.
- The backup destination is accessed using the CIFS protocol.

Storage layout

The following figure shows how the storage is provisioned in the validated backup and recovery solution.



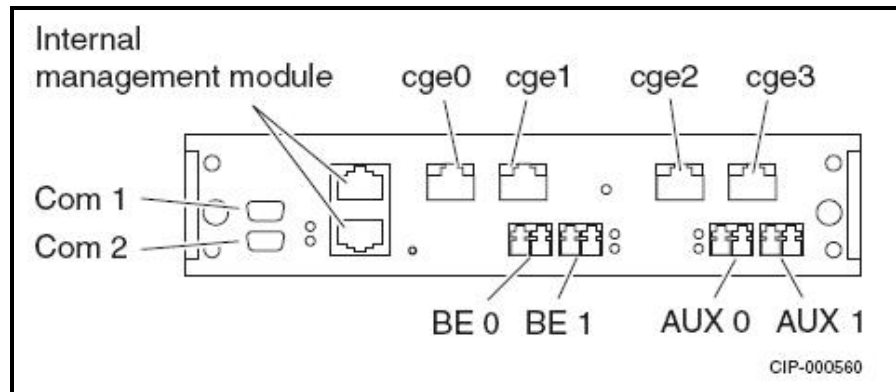
Storage layout overview

The validated solution uses storage through iSCSI and CIFS protocols. The iSCSI protocol is used to provide the storage for the Exchange mailbox database and log files. The CIFS protocol provides access to the area used for the Exchange mailbox backup.

To satisfy the Exchange mailbox server performance requirement, the validated solution is configured on 15k revolutions per minute (rpm) FC drives using the building block approach. A building block is defined as two spindles for logs and four spindles for the database. The validated solution uses two building blocks to host Exchange database and log files. The protection level used is RAID 1/0 for high performance.

The backup file system is created using Automatic Volume Management (AVM) with a system-defined storage pool — CLARATA_ARCHIVE on 7.2k rpm ATA drives. Fourteen low-cost, low-powered ATA drives with RAID 5 protection level are used for the backup area.

Network layout The following figure shows the ports on EMC Celerra NS-120 storage.



Network layout overview

System-wide network design and architecture are outside the scope of this document and solution. This section describes the high-level network architecture of the validated solution.

Virtual local area networks

The validated solution uses a virtual local area network (VLAN) to segregate network traffic of different types. This improves throughput, manageability, application separation, high availability, and security.

- A client VLAN network is used to support connectivity between the Microsoft Exchange 2007 SP2 servers and the Outlook client workstations. The same VLAN is used to back up the Exchange data from the Exchange 2007 SP2 mailbox server to EMC Celerra.
- Two more VLAN networks are used for iSCSI connectivity between the Microsoft Exchange 2007 SP2 mailbox server and EMC Celerra.

EMC Celerra NS-120

EMC Celerra NS-120 storage arrays contain at least two Data Movers, which can operate independently. Each Data Mover can have a minimum of four Ethernet ports.

EMC Celerra NS-120 comes with an integrated CLARiiON® CX4-120 storage array, which has two storage processors (SPs). The NS-120 Data Mover ports cge0 and cge1 are used for iSCSI traffic and port cge2 is used for CIFS traffic.

The Data Mover supports several types of link aggregation for IP traffic. However, in this configuration, no link aggregations or Ethernet channels are configured.

As a best practice, the Data Mover network ports connected to the storage network should be dedicated to storage traffic. However, if the ports are not heavily used, they can be shared with non-storage network traffic. EMC recommends monitoring the network to avoid bottlenecks.

Key components

Introduction

This chapter briefly describes the key components of this solution.

[Validated environment profile](#) on page 11 provides more information on all the components that make up the reference architecture.

EMC Celerra unified storage platform

EMC Celerra storage is a dedicated network server optimized for files and block access, delivering high-end features in a scalable, easy-to-use package. For high scalability, Celerra storage platforms leverage both the innovative EMC CLARiON FC RAID storage — delivering best-in-class availability and data protection and industry-leading EMC Celerra availability, performance, and ease of management. EMC Celerra storage systems deliver a single-box block and file access offering a centralized point of management for distributed environments.

Celerra unified storage systems deliver a single-box block and file solution offering a centralized point of management for distributed environments. This makes it possible to dynamically grow, share, and cost-effectively manage multi-protocol file systems and provide multi-protocol block access. Administrators can take advantage of simultaneous support for network file system (NFS) and CIFS protocols by enabling Windows and Linux/UNIX clients to share files using the Celerra system's sophisticated file-locking mechanisms and by leveraging iSCSI or FC for high-bandwidth or latency-sensitive applications.

This enables customers to dynamically grow, share, and cost-effectively manage multi-protocol file systems as well as provide multi-protocol block access. Customers can take advantage of simultaneous support for NFS and CIFS protocols by enabling Windows and Linux or UNIX clients share files using Data Access in Real Time (DART) operating system's sophisticated file-locking mechanisms.

VMware vSphere 4

The new VMware vSphere 4 provides significant performance enhancements that make it easier for organizations to virtualize their most demanding and intense workloads.

VMware vSphere 4 includes ESX 4.0 and the vCenter management interface. VMware ESX 4.0 can transform or virtualize the hardware resources of an x64-based computer including the CPU, RAM, hard disk, and network controller to create a fully functional virtual machine that can run its own operating system and applications just like a physical server.

Windows Server 2008 backup

The Windows 2008 VSS provides a framework to backup NTFS volumes without any I/O interruption to application that uses the volume. The VSS framework coordinates with three different components requestor (Windows Server 2008 backup), writer (Exchange 2007), and provider (component which creates the shadow copy). The Windows Server 2008 backup does not have the ability to coordinate with the Exchange 2007 application to take an application-consistent backup. The Exchange backup plug-in (WSBExchange.exe) that comes with SP2 coordinates between Exchange 2007 application and Windows Server 2008 backup to create Exchange aware backup.

The backup has the ability to take full backup and truncate the logs once it is successful. It also has the ability to restore the backup data on the same location as well as an alternate location. The restore process to the original location will automatically handle the recovery process, including dismounting any existing databases and replaying logs into the recovered Exchange database.

NOTE

The Windows Server 2008 backup along with Exchange 2007 SP2 backup plug-in can take only full and copy backups. Incremental or differential backups are not possible.

The Windows Server 2008 built-in backup with basic functionality makes it more appealing to cost-conscious small and medium-size customers that do not have fine granular backup and restore requirements.

Validated environment profile

Profile characteristics

This solution was validated with the following environment profile.

Profile characteristic	Value
Exchange 2007 users	1,000
IOPS per user	0.48 (very heavy profile)
Exchange database read: write ratio	1:1
Number of mailbox database per storage group	One
Exchange user mailbox size	500 MB
Number of users per database	250
Microsoft Exchange 2007 databases RAID type, physical drive size, and speed	RAID 1/0, 450 GB FC drives (15k rpm)
Backup area RAID type, physical drive size, and speed	RAID 5, 1 TB, 7.2k rpm SATA disks

Hardware and software resources

Hardware

The following table lists the hardware used to validate this solution.

Equipment	Quantity	Configuration	Purpose
Storage	One	EMC Celerra NS-120 unified storage - CLARiiON CX4-120 Two Data Movers 18 of the 450 GB FC drives (15k rpm) 15 of the 1 TB SATA drives (7.2k rpm)	One array for Exchange data and backup data
Enterprise network switch	One	Gigabit Ethernet network switch	
Virtual servers	One	Four vCPU 3.0 GHz processors Three virtual NICs 8 GB RAM	Mailbox server
	One	Two vCPU 3.0 GHz processors One virtual NIC 4 GB RAM	HUB/CAS server
	One	Two vCPU 3.0 GHz processors One virtual NIC 2 GB RAM	Active Directory

Software

The following table lists the software used to validate this solution.

Software	Version
VMware ESX server	VMware vSphere 4
Microsoft Windows Server	Windows 2008 x64 Enterprise Edition SP2 Windows 2008 x32 Standard Edition SP2
Microsoft Exchange Server	Exchange 2007 Enterprise Edition 2007 SP2
EMC Celerra DART	5.6.47.11
EMC CLARiiON FLARE®	04.29.000.5.003

Conclusion

Summary

The Exchange 2007 SP2 environment's backup and recovery capability is an integral part of an organization to ensure high availability of data and recovery in case of corruption of data. This reference architecture depicts a validated backup and recovery solution for Microsoft Exchange 2007 SP2 using an EMC Celerra and Windows Server 2008 backup.

Next steps

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

To learn more about this and other solutions, contact an EMC representative.
