Protect Microsoft® Exchange 2010 with Hitachi Application Protector

Lab Validation Report

By Leo Nguyen

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Protect Microsoft® Exchange 2010 with Hitachi Application Protector

Lab Validation Report

The purpose of this lab validation report is to show how organizations can use Hitachi Application Protector (HAPRO) to perform rapid backups and restores of Exchange databases within a DAG (database availability group) environment. It leverages Hitachi Copy-on-Write Snapshot technology and Microsoft® VSS (Volume Shadow Copy Service) to give you application-consistent data protection.

This paper is intended for Exchange and backup administrators responsible for backup and recovery of Microsoft Exchange 2010 running in a physical environment. It assumes familiarity with Hitachi storage systems and data protection software, Microsoft Windows Server® 2008 R2, and Microsoft Exchange Server 2010.

**Note** — These procedures were developed in a lab environment. Many things affect production environments beyond prediction or duplication in a lab environment. Follow recommended practice by conducting proof-of-concept testing for acceptable results before implementing this solution in your production environment. Test the implementation in a non-production, isolated test environment that otherwise matches your production environment.
Product Features

Hitachi Application Protector uses a new storage-system-based snapshot technology that leverages Microsoft VSS (Volume Shadow Copy Service), to give you application-consistent data protection. Application Protector understands how and where the primary datastores and the log files are stored. As a result, it ensures that all application-related data changes are tracked and backed up at the requested point-in-time so that recovery is guaranteed. The storage-system-based snapshot technology creates backup images quickly and easily. The technology also uses storage space efficiently to maintain changes to the datastores and files.

Figure 1 shows the backup process for Exchange 2010 using Hitachi Application Protector.
Hardware Components

The following hardware was used to do the lab validation report for Hitachi Application Protector.

Hitachi Unified Storage 150

Hitachi Unified Storage is a midrange storage platform that can consolidate and manage block, file, and object data on a central platform.

The performance provided by Hitachi Unified Storage is reliable, scalable, and available for block and file data. Unified Storage is simple to manage, optimized for critical business applications, and efficient.

Using Unified Storage requires a smaller capital investment. Deploy this storage, which grows to meet expanding requirements and service level agreements, for critical business applications. Simplify your operations with integrated set-up and management for a quicker time to value.

Unified Storage enables extensive cost savings through file and block consolidation. Build a cloud infrastructure at your own pace to deliver your services.

Hitachi Unified Storage 150 provides reliable, flexible, scalable, and cost-effective modular storage. Its symmetric active-active controllers provide input-output load balancing that is integrated, automated, and hardware-based.

Both controllers in Unified Storage 150 dynamically and automatically assign the access paths from the controller to a logical unit (LU). All LUs are accessible, regardless of the physical port or the server that requests access.

Hitachi Compute Blade 2000

Hitachi Compute Blade 2000 is an enterprise-class blade server platform. It features the following:

- Supports up to eight server blades
- A balanced system architecture that eliminates bottlenecks in performance and throughput
- Configuration flexibility
- Sustainable power-saving capabilities
- Fast server failure recovery using a N+1 cold standby design that allows replacing failed servers within minutes
Software Components

The following software was used to do the lab validation report for Hitachi Application Protector.

Hitachi Dynamic Provisioning

On Hitachi storage systems, Hitachi Dynamic Provisioning provides wide striping and thin provisioning functionalities.

Using Hitachi Dynamic Provisioning is like using a host-based logical volume manager (LVM), but without incurring host processing overhead. It provides one or more wide-striping pools across many RAID groups. Each pool has one or more dynamic provisioning virtual volumes (DP-VOLS) of a logical size you specify of up to 60 TB created against it without allocating any physical space initially.

Deploying Hitachi Dynamic Provisioning avoids the routine issue of hot spots that occur on logical devices (LDEVs). These occur within individual RAID groups when the host workload exceeds the IOPS or throughput capacity of that RAID group. Dynamic provisioning distributes the host workload across many RAID groups, which provides a smoothing effect that dramatically reduces hot spots.

When used with Hitachi Unified Storage, Hitachi Dynamic Provisioning has the benefit of thin provisioning. Physical space assignment from the pool to the dynamic provisioning volume happens as needed using 1 GB chunks, up to the logical size specified for each dynamic provisioning volume. There can be a dynamic expansion or reduction of pool capacity without disruption or downtime. You can rebalance an expanded pool across the current and newly added RAID groups for an even striping of the data and the workload.

Hitachi Copy-on-Write Snapshot

Hitachi Copy-on-Write Snapshot creates rapid point-in-time copies of any data volume within Hitachi storage systems without impacting application service or performance levels.

VSS Hardware Provider for Hitachi Storage

Hitachi VSS Hardware Provider is a program that controls a data backup function and works with the Microsoft Volume Shadow Copy Service (VSS). It uses ShadowImage Replication or Copy-on-Write Snapshot in Hitachi storage devices such as the AMS series, the HUS series, the VSP series and HUS VM series. This program delivers backup integration operations with VSS. This program provides the following three functions:

- VSS provider performs copy control of the ShadowImage or Copy-on-Write Snapshot pair in the storage device targeted for a backup.
- CLI tool checks the configuration necessary for the VSS Provider's operation.
- GUI tool confirms and sets up the configuration necessary for the VSS Provider's operation.
Microsoft Windows Server
Microsoft Windows Server is a multi-purpose server that increases the reliability and flexibility of your server or private cloud infrastructure.

Microsoft Exchange Server 2010
Microsoft Exchange Server 2010 is a messaging application that offers high availability and site resiliency at the database level. It includes the following:

- Database availability groups
- Multiple database copies supported
- Exchange Extensible Storage Engine to support slower and high capacity disks
Test Environment Configuration

The environment for these tests is outlined in Table 1 and Table 2.

Table 1. Hardware Components

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Detail Description</th>
<th>Firmware Version</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitachi Compute Blade 2000 Chassis</td>
<td>▪ 8-blade chassis</td>
<td>A0335-E-7174</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>▪ 2 management modules</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ 2 × 1 Gb/sec LAN switch modules</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ 8 cooling fan modules</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ 4 power supply modules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E55A2 Server Blade</td>
<td>▪ Full blade</td>
<td>03-73</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>▪ 2 × 6-core Intel Xeon X5670 2.93 GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ 80 GB RAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hitachi Unified Storage 150</td>
<td>▪ Dual controller</td>
<td>0925/A-H</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>▪ 16 × 8 Gb/sec Fibre Channel ports</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ 32 GB cache memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hitachi Dual-Port HBA</td>
<td>▪ Dual port 8 Gb/sec Fibre Channel PCIe card</td>
<td>00300439</td>
<td>2</td>
</tr>
<tr>
<td>Brocade 5300 Fibre Channel Switch</td>
<td>▪ 8 Gb/sec</td>
<td>6.4.0b</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2. Software Components

<table>
<thead>
<tr>
<th>Software</th>
<th>Version</th>
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<tbody>
<tr>
<td>Hitachi Application Protector</td>
<td>2.1.1.3</td>
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<tr>
<td>Hitachi Dynamic Provisioning</td>
<td>Microcode Dependent</td>
</tr>
<tr>
<td>Hitachi Copy-on-Write Snapshot</td>
<td>Licensed on Hitachi Unified Storage</td>
</tr>
<tr>
<td>VSS Hardware Provider for Hitachi Storage</td>
<td>4.8.1</td>
</tr>
<tr>
<td>Microsoft Windows Server</td>
<td>2008 R2 Enterprise Edition SP1</td>
</tr>
<tr>
<td>Microsoft Exchange Server</td>
<td>2010 Enterprise Edition SP2</td>
</tr>
</tbody>
</table>
Hitachi Application Protector requires the following configuration before you can create a snap backup on Exchange 2010.

Hitachi Unified Storage 150 Configuration
Hitachi Unified Storage 150 configuration:
1. Licensed Copy-on-Write Snapshot on the storage.
2. Created a 10 GB Differential Management Logical Unit (DMLU).
3. Created a dynamic provisioning pool.
4. Created a volume and mapped it to the Exchange mailbox server.

VSS Hardware Provider for Hitachi Storage Configuration
VSS Hardware Provider for Hitachi Storage configuration:
1. Added storage subsystem to the VSS hardware provider.

Microsoft Exchange 2010 Configuration
Microsoft Exchange 2010 configuration:
1. Created a database availability group
2. Added both mailbox servers to it.
Test Methodology

This is the HAPRO test methodology.

Install HAPRO for Exchange

The objective of this test was to install HAPRO for Exchange directly on both mailbox servers within a DAG environment. Leave all default settings and follow the wizard to complete the install.

Install HAPRO Client

The objective of this test was to install HAPRO client on a management laptop. This is used to connect to the HAPRO for Exchange to manage HAPRO.

Manual Snap Backup

The objective of this test was to manually backup an Exchange database in a DAG environment.

Note: the database needs to be mounted prior to running a snap backup.

Schedule Snap Backup

The objective of this test was to schedule a backup of an Exchange database in a DAG environment.

Note: the database needs to be mounted prior to running a snap backup.

Mount and Browse a Snapshot

The objective of this test was to mount and browse the contents of a snapshot. You should see the Exchange database, logs and content index information.

Unmount a Snapshot

The objective of this test was to unmount a snapshot.

Delete a Snapshot

The objective of this test was to delete a snapshot.

Recover from a Snapshot (Replace Target Mailstore Files)

The objective of this test was to do a complete recovery with Perform Roll Forward Recovery checked. This recovery will overwrite the existing database. The logs will also be restored and replayed.

Note: On Exchange Management Console, check This database can be overwritten by a restore prior to running a database restore.
Recover from a Snapshot (Preserve Target Mailstore Files)

The objective of this test was to do a complete recovery with Perform Roll Forward Recovery checked. This recovery will rename the existing database and logs to create a second backup.

Note: On Exchange Management Console, check This database can be overwritten by a restore prior to running a database restore.

Granular Individual Email Message Recovery

Requires a 3rd party tool called Kroll Ontrack PowerControls to do granular individual email message recovery. This part was not covered during the lab validation report.

Verify Database Recovery

The objective of this test was to verify the integrity of the database to make sure it's still mounted, healthy and online.
Test Results
These are the HAPRO test results.

Install HAPRO for Exchange
HAPRO for Exchange installed successfully.

Install HAPRO Client
The HAPRO client installed successfully.

Manual Snap Backup
The first manual backup of the active database in a DAG environment completed successfully.

The second manual backup of the passive database in a DAG environment completed successfully.

Schedule Snap Backup
The first schedule backup of the active database in a DAG environment completed successfully.

The second schedule backup of the passive database in a DAG environment completed successfully.

Mount and Browse a Snapshot
Able to mount and browse a snapshot successfully.

Unmount a Snapshot
Able to unmount a snapshot successfully.

Delete a Snapshot
Able to delete a snapshot successfully.

Recover from a Snapshot (Replace Target Mailstore Files)
The recovery to overwrite the existing database to restore and replay the logs completed successfully.

Note: HAPRO snapshots must be restored to the same host from which they were backed up. This is to ensure reseeding.

Recover from a Snapshot (Preserve Target Mailstore Files)
The recovery to rename the existing database and logs completed successfully.
Granular Individual Email Message Recovery

Requires a 3rd party tool called Kroll Ontrack PowerControls to do granular individual email message recovery. This part was not covered during the lab validation report.

Verify Database Recovery

The database recovery was mounted, healthy and online.
Conclusion

Hitachi Application Protector leverages Microsoft Volume Shadow Copy Service (VSS) to provide backup, recovery, and data protection services that are application consistent. The software understands how and where the primary datastores and supporting files (like log files) are stored. Application Protector also supports Microsoft Exchange 2010 Database Availability Groups (DAG), providing increased availability and functionality. It ensures that all application-related data changes are being tracked and backed up at the requested point in time so that recovery is guaranteed.

Hitachi Application Protector was designed to be self-service and customer-installable. Meanwhile, Hitachi Data Systems Global Solution Services (GSS) team offers full support for Hitachi data protection solutions and capabilities, leveraging HUS, VSP, and the entire suite of Hitachi storage products. With proven methodology, GSS ensures successful implementations that reduce risk and accelerate time to results.
For More Information

Hitachi Data Systems Global Services offers experienced storage consultants, proven methodologies and a comprehensive services portfolio to assist you in implementing Hitachi products and solutions in your environment. For more information, see the Hitachi Data Systems Global Services website.

Live and recorded product demonstrations are available for many Hitachi products. To schedule a live demonstration, contact a sales representative. To view a recorded demonstration, see the Hitachi Data Systems Corporate Resources website. Click the Product Demos tab for a list of available recorded demonstrations.

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