

Lab Guide for Replication Solutions

TSI1635

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NOTICE:

Notational conventions: 1KB stands for 1,024 bytes, 1MB for 1,024 kilobytes, 1GB for 1,024 megabytes, and 1TB for 1,024 gigabytes, as is consistent with IEC (International Electrotechnical Commission) standards for prefixes for binary and metric multiples.

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HDS Academy 1012

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Introduction

Scenario

As one of the largest providers of education courses, TIIN is a dynamic organization created from a diverse range of specialist institutions. Today TIIN has more than 2million students and 3000 staff, and it offers more than 400 courses at its four campuses across two centers.

TIIN has recently invested in upgrading their storage environment to Hitachi Data Systems storage systems. TIIN has initiated multiple projects to support the new environment. Phase 1 of the project implemented the tested and implemented the provisioning operations and processes. Phase 2 of the project implemented the storage virtualization features to consolidate the storage infrastructure. Phase 3 of the project requires the storage team to setup replication using Hitachi Replication Manager.

TIIN has decided to start phase 3 and will involve performing the following tasks.

- Install and Configure Hitachi Command Suite (Device Manager/Replication Manager)
- Perform initial setup of the environment
 - ♦ Setup Command Device
 - ♦ Setup Pair Management Server
- Perform ShadowImage Operations with Replication Manager
 - ♦ Setup Replication Pairs
 - ♦ Manage Replication Pairs
- Perform Copy-On-Write Operations with Replication Manager
 - ♦ Setup Data Pool
 - ♦ Setup Virtual Volumes
 - ♦ Setup Replication Pairs
 - ♦ Manage Replication Pairs
- Perform TrueCopy Operations with Replication Manager

- ♦ Setup Remote Paths
- ♦ Setup Replication Pairs
- ♦ Manage Replication Pairs
- Perform Hitachi Universal Replicator Operations with Replication Manager
 - ♦ Setup Remote Paths
 - ♦ Setup Journal Groups
 - ♦ Setup Replication Pairs
 - ♦ Manage Replication Pairs

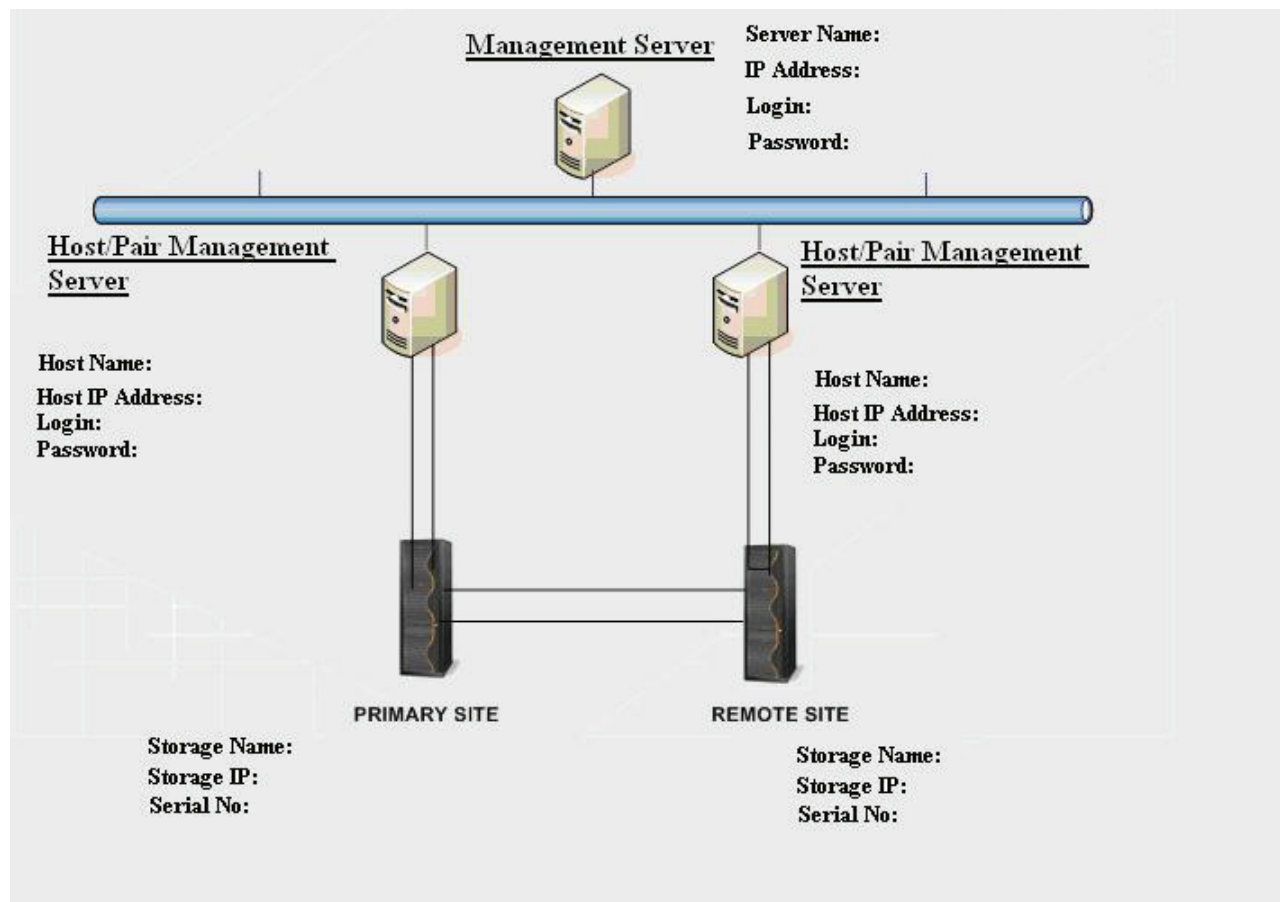
You have been tasked with conducting a proof of concept (POC) using a sample configuration (as described below). In the following exercises you will perform the tasks identified for stage 3.

You can use the User Guides for performing the tasks. The Solution section of this guide also provides step-by-step instructions for performing the tasks.

Lab Worksheet

Instructions: Tear out this page to use during the Lab Activities.

Lab Group _____



Lab Activity 1

Installing and Configuring Replication Manager

Introduction

Objectives

Upon completion of the lab project, the learner should be able to:

- Install the Hitachi Command Suite server software
- Install the license keys for Hitachi Device Manager
- Install the license keys for Hitachi Replication Manager

Installation of the Replication Manager Server Software

Lab Tasks

Note the information about the Hitachi Replication Manager Server

Hostname - _____ IP Address - _____

A. Install Hitachi Command Suite software (HDvM/HRpM)

First, install Hitachi Command Suite Server software on the Management Server.

Check with instructor for the location of the install files.

B. Install License Keys

Once the server software is installed, install the license key to access the software. Each storage system will require a license key.

Check with instructor for the location of the install files.

C. Register Storage Systems in Device Manager

Register all storage systems that will be managed through Device Manager.

D. Register Hosts in Device Manager

Install the Device Manager Agents on the hosts and ensure the hosts show up in Device Manager GUI.

E. Prepare Primary and Remote Hosts

Present 10 volumes (1GB or 2GB) to the hosts. We will use these as production volumes for replication.

Ensure the volumes show up on your hosts.

Create a file system on couple of volumes.

End of Lab 1

Lab Activity 2

Initial Setup

Overview

Objectives

Upon completion of this lab activity, the learner should be able to:

- Perform refresh for the local information source in Replication Manager
- Setup Command Device
- Setup Pair Management Server

References

- *Hitachi Replication Manager Software Users Guide*

Perform Initial Setup Tasks

TIIN manages two data-centers. The primary data center hosts all the production applications and the remote data center is used as a DR site. The remote data center is a replica of the primary data center. With the growth in infrastructure and number of administrators there are two key challenges related to management and security. You have decided to test the Site and Resource Group features of Replication Manager to organize your resources.

The following tasks are required for doing initial setup of the Replication Manager environment and also implement the Sites and Resource Group features.

Lab Tasks

A. Perform refresh of Information Source

Refresh the Replication Manager repositories with information from Device Manager.

Hint: **Settings > Refresh Settings > Configuration Settings**

Validate that your storage systems appear under the **Storage System** folder under Explorer panel.

B. Setup Command Device

Command Devices are used by Command Control Interface (CCI) software for in-band communication with the storage system.

Setup at least one command device on each storage system.

Hint: **Storage Systems > [Storage]> open > Cmd Devs > Add Cmd Devices**

Command Device Details

Storage System 1 – Command Device ID - _____

Storage System 2 – Command Device ID - _____

Present the command devices to the respective hosts. (Refer to the configuration diagram.)

Ensure the volumes show up on your Hosts.

C. Pair Management Server

- Install CCI software on the Primary and Remote Hosts.

Check with instructor for the location of the install files.

- Configure Device Manager Agents on the Hosts to see the new configuration.

*Hint: Execute **hdvmagt_setting.exe** file from the agent install folder*

Ensure you select the following options for **Specify the setup of RAID**

Select **Yes** to **Do you want to specify setup of RAID Manager?**

Select **Enable** for **Specify centrally manage pair configuration mode.**

D. Refresh the Hosts from Device Manager

Device Manager should be able to see the latest configuration on the hosts.

E. Create Sites to represent the following structure

- a. Primary Site – Include the following resources.

- i. Storage Primary
- ii. Host Primary

- b. Remote Site – Include the following resources.

- i. Storage Remote
- ii. Host Remote

F. Create Users and Resource Groups

- a. Create two users and assign modify permissions to access HDvM and HRpM

- i. Primary
- ii. Remote

- b. Create two Resource Groups with associated Resources

- i. PrimaryRG
 - 1. Storage Primary
 - 2. Host Primary
 - 3. User - Primary

- ii. RemoteRG
 - 1. Storage Remote
 - 2. Host Remote
 - 3. User - Remote
- c. Log in as either Primary or Remote User and answer the following questions.
 - i. Are you able to view the complete Site Structure?
 - ii. Can you view resources under both the sites?

End of Lab 2

Lab Activity 3

ShadowImage®

Operations

Overview

Objectives

Upon completion of this lab activity, the learner should be able to:

- Setup ShadowImage pairs
- Manage ShadowImage pair status

References

- *Hitachi Replication Manager Software Users Guide*

Perform ShadowImage Operations

The billing system at TIIN uses oracle as the database for storing all billing information. Since it is a critical database, the administrators take a tape backup on a daily basis. The tape backup is taking longer time due to the recent growth in volume of data handled by the system. ShadowImage software has been identified as a possible alternative to reduce the backup time.

The following tasks will test the functionality offered by ShadowImage software.

Lab Tasks

A. Identify Production Volume to Replicate

- a. Identify the volume to be replicated – Primary.

LUN - _____ Mount Point/Drive Letter - _____

- b. Identify the volume to be replicated to – Secondary.

LUN - _____

B. Write Data on Primary Volume

Copy some folders from C:\ to the Primary Volume. This will be used as the production data that needs to be replicated to the Secondary.

C. Create ShadowImage Pair

Use Replication Manager GUI to create a ShadowImage Pair. Use the following specifications for creating the pair.

- Copy Pace – 15

Hint: **Hosts > [Hostname] > LUNs > Unpaired > [Primary Volume] > Pair Management**

D. Check Task/Pair Status

Validate that the task was executed successfully.

*Hint: **Tasks***

Validate that the Pair Status is now **PAIR**.

*Hint: **Hosts** > [Host Name] > **Pairs** > **Paired** > [Pair Volume]*

E. Split Pair to access Secondary Volume

To access the data copied on to the secondary volume you will need to split the pair.

*Hint: **Hosts** > [Host Name] > **Pairs** > **Paired** > [Pair Volume] > [Copy Group] > [Copy Pair] > **Change Pair Status***

Validate that the task was executed successfully.

*Hint: **Tasks** > **Pair Management***

Validate that the Pair Status is now **SPLIT**.

*Hint: **Hosts** > [Host Name] > **Pairs** > **Paired** > [Pair Volume]*

F. Check Data on Secondary Volume

Mount the secondary volume and verify that the data from the primary volume has been copied.

G. Modify Data on Primary Volume

Create some new folders on the primary volume. This represents the differential data.

H. Resync the Primary Volume and Secondary Volume

Unmount the Secondary Volume before resyncing the pair.

Perform Resync Operation on the pair.

*Hint: **Hosts** > [Host Name] > **Pairs** > **Paired** > [Pair Volume] > [Copy Group] > [Copy Pair] > **Change Pair Status***

Validate that the Pair Status is now **PAIR**.

*Hint: **Hosts** > [Host Name] > **Pairs** > **Paired** > [Pair Volume]*

I. Validate that the volumes were synchronized again.

Split the Pair again (Step E)

Validate the data on Secondary Volume (Step F)

J. Delete the Pair

Delete the Pair.

Validate that the volumes are not paired.

Hint: **Hosts > [Host Name] > Pairs > Unpaired**

End of Lab 3

Lab Activity 4

Copy-On-Write Operations

Overview

Objectives

Upon completion of this lab activity, the learner should be able to:

- Create Pools
- Create Virtual Volumes
- Create Copy-On-Write Pairs
- Manage Copy-On-Write Pairs

References

- Hitachi Replication Manager Software Users Guide

Perform Copy-On-Write Operations

The development team at TIIN uses a copy of the billing system to test new application modules. Sometimes the developers make a mistake and wrong values get updated in the database. As a result they have to request for another copy. This is a time consuming process. The administrators want to use Copy-On-Write to create copies of the test database and use the copies for development and testing. Creating Copy-On-Write copies take less time as compared to ShadowImage as no physical data movement takes place. In addition to that since the copies are virtual volumes they take less capacity as compared to ShadowImage copies.

The following tasks will test the functionality offered by Copy-On-Write software.

Lab Tasks

A. Create Pool

Create a new Pool and add a 20GB volume to the pool.

Hint: **Storage Systems > [Storage Name] > Open > Pools > Pools > Create Pool**

Note: The minimum size for a pool volume is 8GB (20GB for modular storage).

B. Create Virtual Volumes (used as Secondary Volumes)

Create six virtual volumes which are the same size as your primary volumes. These volumes will be used as the secondary volumes.

Hint: **Storage Systems > [Storage Name] > Open > Pools > V-VOLs > Create V-VOLs**

Present these to your host (use Device Manager).

Refresh Storage in Replication Manager.

Hint: **Storage Systems > [Storage Name] > Open > Refresh Storage System**

C. Expand the Pool

Add two more volumes to the Pool.

D. Identify Production Volume to Replicate

- a. Identify the volume to be replicated – Primary.

LUN - _____ Mount Point/Drive Letter - _____

- b. Identify the volume to be replicated to – Secondary.

LUN - _____

E. Write Data on Primary Volume

Copy some folders from C:\ to the Primary Volume. This will be used as the production data that must be replicated to the Secondary.

F. Create Copy-On-Write Pair

Use Replication Manager GUI to create a Copy-On-Write Pair. Use the following specifications for creating the Pair.

- Copy Pace – 15

Hint: Hosts > [Hostname] > LUNs > Unpaired > [Primary Volume] > Pair Management

G. Check Task/Pair Status

Validate that the task was executed successfully.

Hint: Tasks > Pair Management

Validate that the Pair Status is now **PAIR**.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume]

H. Split Pair to access Secondary Volume

To access the data copied on to the secondary volume you will need to split the pair.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume] > [Copy Group] > [Copy Pair] > Change Pair Status

Validate that the task was executed successfully.

Hint: **Tasks > Pair Management**

Validate that the Pair Status is now **SPLIT**.

Hint: **Hosts > [Host Name] > Pairs > Paired > [Pair Volume]**

I. Check Data on Secondary Volume

Mount the secondary volume and verify that the data from the primary volume has been copied.

J. Modify Data on Primary Volume

Create some new folders on the primary volume. This represents the differential data.

K. Resync the Primary Volume and Secondary Volume

Unmount the Secondary Volume before resyncing the pair.

Perform Resync Operation on the pair.

Hint: **Hosts > [Host Name] > Pairs > Paired > [Pair Volume] > [Copy Group] > [Copy Pair] > Change Pair Status**

Validate that the Pair Status is now **PAIR**.

Hint: **Hosts > [Host Name] > Pairs > Paired > [Pair Volume]**

L. Validate that the volumes were synchronized again.

Split the pair again (Step H)

Validate the data on Secondary Volume (Step I)

M. Delete the Pair

Delete the Pair.

Validate that the volumes are not paired.

Hint: **Hosts > [Host Name] > Pairs > Unpaired**

Additional Tasks

A. Try restoring data from a Secondary volume.

- ♦ Create a pair and split the pair immediately.

Hint: During Pair Create enable SPLIT as a Pair Setting attribute.

- ♦ Delete all data from Primary Volume.
- ♦ Unmount the primary volume and restore the data from Secondary copy

Hint: **Change Pair Status > Restore.**

- ♦ After the Volume status shows PAIR, mount the primary and check if the data has been restored.
- ♦ Delete the Copy Pair(s).

End of Lab 4

Lab Activity 5

TrueCopy®

Operations

Overview

Objectives

Upon completion of this lab activity, the learner should be able to:

- Setup Remote Paths
- Setup TrueCopy Pairs
- Manage TrueCopy Pair status

References

- *Hitachi Replication Manager Software Users Guide*

Perform TrueCopy Operations

Lab Tasks

A. Setup Remote Paths

Collect the connectivity information about your environment.

Primary Site Port	Remote Site Port

Check with your instructor for above information.

Use the above information to setup the Remote Paths.

*Hint: **Storage Systems > [Storage Name] > Open > Remote Paths***

B. Identify Production Volume to Replicate

- Identify the volume to be replicated – Primary.

LUN - _____ Mount Point/Drive Letter - _____

- Identify the volume to be replicated to – Secondary.

LUN - _____

C. Write Data on Primary Volume

Copy some folders from C:\ to the Primary Volume. This will be used as the production data that must be replicated to the Secondary.

D. Create TrueCopy Pair

Use Replication Manager GUI to create a TrueCopy Pair. Use the following specifications for creating the Pair.

- Copy Pace – 15
- Fence Level - Never

*Hint: **Hosts > [Hostname] > LUNs > Unpaired > [Primary Volume] > Pair Management***

E. Check Task/Pair Status

Validate that the task was executed successfully.

Hint: Tasks > Pair Management

Validate that the Pair Status is now **PAIR**.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume]

F. Split Pair to access Secondary Volume

To access the data copied on to the secondary volume, split the pair.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume] > [Copy Group] > [Copy Pair] > Change Pair Status

Validate that the task was executed successfully.

Hint: Tasks > Pair Management

Validate that the Pair Status is now **SPLIT**.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume]

G. Check Data on Secondary Volume

Mount the secondary volume and verify that the data from the primary volume has been copied.

H. Modify Data on Primary Volume

Create some new folders on the primary volume. This represents the differential data.

I. Resync the Primary Volume and Secondary Volume

Unmount the Secondary Volume before resyncing the pair.

Perform Resync Operation on the pair.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume] > [Copy Group] > [Copy Pair] > Change Pair Status

Validate that the Pair Status is now **PAIR**.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume]

J. Validate that the volumes were synchronized again.

Split the Pair again (Step F)

Validate the data on Secondary Volume (Step G)

K. Delete the Pair

Delete the pair.

Validate that the volumes are not paired.

Hint: Hosts > [Host Name] > Pairs > Unpaired

L. Delete the Remote Paths

Hint: Storage Systems > [Storage Name] > Open > Remote Paths

End of Lab 5

Lab Activity 6

Universal Replicator Operations

Overview

Objectives

Upon completion of this lab activity, the learner should be able to:

- Create Journal Groups
- Setup Remote Paths
- Setup Replication Pairs
- Manage Replication Pairs

References

- *Hitachi Replication Manager Software Users Guide*

Perform Universal Replicator Operations

Lab Tasks

A. Setup Remote Paths

Collect the connectivity information about your environment.

Primary Site Port	Remote Site Port
_____ →	_____
_____ →	_____
_____ ←	_____
_____ ←	_____

Check with your instructor for above information.

Use the above information to setup the Remote Paths.

*Hint: **Storage Systems** > [Storage Name] > **Open** > **Remote Paths***

B. Create Journal Groups on Primary and Remote Sites

- Create Journal Groups on Primary Site and add two volumes of 25GB each.

JNLG ID - _____

- Create Journal Groups on Remote Site and add two volumes of 25GB each.

JNLG ID - _____

*Hint: **Storage Systems** > [Storage Name] > **Open** > **JNLGs** (Journal Groups)*

C. Identify Production Volume to Replicate

- Identify the volume to be replicated – Primary.

LUN - _____ Mount Point/Drive Letter - _____

- b. Identify the volume to be replicated to – Secondary.

LUN - _____

D. Write Data on Primary Volume

Copy some folders from C:\ to the Primary Volume. This will be used as the production data that needs to be replicated to the Secondary.

E. Create TrueCopy Pair

Use Replication Manager GUI to create a TrueCopy Pair.

Hint: **Hosts > [Hostname] > LUNs > Unpaired > [Primary Volume] > Pair Management**

F. Check Task/Pair Status

Validate that the task was executed successfully.

Hint: **Tasks > Pair Management**

Validate that the Pair Status is now **PAIR**.

Hint: **Hosts > [Host Name] > Pairs > Paired > [Pair Volume]**

G. Split Pair to access Secondary Volume

To access the data copied on to the secondary volume you will need to split the pair.

Hint: **Hosts > [Host Name] > Pairs > Paired > [Pair Volume] > [Copy Group] > [Copy Pair] > Change Pair Status**

Validate that the task was executed successfully.

Hint: **Tasks > Pair Management**

Validate that the Pair Status is now **SPLIT**.

Hint: **Hosts > [Host Name] > Pairs > Paired > [Pair Volume]**

H. Check Data on Secondary Volume

Mount the secondary volume and verify that the data from the primary volume has been copied.

I. Modify Data on Primary Volume

Create some new folders on the primary volume. This represents the differential data.

J. Resync the Primary Volume and Secondary Volume

Unmount the Secondary Volume before resyncing the pair.

Perform Resync Operation on the pair.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume] > [Copy Group] > [Copy Pair] > Change Pair Status

Validate that the Pair Status is now **PAIR**.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume]

K. Validate that the volumes were synchronized again.

Split the Pair again (Step F)

Validate the data on Secondary Volume (Step G)

L. Delete the Pair

Delete the Pair.

Validate that the volumes are not paired.

Hint: Hosts > [Host Name] > Pairs > Unpaired

M. Delete the Remote Paths

Hint: Storage Systems > [Storage Name] > Open > Remote Paths

N. Delete the Journal Groups on Primary and Remote Sites.

Hint: Storage Systems > [Storage Name] > Open > JNLGs (Journal Groups)

End of Lab 6

LAB ACTIVITY 7
MONITOR REPLICATION
OPERATIONS

Lab Activity 7

Monitor Replication Operations

Overview

Objectives

Upon completion of this lab activity, the learner should be able to:

- Setup Alerts to Monitor
 - ♦ Pair Status
 - ♦ Remote Copy Performance
 - ♦ License Usage
 - ♦ Resource Utilization

References

- *Hitachi Replication Manager Software Users Guide*

Setup Monitoring Operations

Lab Tasks

A. Create Pairs

Create the following type of Copy Pairs –

- a. 1 x ShadowImage Pair
- b. 1 x Universal Replicator Pair

B. Setup Pair Status Alert

You need to be alerted whenever the pair status of the ShadowImage pair changes (Any Status Change) and the pair status of Universal Replicator pair changes to PAIR.

- Setup the Alert required.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume] > [Select paired volume] > Create Alert

- Split the ShadowImage pair and Resync.
- Split the Universal Replicator Pair.
- Wait for a couple of minutes. You should see the status change on the Dashboard.
- The Alert should also be registered under Alerts drawer in the Explorer panel.

C. Setup Remote Copy Performance Alert

You need to monitor the Write delay time or consistency time deltas (C/T delta) for Universal Replicator copy pairs. The delay should be less than 5 secs. Setup the required alert.

- Setup the Alert required.

Hint: Hosts > [Host Name] > Pairs > Paired > [Pair Volume] > [Select paired volume] > Create Alert

D. Setup License Usage Alert

You want to be alerted when you are @ 80% utilization of your licensed replication capacity for ShadowImage. Setup the required Alert.

Hint: Storage Systems > [Storage Name] > Open > Copy Licenses > Create Alerts

E. Setup Resource Utilization Alert

You need to be alerted when the Journal Group utilization exceeds 80%. Setup the required Alert.

Hint: Storage Systems > [Storage Name] > Open > Copy Licenses > Create Alerts

F. Manage Alerts.

- Edit the Alert created in Step D to change the utilization threshold from 80% to 90%.
- Disable the Alert created in step E.
- Delete the Alert created in Step C.

Hint: Alerts > Alert Setting list

End of Lab 7

Solution Procedure A.

Installing and Configuring

These procedures will:

- Install the Hitachi Command Suite server software
- Install the License Key for Hitachi Device Manager and Hitachi Replication Manager

Installation of the Hitachi Device Manager Server Software

1. Log on to the management server using the **Administrator** Account.
2. Check with your instructor on the location of the Hitachi Command Suite v7 (HCS7) installation files folder. Change directory to the folder.
3. Click **index.html**. A browser window appears with the install options.
Note: If installing the software from the Hitachi Command Suite DVD, **index.html** is launched automatically.
4. Click **Install** to Hitachi Device Manager.
5. When you are prompted, enter the required information.
6. In the Installation Completed window, select the **When installation completes, open the Device Manager** check box.
7. Click **Finish**. The login window is displayed.
8. Click the **Licenses** button.
9. Select **File** and click **Browse**.

10. Navigate to the appropriate folder to select the license key file. (Check with instructor for license key file location)
11. Click **Save**.
12. Click the **Hitachi Device Manager (HDvM)** hyperlink under product column. Check the License Key Details area to confirm if the key has been installed.
13. Repeat step 12 to validate the Replication Manager Key.
14. Close all the license dialogs to return to login screen.

Installation of the HDvM Agent on Windows Host

Perform the following steps to install the Hitachi Device Manager agent in Windows:

1. Log on to the Primary Host.
2. Launch Device Manager GUI.
[Http://<HDvM_server_IPaddress>:23015/DeviceManager/](http://<HDvM_server_IPaddress>:23015/DeviceManager/)
User – **system**, Password - **manager**
3. From the **Tools** menu, select **Download**.
4. The download dialog appears. Click the appropriate hyperlink to download the agent on your desktop. Close the download dialog after the download is complete.
5. Minimize the Device Manager GUI window.
6. Uncompress the agent setup files by executing the downloaded file.
7. Run **setup.exe** from the uncompressed files to install the agent.
8. When you are prompted, enter the required information.
 - a. Select **No** for setting up RAID Manager.
9. Select **Administration > Managed Resources > Hosts**.
10. Verify that the windows host appears in the tree now.
11. Repeat the above procedures to install agent on the Remote Host.

Installation of the Hitachi Device Manager Agent on Solaris Host (optional)

Perform the following steps on Primary and Remote Host.

1. Log in to Solaris server as the root user.
2. Change directory to the Hitachi Device Manager (HDvM) Agent for Solaris folder. (Ask your instructor for the agent installer location)

3. **Run # ./install.sh.**

4. When you are prompted, enter the required information.

- ♦ User ID and password.

Note: A user with peer-to-peer permissions can be used by the agent to log in into the server. By default the Hitachi Device Manager Server gets configured with an account with peer permission.

User – **hauser** , Password – **haset**

You can use this username and password for registering your agents.

- ♦ Select No for setting up RAID Manager.

A user with peer-to-peer permission cannot be used for logging into the GUI.

The following message appears when the Device Manager agent setup is complete: The Device Manager agent setup has completed successfully.

5. Change directory to the agent folder

a. **cd /opt/HDVM*/HB*/bin**

b. Check the status of the agent service **./hbsasrv status**

c. Status should show **Running**

6. Select the **Hitachi Device Manager (HDvM)** GUI. Click **Hosts > Solaris** in the navigation area.

7. Verify that the Solaris host appears in the tree now.

Register Storage Systems into Hitachi Device Manager

Perform the following steps to register a storage system:

1. From the **Administration** tab, select **Managed Resources**.
2. From the **Storage Systems** tab, click **Add Storage System**.
3. Specify the appropriate information for registering your storage system and click **OK**.
4. Repeat steps 1 to 3 to register additional storage systems (if any)
5. Check the **Data Collection Tasks** tab to verify that the task(s) has completed successfully.

Note: Device Manager queues the Add Storage System tasks and executes them in a serial order.

6. When the task completes, confirm that the storage system name appears in the **Storages** tree in the **Resources** tab.

End of Solution Procedure A

Solution Procedure B.

Configure Storage

These procedures will:

- Set up Command Device
- Set up Pool
- Set up V-VOLs
- Set up Remote Paths
- Set up Journal Groups

Set up Command Device

1. From the **Explorer** panel, choose **Resources** and then **Storage Systems**.
2. Expand the object tree, and then select a storage system under **Storage Systems**.
3. Click **Open**.
4. Select **Cmd Devs** tab and click the **Add Cmd Devices** button. The **Add Command Devices Wizard** appears.
5. Add command devices as instructed by the wizard.

The added command devices are displayed in the **Open** pane.

Set up V-VOLs

1. From the **Explorer** menu, choose **Resources** and then **Storage Systems**.
2. Expand the object tree, and then select a storage system under **Storage Systems**.
3. Click the **Open** link.
4. Under the **Pools** tab, display the **V-VOLs** tab.

5. The **Create V-VOLs Wizard** is launched.
6. On the **Setup V-VOL Group** page, specify the parameters of the **V-VOL Group** (Parity Group).
7. To create a new V-VOL Group, in the **V-VOL Group ID** pane, check the **Create New Group** option or to add V-VOLs to an existing V-VOL Group, in the V-VOL Group ID pane, check the **Select Existing Group** option and specify a V-VOL Group ID.
8. Specify **Emulation Type** and **CLPR**. Click **Next**. The Select Primary LDEVs page is displayed.
9. In the **Target LDEVs** tab, filter and select primary LDEVs to be replicated with V-VOLs. Click **Add**. The primary LDEVs selected in the Candidate LDEVs pane are displayed in the Target LDEVs pane.
10. To create multiple V-VOLs for LDEVs for multiple generations of snapshots, select the **Count of Snapshot** tab and specify a generation number. Click **Next**. The Setup V-VOLs page is displayed.
11. Assign LDEV numbers to the V-VOLs by selecting the **Specify start number of V-VOL(s)** check box and specifying the start numbers of CU and LDEV.

If the **Specify start number of V-VOL(s)** check box is not selected, the CU:LDEV of the V-VOLs will be automatically assigned during the creation. If the specified number is an LDEV number being used as a non-representative LDEV of a LUSE in Device Manager, V-VOL creation may fail.

12. Click **Next**.
13. On **Confirm** page, review all parameters of the V-VOLs and click **Confirm**.

The time taken to complete this operation depends on the count and size of the primary LDEVs, and the specified Count of Snapshot. This operation can take longer when a large number of primary LDEVs are selected.

14. Confirm that the V-VOLs created are listed on the **V-VOLs** tab in the Storage Systems view.

The size of created V-VOLs are exactly the same as the size of target LDEVs.

Set up Pool

1. From the **Explorer** panel, choose **Resources** and then **Storage Systems**.
2. Expand the object tree, and then select a storage system under Storage Systems.
3. Click Open.
4. On the Pools page, click Create Pool. The Create Pool Wizard starts. Create a pool as instructed by the wizard. The added pool is displayed in the Open sub-window.

Set up Remote Paths

1. From the **Explorer** menu, select **Resources**, and then **Storage Systems**.
2. Expand the object tree, and then select a storage system under **Storage Systems**.
3. Click **Open**.
4. Under the **Remote Paths** tab, click **Create Path**. The **Create Remote Path Wizard** starts.
5. Follow the instructions provided by the wizard to create a remote path.

The remote path you created is displayed in the **Open** sub-window.

Set up Journal Groups

1. From the **Explorer** menu, choose **Resources** and then **Storage Systems**.
2. Expand the object tree, and then select a storage system under **Storage Systems**.
3. Click **Open**.
4. On the JNLGs page, click **Create JNLG**. The Create Journal Group Wizard starts.
5. Create a journal group as instructed by the wizard.

End of Solution Procedure B

Solution Procedure C.

Organize Resources

These procedures will:

- Create Sites
- Create Resource Groups

Create Sites

1. From the **Explorer** menu, choose **Shared Views** and then **Sites**.
2. Click **Add Site**.
3. Enter **Site information** and click **OK**.
4. Select the site and specify the resources for the sites.
 - Storage systems
 - Hosts
 - Pair management servers

Create Users

1. From the **Explorer** menu, choose **Administration** and then **Users and Permissions**.
2. Expand the object tree, and then select **Users**.
3. Click **Add User**. The Add User dialog box appears.
4. Register the information about the users to be added.

The information about the registered users is displayed in the Users sub-window.

Create Resource Groups

1. From the **Explorer** menu, choose **Administration** and then **Resource Groups**.
2. Click **Create Group**.
3. Register the information about the resource group you want to create.
4. The created resource group is displayed in the Resource Groups sub-window.
5. Add the following resources to the resource group.
 - ♦ Hosts (**Hosts** tab > **Add Hosts**)
 - ♦ Storage (**Systems** tab > **Add Storage Systems**)
 - ♦ User (**Users** tab > **Add Users**)

End of Solution Procedure C

Solution Procedure D.

Monitoring

These procedures will:

- Setup alerts for monitoring
 - ♦ Pair Status
 - ♦ Performance
 - ♦ Copy License Usage

Pair Status Alerts

1. From **Explorer** panel, select **Host**, **Hostname** and then **Copy Groups** tab.
2. Select the check boxes of the copy pairs for which you want to set monitoring conditions, and then click **Create Alerts**. The Create Alert Setting Wizard starts. Click **Next**.
3. On the Select Monitoring Type page, select the **Pair Status Monitoring** option, and then click **Next**.
4. On the Select Alert Setting page, select the **Create New Alert Setting** option, and then click **Next**.
5. On the Edit Alert Action page, specify the alert notification conditions and method. Click **Next**.
6. On the Confirm page, review the settings that will be applied and click **Confirm**.
7. Click **Finish** on the Finish page.

Performance Alert

1. From **Explorer** panel, select **Host, Hostname** and then Copy Groups tab.
2. Select the check boxes of the copy pairs for which you want to set monitoring conditions, and then click Create Alerts. The Create Alert Setting Wizard starts. Click **Next**.
3. On the Select Monitoring Type page, select the **Performance Monitoring** option, and then click **Next**.
4. On the Select Alert Setting page, select the **Create New Alert Setting** option, and then click **Next**.
5. On the Edit Alert Action page, specify the alert notification conditions and method (*Monitoring Performance C/T Delta per Copy Group > 5 secs*). Click **Next**.
6. On the Confirm page, review the settings that will be applied and click **Confirm**.
7. Click **Finish** on the Finish page.

License Usage Alert

1. From **Explorer** panel, **Select Storage System > Storage Name > Open**.
2. Select the check boxes of the copy product for which you want to set monitoring conditions, and then click **Create Alerts**.
3. The Create Alert Setting wizard starts. Click **Next**.
4. On the Select Monitoring Type page, select the **Copy License Usage Monitoring** option and then click **Next**.
5. On the Select Alert Setting page, select the **Create New Alert Setting** option and then click **Next**.
6. On the Edit Alert Action page, specify the alert notification conditions and method (*Copy License Usage per Copy Product >80%*). Click **Next**.
7. On the Confirm page, review the settings that will be applied and click **Confirm**.
8. Click **Finish** on the Finish page.

End of Solution Procedure D

Solution Procedure E.

Create Copy Pair

This procedure will:

- o Create Copy Pairs

Create Copy Pair

Create Copy Pair includes the following steps:

Step 1: - Launching Wizard

- Select P-VOLs
- Select P-VOLs on the LUN list

Step 2: Pair Association

- Associate Copy Pairs
- Specify copy types
- Specify S-VOLs
- Associate P-VOLs with S-VOLs

Step 3: Group Management

- Define Copy Groups
- Create copy groups
- Specify pair management parameters
- Associate copy pairs with copy groups

Step 4: Task Management

- Set Execution Options
- Specify immediate or scheduled pair creation
- Specify advanced options for pair creation

1. From the Hosts or Storage Systems view in the **Resources** drawer, select the primary volume (P-VOL) from the **Unpaired LUN** list. You mapped this LUN earlier in this lab.
2. In the Application area, click **Pair Management** to launch the Pair Configuration wizard.
3. The introduction screen lists required steps for pair configuration. Click **Next**.

The **Pair Association** window allows user to define complex pair configuration with topological view.

The P-VOLs user specified on the LUN list are listed on the **Pair List** pane as displayed below. Also isolated P-VOL icon is displayed on the **Copy Topology** pane.

4. To create new pair group, click **Add Group** to open the Add Pair Group dialog box.
5. Specify the **Pair Group Name** and select appropriate copy product from the list for **Copy Type** and click **OK**.

Note: You cannot use a space character in a **Pair Group** name, and you cannot use a hyphen (-) at the beginning of a **Pair Group** name.

With Add Pair group operation, the window shows new pair group in the **Copy Topology** pane.

6. To assign the S-VOLs, select target P-VOLs on the **Pair List** pane. Now select corresponding S-VOLs on the **Volume Selection** pane.
7. Under **Select Volume** as displayed in the figure below, select **Type** as **Secondary**.
8. Under **Filter By**, select the following:

Site: Remote Site

Host Name: (select your remote host)

Storage Systems: (select your remote Storage Systems)

9. Click **Apply**.

Note: For finding of S-VOLs quickly, the pane provides filtering with site, host, storage systems, or logical group.

10. From the **Results** tab, expand the Storage Systems, Port and host group and select the S-VOL, and click **Add Selection** to associate P-VOL and S-VOL.

Once S-VOLs are associated with P-VOLs, the window shows pairs of P-VOL and S-VOL on the **Pair List** panel.

11. Click **Next** to proceed.

- ♦ The Group Management window allows a user to define CCI copy groups for the pair groups, and setup parameters for pair management.

- ♦ The **Pair Group** pane provides topological view of a pair group defined on the previous step, and a **Pair List** pane lists the copy pairs for the selected pair group.
12. To create new copy group, on the **Copy Group** pane click **Create Group**.
- A Copy Group is group of copy pairs created for management purposes, as required by a particular task or job. Using Copy Groups, you can perform operations such as changing the pair status of multiple copy pairs at once.
- The Create Group dialog box appears.
13. Specify Copy Group name and CCI Configuration Definition file related information (instance number and communication port number). The CCI configuration file can be placed separately for the primary volume and secondary volume instances.
- ♦ If the Copy Group uses existing instance number, specify the number from the list
 - ♦ As a default value, the window shows pair group name as the copy group name.
14. Enter the following as displayed and click **OK**. You can use other instances and UDP port numbers:

Copy Group: *Grp_Orcl*

Primary Server

Instance Number = 108

UDP Port Number =11108

Secondary Server

Instance Number = 109

UDP Port Number =11109

The Copy Group is now defined. The topology view displays the Copy Group attribute as **Unassigned**.

15. Click **Apply** to add the Pair Group instance to the newly created Copy Group instance. The selected pair instances are added to the Copy Group and also the topology view displays the **Copy Group** attribute as **Assigned**.
16. After confirming that all the pair groups show **Assigned** on the **Pair Group** pane, click **Next** to continue. The Task Management screen appears.

The final step of the wizard is to setup execution options, which allows the user to specify the options for pair creation. The **Task List** pane displays copy groups to be created and the default execution option is Immediate.

17. Click the **edit** icon of the copy group. The **Task Options** tab displays the following **Execution Request** time options:
 - ♦ Execute Immediately
 - The task will start when the Pair Configuration Wizard ends.
 - ♦ Execution Date
 - Scheduled execution, specify execution date and time
 - ♦ Modify Pair Configuration File Only (Do not create pair)
 - Only modifies the CCI definition (HORCM) configuration file
18. Leave the execution request time to default and click the **Pair Setting** tab and look at the different options.
19. Click **Next** to continue. A confirmation screen with the Pair List and Task List is displayed.
20. Scroll down and click the check box for **I have confirmed the above information and wish to create pair configuration** to create volume pairs. Click **Confirm**.
21. Click **Finish** to end the Pair Configuration Wizard. Task is registered and executed based on the specified schedule.
22. Go to the **Tasks** view and view all the execution tasks listed.
23. Refresh the **Tasks** view to check the completion of tasks. The Status column will indicate the execution status of the task.
24. Wait for the completion of all Tasks and ensure the status is **Success**.

End of Solution Procedure E

Solution Procedure F.

Change Pair Status

This procedure will:

- o Change the status of a Copy Pair

Changing the Statuses of the Copy Pairs

1. In the **Pairs** tab, select the check box and click **Change Pair Status** to launch the Change Pair Status Wizard.
2. The Introduction screen of the Change Pair Status Wizard lists the required steps for changing copy pair status. Click **Next** to continue.
3. Select the copy pairs to change the status and click **Next**.
4. The Select Pair Operation screen is displayed as shown below. Under the **Pair Operation** section, you can select the operation type from the **Operation** list. The default operation is **Split**.

The operation listed is based on the current status of the copy pair and copy type. The Confirm screen of the wizard is displayed.

5. Click the check box for **Yes, I have confirmed the above information and wish to change pair status** and click **Confirm**.
6. The Finish screen of the wizard is displayed. A task for change pair status is created successfully. Click **Finish**.
7. Refresh the copy group to see the results of the operation.
8. In the **Explorer** menu, click **Tasks**. The task list is displayed in the application area. Ensure you see a task listed and the status of the task is success.

End of Solution Procedure F

