




# Hitachi Data Systems

## Virtual Infrastructure Integrator for Hitachi Storage Platforms Operational Best Practice

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## Intended audience

The content presented in this document assumes hands-on knowledge of HNAS administration.

## About this document

This document provides operational guidance on Hitachi Virtual Infrastructure Integrator for HNAS platform. This document is supplemental to the *Hitachi Virtual Infrastructure Integrator Administration Guide* and HNAS operational envelope collateral, and the rest of the HNAS product documentation suite. This document is not intended to be a procedural guide or a replacement for *Hitachi Virtual Infrastructure Integrator Administration Guide*.

## Introduction

By integrating into the VMware vSphere® virtual environment, the Virtual Infrastructure Integrator software provides seamless virtual machine (VM) data management services, including VM snapshot backups, VM snapshot restores, and snapshot backup scheduling capabilities for VMs and virtual applications (vApps), which are hosted exclusively on Hitachi Storage Platforms—Hitachi NAS and, starting with the Virtual Infrastructure Integrator version 3.0 also on the block storage. You can apply snapshot backup schedules to specific VMs and vApps by grouping them according to your needs. The Virtual Infrastructure Integrator also enables the creation of VM and vApp clones instantly, even while the VMs and vApps are powered on.

If a File Clone license is installed, the software takes advantage of HNAS File Clone technology to deliver VM and VMDK hardware-level snapshot backups, which can be instantly created or restored. The same technology is used to create efficient clones and linked-clone VMs

## Use case

The Hitachi Virtual Infrastructure Integrator solves the problem of creating backups of VMs using HNAS File-level Clone or file system-level snapshot technology and vCenter. Specifically, it allows the user to create or restore VMs in seconds.

## Feature description

Snapshot backup scheduling automates the task of taking snapshot backups at regular intervals. Snapshot backup schedules enable you to select the date, time, retention period, and frequency of backups. Backup schedules can be created for individual entities, such as a VM, vApp, group or an entire datastore. You can modify backup schedules, and create several different backup schedules for one entity.

If you schedule a backup using a 'group', a backup for each member of the group will be performed. If new VMs are created and hosted on Hitachi Storage, they will not be part of a 'group' backup unless the newly created VM is added to the group. By contrast, a schedule for an entire datastore will automatically include any newly created VMs if they are on the specific datastore. Therefore, backing up by datastore automatically incorporates any newly created VMs on that datastore without the requirement to update the backup group. In contrast, a group is a tightly controlled list of VMs and vApps to be protected, regardless of changes to other VMs.

## Operation

For schedule-based snapshots of a VM, a schedule must be created first, defining the frequency of the backups to be taken (Minutes/Hourly/Daily/Weekly/Monthly), the start date and time for the schedule, and retention policy for the backup in days or number of backups to keep.

Restoring a VM to a previous state can be done using any of the available snapshot backups.

The Virtual Infrastructure Integrator provides the capability to group VMs allowing users to schedule group backup and supports a backup of every VM and vApp on a specific datastore.

## Management interface

The Virtual Infrastructure Integrator can be managed through vSphere Web Client GUI, external APIs (introduced in version 3.0), and a CLI.

### Virtual Infrastructure Integrator GUI

The Virtual Infrastructure Integrator GUI is a VMware vSphere Web Client Plug-in. The GUI allows the user to:

- Configure the Hitachi Virtual Infrastructure Integrator, including setting up file and/or block storage resources
- View all VMs that are hosted on HNAS Storage (If you do not see a VM, most of the time the VM is utilizing not HNAS storage such as local storage, a block device or a Raw Device Map (RDM))
- View all available backup per VM
- View all of the current schedules
- View all of the configured HNAS devices
- View all of the HNAS datastores hosting a VM or vApp
- View all groups
- Create, edit, or delete schedules
- Create, edit or delete groups
- Delete backups
- Restore a VM
- Clone a VM
- Manually create a backup

## Virtual Infrastructure Integrator CLI

The following Virtual Infrastructure Integrator CLI commands are relevant to backups:

<i>CLI command</i>	<i>Description</i>
v2i-backup.exe	Create/delete/schedule backups
v2i-clone.exe	Create fast clones of a VM
v2i-mount.exe	Mount VMDK snapshot backup on a VM
v2i-restore.exe	Restore the VM using a backup.
v2i-tools.exe	Manage Group and View File devices

## Troubleshooting

Most troubleshooting related to Virtual Infrastructure Integrator operation is done on the basis of logging events reported by the Virtual Infrastructure Integrator server log.

The following table shows common errors relevant to issues reported by customers using Virtual Infrastructure Integrator.

<i>Event</i>	<i>Error Message</i>	<i>Error Meaning</i>	<i>Remediate Action</i>
Error	Hitachi Virtual Infrastructure Integrator Server cannot be reached	The Virtual Infrastructure Integrator Server cannot be reached from the vSphere Web Client	Verify the Virtual Infrastructure Integrator Server is running. If the Virtual Infrastructure Integrator Server is hosted on a VM, verify the VM is running.
Error	Hitachi Virtual Infrastructure Integrator Server cannot be reached or has not been configured	The Virtual Infrastructure Integrator Server cannot be reached from the vSphere Web Client	Verify that port 9000 between the Virtual Infrastructure Integrator Server host and the Virtual Infrastructure Integrator Web Client is not blocked by any firewall Verify that SSL Certificate 'hdscacert' is installed properly in the keystore Verify that vSphere Web Client Service was restarted after successful installation of 'hdscacert'
Error	Unable to connect to Hitachi Virtual Infrastructure Integrator Server.	Not able to reach Virtual Infrastructure Integrator server from vSphere Web client.	Confirm that IP address of Virtual Infrastructure Integrator server is correct and that Virtual Infrastructure Integrator server service is running on 9000 port at that IP address. Verify that port 9000 between the Virtual Infrastructure Integrator Server host and the Virtual Infrastructure Integrator Web Client is not blocked by any firewall



## Performance tuning

Under most circumstances, there is no additional tuning required for Virtual Infrastructure Integrator operation. However, the vCenter setup should be compliant with the minimum requirements posted by VMware.

## Interaction with other HNAS features

### Dedupe

Virtual Infrastructure Integrator does not directly interact with HNAS Dedupe. The Compliance Dashboard will report if a HNAS file system hosting VMs does not have Dedupe enabled. This is recommended as a Best Practice.

### File system snapshots

The Virtual Infrastructure Integrator will only use HNAS file system snapshots if:

- A HNAS File Clone license is not available
- VMware datastore is hosted on HNAS WFS1 file system
- VMware datastore is hosted on HNAS 3100 or 3200

While backups using the HNAS file system snapshot are supported, using File Clones is the preferred and the recommended Virtual Infrastructure Integrator use case.

### File clone

File Clone requires a HNAS File Clone license to be active. If File Clone license is installed on the HNAS system hosting a datastore, the Virtual Infrastructure Integrator **Clone** button is enabled. Otherwise, the **Clone** button is disabled. When the File Clone license is available on a HNAS system hosting a VMware datastore, File Cloning will be used to back up a VM.

Virtual Infrastructure Integrator determines if any HNAS datastore is being replicated through Object Replication. If so, Virtual Infrastructure Integrator displays replication information under the 'Vault'. A 'Vault' should be setup for each HNAS datastore hosting VMs.

Creating a File Clone has very little impact on the HNAS system, write performance, and no impact on read performance of the file. However, deleting a clone or cloned file requires a lot of I/O processing to determine which blocks can be freed and which block need to be retained. The volume of I/O required directly depends on the size of the file, the amount of change in the file, and whether or not you are deleting the 'last' or 'latest' clone. To minimize the impact of clone deletion, it is recommended to schedule Virtual Infrastructure Integrator backup operations at a time when the VMs' I/O is at the anticipated lowest point for the day or week.

## Best practices

### Compliance Dashboard

It is highly recommended to run the Hitachi NAS NFS Best Practices Compliance Dashboard in the Virtual Infrastructure Integrator GUI once a quarter or whenever there is an issue. The

Compliance Dashboard will verify a number of characteristics on the HNAS server, and VMware eco-system. If any issues are found, the Compliance Dashboard reports the issues found, but will not make any changes. The Compliance Dashboard is a read-only operation so it can be run at any time without concern for introducing any changes unintentionally.

## Backups

- Retain at least three backups.
- A minimum of three weeks' worth of backups should be available at any given time.
- Mission critical VMs should be backed up as part of a group. The group should be as small as possible to reduce the time and chance of any issues that may impact the backup.
- Use a schedule datastore backup to automatically backup all VMs contained on a datastore.
- VM quiesce is the process of completing and flushing all pending I/O requests, so a VM can be backed up in the 'application-consistent' state. Quiesce option is disabled by default. Only use the quiesce option on VMs that VMware can routinely quiesce. Quiescing requires VM tools installed in the guest OS.
- Schedule the backups at a time when the VM I/O is at the anticipated lowest point for the day or week.
- Review the Virtual Infrastructure Integrator logs regularly to identify any issues with the specific backup or VM.

## New features in Virtual Infrastructure Integrator version 3.0

<i>Feature</i>	<i>Value</i>
Hitachi FC Block Support	Virtual Infrastructure Integrator for block storage. Automated backup and recovery of VMs on Hitachi block storage (VSP G1000, VSP and HUSVM, VSP G) – Capacity/Unlimited Licensed Option
Extend App/Database Consistent backup Integration for Linux VMs	Provide Freeze and Thaw VM scripts for Oracle DB on Linux [10 and higher] and MySQL <a href="https://community.hds.com/docs/DOC-1004498">https://community.hds.com/docs/DOC-1004498</a>
Increased scale and concurrency	<ul style="list-style-type: none"> <li>• Support multi-VM backups concurrently for faster backup jobs</li> <li>• Higher scale from Web Client UI plugin support</li> <li>• Support high I/O VMs and quiesce</li> </ul>
External Virtual Infrastructure Integrator Control through web APIs and default group templates	<ul style="list-style-type: none"> <li>• Allow External control of Virtual Infrastructure Integrator services through APIs (HDID, UCP, vCO, and so on)</li> <li>• Preconfigured Default Backup groups for easy automation</li> </ul>
UI and Compliance Dashboard+	<ul style="list-style-type: none"> <li>• Support datastore Clusters, additional metrics and BPs</li> <li>• Storage vMotion VM's support, backup space stats and enhanced logging/messages</li> </ul>



<i>Feature</i>	<i>Value</i>
Virtual Infrastructure Integrator Env stats , Virtual Infrastructure Integrator Diagnostics data	Virtual Infrastructure Integrator Service will provide a URL where a user/HiTrack can download environment info and Virtual Infrastructure Integrator diagnostics which includes the logs & configuration
Security/RBAC	Enable non administrator roles/permissions to manage Virtual Infrastructure Integrator (i.e backup operator vCenter role)

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