# Global Data Replication & Recovery



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# **Chapter 1**

# Introduction to Global Data Replication & Recovery

NEXSAN Global Disaster Replication & Recovery (GDR) introduces network based data replication and site recovery over any IP LAN, SAN or WAN providing data continuity and workflow continuance for any business and organization.

NEXSAN GDR creates a duplicate data environment for mission critical information allowing data changes made to volumes at one location to be replicated to matching volumes at the remote location. Volumes can be replicated individually or in groups to maintain data consistency for larger applications like databases.

NEXSAN GDR provides planned and unplanned (disaster) failover and recovery after disaster.

### **GDR Key Features and Benefits**

#### • Data Replication over IP

Replicate data to a remote site and provide disaster recovery method.

#### • Synchronous Replication

Maintain exact duplicates of live data between two locations to ensure full data recovery and achieve zero RPO (Recovery Point Objective).

#### Asynchronous Replication

Replicate data changes across any bandwidth to the remote site to eliminate the cost associated with high speed connections.

#### Active-Active Replication

Replicate data between two production sites so each site can recover from the other.

#### Many to One Replication

Replicate multiple data centers to one remote site.

#### • Failover and Fallback processes

Wizard-based management guides users in failover and fallback processes to minimize RTO (Recovery Time Objective).

### • Planned Failover and Fallback

Minimize service interruption time during site migration or full site maintenance for 24/7 business continuity.

### • Use any Type of Disk Storage

Storage systems used at the local and remote sites do not need to be the same brand or type. Select the storage type that best fits your requirements (FC or SCSI systems using FC, SCSI, SATA or ATA drives).

### • Server and Operating System Independent

Replication is provided by the **i** series through the entire network – no need to purchase data replication software or licenses for each server.

### Low Maintenance Cost

Allow unlimited number of volumes, servers and storage capacity, with no additional cost, to provide significant return on investment.

### • Volume Specific

Select only the volumes you wish to protect to conserve bandwidth costs and efficiently utilize storage capacity.

### Consistency Groups

Consistency groups ensure that related volumes are replicated at the same time to maintain data flow integrity for databases or any other multiple volume applications.

### • Central Management

Administer multi-site global data replication and recovery using a central **network** management application.

## What is a Disaster?

A disaster is an event causing a network shut down, leaving its data inaccessible. A disaster can be caused by several different elements such as:

- Natural
- Man-made
- Regional disasters

Good disaster recovery solutions safeguard against all of these types of disasters and enable networks to recover from the disaster and continue operating normally.

Every well-planned network has built-in safeguards against localized failures. A disaster recovery solution safeguards against a site-wide failure.

High Availability safeguards against technological failures. Some examples of high availability are:

- Dual power supplies safeguard against power supply failure
- Data mirroring safeguard against disk failure
- Host clustering safeguards against application failures.

Data Protection safeguards against human failure. Some examples of data protection are:

- Data backups safeguard against data loss
- Volume snapshots safeguard against data corruption.

Some examples of a disaster are:

• Natural, man-made or regional disaster that caused data loss.

# **GDR Topology**

NEXSAN's GDR solution is based on primary and secondary sites. NEXSAN's GDR solution supports one secondary and multiple primary sites:

- Primary (local): site that is replicated
- Secondary (remote): site that holds replicated data.

Different topologies influence disaster recovery solutions.

NEXSAN GDR offers the following topologies:

- Active/Passive: 1 primary site / 1 secondary site
- Active/Active : 1 primary/secondary site / 1 secondary/primary site
- Star Formation: More than one primary site / 1 secondary site

#### Note:

In all three topologies:

- The primary site replicates the data to the secondary site.
- The secondary site does not pull data from the primary site.

### **Active/Active Topology**

In an active/active topology, both the primary as well as the secondary sites are productive and replicated.

### Active/Passive Topology

In an active/passive topology, volumes are replicated from primary and stored on secondary. The secondary only acts as a data warehouse and will not take over network functions in the event of a disaster. The takeover must be initiated by the customer.

### **Star Formation Topology**

In Star Formation topology there is one secondary site and more than one primary site. This topology is suited to a multi-branch company in which each primary site (branch) replicates its data to the secondary site (headquarters).



Figure 1-1. Star Formation Topology

## **GDR Building Blocks**

The building blocks of NEXSAN GDR are:

- Primary and Secondary Sites
- Journal Volumes
- Disaster Recovery (GDR) Pairs
- Consistency Groups

### Journal Volumes

Journal Volume is needed for administrative *journaling* functions of GDR. Journal volumes include maintaining a mapping table of all changes made to the GDR Pair Volumes at the block level. Journal volumes are expandable to accommodate growing journaling functions. One *Journal Volume* is needed per **i** series and only for Asynchronous Replication.



Figure 1-2. GDR Volume

### Journal Size

The journal size is influenced by:

- The amount of changes that occurred during the initial sync process.
- The amount of changes between consecutive replication for all GDR pairs.
- The network speed.

### **GDR Pairs**

On the **i** series, primary storage is virtualized into volumes. These virtual volumes are the basic building blocks in the GDR solution.

Each virtual volume can be replicated to a dedicated virtual volume at the secondary site. Together, the primary and secondary volumes form a *GDR Pair*.



Figure 1-3. GDR Pair

### **Consistency Groups**

A consistency group applies a given set of replication parameters to a group of GDR pairs. Point in Time (PIT) snapshots of data changes are created at specified times. Point-In-Time (PIT) snapshots guarantee that the pair within the CG replicate/merge within the same point in time enabling the application to recover.

Since some applications create or require more than one volume with inter-volume dependencies, e.g. databases and Email applications that have several volumes for databases and logs, it is necessary to define identical replication parameters for them. Consistency Groups ensure that they are replicated together.

### Note:

GDR pairs can be assigned as stand alone pairs and not be part of a Consistency Group.



Figure 1-4. GDR pairs within a Consistency Group

# **GDR Initial Synchronization Options**

If your primary volumes contain data, it is necessary to perform an initial volume synchronization action to replicate data to the secondary site.

There are three initial synchronization policies:

### 1. No Sync

No need for initial volume copy.

If your primary volume is a new volume and contains no data, there is no need for initial data synchronization. There is no data to synchronize between the primary and secondary volumes.

### Note:

If you plan on copying a large amount of data to a newly created pair after replication has started, the journal might fill up too quickly and become out of sync. NEXSAN recommends copying the data to the primary volume before you create the pair and use initial sync (which does not use the journal).

### 2. Online

Copies volumes over the network.

#### Note:

There are two ways to use Online Initial Sync.

- When there is sufficient bandwidth you can synchronize the data directly over the network.
- When there is insufficient bandwidth, you can configure both the primary and secondary i series locally and perform online initial sync over the local LAN. After the initial sync is done you can transport the secondary i series to the remote site. This method is described in <u>Using Online Init Sync with</u> <u>Low Bandwidth Lines</u>.

### For Asynchronous pairs:

A snapshot is taken of the primary volume. You must define this snapshot volume. The snapshot of the primary volume is replicated to the secondary site in real time.

#### 3. Offline

Used for copying volumes offline to an external media (disk/tape). The steps for performing Offline copy are described in <u>Offline Copy</u>.

#### For Asynchronous pairs only:

A snapshot is taken of the primary volume. When using the Wizard, you must define this snapshot volume when creating the GDR pair. The snapshot of the primary volume is copied to a separate tape/disk. This separate tape/disk is physically transferred to the secondary site and than is copied to the secondary volume.

### Replication

The method you choose for replicating your data depends on several factors.

The most important factors for data replication are:

- Available bandwidth
- Latency between sites

The GDR solution offers you two methods of replication:

- 1. Synchronous recommended for high bandwidth, low latency
- 2. Asynchronous recommended for low bandwidth, high latency

A site can use a combination of both synchronous and asynchronous replication methods. When deciding which method is most appropriate for each GDR pair,

consider the following:

- How often does the data change?
- What data shares interdependency with other data and, therefore, should be replicated together?
- What kind of impact do small changes in a certain data chunk have on business functioning, i.e. what is the data loss tolerance?

### **Synchronous Replication**

Synchronous replication means that every write operation is written to the primary and secondary volumes before sending back a write acknowledge to the server. Synchronous replication provides zero data loss.

### Note:

*If you want to have zero data loss, use synchronous replication. However, you must have high bandwidth network and low latency to have an efficient synchronous replication solution* 

A synchronously replicated GDR pair functions similarly to a regular mirrored volume over iSCSI, with each volume as a child. However, if the primary volume fails, the volume must be manually failed over to the secondary volume in order for the secondary volume to take over regular volume functions.



Figure 1-5. Synchronous Replication Method

### **Asynchronous Replication**

With Asynchronous replication, every write operation is written to the primary volume. However, instead of replicating it to the secondary site, the data is written in the primary journal and then a write acknowledge is sent back to the server.

Use asynchronous replication when site connectivity is limited in bandwidth and the latency is high.

#### Note:

The data in the remote site might not be synchronized with the latest data of the primary volume.



### Figure 1-6. First Step of Asynchronous Replication Method

Point in Time (PIT) snapshots of data changes are created at specified times. PIT data is replicated to the secondary site journal. At the secondary site, after the entire PIT has been transferred, the PIT is merged with secondary volume. There is no potential for data loss in the secondary volume if network conditions interfere with the successful transfer of a PIT to the secondary site. This is due to the fact that the PIT data merge does not begin until the complete PIT is successful transfer remains intact.



Figure 1-7. Second Step of Asynchronous Replication Method

### **GDR Workflow Processes**

Figure 1-8 shows GDR workflow.



Figure 1-8. GDR Workflow Diagram

### Table 1-1. GDR Workflow

Step	Remarks
Initial Sync	Volumes marked for initial synchronization are replicated to the secondary site.
Replication	Routine GDR replication follows, as per each stand alone GDR pair or consistency group.
Disaster (Planned/Unplanned)	Primary site goes down, due to scheduled maintenance or disaster.
Site Failover (Switch)	Primary site is manually failed-over to the secondary site and all GDR volumes are exposed according to their designated hosts. At this stage the secondary site acts as the primary site.
	After planned failover, changes in the secondary site are replicated to the primary site.
Repair (Local Site)	Secondary site continues to function as the primary site while the primary site is repaired.
Site Fallback (Switch)	Secondary site is manually failed back to the primary site when primary site is repaired or scheduled maintenance is finished.

### **Planned Failover & Fallback**

Planned failover can be used when a site needs to go down for primary maintenance or for site relocation. The unique feature of a planned failover is its ability to continue to keep the data changes, eliminating the need for an initial data resynchronization when the primary site is up again.

### Notes:

The secondary site continues to keep a journal volume. This journal volume will be instrumental in quickly restoring the primary site.

Since the journal volume is not being pushed to another site, it can grow quickly depending on volume activity. Therefore, attention should be paid to the journal volume to make sure that it is not quickly approaching its load threshold. A journal volume can be resized if necessary.

### **Failover Wizard**

NEXSAN's Failover Wizard guides you through the failover process. For more information see *Planned Failover Wizard in Chapter 3*.

### **Primary Site Operations**

- 1. Deactivate the necessary applications at the primary site.
- 2. Once all write operations are stopped and all caches are flushed, PITs are taken of all GDR volumes and are replicated to the secondary site.
- 3. When all data has been transferred, you can switch to the secondary site.
- 4. The primary site is now available for maintenance.

### Secondary Site Operations

- 1. At the secondary site the PITs are merged with the secondary volumes for the most up-to-the-minute data copies.
- 2. Once all of the data is replicated, the secondary volumes are exposed to the appropriate hosts.

### **Fallback Wizard**

NEXSAN's Fallback Wizard guides you through the fallback process. For more information see *Fallback Wizard in Chapter 3*.

### **Primary Site Operations**

- 1. Deactivate the necessary applications at the secondary site.
- 2. Once all write operations are stopped and all caches are flushed, PITs of all GDR volumes are replicated to the primary site.
- 3. When all data has been transferred, you can switch back to the primary site.
- 4. At the primary site the PITs are merged with the primary volumes.

#### Note:

An initial resynchronization of all data is not necessary. Only the PIT data needs to be merged with the primary site data.

The secondary site continues to keep a journal volume. This journal volume will be instrumental in quickly restoring the primary site.

Since the journal volume can grow quickly depending on volume activity, attention should be paid to the journal volume to make sure that it is not quickly approaching its load threshold. A journal volume can be resized if necessary.

5. Once all of the data is replicated, you can reactivate all applications.

### **Disaster Failover, Recovery & Fallback**

In an unplanned failover there is nothing to do immediately at the primary site. Begin working straight in the secondary site.

### **Disaster Failover Wizard**

NEXSAN's Disaster Failover Wizard guides you through the failover process. For more information see *Disaster Failover Wizard in Chapter 4.* 

### Secondary Site Operations

- 1. Switch the secondary volumes to primary volumes.
- 2. Expose the secondary volumes to the configured hosts and activate any applications that need to be activated.

### Note:

Note that the secondary site does not continue to keep a journal volume of data changes. The secondary site functions as a regular site without GDR capabilities.

When using asynchronous replication, there will be a potential possibility to lose some of the data that was not replicated to the secondary site upon disaster. With NEXSAN GDR solution you may keep the data loss to a minimum or completely eliminate it by using optimal replication policies.

### **Recovery after a Disaster**

After performing Failover, you must complete the following steps before your system will be restored.

- 1. Use the Recover Wizard to recover your local site.
- 2. Replicate (initial sync and replicate)
- 3. Perform Fallback.

### **Recovery Wizard**

Depending on the level of disaster, the need for initial fallback configurations at the primary will vary. NEXSAN's Recover Wizard will guide you to recreate the GDR pairs on the primary i series. For more information see <u>Recovery Wizard in</u> <u>Chapter 4.</u>

- If equipment and virtual volumes are still intact there is no initial reconfiguration that must be done at the primary site.
- If the site suffered hardware or software damage, primary volumes, volume hierarchies, targets, GDR pairs and consistency groups must be reconfigured from the ground up.
- If volume names have changed you must update volume pair relations at the secondary site.

### Replication

Once both sites are properly configured, you can begin initial synchronization from the secondary site to the restored primary site of all volume pairs using either online or offline copy. In essence, the secondary site is acting temporarily as a primary site replicating data to the primary site. For more information see <u>Replication in</u> <u>Chapter 4</u>.

### Fallback Wizard

Once the initial sync is completed, you can deactivate applications on the secondary site and failover the secondary site back to the primary site. Once all write operations are stopped and all caches are flushed, PITs are taken of all GDR volumes and replicated to the primary site. When all PITs have been transferred, you can switch back to the primary site. For more information see *Fallback in Chapter 4.* 

You can now reactivate all applications in the primary site.

# **Chapter 2**

# **GDR Configuration**

## Introduction

### Note:

Before you start configuring GDR, make sure that:

- All i series have assigned IP addresses.
- All i series have assigned Portals.
- IP Routes have been defined.

If you have not configured any of these, stop and do so now (refer to the i series manage User Manual).

#### Note:

This chapter provides examples for Active/Passive configurations.

Use i series manager GUI to configure your GDR solution. The following lists the basic steps for building a GDR solution:

- 1. Defining Primary and Secondary Sites
- 2. Assigning i series to Primary and Secondary sites
- 3. Creating GDR Pairs

A GDR pair is the combination of a designated primary volume for replication and a designated secondary volume that receives the replicated data. GDR pairs are created via the Create Pairs Wizard. The wizard guides you through the creation steps. At each stage in the create pairs process, you can either select previously existing volumes or create new ones.

4. Replicating the Data

# **Defining Primary/Secondary Sites**

The site wizard allows you to define sites for your GDR solution.

#### Note:

You must define two different sites before you can begin configuring DR.

#### To define a site:

- 1. From the navigation pane, select **i series manager > New > Site**.
- 2. From the Quick Launch: Configure > Create System Entity > Site...





Figure 2-1. New Site

The New Site dialog box opens

🛞 New Cluster 🛛 🔀
Location: 🔶 Australia
Cluster Alias: Sidney
OK Cancel

Figure 2-2. New Site

- 3. Enter site name.
- 4. Click OK.
- 5. Repeat for each site in your GDR topology.

## **Assign i series to Primary/Secondary Sites**

A site can be built from a stand-alone i series or a i series cluster. You must assign the i series or Cluster to the primary/secondary sites.

#### Note:

You can assign as many storage resource groups as needed per site (A storage resource group is a cluster or a single i series).



Figure 2-3. Add i series/Cluster

### Adding i series

To add i series to site(s):

1. From the i series manage menu, select Local/Remote site, right click and select New > Storage Resource Group [Single Switch]

Location:	🔶 Europe			~		
Storage Res	ource Group:	euriser	ies2			
IP Address:		172 . 2	20 .	62.	2	
Mask:		255 . 2	255 .	255 .	0	
SNMP UDP P	ort:	161				
TRAP UDP P	ort:	1162				
Read comm	unity:	public				
Write comm	unity:	private				
Timeout:		4500		ms		
Number of R	etries.	2				
SNMP Versi	on:	av2c				
Storage						
Storage	Name:					
Storage	First IP:					
Storage	Second IP:					
	OK	Can	rel	)		

Figure 2-4. Add New i series

- 2. Specify IP Address for new i series.
- 3. Click OK.

### **Adding Cluster**

### Note:

A cluster contains 2 i series. After adding a cluster, you must add the 2 i series to the defined cluster.

### To add new cluster to site(s):

1. From the i series manage menu, select Local/Remote site, right click and select New > Storage Resource Group [Cluster].

📡 New Cluster 🛛 🚺	×
Location: 💠 USA	
Cluster Alias: Chicago	

Figure 2-5. Add New Cluster

- 2. Specify new Cluster Alias.
- 3. Click OK.
- 4. Add two i series under cluster by following the steps for Adding i series.

### Note:

The *i* series must be part of a site. If you don't start from scratch with a new *i* series, you can move an existing one to a site.

## **Creating GDR Pairs**

A GDR pair is the combination of a designated primary volume for replication and a designated secondary volume that receives the replicated data. You may create Synchronous or Asynchronous pairs. The GDR Wizard guides you through the process.

#### Note:

Before you start configuring GDR, make sure that:

- All i series have assigned IP addresses.
- All i series have assigned Portals.
- IP Routes have been defined.
- If you have not configured any of these, stop and do so now (refer to the i series manager User Manual).

### **Starting the Create Pair Wizard**

The wizard guides you through the steps for making GDR pairs. The wizard is flexible. You can either choose from previously existing volumes or create the necessary volumes. If no suitable volume exists, you must create one.

#### Note:

The following sections are written for both Synchronous and Asynchronous pairs. When something is specific to one type it is noted.

To open the GDR Pair wizard:

1. From the Quick Launch: GDR > Create Pair





The Create Pair wizard opens (Figure 2-7).

### **Configuring Primary Site Parameters**

### Note:

The steps for configuring Primary Site/Secondary are the same, the only difference being the focus on the site.

- 1. Select the pair's primary Site.
- 2. Select the pair's Cluster/i series.
- 3. Click Next.

mmary:		Welcome to the	Create Pair Wizard.	
Parameter Val	Value	This wizard ou	ides you through the creation of a GDR pair.	
		This area ag	The for one of the creation of a low gate	
		Select the pair/s p	primary site:	
		Site	Australia	~
		Select the pairs p	primary cluster/i series:	
	Cluster/iseries	i series1	$\checkmark$	
			< Back Next > Finish	Cancel

Figure 2-7. Select Primary Site & Cluster/i series

### **Configure Volumes**

If the i series has configured volumes, the wizard will automatically discover and display them. The wizard also displays available storage.

- 1. Do one of the following:
  - a. Select an existing volume (exposed or unexposed).
  - b. Select a storage device.
  - c. Create a new volume from existing storage and select it.
- 2. Click Next.

Summary:		Select/create the primary resource:
Parameter	Value	Percentered on Frind Lenouron
Primary site	Australia	Colort the primary volume from the list below.
Primary cluster	i series1	Select the philling volume nom the list below:
		Resource     Stor_1     Stor_2     Stor_3     Stor_1 [SAS]
		Create volume
		ny

Figure 2-8. Select Primary Volume

To create a new volume from existing storage and select it:

- **1.** Click Create Volume in Figure 2-8.
- 2. Select desired resource(s) and type of volume: **Mirror, Stripe or Concatenation**. Configure volume type parameters. Once volume has been created it appears on the right hand side of the window.
- 3. Select Volume.
- 4. Click Next.

Summary:		Create	and s	elect the pr	imary resourc	e.		
Parameter	Value				-			
Primary site	Australia							
Primary cluster	i series 1	* Mirror	<ul> <li>Stripe</li> </ul>	Concatenation				
		Availat	ale Stor	ane Devices			Unexposed Volumes	
		Alias	A	Subdisk	Total Space	Non		
		Sto	r_1 [S		34.18 GB	33.18		
		Stor	_1 [5	•••• Finance	168			
		Sto	or_2[		34.18 GB	v34.1		
		Sto	or_3[		34.18 GB	34.1		
						-		
							1	
		<				)>	1	
		Total 4 iten	ns					
		]						

Figure 2-9. Create New Volume

### **Configure Target Parameters**

If the i series has configured Targets, the wizard will automatically discover and display the previously configured target parameters.

Case 1: You selected an exposed Volume for your primary resource:

**1.** If you selected an exposed volume, Figure 2-10 appears.

Summary:		Create new target	and assign LUN for the primary resource.							
Parameter	Value	cicaco non cargoo (	······································							
Primary site	Australia	The primary resour	he primary resource will be exposed.							
Primary cluster	i series1									
Primary volume	FinanceHQ [1GB]	Primary volume target parameters:								
		Target alias:	financehq.1							
		Target name:	a financehq.1							
		LUN:	0 I							
		Exposed on i series:	₿ 172.20.62.1							
		New target								
			< Back Next > Finish	Cancel						

### Figure 2-10. Select Target

2. Click **Next** and skip to Configure Pair Type.

Case 2: You selected an unexposed Volume for your primary resource:

- 1. If no Target exists, the Create New Target window appears. Create a target and configure desired parameters.
- 2. Once a target exists, the wizard displays the available target parameters: **Target** alias, **Target name** and **LUN.** Select desired parameters or click **New Target** to create another target.
- 3. Click Next.

### **Configure Pair Type**

- 1. Select pair type **Synchronous/Asynchronous**.
- 2. Click Next.

Summan/					
Parameter	Value	Select the	pair type.		
Primary site	Australia				
Primary cluster	i series 1	Pair type:	Asynchronous		
Primary volume	FinanceHQ (1 GB)		Synchronous		
Primary I LIN	financeha 1 I U				
Primary Low	financeng.1, Lo				
				< Back Next > Einish	<u>C</u> ancel

Figure 2-11. Select Pair Type
### **Configure Initial Synchronization Policy and Consistency Group Parameters**

1. Select the Initial Sync. Policy:

**None:** The Primary Volume has just been created and there is no data on it to synchronize with the secondary.

Online: For previously existing Primary Volume containing data.

#### Note:

In the case of insufficient bandwidth see Using Online Init Sync with Low Bandwidth Lines.

Offline: To copy data on external media.

#### Note:

Offline is available only for Asynchronous pairs.

2. Configure Consistency Group parameters: Note: CG parameters are available only for Asynchronous pairs.

Use existing: Select an existing Consistency Group name

**New:** Fill in name for new group

None: For stand-alone asynchronous pairs

3. Click Next.

summary:		Select the Initial S	ync. type and policy.	
Parameter	Value		a	
Primary site	Australia			
Primary cluster	i series 1	Set volume pair paramete	ers:	
Primary volume	FinanceHQ [1 GB]			
Pairtype	Asynchronous	Initial sync. policy	Online	
Primary LUN	financehq.1,LU			
Primary target	financehq.1			
		<ul> <li>Use existing</li> <li>New</li> </ul>	cg2	
		None		

Figure 2-12. Init. Sync Policy and Consistency Group Parameters

## **Replication Policy**

### Note:

This section is relevant only for Asynchronous Pairs.

- **1.** Set the replication policy parameters.
- 2. Click Next.

Bummary:		Configure the r	enlication policy
Parameter	Value	contrigure ene r	children borrel.
Primary site	Australia		
Primary cluster	i series 1	Set the replication	policy for the consistency group:
Primary volume	FinanceHQ [1GB]	n h u h	
Pairtype	Asynchronous	Replication policy	
Primary LUN	financehq.1,LU		Deviedia
Primary target	financehq.1	Method	
New CG name	cg2	Run every	1 Hour(s)
Initial sync. policy	Online		Day(s)
			Date: 17 DEC 2008 Time: 10: 30: 38
		Advanced	< Back Next > Finish Cancel

Figure 2-13. Replication Parameters

### **Transfer Policy**

#### Note:

This section is relevant only for Asynchronous Pairs.

#### Note:

The transfer policy will be the same as that chosen for replication unless otherwise configured.

To set transfer policy parameters that are different from those selected for replication:

- 1. In Figure 2-13, Start at parameters, check the Date box
- 2. Click Advanced...

The Transfer Policy Parameters window appears (Figure 2-14).

- 3. Set the transfer policy parameters.
- 4. Click Next.

Bummary:		Configure the t	ransfer policy.
Parameter	Value		Ferra.
Primary site	Australia		
Primary cluster	i series1	Set the transfer po	licy for the consistency group:
Primary volume	FinanceHQ[1GB]		
Pairtype	Asynchronous	Transfer policy	
Primary LUN	financehq.1,LU		Deviatio
<sup>o</sup> rimary target	financehq.1	Method	Periodic
New CG name	cg2	Run everv	1 Hour(s)
nitial sync. policy	Online		
Transfer start at	Immediate		
Transfer run every	1 Hour(s)		
Fransfer method	Periodic	Start at:	Immediate
Replication start at	Immediate		
Replication run every	1 Hour(s)		
Replication method	Periodic		Time: 10 🔽: 31 🔽: 05 🔽
			L <sub>2</sub>
			< <u>Back</u> Next > Finish

Figure 2-14. Transfer Policy Parameters

### **Configuring Secondary Site Parameters**

### Note:

The steps for configuring the secondary site parameters are identical to those detailed in Configuring Primary Site Parameters.

### **Journal Parameters**

#### Note:

This section is relevant only for Asynchronous Pairs. If you are configuring a Synchronous pair, skip to Review GDR Pair Summary.

#### Note:

There is only one Journal per i series. If a journal was already defined, the screens in this section will not appear. Skip to the next section: Snapshot Volume.

### **Creating Primary Journal Volumes**

If no journal volume exists the following screen appears.

1. Click Next.

ummary:			
Parameter	Value		Click Next to create journals for the select
rimary site	Australia		
rimary cluster	i series 1	l	
rimary volume	FinanceHQ [1GB]		
airtype	Asynchronous		
rimary LUN	financehq.1,LU	l	
rimary target	financehq.1		
lew CG name	cg2		
nitial sync. policy	Online		
ransfer start at	Immediate		
ransfer run every	1 Hour(s)		
ransfer method	Periodic		
eplication start at	Immediate		
eplication run every	1 Hour(s)		
eplication method	Periodic		
ransfer start at	Immediate		
ransfer run every	1 Hour(s)		
ransfer method	Periodic		
econdary site	Europe		
econdary cluster	eur i series 2		
econdary volume	financehq.sec [		
econdary LUN	financehq.1.re		
econdary target	financehq.1.rem		
		1	

Figure 2-15. Create Journal Volume

- 2. Select storage resource for journal volume or create volume for new resource.
- 3. Click Next.

sanninarj.		Primary side journal volume:
Parameter	Value	Select a resource from the list below.
Primary site	Australia	
Primary cluster	i series 1	Select a storage resource for the journal from the list below:
Primary volume	FinanceHQ [1GB]	
Pairtype	Asynchronous	Resource 🦰 🚽 🛹 journal [20 GB]
Primary LUN	financehq.1,LU	🗢 🖚 journal
Primary target	financehq.1	VED Stor_3
New CG name	cg2	[journal [20 GB]]
Initial sync. policy	Online	
Transfer start at	Immediate	
Transfer run every	1 Hour(s)	
Transfer method	Periodic	
Replication start at	Immediate	
Replication run every	1 Hour(s)	
Replication method	Periodic	
Transfer start at	Immediate	
Transfer run every	1 Hour(s)	
Transfer method	Periodic	
Secondary site	Europe	
Secondary cluster	eur i series 2	
Secondary volume	financehq.sec[	
Secondary LUN	financehq.1.re	
Seconderviteraet	financehq.1.rem	Create volume

Figure 2-16. Select Storage Resource for Journal Volume

To create new storage resource for journal volume

- 1. Click Create Volume in Figure 2-16.
- 2. Select desired resource(s) and type of volume: **Mirror, Stripe or Concatenation**. Configure volume type parameters. Once volume has been created it appears on the right hand side of the window.

Note:

Building a journal on top of a Mirror volume is not supported.

- 3. Select Volume.
- 4. Click Next.

Bummary:			Primary side i	iour	nal	volume:	
Parameter	Value		Configure the	jou	rnal	volume parameters.	
Primary site	Australia	^					
Primary cluster	i series 1		Select i series and	d en	ter ar	n alias for the journal:	
Primary volume	FinanceHQ[1					·	
Pairtype	Asynchronous						
Primary LUN	financehq.1,L						
Primary target	financehq.1		iseries		172.20	0.62.1	$\sim$
New CG name	cg2						
Initial sync. policy	Online		louro al aliac		iouro	ali	
Transfer start at	Immediate		Journal anas		le su li	<b>VII •</b>	
Transfer run every	1 Hour(s)						
Transfer method	Periodic		Threshold		80	40	
Replication start at	Immediate						
Replication run eve	. 1 Hour(s)						
Replication method	Periodic						
Transfer start at	Immediate						
Transfer run every	1 Hour(s)						
Transfer method	Periodic						
Secondary site	Europe						
Secondary cluster	eur i series 2						
Secondary volume	financehq.se						
Secondary LUN	financehq.1.r						
Secondary target	financehq.1.r						
Journal Child	journal [20 GB]	~					
						< Back Next > C Einish	Cancel

Figure 2-17. Create Storage Resource for Journal Volume

- 5. Enter the Journal alias.
- 6. Enter the Journal threshold. The default threshold is 80%.

#### Note:

When journal is filled with data exceeding its threshold, an alarm is displayed.

- 7. Click Next.
- 8. Review journal summary.
- 9. Click Next.

Summary:		Primary s	ide journal volume:		
Parameter	Value	Click A	ply' to create the journal vo	lume or 'Back' to re-	configure th
Primary site	Australia	journal v	olume parameters.		
Primary cluster	i series 1	n			
Primary volume	FinanceHQ[1				
Pairtype	Asynchronous				
Primary LUN	financehq.1,L				
Primary target	financehq.1				
New CG name	cg2				
Initial sync. policy	Online				
Transfer start at	Immediate		Create Journal Volume	uetalis summary:	
Transfer run every	1 Hour(s)		Site:	Australia	
Transfer method	Periodic		Cluster-	i seriest	
Replication start at	Immediate		Bacource.	journal pa GP1	
Replication run eve.	1 Hour(s)			journal (20 Ob)	
Replication method	Periodic		Journal allas:	Journali	
Transfer start at	Immediate		Active on i series:	172.20.62.1	
Transfer run every	1 Hour(s)		Threshold	80%	
Transfer method	Periodic				
Secondary site	Europe				
Secondary cluster	eur i series 2				
Secondary volume	financehq.se				
Secondary LUN	financehq.1.r				
Secondary target	financehq.1.r				
Journal Child	journal [20 GB]	~			

Figure 2-18. Summary of Journal Volume

### Creating Secondary Journal Volumes

#### Note:

The wizard will guide you through the creation of the secondary journal parameters. The steps are exactly the same as for Creating Primary Journal Volumes.

### **Snapshot Volume**

### Note:

This section is relevant only for Asynchronous Pairs. If you are configuring a Synchronous pair, skip to Review GDR Pair Summary.

- 1. If no snapshot volume exists, the following screen appears.
- 2. Click Next.

			Primary	side	snapshot vol	ume:		
Parameter	Value		There a	re no	suitable sna	pshot volume:	s. Cre	ate a resource for snapshot
Primary site	Australia	-	volume.					
Primary cluster	i series 1			889				
Primary volume	FinanceHQ[1		Mirror	Stripe	Concatenation			
Pairtype	Asynchronous							
Primary LUN	financehq.1,L		Availab	le Stor	age Devices			Unexposed Volumes
Primary target	financehq.1		Aliac		Subdick	Total Space	Non	v 🗳 journal1 [20 GB]
New CG name	cg2		Stor	1.[5	JUDUISK	34 18 GB	33.19	journal [20 GB]
Initial sync. policy	Online		Stor .	1 [545]	Y - FinanceH	1.GB	00/10	
Transfer start at	Immediate		Stor	2[5		34 18 GB	14 15	
Transfer run every	1 Hour(s)		Stor 1	2 [505]	iourpal [2	20.CB	14.10	
Transfer method	Periodic			2 [JMJ] 2 <b>3 [</b>	journai [2	34 18 CB	34.1	
Replication start at	Immediate			- <u> </u>		54.10 00	34.1	
Replication run eve	1 Hour(s)							
Replication method	Periodic							
Transfer start at	Immediate							
Transfer run every	1 Hour(s)							
Transfer method	Periodic	U						
Secondary site	Europe							
Secondary cluster	eur i series 2							
Secondary volume	financehq.se							
Secondary LUN	financehq.1.r		10				~~	
Seconderuteraet	financehq.1.r		Tetal				)/	
Secondary target		V	lotals item	5				

Figure 2-19. No Snaphot Volume

3. Click Next.

Bummary:			Primary side	snapshot vol	ume:		
Parameter	Value		There are no	suitable sna	pshot volume	s. Cre	ate a resource for snapshot
Primary site	Australia	^	volume.				
Primary cluster	i series 1						
Primary volume	FinanceHQ[1		Mirror Stripe	Concatenation			
Pairtype	Asynchronous						
Primary LUN	financehq.1,L		Available Stora	age Devices			Unexposed Volumes
Primary target	financehq.1		Aliac A	Subdick	Total Space	Non	🗸 🛹 financehq.1.snap [1 GB] 💦 💦
New CG name	cg2		Stor 1 IS		34 18 GB	32.19	y 🖉 journal1 [20 GB]
Initial sync. policy	Online		Stor 1 [SAS]		1 GB		journal [20 GB]
Transfer start at	Immediate		Stor_1[545]	v	1 GB		1
Transfer run every	1 Hour(s)		Stor 215		34 18 GB	14 15	1
Transfer method	Periodic		Stor 2[SAS]		20.6B		
Replication start at	Immediate		Stor 3[		34 18 GB	34.1	
Replication run eve	. 1 Hour(s)		- and provide fun		54110 00	511	
Replication method	Periodic						
Transfer start at	Immediate						
Transfer run every	1 Hour(s)						
Transfer method	Periodic	U					1
Secondary site	Europe						
Secondary cluster	eur i series 2						1
Secondary volume	financehq.se						
Secondary LUN	financehq.1.r		16			72	1
Secondarytarget	financehq.1.r		Total (items				
Journal Child	journal [20 GB]	~	Total interns				

Figure 2-20. Snaphot Volume for Primary Site

- 4. Create and select a snapshot volume for the secondary site.
- 5. Set snapshot alias and threshold.

Bummary:			Primary resource spanshot volume:
Parameter	Value		Configure the snapshot volume parameters.
Primary site	Australia	^	
Primary cluster	i series1		Enter the snapshot alias and threshold:
Primary volume	FinanceHQ[1		
Pairtype	Asynchronous		
Primary LUN	financehq.1,L		
Primary target	financehq.1		Volume alias: [FinanceHQ_1
New CG name	cg2		
Initial sync. policy	Online		Load threshold. 80 %
Transfer start at	Immediate		
Transfer run every	1 Hour(s)		
Transfer method	Periodic		
Replication start at	Immediate		
Replication run eve	. 1 Hour(s)		
Replication method	Periodic		
Transfer start at	Immediate		
Transfer run every	1 Hour(s)		
Transfer method	Periodic	U	
Secondary site	Europe		
Secondary cluster	eur i series 2		
Secondary volume	financehq.se		
Secondary LUN	financehq.1.r		
Secondary target	financehq.1.r	U	
Journal Child	journal [20 GB]	~	
			< <u>Back</u> <u>N</u> ext > <u>Finish</u> <u>Cancel</u>

### Figure 2-21. Snapshot Parameters – Primary Site

The following screen appears asking if you want to create snapshot on the secondary site.

6. Click Yes (recommended for faster recovery time).

Summary:			Primary resource snapshot volume:
Parameter	Value		Configure the snapshot volume parameters.
Primary site	Australia	^	
Primary cluster	i series1	Π	Enter the snapshot alias and threshold:
Primary volume	FinanceHQ[1		
Pairtype	Asynchronous		
Primary LUN	financehq.1,L		
Primary target	financehq.1		Volume alias: [phinanceHQ_1
New CG name	cg2		
Initial sync. policy	Online		Load threshold.
Transfer start at	Immediate		
Transfer run every	1 Hour(s)		
Transfer method	Periodic		
Replication start at	Immediate		
Replication run eve	. 1 Hour(s)		
Replication method	Periodic		
Transfer start at	Immediate		
Transfer run every	1 Hour(s)		
Transfer method	Periodic	U	
Secondary site	Europe		
Secondary cluster	eur i series 2		
Secondary volume	financehq.se		
Secondary LUN	financehq.1.r		
Secondary target	financehq.1.r		
Journal Child	journal [20 GB]	~	
			< <u>Back</u> <u>N</u> ext > <u>Finish</u> <u>Cancel</u>

sammary.			
Parameter	Value		Do you wish to create a secondary snapshot now: The remote site will use the secondary
Primary site	Australia	^	snapshot during fallback. If you choose not to create a secondary snapshot now, you can
Primary cluster	i series 1		do so during fallback operation.
Primary volume	FinanceHQ[1		Click Yes to create a secondary snapshot.
Pairtype	Asynchronous		
Primary LUN	financehq.1,L		
Primary target	financehq.1		
New CG name	cg2		
Initial sync. policy	Online		
Transfer start at	Immediate		
Transfer run every	1 Hour(s)		
Transfer method	Periodic		
Replication start at	Immediate		
Replication run eve	1 Hour(s)		
Replication method	Periodic		
Transfer start at	Immediate		
Transfer run every	1 Hour(s)	U	
Transfer method	Periodic		
Secondary site	Europe		
Secondary cluster	eur i series 2		
Secondary volume	financehq.se		
Secondary LUN	financehq.1.r		
Secondary target	financehq.1.r		
	iournal (20 GB)	~	

Figure 2-22. Create Snapshot

7. Click Next.

Summary:			Secondary s	ide snanshot v	nlume:		
Parameter	Value		There are n	o suitable sna	pshot volume	s. Cre	ate a resource for snapshot
Primary site	Australia	^	volume.				
Primary cluster	i series1	Π					
Primary volume	FinanceHQ[1		Mirror Stripe	e Concatenation			
Pairtype	Asynchronous						
Primary LUN	financehq.1,L		Available Sto	orage Devices			Unexposed Volumes
Primary target	financehq.1		Aliac A	Subdick	Total Space	Non	🗸 🥪 financehq.1.sec.snap [1 GB] 📐
New CG name	cg2		Stor 1 [S		34 18 GB	32.19	🗸 🏒 journalrem [10 GB]
Initial sync. policy	Online		Stor 1 [SAS	il v 🛹 financeh	1 GB	52.10	journal.sec [10 GB]
Transfer start at	Immediate		Stor 1 [SAS	financeh	1 GB		
Transfer run every	1 Hour(s)		Stor_2[5.		34.18.CB	24.19	
Transfer method	Periodic		Stor_2[5.	il v 🖛 journal c	10 CP	24.10	
Replication start at	Immediate		Etor 2	journai.s	24 19 CP	24.1	
Replication run eve	. 1 Hour(s)			•	34.10 GD	34.1	
Replication method	Periodic						
Transfer start at	Immediate						
Transfer run every	1 Hour(s)	U					
Transfer method	Periodic						
Secondary site	Europe						
Secondary cluster	eur i series 2						
Secondary volume	financehq.se						
Secondary LUN	financehq.1.r		7.6			~	
Secondary target	financehq.1.r		Tradiciona			)/	
Journal Child	journal [20 GB]	~	liotal i items				
					(	< <u>B</u> acl	k <u>N</u> ext > Einish <u>C</u> anc

Figure 2-23. Snaphot Volume for Secondary Site

8. Set snapshot Volume alias and Load threshold.

Value ralia es1 iceHQ[1 ichronous cehq.1,L cehq.1	Enter the snapshot alia	as and threshold:
ralia	Enter the snapshot alia	as and threshold:
es1 iceHQ[1 ichronous cehq.1,L cehq.1	Enter the snapshot alia	as and threshold:
iceHQ[1 ichronous cehq.1,L cehq.1		
ichronous cehq.1, L cehq.1		
cehq.1,L cehq.1		
cehq.1		
	Volume alias:	pfinancehq.sec_1
e	Load threshold.	80 %
diate	Load theshold:	
ır(s)		
dic		
diate		
ır(s)		
dic		
diate		
ır(s)		
dic		
oe 👘		
series 2		
cehq.se		
cehq.1.r		
cehq.1.r		
al [20 GB] 🛛 🗹		
	- diate r(s) dic diate r(s) dic diate r(s) dic diate r(s) dic diate chan chan chan chan chan chan chan diate diate diate diate chan diate diata	Load threshold: diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic diate tr(s) dic tr(s) di

Figure 2-24. Snapshot Parameters – Secondary Site

### **Review GDR Pair Summary**

- 1. Review parameters.
- 2. Click **Apply** to apply the GDR pair configurations.

Summary:		Click 'Appl	v' to creat	e the GDR p	air.	
Parameter	Value			-		
Primary site	Australia 🛛	Asynchronou	is pair details s	summary:		
Primary cluster	i series 1	Primary			Secondary	
Primary volume	FinanceHQ[1	Site:	Australia		Site:	Europe
Pairtype	Asynchronous	Cluster/i s	eries: i series1		Cluster/i seri	es: eur i seriesz
Primary LUN	financehq.1,L	Volume:	Financel	HQ	Volume:	financehq.sec
Primary target	financehq.1	Journal:	journalı		Journal:	journalrem
New CG name	cg2	Target:	financeh	q.1	Target:	financehq.1.rem
Initial sync. policy	Online	LUN:	financeh	q.1, LUN-0	LUN:	financehq.1.rem, LUN-o
Transfer start at	Immediate	Snapshot:	SFinance	eHQ_1	Snapshot:	Sfinancehq.sec_1
Transfer run every	1 Hour(s)					
Transfer method	Periodic	Initial sync	nolicy. Onlin	•		
Replication start at	Immediate	Openaiotono		6		
Replication run eve.	1 Hour(s)	Consistent	y group: cgz			
Replication method	Periodic	-Replication p	olicy:			
Transfer start at	Immediate	Method:	Periodic	Start at:	Immediate F	Run every: 1 Hour(s)
Transfer run every	1 Hour(s)	Transfer poli	cv:			
Transfer method	Periodic		<i>,</i>			
Secondary site	Europe	Method:	Periodic	Start at:	Immediate F	Run every: 1 Hour(s)
Secondary cluster	eur i series 2					
Secondary volume	financehq.se	Merge policy				
Secondary LUN	financehq.1.r	Method:	Only curren	t		
Secondary target	financehq.1.r					
	iourpel ton CB1					

### Figure 2-25. Summary

- 3. Click Yes if you want to create another Disaster Recovery pair.
- 4. Click **No** if you are done.

mmary:		Would you like to greate another (DD wain?	
Parameter	Value	would you like to create another GDR pair?	
		6	Yes No

Figure 2-26. Create Another GDR Pair

### Note:

After creating all your pairs or if you have made other substantial changes to the configuration, NEXSAN recommends saving the database. For details, see Saving StorgePro Database.

# **Replicating Data**

Once you have configured your GDR setup (or after having recovered a site), you can start the initial synchronization of any volumes (already containing data) that you want to replicate to the secondary site. Start initial synchronization and replication for the pair, consistency group and site levels.

- 1. Select the entity level for replication: pair, consistency group or site.
- 2. From the Quick Launch: GDR > Start Replication



Figure 2-27. Start Replication

The GDR Replication Window appears (Figure 2-28).

3. Select the Consistency Group or the Pair for replication and click **OK**.

8	GDR Replication
e	- 🔲 💠 Australia
	i cg2
	OK Cancel

### Figure 2-28. Selecting Pair or CG for Replication

Initial synchronization and replication begins. You can view the progress of the initial synchronization replication.

4. From the Quick Launch: GDR > Monitor GDR



Figure 2-29. Monitor GDR Quick Launch

716	0		Secondary site	Secondary volume	Mode	Initial sync.	Consistency group	State	Pending PITs	Last Successful Replicatio
	Australia	FinanceH	Europe	Tinancenq.s	Normal	0%	e asa cgz	OK	N/A	N/A
: (										)
	-1.1.h									
σta	ai Iitems									
				*********************						
_										
D	air detaile									
-	an uctans									
	Primary site	Primary volume	Secondary site	Secondary volume	Mode	Initial sync.	Consistency group	State	Pending PITs	Last Successful Replicatio
								<u> </u>		
	Australia	🗸 🛹 EinenceH	Furone	🗸 🛹 financaha s	Normal I	100.06		1 14	IO FO MIEL	17 Dec 2009 19, 19, 11



Your GDR solution is now configured and all preliminary data to be replicated is replicating.

In the case of site fallback, after Initial sync has completed (indicated as 100% see Figure 2-30), you can deactivate applications on the secondary site and fallback the secondary site back to the primary site. Once all write operations are stopped and all caches are flushed, PITs are taken of all GDR volumes and replicated to the primary site. When all PITs have been transferred you can switch back to the primary site.

# **Offline Initial Sync**

When Offline is chosen for the type of Init Sync, a snapshot of the primary volume is created. This snapshot volume is copied to an external disk/tape. This separate tape/disk must be physically transferred to the secondary site. After being physically transferred, the data is copied to the secondary volume.

To copy data to external media and copy it to remote site:

- 1. Create a GDR pair in primary and secondary sites with policy Offline Sync.
- 2. Start replication.
- **3.** Expose primary snapshot to host. The host is the backup server that the external tape/media is connected to.
- 4. Copy snapshot to tape/disk. Use "disk image" to copy all block to the tape/disk.
- 5. Define the Journal on secondary site before starting replication.
- 6. Start replication. All changes are replicated to the remote site journal waiting to be merged once the storage arrives.
- 7. Physically move the tape/disk to the secondary host.
- 8. Expose the secondary volume to the secondary host.
- 9. Copy contents of tape/disk to secondary volume.
- **10.** Merge the changes from the journal. From the pair view window, select the pair, right click and select **Init. Sync > End**.

## **Using Online Init Sync with Low Bandwidth Lines**

This section describes the needed actions while performing Online Initial Sync to a secondary i series connected to the same LAN as the primary i series in case of low bandwidth.

To perform Online Initial Sync when there is low bandwidth:

- 1. Connect the secondary i series locally to the LAN.
- 2. Using the Create Pair Wizard, configure all pairs with Init Sync Type=Online.
- 3. After all pairs have been created, start replication.

#### Do the following once Initial Sync has finished:

- 1. Shut down and disconnect the locally attached i series.
- 2. Physically move the i series to the remote site and connect it to the LAN. Turn on the power for the storage and the i series.
- Configure the MGNT port on the remote i series via the serial port or telnet to its new.
- 4. If you are using a cluster in the secondary site you must remove the old neighbor on both i series and define a new neighbor (with the new subnet) on both i series. Do this via the serial port using the CLI command: neighbor>remove -nb name
- 5. Using the i series manage GUI, delete the old portal and delete the portal IP on the remote i series.
- 6. Add the new IP and the portal for the remote site on the remote i series.
- 7. On the remote i series, configure the routing to the local site.
- 8. On the local i series, configure the routing to the remote site.
- 9. On the local i series, delete the old remote portal for the remote targets.
- **10.** On the local i series, configure the new remote portal for the remote targets.

For more information on deleting portal see <u>Portals in Chapter 3. i series manager</u> <u>GUI User Manual.</u>

For more information on how to add an IP Address see <u>IP Address in Chapter 3. i</u> series manager GUI User Manual.

For more information on how to add an IP Address see <u>IP Routing in Chapter 3. i</u> series manager GUI User Manual.

# Saving StorgePro Database

NEXSAN recommends saving the database after making substantial changes to your configuration. In the event that the system crashes, you can import the i series manage database. NEXSAN recommends that you save the database on the secondary site.

To export the database to a file:

1. From the File menu select Export...





The Export window appears.

🕒 My Doc	cuments		3 🕼 💼	
🛅 caps				
My Music				
My Pictur	es ne			
Can Screenca,	54			
Save As: 🖸	\Documents and Settings\yuvaly\My Docume	ints		
	osconfia.zin			
Format: nn	nocoringrap			
Forma <u>t</u> : nr				

Figure 2-32. Select Location

- 2. Select location for the file spconfig.zip. NEXSAN recommends keeping this file in an external safe place (e.g. removable disk). If the local site goes down, you need to be able to access this file.
- 3. Click OK.
- To import the saved database:
- 1. From the File menu select Import...
- **2.** Select the file spconfig.zip.
- 3. Click OK.

The file will be imported.

# **Chapter 3**

# **Planned Failover & Fallback**

Planned Failover can be used when a site must go down for local maintenance or a limited period of time. Planned Failover minimizes service interruption time during site migration or full site maintenance.

For Asynchronous pairs, the unique feature of a planned failover is its ability to continue to keep a journal of data changes, eliminating the need for an initial data resynchronization after planned failback. A planned failover should only be for a limited period of time.

#### Note:

Since the journal volume is not being replicated to the remote site, it can be fully utilized quickly depending on volume activity. Therefore, attention should be paid to the journal volume to make sure that it is not reaching its load threshold. A journal volume can be resized if necessary

Upon reaching the journal load threshold, an alarm will be triggered notifying the administrator to consider a journal resizing.

### **Planned Failover Wizard**

#### Notes:

- Before starting the wizard, close open applications to prevent further write operations to exposed volumes.
- Make sure to flush the File System and Application cache at the local site (as an example this can be done by closing the iSCSI initiator session).

To open the Planned Failover wizard:

- 1. Select the site to failover.
- 2. Right click and select Planned Failover...



Figure 3-1. Planned Failover

- 3. The Planned Failover wizard opens.
- 4. Click Next.

nmary:		
Parameter	Value	Welcome to the planned failover wizard.
		This wizard will guide you through your local site/s planned failover.
		Close all applications now to prepare for planned failover.
		< Back (Next >) Einish (Cancel

Figure 3-2. Planned Failover Wizard

### **Failover Pairs**

- 1. Select the consistency groups or stand-alone pairs to failover.
- 2. Click Next.

nary:						
Parameter	Value	Select the items	s you wish to failover:			
		tems				
		Alias	Primary site	Secondary site	Replication method	
		- 🗮 cg2	- 🕂 Australia	- + Europe	Periodic	
				1010101010		
		Details				
			Primary volume	Secondary volume		
		🗸 🛹 FinanceHG	[1 GB]	🗸 🛹 financehq.se	c[1GB]	
				< Back Nex	t>) Finish	

Figure 3-3. Failover Pair(s) Selection

### **Access Rights**

Define access rights for host following the volume(s) failover to the secondary site. The default ACL is R/W, enabling full access privileges to the failover volumes on the secondary site.

1. Click Next.

Bummary:		
Parameter	Value	Each pair or consistency group remote target must have access permission for
Parameter Selected policies	Value Cg2	Each pair or consistency group remote target must have access permission for authorized host groups. Click Next to configure the remote target ACLs.
		< <u>Back</u> <u>Next</u> > <u>Einish</u> <u>Cancel</u>

Figure 3-4. Access Control Privileges

2. Click Next to use default values for access privileges.

Or

Change default access privileges for the volume that failed over to the secondary site by clicking **Edit ACL...** and define parameters. When finished, click **Next**. For more information, refer to the i series manager *User Manual*.

Value cg2 financehq.1.rem	Target alias: financehq.1.rem The following ACL will be act Authorized host groups Alias	ve for target financehq1.rem in t Description	he remote site after the failover
cg2 financehq.1.rem	The following ACL will be act Authorized host groups Alias	ve for target financehq.1.rem in t Description	he remote site after the failover
	Alias	Description	Access
	Edit ACL		
	Primary volume 🔺	Secondary volume	Consistency group
		Target pairs         Primary volume         FinanceHQ [1 GB]	Primary volume       Secondary volume <ul> <li>FinanceHQ [1 GB]</li> <li>financehq.sec [1 GB]</li> </ul>

Figure 3-5. Access Control Configuration

3. Click Next.

Figure 3-6. Failover Summary

### **Start Failover**

• Click **Finish** to begin failover.



Figure 3-7. Failover Started



Figure 3-8. Failover Completed

### **Fallback Wizard**

After a planned failover, use the Fallback wizard to fallback volumes from the remote site to the local site.

To open the Fallback Wizard:

- 1. Select the remote site.
- 2. Right click and select Fallback...



Figure 3-9. Fallback

- 3. The Fallback wizard opens.
- 4. Click Next.

Summary:		
Parameter	Value	Welcome to the fallback wizard.
Site	Europe	
		This common will avoid a constitution of a second state of the second
		i nis wizard will guide you through your local site/s failback.
		close an applications now to prepare ion landack.
		< Rack Next > Finish Cancel

Figure 3-10. Fallback Wizard
## **Fallback Pairs**

- 1. Select the consistency groups or stand-alone pairs to fallback.
- 2. Click Next.

ummary:					
Parameter	Value	Select the iter	ns you wish to fallbac	k:	
Site	USA		•		
		Items			
		Alias	Primary site	Secondary site	Replication method
		CG2	+ Europe	! 🕂 USA	Periodic
		Details		1010101010	
				141414141414	
		Detans	Duine and the large		Concerdant inclusion
		Figure 1	Primary Volume	N Configure	secondary volume
				< Back	Next > Finish

Figure 3-11. Fallback Pair(s) Selection

## **Access Rights**

Define access rights for the associated hosts after the volume(s) fallback to the secondary site. The default ACL is R/W, enabling full access privileges to the failover volumes on the secondary site.

1. Click Next.

Summary:					
Parameter	Value	Select the item:	s you wish to fallback:		
Site	Europe				
		llems			
		Alias	Primary site	Secondary site	Replication method
		- 🖁 🚆 cg 2	-+ Australia	- + Europe	Periodic
		Details		tututututu	
			Primary volume	Se	econdary volume
		V 🛹 FinanceHG	(1GB)	🗸 🥓 financehq.se	c[1GB]

Figure 3-12. Access Control Privileges

2. Click Next to use default values for access privileges.

Or

Change default access privileges for the volume that failed over to the secondary site by clicking **Edit ACL**... and define desired parameters. For more information, refer to the i series manager *User Manual*.

Parameter       Value         Site       Europe         Selected policies       cg2         Total selected targets       financehq.1         Allas       Description         Access         Edit ACL         Edit ACL         Primary volume       Secondary volume         Consistency group	Summary:		Torget	olico finoncoha :		
Site       Europe         Selected policies       cg2         Total selected targets       financehq.1         Authorized host groups         Edit ACL         Target pairs         Primary volume       Secondary volume         Consistency group	Parameter	Value	rarget	anas: infanceny.1		
Selected policies cg2 Total selected targets financehq.1 Authorized host groups Edit ACL Edit ACL Target pairs Primary volume Secondary volume Consistency group	Site	Europe	The	following ACL will be act	tive for target financehg.1 in the r	emote site after the failover:
Total selected targets financehq.1       Alias       Description       Access         Edit ACL       Target pairs       Primary volume       Secondary volume       Consistency group	Selected policies	cg2	Aut	horized host aroups		
Edit ACL  Target pairs  Primary volume Secondary volume Consistency group	Total selected targets	financehq.1		Al:	Description	A
Primary volume Secondary volume Consistency group			Edit	: ACL		
				Drimaru uoluma	Secondaru uolume	Consistency group
< Back Next > Einish					< <u>B</u> ack	lext > Einish Ca

Figure 3-13. Access Control Configuration – Part I

3. Click Next.

Summary:		Target alias: financehg.1		
Parameter	Value			
Sile	Europe	Attach/detach ACL host groups	to be active for target financeho	.1 in the remote site after the
Selected policies	cgz	failover:		
l otal selected targets	financenq.1			
		Attach Detach Move Up Mo	ove Down	
		Alias	Description	Access
		Available Host Groups		Description

Figure 3-14. Access Control Configuration – Part II

### **Start Fallback**

• Click **Finish** to begin fallback.

ournmary:		
Parameter	Value	
Site	Europe	
Selected policies	cg2	
Total selected targets	financehq.1	
		The system will start fallback process now.

Figure 3-15. Fallback Summary



Figure 3-16. Fallback Started





# Chapter 4

# Disaster Failover, Recovery & Fallback

Disaster (Unplanned) Failover refers to the case when a primary site was lost suddenly and there is no way to access it using i series manager. Disaster failover is manually implemented after a site has gone offline. Volume and pair constructions at the local site may or may not still be intact. If the volume and pair constructions at the local site have been lost during the disaster, a recover operation must be performed before the site can fallback.

#### Note:

In order to access data in the secondary site, you must perform a Disaster Failover.

## **Disaster Failover Wizard**

To open the Disaster Failover wizard:

- 1. Open Unplanned (Disaster) Wizard from secondary (remote) site.
- 2. Right click and select Disaster Failover...



Figure 4-1. Unplanned Failover

The Disaster Failover wizard opens.

## **Failover Pairs**

- 1. Select the consistency groups or stand-alone pairs to failover.
- 2. Click Next.

		Welcome to the	disaster failover	wizard. This wiza	d will guide you throw
Parameter	Value	your local site	e's disaster failo	ver.	a mini yana jer once
		Select the items	; you wish to configure:		
		ttems			
		Alias	Primary site	Secondary site	Replication method
		• 🖁 🛗 cg2	- + Australia	+ Europe	Periodic
				*******	
		Details			
			Primary volume	S	econdary volume
			11(70)	🕐 🥣 🖉 III al iceriu. St	SC[IGD]
			()		
		- FinanceHQ			
		- FinanceHQ			

Figure 4-2. Failover Pair(s) Selection

## **Access Rights**

Define access rights for host after the volume(s) failover to secondary site. By defaults, everyone has full access privileges to the failover volumes on the secondary site.

• Click Next.

Bummary:		
Parameter	Value	Each pair or consistency group remote target must have access permission for
Selected policies	cg2	Each pair or consistency group remote target must have access permission for authorized host groups. Click Next to configure the remote target ACLs.
		< <u>Back</u> <u>Next</u> > <u>Einish</u> <u>Cancel</u>

Figure 4-3. Access Control Privileges

 Click Next to use default values for access privileges. Or

Change default access privileges for the volume that failed over to the secondary site by clicking **Edit ACL**... and define desired parameters. For more information, refer to the i series manager *User Manual*.

Summary:		Target alias:	financehq.1.rem		
Parameter	Value				
Selected policies Total selected targets	cg2 financehq.1.rem	The followi	ing ACL will be active I host groups	for target financehq.1.rem in	the remote site after the failover
		Edit ACL			
		larget pai	rs		
		Prin	nary volume 🗠	Secondary volume	Consistency group
				< Back	ext >) Einish Cance

Figure 4-4. Access Control Configuration – Part I

4. Click Next.

Bummary:	Value	Target alias: financeh	iq.1.rem	
Selected policies Total selected targets	cg2 financehq.1.rem	Attach/detach ACL hos the failover:	st groups to be active for target fina	ancehq.1.rem in the remote site after
		Authorized Host Gr	oups Description	Access
		Available Host Grou	ips	
		AI	lias	Description

Figure 4-5. Access Control Configuration – Part II

5. Click Next.

The system will start the disaster failover process now.

Figure 4-6. Disaster Failover Summary

## Start Disaster Failover

• Click **Finish** to begin disaster failover.



Figure 4-7. Disaster Failover Started



Figure 4-8. Disaster Failover Completed

## **Recovery after a Disaster**

After performing Disaster Failover, you must complete the following steps before your system will be restored.

#### Note:

Before starting recover wizard, do the following in i series manager:

- Add reconstruct site object.
- Add i series or i series Cluster to reconstruct site object.
- Configure IP and Portal for added i series.
- Define IP Routes.
- 1. Use the Recover Wizard to recover your local site.
- 2. Replicate (initial sync and replicate)
- 3. Perform Fallback

### **Recover Wizard**

To open the Recover wizard:

- 1. Select the site to recover from.
- 2. Right click and select Recover...



Figure 4-9. Open Recover Wizard

3. Click Next.

Summary:		Welcome to the	e recover wizard. This wizard will guide you through
Parameter	Value	recovering you	r local site, including rebuilding GDR pairs.
Recover from site	Europe	After completi fallback.	ng this wizard you will be able to perform a site
		Select a site from	n the list:
		Site Select a Storage	Australia
		Cluster/iseries	eur i series 1
			< Back Next > Finish Cancel

#### Figure 4-10. Recover Wizard

4. The wizard will guide you through the rest of the steps necessary to recover all of your pairs.

#### Note:

The steps to recover are identical to creating a new pair. However, ensure that the parameters are identical to those that you want to recover from.

- 5. After rebuilding the pair(s) a Review Summary appears.
- 6. Click Apply.

Summary:	
Parameter	Value
ecover from site	Europe
rimary LUN S/N	SR00081a:00000
imary LUN	0
rimary Target	financehq.1
Recover from volume	financehq.sec[
econdary Snapshot	Sfinancehq.se
Secondary Journal	journalrem[10G
ecovering cluster	eur i series 1
covering site	Australia
imary Volume	financehq.1.rec
rimary LUN	0
ournal Child	journal.rec [10
lournal Threshold	80
Journal Active on i s	172.20.62.1
Journal Alias	iournal.rec

Figure 4-11. Review Summary

7. Click Finish.

Summary:		The Recover Wizard ended successfully.
Parameter	Value	In record and a case baccopract.
Recover from site	Europe	
		( <u>Finish</u> ) ( <u>C</u> ancel

Figure 4-12. Recovery Ended Successfully

## Replication

After completing the Recover Wizard, you must start replication.

#### Note:

Before starting replication, make sure that the Init Sync Type for your pairs is suitable for your network. You can change the Init Sync Type from the **Pair Properties** dialog box.

#### To start replication:

- **1.** Select the remote site.
- 2. Right click and select Replicate >Start



Figure 4-13. Replicate Menu

## Fallback

After Replication, when all the pairs are synchronized, you can perform Fallback.

To open the Fallback Wizard:

• Follow the steps described in *Fallback Wizard*.

# **Chapter 5**

# **Monitoring & Maintenance**

Once you have begun creating GDR pairs and consistency groups, you may want to adjust or change certain parameters for more effective GDR management and utilization.

# **Journal Volumes**

You can change a journal volume's alias and threshold.

To configure journal properties:

1. From the Journals View pane, right click on the journal volume to modify and select **Properties.** 

A Mo	nitor
2	Current Alarms
2	Current Storage Events
	Session Statistics
	Mirror Syncs
<b>`</b>	Offline Copy
Õ	Snapshots
	Journals

Figure 5-1. Journals Quick Launch

			Jou	irnals		
Journals						
Alias	Site	Cluster	Active on	i series	Threshold	Utilization
🥒 🤌 j621 [1 GB]	Australia	Sidney	172.20.62.1		80%	0%
🥩 🏒 j622 [1 GB]	Europe	Rome	172.20.62.2	0.larm		0%
				Delet	e	
				Prope	erties	
				_		

Figure 5-2. Journals Properties Menu

The **Properties** dialog box opens (Figure 5-3).

- 2. Configure the Volume Alias and Threshold.
- 3. Click OK.

Alias:	j622	
Type:	Bournal	
Block Size:	B 512	
Actual Capacity:	a 1 GB	
Potential Capacity:	a 1 GB	
Volume State:	Internal	
Threshold:	80 %	
Percentage Utiliza	tion: 🕞 0 😽	
Active On i series:	172.20.62.2	
Current Activity:	active	

Figure 5-3. Journal Volume Properties

#### Note:

You can resize the size of a journal. For more information see <u>Resizing Volumes</u>. You can also add a mirror copy of the journal. For more information see <u>Online Copy</u>

# **Consistency Groups**

## **Changing/Displaying Consistency Group Properties**

You can view all details of a consistency group, including number of PITs waiting to be transferred and number of GDR pairs.

To view consistency group properties:

- 1. From the **Policies** pane, select the consistency group.
- 2. Right click and select Properties.

r olicies								
	Rep	olication policy	Tr	ansfer policy		Managarian	A	m D a in
Consistency group	method	run every	method	ru	un every	Merge policy	Activity	all 3
s 🖁 📲 og 1	Periodic	2 minutes	Periodic	2 minutes		Only current	ок	1
					Replicate	>		
					Planned F	ailover		
					Fallback			
					Disaster f	ailover		
					Show PIT	s		
					Alarms	>		

Figure 5-4. Consistency Group Properties Menu

>roup:	cg1	
rimarysite:	Australia	
econdary site:	Europe	
of pairs:	1	
nitial synchronization:	ок	
Froup state:	ок	
∂roup Mode:	Normal	
Replication		Transfer
Policy:	Periodic	Policy: BPeriodic
Period:	2 Minute(s)	Period: 2 Minute(s)
Starting replication at:	🔿 Immediate	Starting replication at: OImmediate
	Date: 01  JAN  2009	Date: 01 JAN - 2009
	Time: 17 💽: 07 💽: 13 🔽	Time: 17 💽: 07 💽: 13 💟
State:	Active	Merge
Not-yet replicated [#PITs]:	0	
Not-yet merged (#PITs);	0	Type:

Figure 5-5. Consistency Group Properties

## **Deleting a Consistency Group**

To delete a Consistency Group:

• Delete all the pair in the Consistency Group (see Deleting a GDR Pair).

After the last pair has been deleted the system will delet the Consistency group.

## **GDR Pairs**

You can change the Init. Sync. type for a GDR Pair. Additionally, you can view GDR pair details, including number of PITs waiting to be transferred and GDR pair state.

## **Changing/Displaying Pair Properties**

To change/display GDR Pair properties:

1. From the Pair Details pane, select the GDR pair.

P	Pair details										
	Primary site	Primary volume	Secondary site	Secondary volume	Mode	Initial sync.	Co	nsistency group	State	Pending PITs	Last Successful Re
•	Australia	🗢 💳 hq1 [1 GB]	Europe	👓 🛹 hq1.rem [1 GB]	Normal	100%	- 8	gi cgi	ок	0 (0 MB)	01 Jan 2009 17:13:13
						ſ		Replicate	>	1	
								Initial sync.	>		
								Planned Failover			
								Fallback			
								Disaster Failover			
								PIT Management	>		
								Alarms	>		
							x	Delete			
								Properties			

Figure 5-6. Pair Details Menu

2. Right click and select Properties.

The Properties dialog box opens.

**3.** If desired, change the Initial Synchronization Type.

Frindry		Secondary	
Site: Au	ustralia	Site: Europe	
Cluster: Sic	dney	Cluster: Rome	
Volume: Sy	nc1[1GB]	Volume: Synci.ren	n [1 GB]
State:	ок		
Mode:	Normal		
Initial synchroni	ization		
Туре:	Online		~
State:	🔒 İn Progi	ress	
Data transferre	ed: 🔒 3 %		
Replication			
State:	Active		
	Normal		

Figure 5-7. Synchronous Pair Properties

Primary		Secondary	
Site: Aust	tralia	Site:	Europe
Cluster:	ey i	Cluster:	Rome
Volume: hqi[	1 GB]	Volume:	hqi.rem[iGB]
Journal: 🔒 j621[	1 GB]	Journal:	<mark>∎</mark> j622 [1 GB]
Snapshot: Shqi	L_1[1GB]	Snapshot:	8
State:	ок		
Mode:	Normal		
Consistency group:	cg1		
Initial synchronizati	on		
Туре:	Online		
State:	ок		
Data transferred:	100 %		
Replication			
State:	2	Active	
Mode:	1	Vormal	
Not-yet replicated	(aPITs):	)	
	_		

Figure 5-8. Asynchronous Pair Properties

## **Start/Abort Replication**

Once replication has started, you can abort the replication of a GDR pair.

To abort replication:

• Select the GDR pair, right click and select **Replicate >Abort** 

Replication is aborted.

#### To start replication:

• Select the GDR pair, right click and select **Replicate > Start** 

Replication starts.

### **Initial Sync Operations**

You can start or stop the initial sync for a Sync pair (replication will continue). You cannot stop the initial sync of an Async pair (to stop initial sync for an Async pair, abort replication).

P	Pair details										
	Primary site	Primary volume	Secondary site	Secondary volume	Mode	Initial s	ync.	Consistency group	St	ate Pending PITs	Last Successful Replication
•	Australia	🗸 🥣 hq1 [1 GB]	Europe	🗸 🫹 hq1.rem [1 GB]	Normal	55%		📲 cg1	οк	1 (0 MB)	N/A
	Australia	🗢 💳 synci[i	Europe	🗢 👓 synci.rem [i	Normal	3 %			ок	0.00	
								Replicate	>		
								Initial sync.	>	Start	
								Planned Failover		Stop N	
								Fallback		End K	
								Disaster Failover	_[		
								Alarms	>		
							x	Delete			
								Properties			

Figure 5-9. Initial Sync Action

#### Note:

Initial Sync for an Async pair will stop if replication is aborted. Starting replication for this Async pair will restart the initial synchronization from the beginning and not from where it was stopped.

#### To end offline initial sync for an Async pair:

 From the Pair Details pane, select the GDR pair, right click and select Initial sync. >End

Monitoring & Maintenance GDR-0109-3600

## **Deleting a GDR Pair**

Before you can delete a GDR pair you must first abort the replication of the pair. See Start/Abort Replication.

To delete a GDR pair

- 1. From the **Pair Details** pane, select the GDR pair to delete.
- 2. Right click and select **Delete**.

Ρ	air details												
	Primary site	Primary volume	Secondary site	Secondary volume	Mode	Initial sync.	Cons	isten	cy group	State	Pendi	ng PITs	Last Successful Replic
••	Australia	🗸 🛹 hq1 [1 GB]	Europe	🗸 🫹 hqi.rem [iGB]	Normal	100%)	- 13	cg1		ок	o (o MB)	1	01 Jan 2009 22:35:13
	Australia	🕶 💳 sync1[1	Europe	🗢 💳 synci.rem[i	Normal	0%	-			ок			
									Replicate		>	1	
									Initial syr	ic.	->		
									Planned F	ailover			
									Fallback				
									Disaster I	ailover			
									Alarms		>		
								X	Delete		N		
									-				

Figure 5-10. Delete GDR Pair

# **PIT Statistics**

PITs: exist per Consistency Group as well as for individual pairs. You can monitor the Point-In Time created for the asynchronous replication process.

To view PIT status:

- 1. From the **GDR pane**, select the desired pair.
- 2. Right click and select PIT Management > Show Pits...

Ρ	Pair details											
	Primary site	Primary volume	Secondary site	Secondary volume	Mode	Initia	al sync.	Consistenc	y group	State	Pending PITs	Last Successful Replicatio
••	Australia	🗢 💳 hq1 [1 GB]	Europe	🗢 👓 hqi.rem [i GB]	Normal	100 %		🗢 🖥 🕄 ca1		ок	0 (0 MB)	01 Jan 2009 22:37:13
	Australia	🗸 🥏 synci [i	Europe	🗸 🧈 synci.rem [i	Normal	0%	Rep	licate	>	OK		
							Initi	al sync.	>			
							Plan	ned Failover				
							Fallt	back				
							Disa	ster Failover				
							PIT	Management	>	Show P	ITs	
							Alar	ms	>	Policy P	ITS V	
							🗙 Dele	te				
							Prop	erties				

#### Figure 5-11. PIT Management

The PITs table for GDR policy appears.

**3.** Select the desired pair. The PITS details are shown in the bottom part of the screen.

	t Refresh: Th	u Jan o	14:40:04 GMT 200	9	
Site	Date & Time	State	Transferred [MB]	Pending Transfer [MB]	Transfer Rate [MB/S]
Au	N/A	formi	0	0	N/A

Figure 5-12. PITs Table for GDR Policy

# Chapter 6

# Troubleshooting

i series manager identifies error conditions and generates alarms accordingly.

The alarms are viewable and can be sorted. The last ten unacknowledged alarms generated are displayed in the bottom pane of the i series manager GUI.

## **Alarm Operations**

i series manager supports alarm messages for real-time tracking and monitoring of both i series manager and i series configurations and activity. Alarms are timestamped according to the i series manager server date and time.

## **Configuring Email Alarm Notification**

You can send an email when an alarm is opened for off-site alarm monitoring. The administrator should configure the alarms which will trigger the Email notification using i series manager Alarms Notification Configuration list.

A user profile must be configured on the SMTP server for sending Email notifications received from i series manager. The profile must include a user name and password for authentication. The SMTP server parameters are:

- Mail Server: Name or IP address of SMTP server
- From Address: Address that Email appears to be sent from
- User Name: User authentication name
- Password: User authentication password

#### To configure the alarm notification list:

1. From the i series manager menu bar, select Alarm Notifications > Email Setup...



Figure 6-1. Alarms Menu

The Alarms Notification Configuration window opens.

- 2. Select each alarm for which you want to receive email notification.
- 3. Click OK.

☑
<b>√</b>

Figure 6-2. Selected Alarms for Email Notification

#### To configure the email address for alarm notification:

1. From the i series manager menu bar, select Alarms Notifications > E-mail Addresses...



Figure 6-3. Configure Menu

The Email Configuration dialog box opens.

- 2. Enter the name or IP address of the SMTP server.
- 3. Enter the email address for the outgoing email notification.
- 4. Enter the User Name and Password for user authentication.

General Destina	guration 🔀
Mail Server:	SMTP1
From Address:	iseries@nexsan.com
User Name:	nexsanmail
Password:	•••••
	OK Cancel



5. Toggle to the **Destination** tab and click **Add**...

The Add Address dialog box opens.

6. Enter the Email address to send alarm notifications to and click OK.

Email Configuration	
	Address Address Address: Susan@rome.it
Add Remove	Tancel

Figure 6-5. Email to Send Alarm Notification to

The Email notification format is shown in Figure 6-6.

StoragePro Server Alarm	<u>*</u>
Message: Cluster MedSchool - V-Switch sdc137. The Disk Stor_4 is missing. Opened at: Tue Feb 03 17:43:55 IST 2004	
ID: 0101 Type Storage is missing	

Figure 6-6. Alarm Email

#### Note:

*Email is sent only at the time when an alarm is generated. If an alarm entry already exists during the Email notification configuration, an Email notification will not be sent.* 

## **Viewing Specific Alarms**

Every alarm can be associated with a specific i series manager element, e.g. cluster, i series, disk, volume or target.

To view specific alarms:

Select the element.

• Right click and select Alarms > Specific.



Figure 6-7. Specific Alarms Selected
#### The Specific Alarms window opens.

VVed Dec 17 07: 49: VVed Dec 17 07: 49:
Wed Dec 17 07: 49:
)
)
)

Figure 6-8. Specific Alarms Window

From the Specific Alarms window, you can select an alarm and view its source and properties. You can also close an alarm. This will remove the closed alarm from the Current Alarms list and move it to the Closed Alarms list.

## **Viewing Propagated Alarms**

A propagated alarm is generated by a source which is a logical member of a selected element.

The Propagated Alarms window lists all the specific alarms of a selected element as well as all the selected element derived alarms.

There are two propagation hierarchies:

- Cluster > Target > LU > Volume > Subdisk > Disk
- Cluster > i series > Management Parameters and Configurations

#### To view propagated alarms:

• Select the element whose propagated alarms you want to view. Right click and select **Alarms > Propagated**.



Figure 6-9. Propagated Alarms Selected

The **Propagated Alarms** window opens with all propagated alarms for the element.

Severity	Name	Cluster	Source	Description	Oper
CRI	Volume n	Rome	🧼 more	i series 172.20.62.1. The Subdisk more1 is not functioning.	Wed Dec 17 07: 49
CRI	Volume n	Rome	🧼 more	i series 172.20.62.2. The Subdisk more1 is not functioning.	Wed Dec 17 07:49
CRI	Volume n	Rome	🛹 hr1[1	i series 172.20.62.1. The Subdisk hr1 is not functioning.	Wed Dec 1707: 49
CRI	Volume n	Rome	🛹 hr1[1	i series 172.20.62.2. The Subdisk hr1 is not functioning.	Wed Dec 1707: 49
CRI	Volume n	Rome	🍈 Xhri[	i series 172.20.62.1. The Cube Volume Xhr1 is not functioning.	Wed Dec 1707: 49
CRI	Volume n	Rome	🍈 Xhri[	i series 172.20.62.2. The Cube Volume Xhr1 is not functioning.	Wed Dec 1707:49
CRI	Storage is	Rome	📖 Stor	i series 172.20.62.1. The Disk Stor_2 is missing.	Wed Dec 1707:49
CRI	Storage is	Rome	🛄 Stor	iseries 172.20.62.2. The Disk Stor_2 is missing.	Wed Dec 1707: 49
CRI	Storage is	Rome	📖 Stor	iseries 172.20.62.1. The Disk Stor_3 is missing.	Wed Dec 1707:49
CRI	Storage is	Rome	📖 Stor	i series 172.20.62.2. The Disk Stor_3 is missing.	Wed Dec 1707:49
CRI	Volume n	Rome	🥏 stor	i series 172.20.62.1. The Subdisk stor_3 sd2 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.2. The Subdisk stor_3 sd2 is not functioning.	Wed Dec 1707: 49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.1. The Subdisk stor_2 sd2 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.2. The Subdisk stor_2 sd2 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.1. The Subdisk stor_3 sd1 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	🛹 stor	i series 172.20.62.2. The Subdisk stor_3 sd1 is not functioning.	Wed Dec 1707: 49
CRI	Volume n	Rome	mirror	i series 172.20.62.1. The Mirror Volume mirror 2 is not functioning.	Wed Dec 1707: 49
CPI	Volumo p	Pomo	mirror	i opriop 473-30 (1-2). The Mirror Volume mirror 3 is not functioning	10/00 Doo 1707 40

### Figure 6-10. Propagated Alarms Window

From the Propagated Alarms window, you can select an alarm in order to view its source and properties. You can also close an alarm. This deletes it from the Current Alarms list and moves it to the Closed Alarms list.

# **Viewing Alarms History**

You can view the list of all acknowledged (previous) alarms.

#### To view previous alarms:

 From the standard i series manager toolbar, click Alarms > History or click the History button

Alarms	
Session Statistics Image: History   Mirror Syncs Current Storage Events   Offline Copy Snapshots   Journals Image: History	2
	Alarms   Image: Current     Image: Session Statistics   Image: History     Image: Mirror Syncs   Image: Current Storage Events     Image: Offline Copy   Image: Current Storage Events     Image: Snapshots   Image: Current Storage Events     Image: Journals   Image: Current Storage Events     Image: Alarm Notifications   Image: Current Storage Events

Figure 6-11. Alarms Menu

The Alarms History window opens.

Severity	Name	Cluster	Source	Description	Opened At	
<mark>!</mark> MAJ	iSCSI Tar	Rome	iSCSI Rem	i series 172.20.62.1. The iSCSI Remote Target Xiqn.2001-05.com.equallogic:	Wed Dec 1707:22:	Wed
<mark>.</mark> MAJ	iSCSI Tar	Rome	iSCSI Rem	i series 172.20.62.2. The iSCSI Remote Target Xiqn.2001-05.com.equallogic:	Wed Dec 1707:22:	Wed
WRN	Link down	Rome	i series-null	i series 172.20.62.2. The FC Interface fc1 is down.	Tue Dec 16 15: 44:0	Wed
VVRN	Link down	Rome	i series-null	i series 172.20.62.2. The Ethernet Interface eth3 is down.	Tue Dec 16 15: 44:0	Wed
WRN	Link down	Rome	i series-null	i series 172.20.62.2. The Ethernet Interface eth2 is down.	Tue Dec 16 15: 44:0	Wed
. MAJ	iSCSI Tar	Rome	iSCSI Rem	i series 172.20.62.1. The iSCSI Remote Target Xiqn.2001-05.com.equallogic:	Tue Dec 16 15: 44:0	Wed
MAJ	iSCSI Tar	Rome	iSCSI Rem	i series 172.20.62.2. The iSCSI Remote Target Xiqn.2001-05.com.equallogic:	Tue Dec 16 15: 44:0	Wed
<mark>.</mark> MAJ	Power su	Rome	i series-null	i series 172.20.62.2. Only one power supply is working.	Tue Dec 16 15: 44:0	Wed
VVRN	SFP conn	Rome	i series-null	i series 172.20.62.2. The SFP connector bit rate of FC Interface fc2 (2000 Mbi	Tue Dec 16 15: 44:0	Wed
WRN	Link down	Rome	i series-null	i series 172.20.62.2. The FC Interface fc8 is down.	Tue Dec 16 15: 44:0	Wed
. WRN	Link down	Rome	i series-null	i series 172.20.62.2. The FC Interface fc7 is down.	Tue Dec 16 15: 44:0	Wed
. WRN	Link down	Rome	i series-null	i series 172.20.62.2. The FC Interface fc6 is down.	Tue Dec 16 15: 44:0	Wed
WRN	Link down	Rome	i series-null	i series 172.20.62.2. The FC Interface fc5 is down.	Tue Dec 16 15: 44:0	Wed
WRN	Link down	Rome	i series-null	i series 172.20.62.2. The FC Interface fc4is down.	Tue Dec 16 15: 44:0	Wed
VVRN	Link down	Rome	i series-null	i series 172.20.62.2. The FC Interface fc3 is down.	Tue Dec 16 15: 44:0	Wed
CRI	Target ex	Rome	➡III iSCSI	iSCSI Target hq is exposed on different i series cluster (172.20.62.2, 172.20	Wed Dec 1706:40:	Wed
! MIN	Attribute i	Rome	👍 Cube	The Cube Volume Xhr1 has two different values for the parameter Potenti	Tue Dec 16 17:02:2	Tuel
- KAINI	Ottributo i	Pomo	Cubo	The Cube Volume Ybri has two different volues for the peremoter Detection	Tup Doo 1( 17.02.1	Tune
C						1
				<b>•</b> • • • • •		
				lotal /litems		

Figure 6-12. Alarms History Window

# **Viewing Current Alarms**

You can view all current open alarms for all the i series manager elements.

To view current alarms:

1. From the Quick Launch: Monitor > Current Alarms



The Current Alarms window opens.

Severity	Name	Cluster	Source	Description	Opened
CRI	Storage is	Rome	💷 Stor	i series 172.20.62.1. The Disk Stor_3 is missing.	Wed Dec 1707: 49
CRI	Volume n	Rome	🧼 more	i series 172.20.62.1. The Subdisk more1 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	mirror	i series 172.20.62.1. The Mirror Volume mirror 2 is not functioning.	Wed Dec 1707:49
CRI	Storage is	Rome	Stor	i series 172.20.62.2. The Disk Stor_3 is missing.	Wed Dec 1707:49
CRI	Volume n	Rome	🛹 more	i series 172.20.62.2. The Subdisk more1 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	mirror	i series 172.20.62.2. The Mirror Volume mirror 2 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.1. The Subdisk stor_3 sd2 is not functioning.	Wed Dec 17 07: 49
<mark>.</mark> MAJ	Mirror not	Rome	mirror	i series 172.20.62.1. The Mirror Volume mirror2 is not mirroring the data.	Wed Dec 17 07: 49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.1. The Subdisk stor_3 sd1 is not functioning.	Wed Dec 1707:49
CRI	Storage is	Rome	📖 Stor	i series 172.20.62.1. The Disk Stor_2 is missing.	Wed Dec 1707:49
CRI	Volume n	Rome	🛹 stor	i series 172.20.62.2. The Subdisk stor_3 sd2 is not functioning.	Wed Dec 17 07: 49
MAJ	Mirror not	Rome	mirror	i series 172.20.62.2. The Mirror Volume mirror2 is not mirroring the data.	Wed Dec 17 07: 49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.2. The Subdisk stor_3 sd1 is not functioning.	Wed Dec 17 07: 49
CRI	Storage is	. Rome	💷 Stor	i series 172.20.62.2. The Disk Stor_2 is missing.	Wed Dec 17 07: 49
CRI	Volume n	Rome	🛹 hr1[1	i series 172.20.62.1. The Subdisk hr1 is not functioning.	Wed Dec 17 07: 49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.1. The Subdisk stor_2 sd2 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	🌆 Xhr1[	i series 172.20.62.1. The Cube Volume Xhr1 is not functioning.	Wed Dec 1707:49
< CD	Vet me e	D	Manut P	i navina eta 20 42 2. The Color Mahmur Montin ark for editaria u	10/2-10-2-10-2-10
				Total 44 items	
					Close



# Acknowledging an Alarm

An *acknowledged* alarm still exists but its severity will not propagate to higher levels. However, the alarm will still be listed in the Current Alarms window, along with the name of the user who acknowledged the alarm.

#### Note:

If an alarm is listed in the Last 10 Alarms pane, after being acknowledged it is removed from the pane.

#### To acknowledge an alarm:

Select the alarm to acknowledge.

Do one of the following:

• Right click and select Acknowledge

OR

• Check the Ack checkbox from any alarm pane.

If the alarm was in the Last 10 Alarms pane, it is removed.

Severity	Name	Cluster	Source		Description	Opened
CRI	Storage is	Rome	📖 Stor	i series 172.20.62.1. The Disk	Stor_3 is missing.	Wed Dec 17 07: 49
CRI	Volume n	Rome	🧼 more	i series 172.20.62.1. The Subo	lisk more1 is not functioning.	Wed Dec 1707:49
L CRI	Volume n	Rome	mirror	i series 172.20.62.1. The Mirre	* Volume mirror 2 in not functioning.	Wed Dec 1707:49
CRI	Storage is	Rome	💷 Stor	i series 172.20.62.2. The Disk	Close	Wed Dec 1707:49
CRI	Volume n	Rome	🧼 more	i series 172.20.62.2. The Sub	Acknowledge notioning.	Wed Dec 1707:49
CRI	Volume n	Rome	mirror	i series 172.20.62.2. The Mirr	Properties not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	🧈 stor	i series 172.20.62.1. The Sub	where the second struction second structure second struct	Wed Dec 1707:49
MAJ	Mirror not	Rome	mirror	i series 172.20.62.1. The Mirro	r Volume mirror 2 is not mirroring the data.	Wed Dec 1707:49
CRI	Volume n	Rome	🧈 stor	i series 172.20.62.1. The Subo	lisk stor_3 sd1 is not functioning.	Wed Dec 1707:49
CRI	Storage is	Rome	💷 Stor	i series 172.20.62.1. The Disk	Stor_2 is missing.	Wed Dec 1707:49
CRI	Volume n	Rome	🧈 stor	i series 172.20.62.2. The Subo	lisk stor_3 sd2 is not functioning.	Wed Dec 1707:49
MAJ	Mirror not	Rome	mirror	i series 172.20.62.2. The Mirro	r Volume mirror 2 is not mirroring the data.	Wed Dec 17 07: 49
CRI	Volume n	Rome	🧈 stor	i series 172.20.62.2. The Subo	lisk stor_3 sd1 is not functioning.	Wed Dec 1707:49
CRI	Storage is	Rome	📖 Stor	i series 172.20.62.2. The Disk	Stor_2 is missing.	Wed Dec 1707:49
CRI	Volume n	Rome	🛹 hr 1 [1	i series 172.20.62.1. The Subo	lisk hr1 is not functioning.	Wed Dec 17 07:49
CRI	Volume n	Rome	🫹 stor	i series 172.20.62.1. The Subo	lisk stor_2 sd2 is not functioning.	Wed Dec 1707:49
CRI	Volume n	Rome	🚺 Xhri[	i series 172.20.62.1. The Cube	Volume Xhr1 is not functioning.	Wed Dec 1707:49
<u></u>	i	_				)>
Wed Dec	1707 49 10 G	MT2009 is	oriae 172 20 42	1. The Mirror Volume mirror?	is pat functioning	
* YEU DEC	11 07:47:10 0	MT 2000 13	51103 172.20.62	Table 44	he not remotioning.	

## Figure 6-14. Acknowledge Alarm

everity	Name	Cluster	Source	Description	Opened At 🛛 🕅	Ack	Ack By	Ack At
CRI	Storage is mi	Rome	🛄 Stor_3 [	i series 172.20.62.1. The Disk Stor_3 is missing.	Wed Dec 17 07: 49: 10 GMT 2008			
CRI	Volume non	Rome	ar more1[1	i series 172.20.62.1. The Subdisk more1 is not functioning.	Wed Dec 17 07: 49: 10 GMT 2008			
E CRI	Volume non	Rome	mirror 2 [	i series 172.20.62.1. The Mirror Volume mirror 2 is not functioning.	Wed Dec 17 07: 49: 10 GMT 2008		admin	Wed Dec 17 .
CRI	Storage is mi	Rome	🛄 Stor_3 [	i series 172.20.62.2. The Disk Stor_3 is missing.	VVed Dec 17 07: 49: 10 GMT 2008			
CRI	Volume non	Rome	🫹 more1[1	i series 172.20.62.2. The Subdisk more 1 is not functioning.	VVed Dec 17 07: 49: 10 GMT 2008			
CRI	Volume non	Rome	mirror 2 [	i series 172.20.62.2. The Mirror Volume mirror 2 is not functioning.	VVed Dec 17 07: 49: 10 GMT 2008			
CRI	Volume non	Rome	🧈 stor_3 s	i series 172.20.62.1. The Subdisk stor_3 sd2 is not functioning.	VVed Dec 17 07: 49:07 GMT 2008			
MAJ	Mirror not mir	Rome	mirror2[	iseries 172.20.62.1. The Mirror Volume mirror 2 is not mirroring the data.	Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🧈 stor_3 s	i series 172.20.62.1. The Subdisk stor_3 sd1 is not functioning.	Wed Dec 1707: 49:07 GMT 2008			
CRI	Storage is mi	Rome	🛄 Stor_2[	i series 172.20.62.1. The Disk Stor_2 is missing.	Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🥏 stor_3 s	i series 172.20.62.2. The Subdisk stor_3 sd2 is not functioning.	Wed Dec 1707: 49:07 GMT 2008			
MAJ	Mirror not mir	Rome	mirror2[	i series 172.20.62.2. The Mirror Volume mirror 2 is not mirroring the data.	Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🧈 stor_3 s	i series 172.20.62.2. The Subdisk stor_3 sd1 is not functioning.	Wed Dec 1707: 49:07 GMT 2008			
CRI	Storage is mi	Rome	🛄 Stor_2[	i series 172.20.62.2. The Disk Stor_2 is missing.	Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🧼 hr 1 [ 1 GB]	i series 172.20.62.1. The Subdisk hr1 is not functioning.	Wed Dec 1707: 49:04 GMT 2008			
CRI	Volume non	Rome	🧈 stor_2 s	i series 172.20.62.1. The Subdisk stor_2 sd2 is not functioning.	VVed Dec 17 07: 49:04 GMT 2008			
CRI	Volume non	Rome	Xhr1[2	i series 172.20.62.1. The Cube Volume Xhr1 is not functioning.	VVed Dec 1707: 49:04 GMT 2008			
CRI	Volume non	Rome	Xhr1 [2	i series 172.20.62.2. The Cube Volume Xhr1 is not functioning.	Wed Dec 1707: 49:04 GMT 2008			
ed Dec 1	707:49:10 GMT 20	08 iseries 17	2.20.62.1. The Min	ror Volume mirror 2 is not functioning.				
				Total 44 items				

Figure 6-15. Ack Checkbox

## **Closing an Alarm**

Once an alarm occurs, it remains in the current alarm list till the situation that caused it ceases. However, it can be closed manually.

If the event that generated the alarms occurs again, another alarm will be generated and added to the current alarm list.

#### To close an alarm:

1. Select the alarm to close. Right click and select **Close**.

Severity	Name	Cluster	Source	Description		Opened At 🛛 🕅	Ack	Ack By	Ack At
CRI	Storage is mi	Rome	😳 Stor_3 [	i series 172.20.62.1. The Disk Stor_3 is missing.		Wed Dec 17 07: 49: 10 GMT 2008			
CRI	Volume non	Rome	🫹 more1[1	i series 172.20.62.1. The Subdisk more 1 is not functioning.		Wed Dec 17 07: 49: 10 GMT 2008			
CRI	Volume non	Rome	mirror 2 [	i series 172.20.62.1. The Mirror Volume mirror 2 is not function	ning.	Wed Dec 17 07: 49: 10 GMT 2008			
CRI	Storage is mi	Rome	🔛 Stor_3 [	i series 172.20.62.2. The Disk Stor_3 is missing.		Wed Dec 17 07: 49: 10 GMT 2008			
CRI	Volume non	Rome	🫹 more1[1	i series 172.20.62.2. The Subdisk more 1 is not functioning.		Wed Dec 17 07: 49:10 GMT 2008			
CRI	Volume non	Rome	mirror 2 [	i series 172.20.62.2. The Mirror Volume mirror 2 is not function	ning.	Wed Dec 17 07: 49: 10 GMT 2008			
CRI	Volume non	Rome	🧈 stor_3 s	i series 172.20.62.1. The Subdisk stor_3 sd2 is not functionir	ng.	Wed Dec 17 07: 49:07 GMT 2008			
5 MAJ	Mirror not mir	Rome	mirror2[	i series 172.20.62.1. The Mirror Volume mirror 2 is not mirrori	ng the data.	Wed Dec 1707:49:07 GMT 2008			
CRI	Volume non	Rome	🥏 stor_3 s	i series 172.20.62.1. The Subdisk stor_3 sd1 is not functioni	Source	Wed Dec 1707: 49:07 GMT 2008			
CRI	Storage is mi	Rome	📰 Stor_2[	i series 172.20.62.1. The Disk Stor_2 is missing.	Close	Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🧈 stor_3 s	i series 172.20.62.2. The Subdisk stor_3 sd2 is not functioni	Acknowledge V	Wed Dec 1707: 49:07 GMT 2008			
<mark>.</mark> MAJ	Mirror not mir	Rome	mirror2[	i series 172.20.62.2. The Mirror Volume mirror2 is not mirrori	Properties	Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🧈 stor_3 s	i series 172.20.62.2. The Subdisk stor_3 sd1 is not functionin	Wed Dec 1707: 49:07 GMT 2008				
CRI	Storage is mi	Rome	💷 Stor_2[	i series 172.20.62.2. The Disk Stor_2 is missing.		Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🛹 hr 1 [1 GB]	i series 172.20.62.1. The Subdisk hr1 is not functioning.		Wed Dec 17 07: 49:04 GMT 2008			
CRI	Volume non	Rome	🧈 stor_2 s	i series 172.20.62.1. The Subdisk stor_2 sd2 is not functionir	ng.	Wed Dec 17 07: 49:04 GMT 2008			
CRI	Volume non	Rome	🚺 Xhr1 (2	i series 172.20.62.1. The Cube Volume Xhr1 is not functionin	g.	Wed Dec 17 07: 49:04 GMT 2008			
CRI	Volume non	Rome	🚺 Xhr1 (2	i series 172.20.62.2. The Cube Volume Xhr1 is not functionin	g.	Wed Dec 17 07: 49:04 GMT 2008			
Wed Dec 17	7 07: 49:07 GMT 20	08 iseries 17	2.20.62.1. The Mirr	ror Volume mirror2 is not mirroring the data.					
				Total	4 items				

Figure 6-16. Close Alarm

The Close Alarm dialog box opens.

2. Click **Yes** to reconfirm the alarm closure.



Figure 6-17. Close Alarm Confirmation Dialog Box

The alarm will be closed and removed from the pane. You can view the closed alarm in the Alarms History window (Figure 6-12).

## **Viewing Alarm Properties**

You can view the properties of an alarm, including:

- Alarm Severity
- Alarm Name
- Source Name
- Source Type
- Date Opened
- Category
- Probable Cause
- Alarm Text
- Troubleshooting

Use the alarm properties to help solve the alarm issue.

#### To display alarm properties:

From any of the alarm windows, select the alarm whose properties you want to view.

• Right click and select **Properties**.

everity	Name	Cluster	Source	Description		Opened At 🛛 🔍	Ack	Ack By	Ack At
CRI	Storage is mi	Rome	🛄 Stor_3 [	iseries 172.20.62.1. The Disk Stor_3 is missing.		Wed Dec 1707: 49:10 GMT 2008			
CRI	Volume non	Rome	🛹 more1[1	i series 172.20.62.1. The Subdisk more1 is not functioning.		Wed Dec 1707: 49:10 GMT 2008			
CRI	Volume non	Rome	mirror 2 [	i series 172.20.62.1. The Mirror Volume mirror 2 is not functio	ning.	Wed Dec 1707: 49:10 GMT 2008			
CRI	Storage is mi	Rome	🛄 Stor_3 [	i series 172.20.62.2. The Disk Stor_3 is missing.		Wed Dec 1707: 49:10 GMT 2008			
CRI	Volume non	Rome	🛹 more1[1	i series 172.20.62.2. The Subdisk more 1 is not functioning.		Wed Dec 1707: 49:10 GMT 2008			
CRI	Volume non	Rome	mirror 2 [	i series 172.20.62.2. The Mirror Volume mirror 2 is not functio	ning.	Wed Dec 1707: 49: 10 GMT 2008			
CRI	Volume non	Rome	→ stor_3 s	i series 172.20.62.1. The Subdisk stor_3 sd2 is not functionin	g.	Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	→ stor_3 s	i series 172.20.62.1. The Subdisk stor_3 sd1 is not functionin	g.	Wed Dec 1707: 49:07 GMT 2008			
CRI	Storage is mi	Rome	5 Stor_2[	i series 172.20.62.1. The Disk Stor_2 is missing.		Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🛹 stor_3 s	i series 172.20.62.2. The Subdisk stor_3 sd2 is not functionin	g.	Wed Dec 1707: 49:07 GMT 2008			
MAJ	Mirror not mir	Rome	mirror 2 [	i series 172.20.62.2. The Mirror Volume mirror 2 is not mirrorir	ig the data.	Wed Dec 1707: 49:07 GMT 2008			
E CRI	Volume non	Rome	🕶 stor_3 s	i series 172.20.62.2. The Subdisk stor_3 sd1 is not functionin	_	Wed Dec 1707: 49:07 GMT 2008			
CRI	Storage is mi	Rome	💷 Stor_2[	i series 172.20.62.2. The Disk Stor_2 is missing.	Source	Wed Dec 1707: 49:07 GMT 2008			
CRI	Volume non	Rome	🛹 hr1[1GB]	i series 172.20.62.1. The Subdisk hr1 is not functioning.	Close	Wed Dec 1707: 49:04 GMT 2008			
CRI	Volume non	Rome	→ stor_2 s	i series 172.20.62.1. The Subdisk stor_2 sd2 is not functionir	Acknowledge	Wed Dec 1707: 49:04 GMT 2008			
CRI	Volume non	Rome	Xhr1[2	i series 172.20.62.1. The Cube Volume Xhr1 is not functionin	Properties	Wed Dec 1707: 49:04 GMT 2008			
CRI	Volume non	Rome	Xhr1[2	i series 172.20.62.2. The Cube Volume Xhr1 is not functionin	g.	Wed Dec 17 07: 49:04 GMT 2008			
CRI	Volume non	Rome	🛹 hr1 [1 GB]	i series 172.20.62.2. The Subdisk hr1 is not functioning.		Wed Dec 1707: 49:04 GMT 2008			
/ed Dec 17	707:49:07 GMT 20	08 iseries 17	2.20.62.2. The Suk	odisk stor_3 sd1 is not functioning.				!	!
				Total 4	litems				

Figure 6-18. Properties

The Properties window opens.

General Troublesho	oting	 General Troubleshooting	
Severity:	CRITICAL	A volume is non-functional if it is relying on a storage that is missing or invalid. The administrator can reconnect the storage if missing or replace the volume and delete the non-functional one.	
Name:	Volume non-functional		
ID:	0201		
Cluster Name:	Rome		
Source Name:	stor_3 sd1[1GB]		
Source Type:	Subdisk		
Opened At:	Wed Dec 1707: 49:07 GMT 2008		
Category:	Communication		
Probable Cause:	a Jnderlying resource unavailable		
Description:	i series 172.20.62.2. The Subdisk stor_3 sd1 is not functioning.	ê	
(	OK Cancel	OK Cancel	

Figure 6-19. Alarm Properties Window

## **Alarm Severity**

i series manager supports four types of alarm severity:

- **Warning alarms:** may be temporary but the administrator should be notified of. Warning alarms are marked with a blue exclamation mark
- **Minor alarms:** may cause service interruption or have an administrative reason. Minor alarms are marked with a yellow exclamation mark .
- **Major alarms:** may cause service interruption and clearly indicated problems in the system operation. Major alarms are marked with an orange exclamation mark
- **Critical alarms:** represent service interruption. Critical alarms are marked with a red exclamation mark

	Name	ID	Troubleshooting	Action
	Mirror sync		Mirror is synchronizing.	
	Theoretical target		Target will only be operational with LUN 0.	
!	Storage is missing	0101	Storage has been disconnected. The administrator can reconnect the storage or replace it by a new one and then replace volume and delete the faulty storage	Reconnect or Delete.
•	Storage Invalid	0102	A storage known by the system is configured differently. The administrator can delete the storage.	Delete.
•	Storage Unknown	0103	V Switch doesn't know the state of the storage. Select cluster and then the option Storage Discovery.	Storage Discovery.
1	Storage Provisioned	0104	A storage has been configured by the user but never has been discovered by the V Switch. Select cluster and then the option Storage Discovery.	Storage Discovery.
•	Subdisk Mismatch	0105	A subdisk has been provisioned by the user but after having been connected, its characteristics are different from those configured.	Delete.
!	Volume non-functional	0201	A volume is non-functional if it is relying on a storage that is missing or invalid. The administrator can reconnect the storage if missing or replace the volume and delete the non-functional one.	Replace and Delete.
	Volume internal	0202	Volume is not exposed.	
	Volume needs sync	0203	Volume needs to be synchronized.	Synchronize.
•	Vol Need Sync	0203	A volume needs synchronization when it is not synchronized with the other children of a mirror. Activating mirror synchronize will close the alarm when synchronization is finished.	Mirror Synchronize.
•	Mirror not Mirror	0208	A mirror volume is not mirroring because the other leg(s) of the mirror are non-functional.	Replace defective volume.

## Table 6-1: i series manager Alarms

	Name	ID	Troubleshooting	Action
	Expandable	0212	The administrator has resized a volume hasn't yet expanded them. After expanding the volume, it will be the whole potential size attributed to it.	Expand.
•	Over Used Snapshot	0213	A snapshot is approaching to the limit of its full capacity.	Resize.
•	Snapshot Out of Sync	0214	A snapshot is no longer synchronized with its source.	Delete Snapshot.
!	Snapshot Full	0215	A snapshot is full and no more synchronized with its source. Nothing can be done. Only delete the snapshot volume.	Delete Snapshot.
•	Snapshot Modified	0216	A snapshot has been exposed with read-write access and was modified.	Delete Snapshot.
•	Snapshot Expose Inconsistency	0217	A snapshot is exposed on a target exposed on a switch different from the one exposing the source.	Configuration.
•	Volume Mismatch	0220	A volume has been provisioned by the user but after having been connected, its characteristics are different from those configured.	Delete.
	Not Validated	0221	A Volume has been configured and its size and block size haven't been validated.	Connect Storage.
	Theoretical Target	0301	A target has no LUN exposed on it.	Expose LU.
	Incomplete Definition	0302	There is no portal defined for it remote target.	Add Portal.
•	Target not Connected	0303	The initiator of the V switch couldn't connect to the remote target.	Check IP and ACL.
•	Fans faulty	0401	One FAN (and only one) doesn't work. Call support to replace the FAN.	i series X. Only two fans are working.
•	Fans critical	0402	Both FANs don't work. Call support to replace the FANs.	Call Tech Support.
•	Power supplies faulty	0403	One of the power supplies doesn't work. Call support to replace the power supply.	Call Tech Support.
•	CPU temperature warning	0404	The temperature of the CPU is above the tolerable threshold. Turn off the switch and call support.	Turn off i series.
•	On-board temperature warning	0405	The on-board temperature is above the tolerable threshold. Turn off the switch and call support.	Turn off i series.
•	No fans	0406	No FANs are working. Turn off the i series and call support.	Turn off i series.

	Name	ID	Troubleshooting	Action
	CPU temperature critical	0407	The temperature of the CPU is above the critical threshold. Turn off the switch and call support.	Turn off i series.
•	On-board temperature critical	0408	The on-board temperature is above the critical threshold. Turn off the switch and call support.	Turn off i series.
	Inconsistent Database	0409	The i series database is corrupted. Call technical support	Call technical support.
•	Low Memory	0410	The device is under heavy load. Redistribute your resources.	Restart the i series.
•	Cluster Inc	0501	At least one V Switch missing from the cluster in order to provide full redundancy.	Add V Switch.
•	Neighbor dead	0502	i series lost connection with one of its neighbors. Check the network. Reconnecting the i series will close the alarm	Reconnect.
	Neighbor unknown	0504	i series doesn't know the state of one of its neighbors. After few seconds this alarm will be closed.	Wait.
•	Object not redundant	0505	An object doesn't exist in the database of one of the i series of the cluster. Synchronizing the object will solve the problem.	Synchronize the cluster.
•	Alias inconsistency	0506	Inconsistent Alias. By giving a new alias to the object, the administrator will remove the alarm condition	Configure.
•	LU number inconsistency	0507	A volume is exposed on a different LUN on the same target on two i series of the cluster. Delete one of the LU and synchronize the other one.	Delete and synchronize.
!	Data Attributes inconsistency	0508	Some parameters of an object are different according the i series; if the parameters are writable, re-writing them should solve the problem.	Configure.
•	Illegal Subdisk	0510	There is a subdisk on one V Switch while there is a volume on the whole disk on another V Switch.	Delete subdisk.
-	Illegal Volume	0511	The volume is inconsistent in the cluster: its structure is different on each V Switch.	Delete Volume.
!	LU volume inconsistency	0512	A specific LUN is pointing to two different volumes within the cluster. Deleting the virtual LU will solve the problem.	Delete.

	Name	ID	Troubleshooting	Action
•	Target volume inconsistency	0513	A volume is exposed on a different target on two i series of the cluster. Delete one of the LU and synchronize the other one.	Delete.
	i series takeover	0514	i series has taken over its neighbor. Reconnecting the second i series will solve this alarm condition.	Wait.
	Inconsistent ACL	0515	The ACL configuration is different within the cluster.	Reconfigure ACL.
	Inconsistent Volume	0516	The volume does not have the same number of children in the cluster	Synchronize volumes.
•	Inconsistent Size	0517	The volume does not have the same actual size in all the V Switches in the cluster.	Expand.
•	i serieses are not neighbors	0518	The switches are not configured as being neighbors. Try to rediscover your cluster. Select cluster, right click and select Rediscover.	Configure.
•	Target exposed inconsistency	0519	A target is inconsistently exposed among the cluster. The administrator should change the exposure of the target.	Configuration.
•	Illegal LUN serial number	0523	The serial number of a specific logical unit is different within the i series of the cluster. The administrator should delete one of the LU and then activate cluster synchronization.	Configuration.
•	Portal Inconsistency	0524	A remote portal for a remote target is not defined in all the switches of the cluster.	Configure.
•	ACL Entry not Redundant	0525	An ACL entry is not defined at the same target in all the switches of the cluster.	Configure.
•	Incompatible License	0526	The devices in the cluster have incompatible licenses.	Configure. Ask your supplier to provide you with an upgraded license.
	Synchronizing	0527	One of the switches is synchronizing its states with that of its neighbor.	Wait.
!	Standing	0528	Some incompatibility was found.	Check the configuration and correct it.
•	Neighbor Removed	0531	The i series were inconsistently configured from the cluster's point of view, therefore the i series was removed.	Add the neighbor i series in the New i series dialog box.

	Name	ID	Troubleshooting	Action
!	i series disconnected	0901	i series manager lost connection with a i series. Check the network. Reconnecting the i series will close the alarm. You can check also that the server's IP address is defined in the switch as manager by using the CLI command: snmp manager show. If it is not, please add it by using the CLI command: snmp manager add -ip <ip address&gt;</ip 	Reconnect.
!	Trap port in use	0902	i series trap port is already in use. Change the trap port via i series - >Properties ->SNMP to receive traps from this i series. This trap port is where i series manager listens from. The trap port must also be changed in the CLI. This trap port is where the i series sends from.	Configuration.
•	i series manager inconsistent with the i series	0903	There is total incompatibility between i series manager and the i series. The administrator should exit i series manager and then run it again.	Reset i series manager.
	LinkDown	1001	An interface stopped functioning.	Reconnect.

	Name	ID	Troubleshooting	Action
	Journal Internal	0218	The journal is not used.	Connect a pair.
	Overused Journal	0219	A journal is approaching to the limit of its full capacity.	Resize journal.
•	Illegal Volume Pair	0521	The primary or the secondary volume of a pair in a switch is part of another pair in another switch of the cluster.	Select one of the pair as the "good" one and delete the other one. Activate Cluster Sync to synchronize the cluster (or the pair only).
•	Illegal Pair Consistency Group	0522	The pair of a CG in a switch is part of another CG in another switch of the cluster.	Set the problematic pair to appropriate consistency group.
•	Journal out of sync	1201	A journal is no longer synchronized with one of the replicating production volumes. User should abort replication, and restart it including initial synchronization.	Restart DR Process.
•	Journal Full	1202	A journal is no longer synchronized with one of the replicating production volumes because it was full. User should abort replication, and restart it including initial synchronization.	Restart DR Process.
!	Pair Error	1203	One of the volumes essential to the replication is not functioning including a journal volume.	Check that all the volumes: primary, secondary and Journal are well configured and well connected to the switch.
1	Need Synchronization	1204	A pair or a group can be in this state if the remote volume was disconnected. Reconnect and reinitialize the initial synchronization.	Activate Replicate.
	Initial Sync in Progress	1205	The pair or the group is actually synchronizing its data.	Wait patiently.
	Switched	1206	Either a disaster occurred or the administrator initiated a planned failover. After fallback, the mode of those objects will switch back to normal.	Fallback.

## Table 6-2: Disaster Recovery Alarms

	Name	ID	Troubleshooting	Action
•	Consistency Group DR Unknown	1207	This group has simultaneously, at least one pair in normal mode and at least one pair in switched mode. The only way to correct the problem is to restart everything from the beginning. The administrator should activate the option "Abort Replication" from the pull down menu and then restart initial synchronization.	Restart DR Process.
•	Replication Inactive	1208	The group/pair is well configured but wasn't activated yet. The administrator should activate the option "Start Initial Synchronization or Start Replication" from the pull down menu.	Start DR Process.
	Replicate Merge	1209	The group/pair is actually merging.	Wait.
	Replicate Transfer	1210	The group/pair is actually transferring	Wait.
•	CG Empty	1211	The group is empty. Configure a pair to it.	Complete configuration.
1	PFailover	1212	The group/pair started a process of planned failover which has not yet completed.	After waiting a while, you can try: 1. Rediscover 2. Reset switch
1	Fallback	1213	The group/pair started a process of Fallback which has not yet completed.	After waiting a while, you can try: 1. Rediscover 2. Reset switch
•	CFWaiting	1214	The group/pair is waiting for the agreement of the other side in order to perform an action.	Wait a while and reset switch.
•	CFError	1215	The group/pair couldn't get the agreement of the other side in order to perform an action. Reset the switches.	Reset.
•	Not Symmetric DR	1301	The pair is not configured in both sites.	Use wizard in order to complete pair configuration.
•	Unequivalent Pair	1302	A pair is defined on Primary1, Secondary1 in one site and Primary1, Secondary2 in another site.	Delete misconfigured pair and use wizard.
•	Inverted Pair	1303	Pair is defined on Primary1, Secondary1 in one site and Secondary1, Primary1 in another site. Delete one pair and then use wizard in order to complete pair configuration	Delete misconfigured pair.

	Name	ID	Troubleshooting	Action
	Asymmetric Attribute	1304	One pair has a different value between the sites.	Open the pair properties and reconfigure the initial sync type.
•	Inverted Role	1305	The consistency group is declared local or remote in the both sites.	Use wizard.
	Inconsistent Replication	1306	The replication attributes are different within the sites.	Use wizard.
•	Control Function Failure	1307	An action couldn't be performed. The most common reason for this alarm is that the network between a local site and a remote site is unavailable	Configuration.
	DiffSize	1308	The primary volume is different in size from the secondary one.	Delete and recreate the pair.
	Disaster	1309	The pair/group is in disaster mode.	Fallback.

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