

**Step-by-Step Guide to
Asynchronous Data Replication
(File Based) over a WAN
Supported by Open-E® DSS™**



Asynchronous Data Replication over a WAN

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	Replication Mode		Source/Destination			Data Transfer		Volume Type		
	Synchronous	Asynchronous	w/ System	LAN	WAN	File based	Block based	NAS	iSCSI	
									File-I/O	Block-I/O
Asynchronous Data Replication over a WAN		✓			✓	✓		✓		

- **ASYNCHRONOUS DATA REPLICATION over a WAN** enables **asynchronous** file and folder copy from one storage system to another over the Wide Area Network:

- With Asynchronous Replication, a point-in-time or snapshot copy of data on the source is made and copied to the target storage system.
- For maximum flexibility, you can run a data replication task in two directions: one system can be both the source and the destination at the same time, allowing cross data backups on several systems. Replication can be used in disaster recovery or for disk-to-disk backup.

REPLICATION BETWEEN TWO SYSTEMS OVER A WAN

■ Recommended Resources

- Key Hardware (two system)
 - ✓ x86 compatible
 - ✓ RAID Controller
 - ✓ HDD's
 - ✓ Network Interface Cards
- Software:
 - ✓ Open-E DSS (recommended) or Open-E NAS-R3, 2 units

■ Benefits

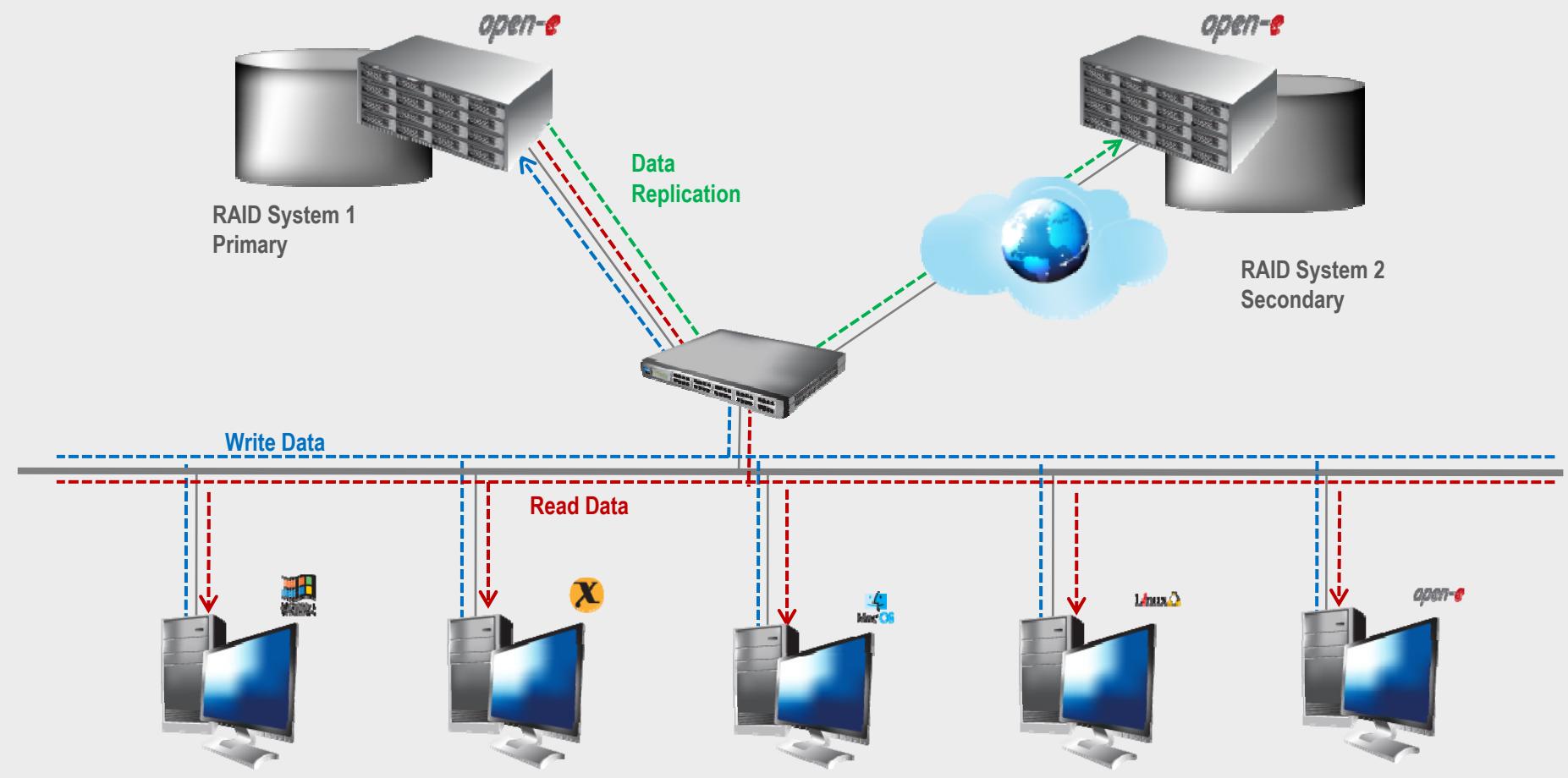
- Data redundancy
- Maximum data safety

■ Disadvantages

- High cost of WAN solution

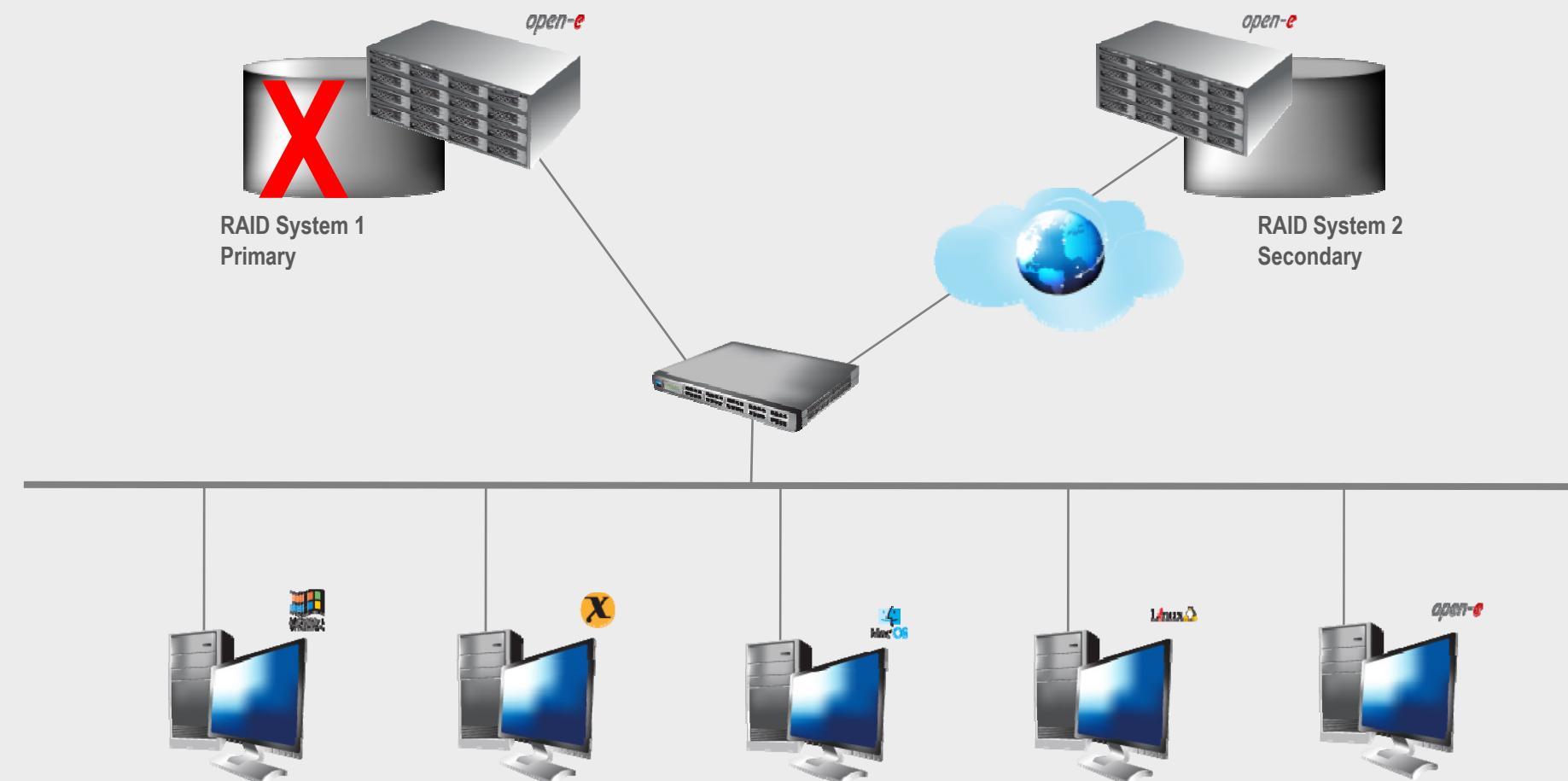
Asynchronous Data Replication over a WAN

- Data is written and read in System 1
- Periodically data is replicated to System 2 via Internet connection.



Asynchronous Data Replication over a WAN

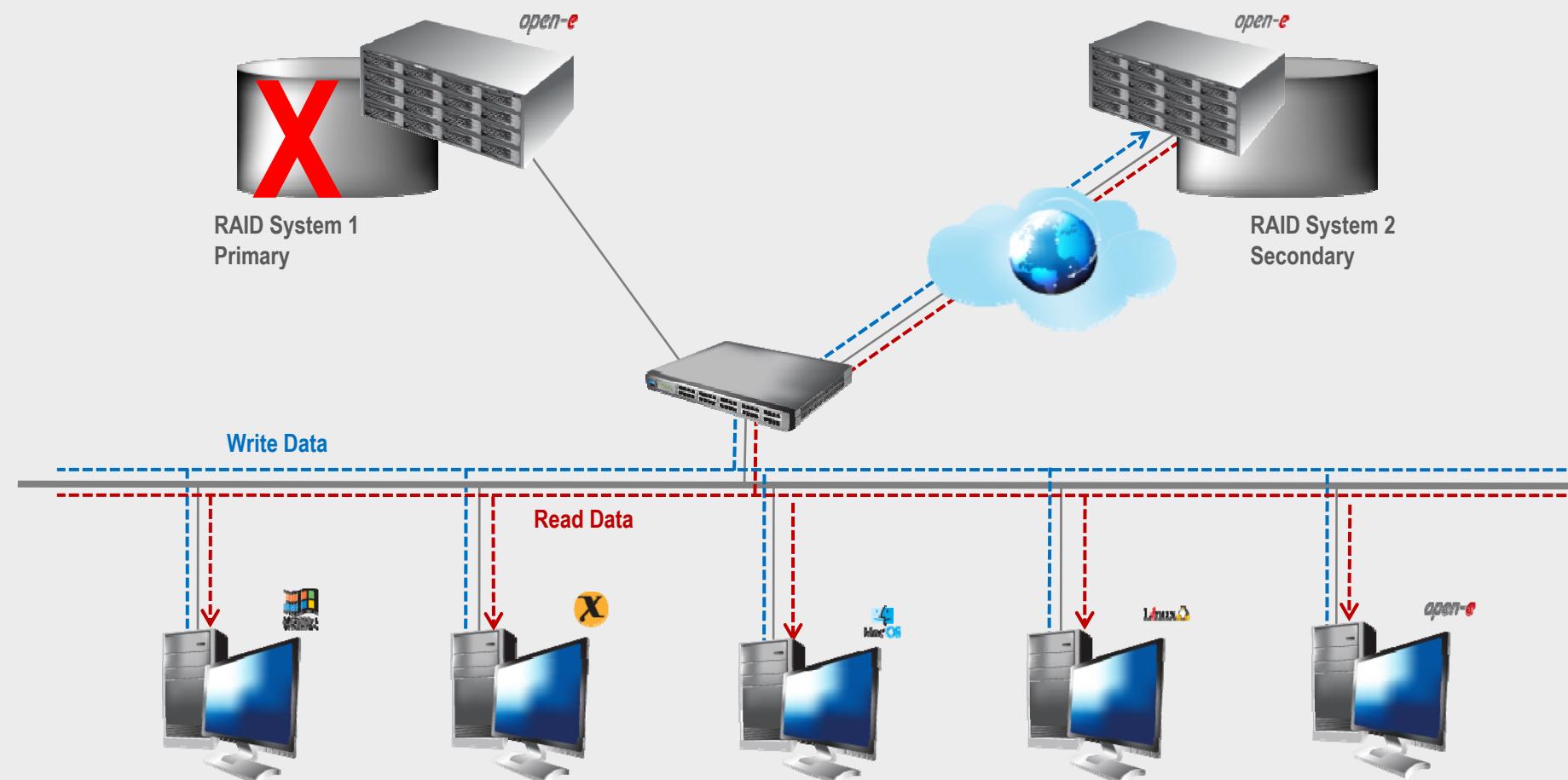
- In the event of a raid array error or disk drive error on System 1, the server will send an e-mail notification to the administrator
- In the event of a loss of system 1 users will be notified
- Administrator then switches users to System 2 over the WAN



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- After switching, replicated data is available on System 2



Setting up Asynchronous Data Replication over a WAN

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TO SET UP DATA REPLICATION, PERFORM THE FOLLOWING STEPS:

1. Hardware configuration
2. Configure DSS1 and DSS2 on the WAN
3. Configure the destination node
4. Configure the source node
5. Schedule replication

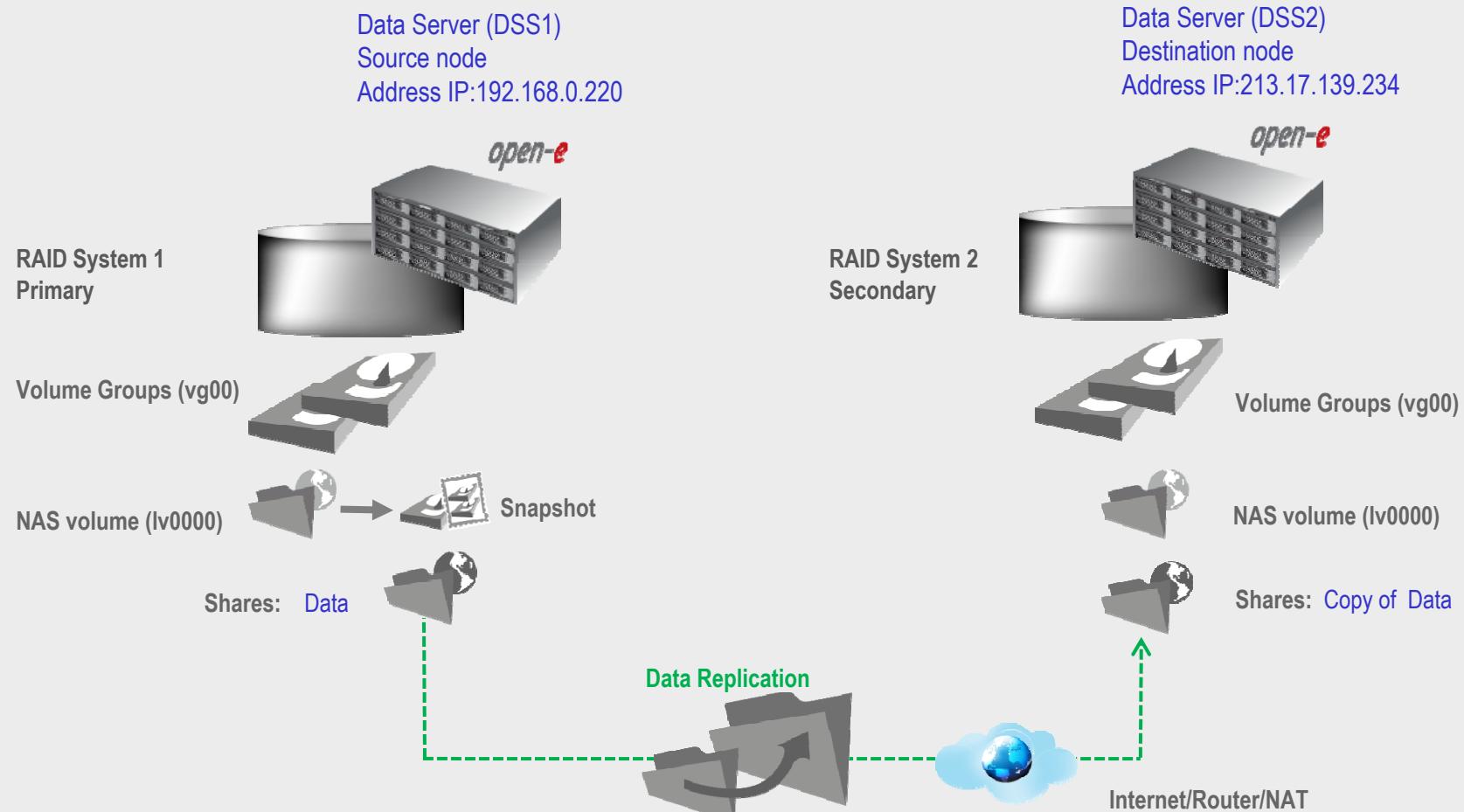
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1. Hardware Configuration

Hardware Requirements

To run the data replication of Open-E DSS (or NAS R-3), a minimum of two systems are required. Logical volumes working in slave mode must have snapshots created and enabled. Both servers are working in the Wide Area Network. An example configuration is shown below:



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2. Configure DSS1 and DSS2 on the WAN

BELOW YOU CAN FIND OF SETTING THE DSS1 AND DSS2 ON THE WAN:

- DSS 1 - machine behind the NAT with local IP address,
- Forwarding port 873 to local ip from DSS 1 in your router (eg. below screenshot)

Port Range					
Application	Start	End	Protocol	IP Address	Enable
DSS	873	to	873	TCP	<input checked="" type="checkbox"/>
DSS	443	to	446	TCP	<input checked="" type="checkbox"/>
		to		TCP	<input type="checkbox"/>
		to		TCP	<input type="checkbox"/>

- DSS 2 – Data Storage System with external internet IP address router/firewall

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Data Server (DSS2)
Destination node
Address IP:213.17.139.234

Under the „CONFIGURATION“ tab, select „volume manager“.

Volume Groups (vg00)

Add the selected physical units (Unit S000) to create a new volume group (in this case, vg00) and click **apply** button.

3. Configure the Destination Node

The screenshot shows the 'DSS' (Data Storage Server) web interface. At the top, there's a logo of a server unit with 'open-e' written on it. Below the logo, the text 'Data Server (DSS2)', 'Destination node', and 'Address IP:213.17.139.234' is displayed. The main menu at the top has tabs: 'LOGOUT', 'DSS', 'SETUP', 'CONFIGURATION' (which is highlighted in red), 'MAINTENANCE', 'STATUS', and 'HELP'. Under 'CONFIGURATION', there are sub-tabs: 'volume manager' (highlighted in blue), 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. On the left side, there are two sections: 'Vol. groups' (with a 'rescan' button) and 'Vol. replication'. The right side contains three main panels: 'Unit rescans' (with a 'rescan' button), 'Unit manager' (listing 'Unit S000' with size 372.61 GB, serial number 3NF0N4HX, and status 'available'), and 'Drive identifier' (listing 'Unit S000' with serial number 3NF0N4HX). A large blue callout box on the left points to the 'volume manager' tab. Another blue callout box below it points to the 'Unit manager' panel, specifically highlighting the 'Action' dropdown set to 'new volume group' and the 'Name' input field containing 'vg00'. An arrow points from the 'apply' button in the 'Unit manager' panel towards the bottom right.

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Data Server (DSS2)
Destination node
Address IP:213.17.139.234

Volume Groups (vg00)

NAS volume (lv0000)

Select the appropriate volume group (**vg00**) from the list on the left and create a **new NAS volume** of the required size. This logical volume will be the destination of the replication process.

After assigning an appropriate amount of space for the NAS volume, click the **apply** button

3. Configure the Destination Node

DSS DATA STORAGE SERVER

CONFIGURATION

Volume manager

Volume group: vg00

Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000					N/A	40.00 <input checked="" type="checkbox"/>
System volumes						Size (GB)
						4.00 <input checked="" type="checkbox"/>
						0.00
						1.00
						0.00
						327.56

Action:

Use volume replication
 WORM

add: 0.00 GB

Event Viewer:

Data Storage Server. All rights reserved

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The diagram illustrates the process of setting up asynchronous data replication over a WAN. It features three main sections: a top banner with a server icon and text, a central configuration interface, and two callout boxes with arrows pointing to specific settings.

Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

Under the „CONFIGURATION“ tab, select „NAS settings“ menu.

Data Replication

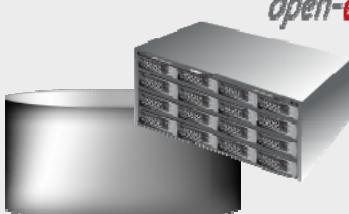
Check the Enable Data replication Agent box, and click the apply button

The central configuration interface shows the following steps:

- The top navigation bar includes: logout, DSS, DATA STORAGE SERVER, open-e, SETUP, CONFIGURATION (highlighted in red), MAINTENANCE, STATUS, HELP, volume manager, NAS resources, iSCSI target manager, FC target manager, and apply buttons.
- The main configuration area contains three sections:
 - NDMP data server**: Includes a checkbox for "Enable NDMP data server" and an "apply" button.
 - Data replication agent**: Includes a checked checkbox for "Enable Data replication Agent" and an "apply" button.
 - Antivirus setup**: Displays an info message: "Info No shares found."
- At the bottom, there is an "Event Viewer:" section and a footer stating "Data Storage Server. All rights reserved".

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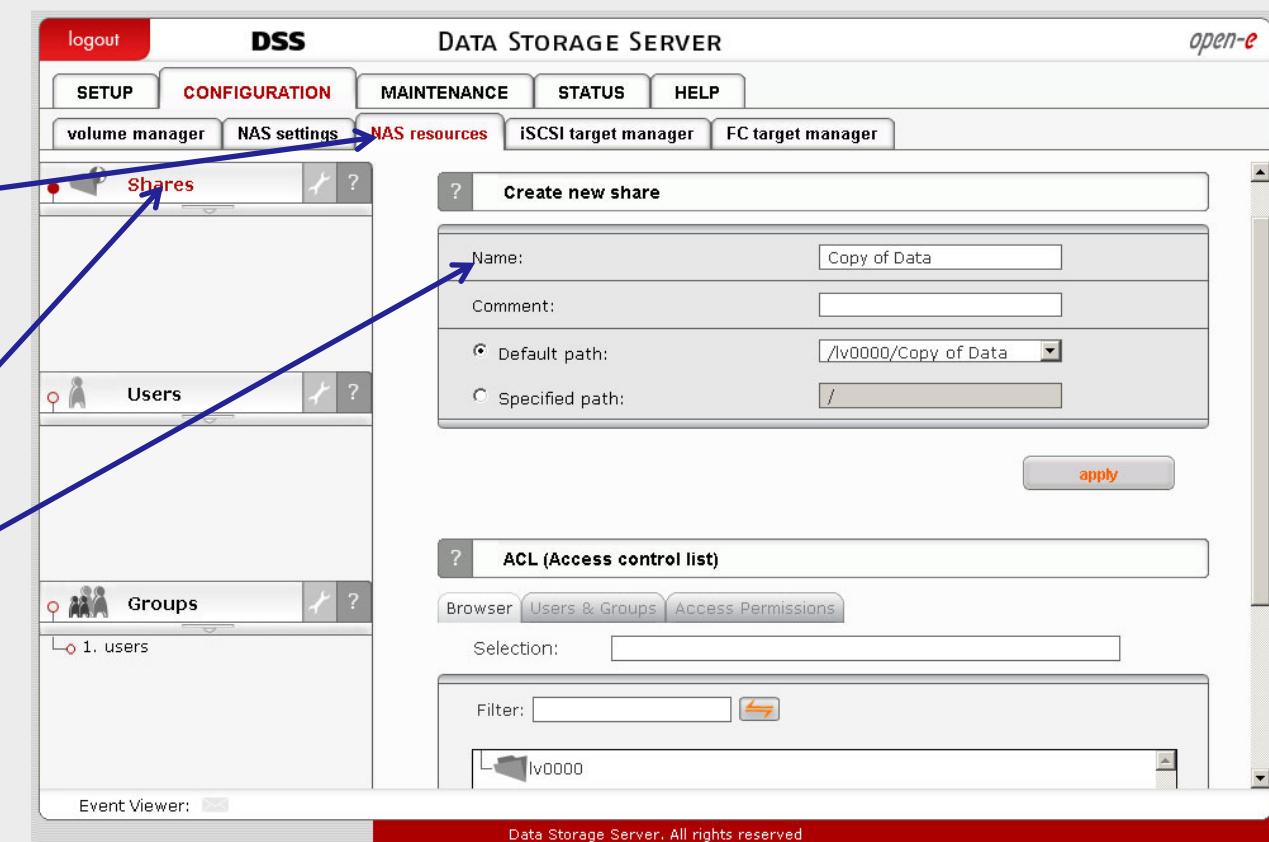
Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

Under the „CONFIGURATION“ tab, select „NAS settings“ menu.

Shares: Copy of Data 

A tree listing of NAS shared volumes (**Shares**) will appear on the left side of the DSS console. In the example, a shared volume named **Copy of Data** has been created.



The screenshot shows the DSS (Data Storage Server) web interface. At the top, there is a navigation bar with tabs: logout, DSS, CONFIGURATION (which is highlighted in red), MAINTENANCE, STATUS, and HELP. Below the navigation bar, there are several management links: volume manager, NAS settings (highlighted in red), NAS resources (highlighted in red), iSCSI target manager, and FC target manager. On the left side of the interface, there is a sidebar with three main sections: Shares (highlighted in red), Users, and Groups. Under the Shares section, a tree view shows a single item: 1. users. To the right of the sidebar, there is a large central panel titled "Create new share". This panel contains fields for "Name:" (set to "Copy of Data"), "Comment:" (empty), "Default path:" (set to "/lv0000/Copy of Data"), and "Specified path:" (empty). There is also an "apply" button at the bottom of this panel. Below the "Create new share" panel, there is another section titled "ACL (Access control list)" with tabs for Browser, Users & Groups, and Access Permissions. At the bottom of the interface, there is a footer bar with the text "Event Viewer:" and "Data Storage Server. All rights reserved".

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Setting up Asynchronous Data Replication over a WAN

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Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

After creating the new shared volume, configure it:

- Click on the share name (**Copy of Data**),
- Check the box **Use data replication** within **Data replication agent settings** function.
- Click on the **apply** button.

Shares: Copy of Data

Data Replication

NOTE:

It is strongly recommended to protect the replication protocol with a user name and password, along with a list of allowed IP address. This will prevent local network users from accessing this share. **The user name and password must be the same as on the destination node.**

The configuration of the Destination Node (storage server) is now complete.

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Setting up Asynchronous Data Replication over a WAN

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Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. Configure the Source Node

Under the „CONFIGURATION“ tab, select „volume manager“.

Volume Groups (vg00)

Add the selected physical units (Unit S001) to create a new volume group (in this case, vg00) and click apply button.

The screenshot shows the DSS (Data Storage Server) web interface. At the top, there's a banner with the open-e logo and server details: "Data Server (DSS1)", "Source node", and "Address IP:192.168.0.220". Below the banner, the title "4. Configure the Source Node" is displayed. The main navigation bar has tabs: "SETUP", "CONFIGURATION" (which is highlighted in red), "MAINTENANCE", "STATUS", and "HELP". A sub-menu under "CONFIGURATION" includes "volume manager", "NAS settings", "NAS resources", "iSCSI target manager", and "FC target manager". On the left, there are two icons: "Vol. groups" and "Vol. replication". The "Unit manager" panel on the right lists a unit: "Unit S001" (Size: 6286.81 GB, Serial number: 35E615C9, Status: available). An "apply" button is at the bottom of this panel. The "Drive identifier" panel below it lists "Unit S001" with the same details. At the bottom of the interface, there's an "Event Viewer" section and a footer that says "Data Storage Server. All rights reserved". Blue arrows from the text boxes point to the "volume manager" tab in the menu and the "Unit manager" panel where the "apply" button is located.

Setting up Asynchronous Data Replication over a WAN

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Data Server (DSS1)
Source node
Address IP:192.168.0.220

Volume Groups (vg00)

NAS volume (lv0000)

Select the appropriate volume group (**vg00**) from the list on the left and create a **new NAS volume** of the required size. This logical volume will be the source of the replication process.

After assigning an appropriate amount of space for the NAS volume, click the **apply** button

4. Configure the Source Node

The screenshot shows the open-e DSS configuration interface. The top navigation bar includes **LOGOUT**, **DSS**, **CONFIGURATION** (which is selected), **MAINTENANCE**, **STATUS**, and **HELP**. Below the navigation bar are tabs for **VOLUME MANAGER**, **NAS SETTINGS**, **NAS RESOURCES**, **iSCSI TARGET MANAGER**, and **FC TARGET MANAGER**. The left sidebar has sections for **Vol. groups** and **Vol. replication**. The main panel displays a table for the **Volume manager** under the **Logical Volume** section. The table includes columns for Type, Snap., Rep., Init., Blocksize (bytes), and Size (GB). A blue arrow points from the text "Select the appropriate volume group (**vg00**)" to the **Vol. groups** section in the sidebar. Another blue arrow points from the text "After assigning an appropriate amount of space for the NAS volume, click the **apply** button" to the **apply** button at the bottom right of the main panel. The bottom of the interface shows an **Event Viewer** and the copyright notice **Data Storage Server. All rights reserved**.

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Data Server (DSS1)
Source node
Address IP:192.168.0.220

Snapshot

To run the replication process, you must first define a **new snapshot** in **Volume manager** function to be taken of the volume to be replicated. Snapshot size should be large enough to accommodate the changes you anticipate, 10% to 15% of the logical volume is sometimes recommended.

After assigning an appropriate amount of space for the **snapshot**, click the **apply** button.

4. Configure the Source Node

The screenshot shows the open-e DSS web interface with the 'CONFIGURATION' tab selected. In the 'volume manager' section, a table lists existing volumes and their properties. A blue arrow points from the text in the left sidebar to the 'Action' dropdown menu, which is set to 'new snapshot'. Another blue arrow points from the text in the left sidebar to the 'Assign to volume' dropdown menu, which is set to 'Just create snapshot volume'. The bottom right corner of the interface has an 'apply' button.

Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000					N/A	40.00 <input checked="" type="checkbox"/>
snap00000	S				N/A	4.00 <input checked="" type="checkbox"/>
System volumes						
Reserved Pool						
Reserved for snapshots						
Reserved for system						
Reserved for replication						
Free 6237.81						

Action: new snapshot
Assign to volume: Just create snapshot volume

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Data Server (DSS1)
Source node
Address IP:192.168.0.220

NAS volume
(lv0000)

Snapshot

Assign the snapshot (snap00000) to the logical volume to be replicated (in this example: lv0000) and click the apply button.

4. Configure the Source Node

The screenshot shows the DSS (Data Storage Server) configuration interface. The top navigation bar includes 'CONFIGURATION' (selected), 'MAINTENANCE', 'STATUS', and 'HELP'. Sub-tabs under 'CONFIGURATION' are 'volume manager' (selected), 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The left sidebar has 'Vol. groups' and 'Vol. replication' sections. The main right panel displays a 'Volume group: vg00' configuration window with an 'Action' dropdown set to 'new NAS volume'. It includes checkboxes for 'Use volume replication' and 'WORM'. Below this is a table for 'Snapshot definition' with a single entry: Name: snap00000, LV: lv0000, Status: unused. A blue arrow points from the 'Snapshot' icon above to the 'Name' field in the table. At the bottom right of the main panel are 'apply' and 'cancel' buttons. The footer of the interface reads 'Event Viewer:' and 'Data Storage Server, All rights reserved'.

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Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. Configure the Source Node

Under the „CONFIGURATION“ tab, select „NAS resources“ menu, to see a tree listing all the NAS shared volumes (Shares).

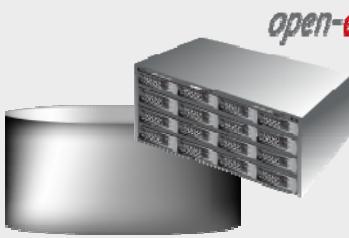
Shares: Data

To create a share, enter the share name in field **Name**. In this example a new share named **Data** has been created

The screenshot shows the DSS (Data Storage Server) web interface. At the top, there's a logo of a server and a database, followed by the text "Data Server (DSS1)", "Source node", and "Address IP:192.168.0.220". Below this, the title "4. Configure the Source Node" is displayed. The main area shows the "DSS" interface with tabs for "LOGOUT", "DSS", "CONFIGURATION", "MAINTENANCE", "STATUS", and "HELP". The "CONFIGURATION" tab is selected, and its sub-tabs include "volume manager", "NAS settings" (which is highlighted with a blue arrow), "NAS resources" (selected), "iSCSI target manager", and "FC target manager". On the left, there's a sidebar with sections for "Shares" (listing "Shares" and "Data"), "Users" (listing "1. john"), and "Groups" (listing "1. users"). The "Shares" section is expanded. On the right, a "Create new share" dialog box is open, showing fields for "Name" (set to "Data"), "Comment" (empty), "Default path" (set to "/lv0000/Data"), and "Specified path" (empty). An "apply" button is at the bottom right of the dialog. At the very bottom of the interface, it says "Event Viewer:" and "Data Storage Server. All rights reserved".

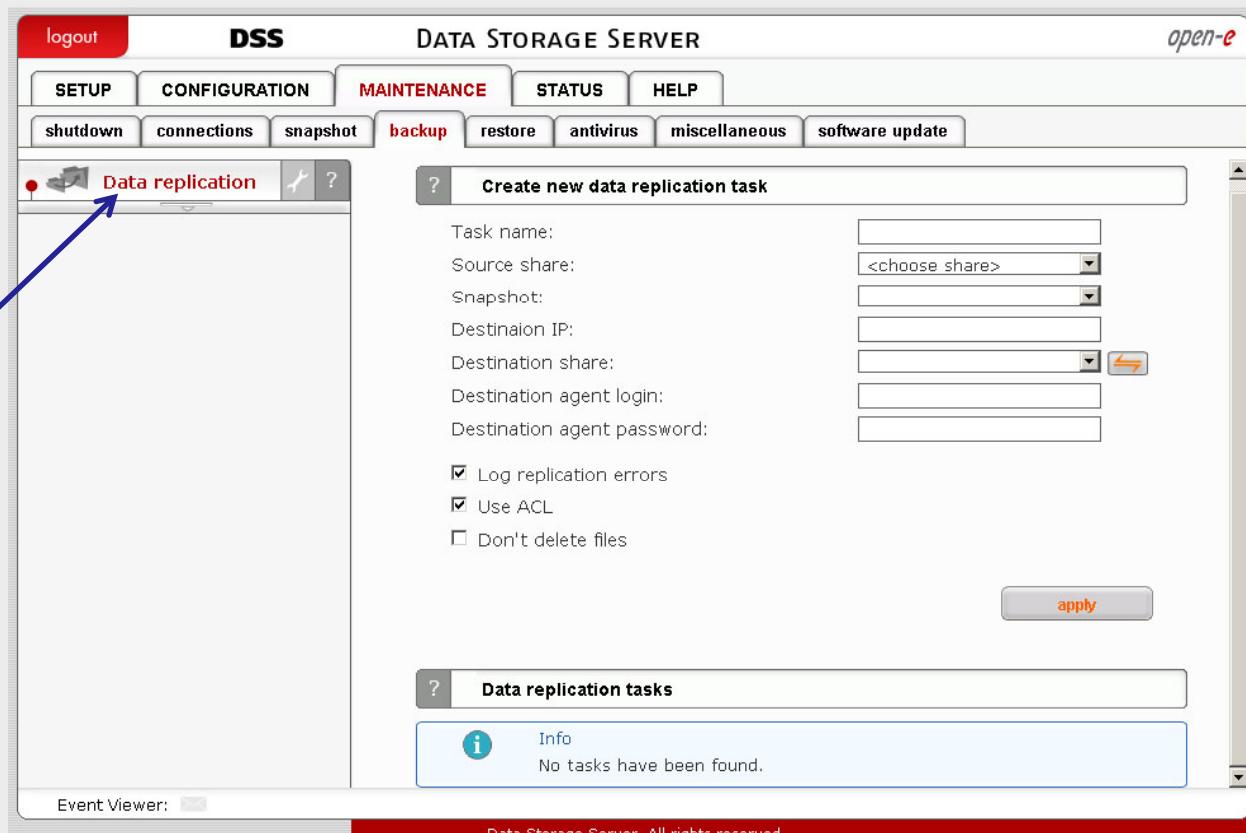
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Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. Configure the Source Node



The screenshot shows the DSS (Data Storage Server) web interface. The top navigation bar includes links for logout, DSS, DATA STORAGE SERVER, and open-e. Below the main menu, there are several tabs: SETUP, CONFIGURATION, MAINTENANCE (which is currently selected), STATUS, and HELP. Under the MAINTENANCE tab, there are sub-links for shutdown, connections, snapshot, backup (which is highlighted in red), restore, antivirus, miscellaneous, and software update. A large blue callout box contains the following text:

After the share to be replicated has been configured, go to the „MAINTENANCE“ tab and select „backup“ to choose the Data Replication function.

The main content area is titled "Create new data replication task". It includes fields for Task name, Source share (with a dropdown menu showing <choose share>), Snapshot, Destination IP, Destination share (with a dropdown menu showing <choose share>), Destination agent login, Destination agent password, and checkboxes for Log replication errors, Use ACL, and Don't delete files. An "apply" button is located at the bottom right of this section. Below this, there is a "Data replication tasks" section which displays an info message: "Info No tasks have been found." The footer of the interface includes an Event Viewer link and the copyright notice "Data Storage Server. All rights reserved".

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Setting up Asynchronous Data Replication over a WAN

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Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. Configure the Source Node

Select the source share to be replicated. Under **Create new data replication task** function, enter a name for the task and select the **Source share** to be replicated. At this point, a snapshot (**snap00000**) of the source share will automatically be assigned.

In the **Destination IP** field, enter the IP address of the destination server (in this example, 213.17.139.234) and the user name/password (if applicable) for the destination. Next, configure the **Destination share** field by clicking on the button. In this example, the **Copy of Data** share is appear. Click on the **apply** button.

The screenshot shows the DSS interface with the 'MAINTENANCE' tab selected. On the left, there's a 'Data replication' section with a red error icon. On the right, the 'Create new data replication task' dialog is open, containing the following fields:

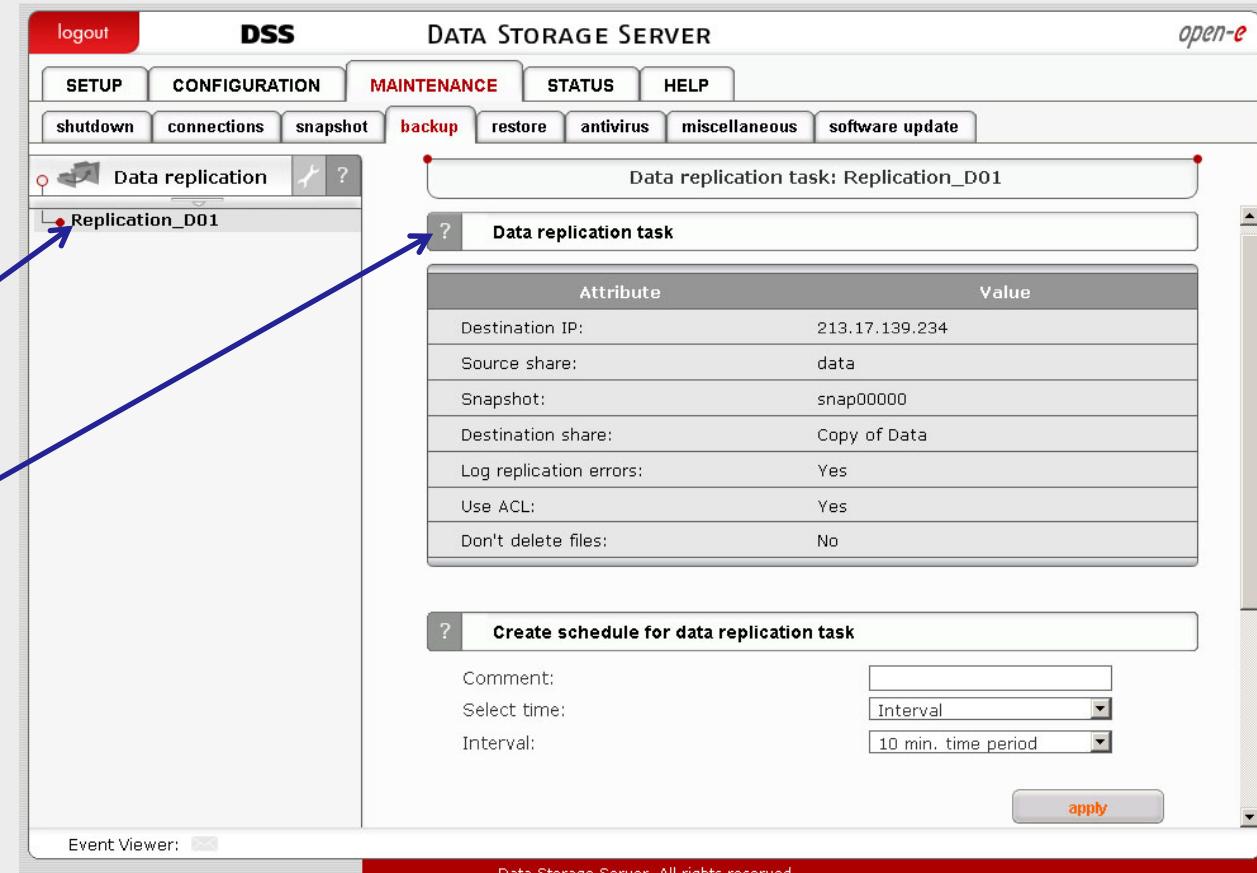
- Task name: Replication_D01
- Source share: data
- Snapshot: snap00000
- Destination IP: 213.17.139.234
- Destination share: Copy of Data
- Destination agent login: (empty)
- Destination agent password: (empty)
- Log replication errors
- Use ACL
- Don't delete files

At the bottom right of the dialog is a 'apply' button. Below the dialog, a 'Data replication tasks' section shows a message: 'Info' and 'No tasks have been found.' The footer of the interface includes 'Event Viewer:', 'Data Storage Server. All rights reserved', and a red bar at the bottom.

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Setting up Asynchronous Data Replication over a WAN

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The screenshot shows the DSS (Data Storage Server) web interface. At the top, there is a logo of a server unit with the text "open-e". Below it, a large cylinder represents a database or storage unit. To the right, the text "Data Server (DSS1)", "Source node", and "Address IP:192.168.0.220" are displayed.

4. Configure the Source Node

After the DSS WEB console has been reloaded, the new task should appear (**Replication_D01**). Obtain additional information about a selected replication task by accessing the **Data replication task** function

The interface includes a navigation bar with links like logout, DSS, SETUP, CONFIGURATION, MAINTENANCE (which is highlighted in red), STATUS, HELP, shutdown, connections, snapshot, backup, restore, antivirus, miscellaneous, and software update. The main content area shows a tree view under "Data replication" with "Replication_D01" selected. A detailed configuration window for "Replication task" is open, listing attributes and their values:

Attribute	Value
Destination IP:	213.17.139.234
Source share:	data
Snapshot:	snap00000
Destination share:	Copy of Data
Log replication errors:	Yes
Use ACL:	Yes
Don't delete files:	No

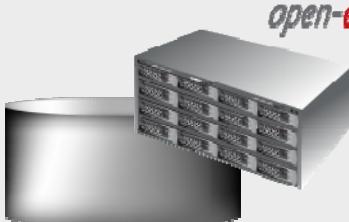
Below this, there is a section for creating a schedule for the data replication task, with fields for Comment, Select time, and Interval. An "apply" button is at the bottom right of the configuration window.

The footer of the interface includes "Event Viewer:" and "Data Storage Server. All rights reserved".

The text at the bottom of the slide states: "The configuration of the Source Node (storage server) is now complete."

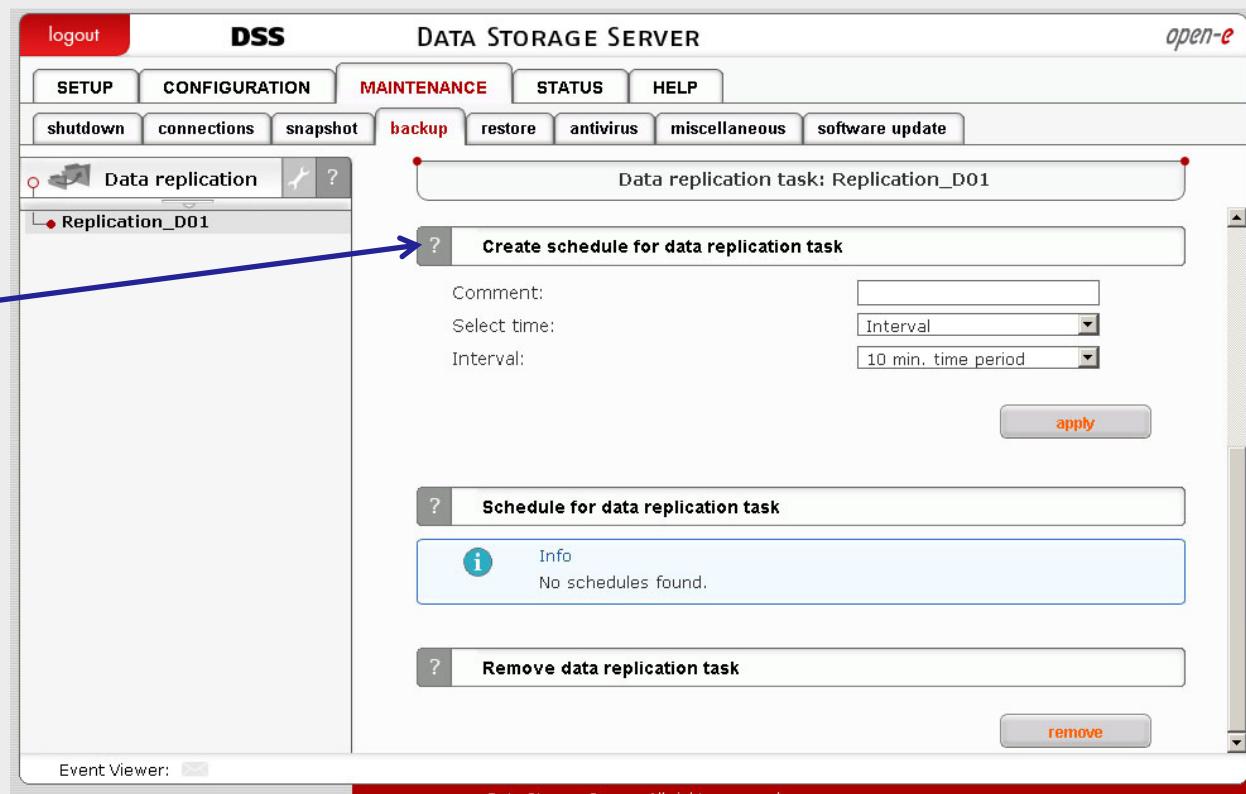
Setting up Asynchronous Data Replication over a WAN

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Data Server (DSS1)
Source node
Address IP:192.168.0.220

5. Configure Schedule replication



The screenshot shows the DSS (Data Storage Server) maintenance interface. The main window title is "DATA STORAGE SERVER". The "MAINTENANCE" tab is selected. On the left, there's a tree view with "Data replication" expanded, showing "Replication_D01". A blue callout box with the following text is positioned to the left of the interface:

Using the **Create schedule for data replication task** function, set the desired replication schedules or explicitly start, stop and delete data replication tasks, as desired.

The right side of the interface contains several panels:

- Create schedule for data replication task:** This panel includes fields for "Comment:", "Select time:", and "Interval:". The "Interval" dropdown is set to "10 min. time period". An "apply" button is at the bottom.
- Schedule for data replication task:** This panel displays an info message: "Info No schedules found."
- Remove data replication task:** This panel has a "remove" button.

At the bottom, there are "Event Viewer:" and "Data Storage Server. All rights reserved" links.

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Setting up Asynchronous Data Replication over a WAN

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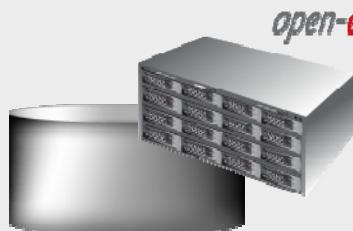
The screenshot shows the open-e DSS (Data Storage Server) web interface. At the top left, there is a graphic of a server unit with the 'open-e' logo. To its right, the text reads: 'Data Server (DSS1)', 'Source node', and 'Address IP:192.168.0.220'. The main window has a header with tabs: 'logout', 'DSS', 'DATA STORAGE SERVER', and 'open-e'. Below the tabs is a sub-header with buttons: 'SETUP', 'CONFIGURATION', 'MAINTENANCE' (which is highlighted in red), 'STATUS', and 'HELP'. Under 'MAINTENANCE', there are buttons for 'shutdown', 'connections', 'snapshot', 'backup' (which is highlighted in red), 'restore', 'antivirus', 'miscellaneous', and 'software update'. A sidebar on the left shows a tree structure with 'Data replication' expanded, revealing 'Replication_D01'. On the right side of the interface, there is a configuration panel for 'Data replication tasks'. It includes checkboxes for 'Log replication errors' (checked), 'Use ACL' (checked), and 'Don't delete files' (unchecked). An 'apply' button is located at the bottom right of this panel. Below the configuration panel is a table titled 'Data replication tasks' with one row. The table columns are 'Name', 'Start time', and 'Action'. The row contains: 'Replication_D01', '2009-03-12 23:46:54', and three icons for 'start', 'stop', and 'delete'. At the bottom of the interface, there is an 'Event Viewer' section and a red footer bar with the text 'Data Storage Server. All rights reserved'.

In **Data replication tasks** function set the desired data replication to start, stop and delete tasks.

6. Checking status data replication

Setting up Asynchronous Data Replication over a WAN

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Data Server (DSS1)
Source node
Address
IP:192.168.0.220

5. Checking status data replication

To obtain detailed information about the progress of data replication tasks, under the „STATUS” tab, select „tasks” menu.
Next click Data Replication tasks and select the Tasks

The screenshot shows the DSS (Data Storage Server) web interface. At the top, there is a navigation bar with tabs: logout, DSS, DATA STORAGE SERVER, STATUS (which is highlighted in red), HELP, and several others like network, logical volume, connections, system, hardware, tasks (also highlighted in red), and S.M.A.R.T. Below the navigation bar, there is a sidebar with a tree view containing 'Tasks' (selected), 'Backup', 'Restore from backup', 'Data Replication' (which is also highlighted with a blue arrow), 'Antivirus', 'Volume Replication', and 'Snapshots'. The main content area has three sections: 'Tasks: Data Replication' (empty), 'Running tasks' (listing 'Replication_D01' as a 'Data replication' task started on 2009-03-12 23:46:54), and 'Tasks log' (listing two entries: one for 'Replication_D01' started at 23:47:08 and finished at 20:20:57, and another summary row with statistics: Files overall: 431, Files transferred: 26, Preparing time: 4.79 sec, Sent: 267.71 MB, Transfer: 14.90 MB/s). At the bottom, there is an 'Event Viewer:' link and a footer that says 'Data Storage Server. All rights reserved.'

The configuration of the source and destination nodes for asynchronous data replication is now complete.

Thank You!