## Contents

### About this guide
- Intended audience ............................................. 11
- Related documentation ........................................ 11
- Document conventions and symbols .......................... 11
- HP technical support .......................................... 12
- Customer self repair .......................................... 12
- Product warranties ........................................... 12
- Registering your tape drive ................................... 12
- Subscription service .......................................... 13
- HP websites .................................................... 13
- Documentation feedback ...................................... 13

### 1 Before you start
- Overview ....................................................... 15
- Optional tape attach .......................................... 15
- Software and hardware requirements ........................ 16
- Terminology .................................................... 16
  - Autoloaders .................................................. 16
  - Backup devices and slots .................................. 16
  - Hosts .................................................................. 16
  - Import/Export and Copy ..................................... 18
  - iSCSI .................................................................. 18
  - Mail slots (import/export elements) ....................... 18
  - Physical tape drives ......................................... 19
  - RAID .................................................................. 19
  - Storage capacity .............................................. 19
  - Physical storage .............................................. 19
  - Actual storage used .......................................... 19
  - Considerations when configuring cartridges and slots 19
  - Tape rotation strategies ..................................... 20
- Compression ...................................................... 21

### 2 Connecting and installing the HP D2D Backup System
- Connect the hardware .......................................... 23
  - DHCP and static IP addressing ............................. 24
  - Optional Tape Attach ......................................... 24
- Supported network configurations ............................. 24
  - As a device on a Gigabit Ethernet network ............... 24
  - Directly connected to a backup server on your main network 24
- Software installation, discovery and configuration ...... 26
- Recommended web browser settings ........................ 26
  - Internet Explorer 7.X ........................................ 27
  - Internet Explorer 6.X ........................................ 27
  - Mozilla Firefox 1.5 and Firefox 2.X ....................... 27

### 3 Attaching a physical tape drive (optional)
- Hardware requirements for Tape Attach ...................... 29
- Tape drive installation overview ................................ 29
- Removing the access panel and bezel .......................... 30
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installing the HBA</td>
<td>31</td>
</tr>
<tr>
<td>Installing an internal tape drive</td>
<td>33</td>
</tr>
<tr>
<td>Replacing the access panel and bezel</td>
<td>35</td>
</tr>
<tr>
<td>Connecting an external tape drive</td>
<td>36</td>
</tr>
<tr>
<td>4 The Installation wizard</td>
<td>39</td>
</tr>
<tr>
<td>Before you install the first host</td>
<td>39</td>
</tr>
<tr>
<td>Run the Installation wizard</td>
<td>40</td>
</tr>
<tr>
<td>5 Advanced installation</td>
<td>45</td>
</tr>
<tr>
<td>Using DHCP to discover the HP D2D Backup System</td>
<td>45</td>
</tr>
<tr>
<td>Using the Discovery Engine to discover the HP D2D Backup System</td>
<td>45</td>
</tr>
<tr>
<td>Beacon mode</td>
<td>46</td>
</tr>
<tr>
<td>If the HP D2D Backup System is new and not yet configured</td>
<td>46</td>
</tr>
<tr>
<td>If the HP D2D Backup System has been configured incorrectly</td>
<td>46</td>
</tr>
<tr>
<td>If the network setup has been changed</td>
<td>46</td>
</tr>
<tr>
<td>Microsoft iSCSI Initiator</td>
<td>46</td>
</tr>
<tr>
<td>Manual iSCSI initiator installation</td>
<td>47</td>
</tr>
<tr>
<td>The iSCSI Initiator</td>
<td>47</td>
</tr>
<tr>
<td>General tab</td>
<td>48</td>
</tr>
<tr>
<td>Discovery tab</td>
<td>48</td>
</tr>
<tr>
<td>Targets tab</td>
<td>49</td>
</tr>
<tr>
<td>Persistent Targets tab</td>
<td>50</td>
</tr>
<tr>
<td>Bound Volumes/Devices tab</td>
<td>51</td>
</tr>
<tr>
<td>Linux iSCSI initiator</td>
<td>51</td>
</tr>
<tr>
<td>Manual driver installation</td>
<td>51</td>
</tr>
<tr>
<td>HP LTO Tape driver</td>
<td>52</td>
</tr>
<tr>
<td>Medium changer driver</td>
<td>52</td>
</tr>
<tr>
<td>6 LEDs</td>
<td>53</td>
</tr>
<tr>
<td>Understanding the LEDs</td>
<td>53</td>
</tr>
<tr>
<td>Bootup LED sequence</td>
<td>53</td>
</tr>
<tr>
<td>Firmware LED sequence</td>
<td>53</td>
</tr>
<tr>
<td>Beacon mode</td>
<td>53</td>
</tr>
<tr>
<td>7 Backup scenarios using the HP D2D Backup System</td>
<td>55</td>
</tr>
<tr>
<td>Simple backup</td>
<td>55</td>
</tr>
<tr>
<td>Office backup</td>
<td>56</td>
</tr>
<tr>
<td>Fileserver</td>
<td>56</td>
</tr>
<tr>
<td>Database server</td>
<td>57</td>
</tr>
<tr>
<td>Desktop PC</td>
<td>58</td>
</tr>
<tr>
<td>Summary</td>
<td>59</td>
</tr>
<tr>
<td>High-performance workstation backup</td>
<td>60</td>
</tr>
<tr>
<td>Main backup to autoloader</td>
<td>60</td>
</tr>
<tr>
<td>Additional backup to tape drive</td>
<td>60</td>
</tr>
<tr>
<td>Summary</td>
<td>61</td>
</tr>
<tr>
<td>Incorporating archive to tape into a rotation strategy</td>
<td>61</td>
</tr>
<tr>
<td>8 The Web Management Interface</td>
<td>63</td>
</tr>
<tr>
<td>What is the Web Management interface?</td>
<td>63</td>
</tr>
<tr>
<td>To run the Web Management Interface</td>
<td>63</td>
</tr>
<tr>
<td>Summary (Home)</td>
<td>64</td>
</tr>
<tr>
<td>Status icons</td>
<td>65</td>
</tr>
<tr>
<td>Devices (Configuration)</td>
<td>65</td>
</tr>
<tr>
<td>To view device details</td>
<td>65</td>
</tr>
<tr>
<td>To edit device details</td>
<td>66</td>
</tr>
<tr>
<td>To create a new device</td>
<td>66</td>
</tr>
</tbody>
</table>
To delete a device .................................................. 67
Cartridges (Configuration) ........................................ 67
Empty slots ................................................................ 69
To remove a cartridge ............................................... 69
To write protect a cartridge ...................................... 70
To edit maximum size .............................................. 70
To create a cartridge ................................................ 70
Network (Configuration) ........................................... 71
Network configuration ............................................ 72
To edit network settings ........................................... 72
Resetting network settings to factory defaults ........... 73
Beacon mode ....................................................... 73
Email Alerts (Configuration) ..................................... 74
To configure Microsoft Exchange Server .................... 75
Disk & RAID (Status) .............................................. 76
RAID status ........................................................... 76
Disk usage ................................................................ 76
Physical disks ......................................................... 77
iSCSI (Status) ......................................................... 77
Log (Status) ............................................................. 78
Tape Attach pages .................................................. 79
Shutdown (Admin) ..................................................... 79
Administration (Admin) .......................................... 80
Resetting the password ........................................... 80
Firmware (Admin) ...................................................... 81
Support (Admin) ....................................................... 82

9 Export, import and copy using an attached tape drive . . . 83
Requirements for connecting a tape drive to the HP D2D . 83
A note about terminology .......................................... 83
Archiving methods .................................................. 84
Cartridge copy .......................................................... 84
  Why use the Copy functionality? .............................. 85
  When would Copy be used? ...................................... 85
  When is it necessary to restore from a copied cartridge? 85
  Disadvantages of Copy .......................................... 86
Cartridge export ........................................................ 86
  Why use the Export functionality? ......................... 87
  When would Export be used? ................................. 87
  When would I restore from an exported cartridge? .... 87
  Disadvantages of Export ....................................... 87
Cartridge import ...................................................... 88
Tape spanning ........................................................ 88
Using the Web Management interface to copy/export/import cartridges ............................. 88
Configuration (Tape Attach) ....................................... 89
  Adding tape drives to the list .................................. 89
  Upgrading tape drive firmware ............................... 89
Copy/Export/Import (Tape Attach) ......................... 89
  To copy to attached tape drive .............................. 90
  To export to attached tape drive ............................ 91
  To import from attached tape drive ....................... 93
Status (Tape Attach) ............................................... 94
  To cancel a job ..................................................... 95
  If an error occurs ............................................... 95
Schedule (Tape Attach) ........................................... 95
  To create a schedule ............................................ 96
  To view, edit or delete existing schedules .............. 97
Job History (Tape Attach) ......................................... 97
Compression .......................................................... 98
10 Copy using a tape drive attached to the host ........................................ 99
  Requirements .................................................................................. 99
  Tape drives supported ........................................................................ 99
  Archive from host to tape process ................................................... 99
  Further information ........................................................................... 100
  Compression ......................................................................................... 100

11 Restore processes ............................................................................ 101
  Restore scenarios .............................................................................. 101
  Restoring from the HP D2D Backup System ...................................... 102
  Reconnecting to the HP D2D after host failure .................................. 102

12 Troubleshooting .................................................................................. 105
  Connecting the hardware ................................................................... 105
    My network does not have a spare Gigabit port ............................... 105
    The supplied cable is too short ....................................................... 105
    I am connecting directly to a 10/100 Base-T port on a storage server ... 105
  DHCP is not working ......................................................................... 105
  Running the Installation wizard ........................................................ 106
    Drivers fail to install using the install wizard ................................. 106
    Device discovery fails to find device ............................................. 106
    iSCSI Initiator fails to download ................................................... 107
    The wizard has not created an autoloader for my host ..................... 107
  Manual installation ............................................................................. 108
  HP D2D Backup System troubleshooting .......................................... 108
    Powering up the HP D2D Backup System ....................................... 108
    Shutting down the HP D2D Backup System ..................................... 108
    Disconnecting hosts ....................................................................... 109
  Device troubleshooting ..................................................................... 109
    Host cannot connect to the device from Web Management Interface ... 109
    Backup application fails to see device ............................................ 109
    I cannot create a device .................................................................. 110
    I cannot see a newly created device .............................................. 110
    I cannot see additional slots from the backup application ................. 110
    A deleted device keeps reappearing .............................................. 110
    If backup is slow ........................................................................... 110
  Cartridge troubleshooting .................................................................. 110
    I cannot resize cartridges ................................................................ 110
    My tape drive device has run out of space ..................................... 111
    The cartridges for my attached tape drive are smaller than 200 GB .... 111
  Attached tape drive troubleshooting .................................................. 111
    An attached tape drive does not appear on the Web interface ........... 111
    Cartridge copy or export fails ....................................................... 111
    Cartridge import fails .................................................................... 111
  Email alerts troubleshooting .............................................................. 112
  Disk troubleshooting .......................................................................... 112
    If the HP D2D Backup System runs out of space ............................. 112
    If a disk fails ................................................................................. 112

13 Hard disk replacement ....................................................................... 113
  Replaceable parts .............................................................................. 113
    RAID 5 .......................................................................................... 113
  How do I know a disk has failed? ...................................................... 113
    If more than one disk fails ........................................................... 114
  Electrostatic discharge information .................................................. 115
  Replacing the hard disk .................................................................... 115
  Replacing a complete unit .................................................................. 122
## Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front and rear view of the HP D2D Backup System</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>Device configuration with one host</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Device configuration with multiple hosts</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>Storage capacity</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Network and power connectors</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>Attaching a tape drive to the HP D2D Backup System</td>
<td>24</td>
</tr>
<tr>
<td>7</td>
<td>Connecting to a business server on the main network</td>
<td>25</td>
</tr>
<tr>
<td>8</td>
<td>Connecting to a dedicated backup network</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>Connecting to a network server</td>
<td>26</td>
</tr>
<tr>
<td>10</td>
<td>Attaching a tape drive to the HP D2D Backup System</td>
<td>29</td>
</tr>
<tr>
<td>11</td>
<td>Removing the access panel</td>
<td>30</td>
</tr>
<tr>
<td>12</td>
<td>Removing the front bezel</td>
<td>31</td>
</tr>
<tr>
<td>13</td>
<td>Removing the slot cover retainer</td>
<td>31</td>
</tr>
<tr>
<td>14</td>
<td>Removing the top expansion slot cover</td>
<td>32</td>
</tr>
<tr>
<td>15</td>
<td>Installing the HBA</td>
<td>32</td>
</tr>
<tr>
<td>16</td>
<td>Replacing the PCI slot cover</td>
<td>33</td>
</tr>
<tr>
<td>17</td>
<td>Removing the filler panel</td>
<td>33</td>
</tr>
<tr>
<td>18</td>
<td>Selecting the correct screws</td>
<td>34</td>
</tr>
<tr>
<td>19</td>
<td>Attaching the screws and metal shims</td>
<td>34</td>
</tr>
<tr>
<td>20</td>
<td>Installing the internal tape drive (example shows a SCSI tape drive)</td>
<td>35</td>
</tr>
<tr>
<td>21</td>
<td>Removing the blank plate in the bezel</td>
<td>35</td>
</tr>
<tr>
<td>22</td>
<td>Replacing the bezel</td>
<td>36</td>
</tr>
<tr>
<td>23</td>
<td>Replacing the access panel</td>
<td>36</td>
</tr>
<tr>
<td>24</td>
<td>Connecting the cables (SCSI tape drive)</td>
<td>37</td>
</tr>
<tr>
<td>25</td>
<td>Powering on the HP D2D Backup System</td>
<td>40</td>
</tr>
<tr>
<td>26</td>
<td>Creating the backup device</td>
<td>43</td>
</tr>
<tr>
<td>27</td>
<td>iSCSI Initiator download page</td>
<td>47</td>
</tr>
<tr>
<td>28</td>
<td>LEDs</td>
<td>53</td>
</tr>
<tr>
<td>29</td>
<td>Simple backup from a single host</td>
<td>56</td>
</tr>
<tr>
<td>30</td>
<td>HP D2D Backup System after the first host is configured</td>
<td>57</td>
</tr>
<tr>
<td>31</td>
<td>HP D2D Backup System after the second host is configured</td>
<td>58</td>
</tr>
<tr>
<td>32</td>
<td>HP D2D Backup System after the third host is configured</td>
<td>59</td>
</tr>
<tr>
<td>33</td>
<td>Option remains to configure more hosts</td>
<td>60</td>
</tr>
<tr>
<td>Page</td>
<td>Topic</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>HP D2D Backup System with one host and two devices</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Copying to physical tape as part of a rotation strategy</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Cartridge copy</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Cartridge export</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Cartridge import</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Archiving to tape</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Fewer hosts are supported because Hosts 1, 2 and 3 have two devices</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Removing the access panel</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Removing the front bezel</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Removing the disk cover</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Identifying the hard disk</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Removing the hard drive</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Installing a hard drive</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Replacing the drive cover</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Replacing the bezel</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Replacing the access panel</td>
<td></td>
</tr>
</tbody>
</table>
Tables

1. Document conventions ........................................ 11
2. Summary page layout ...................................... 65
3. Device parameters ............................................ 67
4. Cartridge parameters ....................................... 69
5. Network parameters ......................................... 73
6. Email parameters ............................................. 75
7. Physical disk parameters .................................... 77
8. Job schedule parameters .................................... 97
9. Restore scenarios ............................................ 101
About this guide

This guide provides information about:
• Installing the HP StorageWorks D2D Backup System
• Using the HP StorageWorks D2D Backup System
• Troubleshooting the HP StorageWorks D2D Backup System

Intended audience
This guide is intended for users who install, operate and maintain the HP StorageWorks D2D Backup System.

Related documentation
In addition to this guide, the following document provides related information:
• ‘Start here’ poster for an overview of the installation information in this guide (available in English, French, German and Japanese)

You can find these documents from the Manuals page of the HP Business Support Center website:
http://www.hp.com/support/manuals
In the Storage section, click Storage Solutions and then select your product.
http://www.hp.com/support/manuals

Document conventions and symbols

Table 1 Document conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue text: Table 1</td>
<td>Cross-reference links and e-mail addresses</td>
</tr>
<tr>
<td>Blue, underlined text: <a href="http://www.hp.com">http://www.hp.com</a></td>
<td>website addresses</td>
</tr>
<tr>
<td>Bold text</td>
<td>• Keys that are pressed</td>
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<tr>
<td></td>
<td>• Text typed into a GUI element, such as a box</td>
</tr>
<tr>
<td></td>
<td>• GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes</td>
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<tr>
<td>Italic text</td>
<td>Text emphasis</td>
</tr>
<tr>
<td>Monospace text</td>
<td>• File and directory names</td>
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<td></td>
<td>• System output</td>
</tr>
<tr>
<td></td>
<td>• Code</td>
</tr>
<tr>
<td></td>
<td>• Commands, their arguments, and argument values</td>
</tr>
<tr>
<td>Monospace, italic text</td>
<td>• Code variables</td>
</tr>
<tr>
<td></td>
<td>• Command variables</td>
</tr>
<tr>
<td>Monospace, bold text</td>
<td>Emphasized monospace text</td>
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</tbody>
</table>
WARNING!
Indicates that failure to follow directions could result in bodily harm or death.

CAUTION:
Indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT:
Provides clarifying information or specific instructions.

NOTE:
Provides additional information.

HP technical support
For worldwide technical support information, see the HP support website:
http://www.hp.com/support
Before contacting HP, collect the following information:
• Product model names and numbers
• Technical support registration number (if applicable)
• Product serial numbers
• Error messages
• Operating system type and revision level
• Detailed questions

Customer self repair
HP customer self repair (CSR) programs allow you to repair your StorageWorks product. If a CSR part needs replacing, HP ships the part directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your HP-authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider. For North America, see the CSR website:
http://www.hp.com/go/selfrepair

Product warranties
For information about HP StorageWorks product warranties, see the warranty information website:
http://www.hp.com/go/storagewarranty

Registering your tape drive
Once you have installed and tested your HP D2D Backup System please take a few minutes to register your product. You can register via the web (www.register.hp.com).
To ensure your registration is complete, there are a number of questions on the electronic form that are mandatory. Other questions are optional. However, the more you feel able to complete, the better HP can meet your needs.

Subscription service

HP recommends that you register your product at the Subscriber’s Choice for Business website:

http://www.hp.com/go/e-updates

After registering, you will receive e-mail notification of product enhancements, new driver versions, firmware updates, and other product resources.

HP websites

For additional information, see the following HP websites:

• http://www.hp.com
• http://www.hp.com/go/storage
• http://www.hp.com/service_locator
• http://www.hp.com/support/manuals
• http://www.hp.com/support/downloads

Documentation feedback

HP welcomes your feedback.

To make comments and suggestions about product documentation, please send a message to storagedocs.feedback@hp.com. All submissions become the property of HP.
1 Before you start

In this chapter:
- “Overview” on page 15
- “Optional tape attach one” on page 15
- “Software and hardware requirements” on page 16
- “Terminology” on page 16
- “Storage capacity” on page 19
- “Compression” on page 21

Overview

The HP StorageWorks D2D Backup System is an iSCSI disk-based storage appliance that emulates up to six tape devices; these tape devices can be used to back up a maximum of six host network servers or PCs. Each tape device is configured as an 1x8 G2 Ultrium Tape Autoloader (or standalone Ultrium Tape Drive). Autoloaders may be configured with between 8 and 24 slots.

Optional tape attach

An Ultrium Tape Drive may be attached directly to the HP D2D Backup System, allowing the user to store backups offsite. An internal tape drive must be half-height and is installed in the half-height bay above the LEDs, labeled 3 on Figure 1. External tape drives may be half-height or full-height. Both SAS and SCSI tape drives are supported and require installation of a host bus adapter (HBA).
To find out which Ultrium Tape Drive models and HBAs and are supported, refer to www.hp.com/go/connect.

Software and hardware requirements

Refer to www.hp.com/go/connect for the latest connectivity and compatibility information.

- The HP D2D Backup System should be connected to a Gigabit Ethernet network. 100 Base-T Ethernet will limit performance; 10 Base-T Ethernet will severely limit performance. For example network topologies, see “Supported network configurations” on page 24.
- For backup and restore you need software that supports tape autoloaders. This software resides on the host, not the HP D2D Backup System. A CD-ROM containing HP Data Protector Express software is supplied with the HP D2D Backup System. The device may also be used with the major backup applications from HP, Symantec, EMC, Computer Associates and others.
- Windows Backup is only supported with standalone tape drives created on the HP D2D Backup System. It is not supported for use with autoloader backup devices created on the HP D2D Backup System.

Terminology

Autoloaders

An autoloader is a backup device that has multiple storage slots. Each storage slot contains a cartridge. This has two advantages over standalone tape drives:

- The overall storage capacity is much greater.
- More importantly, each cartridge can be allocated to a specific backup task; for example, one cartridge can hold Monday’s data, another can hold Tuesday’s data, and so on. In this way, backup applications are able to implement tape rotation strategies that accommodate differing backup requirements for daily, weekly, monthly, yearly backups. Please see “Backup scenarios using the HP D2D Backup System” on page 55 for worked examples.

Backup devices and slots

Backup devices appear to the host as locally-attached tape devices, but physically, they use disk space on the HP D2D Backup System which, as in tape terminology, is referred to as slots or cartridges.

Depending on your data protection strategy, you may configure each backup device as a standalone HP StorageWorks Ultrium Tape Drive or, more typically, as an HP StorageWorks 1x8 G2 Tape Autoloader with attached Ultrium Tape Drive.

- When you configure your HP D2D Backup System with a standalone tape drive, 200 GB of physical disk space is made available for that tape drive. This is the equivalent of a permanently-mounted 200 GB tape cartridge, which cannot be unloaded. Tape spanning is impossible, so the data to be backed up must not exceed 200 GB.
- When you configure your HP D2D Backup System with a tape autoloader, up to 200 GB of physical disk space can be made available for each configured slot. This is the equivalent of an autoloader with multiple slots, each containing a 200 GB cartridge. Both tape spanning and, more importantly, flexible tape rotation strategies are possible.

Hosts

Each emulated tape device is uniquely mapped to an individual host; this is the network server or PC that you wish to back up.

- The tape device appears to the host as a locally-attached tape autoloader or tape drive.
- The tape device is accessed and managed from the backup software running on the host.
- The tape device is not visible to other devices on the network.
Multiple servers may not back up to a single tape device.

Figure 2 on page 17 shows a configuration with a single host. Figure 3 on page 18 shows a configuration with six hosts. See “Connecting and installing the HP D2D Backup System” on page 23 for more example configurations.

1. The Installation wizard has been run on Host 1.
2. The HP D2D Backup System automatically generates an autoloader for the host. The user may specify the number of slots during installation.

**Figure 2 Device configuration with one host**

- By default, the host sees only one device, the autoloader that has been configured for it during installation. Data from each host goes to its corresponding autoloader.
- Each backup device is visible only to the host for which it has been configured.
- A host may have multiple devices configured for it on the HP D2D Backup System, but this means fewer hosts may be connected (not illustrated, see Figure 34 on page 61 for an example of one host with two devices).
1. The HP D2D Backup System can be used to back up a maximum of six hosts.

2. The Installation wizard automatically generates an autoloader for each host. The user may specify the number of slots during installation.

**Figure 3 Device configuration with multiple hosts**

**Import/Export and Copy**

If you attach a supported, physical tape drive directly to your HP D2D Backup System, you will be able to copy or export data to the physical tape drive so that backups can be stored offsite. This is an important requirement for Disaster Recovery strategies. The main difference between copy and export is that copied data remains on the HP D2D Backup System; exported data is removed from it, but can be imported easily when required. These functions are grouped under the Tape Attach section of the Web Interface. Please see “Export, import and copy to an attached tape drive” on page 83 for more details about working with Tape Attach.

**iSCSI**

The HP D2D Backup System is an iSCSI device. This means that the HP D2D Backup System plugs directly into the network, but it presents devices as directly-attached SCSI autoloaders to host machines. In order to function, it requires an iSCSI initiator. On Windows systems, this is normally downloaded by the Installation wizard, as described in “Connecting and installing the HP D2D Backup System” on page 23. For more information about iSCSI, see “Advanced installation” on page 45. Linux users should also refer to the “Linux Configuration Guide” on the HP StorageWorks Tape CD-ROM for more information.

**Mail slots (import/export elements)**

A mail slot is a term borrowed from tape terminology to identify a dedicated slot that is used specifically to import and export cartridges. They are sometimes called import/export elements by backup applications. Backup applications that support this feature move cartridges from the mail slot when the user runs an Export job, and look for cartridges in the mail slot when the user runs an Import job.
Physical tape drives

A physical tape drive is a tape drive that is attached to the HP D2D Backup System or the host computer, so that data can be moved from the HP D2D Backup System and stored offsite. (It should not be confused with the tape drive device that can be configured as one of the backup devices on the HP D2D Backup System.)

RAID

RAID stands for Redundant Array of Inexpensive (or Independent) Devices, which is a data storage scheme that divides data among multiple hard drives, increasing data reliability and throughput. The HP D2D Backup System is a RAID5 device, which offers the best combination of data protection and capacity. It has four hard disks, but if one of the disks fails, no data is lost and the HP D2D Backup System continues to operate correctly. (The failed disk should be replaced as soon as possible, as described in “Replacing the hard disk” on page 115.)

Storage capacity

Physical storage

The physical storage capacity of the HP D2D Backup System 130 is 3.0 TB (3000 GB), of the HP D2D Backup System 120 is 2.0 TB (2000 GB) and of the HP D2D Backup System 110 is 1 TB (1000 GB). However, in order to ensure a high level of data integrity, the disks use RAID 5 protection. This reduces the available capacity but ensures that, in the event of a single disk failure in the device, there will be no data loss.

Actual storage capacity is approximately:

- 2.25 TB for the HP D2D Backup System 130
- 1.5 TB for the HP D2D Backup System 120
- 750 GB for the HP D2D Backup System 110

You cannot add physical disk space, but you may be able to create some space. Options for creating space, if the disks start to get full, are:

- Review your backup jobs to see if you can reduce the size of backup or retention time.
- Use the backup application job settings to overwrite or erase data.
- Export cartridges to physical tape.

Actual storage used

The default maximum cartridge size is 200 GB, but the HP D2D Backup System only allocates space as it is required for backup. Individual backup jobs rarely use a whole cartridge and you are unlikely to use all the available disk capacity. However, when configuring the HP D2D Backup System for extremely flexible tape rotation schemes, it may be necessary to exercise a little care. You should take the following factors into consideration to ensure that you do not over-commit physical storage space:

- The number of slots that you have configured in an autoloader. The default configuration is 8, but you can edit that to be any number up to 24 (24 x 200 GB = 4.8 TB, which is greater than the physical disk capacity. Therefore, you could not fill all of these slots with the capacity available.)
- The number of devices that you have created. It is possible to create up to six tape autoloaders, each with 24 slots. You could not fill all of these slots with the physical disk capacity available.

Considerations when configuring cartridges and slots

Each slot configured commits 2 GB of physical disk space, regardless of what value has been configured for the maximum cartridge size. The remainder of the configured maximum capacity is used only as needed, but the initial 2 GB is permanently committed. Therefore, only configure the number of slots...
that you actually require. If you configure six 24-slot autoloaders, you should be aware that you have committed 192 GB of disk space. Only do this, if you are sure all slots will be used. Once added, slots cannot be removed.

1. 8 x 2 GB of physical disk space has been committed.

2. The remainder of the configured maximum capacity is used only as needed, but the initial 2 GB is permanently committed.

**Figure 4 Storage capacity**

The example configurations in “Backup scenarios using the HP D2D Backup System” on page 55 illustrate how you can make full use of the available slots in designing your backup rotation strategy and ensure that you do not create a backup scheme that would result in running out of physical disk space.

**NOTE:**

The LED indicators and the Status pages on the Web Management Interface will warn you when disks in the HP D2D Backup System exceed 90% full.

**Tape rotation strategies**

Tape rotation strategies determine when backups are run, the number of cartridges that are required and how they are reused. The HP D2D Backup System is a very flexible device that can easily be incorporated into most tape rotation strategies. If your organization does not yet have a tape rotation strategy in place, see “Backup scenarios using the HP D2D Backup System” on page 55 for example configurations.
Compression

The HP D2D Backup System does not apply hardware compression to backed-up data, but if you are moving data from the HP D2D to physical tape, bear in mind that HP StorageWorks tape drives do apply compression. Therefore, 200 GB of data on the HP D2D Backup System will require less space on a physical tape cartridge. If moving data to a physical cartridge for offsite storage, there is no need for concern if the data seems to utilize less space.

Some users may choose to enable software compression from their backup application to increase the storage space available to the backup application, but this can make backup jobs slower to run. However, once software compression has been applied, the data is not further compressed when it is exported to a physical tape directly attached to the HP D2D Backup System. This ensures that the user knows exactly how much physical cartridge space is required for export or copy.
2 Connecting and installing the HP D2D Backup System

In this chapter:
• “Connect the hardware” on page 23
• “Supported network configurations” on page 24
• “Software installation, discovery and configuration” on page 26
• “Web browser settings” on page 26

Connect the hardware

1. Network connector
2. Power connector

Figure 5 Network and power connectors
1. Always use the supplied power cord to connect the HP D2D Backup System to the main power supply. This HP-approved cord is appropriate for your specific geographic region.
   For detailed safety information, see the Safety Guide on the HP StorageWorks CD-ROM.
2. Use the supplied network cable to connect to a Gigabit network switch. 100 Base-T Ethernet will limit performance; 10 Base-T Ethernet will severely limit performance. For example network topologies, see “Supported network configurations” on page 24.
DHCP and static IP addressing

DHCP network addressing is enabled by default, which means that an IP address and other network settings are assigned automatically when you connect the HP D2D Backup System to a network that has a DHCP server. If preferred, you can use static IP addressing and assign settings manually during the installation process.

In both instances, the HP D2D Backup System should be on the same logical and physical network as the host machine connecting to it. This is normally the case because, typically, the HP D2D Backup System is connected to the same Gigabit network switch as the host machines backing up to it.

Optional Tape Attach

A tape drive may be attached directly to your HP D2D Backup System, allowing you to store backups offsite. Please refer to “Attaching a physical tape drive” on page 29 for further details.

Figure 6 Attaching a tape drive to the HP D2D Backup System

1. Internal tape drive 2. External tape drive

Supported network configurations

There are two ways of connecting the HP D2D Backup System to your network:

- By connecting it directly to a network switch on your network
- By connecting it to a backup server that is already on the network

As a device on a Gigabit Ethernet network

The HP D2D Backup System is connected to a spare port on an existing Gigabit network switch.

This may be your main network, which is also used to connect a number of different types of devices, such as PCs, servers, workstations and printers, or a dedicated backup network that is used solely for clients that need to be backed up.

The configuration, illustrated in Figure 7 on page 25, is the simplest and most common configuration, assuming that Gigabit networking is already in place, and requires no additional hardware. The only disadvantage to the configuration is that a high volume of traffic may impact network performance during backup and backups may take longer to complete. However, if backups are scheduled to run outside of normal business hours, the volume of data traffic is unlikely to be a problem.
In some environments, backup data is kept separate from day-to-day office network traffic, as illustrated in Figure 8 on page 25. There is a separate, dedicated IP network for all hosts that need data to be backed up.

**NOTE:**
Our example shows one PC that is connected to the LAN, but not to the Storage Network. This PC will not be able to run the Installation wizard or connect to the HP D2D Backup System from the web. No data from this PC can be directly backed up to the HP D2D Backup System.

**Directly connected to a backup server on your main network**

In this configuration, a specific server on the network is being used as a backup server. The HP D2D Backup System has a dedicated connection directly to the storage server and not to the business network.
This ensures good backup performance. However, only the backup server can be backed up; other devices on the network must be configured as clients that back up to the designated backup server over the business network, which may impact performance.

![Diagram of network setup](image)

**Figure 9 Connecting to a network server**

This configuration, illustrated in Figure 9 on page 26, requires a spare Gigabit network port or card on the storage server to support the direct connection to the HP D2D Backup System. Use the cable supplied with the HP D2D Backup System to connect to the Gigabit network card on the server.

**NOTE:**
If the server has a 10/100 Base-T network card, you will need a cross-over network cable (not supplied). A better solution, to ensure optimum performance, is to purchase and install a Gigabit network card.

### Software installation, discovery and configuration

There are three stages to installation:

- Install all the required drivers
- Discover the HP D2D Backup System on the network, give it a name and, if DHCP is not supported, assign network settings
- Create a base configuration to get started

Dynamic (DHCP) addressing is enabled by default on the HP D2D Backup System. If your network supports DHCP, all the required network parameters will be assigned automatically. If your network uses static IP addressing, you will need to assign network settings manually (IP address, subnet mask and gateway).

For Windows users, the recommended way to set up the HP D2D Backup System network is to run the Installation wizard from the HP StorageWorks CD-ROM, as described in “Installation wizard” on page 39.

Linux users should download the latest patches for their operating system and refer to the “Linux Configuration Guide” on the HP StorageWorks CD-ROM for configuration instructions.

### Recommended web browser settings

The web browser used to communicate with the D2D Backup System must have Active Scripting or JAVA scripting enabled. If it does not, some of the browser buttons may not be displayed.
Internet Explorer 7.X
1. Click on the Tools button located in the upper right part of the screen (next to the gear icon).
2. Select Internet Options.
3. Click on the Security tab.
4. Click on the Custom Level... button.
5. Set the option Active scripting to Enable and click OK.
6. Click Yes.
7. Refresh the page.

Internet Explorer 6.X
1. Select Tools from the top menu.
2. Select Internet Options.
3. Click on the Security tab.
4. Click on the Custom Level.
5. Scroll down until you see the section labeled Scripting.
6. Under Active scripting select Enable and click OK.

Mozilla Firefox 1.5 and Firefox 2.X
1. Select Options from the Tools menu.
2. Click on Content.
3. Check the box next to Enable JavaScript.
4. Click OK.
5. Refresh the page.
Connecting and installing the HP D2D Backup System
3 Attaching a physical tape drive (optional)

In this chapter:
• “Hardware requirements” on page 29
• “Tape drive installation overview” on page 29
• “Removing the access panel and bezel” on page 30
• “Installing the HBA” on page 31
• “Installing an internal tape drive” on page 33
• “Replacing the access panel and bezel” on page 35
• “Attaching an external tape drive” on page 36

Hardware requirements for Tape Attach

A tape drive may be attached directly to your HP D2D Backup System, allowing you to store backups offsite.

![Diagram of HP D2D Backup System with tape drives]

Figure 10 Attaching a tape drive to the HP D2D Backup System

1. Internal tape drive
2. External tape drive

To use this facility you need:
• A tape drive, such as an HP StorageWorks Ultrium device. This should be a half-height tape drive, if it is to be installed internally. Both SAS and SCSI tape drives are supported.
• A host bus adapter, HBA for the tape drive connection (because there are no embedded SAS or SCSI ports). If the tape drive is pre-installed, an appropriate HBA is already installed. If not, you must purchase and install the HBA before connecting the tape drive.
• Please refer to [www.hp.com/go/connect](http://www.hp.com/go/connect) for a list of all supported host bus adapters and tape drives. No additional drivers are required for recommended HBAs and tape drives; they are included in the HP D2D Backup System firmware.

Please refer to “Export, import and copy to an attached tape drive” on page 83 more information about transferring data to the tape drive.

Tape drive installation overview

Before connecting either an internal or internal tape drive, you must install an HBA. All necessary cables for connecting to the HBA are supplied with the tape drive. The instructions in this chapter provide the following information that is specific to the HP D2D Backup System:
1. If you have already powered up the HP D2D Backup System, power it down and disconnect the cables before you start.
2. Remove the access panel from the HP D2D Backup System.
3. Install the HBA.
4. Install an internal tape drive and connect it to the HBA (if required).
5. Replace the access panel on the HP D2D Backup System.
6. Connect an external tape drive (if required).

Please refer to the “User Guide” that is supplied with the tape drive for more detailed information about tape drive cabling and LED troubleshooting.

Removing the access panel and bezel

1. If you are installing the tape drive as part of the initial installation, go to step 3. If you have already powered on the HP D2D Backup System, it must be shut down before you start. Make sure there are no backup or restore jobs in progress and that no future jobs are scheduled to start whilst the system is shut down. Select Shutdown on the Web Management interface and click Power Off to power down the HP D2D Backup System safely.

2. Disconnect the network cable and the power cord from the HP D2D Backup System.
3. Loosen the captive thumbscrew (1) located on the rear edge of the access panel and slide (2) the panel back about 2.5 cm (1.0 in). Remove the access panel.

4. Press in on the two bottom tabs (1) on the side of the bezel so that they release from the chassis. Press in on the upper tab on the side of the bezel so that it releases from the chassis. The bezel will rotate out slightly (2). Pull the bezel away from the front panel (3).
Installing the HBA

⚠️ CAUTION:
Static electricity can damage electronic components. Always wear an antistatic wriststrap if one is available. If not, after you have disconnected power from the server and removed the cover, touch a bare metal part of the chassis. Similarly, touch a bare metal part of the drive before installing it.

The supported PCI-Express HBA should be installed in the top PCI slot. Please refer to www.hp.com/go/connect for a list of all supported host bus adapters and tape drives. No additional drivers are required for recommended HBAs and tape drives; they are included in the HP D2D Backup System firmware.

1. Undo the retaining screw (1) and remove the slot cover retainer (2).

2. Remove the cover from the top expansion slot.
**Figure 14 Removing the top expansion slot cover**

**IMPORTANT:**
It may be necessary to temporarily remove the slot cover next to the slot in which you are installing the HBA.

3. Install the new HBA in the top slot.

**Figure 15 Installing the HBA**

4. Reinstall the slot cover retainer (1) and secure it with the screw that you removed earlier (2).
Installing an internal tape drive

Read this section if you are installing an internal tape drive. If you are connecting an external tape drive, go to “Replacing the access panel and bezel” on page 35.

⚠️ WARNING!
To avoid personal injury or damage to the server or tape drive, ensure that the server is disconnected from the mains power supply while you install the drive.

⚠️ CAUTION:
Static electricity can damage electronic components. Always wear an antistatic wriststrap if one is available. If not, after you have disconnected power from the server and removed the cover, touch a bare metal part of the chassis. Similarly, touch a bare metal part of the drive before installing it.

1. Access the removable media cage (1) and remove the filler panel (2).

2. Mounting screws and shims are provided in the Mounting Hardware pack, which is supplied with the tape drive. Locate the pack of short, cylindrical-headed screws and shims.
△ **CAUTION:**

The Ultrium half-height tape drive allows only 3 mm engagement of the screw into the tape drive. To avoid damage to the tape drive, it is important to use the correct screws, which have a slightly thicker head than general mounting screws, and the metal shims. The shims prevent overtightening of the screws which may cause the drive mounts to shear.

![Selecting the correct screws](image)

**Figure 18 Selecting the correct screws**

3. Attach the screws and shims to the tape drive as illustrated (1).

![Attaching the screws and metal shims](image)

**Figure 19 Attaching the screws and metal shims**

4. Slide the half-height tape drive most of the way into the bay (1) and attach a spare power cable from the server’s internal power supply to the power connector on the tape drive. Connect the device cable (SCSI or SAS) to the appropriate ports on the HBA and tape drive (2).

**NOTE:**

Please refer to the documentation supplied with your tape drive for more information about cabling.
5. Slide the tape drive fully into the bay until it is seated securely.

Replacing the access panel and bezel

1. Remove the blank plate (1) at the top of the bezel.

2. Insert the two hooks (1) on the right side of the bezel into the rectangular holes on the chassis. Rotate (2) the bezel into place so that the three tabs on the left side of the bezel snap into the slots on the chassis.
3. Use two hands to place the access panel flat against the chassis (1), the back of the access panel extending about 2.5 cm (1.0 in) behind the back of the server. Make sure the hooks on the access panel align with the holes on the edges of the chassis. Slide (2) the access panel toward the front of the chassis to position it into place. Tighten the captive thumbscrew (3) to secure the access panel.

4. Reconnect the network cable and the power cord.

Connecting an external tape drive

Read this section if you are connecting an external tape drive.

NOTE:
You can only connect an external tape drive, if you have already installed a recommended HBA.

1. Connect the device cable (SCSI or SAS) to the appropriate ports on the HBA and tape drive. The example shows a SCSI tape drive.

2. Plug the power cable (1) securely into the socket on the rear panel of the drive and plug the other end of the power cable into the power outlet. The power on/off switch (2) is on the front panel.
Figure 24 Connecting the cables (SCSI tape drive)
Attaching a physical tape drive (optional)
4 The Installation wizard

This chapter is relevant for users installing on a Windows host. If you are installing on a Linux system, please refer to the “Linux Configuration Guide” on the HP StorageWorks Tape CD-ROM.

In this chapter:

• “Before you install the first host” on page 39
• “Run the Installation wizard” on page 40

If you are installing on a Windows system, the Installation wizard is the recommended way to set up a host machine to work with the HP D2D Backup System, particularly if you are configuring the host for the first time. The wizard automatically configures all the software components needed to connect and use the HP D2D Backup System. It should be run on all hosts that are to be backed up to the HP D2D Backup System.

If you are not using the Installation wizard to install on a Windows system, please see “Advanced installation” on page 45.

Before you install the first host

You must have the necessary administrative rights on the host to run the Installation wizard successfully.

1. Make sure the host machine on which you are running the Installation wizard has Internet access. If it does not, you will have to download the Microsoft ® iSCSI Initiator manually. See “Microsoft iSCSI Initiator” on page 46.

2. Press the Power on button on the front of your HP D2D Backup System. During power on the LEDs will perform a self-test sequence; all LEDs with the exception of the status LED will then be extinguished until the boot sequence is completed.
Run the Installation wizard

The HP D2D Backup System can be used to back up a maximum of six hosts. You should run the Installation wizard on each host that will provide a source of data for backup. The host may be a server, workstation or PC.

1. Insert the CD-ROM supplied with your HP D2D Backup System into the host machine. It should launch automatically. If it does not, locate the D2DInstallationWizard.exe file and run it manually.

2. Select Start the wizard and follow the onscreen instructions to step through the installation, normally by pressing Next.

The Installation wizard will automatically configure all the software components required for setup and use of the HP D2D Backup System. There are three main phases:

- **Install the tape drivers:** These allow your system to recognize the tape drives created on the HP D2D Backup System.
• Discovery: This will allow you to locate your HP D2D Backup System on the network and configure network settings. If you have multiple devices on your network, a list is displayed so that you can select the required HP D2D Backup System.

The configuration page for the device is displayed. DHCP is enabled by default. If you wish to use static IP addressing, disable DHCP and enter the IP address details.
**TIP:**

If more than one HP D2D Backup System is being configured at the same time, it may be useful to physically identify a D2D device. Use **Beacon** mode to flash the LEDs on the selected device.

- **iSCSI installation and configuration:** If required, this step retrieves and installs the Microsoft iSCSI initiator, connects this host to the HP D2D Backup System and configures an autoloader, as defined by the user. The second option presented in this dialog is appropriate for most backup applications and is the recommended option. You may edit the number of slots, if required.
3. The Installation wizard sets up a link to the Web Management Interface on the host’s desktop and gives you the option of launching it. Once it has been assigned network settings, the HP D2D Backup System is ready to use. See “The Web Management Interface” on page 63.

The HP D2D Backup System does not appear as a device under My Computer and it is not mapped to a drive letter (although it can be seen as a tape drive (1) and medium changer (2) from Device Manager). Use a backup application on the host machine to back up and restore data.

4. Run the Installation wizard on any other hosts that are to be backed up—six is the maximum. On running the wizard on subsequent hosts, you only need to select the HP D2D Backup System; its network settings have already been assigned.
5 Advanced installation

Although the Installation wizard is the recommended way to install the HP D2D Backup System, it is possible to install it manually. You may also need to run phases independently when troubleshooting. This chapter describes:

- “Using DHCP to discover the HP D2D” on page 45
- “Using the Discovery Engine to discover the HP D2D” on page 45
- “Microsoft iSCSI Initiator” on page 46
- “Linux iSCSI initiator” on page 51
- “Manual driver installation” on page 51

Using DHCP to discover the HP D2D Backup System

If you are connecting the HP D2D Backup System to a network that has a DHCP server, DHCP addressing is enabled by default. The IP address and other network settings are assigned automatically when you connect the HP D2D Backup System to the network. You only need to know the name of the HP D2D Backup System to complete the installation and create an 8-slot autoloader configuration. The name is in the format D2DBS-<serial number> and can be found on the label on the front of the unit.

In the web browser type in: D2DBS-<serial number>

**NOTE:**
Depending on network settings, you may need to enter the full domain path.

Once the HP D2D Backup System has been discovered on the network, you must configure the Microsoft iSCSI Initiator on the host, so that the autoloader devices on the HP D2D are visible to the backup application. See “Microsoft iSCSI Initiator” on page 46.

Using the Discovery Engine to discover the HP D2D Backup System

If your network does not have a DHCP server, the Discovery Engine allows you to locate the HP D2D Backup System on your network and assign network settings, such as the IP address. It is the recommended way to locate and configure the HP D2D Backup System on your network, if you are using static IP addressing. It also allows you to select your required base configuration and specify the number of slots for an autoloader.

The Discovery Engine can be run as part of the Installation wizard or as a standalone utility from the HP StorageWorks Tape CD-ROM.
Beacon mode
The HP D2D Backup System supports a Beacon LED sequence, which helps a user identify which unit is being configured, if several are connected to the network. See also “LEDs” on page 53.

If the HP D2D Backup System is new and not yet configured
When installing the HP D2D Backup System for the first time, this step must be completed successfully before you can connect from your host. Select the appropriate HP D2D Backup System from the list and make a note of its IP address because you will need this when you configure the Microsoft iSCSI Initiator, see “Discovery tab” on page 48.

If the HP D2D Backup System has been configured incorrectly
If you cannot connect to the HP D2D Backup System using the Web Management interface, it may have been configured incorrectly. Run the Discovery Engine to check the IP address of the HP D2D Backup System and, if necessary, select it again from the list of available HP D2D Backup Systems. If you still cannot connect to it, check that you have configured the Microsoft iSCSI Initiator correctly, see “Discovery tab” on page 48.

If the network setup has been changed
If the network infrastructure changes, you may need to update the HP D2D Backup System network settings to allow hosts to continue to connect. Run the Discovery Engine and change the network settings in accordance with your new infrastructure.
You can also use the Web Management Interface to modify these settings directly on the HP D2D Backup System, as long as this is done before the infrastructure changes are made.
Once the network settings of the HP D2D Backup System have been changed, you must also change the Microsoft iSCSI Initiator for each host.

Microsoft iSCSI Initiator
iSCSI is a protocol for sending SCSI commands via Ethernet. It defines how SCSI packets are translated to Ethernet packets and connects to the required devices. An iSCSI initiator may be hardware or software. The HP D2D Backup System supports the Microsoft software iSCSI initiator and requires it to be running.

### Beacon mode

**Select** | **Device** | **Beacon**
---|---|---
- | **Host Name: D209E6.C2D51601A9**<br>IP Address: 192.168.1.12<br>Domain Name: mydomain.local<br>**DHCP:** | BEACON
- | **Host Name: D209E6.081646038B**<br>IP Address: 192.168.0.11<br>Domain Name: mydomain.local<br>**DHCP:** | BEACON
on each host. If the host does not have the Microsoft iSCSI initiator, it will not be able to connect to the
autoloader (or tape drive) configured on HP D2D Backup System and will not be able to perform backups.
The Microsoft iSCSI initiator must be retrieved from the Microsoft website.

<table>
<thead>
<tr>
<th>File Name</th>
<th>File Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator-2.04-build3273-amd64fire.exe</td>
<td>1.8 MB</td>
</tr>
<tr>
<td>Initiator-2.04-build3273-ia64fire.exe</td>
<td>2.4 MB</td>
</tr>
<tr>
<td>Initiator-2.04-build3273-x86fire.exe</td>
<td>1.5 MB</td>
</tr>
<tr>
<td>iSCSInitiator.doc</td>
<td>137 KB</td>
</tr>
<tr>
<td>renotes.txt</td>
<td>9 KB</td>
</tr>
<tr>
<td>iGuide.doc</td>
<td>764 KB</td>
</tr>
</tbody>
</table>

**Figure 27 iSCSI Initiator download page**

1. amd 64 Use with amd® 64-bit processors and with Intel® em64t processors, when running a 64-bit version of the Windows operating system.
2. ia 64 Use with ia-64 processors, such as Itanium and HP Integrity.
3. x86 Use with 32-bit processors or 64-bit processors running 32-bit Windows, such as Windows XP and Server 2003.

If you download the wrong version, it will not install. The simplest way of ensuring you download the correct version is to run the Installation wizard from the HP StorageWorks CD-ROM because it automatically checks which is the appropriate version for your host.

**NOTE:**
The Microsoft Vista operating system includes the Microsoft iSCSI Initiator. It can be run from the Control Panel in Classic Mode.

**Manual iSCSI initiator installation**

The Installation wizard could fail for the following reasons:

- The host machine does not have an internet connection
- Firewall restrictions prevent this process
- Microsoft has relocated the iSCSI initiator files to a different address on its website.
- The process times out due to a slow connection

If the process fails:

1. On a machine that supports an external internet connection, go to the Microsoft website and search on “iSCSI initiator”
2. Select the result that takes you to the Download page and choose the download that is appropriate for your host.
3. Download the iSCSI initiator and install it on the host, accepting all the default settings.

**The iSCSI Initiator**

The Microsoft iSCSI initiator contains a number of tabs. This section describes the information that must be provided in order to connect the host to a device on the HP D2D Backup System. It does not provide a comprehensive description of all the tabs; please download the “User Guide” from the Microsoft website for more information.
General tab

You do not normally need to make any changes on the General tab. The Initiator Node Name is generated automatically, which guarantees that it will be unique on your network. The other fields relate to authentication and are not needed for the HP D2D Backup System. Only use them if required to by your IT policy. (If you use Secret to enter an encryption string in this dialog to authenticate targets, you must also enter the same string on the Web Management interface in the iSCSI page. (See “iSCSI (Status)” on page 77.)

![iSCSI Initiator Properties dialog](image)

**NOTE:**

When you use the Web Management Interface to create an additional device for your host, you must provide the iSCSI Initiator Name. This is the Initiator Node Name found on the General tab.

Discovery tab

You must enter the IP address or fully qualified domain name of the HP D2D Backup System (for example, myhpd2d.mydomain.com) to add it as a target portal for the host on the Discovery tab. Do not change the Port; it should be 3260.
• If this is the first time that the iSCSI Initiator has been configured and the Installation wizard has not been run, it will automatically create an 8-slot autoloader with two target devices (loader and tape drive).
• If target devices have already been configured for the host in the past, they appear in the list; no more are created.

Targets tab

This tab contains a list of all available devices. When you run the iSCSI Initiator manually, new devices have a status of **Inactive**. You must log on to the appropriate targets for your host. Remember that each autoloader has two devices and you must log onto each one separately.
We recommend that you also select the **Automatically restore this connection when the system boots** option in the **Log On** dialog.

### Persistent Targets tab

The **Persistent Targets** tab shows the targets that have been configured to restore automatically on reboot. During initial configuration, it is for information only. However, if you want to stop the host automatically connecting to a device, you must select the device on this tab and **Remove** it. To disconnect the device without rebooting, go back to the **Targets** tab, select the device, click **Details** and log off.
Bound Volumes/Devices tab
No configuration is required on the Bound Volumes/Devices tab.

Linux iSCSI initiator
An iSCSI initiator is embedded in the operating system. Please refer to the “Linux Configuration Guide” on the HP StorageWorks Tape CD-ROM for instructions on using it. Make sure that you have downloaded the latest operating system patches before you configure your system.

Manual driver installation
Two drivers are required; an HP LTO Tape driver and a medium changer driver.

NOTE:
Certain backup applications require you to use their own drivers for both the tape device and medium changer. For many applications these will be installed automatically during the software installation process. If the backup software is already installed, you may need to manually update the drivers after installing the HP D2D Backup System.
**HP LTO Tape driver**

The HP LTO Tape driver must be installed to allow your system to recognize the Ultrium devices created by the HP D2D Backup System.

Tape drivers can be installed from the **drivers** directory on the HP StorageWorks CD-ROM, where they are supplied as an installer application and as driver files for manual installation. Also check the HP website for driver updates at [www.hp.com/support](http://www.hp.com/support).

The tape drive is reported to your backup application (and Windows Device Manager) as an LTO-3 device. This is the default behavior of the tape drive and there is no need and no way to change it on the HP D2D Backup System. It is important not to confuse emulation type with cartridge size. Emulation type is totally independent from cartridge size. The HP D2D Backup System allows you to pick whatever cartridge size you like (up to 800 GB).

In earlier versions of the HP D2D Backup System firmware, the tape drive was reported as an LTO-2 device. Once you upgrade to the latest version of the firmware, the backup application continues to identify existing backup devices as LTO-2 and identifies new tape devices as LTO-3, but this has absolutely no impact on how the device behaves or functions. If you delete existing devices (LTO-2) and create new ones; the new ones will be LTO-3.

**Medium changer driver**

No additional medium changer driver is required because Microsoft Windows provides a suitable generic driver and all backup applications provide their own changer drivers.
Understanding the LEDs

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Disk Activity Flashing Green = Disk activity in progress.</td>
</tr>
<tr>
<td>2</td>
<td>Disk Status Solid Green = All disks are working correctly. Flashing Orange = A disk has failed.</td>
</tr>
<tr>
<td>3</td>
<td>Disk Capacity Solid Green = Normal operation and disk space is available. Solid Orange = Disk threshold capacity exceeded, device is nearly full.</td>
</tr>
<tr>
<td>4</td>
<td>Status Solid Green = System is booted and operating normally. Flashing Green = System is powering up or shutting down. Flashing Orange = System has failed.</td>
</tr>
<tr>
<td>5</td>
<td>Network Off = No network connection or network not configured. Solid Green = A Gigabit Ethernet connection is made. Solid Orange = A 10/100Base-T connection is made.</td>
</tr>
<tr>
<td>6</td>
<td>Power Solid Green = Power on.</td>
</tr>
</tbody>
</table>

Bootup LED sequence

During power on, the LEDs will perform a self-test sequence. All LEDs with the exception of the status LED will then be extinguished until the boot sequence is completed.

Firmware LED sequence

During a firmware upgrade, all LEDs apart from the Power LED flash with an alternate green and orange.

Beacon mode

The HP D2D Backup System also supports a Beacon LED sequence, which helps a user identify which unit is being configured, if several are connected to the network.
Use the Network page of the Web Management Interface to turn Beacon Mode on and off. This flashes the LEDs on the selected device. If you do not switch off Beacon Mode from the Network page, it will continue for 5 minutes.
The HP D2D Backup System combines all the traditional benefits of tape technology, such as support for complex media rotation schemes, with the rapid backup and restore time that is only possible from disk.

Backup applications allow users to configure rotation schemes that use tapes for specific days, weeks and months of a year, often applying different retention policies to each backup job. Such rotation schemes require an autoloader as the backup device.

Using a tape autoloader configured on your HP D2D Backup System enables you to use the same tape rotation schemes that you would use with physical tape. To your backup application the tape autoloader configured on the HP D2D Backup System is a physical tape autoloader device and you can configure backup jobs from your backup application in exactly the same way as you would for tape. But you benefit from much faster performance because you are writing to or reading from disk.

Read this chapter for example backup scenarios. It will also give you a clearer understanding of how you can calculate the number of slots required and ensure that disk space is used effectively.

- “Example 1: Simple backup” on page 55
- “Example 2: Office backup” on page 56
- “Example 3: High-performance workstation” on page 60
- “Incorporating archive to tape into a rotation strategy” on page 61

Simple backup

- On Friday: carry out a full backup to one cartridge to capture the week’s work and keep that cartridge for four weeks before overwriting. Assuming a separate cartridge for each week’s full backup, four autoloader slots are required.
- For the other weekdays, Monday to Thursday: carry out incremental backups to capture that day’s changes (one cartridge for each day) and keep each cartridge for a week before overwriting. Assuming a separate cartridge for each day’s incremental backup, another four autoloader slots are required.
- On Friday overnight: run a copy job to copy Friday’s full backup to physical tape for offsite storage.
Figure 29 Simple backup from a single host

This scenario provides fast restore times for individual files, with the added security of offsite tape storage. It requires 8 autoloader slots. The examples in the rest of this chapter illustrate more complex scenarios.

Office backup

The office has three hosts that must be backed up:

- A fileserver
- A database server
- A high-performance desktop PC

Each device will be backed up to an autoloader on the HP D2D Backup System. You must run the Installation wizard on each host that is to be backed up. The following examples illustrate how you decide how many slots should be allocated to each autoloader. You can either assign these during installation, if you run the Installation wizard, or use the Web Management interface after installation to increase the number of slots, as described in “To edit device details” on page 66.

Filesaver

This is used by all the people in the office who have access to a file share on the server for storing office documents, such as word processing files and spreadsheets. These files must be backed up daily, retained for a month and copied once a week to a tape drive attached to the filesaver for offsite storage.

The starting size of the data on the file share is 60 GB. Daily changes are approximately 500 MB.

<table>
<thead>
<tr>
<th>Number of slots required</th>
<th>Physical disk space required on HP D2D Backup System</th>
<th>Offsite storage requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x 1 full weekly backups</td>
<td>4 x 60 GB = 240 GB</td>
<td>4 x 60 GB = 240 GB</td>
</tr>
<tr>
<td>4 x1 incremental daily backup</td>
<td>4 x 500 MB = 2 GB</td>
<td>Tapes will be rotated on a 4-weekly basis; backup size increments by 2 GB per week</td>
</tr>
<tr>
<td>8 slots required</td>
<td>242 GB in week 1 Incrments by 2 GB a week</td>
<td></td>
</tr>
</tbody>
</table>
Database server

This is used to hold the customer database. It must be backed up weekly and monthly and retained for 12 months. Data will be copied offsite once a month and retained for 7 years.

The size of the database is 10 GB.

<table>
<thead>
<tr>
<th>Number of slots required</th>
<th>Physical disk space required on HP D2D Backup System</th>
<th>Offsite storage requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x 1 full weekly backups 12 x 1 full monthly backups</td>
<td>3 x 10 GB = 30 GB 12 x 10 GB = 120 GB</td>
<td>12 x 10 MB = 120 GB Tapes will be rotated after 7 years</td>
</tr>
<tr>
<td>15 slots required</td>
<td>150 GB (initially)</td>
<td></td>
</tr>
</tbody>
</table>
Desktop PC

This is used by engineers to store drawings, specifications and similar working documents. The backup requirement is for one full weekly backup and a daily incremental backup, retained for one week.

The size of the daily incremental backup is 10 GB. The size of the full backup is 250 GB, which exceeds the disk space that can be allocated to a single slot. Therefore, each full backup requires two autoloader slots.

<table>
<thead>
<tr>
<th>Number of slots required</th>
<th>Physical disk space required on HP D2D Backup System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 2 for the full weekly backup</td>
<td>1 x 250 = 250 GB</td>
</tr>
<tr>
<td>4 x 1 for the incremental daily backups</td>
<td>4 x 10 GB = 40 GB</td>
</tr>
<tr>
<td>6 slots required (8 is the minimum that can be assigned)</td>
<td>290 GB</td>
</tr>
</tbody>
</table>
Summary

Fileserver requires 242 GB
Exchange server requires 150 GB
Desktop PC requires 290 GB

Approximate capacity required = 682 GB at the end of week 1

This is within the capacity of the HP D2D Backup System and still leaves the option of backing up additional hosts, particularly on the HP D2D Backup System 130 and 120.
High-performance workstation backup

This is a high-performance graphics workstation, used by an architect, who has 250 GB of data that must be fully backed up every week and approximately 10 GB of changes to be backed up each day. This data will be backed up to an autoloader configured on the HP D2D Backup System.

Additionally, there is an ‘IMPORTANT’ folder that relates to current, high-priority projects that must be backed up daily and moved from the HP D2D to physical tape at the end of each week. This data will be backed up to a standalone tape drive configured on the HP D2D Backup System.

You can specify the number of slots to meet the backup requirements for the workstation when you run the Installation wizard, or from the Web Management interface after installation. You must use the Devices page of the Web Management interface to create an additional standalone tape drive device for the ‘IMPORTANT’ folder. (See “To create a new device” on page 66 for further details.)

Main backup to autoloader

The data at 250 GB exceeds the disk space that can be allocated to a single slot. Therefore, each full backup requires two autoloader slots. You must also make sure that tape spanning is enabled in your backup application.

<table>
<thead>
<tr>
<th>Number of slots required</th>
<th>Physical disk space required on HP D2D Backup System</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x 2 for each full weekly backup</td>
<td>4 x 250 GB = 1000 GB</td>
</tr>
<tr>
<td>4 x 1 incremental daily backups</td>
<td>4 x 10 GB = 40 GB</td>
</tr>
<tr>
<td>12 slots required</td>
<td>1.04 TB</td>
</tr>
</tbody>
</table>

Additional backup to tape drive

The ‘IMPORTANT’ folder starts at 10 GB and has 4 incremental backups to a single cartridge on a standalone tape drive. The final data size is approximately 60 GB, which is moved from the HP D2D to physical tape weekly.
After configuration, the host has access to two devices on the HP D2D Backup System.

![Diagram of HP D2D Backup System with one host and two devices]

**Figure 34 HP D2D Backup System with one host and two devices**

**Summary**

- Main backup to autoloader requires 1040 GB
- Additional backup to tape drive requires 60 GB

Approximate capacity required = 1.1 TB

This is within the capacity of the HP D2D Backup System 130 and 120.

**Incorporating archive to tape into a rotation strategy**

Two methods are provided for archive a cartridge to the directly attached tape device, these are Copy and Export.

- **Copy** retains the data cartridge on the HP D2D system and creates an exact copy onto a physical cartridge in the attached tape drive.
- **Export** removes the data cartridge from the autoloader on the D2D once data has been successfully copied to the physical cartridge in the attached tape drive.

Each method has advantages and disadvantages, as described in more detail in “Archiving methods” on page 84. Refer also to the white papers on [http://www.hp.com/support](http://www.hp.com/support) for examples of using these functions with specific backup applications.

This example shows how to incorporate copy to a tape drive connected to the HP D2D Backup System into a tape rotation strategy.

- On Friday: carry out a full backup to one cartridge to capture the week’s work and keep that cartridge for four weeks before overwriting. Assuming a separate cartridge for each week’s full backup, four autoloader slots are required.
• For the other weekdays, Monday to Thursday: carry out incremental backups to capture that day’s changes (one cartridge for each day) and keep each cartridge for a week before overwriting. Assuming a separate cartridge for each day’s incremental backup, another four autoloader slots are required.

• On the last day of the month:
  • From the host (1) carry out a full backup to one cartridge to capture the month’s work ready for archiving, this requires one extra slot on the autoloader device (2)
  • From the HP D2D Web interface schedule a copy to physical cartridge job (3) to run on the last day of the month. See “Cartridge copy” on page 84 for further details.

![Figure 35 Copying to physical tape as part of a rotation strategy](image)

This scenario requires nine slots on the autoloader device and a physical cartridge in the attached tape drive on the last day of the month. The cartridge data remains on both the HP D2D Backup System and the copy on the physical tape drive can be stored offsite.
In this chapter:

- “Web management interface” on page 63
- “To run the Web Management Interface” on page 63
- “Summary (Home)” on page 64
- “Devices (Configuration)” on page 65
- “Cartridges (Configuration)” on page 67
- “Network (Configuration)” on page 71
- “Email Alerts (Configuration)” on page 74
- “Disk & RAID (Status)” on page 76
- “iSCSI (Status)” on page 77
- “Log (Status)” on page 78
- “Shutdown (Admin)” on page 79
- “Administration (Admin)” on page 80
- “Firmware (Admin)” on page 81
- “Support (Admin)” on page 82

What is the Web Management interface?

The Web Management Interface is the main interface for:

- Monitoring the status and health of the HP D2D Backup System and all configured backup devices
- Changing the number of cartridge slots or creating additional autoloaders, or standalone tape drives, for a host
- Managing movement of data to and from a physical tape drive attached to the HP D2D (if one has been installed)

To run the Web Management Interface

There are two ways of logging on:

- **From the host server or PC:** Use the desktop shortcut created by the Installation wizard.
- **From any machine connected to the network:** Enter the IP address or fully qualified domain name (for example, myhp2d.mydomain.com) of the HP D2D Backup System into the web browser.

The Web Management Interface displays the Login prompt:

```
User Name: Administrator
Password: 
Login
```

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The Login is Administrator with an initial password of Admin.

Both names are case sensitive. The password can subsequently be changed from the Administration menu option, see “Administration (Admin)” on page 80.
NOTE:
The web browser used to communicate with the D2D Backup System must have Active Scripting or JAVA scripting enabled. If it does not, some of the browser buttons may not be displayed. See “Web browser settings” on page 26.

Summary (Home)

Whenever you log in, the Summary page is displayed.

Use this page:
- To display information about your HP D2D Backup System and the backup devices that have been configured for it.
- To monitor system health and status.
- To display status information about any physical tape drives that are attached directly to the D2D Backup System.
Table 2 Summary page layout

<table>
<thead>
<tr>
<th></th>
<th>Navigation bar</th>
<th>Select the appropriate option from the side bar.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Help and logout</td>
<td>The Help option opens the help pages. Logout closes your session on the HP D2D Backup System. If somebody else logs in, you will be automatically logged out.</td>
</tr>
<tr>
<td>3</td>
<td>Device information</td>
<td>This section provides the information that identifies your HP D2D Backup System. It shows the IP Address and Network Name of the HP D2D Backup System.</td>
</tr>
<tr>
<td>4</td>
<td>Status details</td>
<td>This section provides details about overall system status and the status of system components. Additional information is provided if the status is not OK. See also “Status icons” on page 65. Network, Disk Usage and RAID all link directly to the relevant pages for more information. If a tape drive is connected directly to the HP D2D Backup System, its status is also displayed in this section with a link to job history.</td>
</tr>
<tr>
<td>5</td>
<td>Configured backup devices</td>
<td>This section shows the devices that have been configured and their connection status. Our example shows one autoloader and no tape drives. Note that when a tape drive is shown, it is the tape drive that has been configured on the HP D2D Backup System and not the physical tape drive that may be attached to it. The icon for the device changes to indicate a copy or export to physical tape by showing the cartridge partially ejected. To configure the devices, select Devices from the navigation side bar. Or: • Click on the relevant Edit Config, iSCSI or Cartridges link to view specific information for the selected device.</td>
</tr>
</tbody>
</table>

Status icons

- ![Healthy System](image)
  Indicates a healthy system or system component.

- ![Warning/Error](image)
  Indicates a warning or error state.

Devices (Configuration)

By default, one autoloader is created automatically when a new host connects to the HP D2D Backup System. Use this page to view and configure the default autoloader and to create additional devices, if required, for the host.

The top half of the page shows the six possible devices available on the HP D2D Backup System. None or all of these may be populated depending on how many devices have been created.

To view device details

Click on Select to view the details for a selected device in the bottom half of the page, where you can also edit and delete details.

There are also links on the Name, Cartridges and Connection fields that take you directly to the relevant information for that device.

**NOTE:**

If a device is shown as not connected, this indicates that the iSCSI Initiator on the host has not logged on. For more information, see “Targets tab” on page 49.
To edit device details

1. Click on **Select** to view the details for the required device and then click on **Edit**.
2. Amend details as appropriate and click **Update** to apply them. See “Device parameters” on page 67.

To create a new device

1. To create a new device, select the appropriate device type (Autoloader or Tape Drive) from the drop-down menu and click on **Create** to create a new device for the host.

2. Enter the appropriate details and click **Create**. You can find the **iSCSI Initiator Name** by running the iSCSI Initiator on the host and copying the Initiator Node Name from the General tab. See also “To edit device details” on page 66.
**Table 3 Device parameters**

<table>
<thead>
<tr>
<th><strong>Autoloader Name or Tape Drive Name:</strong></th>
<th>This is the name that is used to identify that device (autoloader or tape drive). You may like to enter a name that identifies the host or backup job with which it is associated.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total No of Cartridge Slots:</strong></td>
<td>This is where you define the number of slots that you require for your tape rotation strategy. For autoloaders you can select a number between 8 and 24 from the pull-down menu; each slot will initially be assigned a 200 GB cartridge. Tape drives only have one cartridge, which is always assigned a 200 GB cartridge. You can change the maximum size of the cartridge as long as it is blank. This means that you can only change the value immediately after the device is created and before it has been accessed by the backup application. See “Cartridges (Configuration)” on page 67.</td>
</tr>
<tr>
<td><strong>Emulation Type:</strong></td>
<td>This is the emulation type used by the backup software. The default of 1x8 G2 Autoloader is correct for most applications. An alternative of D2DBS Generic is available for certain applications. Consult your backup application technical support information for further details. If you have created an autoloader on an earlier version of the HP D2D Backup System, it will have an emulation type of ThinStor. This emulation type does not support mail slots and tape attach. If you want to connect a tape drive to the HP D2D Backup System, you must change the emulation type. (Once changed, you cannot revert to ThinStor.)</td>
</tr>
<tr>
<td><strong>iSCSI Initiator Name:</strong></td>
<td>This is the Initiator Node Name of the host that will back up to this device (autoloader or tape drive). It is provided automatically for the default autoloader that is created when you run the Installation wizard on a host for the first time. But you must enter it manually if you are creating a new device on this page. You can find the name by running the iSCSI Initiator on the host and copying the Initiator Node Name from the General tab. See “Manual driver installation” on page 51.</td>
</tr>
</tbody>
</table>

To delete a device

Click on **Select** to view the details for the required device and then click on **Delete** to delete it. You will be prompted to confirm that this is what you wish to do.

⚠️ **WARNING!**

All data on the device will be deleted.

**Cartridges (Configuration)**

Use this page to view and configure cartridge settings. The number of slots configured on the Devices page for an autoloader determines the number of cartridge rows that are available to edit on this page; tape drives have only one cartridge.
Table 4 Cartridge parameters

<table>
<thead>
<tr>
<th>Location</th>
<th>The Location column identifies each element of the autoloader that is available to hold a cartridge. There are three elements:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <strong>Slot n:</strong> which is one of the standard autoloader slots</td>
</tr>
<tr>
<td></td>
<td>• <strong>Mail slot:</strong> which is a dedicated slot that is used to hold a cartridge that is ready for exporting to or importing from physical tape. Cartridges can only be moved into the mail slot by the backup application on the host machine.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Tape drive:</strong> which indicates that a physical cartridge is inserted in an attached tape drive and is ready for import.</td>
</tr>
<tr>
<td>Bar Code:</td>
<td>A bar code is an 8-digit, alphanumeric, unique identifier for a cartridge within the HP D2D Backup System. Bar codes are shared with the backup application, if requested. The backup application may also choose to assign its own internal identifier to the cartridge but, if it does so, it cannot assign this identifier to the Cartridge bar code. Bar codes are generated automatically but may be edited by the user. If you choose to edit the bar code:</td>
</tr>
<tr>
<td></td>
<td>• It must be unique and must not start with the letters “CLN” or “DG” because these are reserved designations for cleaning and diagnostic cartridges.</td>
</tr>
<tr>
<td></td>
<td>• It should be a minimum of 4 characters. Valid ASCII characters are A-Z, a-z, 0–9, space and hyphen. Anything less than 8 characters will be appended with space characters.</td>
</tr>
<tr>
<td>Used Size:</td>
<td>This shows the actual used capacity in MB or GB. If this is <strong>Blank</strong>, the cartridge may be removed, see below.</td>
</tr>
<tr>
<td>Max Size:</td>
<td>defaults to 200 GB. This value may be changed if the Used Size is Blank, see below. The maximum value allowed is 800 GB.</td>
</tr>
<tr>
<td>Write Protected:</td>
<td>is a check box that allows you to enable (checked) and disable (unchecked) write protection, see below.</td>
</tr>
<tr>
<td>Last Written:</td>
<td>tells you when the cartridge was last written to and is useful when identifying data for copying or exporting.</td>
</tr>
</tbody>
</table>

Empty slots

Empty slots are slots that contain no cartridges; all the fields contain dashes or hyphens.

- **Tape drive row:** An autoloader consists of two devices; a tape drive and changer device. This location refers to the tape drive element of the autoloader. It is only populated when the backup application on the host is writing to or reading from the autoloader.
- **Mail slot row:** This location refers to the slot that is used for importing and exporting data. It is only populated:
  - When the backup application on the host moves data into it for export to a tape drive attached to the HP D2D Backup System. Once the export has been run successfully from the Web Interface, the slot becomes empty again.
  - When the Web Interface is used to import data from a tape drive attached to the HP D2D. The backup application on the host is used to move the data back into a numbered slot and the mail slot becomes empty again.
  - **Numbered slot row:** This slot is empty after a **Remove** operation or after the backup application has moved data to the mail slot for export.

Once a mail slot or numbered slot is empty, a **Create** button is available to create a new, blank cartridge. See “To create a cartridge” on page 70.

To remove a cartridge

If the **Used Size** of a cartridge is **Blank**, you will be able to remove it. Click on the **Remove** button. This button is not displayed, if the cartridge is not blank.
To write protect a cartridge

Click **Edit** for the appropriate cartridge. Check the **Write Protected** check box for the cartridge. Your backup application will not be able to write any more data to it.

<table>
<thead>
<tr>
<th>Cartridge List of Autoloader 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
</tr>
<tr>
<td>Tape Drive</td>
</tr>
<tr>
<td>Mail Slot</td>
</tr>
<tr>
<td>Slot 1</td>
</tr>
</tbody>
</table>

To edit maximum size

The only time you can resize cartridges is when you first create an autoloader or add slots and they are blank. Once the cartridges are made available to the backup application, it formats them ready for use and they are no longer blank, even if you have not yet written data to them. Similarly, the erase function on most backup applications does not return the cartridge to a completely blank state.

The **Max Size** defaults to 200 GB, but if the **Used Size** is Blank, you can edit this value. The maximum value allowed is 800 GB.

Click **Edit** for the appropriate slot. Select a value from the drop-down menu and click **Update**.

**NOTE:**

The maximum size indicates the physical disk space available for that slot; it will only be committed when data is written to it. Changing the maximum space does not affect actual disk usage or save disk space, but may be useful if you know you will be moving data to a physical tape with a smaller cartridge capacity.

To create a cartridge

Slots that are empty have an extra button, called **Create**.
If you use the **Create** button on an empty slot, the backup application needs to inventory it (add it to its database or catalog) before it can access it.

If you use the **Create** button on an empty mail slot, you can use the backup application to move the blank, new cartridge to an empty cartridge slot, without having to run an inventory. This saves some processing time.

**NOTE:**
When you import a cartridge, you need an empty mail slot and an empty cartridge to which the backup application can move the imported data. Therefore, you may wish to leave a slot whose cartridge has been exported empty, rather than creating a new cartridge. Or to create a slot, edit the **Total No Of Cartridge Slots** on the Devices page, see “To edit device details” on page 66.

### Network (Configuration)

This page is used to view and edit network settings. It is also used to turn Beacon Mode on and off.
Network configuration

The details in this section reflect the IP settings that were specified during installation. The HP D2D Backup System supports DHCP and this is turned on by default.

You may need to edit the details if there is a conflict in the IP address, or you move the host to a different network node. Be aware that any changes you make to the network settings could affect how you connect again to the HP D2D Backup System. For example, if you change the IP address, you must use the new address to log in from a web browser.

To edit network settings

1. Click Edit to make the details editable.
2. Make the required changes and click Update.
3. You must now reconnect to the HP D2D Backup System using the new settings.
   - If you have changed the IP address, you must use the new address to log in from a web browser.
   - You will also need to edit the iSCSI Initiator on all hosts that are connected to the HP D2D Backup System, if you change the IP address. See “The iSCSI Initiator” on page 47.
Table 5 Network parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Name:</td>
<td>This is the name of the HP D2D Backup System. You can use the network name,</td>
</tr>
<tr>
<td></td>
<td>instead of the IP address, to log on to the Web Management Interface.</td>
</tr>
<tr>
<td>DHCP:</td>
<td>Check or uncheck the box to enable or disable this feature. If DHCP is</td>
</tr>
<tr>
<td></td>
<td>turned off, you must manually specify all the network settings for the HP</td>
</tr>
<tr>
<td></td>
<td>D2D Backup System. If DHCP is turned on, the majority of the network settings</td>
</tr>
<tr>
<td></td>
<td>are obtained automatically. However, even when DHCP is on the Network Name</td>
</tr>
<tr>
<td></td>
<td>must be specified. Other parameters, such as Domain Name and DNS Server</td>
</tr>
<tr>
<td></td>
<td>Address, become optional. You can override the automatic settings and enter</td>
</tr>
<tr>
<td></td>
<td>your own values, if required, but this is not usually necessary.</td>
</tr>
<tr>
<td>IP Address:</td>
<td>This is the IP address for the device. The HP D2D Backup System supports both</td>
</tr>
<tr>
<td></td>
<td>dynamic (DHCP) and static IP addressing. The IP Address must be unique on the</td>
</tr>
<tr>
<td></td>
<td>network. If you are using static IP addressing, you must also provide the</td>
</tr>
<tr>
<td></td>
<td>subnet mask, default gateway and, optionally, domain name.</td>
</tr>
<tr>
<td>Subnet Mask:</td>
<td>This determines the subnet to which the IP address belongs. (Static IP</td>
</tr>
<tr>
<td></td>
<td>addressing only.)</td>
</tr>
<tr>
<td>Gateway:</td>
<td>This is the node that connects the HP D2D Backup System to the network that</td>
</tr>
<tr>
<td></td>
<td>is servicing the web pages. (Static IP addressing only.)</td>
</tr>
<tr>
<td>Domain:</td>
<td>This is the group of devices on the network to which the HP D2D Backup System</td>
</tr>
<tr>
<td></td>
<td>belongs. (Static IP addressing only.)</td>
</tr>
<tr>
<td>DNS Server Name</td>
<td>These are the DNS IP addresses. When using DHCP these may be obtained</td>
</tr>
<tr>
<td>1/2/3:</td>
<td>automatically. Ask your network administrator to advise what you should enter.</td>
</tr>
</tbody>
</table>

Resetting network settings to factory defaults

There are some conditions in which a previously configured device may fail to be discovered on a network and, therefore, may be unreachable if the network parameters are invalid for the network to which the device is attached. In this case, it may be necessary to reset the networking parameters and device name to factory defaults.

To reset the network settings:

1. Ensure that there are no backup or restore jobs in progress to the device.
2. Press the Power On button on the front of the HP D2D Backup System three times in quick succession to reset it.
   After approximately 5 seconds, the HP D2D Backup System will begin its reboot sequence.

**NOTE:**
The HP D2D Backup System will be reset to factory networking settings and the Administrator password will be reset to **Admin**. No user data will be lost.

3. After the reboot, the device will be in DHCP mode and also available for discovery using the Installation wizard provided on the StorageWorks CD.

Beacon mode

Beacon mode flashes the LEDs on the HP D2D Backup System. It is useful if you have several HP D2D Backup Systems on your network and want to confirm which unit is being configured.

- Click **Turn Beacon On** to activate beacon mode.
- If you do not switch off Beacon Mode from the Network page, it will continue for 5 minutes.
Email Alerts (Configuration)

This page is used to set up details of the email servers that will be used to route messages about the HP D2D Backup System and to specify up to four email recipients. Messages are generated if a disk fails or reaches its threshold capacity, if the system reboots, if there are network problems or if there is a critical hardware failure. Email alerts are also generated for tape attach activities, when there is a separate tape drive connected to the HP D2D Backup System and the user is importing data from it, copying or exporting data to it, or scheduling tasks to carry out these activities.

The HP StorageWorks D2D Backup System uses Simple Mail Transfer Protocol (SMTP), which is the established standard for transferring mail over the internet. Microsoft Exchange has a virtual SMTP server available which can be used to receive these emails and forward onward if necessary. Unix operating systems, such as Linux, have a Sendmail program included. Sendmail uses the SMTP protocol to receive and, if necessary, forward on e-mail messages.

To configure email settings, the HP D2D Backup System must be on the same network as an SMTP server that it can use.

- Click **Edit** to make the fields editable. Make changes, as appropriate and click **Update**.
- Once you have created a recipient’s email address, use the **Test** button to make sure emails can be sent successfully.

![Email Notifications Configuration](image-url)
Table 6 Email parameters

<table>
<thead>
<tr>
<th><strong>SMTP Server:</strong></th>
<th>This is the IP address of the email server.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Username and Password:</strong></td>
<td>Some email servers require authentication to send email alerts. If required, enter a Username and a Password here that are valid on the SMTP server entered in the previous box.</td>
</tr>
<tr>
<td><strong>Sender’s Email Account:</strong></td>
<td>This is the email account to which the email will be attributed in the recipient’s inbox. The account must exist on the email server. For example, you may like to create an account called “<a href="mailto:MyD2D@MyServer.com">MyD2D@MyServer.com</a>”.</td>
</tr>
<tr>
<td><strong>Recipient’s Email Address 1/2/3/4:</strong></td>
<td>This is the email address of the person who should receive the message. Up to four email addresses may be specified. You may only enter one address per line. Once you have configured an email recipient, there is a Test button that you can use to send a test email to the specified address.</td>
</tr>
</tbody>
</table>

To configure Microsoft Exchange Server

**NOTE:**

Please refer to the Linux Configuration Guide on the CD-ROM for information about configuring SMTP with Linux.

It is important to check the SMTP server’s security configuration parameters to ensure that the **Sender’s Email Account** can be recognized. Security configuration parameters are found within the SMTP virtual server’s property pages. To view or modify them:

1. Open the Exchange Management console.
2. Click on **Servers** and then the server you wish to configure.
3. Click on Protocols and then **SMTP**.
4. You will see the default virtual SMTP server. Right click on this and select **Properties**.
5. Select the **Access Control** tab and then select **Authentication**.

![Authentication dialog box](image)

6. The HP D2D Backup System may be used with one of the following settings:
- **Anonymous Authentication** (anyone can log on, you do not need to provide a Username and Password when you configure email alerts)
- **Basic Authentication**, where a user name and password are required and should be provided when you configure email alerts

---

**NOTE:**

**Integrated Windows Authentication** is not supported with the HP D2D Backup System.

If your SMTP Server requires this form of authentication and you have a spare network port, we recommend that you create a new virtual SMTP server, allowing connection only to the HP D2D Backup System. In this instance, you may lock the SMTP server to use only the HP D2D Backup System’s IP address and authentication may safely be set to anonymous for the dedicated SMTP server.

---

### Disk & RAID (Status)

This page provides information about the RAID status, disk usage and status of the physical disks. Use it to identify disks that may be failing or disks that are approaching capacity.

#### RAID status

In normal operation, this shows green, OK.

If one or more disks fail, it shows a warning icon.

#### Disk usage

This section shows you how much disk space has been used.

**Total Disk Usage:** The green area is the amount of disk space committed. This always shows some value because it includes the default 2 GB space committed for each cartridge slot (see “Considerations when configuring cartridges and slots” on page 19).
The red area indicates the threshold capacity. The system will send warning messages to email recipients that the disks are reaching capacity. The Disk Usage icon on the Summary page will also indicate that disk space is running out and the Disk Capacity LED will flash.

You cannot add physical disk space, but you may be able to create some space. Options for creating space, if the disks start to get full, include:

- Review your backup jobs to see if you can reduce the size of backup or retention time.
- Use the backup application job settings to overwrite or erase data.
- Export a cartridge to tape, see “Using the Web Management interface to copy/export/import cartridges” on page 88.

**Autoloader 1/2/...:** This is the amount of data backed up to each device. (This does not include the default 2 GB space committed for each cartridge slot. If no data has been backed up, the value is 0 GB). Each autoloader and tape drive is shown separately.

**Physical disks**

This section provides information about the physical disks. If you need to replace a disk, it is very important to obtain the serial number and the physical location of the failed disk from this page before you replace it.

**Table 7 Physical disk parameters**

<table>
<thead>
<tr>
<th>Disk:</th>
<th>This indicates the physical location of the disk and is useful if you need to replace a disk. It should relate to the wiring diagram on the access panel, but always double check against the serial number after removing a disk.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td>This is the product number of the disk.</td>
</tr>
<tr>
<td>Serial No:</td>
<td>This is the serial number of the disk. Always make a note of this before replacing a failed disk.</td>
</tr>
<tr>
<td>FW Version:</td>
<td>This is the firmware version of the disk. It may be useful for troubleshooting and when replacing a disk.</td>
</tr>
<tr>
<td>Size:</td>
<td>This is 750 GB for the HP D2D Backup System 130, 500 GB for the HP D2D Backup System 120 or 250 GB for the HP D2D Backup System 110.</td>
</tr>
<tr>
<td>State:</td>
<td>This indicates the state of the disk. Green indicates OK, amber indicates a warning.</td>
</tr>
</tbody>
</table>

**iSCSI (Status)**

This page shows the iSCSI details for all the devices that are configured on the HP D2D Backup System. It also shows any active connections. All available devices are shown in the top half of the page. Click on Select to view more detailed information on that device in the bottom half of the screen.

This page is mainly for information and is useful in troubleshooting. The Edit facility is provided only for users who need to enable authentication. It displays additional fields in the iSCSI Authentication section.

We do not recommend that you use authentication, but it will be necessary if you have enabled the Secret feature on the General tab in the iSCSI Initiator. Click Edit to make the fields editable.

If a device is showing as not connected, this indicates that the iSCSI Initiator on the host has not logged on. Log on using the iSCSI Initiator and set the device as a Persistent Target for that host. This ensures that it will automatically log on again, if the host is rebooted. See “Microsoft iSCSI Initiator” on page 46.
Log (Status)

This page presents a time and date stamped list of significant system events. The most recent information is shown at the top of the list. The icons identify whether the messages are information, error or warning messages.

The Log is maintained even if the HP D2D Backup System is power cycled. Use the **Clear Log** button to clear the log.
### Tape Attach pages

These pages allow you to manage copy, export and import activities between the HP D2D Backup System and an attached tape drive. They are described in detail in “Export, import and copy to an attached tape drive” on page 83.

### Shutdown (Admin)

This option allows you to shut down the HP D2D Backup System cleanly. It is the only recommended way of powering off the device. If you remove the power in any other way and a host is carrying out a backup or restore, you may lose or corrupt data.

Click **Power Off** and **Yes** to confirm.

![Shutdown Option](image)
WARNING!
Before shutting down always ensure that there are no backup or restore jobs in progress and that no future jobs are scheduled to start whilst the system is shut down. If hosts do not automatically reconnect to the HP D2D Backup System when it restarts, you must reconnect manually from the iSCSI Initiator on each host, see “Targets tab” on page 49.

Administration (Admin)
This page allows you to manage the Administrator’s password and amend the date and time settings.
When you first log on the Administrator user has a password of Admin. For security reasons, you may wish to change this.

- Click Edit to make the fields editable.
- Make the required changes and click Update to apply the changes (or Cancel to discard them).

Resetting the password
If you forget your password, you can reset the HP D2D Backup System as follows:

**NOTE:**
Resetting the password will reset the networking settings to the factory defaults and reset the Administrator password to Admin. No user data will be lost.

1. Make sure nobody is using the HP D2D Backup System before you attempt the reset.
2. Press the Power button on the front of the HP D2D Backup System three times in quick succession. Approximately 5 seconds later the HP D2D Backup System will reboot.
3. Use the device discovery tool on the HP StorageWorks CD-ROM to re-configure the network settings of the HP D2D Backup System.
This page provides information about the firmware version of your HP D2D Backup System and allows you to upgrade the firmware.

1. Check [www.hp.com/support](http://www.hp.com/support) for the latest firmware and download it to your hard disk.
2. Select **Firmware** from the Web Management Interface and click **Upgrade**.
3. Make sure that there are no backup or restore jobs in progress and that no future jobs are scheduled to start whilst the firmware is upgrading. Click **Yes**.
4. Click **Browse...** and locate the upload file that you have just downloaded.
5. Click **Upload** to upgrade the firmware. A progress meter is displayed while the upgrade takes place. The system will reboot once it has been updated. Configuration information and data are unaffected by this process.
WARNING!
Once you have started to upgrade the firmware, it is important that you allow it to complete. Do not attempt to cancel the upgrade process, or power off the machine.

NOTE:
The tape drive is reported to your backup application (and Windows Device Manager) as an LTO-3 device. This is the default behavior of the tape drive and there is no need and no way to change it on the HP D2D Backup System. In earlier versions of the HP D2D Backup System firmware, the tape drive was reported as an LTO-2 device. Once you upgrade to the latest version of the firmware, the backup application continues to identify existing backup devices as LTO-2 and identifies new tape devices as LTO-3, but this has absolutely no impact on how the device behaves or functions. If you delete existing devices (LTO-2) and create new ones; the new ones will be LTO-3. (It is important not to confuse emulation type with cartridge size. Emulation type is totally independent from cartridge size. The HP D2D Backup System allows you to pick whatever cartridge size you like, up to 800 GB.)

Support (Admin)
If you have problems, HP Support will ask you to generate a support ticket to help with troubleshooting. It provides a log of everything that has happened on your system.

NOTE:
Please ensure that your browser security settings allow files to be transferred from the HP D2D Backup System to your host machine.

1. Use this page to Generate a support ticket.
2. At the prompt, save the file to disk.
9 Export, import and copy using an attached tape drive

If your organization’s backup strategy also requires the ability to archive backed-up data for offsite storage, there are two ways of achieving this:

• Attach an HP Ultrium tape drive directly to the HP D2D Backup System and use the copy, export and import facilities in the Web Management Interface to transfer data manually or to schedule jobs.
• Attach a supported tape drive to a host machine on the storage network. If your backup application supports the copying of data between devices, you can then use the backup application to move data from the HP D2D Backup System to physical tape. This option is described in “Copy using a tape drive attached to the host” on page 99.

In this chapter:
• “Requirements for connecting a tape drive to the HP D2D” on page 83
• “A note about terminology” on page 83
• “Archiving methods” on page 84
• “Using the Web Management interface to copy/export/import cartridges” on page 88
• “Using a tape drive connected to host” on page 99
• “Compression” on page 98

NOTE:
Always refer to http://www.hp.com/go/connect to find out which tape drive models are supported.

Requirements for connecting a tape drive to the HP D2D

To use this facility you need:
• A tape drive, such as an HP StorageWorks Ultrium device. This should be a half-height tape drive, if it is to be installed internally. Both SAS and SCSI tape drives are supported.
• A host bus adapter, HBA, for the tape drive connection (because there are no embedded SAS or SCSI ports). If the tape drive is pre-installed, an appropriate HBA is already installed. If not, you must purchase and install the HBA before connecting the tape drive.

Please refer to www.hp.com/go/connect for a list of all supported host bus adapters and tape drives. For instructions on attaching the tape drive, please refer to “Attaching a physical tape drive” on page 29.

NOTE:
Physical tape drives attached to the HP D2D Backup System can only be accessed by the HP D2D Backup System, using the Tape Attach pages. They do not appear as attached network devices to the host system.

A note about terminology

Within this guide:
• Export refers to the process that moves the cartridge from the HP D2D Backup System to the attached physical tape drive.
• **Import** refers to the process that returns the cartridge from the attached tape drive to the HP D2D Backup System.
• **Copy** refers to the process that creates an additional copy of the cartridge on the physical tape drive.

Backup applications may use similar terminology to describe the processes for transferring data to a slot where it can be exported to a backup device and for restoring it to the application’s database or catalog after loss or failure. Please refer to the white papers on [http://www.hp.com/support](http://www.hp.com/support) for further clarification.

### Archiving methods

Two methods are provided for archiving data to the directly attached tape device, these are Copy and Export:

• **Copy** retains the data cartridge on the HP D2D Backup system and creates an exact copy onto a physical cartridge in the attached tape drive.
• **Export** removes the data cartridge from the autoloader on the HP D2D Backup System once data has been successfully copied to the physical cartridge in the attached tape drive.

Each method has advantages and disadvantages, as described in more detail below.

---

**NOTE:**

As a general recommendation, **Copy** is the easier of the two options to use because it does not remove the data from the HP D2D Backup system and can be managed completely from the Web Management Interface. Only use the **Export** option, if you need to free up some disk space. **Export** (and **Import**) require additional steps in the backup application.

---

### Cartridge copy

The backup application on the host is used to back up data to a cartridge on the autoloader device (or to a standalone tape drive device) in the HP D2D Backup System. The Web Management Interface on the HP D2D Backup System is used to **Copy** the cartridge from the HP D2D Backup System to the attached tape drive, leaving the data on the HP D2D Backup System so that it is available for quick restore.
Figure 36 Cartridge copy

Why use the Copy functionality?

**Copy** creates two instances of the same cartridge; one stored on the HP D2D, the other on physical tape. Logically these are the same cartridge and the backup application has no awareness that there are two copies. If data from this cartridge is required for restore, the backup application will always restore the data from the HP D2D if it is available. The physical cartridge is, therefore, an additional copy that will be required only if the HP D2D is not available.

When would Copy be used?

Cartridge copies are likely to be appropriate when the user wishes to use the HP D2D Backup System for all foreseeable restore processes but requires an additional offsite copy for insurance or data security purposes. This may mean that weekly, monthly and yearly cartridges are copied. Weekly and monthly physical cartridges may be rotated; the cartridges on the HP D2D Backup System are overwritten after a period of time. Yearly cartridges may be kept indefinitely. Clear labeling of the cartridges in this case is essential because the backup application may overwrite the cartridge on the HP D2D Backup System and, therefore, lose any knowledge of the existence of the physical tape cartridge.

When is it necessary to restore from a copied cartridge?

There are three situations where it may be necessary to restore from the copied cartridge:

- **The cartridge stored in the autoloader device on the HP D2D is overwritten (accidentally) by the backup application.** The backup application database is updated to reflect the new contents of the cartridge and all knowledge of the old data is lost. If the backup administrator becomes aware that this has happened, it is possible to import the physical cartridge back into the HP D2D system, from where its data can be "imported" back into the application database for restore, if required. In this case, because the backup application has overwritten the database entry for the cartridge, some external knowledge of what is on the copied cartridge is required in order to be able to decide whether the data on the copied cartridge is useful.

- **The whole HP D2D Backup System or a complete autoloader on the HP D2D is accidentally removed from the Web Management interface.** The physical copy of the cartridge is the only copy now in existence. The backup application is still aware of the cartridge’s existence because it was not aware of the loss of the D2D system. The backup administrator has two options; if there is no required restore at this point, the administrator can deploy a new HP D2D system or create a new autoloader on the existing D2D and then import any copied cartridges back into the new
device for use with restores at a later date. If a restore is urgently required, the administrator can put the copied cartridge into a physical tape drive attached to the host and restore directly from that. In either case, the backup application is aware of the cartridge’s existence.

- **Both the D2D system and the host are lost.** In this case, the physical cartridge copy (as long as it was a full system backup) can be used for disaster recovery onto new or repaired server hardware using a tape device attached to the host server.

**Disadvantages of Copy**

1. Data is left on the HP D2D Backup System; no disk space is freed by copying to physical cartridge.
2. It is possible for the backup application to overwrite the cartridge on the HP D2D Backup System and thus become unaware of the data that has been copied to the physical cartridge.

**Cartridge export**

The backup application on the host is used to back up data to a slot on the autoloader device (or to a standalone tape drive device) in the HP D2D Backup System. It is also used to move the data from the slot into the mail slot. This creates an empty slot where the data was moved.

The Web interface on the HP D2D is used to **Export** cartridge data from the mail slot on the HP D2D Backup System to the attached tape drive. After a successful export, the data is removed from the HP D2D Backup System and the mail slot becomes empty. (If the export fails, the data remains in the mail slot.) **Export** removes the data and frees up disk space on the HP D2D Backup System and is useful for long term archival (for example in a yearly tape in a rotation scheme). If restore is needed, data can be imported (or moved back) into the HP D2D Backup System.

⚠️ **CAUTION:**

Do not export cartridges that the backup application uses on a frequent basis as part of a rotation strategy because it will not be able to write to the empty slot.
Figure 37 Cartridge export

Why use the Export functionality?

The main reason for using Export is to create more space on the HP D2D Backup System. If space is not an issue, Copy is the recommended method for creating offsite backups, because it is controlled solely from the Web Management Interface and will not impact any tape rotation strategy. Export involves use of the backup application. It is directly analogous to moving a cartridge in a physical autoloader to a mail slot (import/export element) so that the backup administrator can take it offsite or put it into a firesafe. Only a single copy of the cartridge exists. It is on physical tape and no longer on the cartridge in the HP D2D Backup System. The backup application is fully aware that the cartridge location is now offsite, so cannot overwrite it without explicitly asking for the cartridge to be moved back into the autoloader.

The main advantage of Export is that it frees up disk space on the HP D2D Backup System. However, care must be taken to ensure that future backups do not fail. For example, if a weekly backup tape is "exported", it will not be available for append or overwrite the next time it is required. Depending on the backup application configuration it may be possible to simply create a new blank cartridge in the autoloader for use the next time a weekly backup is required, however, in some configurations it will be necessary to re-import the physical copy in order for the next backup to occur successfully.

When would Export be used?

Cartridge exports are likely to be used when the user wishes to free up space on the HP D2D Backup System by exporting to physical tape a cartridge that is used infrequently. For example, if a rotation scheme uses twelve monthly tapes, it is safe to export a monthly tape from two months ago because it will not now be required (except for infrequent restores) for another ten months. The same applies to yearly tapes which may never be required again as they are kept forever.

When would I restore from an exported cartridge?

Restoring from an “exported” cartridge has a higher likelihood than from a copied cartridge, because the data no longer resides on the HP D2D Backup System. If a restore from an “exported” cartridge is required, the backup application will ask for the cartridge to be re-imported into the HP D2D before it can be used for restore. Exported cartridges may also be used for disaster recovery, as with copied cartridges.

Disadvantages of Export

1. Restores may take longer if a physical cartridge is required for the restore.
2. Backup applications may require the exported cartridge for the next job in their rotation scheme.

Cartridge import

The Web interface on the HP D2D is used to Import cartridge data from the attached tape drive to the mail slot on the HP D2D Backup System. The backup application on the host is used to move the data from the mail slot back into one of the autoloader slots.

![Cartridge Import Diagram]

**Figure 38 Cartridge import**

When you import a cartridge:

- If it is less than 200 GB, the cartridge **Max Size** is set to 200 GB.
- If it is over 200 GB, the cartridge **Max Size** is set to 400 GB.
- If it is over 400 GB, the cartridge **Max Size** is set to 800 GB.
- Cartridges over 800 GB are not writeable.

The **Used Size** is always reported correctly.

Tape spanning

Spanning of multiple physical cartridges from a single cartridge in the HP D2D Backup System is not supported. The data from the cartridge on the HP D2D Backup System must not exceed the capacity of the physical cartridge on the attached tape drive. Data from only one cartridge on the HP D2D Backup System can be copied or exported at a time; it is not possible to select multiple slots and copy them to a single physical cartridge.

Using the Web Management interface to copy/export/import cartridges

The Tape Attach web pages allow you to configure attached tape drives, run jobs manually or schedule them, view status and job history.
Configuration (Tape Attach)

This page allows you to view physical tape drives that are attached to the HP D2D Backup System. It shows you the Vendor Name, Product ID, serial number and information about any cartridge loaded.

Click Select next to a specific tape drive to display more information about its serial number and firmware revision. If there is a cartridge loaded in the tape drive, its bar code and cartridge size are also displayed (these fields have hyphens if no cartridge is loaded).

Adding tape drives to the list

If you subsequently attach an additional external tape drive after power on, click Rescan to add it to the list of devices.

NOTE:

If an attached tape drive is not detected, refer to “Attached tape drive troubleshooting” on page 111.

Upgrading tape drive firmware

Firmware for supported HP Ultrium tape drives may also be updated from this page. Please refer to www.hp.com/support for details of the latest firmware for your HP Ultrium Tape Drive and download required files to a location on your host machine before you use this page.

Copy/Export/Import (Tape Attach)

This page allows you to initiate a manual export/import or copy operation.
To copy to attached tape drive

A **copy** operation may be performed upon any non blank cartridge in any numbered slot in an autoloader device or upon a non blank cartridge in a standalone tape drive device. The cartridge data is copied from the HP D2D Backup System to the physical tape drive.

1. In the Web interface select **Copy/Export/Import** and locate the cartridge that you wish to copy in the Cartridge list and click on the **Copy** button next to it. This displays the Setup page. (Or reports an error if no tape drives are currently attached to the HP D2D Backup System.)
2. Select the **attached tape drive** from the pull-down list, the required **verify/compare option** and whether the physical cartridge should be unloaded after the operation completes. Click **Start**.

**NOTE:**
A **Full Verify** reads the data back after copy and compares it byte-by-byte with the original. A **Quick Verify** also reads back the data, but only ensures that it can be read. It may save some time if another tape device on the HP D2D Backup System is being accessed at the same time as the copy operation. **No Verify** is the fastest option.

3. The process checks that media is loaded in the attached tape drive and that it is blank. If it is not blank, you are given the option of overwriting it or canceling the job. (It is not possible to append data.)

4. To view job progress information and any error messages, select the **Status** navigation topic.

**To export to attached tape drive**

An **export** operation may be performed upon any non blank cartridge in the Mail slot in an autoloader device. The cartridge data is first copied from the HP D2D Backup System to the physical tape drive and then subsequently deleted from the HP D2D Backup System. However, if an error occurs during the process, the data is not deleted. It remains on the cartridge located in the Mail slot.

**CAUTION:**
Do not export cartridges that the backup application uses on a frequent basis as part of a rotation strategy.

1. Use the backup application on the host to move the cartridge into the mail slot. This action removes the cartridge from the numbered slot and leaves the slot empty. Backup applications have a number of terms to describe this action, such as remove or eject. Refer to the documentation supplied with your backup application for further details.

2. In the Web interface select **Copy/Export/Import** and locate the cartridge that you wish to export in the Cartridge list. Click on the **Export** button next to it.
3. This displays the Setup page. (Or reports an error if no tape drives are currently attached to the HP D2D Backup System.) Select the attached tape drive from the pull-down list, the required verify/compare option and whether the physical cartridge should be unloaded after the operation completes. Click Start.

**Tape Attach - Export Setup**

You have selected cartridge 5B86F11E for Export which was last written at 11:18 on July 11, 2007

Please select attached tape drive

<table>
<thead>
<tr>
<th>Tape Drive</th>
<th>Bar Code</th>
<th>Used Size</th>
<th>Max Size</th>
<th>Write Protected</th>
<th>Last Written</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 1</td>
<td>5B86F11E</td>
<td>104 MB</td>
<td>200 GB</td>
<td></td>
<td>11-JUN-2007 11:18:11</td>
</tr>
</tbody>
</table>

Please select verify/compare option

- **Full Verify**
- **Quick Verify**
- **No Verify**

After job finishes

- **Eject Physical Cartridge**

**NOTE:**

A **Full Verify** reads the data back after copy and compares it byte-by-byte with the original. A **Quick Verify** also reads back the data, but only ensures that it can be read. It may save some time if another tape device on the HP D2D Backup System is being accessed at the same time as the copy operation. **No Verify** is the fastest option.

4. The process warns you that the cartridge data on the HP D2D Backup System will be removed once it has been exported. You must click **OK** to continue. It also checks that media is loaded in the attached tape drive and that it is blank. If it is not blank, you are given the option of overwriting it or canceling the job.
NOTE: If you cancel the process, remember to use the backup application to move the cartridge back from the mail slot to the cartridge slot.

5. To view job progress information and any error messages, select the Status navigation topic.

6. Once the export completes successfully, the cartridge is removed from the mail slot.

To import from attached tape drive

An import operation may be performed on a physical cartridge in the attached tape drive. The cartridge is copied to the target device on the HP D2D Backup System. The operation will either automatically create a new cartridge in the mail slot of an autoloader device or replace the data on a cartridge in a standalone tape drive device. The mail slot or cartridge must be empty.

NOTE:

Only one copy, export or import job may be run at a time, regardless of the number of physical tape drives that are connected to the HP D2D Backup System. If a job is currently in progress, a warning message will be displayed when you try to set up the new job. You must wait for the current job to complete.

1. For importing to an autoloader, locate the Mail slot in the Cartridge list and click on the Import button next to it. (The Import button is only displayed if the Mail slot is empty - all the other fields contain hyphens.) For importing to a standalone tape drive, click on the Import button in the cartridge row.

2. Once Import has been clicked, the Setup page is displayed. (Or an error is reported if no tape drives are currently attached to the HP D2D Backup System.) Select the attached tape drive from the
pull-down list, the required verify/compare option and whether the physical cartridge should be unloaded after the operation completes. Click **Start**.

### Tape Attach - Import Setup

Please select attached tape drive  
- [ ] HP Ultrium 2:0:0:0

Please select verify/compare option
- [ ] Full Verify
- [ ] Quick Verify
- [ ] No Verify

After job finishes
- [ ] Eject Physical Cartridge

![NOTE:](image)

**A Full Verify** reads the data back after copy and compares it byte-by-byte with the original. **A Quick Verify** also reads back the data, but only ensures that it can be read. It may save some time if another tape device on the HP D2D Backup System is being accessed at the same time as the copy operation. **No Verify** is the fastest option.

3. The process warns you that when importing cartridge data to a tape drive device on the HP D2D that contains a non blank cartridge, the data on the cartridge will be overwritten. You must click **OK** to continue.

4. To view job progress information and any error messages, select the Status navigation topic.

5. Once the import has completed successfully, the cartridge is in the mail slot. Use the backup application to move the data back into the autoloader slots. Backup applications have a number of terms to describe this action, such as insert. Refer to the documentation supplied with your backup application for further details.

- If it is less than 200 GB, the cartridge **Max Size** is set to 200 GB.
- If it is over 200 GB, the cartridge **Max Size** is set to 400 GB.
- If it is over 400 GB, the cartridge **Max Size** is set to 800 GB. Cartridges over 800 GB are not writeable.
- The **Used Size** is always reported correctly.

**Status (Tape Attach)**

This page displays the status of any current tape import/export or copy operations.

If a job is in progress, it shows cartridge barcode and target tape drive details and relevant progress bars. The percentage completion is the amount of progress for all relevant activities in the operation, such as export and verify (if requested).
Once an export job has completed successfully, the cartridge is removed from the HP D2D Backup System and the mail slot will have hyphens on the Cartridges page to show that it is empty (with the option to Create a blank cartridge).

NOTE:
If no operations are currently in progress, a link will be provided to the Tape Attach Job History page.

To cancel a job
To cancel a job in progress, click Cancel. You are asked to confirm that you wish to cancel the job. If a job is canceled during the copy, export or import phase, this cancels the transfer of data.
- For export and copy jobs, the data remains in the mail slot or slot on the HP D2D Backup System and the physical tape on the tape drive is rewound and erased.
- For import jobs, the data remains on the attached tape drive.
If a job is canceled during the verify phase, the data has already been moved and it is only the verify process that is canceled.

If an error occurs
Errors may occur if there is a tape read/write media problem, if there is not enough capacity on the physical cartridge or if there is a verify error. Errors may also occur if the backup application accesses the cartridge that is being exported/imported or copied.
Errors are reported as a dialog box on this page, which requires you to click OK to clear it.
If an error occurs during export or copy, you do not lose any data. The original data remains unaltered in its original location on the HP D2D Backup System.

Schedule (Tape Attach)
This page allows you to create, edit and delete schedules for export and copy operations.
• Four types of schedule are allowed: daily, weekly monthly by day and monthly by week.
• Up to 12 schedules may be created.

When an export or copy scheduled job is run, it automatically overwrites the cartridge in the tape drive. If the cartridge is not blank, there is no warning and no record in the job log.

**NOTE:**
The backup application is not automatically updated with any schedules created on the HP D2D Backup System. The two are independent of each other. If you want the backup application schedules to work in conjunction with a schedule on the HP D2D Backup System, you must co-ordinate them manually.

To create a schedule

1. Select **Schedule** from the Tape Attach section of the navigation side bar.
2. A scrollable list of existing schedules is displayed together with details of the next scheduled tape job.

3. From the pull-down lists below this list, select:
   • The HP D2D Backup System device (autoloader or tape drive) that contains the data for which you want to create a scheduled job.
   • The frequency of the job: daily, weekly, monthly by day or monthly by week.

4. Click **Create**. Appropriate scheduling parameters for the backup device and job frequency are displayed below.

**NOTE:**
The **Create** button is not present if you have already created 12 schedules. You must edit or delete existing schedules if you want to create new ones.
5. Enter the appropriate scheduling information and click Create.

Table 8 Job schedule parameters

<table>
<thead>
<tr>
<th>Day:</th>
<th>This field is not relevant for daily jobs. For weekly jobs, select the day of the week. For monthly by day, select a day between 1 and 31. For months with less than 31 days, the job is always run on the last day of the month. For monthly by week, select First/Second/Third/Fourth/Last week and then the day of the week.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot:</td>
<td>This is the slot that holds the data that is to be copied or exported. For a copy job, select the slot number. For an export job, select Mailslot. (This field is only applicable to autoloaders as tape drives contain only a single cartridge.)</td>
</tr>
<tr>
<td>Time:</td>
<td>Enter the time at which the job is to run. The system uses a 12-hour clock and you must select am or pm.</td>
</tr>
<tr>
<td>Active:</td>
<td>Use this check box to control whether a schedule is active. The default is active (box is checked).</td>
</tr>
<tr>
<td>Unload After Completion:</td>
<td>Use this check box you to control whether the cartridge is unloaded once the scheduled job completes. The default is to remain loaded (the box is not checked).</td>
</tr>
<tr>
<td>Attached Tape Drive:</td>
<td>Select the physical tape drive that is the target for the job.</td>
</tr>
<tr>
<td>Verify:</td>
<td>This determines how the data that has been created on the physical cartridge is to be verified with the original data on the HP D2D Backup system. There are three options: None, Quick and Full. The default is Full.</td>
</tr>
</tbody>
</table>

To view, edit or delete existing schedules

- Locate the schedule in the scrollable list and click Select to display the schedule details.
- Click Edit to make schedule details editable. Make the required changes and click Update. (You cannot edit the schedule Type.)
- Click Delete to delete the schedule completely. You will be prompted to confirm the delete action. (Remember that you can also disable the job temporarily by editing the Active checkbox.)

Job History (Tape Attach)

This page provides details of the last 50 tape export/import and copy jobs. The job type, bar code, start time, duration, verify options, data size, and job status are displayed. The most recent job is shown at the top of a scrollable list.
Compression

The HP D2D Backup System does not apply hardware compression to backed-up data; HP StorageWorks tape drives do apply hardware compression. Therefore, 200 GB of data on the HP D2D Backup System will require less space on a physical 200 GB tape cartridge. If moving data to a physical cartridge for offsite storage, there is no need for concern if the data seems to utilize less space.

The capacity quoted for physical media assumes that the tape drive will be able to compress your data and reduce the file sizes by 50%, but this can be achieved only if your data is not already compressed. For example, JPEG pictures, movies, music or ZIP files, are already in compressed formats: spreadsheets, text files, high-resolution graphics are not. Most users have a mixture of compressed and uncompressed data and seldom achieve 50% compression.

Some users may choose to enable software compression from their backup application to increase the storage space available to the backup application, but this can make backup jobs slower to run. However, once software compression has been applied, the data is not further compressed when it is exported to a physical tape directly attached to the HP D2D Backup System. This ensures that the user knows exactly how much physical cartridge space is required for export or copy.
10 Copy using a tape drive attached to the host

In this chapter:
• “Requirements” on page 99
• “Using a tape drive connected to host” on page 99
• “Compression” on page 100

Requirements

If you wish to copy data from the HP D2D Backup System to a tape drive connected to the host machine, you need:

• A separate tape device, such as an HP StorageWorks Ultrium 460 or 448 tape drive, that can be connected directly to your host.
• A backup application, running on the host, that allows you to copy data from the cartridge on your HP D2D Backup System to the physical cartridge.

**NOTE:**

It is not possible to export and import data using this method. Export and import are only supported on tape drives that are connected directly to the HP D2D Backup System. See “Export, import and copy to an attached tape drive” on page 83

Tape drives supported

The HP StorageWorks Ultrium 448 or 460 tape drive is the ideal device for all copying processes because the physical cartridge size matches the maximum configured cartridge size on the HP D2D Backup System. However, by spanning across several tapes, you can also use a tape drive with a lower capacity, such as an HP StorageWorks DAT 72 tape drive. If your backup application will not allow you to span tapes, you may want to use the Web Management Interface to reduce the maximum configured cartridge size on the HP D2D Backup System. However, you must do this when you first create the autoloader or additional slots and before you have used the autoloader in any way with your backup application. See “To edit maximum size” on page 70.

**NOTE:**

Always refer to [http://www.hp.com/go/connect](http://www.hp.com/go/connect) to find out which tape drive models are recommended.

Archive from host to tape process

This process is controlled by the backup application. For example, HP StorageWorks Data Protector Express calls it a Copy job.
Further information

It is not possible to describe how to carry out this operation because it is controlled solely from the backup application and different applications operate in different ways. HP provides a number of white papers that describe how to use this function with specific applications; see http://www.hp.com/support. Or refer to the documentation that was supplied with your backup application.

Compression

The HP D2D Backup System does not apply hardware compression to backed-up data; HP StorageWorks tape drives do apply hardware compression. Therefore, 200 GB of data on the HP D2D Backup System will require less space on a physical 200 GB tape cartridge. If moving data to a physical cartridge for offsite storage, there is no need for concern if the data seems to utilize less space.

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Some users may choose to enable software compression from their backup application to increase the storage space available to the backup application, but this can make backup jobs slower to run. However, once software compression has been applied, the data is not further compressed when it is exported to a physical tape directly attached to the HP D2D Backup System. This ensures that the user knows exactly how much physical cartridge space is required for export or copy.
11 Restore processes

In this chapter:
• “Restore scenarios” on page 101
• “Restoring single files” on page 102
• “Reconnecting to HP D2D after host failure” on page 102

Restore scenarios

The following table illustrates the three main restore scenarios.

Table 9 Restore scenarios

<table>
<thead>
<tr>
<th>From HP D2D Backup System</th>
<th>From a physical tape drive connected to the HP D2D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic file restore</td>
<td>Use the backup application to restore files from the HP D2D to the host, as required.</td>
</tr>
<tr>
<td>Restore after host failure</td>
<td>1. Rebuild the host and reconnect to the HP D2D. 2. Use the backup application to restore files from the HP D2D to the host.</td>
</tr>
<tr>
<td>Restore after site failure</td>
<td>1. Replace the HP D2D. 2. Rebuild the host and reconnect to the HP D2D. 3. Import the cartridge from the attached tape drive. • If the tape drive is attached to the HP D2D, use the Web Management Interface to import the cartridge to the HP D2D mail slot. Then use the backup application to move the cartridge back into the autoloader slot on the HP D2D and restore data to the host. See Chapter 9. • If the tape drive is attached to the host, use the backup application to restore data to the host. See Chapter 10.</td>
</tr>
</tbody>
</table>

NOTE:
If you have a backup application that supports One-Button Disaster Recovery and have exported an OBDR cartridge, you will be able to run OBDR from a tape drive connected directly to the host. This allows you to reconnect automatically and restores the host system from that cartridge. Please refer to the tape drive and backup application documentation for more information. The tape drive must also support OBDR.
Restoring from the HP D2D Backup System

This is very easy and fast. Run your backup software and select the files to be restored. Although the software application is tape-based, the restore performance on your HP D2D Backup System is much faster than restoring from physical tape.

Reconnecting to the HP D2D after host failure

Each configured autoloader or tape drive on the HP D2D Backup System is uniquely mapped to a host. It cannot be seen by any other host on the network. If the host system fails, you must replace it and reconfigure the mapping of the host to the configured backup device on the HP D2D Backup System.

1. Install the operating system on the host. If possible, give the host the same Computer Name as the host that failed.

2. Install the backup application on the host.

3. Run the iSCSI Initiator on the restored host. (See also “The iSCSI Initiator” on page 47.)

4. Make a note of the Initiator Node Name from the General tab.

5. Modify the target autoloader to see the new machine name of the restored host. Select the Devices page on the Web Management Interface, and put the target autoloader into Edit mode. Copy the host’s Initiator Node Name (found on the General tab in step 4) into iSCSI Initiator Name.
6. On the Discovery tab, enter the IP address of the HP D2D Backup System to add it as a target portal for the host. Do not change the Port; it should be 3260.

7. Target devices have already been configured on the HP D2D Backup System for the host that failed, so they will appear in the list on the Targets tab with a status of **inactive**, if you are using the same hostname and iSCSI initiator node name as the host that failed. Otherwise new devices will be configured for this host. You must log on to the appropriate targets for your host. Remember that...
each autoloader has two devices and you must log onto each one separately. We recommend that you also select the automatic restore on boot option in the Log On... dialog.

8. Run your backup application. It should see the autoloader device on the HP D2D Backup System. Import the media into your backup application’s database and restore the latest full backup from the HP D2D Backup System.
Troubleshooting

Use the information in this chapter to troubleshoot problems. More detailed troubleshooting information can be found at www.hp.com/support.

This chapter provides troubleshooting information on:

- “Connecting the hardware” on page 105
- “DHCP is not working” on page 105
- “Running the Installation Wizard” on page 106
- “Manual installation” on page 108
- “HP D2D Backup System troubleshooting” on page 108
- “Device troubleshooting” on page 109
- “Cartridge troubleshooting” on page 110
- “Attached tape drive troubleshooting” on page 111
- “Email alerts troubleshooting” on page 112
- “Disk troubleshooting” on page 112

Connecting the hardware

Please see www.hp.com/go/connect for supported network cards and cables.

- My network does not have a spare Gigabit port
- The supplied cable is too short
- I am connecting directly to a 10/100 Base-T port on a storage server

My network does not have a spare Gigabit port

You need to purchase a new switch with more available ports or remove any connections to redundant equipment.

100 Base-T Ethernet will limit performance; 10 Base-T Ethernet will severely limit performance. HP strongly recommends that you connect to Gigabit Ethernet. For product details on HP’s range of network switches, see www.hp.com/go/procurve.

The supplied cable is too short

The supplied cable is 3 metres long. If this is too short, it can be replaced. You must purchase a CAT-5E Ethernet cable of the required length.

I am connecting directly to a 10/100 Base-T port on a storage server

This is not recommended, but if you are connecting directly to a storage server, you can only use the supplied cable to connect to a Gigabit Ethernet card. If you are connecting to a 10/100 Base-T port on a storage server, you must purchase a crossover cable.

DHCP is not working

Check that DHCP is enabled. You can use Discovery to do this. If it is enabled, check the DHCP server is operating and configured correctly.
Some users find it helpful to enable DHCP to identify the HP D2D Backup System quickly and easily on the network and then make the IP address permanent for future use.

Running the Installation wizard

- Drivers fail to install using the install wizard
- Device discovery fails to find device
- iSCSI Initiator fails to download
- The wizard has not created an autoloader for my host

Drivers fail to install using the install wizard

The driver installation step of the Wizard installs the HP LTO tape driver to allow your system to recognize the Ultrium devices created by the HP D2D Backup System. No additional medium changer driver is required because Microsoft Windows provides a suitable generic driver and all backup applications provide their own medium changer drivers.

If this phase fails, the remainder of the Wizard can still complete successfully, but the tape device created as part of the autoloader will not be recognized by Windows (it will show up as an unknown device in Device Manager) or your backup application.

Tape drivers can be installed later by one of the two following methods:

- Manually install HP LTO tape drivers after the wizard completes. These can be found both on the HP StorageWorks CD-ROM in the drivers directory and on the HP website, www.hp.com/support.
- Use the Tape drivers supplied with your backup software. For many applications these will be installed automatically during the software installation process. If the backup software is already installed, you may need to manually update the drivers.

**IMPORTANT:**

Certain backup applications require you to use their own drivers for both the tape device and medium changer. If this is the case, you must install the backup application drivers manually after the Installation wizard has completed.

Device discovery fails to find device

When installing the HP D2D Backup System for the first time, this step must be completed successfully before the Installation wizard can succeed. If the HP D2D Backup System has already been assigned network parameters and is currently connected to other host machines on your subnet, the installation process will not fail but must be completed manually via the Web Management Interface. See “Advanced installation” on page 45.

If the Discovery engine fails to find your HP D2D Backup System:

- Check that the HP D2D Backup System is powered on.
- Check that the HP D2D Backup System is connected to a live Ethernet port and that the activity lights next to the network port are flashing.
- Check that the host machine is connected to a live Ethernet port.
- Check that the HP D2D Backup System is connected to the same subnet as the host machine.
- If connecting directly to a 10/100Base-T port on a dedicated backup server, ensure that a crossover Ethernet cable has been used.
**iSCSI Initiator fails to download**

The HP D2D Backup System supports the Microsoft software iSCSI initiator and requires it to be running on each host. If the host does not have the Microsoft iSCSI initiator, it will not be able to connect to the autoloader (or tape drive) configured on HP D2D Backup System and will not be able to perform backups.

The Microsoft iSCSI initiator is normally downloaded from the Microsoft website during installation. Download could fail:

- If the host machine does not have an internet connection
- If Firewall restrictions prevent this process
- If Microsoft has relocated the iSCSI initiator files to a different address on their website.
- If the process times out due to a slow connection

If the process fails:

- Check that the HP D2D Backup System and the host machine are still connected to the network.
- Check that the iSCSI initiator installed correctly. An icon should have been placed on your desktop.
- Manually install and configure the iSCSI Initiator as described in “Advanced installation” on page 45. You may need to temporarily disable the Firewall to download the iSCSI Initiator. It can be re-enabled as soon as the software is downloaded.

**The wizard has not created an autoloader for my host**

You can connect a maximum of six hosts to the HP D2D Backup System. If you have already run the Installation wizard on six hosts, you will not be able to install on a seventh. Similarly, the HP D2D Backup System supports a maximum of six tape autoloaders. If you create an additional device for one of your hosts, you reduce the number of hosts that can be connected.
Figure 40 Fewer hosts are supported because Hosts 1, 2 and 3 have two devices

Manual installation

Please see “Advanced installation” on page 45 for detailed information, including troubleshooting, about manual installation.

HP D2D Backup System troubleshooting

- Powering up the HP D2D Backup System
- Shutting down the HP D2D Backup System
- Disconnecting hosts

Powering up the HP D2D Backup System

The normal boot sequence takes approximately 2 minutes.

- On power up the HP D2D Backup System runs its fans at high speed for approximately 10 seconds.
- It then enters the boot phase. All LEDs flash in a sweeping pattern as it carries out its self-test.
- When the self-test completes, all LEDs go off, apart from the Status LED, which flashes briefly.
- Finally, all LEDs show the appropriate status. See “Understanding the LEDs” on page 53.

If the HP D2D Backup System has not booted after 10 minutes, there is a problem. Reboot the system. If this fails, contact HP Support, www.hp.com/support.

Shutting down the HP D2D Backup System

If you power off the HP D2D Backup System make sure no backup or restore jobs are running or scheduled to run while the HP D2D Backup System is out of action.
Disconnecting hosts

All hosts on which the Installation wizard has been run are automatically reconnected to their device(s) when the HP D2D Backup System is restarted. If you want to disconnect a host permanently, you must:

• Use the iSCSI Initiator to deselect Persistent Target, log off the target and remove the IP address, see “Advanced installation” on page 45. If you do not do this, the host will continuously try to reconnect, which may slow down the system.
• Use the Web Management Interface to edit the target information for the device that was connected to the host. You may want to make it accessible to a different host or delete it. See “To edit device details” on page 66.

Device troubleshooting

• Host cannot connect to the device from Web Management Interface
• Backup application cannot see device
• Backup jobs are slow or time-out
• Cannot create a device
• Cannot see newly created device
• Cannot see slots I have just added
• Cannot delete a device
• Backup is slow

Host cannot connect to the device from Web Management Interface

• Check that you have entered the correct IP address for the HP D2D Backup System in the host’s browser.
• Make sure that the host and the HP D2D Backup System are still connected to a working network.
  • On the HP D2D Backup System, check the LEDs. The Network LED on the front of the HP D2D Backup System will be off, if there is no network connection or the network has not been configured. The LEDs on the network connector on the back of the HP D2D Backup System will also be off if there is no network connection.
  • From the host, see if you can connect to another internet address.
• Make sure that the host is on the same subnet as the HP D2D Backup System.
• Try connecting from another host on the same network.
• Try to PING the IP address of the HP D2D Backup System. If PING is successful, there is network communication between the host and the HP D2D. If PING is unsuccessful, troubleshoot the network and network settings.

If you still cannot see the HP D2D Backup System, use the standalone Discovery tool. Discovery is run as part of the Installation wizard; it is also installed as a standalone utility on your desktop. Run the Discovery tool and check that the HP D2D Backup System appears in the list of devices for selection.

Use the Beacon option to identify a particular HP D2D Backup System on the network.

If Discovery cannot find the device, check whether there is a Firewall. You may need to temporarily disable it. It can be re-enabled as soon as the device is configured. Or, the HP D2D Backup System may be on a different subnet. If possible, connect the HP D2D Backup System directly to the host. If this fails, contact HP Support www.hp.com/support.

Backup application fails to see device

Make sure you have the latest version or software patches for the backup application. (See www.hp.com/go/connect) Stop and restart the backup application services after the backup device has been discovered.

If you still cannot see the device, check Device Manager to make sure it is accessible from the host.
• If it is accessible, there is a problem with the backup application. Certain backup applications require you to use their own drivers for both the tape device and medium changer. If this is the case, you must install the backup application drivers manually after the Installation wizard has completed.
• Make sure that the iSCSI initiator is connected to the devices and log on to them, if they are not. See “Targets tab” on page 49
• If it is not accessible, rerun Discovery.

I cannot create a device
The HP D2D Backup System supports a maximum of six devices.

I cannot see a newly created device
When you create a new device on the HP D2D Backup System, the host will not be able to see the device until you connect manually to it using the iSCSI Initiator. See “Advanced installation” on page 45 for more information.
If you still cannot see the device, check Device Manager to make sure it is visible from the host.

I cannot see additional slots from the backup application
When you create additional slots for an autoloader on the HP D2D Backup System, you may need to restart services on the backup application so that it can see the new slots.

A deleted device keeps reappearing
When you create a device with the Installation wizard it is always configured as a Persistent Target on the host. This means that the connection will automatically be restarted each time the host logs on to the HP D2D Backup System. To delete the connection, use the iSCSI Initiator as described in “Persistent Targets tab” on page 50.

If backup is slow
Are you connecting to a 10/100Base-T port? 100 Base-T will limit performance; 10 Base-T will severely limit performance.
Check that other network traffic is not too heavy. Congested networks will slow performance, even on Gigabit.
Check the backup application. If you are backing up a client of a backup server, the bottleneck may be in the backup server.
Ensure that the host being backed up is not in use at the time of backup.

Cartridge troubleshooting
• Cannot resize cartridges
• My tape drive has run out of space
• My physical tape drive has a smaller capacity than the cartridge size on the HP D2D Backup System

I cannot resize cartridges
The only time you can resize cartridges is when you first create an autoloader or add slots and they are blank. Once the cartridges are made available to the backup application, it formats them ready for use and they are no longer blank, even if you have not yet written data to them. Similarly, the erase function on most backup applications does not return the cartridge to a blank state.
My tape drive device has run out of space

It is not possible to create extra space for a tape drive device. You may be able to create an additional device for this host. Autoloaders are much more flexible because you can add slots.

The cartridges for my attached tape drive are smaller than 200 GB

The HP StorageWorks Ultrium 448 or 460 tape drive is the ideal device for moving data from the HP D2D to physical tape because the physical cartridge size matches the maximum configured cartridge size on the HP D2D Backup System. However, if your backup application supports spanning across several tapes, you can also use a tape drive with a lower capacity, such as an HP StorageWorks DAT 72 tape drive.

NOTE:
The HP D2D Backup System does not apply hardware compression to backed-up data; the HP StorageWorks tape drive does. Therefore, 200 GB of data on the HP D2D Backup System will require less space on a physical 200 GB tape cartridge. However, if the backup application applies software compression, the data is not further compressed when it is exported to a physical tape directly attached to the HP D2D Backup System. This ensures that you know exactly how much physical cartridge space is required for export or copy.

Attached tape drive troubleshooting

An attached tape drive does not appear on the Web interface

Check that the cables and HBA are installed correctly. See “Attaching a physical tape drive” on page 29.

Make sure that you are using a supported HBA and tape drive. See http://www.hp.com/go/connect for the most up-to-date information.

If you still cannot access it, try connecting the tape drive to a host server to ascertain if there is a tape drive problem. The HP diagnostic software for tape drivers, Library & Tape Tools, is not available when the tape drive is connected to the HP D2D, but can be used when the tape drive is attached to a server.

Call HP Support if you are unable to resolve the problem.

Cartridge copy or export fails

Check the media. Is the cartridge is large enough to accommodate the data? Is it WORM media? HP Ultrium tape drives support WORM media, which can only be written to once (Write Once, Read Many). Once you have written to the media, subsequent export and copy operations will fail.

Try again, using new media.

Check the tape drive LEDs, it may need cleaning. (See the documentation supplied with the tape drive for instructions.)

Cartridge import fails

If import fails, try connecting the tape drive to the host server. You can then use Library & Tape Tools to run diagnostic tests on the tape drive.

It is possible to import cartridges that have not been exported from the HP D2D Backup System. However, you will only be able to read these cartridges, if they were created by the same backup application that you are using on the host.
Email alerts troubleshooting

If you are not receiving email alerts, use the Test button on the Email Alerts page to send a test email. If this fails, make sure the email server is configured correctly. See “Email Alerts (Configuration)” on page 74 for more information.

Disk troubleshooting

• HP D2D Backup System runs out of space
• Disk fails on the HP D2D Backup System

If the HP D2D Backup System runs out of space

A warning message is generated when the HP D2D Backup System reaches 90% capacity. You cannot add physical disk space, but you may be able to create some space. Options for creating space include:

• Review your backup jobs to see if you can reduce the size of backup or retention time.
• Use the backup application job settings to overwrite or erase data.
• Export a cartridge to an attached tape drive.

If a disk fails

The Disk Status LED will flash orange, if a disk fails. The Web Management Interface will help you identify the disk that has failed. The HP D2D Backup System operates correctly with three disks, but protection is limited. It is important to replace the failed disk as soon as possible.

For more information, see “Hard disk replacement” on page 113.
Replaceable parts

The only functional parts that can be replaced in the HP D2D Backup System Backup System are the hard disks. If the unit fails for any other reason than hard disk failure and it is still under warranty, a replacement HP D2D Backup System without hard disk drives may be supplied.

The HP D2D Backup System Backup System is a RAID 5 configured device with four disks. No other RAID configurations are supported.

• HP D2D Backup System 110 has four 250 GB disks
• HP D2D Backup System 120 has four 500 GB disks
• HP D2D Backup System 130 has four 750 GB disks

RAID 5

RAID 5, Distributed Data Guarding, offers the best combination of data protection and usable capacity. RAID 5 stores parity data across all the physical drives in the array and allows more simultaneous read operations and higher performance than data guarding (RAID 4). If a drive fails, the controller uses the parity data and the data on the remaining drives to reconstruct data from the failed drive. The system continues operating with a slightly reduced performance until you replace the failed drive. RAID 5 requires an array with a minimum of three physical drives. For the HP D2D Backup System, which has four disks, 25% of the total logical drive storage capacity is used for parity data.

This means that actual storage capacity is approximately:

• 2.25 TB for the HP D2D Backup System 130
• 1.5 TB for the HP D2D Backup System 120
• 750 GB for the HP D2D Backup System 110

How do I know a disk has failed?

The Status and Disk Status LEDs show amber, if a disk fails. Use the Web Management Interface to help you identify the disk that has failed. The HP D2D Backup System operates correctly with three disks, but protection is limited. It is important to replace the failed disk as soon as possible. Any subsequent disk failure will result in complete data loss.

In the following Summary page example you can see that one disk has failed.
Look at the RAID & Disks page for more information.

The disk status icon in the Physical Disks section indicates an error condition. Note also the message in the RAID Status section that warns that “RAID is still operational but failed disk should be replaced as soon as possible”.

If more than one disk fails

You will lose all data on the HP D2D Backup System and the message in the RAID Status section warns that there are “Too few disks to operate”. However, the device operating system is not stored on any of the disks, so the HP D2D Backup System is still usable after replacing the failed disks. Use the Web
Management Interface to help you identify the disks that have failed. You can replace the disks, rebuild the RAID array and use the HP D2D Backup System as a new appliance.

**Electrostatic discharge information**

ESD can damage static-sensitive devices or microcircuit. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface and properly grounded (earthed) tools and equipment.
- Keep work area free of nonconductive materials, such as ordinary plastic assembly aids and foam packing.
- Make sure that you are always properly grounded (earthed) when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives with the Printed Circuit Board (PCB) assembly-side down.
- Use conductive field service tools.

⚠️ **WARNING!**

Hazardous voltages are present inside the HP D2D Backup System. Always disconnect AC power from the server and other associated assemblies while working inside the unit. Serious injury may result if this warning is not observed.

⚠️ **WARNING!**

To reduce the risk of injury from electric shock, disconnect all power cords to completely remove power from the system.

⚠️ **WARNING!**

To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

⚠️ **CAUTION:**

The HP D2D Backup System must always be operated with the system covers on. Proper cooling is not achieved when the system covers are removed.

### Replacing the hard disk

1. Select **Disk & RAID** on the Web Management interface.
2. The information in the Physical Disks section identifies which disk has failed. The serial number is the only unique identifier of the disk. It is very important to make a note of the physical disk number and the serial number as they appear on this screen **BEFORE** you remove the disk. The serial number is the only way that you can be sure you are replacing the correct disk.

⚠ **CAUTION:**

If you replace the wrong disk, you could lose all your data.

3. Make sure there are no backup or restore jobs in progress and that no future jobs are scheduled to start whilst the system is shut down. Select **Shutdown** on the Web Management interface and click **Power Off** to power down the HP D2D Backup System safely.

4. Disconnect the network cable and the power cord from the HP D2D Backup System.

5. Loosen the captive thumbscrew (1) located on the rear edge of the access panel. Slide the panel back about 2.5 cm (1.0 in) to remove the access panel.
6. Press in on the two bottom tabs (1) on the side of the bezel so that they release from the chassis. Press in on the upper tab on the side of the bezel so that it releases from the chassis. The bezel will rotate out slightly (2). Pull the bezel (3) away from the front panel.

7. Remove the screw (1) from cover that secures the drives so that you can remove the failed drive. Pull the cover (2) away from the drives.
8. The diagram on the lid of the HP D2D Backup System shows how the disks are cabled.
   a. Check that the disk identified as failed in the Web Management interface is plugged into the corresponding SATA port. For example, if Disk 1 is shown as failed, trace the cable to the SATA port. It should be in SATA Port 1. (If it is not, you may need to remove several disks to locate the failed one, identified by the unique serial number.)
   b. Remove the disk from the disk bay and check the serial number. It must match the serial number in the Web Management interface.
   c. If the serial number is correct, it is safe to remove and replace the disk. If the serial number is not correct, you must locate the correct disk by checking all the others.

   △ CAUTION:  
   If you replace the wrong disk, you could lose all your data.

9. Observing normal anti-static precautions, remove the failed disk.
   Disconnect the power and data cables from the back of the installed drive (1). A drive latch (2) with release tabs secures the hard drives in the drive bay. Lift the release tab on the drive latch. Slide the hard disk drive from the drive bay (3).
NOTE:

If the replacement drive is not supplied with screws, remove the screws (two on each side) from the failed drive.

10. Replace the failed disk with the new disk.

Insert the four drive screws (two on each side) into the hard drive (1). If these are not supplied with the new disk, use the screws from the failed disk. Slide the new hard drive (2) into the selected bay until it clicks into place. Connect the power cable from the power supply to the back of the hard drive and plug in the SATA cable (3).

11. Replace the drive cover.

   a. Replace the cover.
   
   b. Use the screw removed in step 7 to secure it.
12. Insert the two hooks on the right side of the bezel into the rectangular holes on the chassis (1). Rotate (2) the bezel into place so that the three tabs on the left side of the bezel snap into the slots on the chassis.

13. Use two hands to place the access panel flat against the chassis (1), the back of the access panel extending about 2.5 cm (1.0 in) behind the back of the server. Make sure the hooks on the access panel align with the holes on the edges of the chassis. Slide (2) the access panel toward the front of the chassis to position it into place. Tighten the captive thumbscrew (3) to secure the access panel.
14. Reconnect the network cable and the power cord.

15. Power up again by pressing the Power on switch on the front of the unit.

16. You now need to rebuild the RAID array. Select **Disk & RAID** on the Web Management interface.

17. The status of the failed disk should now be **OK** and there is a message to say that the disk is available but not yet part of the RAID system. Click **Add Disk** to add the disk to the RAID array. The screen refreshes and a rebuilding status message is displayed against the **RAID State**.
NOTE:
If several disks fail, the RAID state will still display a fault, but you are given the option of initializing the RAID array. This will make the HP D2D Backup System usable again, but you will have lost your data.

Replacing a complete unit

If you are sent an empty unit as a replacement, you must transfer the disks from the old unit into the new unit. Follow the steps outlined in the previous section to move each disk into the new unit. Further advice is available on the Support website, www.hp.com/support.
Index

A
admin
- administration page, 80
- firmware page, 81
- shutdown page, 79
- support page, 82
- administration page, 80
archive
- from D2D Backup System, 84
- from host, 99
archive to tape, 83, 99
audience, 11
authentication, 48, 77
autoloader, 65
  See also devices
definition, 16
troubleshooting, 107

B
backup
- slow, 110
backup application
  can’t access device, 109
backup device
definition, 16
backup scenarios
- archive to tape, 61
- high-performance workstation, 60
- office, 56
- simple, 55
bar code, cartridges, 69
beacon mode, 42, 46, 53, 73
bootup LEDs, 53
cartridges
  creating, 70
  editing max size, 70
  removing, 69
  write protecting, 70
cartridges page, 67
compression, 98, 100
definition, 21
configuration
  cartridges page, 67
devices page, 65
e-mail alerts, 74
Microsoft Exchange Server, 75
network, 71
with many hosts, 17
with one host, 17
configuration page
tape attach, 89
connecting
  optional tape drive, 29
  power cord, 23
to network, 23
conventions
document, 11
text symbols, 12
copy
definition, 18
copy cartridge, 84, 90
copy, export, import page, 89
create
cartridge, 70
device, 66
schedule, 96
customer self repair, 12
cancel
tape drive job, 95
cartridge
  can’t resize, 110
copy, 84, 90
export, 91
export, import, 86, 88
import, 93
in tape drive, 89
cable
10/100 Base-T network, 105
troubleshooting, 105
cancel
tape drive job, 95
cartridge
  can’t resize, 110
copy, 84, 90
export, 91
export, import, 86, 88
import, 93
in tape drive, 89
cartridges
  creating, 70
  editing max size, 70
  removing, 69
  write protecting, 70
cartridges page, 67
compression, 98, 100
definition, 21
configuration
  cartridges page, 67
devices page, 65
e-mail alerts, 74
Microsoft Exchange Server, 75
network, 71
with many hosts, 17
with one host, 17
configuration page
tape attach, 89
connecting
  optional tape drive, 29
  power cord, 23
to network, 23
conventions
document, 11
text symbols, 12
copy
definition, 18
copy cartridge, 84, 90
copy, export, import page, 89
create
cartridge, 70
device, 66
schedule, 96
customer self repair, 12
cancel
tape drive job, 95
cartridge
  can’t resize, 110
copy, 84, 90
export, 91
export, import, 86, 88
import, 93
in tape drive, 89
related documentation, 11
replace
complete unit, 122
disk, 115
replaceable parts, 113
reset
network settings, 73
reset password, 80
restore
no tape drive connected, 102
single files, 102
tape drive connected, 101

S
schedule
create, 96
delete, 97
edit, 97
view, 97
schedule page, 95
shutdown
troubleshooting, 108
shutdown page, 79
simple backup, 55
slot
can’t see from backup application, 110
definition, 16
slots
defining number of, 67
software installation
drivers, 51
manual, 45
stages, 26
using DHCP, 45
using Discovery, 45
using iSCSI, 46
wizard, 39
software requirements, 16
spanning tape, 88
status
disk and RAID page, 76
icons, 65
information, 64
iSCSI page, 77
log page, 78
status page
tape attach, 94
storage capacity
definition, 19
how space is allocated, 19
subnet mask, 73
Subscriber’s Choice, HP, 13
summary page, 64
support page, 82
symbols in text, 12

D2D Backup System 125
Tape attach, 29
   configuration page, 89
   copy, export, import page, 89
   example scenario, 61
   job history page, 97
   modes of operation, 84
   schedule page, 95
   status page, 94
   troubleshoot, 111
Tape drive
   adding to list, 89
   cancel job, 95
   connecting, 29
   requirements for connecting, 83
   supported, 99
   upgrading firmware, 89
   viewing details, 89
Tape rotation
   definition, 20
Tape spanning, 88
Technical support
   HP, 12
   service locator website, 13
testing email alerts, 74
text symbols, 12
Troubleshoot
   10/100 Base-T port, 105
   autoloader not created, 107
   backup app can’t access slots, 110
   cable too short, 105
   can’t resize cartridge, 110
   deleted device reappears, 110
   device not accessible to backup application, 109
   discovery fails, 106
   disk out of space, 112
   drivers don’t install, 106
   email alerts, 112
   hardware, 105
   host can’t access new device, 110
   host can’t connect, 109
   installation wizard, 106
   iSCSI, 107
   no Gigabit port, 105
   power on, 108
   shutdown, 108
   slow backup, 110
   tape attach, 111
   tape drive device out of space, 111
Upgrade firmware, 81
Used size, cartridges, 69
View
   device details, 65
   schedule, 97
Web browser
   recommended settings, 26
   web management interface, 63
   summary page, 64
Websites
   customer self repair, 12
   HP, 13
   HP Subscriber’s Choice for Business, 13
   product manuals, 11
Write protect, cartridges, 69

126