

**Dell Lasso**  
**Version 4.3 User's Guide**



# Notes, Cautions, and Warnings



**NOTE:** A NOTE indicates important information that helps you make better use of your computer.



**CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.



**WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

© 2013 Dell Inc.

Trademarks used in this text: Dell™, the Dell logo, Dell Boomi™, Dell Precision™, OptiPlex™, Latitude™, PowerEdge™, PowerVault™, PowerConnect™, OpenManage™, EqualLogic™, Compellent™, KACE™, FlexAddress™, Force10™ and Vostro™ are trademarks of Dell Inc. Intel®, Pentium®, Xeon®, Core® and Celeron® are registered trademarks of Intel Corporation in the U.S. and other countries. AMD® is a registered trademark and AMD Opteron™, AMD Phenom™ and AMD Sempron™ are trademarks of Advanced Micro Devices, Inc. Microsoft®, Windows®, Windows Server®, Internet Explorer®, MS-DOS®, Windows Vista® and Active Directory® are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries. Red Hat® and Red Hat® Enterprise Linux® are registered trademarks of Red Hat, Inc. in the United States and/or other countries. Novell® and SUSE® are registered trademarks of Novell Inc. in the United States and other countries. Oracle® is a registered trademark of Oracle Corporation and/or its affiliates. Citrix®, Xen®, XenServer® and XenMotion® are either registered trademarks or trademarks of Citrix Systems, Inc. in the United States and/or other countries. VMware®, Virtual SMP®, vMotion®, vCenter® and vSphere® are registered trademarks or trademarks of VMware, Inc. in the United States or other countries. IBM® is a registered trademark of International Business Machines Corporation.

2013 - 03

Rev. A00

# Contents

<b>Notes, Cautions, and Warnings.....</b>	<b>2</b>
<b>1 Introduction.....</b>	<b>7</b>
What's New In This Release.....	7
Key Features.....	9
Supported Storage Devices.....	10
Supported Server Operating Systems For Attached Hosts.....	11
Work Flow.....	12
Contacting Dell.....	14
<b>2 Installing And Uninstalling Lasso.....</b>	<b>15</b>
Prerequisites.....	15
Installing Lasso Using GUI.....	15
Installing Lasso Using CLI.....	16
Modifying Lasso Installation.....	16
Repairing Lasso Installation.....	16
Uninstalling Lasso.....	17
Using GUI.....	17
Using CLI.....	18
<b>3 Security.....</b>	<b>19</b>
Passwords.....	19
Network Ports.....	19
<b>4 Using Lasso.....</b>	<b>21</b>
Prerequisites For Data Collection.....	21
Running Lasso.....	21
Starting New Configuration.....	22
Use Existing Configuration.....	23
Loading Configuration File.....	24
Upload Existing Collection.....	24
Lasso GUI — Fields And Descriptions.....	24
Welcome to Lasso.....	25
Your Company Information.....	26
Your Company Contacts.....	27
Your Hardware Environment.....	27
Your Hardware Environment: Storage Arrays.....	28

Your Hardware Environment: Fibre Channel Switches.....	30
Your Hardware Environment: Ethernet Switches.....	31
Your Hardware Environment: Tape Libraries.....	32
Your Hardware Environment: Hosts.....	33
Your Hardware Environment: Enclosures.....	34
Your Hardware Environment: Management & Monitoring Software.....	35
Device Collection.....	36
Upload.....	36
Confirmation.....	37
Log Files.....	37
Generated File Formats.....	37
Viewing Reports.....	37

## **5 Manual Collection.....39**

Manually Collecting Data For Storage Arrays.....	39
Manually Collecting Data For Celerra Device.....	39
Manually Collecting Data For CLARiiON Device.....	40
Manually Collecting Data For MDSeries Device.....	41
Manually Collecting Data For EqualLogic Device.....	41
Manually Collecting Data For PowerVault Or EqualLogic FluidFS NAS Device.....	42
Manually Collecting Data For Attached Hosts.....	42
Manually Collecting Data For Windows OS.....	42
Collecting Storage Device Information For UNIX OS.....	43
Collecting Storage Device Information For VMware (ESX/ESXi OS).....	44
Manually Collecting Data For Tape Library Device.....	44
Manually Collecting Data For PV136T, PV132T, TL2000, And TL4000 Tape Library Device.....	44
Determining Service Port IP For ML6000 Data Collection.....	44
Collecting Logs Manually For ML6000 Device.....	45
Collecting Logs Using Web Client.....	45
Manually Collecting Data For Ethernet and FCoE Switches.....	45
Manually Collecting Data For Cisco Ethernet Device.....	46
Manually Collecting Data For Cisco FCoE Device.....	46
Manually Collecting Data For PowerConnect, Brocade B-Series, And M8428K Devices.....	48
Manually Collecting Data For PowerConnect Ethernet And M8428K Device.....	49
Manually Collecting Data For Force 10 Switches.....	50
Manually Collecting Data For Switches.....	51
Manually Collecting Data For Brocade Device.....	51
Manually Collecting Data For Cisco Device.....	52
Manually Collecting Data For McData Device.....	52
Manually Collecting Data For McDataBlade Device.....	52
Manually Collecting Data For Enclosures — M1000e.....	53
Manually Collecting Data For HITKIT Appliance.....	53

<b>6 Collecting Data Using CLI.....</b>	<b>55</b>
Collecting For Single Device Using CLI.....	56
<b>7 Troubleshooting.....</b>	<b>61</b>
Troubleshooting Unix Host Collection.....	61
Allowing Root Access To Unix Server.....	61
Allowing Root Access Using Multi User Interface (MUI) On VMware.....	62
Troubleshooting MD Series.....	62
Troubleshooting EqualLogic.....	63
Troubleshooting Storage Processor.....	63
Edit Privilege User On CX Array.....	64
Edit Privilege User On AX Array.....	64
Troubleshooting Switches.....	64
Troubleshooting Ethernet Switch.....	64
Troubleshooting Tape Library.....	65
Troubleshooting Unix.....	65
Troubleshooting Windows.....	65
Troubleshooting Enclosures.....	66
Troubleshooting HITKIT Collection.....	66
Troubleshooting PowerVault FluidFS NAS Collection.....	66
Troubleshooting EqualLogic FluidFS NAS Collection.....	66
Troubleshooting Celerra Collection.....	66
Troubleshooting VMware Collection.....	66
Troubleshooting Lasso Run As System Account.....	67
<b>8 Error Codes.....</b>	<b>69</b>
<b>9 Use Case Scenario.....</b>	<b>79</b>
<b>10 Frequently Asked Questions.....</b>	<b>81</b>
FAQ — About Lasso.....	81
FAQ — Passwords and Security.....	83
FAQ — Dealing With Errors.....	84
<b>11 License.....</b>	<b>87</b>
Dell: Export Compliance Disclaimer .....	87
Dell Software Disclaimer .....	87
Dell Software Copyright .....	87
GNU GENERAL PUBLIC .....	88
Preamble.....	88

GNU GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION.....	88
END OF TERMS AND CONDITIONS.....	91

# Introduction

Lasso is a Windows-based client and server utility that automates the collection of hardware, software, and storage logs and configuration from servers, disk arrays (EqualLogic, PowerVault MD-series, and EMC), Fibre Channel switches (Brocade, McData, and Cisco), Ethernet, and FCoE Switches (Power Connect Cisco, Brocade, and Force 10).

After Lasso collects the data, it parses the data into XML and HTML formats. The data is then packaged along with the collected data and encrypted. The collected data is saved as a **.zip** file on the local system. Optionally, you can enable Lasso to automatically upload the report to Dell Technical Support.

Dell uses this data as part of the Systems Maintenance Service (SMS) to determine hardware, software, and firmware versions for compatibility, troubleshoot problems in storage devices, and upgrade of the existing equipment. By default, up to 10 collections (one collection per device) are run in parallel. Lasso tracks and waits for completion of each process and notifies the user of any failures during collection.

For information or assistance, contact **US\_Lasso\_Support@Dell.com**.

## What's New In This Release

- Support to parse and view SAN configurations report to analyze issues for the following FCoE switches:
  - PowerConnect — parse and generate configurations report for PowerConnect B8000 model switches.
  - Brocade — parse and generate SAN configurations report for Brocade 8000 models.
- Support to view SAS HBA card information in the SAN configurations report for MD-series storage connected to Windows 2012 host.
  - Collect and parse diagnostic information and logs from Windows 2012 server with or without Hyper-V enabled.
- Support to collect and parse or view vSphere 5.1 SAN configurations report.
- Support to view PowerConnect switches front port stacking information for 7000, M6348, and 8000 series in SAN configurations report.
- Support to collect and parse data from devices in SAN environment for Windows 8 Management Station.
- Support to collect and parse data from devices in SAN environment for Windows 2012 Server.
- Support to collect, parse, and view SAN Configuration report for Cisco 5020 and 5548 FCoE models. The report includes the following device features:
  - Switch Properties
  - Modules
  - VLAN Table
  - Port channel
  - Spanning Tree
  - Policy Map
  - LLDP, LACP, and VPC
  - Zones, VSAN, and Interface for Fibre Channel
- Support to collect, parse, and view the SAN configurations report for PowerConnect firmware version 4.2 and 5.0. The report includes the following device features:

- Slot Information
  - Spanning Tree Active
  - LLDP TLV
  - LLDP Remote
- Support to view the SAN configuration report for DV Switches Information and DV Switch Port Information in the VMware Hosts section.
- Support to view SAN Configuration report for PowerVault MD3600F, MD3620F, and MD3660F models.
- Support to run Lasso under System context user.
- Support to view SAN Configuration report for Brocade 300 and 5300.
- Support to collect, parse, and view the SAN configuration report for Data Center Bridging (DCB) information on the following switches:
  - Power Connect
    - \* PFC Information
    - \* ClassOfService Traffic Class Group and dot1p-mapping
    - \* Traffic Class Group
  - Brocade Ethernet
    - \* Global LLDP Information
    - \* CEE Maps Information
    - \* Interface QoS Information
    - \* Interface DCB Information
    - \* Interface Media Information
  - Dell Force10
    - \* PFC Summary
    - \* ETS Summary
    - \* Interfaces Configuration report
  - Cisco FCoE
    - \* PFC Information
    - \* Policy Map
    - \* LLDP Information
    - \* LACP Information
- Support to run multiple instances of Lasso CLI simultaneously.
- Support to collect, parse, and view the SAN configuration report for FluidFS NAS storage model FS8600.
- Support to collect, parse, and view the SAN configuration report for SFP attributes on EqualLogic Array.
- Support to collect, parse, and view the SAN configuration report for RHEL version 5.9.
- Support to collect, parse, and view the SAN configuration report for Linux HitKit version 1.2.
- Support to collect, parse, and view the SAN configuration report for NIC Binding order on all Windows Operating System.
- Support to collect, parse, and view the SAN configuration report for Force 10 MXL 10/40GbE Switch.
- Support to stop default upload of the report using Lasso CLI.
- Support to collect, parse, and view Force 10 switch model S4810 with firmware version Kaveri version 8.3.12.0
- Lasso support for the latest EMC Reports/Grabs (ESX — 1.3.1, Unix — AIX 4.5.0, HP Unix 4.5.0, Linux 4.5.0, Windows Version 41)
- Support to view Windows HIT Kit version 4.5 information in SAN configuration report.



- Support to view PS Array Group information for Windows Hit Kit in SAN configuration report.
- Support to view firmware versions for both Chassis Management Controller cards on M1000e appliance in SAN Configuration report.

## Key Features

The key features are:


- Collect and parse Qlogic FC HBA information for Windows and Linux hosts attached to Compellent.
- Optional user name and password credentials when PowerConnect ethernet switch is configured.
- Raw data collection support for Enclosures.
- Data collection and parsing support for HITKIT for VMware.
- Encrypted password support while running Lasso in the CLI mode.
- Collect diagnostic information from the Group Lead and member, when member IP address is provided.
- Option to automatically upload the report to Dell Technical Support site.
- Support for the PS 4110 and PS 6110 devices.
- Collect and parse Host Integration Tool Kit data in the EqualLogic SAN for Windows, Linux and, vSphere hosts.
- Option to provide the Delta Service Request number and Project Manager ID and include in the XML and HTML reports.
- Parser support for the following devices:
  - EqualLogic FS7500
  - Force 10 S50/S60/S4810 switches
  - Xen server
  - PowerVault NX3500
- Solution for error 904 (Collection of EQL Details Failed) for the EqualLogic Array.
- Parser support for MaxRequestHoldtime for all the Windows hosts in EqualLogic and MDSeries SAN.
- Collect and parse Broadcom NIC information when running in Host Bus Adapter (HBA) mode under the control of Broadcom Advanced Server Program (BASP) software.
- Collect NAS Appliance information from the EQL group.
- Support for firmware version 5.2 and 6.0 on Dell EqualLogic Arrays.
- Collect and parse the attributes ROM Level and Last Boot Time from EqualLogic Array.
- Support for Array ping test between the members within an EqualLogic Group.
- Collect and parse the Qlogic iSCSI adapter information from Windows, Linux, and VMware hosts attached to Compellent.
- Collect Emulex information from Windows, Linux, and VMware hosts attached to Compellent.
- Collect and parse SAS HBA information from Windows and Linux (32-bit only) hosts attached to PowerVault MD Series and Compellent.
- Validate user input for Ethernet Switch type in the related GUI pages.
- Include Collection Date - Collection Time - Build Version attributes in the HTML report.
- Enhance user interface in compliance with Dell's lucidity usability requirement.
- Validate the PC Ethernet Switch, when configured with only user name.
- Raw data collection and parsing for the PowerConnect ethernet switches in simple and normal mode.
- Correct parsing of service tag information for all the models of EqualLogic Arrays upon v5.1 Firmware upgrade.
- Solution for error 105 (failed to retrieve completed collection from remote system) for the Windows 2008 R2 host attached to EqualLogic Array.
- Option to re-validate the devices when imported from an existing configuration.

- Use of Forced multi-threaded mode of execution for enhanced Lasso performance.
- Solution to parse EqualLogic Array if the EqualLogic IP Address last octet is single digit issue.
- Secure Site option in the Your Company Information window of the Lasso GUI to remove Customer Identification Information (CII) from XML format of the collection.
- Raw data collection and parser support for the following devices:
  - Cisco switches 3750E/3750X and 4948
  - PowerConnect ethernet switches 7024/7048
  - vSphere 5.0 hosts attached to EqualLogic and MD Series arrays
  - Pirates 1GB - PS4100/PS6100
- Raw data collection support for Force10 (S50N/S481) Switches.
- Correct parsing of PowerConnect ethernet switches upon v4.1 Firmware upgrade.
- Display information only related to EqualLogic iSCSI volumes in vSphere iSCSI VMFS section.
- Collect and parse Hit Kit data for Linux Hosts in EqualLogic SAN.
- Include `ehcmcli -d` command output as part of Linux collection.
- Display the applicable attributes for non-configured Ethernet ports of EqualLogic Arrays.
- Raw data collection and limited parsing for PowerVault NX3500 and EqualLogic FS7500.
- Display the iSCSI network for different subnet masks.
- Collect the applicable attributes for vSphere Hosts for all possible path selection policies.
- Parse the attributes related to Port Channel for Power Connect and Cisco Switches.
- Option to choose SSH or Telnet protocol in case of Ethernet Switches.
- Report the updated version for vSphere host by Lasso.
- Parse all the iSCSI virtual machine network interface cards in the vSphere environment.
- Parse and display cluster name and Is Cluster member attributes for clustered windows host.
- Support for Power Connect 7024, 8024, 8024F, M8024F, M8024-k, M6220, M6348 with version 4.1 firmware.
- Solution for the Interface Name under iSCSINode for Linux Hosts in the XML format of collection issue.

## Supported Storage Devices

The following table provides the types of supported storage devices:

Storage Device	Types of Devices
<b>Storage Arrays</b>	<ul style="list-style-type: none"> <li>• Dell EMC Storage processors           <ul style="list-style-type: none"> <li>– CX3 series— Tackhammer (CX3–10), Jackhammer (CX3–20), Sledgehammer (CX3–40), and Mallet (CX3–80)</li> <li>– CX4 (Fleet) series— Nautilus (CX4–120), Ironclad (CX4–240), Trident (CX4–480), and Dreadnought (CX4–960)</li> <li>– AX series — Mamba (AX4–5F, AX4–5i, and AX4–5FX)</li> </ul> </li> <li>• PowerVault MD Series arrays — MD3000, MD3000i, MD3200, MD3220, MD3200i, MD3220i, MD3600i, MD3600f, MD3620f, and MD3660f</li> <li>• EqualLogic PS series release 4.3 and later</li> <li>• Dell EMC Celerra Storage devices (NAS)</li> <li>• EqualLogic Fluid File System (NAS)</li> <li>• PowerVault Fluid File System (NAS)</li> </ul>

Storage Device	Types of Devices
	<ul style="list-style-type: none"> <li>• Compellent FluidFS NAS</li> </ul>
Fibre Channel Switches	<ul style="list-style-type: none"> <li>• McData and Blade switches except director class switches</li> <li>• Cisco 9124</li> <li>• Brocade 200E/4424/300/5100/5300</li> </ul> <p> <b>NOTE:</b> Telnet must be enabled on all McData switches for Lasso to collect the data.</p>
Ethernet and FCoE Switches	<ul style="list-style-type: none"> <li>• Dell PC 5424/5448</li> <li>• Dell PC 6224/6248</li> <li>• Dell PC 7024/7048</li> <li>• Dell PC M6220</li> <li>• Dell PC 8024/8024F</li> <li>• Dell PC M8024/M8024K</li> <li>• Dell PC M6348</li> <li>• Dell PC M8428K</li> <li>• Dell PowerConnect B-Series 8000</li> <li>• Cisco 2960</li> <li>• Cisco 4948</li> <li>• Cisco CBS 3130</li> <li>• Cisco CBS 3030</li> <li>• Cisco 3750E/3750X</li> <li>• Cisco Catalyst 3750E</li> <li>• Nexus 5020, 7000, and 5548</li> <li>• Dell Force10 S50/S60/S2410/S4810/Kaveri Firmware v8.3.12.0</li> <li>• Dell Force10 MXL 10/40GbE</li> <li>• Brocade 8000</li> </ul>
Enclosures	Dell M1000e

## Supported Server Operating Systems For Attached Hosts

The following table provides the supported server operating systems for attached hosts:

Operating System	Operating System Name
Windows Systems	<ul style="list-style-type: none"> <li>• Windows Server 2003 (RTM, SP1, SP2) and Windows 2008 (RTM, SP1, SP2).</li> <li>• For Windows 2008 (R2), if the correct account (Administrator) is not specified during collection, the registry on that remote host should be edited. Use the Windows 2008 configuration registry script, or manually add the DWORD value in LocalAccountTokenFilterPolicy and set the data to 1 in <b>HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies</b></li> </ul>

`\system\key`, then reboot. It is recommended to use the Administrator account to prevent the modification and reboot.

**NOTE:**

- For adequate disk space to store a copy of all event logs and other system data, see <ftp://ftp.emc.com/pub/emcgrab/Windows> directory for more information.
- **admin\$** and **c\$** share must be enabled for remote commands to execute the program embedded in Lasso. **xCmd.exe** may be detected as a threat by the remote host if McAfee or AVG are installed. On both the systems that Lasso is installed and the remote host, add **xCmd.exe** to the trusted programs if using McAfee or the PUP exception list if using AVG.
- In case of EqualLogic and MD series SAN **.Net** framework 2.0 or later is required on the remote Windows host for the successful Windows host collection. If later version is installed, then Lasso still requires version 2.0.
- Windows Server Core is not supported.

- Windows 2003 R2 32 bit and 64 bit.
- Windows 2012 Server

**UNIX systems**

- Linux — GNU/Linux system
- Solaris — SUN Solaris system
- HP-UX — HP-UX system
- AIX — IBM AIX system
- Secured Shell (SSH) is installed and configured. Normal user credentials are required to establish SSH session, and root password is required to run the commands as root.
- For adequate disk space to store a copy of all logs and system data to be collected, see the *Readme* file available at <ftp://ftp.emc.com/pub/emcgrab/Unix>. In case of ESX, see the *Readme* file available at <ftp://ftp.emc.com/pub/emcgrab/ESX>

**VMware systems**

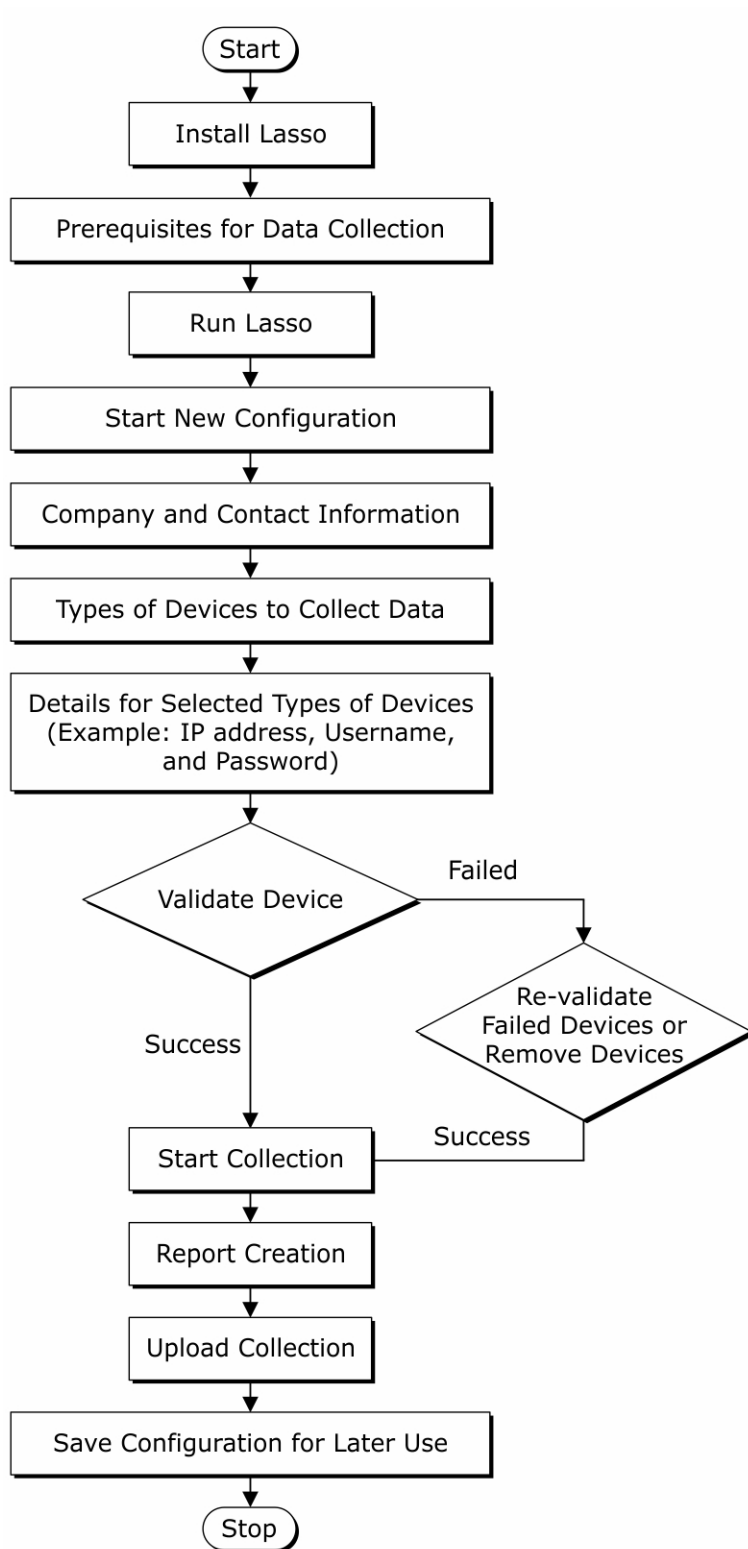
VMware ESX 3.0 server and later

See also:

[Prerequisites For Data Collection](#)

## Work Flow


The following figure provides the steps to run Lasso, create and upload the report to Dell Technical Support site, and save the configuration for later use.



**See Also:**

- [Prerequisites For Data Collection](#)
- [Running Lasso](#)
- [Starting New Configuration](#)
- [Your Company Information and Your Company Contacts](#)
- [Your Hardware Environment](#)
- [Supported Storage Devices and Operating Systems](#)
- [Storage Arrays](#)
- [Fibre Channel Switches](#)
- [Ethernet Switches](#)
- [Attached Hosts](#)
- [Enclosures](#)
- [Management and Monitoring Software](#)
- [Device Collection](#)
- [Upload Collection](#)

## Contacting Dell

 **NOTE:** If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Visit **support.dell.com**.
2. Select your support category.
3. If you are not a U.S. customer, select your country code at the bottom of the **support.dell.com** page, or select **All** to see more choices.
4. Select the appropriate service or support link based on your need.

You can also write to the US Lasso support at **US\_Lasso\_Support@Dell.com**.

# Installing And Uninstalling Lasso

This section provides information to install, modify, repair, and uninstall Lasso. Lasso can be installed using GUI or CLI mode.

## Prerequisites

Before installing Lasso, make sure that the following prerequisites are met:

- The user account has Administrator privileges.
- The system has any of the following Windows (32 bit or 64 bit) operating system:
  - Windows XP
  - Windows Vista
  - Windows 7
  - Windows 8
  - Windows Server 2003
  - Windows 2008 R2
  - Windows 2003 R2
  - Windows 2000 Advanced Server
  - Windows Server 2012
  - Windows Server 2008



**NOTE:** Windows Server Core is not supported.

## Installing Lasso Using GUI

To install Lasso:

1. Double click the **.msi** file.  
The **Welcome to the Dell Lasso Installation Wizard** is displayed.
2. Click **Next**.  
If you already have an earlier version of Lasso, then the message "A previous version of Lasso was detected on your system. Continuing the installation will upgrade Lasso <current version> to Lasso <latest version>." Upgrading to the latest version of Lasso provides several benefits.  
Would you like to proceed with the upgrade?" window is displayed.  
Click **Upgrade** to upgrade to the latest version. Else, click **Cancel** to exit installation.  
The *Dell Software License Agreement* is displayed.
3. Click **I accept the license agreement** and click **Next**.  
The *Readme* information is displayed.
4. Click **Next**.  
The **Destination Folder** window is displayed.

5. Click **Next** to accept the default directory path or click **Browse** to specify another location, and click **Next**. The **Security Level** window is displayed.
6. Select one of the following options and click **Next**:
  - **Save Environment, Username, and Password** — Saves all SAN configuration details, user name, and password. It is recommended to use this option to run Lasso multiple times and avoid re-entering configuration and security details.
  - **Save Environment and Username only** — Saves all SAN configuration details and the user name. The password is not saved.
  - **Save Environment only** — Saves all SAN configuration details. The user name and password is not saved. Select this option to skip saving any security related details.
  - **Do not save any information** — Does not save any configuration details of the environment, user name, and password. Select this option to save configuration and security details, or if the location from where you run Lasso does not allow saving any details.

The **Prerequisites** window is displayed. The window provides the list of prerequisites that must be met to enable Lasso to collect the data after installation is complete.


7. Click **Next**.  
The **Ready to Install the Application** window is displayed.
8. Click **Next** to continue with the installation.  
The **Lasso has been successfully installed** window is displayed.
9. Click **Finish** to close the installation wizard.

## Installing Lasso Using CLI

To install, at the command prompt, set the directory to **LassoMSIPath** and run the command:

```
msiexec /qn /i <LassoMSIName>/log install.txt
```

The installation messages are logged in the **install.txt** file.

 **NOTE:** If `msiexec` is not recognized as an internal or external command, include `%SystemDrive%\Windows\System32` (x86 bit operating system) or `%SystemDrive%\Windows\SysWOW64` (x64 bit operating system) to the path variable.

## Modifying Lasso Installation

After installing Lasso, you can modify the components that are installed.

To modify the components:

1. Double-click on the **.msi** file.  
The **Application Maintenance** window is displayed.
2. Select **Modify** and click **Next**.  
The **Ready to Modify the Application** window is displayed.
3. Click **Next**.  
The **Updating System** window is displayed.
4. Click **Finish** to exit Lasso.

## Repairing Lasso Installation

You can also reinstall the corrupt files, registry keys, and shortcuts to the Lasso application.



To repair Lasso:

1. Double-click the **.msi** file.  
The **Application Maintenance** window is displayed.
2. Select **Repair** and click **Next**.  
The **Ready to Repair the Application** window is displayed.
3. Click **Next**.  
The **Updating System** window is displayed.
4. Click **Finish** to exit Lasso.

## Uninstalling Lasso

Lasso can be uninstalled using the GUI or the CLI option.

See also:

- [Using GUI](#)
- [Using CLI](#)

### Using GUI

To uninstall Lasso using the GUI, use one of the following options:

- [Start Menu](#)
- [Windows Add Or Remove Programs Wizard](#)


#### From Start Menu

To uninstall Lasso from the **Start** Menu:

1. Click **Start** → **Programs (or All Programs)** → **Dell** → **Lasso** → **Uninstall**.  
The **Are you sure you want to uninstall this product** prompt is displayed.
2. Click **Yes** to uninstall Lasso.

#### From Windows Add Or Remove Programs Wizard

To uninstall Lasso from the Windows Add or Remove Programs wizard on Windows operating systems:

1. Click **Start** → **Control Panel** → **Add or Remove Programs**.  
 **NOTE:** This option differs based on the operating system.
2. Select **Dell Lasso** (version number) and click **Remove**.
3. On the **Are you sure you want to uninstall Dell Lasso?** prompt, click **Yes** to uninstall **Dell Lasso**.

#### From the Application Maintenance Window

To uninstall Lasso from the **Application Maintenance** window:

1. Double-click the installed **.msi** file.  
The **Application Maintenance** window is displayed.
2. Select the **Remove** option and click **Next**.  
The **Lasso Uninstall** window is displayed.
3. Click **Next**.

The **Updating System** window is displayed.

4. Click **Finish** on the **Lasso has been successfully uninstalled** window.

## Using CLI

To uninstall, at the command prompt, set the directory to **LassoInstDir** and run the command:

- Using Lasso msi: `msiexec /qn /x Lasso<version number>.msi/log Uninstall.txt`



**NOTE:** Before running the **.msi** file, make sure that the file is available in the directory.

- Using product code: `<LassoInstallDirectory>\UninstallLasso.cmd No {CF07A03B-765B-46CB-BEF2-7AD19DB4FA9C} /log uninstall.txt`



**NOTE:** Make sure to run the file outside the lasso installation directory.

## Security

Lasso is designed to automate data collections from remote systems and depends on network access to these systems. You can run Lasso from a local system that is on the same subnet as the target remote systems.

For the successful remote data collection, make sure that there are no firewalls, group policies, security enhanced Linux policies, or other security issues.

## Passwords




To execute scripts for data collection from remote systems, administrator rights are required to login to remote systems. On local systems, during installation select the **Save Environment, Username, and Password** options to store the password in an encrypted vault.

You can either create a new user ID dedicated for Lasso collection or change the password for the current collection. The user id can be disabled or deleted after running Lasso.

## Network Ports

Lasso requires network ports to execute the scripts for data collection.

The following table describes the scripts and the corresponding network ports:

Scripts	Network Port
UNIX/VMware collections	SSH (Port 22)
Switch collections	SSH (Port 22) and Telnet (Port 23)
Tape collections	SSH (Port 22) and Telnet (Port 23)
StorageProcessor collections	Navisphere CLI (emc112310 lists ports 6389 and 80/443 or 2162/2163)
	 <b>CAUTION:</b> If the connection is denied, the storage processor collection cannot be performed.
	 <b>NOTE:</b> When retrieving the completed collection from the Storage Processor (SP) on Windows XP, Windows 2003, Windows 2008, and Windows Vista, the firewalls display the prompt to allow this connection.
EqualLogic collection	SNMP default port 161 (SNMP messages) and port 162 (SNMP traps)
	 <b>NOTE:</b> From EqualLogic array, SNMP should be enabled with public access for inventory collection.

---

<b>Scripts</b>	<b>Network Port</b>
Windows Collection	(UDP ports) 137/138 (NetBIOS), TCP ports 139 (NetBIOS) and 445 (SMB)
EqualLogic FluidFS NAS collection	SSH (Port 22), FTP (Port 44421)
PowerVault FluidFS NAS Collection	SSH (Port 22), FTP (Port 44421)

Windows uses the utility **xCmd**. The **xCmd** uses standard Windows file sharing (UDP ports 137/138 (NetBIOS), TCP ports 139 (NetBIOS) and 445 (SMB)).

For more information on Windows Port usage, see Microsoft support site.

# Using Lasso


Lasso compiles information for all the devices in the SAN. It also includes company and site contact information. You can save this information as a configuration file (.xml format) for later use. Lasso collects data for the selected devices and generates a report that can be uploaded to Dell Technical Support site.

This section provides information to use Lasso to collect data from the various storage devices in your SAN.

## Prerequisites For Data Collection

Before using Lasso to collect data, make sure that the following prerequisites are met:

- IP connectivity is available for the required devices.
- For data collection in XML and HTML format, Lasso requires .Net Framework 2.0 or later. If later version is installed, then Lasso still requires version 2.0.
- For EqualLogic, and MD series, Net framework 2.0 or later should be installed on the remote Windows host. If later version is installed, then Lasso still requires version 2.0.
- For EMC SAN, use a system that is not a fibre channel attached host.
- For EqualLogic, Compellent, and MD series devices, the SAN Surfer CLI (iSCSI) software should be installed on the remote Windows, Linux, and VMware hosts to successfully collect iSCSI HBA information.
- For a Compellent SAN, the SAN Surfer CLI (FC) should be installed on the remote Windows, Linux, and VMware hosts to successfully collect Qlogic FC HBA information.
- For ESX/ESXi, the normal or sudo user should have PasswordAuthentication or Keyboard interactive authentication enabled.
- For ESX/ESXi, the root user should have permitrootlogin enabled and the PasswordAuthentication or Keyboard interactive authentication should be enabled.
- For PowerVault MD Series devices, Lasso should be run as an Administrator.
- For PowerVault MD Series devices, MD Storage Manager software should be installed in the system running Lasso.
- For Compellent SAN, the HBAnyware CLI should be installed on the remote Windows, Linux, and VMware host to successfully collect Emulex FC HBA collection.

 **NOTE:** Lasso should be installed on a Windows system that has IP connectivity to all the devices in the SAN environment.

## Running Lasso

You can run Lasso in the following modes:

- GUI
  - [Start a new configuration](#)
  - [Use an existing configuration](#)
  - [Load the configuration file](#)
  - [Upload an existing collection](#)
- CLI

## Starting New Configuration

Use this option to create a new configuration and generate a report.

To collect data using GUI:

1. Click **Start** → **Programs (or All Programs)** → **Dell** → **Lasso** and click **Lasso**.  
The **Welcome to Lasso** window is displayed.
2. Select **Start with a new configuration** and click **Continue**.  
The **Your Company Information** window is displayed.
3. Select **Enable Report Filtering** to exclude Customer Identification Information (CII) in the report. Click **Yes** in the confirmation message displayed to exclude the information. Else, click **No**.  
Click **Learn More** link to display the window with the information about the data that is filtered. The data that is filtered are:

- iSCSI network configuration information such as IP address, Gateway, Subnet Mask, and Domain.
- Host identification information such as host names.
- iSCSI configuration information such as Volume Names and IQN names.

 **NOTE:** It is recommended to not select the Enable Report Filtering option, if the Lasso collection is performed for technical support or proactive maintenance support.

Click **Close** to close the window.

Enter the required information in the **Company Information** and **Dell Technical Support Information** section and click **Continue**.

The **Your Company Contacts** window is displayed.

4. Enter the required information and click **Continue**.  
The **Your Hardware Environment** window is displayed.
5. Select the devices (one or multiple devices depending on your requirement and SAN) for which Lasso must collect data and click **Continue**.  
The device-specific **Your Hardware Environment** windows are displayed.
6. For each device, enter the required information. Click **Continue** until you complete providing information for each selected device.  
The **Device Collection** window is displayed.
7. Make sure that the displayed devices are the selected devices for which data must be collected and click **Start Collection**.  
The status bar displays the collection status.
8. Click the Clock icon next to each device to view the progress.
9. Click **Continue** once collection is complete.  
The collected data is packaged and the **Your Upload Options** window is displayed.
10. You can select the following and click **Continue**.
  - To access the collected data file, click **Open Location**. By default, it is saved in the user profile directory. For example, `c:\Users\\Dell\Lasso\results\`. For information on the collected files, see [Generated File Formats](#).
  - To immediately upload the collection package to Dell, select **Yes**. Else, select **No**.
  - To save the configuration details with a password for later use, select **Yes**. Else, select **No**.

Following actions are performed based on the selection:

- If you have selected **Yes** to upload the report, the collection uploads to Dell Technical Support site.
- If you have selected **No**, the **Save Lasso Configuration** dialog box is displayed. Click **Browse** and save the file in the required location with the password.

The **Confirmation** window is displayed.

11. To see the SAN configuration, select **View Your SAN Configuration** and click **Finish**.

Lasso tool is closed and the report is opened in the internet browser.


#### Related Links:

- [Welcome To Lasso](#)
- [Your Company Information](#)
- [Your Company Contacts](#)
- [Your Hardware Environment](#)
- [Storage Arrays](#)
- [Fibre Channel Switches](#)
- [Ethernet Switches](#)
- [Tape Libraries](#)
- [Attached Hosts](#)
- [Enclosures](#)
- [Management and Monitoring Software](#)
- [Device Collection](#)
- [Upload Collection](#)
- [Confirmation](#)

 **NOTE:** Lasso does not support Tape Libraries in this release.

## Use Existing Configuration

Before using this option, make sure that a configuration is saved in the Lasso installation directory.


 **NOTE:** Loading configuration files from Lasso 3.8 and earlier may result in loss of some device authentication information.

To use an existing configuration:

1. Click **Start** → **Programs (or All Programs)** → **Dell** → **Lasso** and click **Lasso**.  
The **Welcome to Lasso** window is displayed.
2. Select **Use an existing configuration**.  
A drop-down box with the available configurations is displayed. A dialog box displays indicating that background validation is in-progress.
3. Click **Continue**  
A message requesting for password is displayed. Enter the password.  
The **Your Company Information** window is displayed.
4. Edit the existing information or add new information. Perform the steps from 4 to step 11 mentioned in the [Starting New Configuration](#) section.

## Loading Configuration File

Use this option if the configuration file is located in a directory other than the Lasso user profile directory.

 **NOTE:** Loading configuration files from Lasso 3.8 and earlier may result in loss of some device authentication information.


To load an existing configuration:

1. Click **Start** → **Programs (or All Programs)** → **Dell** → **Lasso** and click **Lasso**.  
The **Welcome to Lasso** window is displayed.
2. Select **Load a configuration file** and click **Browse**. Specify the file and click **Continue**.  
A dialog box displays indicating that background validation is in progress.  
The **Your Company Information** window is displayed.
3. Edit the information or add new information. Perform the steps from 4 to step 11 mentioned in the **Starting New Configuration** section.

## Upload Existing Collection

To upload an existing configuration:

1. Click **Start** → **Programs (or All Programs)** → **Dell** → **Lasso** and click **Lasso**.  
The **Welcome to Lasso** window is displayed.
2. Select **Upload an existing collection**.
3. Select from the following geographical location:
  - **Europe, Middle East, or Asia**
  - **All Other Countries**
4. Select the **Upload full collection** option to upload the collection to Dell Technical Support site. Click **Browse** to select the report to be uploaded.  
For more information on the report formats, see [Generated File Formats](#).
5. Select **Authenticated Proxy** option to upload the report using proxy.  
Enter the following details:
  - **IP/Hostname** — Enter the IP address or hostname of the proxy server (optional).
  - **Port** — Enter the port number. Default port is 80.
  - **Username** — Enter the user name (optional).
  - **Password** — Enter the password (optional).

 **NOTE:** **IP/Hostname** information is mandatory, if the port used is other than the default.

6. Click **Continue**.  
A message is displayed indicating that uploading to Dell is in-progress.
7. Click **Finish** when the confirmation message is displayed to close the tool.

## Lasso GUI — Fields And Descriptions

This section provides information about the fields that are available in the Lasso Graphical User Interface (GUI) windows:




- [Welcome To Lasso](#)
- [Your Company Information](#)
- [Your Company Contacts](#)
- [Your Hardware Environment](#)
- [Storage Arrays](#)
- [Fibre Channel Switches](#)
- [Ethernet Switches](#)
- [Tape Libraries](#)
- [Attached Hosts](#)
- [Enclosures](#)
- [Management and Monitoring Software](#)
- [Device Collection](#)
- [Upload Collection](#)
- [Confirmation](#)


 **NOTE:** Lasso does not support Tape Libraries in this release.

## Welcome to Lasso

Use Lasso to collect configuration and diagnostics data for the storage devices in the SAN and upload the report to Dell Technical Support site.


Select one of the following options and click **Continue**.

Field	Description
<b>Start with a new configuration</b>	Select this option to start with a new configuration. Before saving the configuration, if you navigate back to select this option, then the configuration is lost.
<b>Use an existing configuration</b>	Select this option to use the configuration file saved in the Lasso installation directory. From the drop-down menu, select the required configuration file.
<b>Load a configuration file</b>	Select this option to use the configuration file saved in a location other than the Lasso user profile directory. Click <b>Browse</b> to load the configuration file.   <b>NOTE:</b> If the configuration file has array attached Windows-based hosts, a background validation process is automatically run for a few seconds using the host credentials that is locally cached.
<b>Upload an existing collection</b>	Select this option to upload the collected information from the SAN to Dell Technical Support. Select your geographic location from the following options: <ul style="list-style-type: none"> <li>• Europe, Middle East, or Asia</li> <li>• All Other Countries</li> </ul>


Field	Description
	<p>Select <b>Upload full collection</b> option to upload the collection to Dell Technical Support site. Click <b>Browse</b> to select the report to be uploaded.</p> <p>Select <b>Authenticated Proxy</b> option to upload the collection using proxy. Specify the following proxy details:</p> <ul style="list-style-type: none"> <li>• <b>IP/ hostname</b></li> <li>• <b>Port number</b></li> <li>• <b>Username</b></li> <li>• <b>Password</b></li> </ul> <p> <b>NOTE:</b> IP/Hostname is mandatory, if the port used is other than default.</p>

## Your Company Information

In this page, provide your company information, Dell Technical Support information, and click **Continue**.

 **NOTE:** Fields with an asterisk are mandatory.

Select the **Enable Sensitive Data Filtering** option to exclude Customer Identification Information (CII) from the report.

 **NOTE:** If this option is selected, only **Company Name** is mandatory.

Click the **Learn More** link to display the list of sensitive data that is filtered.

### Company Information

Field	Description
<b>Company Name</b>	Enter your company information.
<b>Installation Address</b>	Enter SAN location address.
<b>City</b>	Enter the name of the city where the company is located.
<b>Postal Code</b>	Enter the postal code of the city where the company is located.
<b>Region</b>	<p>From the drop-down menu, select one of the following regions:</p> <ul style="list-style-type: none"> <li>• North America</li> <li>• EMEA</li> <li>• APJ</li> <li>• Latin America</li> </ul>
<b>Country</b>	From the drop-down menu, select the country where the company is located.
<b>Sub Region/State</b>	Enter the sub-region or state where the company is located.


## Dell Technical Support Information

Field	Description
Case Number	Enter service request number. This is optional
Dell PM Mail ID	Enter Dell PM email ID. This is optional.

Click **Previous** to display the **Welcome to Lasso** page.

## Your Company Contacts

In this page, provide the company contact details, edit the contact details, and click **Continue**.

 **NOTE:** Fields with an asterisk are mandatory.

### Your Company Contacts

To edit the information of the company contact, click **Edit** available next to the contact. Update the required fields and click **Update Contact** to save the updates. Else, click **Cancel**.

To remove a contact, click **Delete** available next to the contact. Click **Yes** in the "Do you wish to delete the Customer Contact information for <contact name>?" to remove. Else, click **No**.

### Edit Contact Information

Field	Description
Name	Enter the company contact name.
Title	Enter the designation of the contact.
Email Address	Enter the E-mail address of the contact.
Primary Phone Number	Enter the primary phone number of the contact. Select the type of phone number entered from the drop down list.
Secondary Phone Number	Enter the secondary phone number of the contact. Select the type of phone number entered from the drop down list.

Click **Save New Contact** to save the entered information. Else, click **Cancel**. The saved contact is displayed in the **Your Company Contacts** section.

Click **Previous** to display the **Your Company Information** page.

## Your Hardware Environment

In this page, select the type of devices in your SAN environment for Lasso to collect the data and click **Continue**.

Field	Description
Storage Arrays	Select this option to collect data for the storage arrays.
Fibre Channel Switches	Select this option to collect data for the fibre channel switches.

Field	Description
<b>Ethernet &amp; FCoE Switches</b>	Select this option to collect data for the ethernet and FCoE switches.
<b>Tape Libraries</b>	Select this option to collect data for the tape libraries.
<b>Attached Hosts</b>	Select this option to collect data for the attached hosts.
<b>Enclosures</b>	Select this option to collect data for the enclosure(s).
<b>Management &amp; Monitoring Software</b>	Select this option to collect data for the management and monitoring software.

 **NOTE:** Lasso does not support Tape Libraries in this release.

To collect more details, the required device page is displayed for each selected device.




If previous configuration of Lasso is used and you want to add a specific device, then select the required device option. If you remove an already selected device, then "The option you have selected will result in all <type of devices> being removed from the configuration. Do you wish to continue?" message is displayed. Click **Yes** to remove the device. Else, click **No**.

Click **Previous** to display the **Your Company Contacts** page.

## Your Hardware Environment: Storage Arrays

In this page, select the type of storage array(s) in your SAN environment, enter the details, and click **Continue**.

### Storage Arrays in your environment

Clicking the  image next to the Storage Array provides the validation status. If validation is successful,  image is displayed. Else,  image is displayed.

To edit the selected storage array, click **Edit** available next to the Storage Array. Update the required fields and click **Update Storage Array** to save the updates. Else, click **Cancel**.

To delete a Storage Array, click **Delete** available next to the array.


To verify the storage array(s) from the existing user configuration, select the required storage array(s) and click **Revalidate Selected Storage Arrays**.

### Add/Modify Storage Array information

To add or modify the storage array, select the type of storage from the drop down list and enter information in the required fields. Click **Save New Storage Array** to save. Else, click **Cancel**. The saved array(s) is displayed in the **Storage Arrays in your environment** section and the validation starts for the saved array.

Field	Description
<b>Type of Storage Array</b>	Select from the following type of Storage Array(s): <ul style="list-style-type: none"> <li>• <b>Celerra</b></li> <li>• <b>CLARiiON</b></li> <li>• <b>EqualLogic</b></li> <li>• <b>EQL FluidFS NAS</b></li> </ul>

Field	Description
Celerra	<ul style="list-style-type: none"> <li>• MD Series</li> <li>• PV FluidFS NAS</li> </ul> <p>Enter the details for the following fields:</p> <ul style="list-style-type: none"> <li>• CS IP/Hostname</li> <li>• Username</li> <li>• Password</li> </ul>
CLARiiON	<p>Enter the details for the following fields:</p> <ul style="list-style-type: none"> <li>• SPA IP/Hostname</li> <li>• SPB IP/Hostname</li> <li>• Username</li> <li>• Password</li> <li>• <b>Discover Array Attached Hosts</b>- This option is selected by default. If the <b>Attached Hosts</b> device is selected in the <b>Your Hardware Environment</b> page. When this option is selected and if the user credentials match with the discovered Windows host, then the login credentials of the host is not required. Lasso automatically validates the credentials.</li> </ul>
EqualLogic	<p>Enter the details for the following fields:</p> <ul style="list-style-type: none"> <li>• Group/Mgmt IP</li> <li>• Community String</li> <li>• Username</li> <li>• Password</li> <li>• <b>Gather Diagnostic Data</b> — Select this option to gather diagnostic data. If this option is selected, then login credentials are required.</li> </ul>
EQL FluidFS NAS	<p>Enter the details for the following fields:</p> <ul style="list-style-type: none"> <li>• Management IP</li> <li>• Username</li> <li>• Password</li> </ul>
MD Series	<p>Enter the details for the following fields:</p> <ul style="list-style-type: none"> <li>• RAID Ctrl Mgmt 0 IP</li> <li>• RAID Ctrl Mgmt 1 IP</li> </ul>
PV FluidFS NAS	<p>Enter the details for the following fields:</p> <ul style="list-style-type: none"> <li>• Management IP</li> <li>• Username</li> <li>• Password</li> </ul>




Field	Description
<b>Save as the default Username &amp; Password for additional arrays</b>	Select this option to save the user name and password authentication information as default for the included arrays.   <b>NOTE:</b> This option is disabled when <b>MD Series</b> type is selected.
<b>Use this as the default storage array type</b>	Select this option for the selected storage array to be the default type.

Click **Previous** to display the **Your Hardware Environment** page.

## Your Hardware Environment: Fibre Channel Switches

In this page, select the type of fiber channel switch(es) in your SAN environment, enter the details, and click **Continue**.

### Switches in your environment

Clicking the  image next to the switch provides the validation status. If validation is successful,  image is displayed. Else,  image is displayed.

To edit the selected Fibre Channel Switch, click **Edit** available next to the switch. Update the required fields and click **Update Switch** to save the updates. Else, click **Cancel**.

To delete a Fibre Channel Switch, click **Delete** available next to the switch(es).

To verify the Fibre Channel Switch(es) from the existing user configuration, select the required switch(es) and click **Revalidate Selected Fibre Channel Switches**.

### Add/Modify Switch Information

To add or modify the switch information, select the type of switch from the drop down list and enter the data in the required fields. Click **Save New Switch** to save, display the information in the **Switches in your environment** section, and start validation of the switch. Else, click **Cancel**.

Field	Description
<b>Type of Switch</b>	Select from the following type of switch(es): <ul style="list-style-type: none"> <li>• <b>Brocade</b></li> <li>• <b>Cisco</b></li> <li>• <b>McData</b></li> <li>• <b>McDataBlade</b></li> </ul>
<b>IP/Hostname</b>	Enter the IP address or host name of the selected type of switch.
<b>Username</b>	Enter the user name .
<b>Password</b>	Enter the password .
<b>Use this as the default switch type</b>	Select this option to make the selected type of switch as the default.


Field	Description
<b>Save as the default Username &amp; Password for additional switches</b>	Select this option to save the user name and password authentication information as default for all the switches of the same type.

Click **Previous** to display the **Your Hardware Environment** page.

## Your Hardware Environment: Ethernet Switches

In this page, select the type of Ethernet Switches in your SAN environment, enter the details, and click **Continue**.

### Switches in your environment

Clicking the  image next to the Ethernet Switch provides the validation status. If validation is successful,  image is displayed. Else,  image is displayed.

To edit the selected Ethernet Switch, click **Edit** available next to the Ethernet Switch. Update the required fields and click **Update Switch** to save the updates. Else, click **Cancel**.

To delete a Ethernet Switch, click **Delete** available next to the Ethernet Switch.


To verify Ethernet Switch(es) from the existing user configuration, select the required switch(es), and click **Revalidate Selected Ethernet Switches**.

### Add/Modify Ethernet Switch information

To add or modify Ethernet Switch information, select the type of Ethernet Switch from the drop down list and enter the data in the required fields. Click **Save New Ethernet Switch** to save, display the information in the **Switches in your environment** section, and start validation of the Ethernet Switch. Else, click **Cancel**.

Field	Description
<b>Type of Ethernet Switch</b>	Select from the following type of Ethernet Switch(es): <ul style="list-style-type: none"> <li>• <b>Cisco Ethernet</b></li> <li>• <b>Cisco FCoE</b></li> <li>• <b>PowerConnect</b> — Select this for all types of PowerConnect Ethernet, B8000, and M8428K switches.</li> <li>• <b>Brocade Ethernet</b> — Select this for the Brocade B-Series switches.</li> <li>• <b>Force10</b></li> </ul>
<b>IP/hostname</b>	Enter the IP address or the host name of the switch.
<b>Username</b>	Enter the user name for the IP address or host name.
<b>Password</b>	Enter the password.
<b>Enable Password</b>	Enter the password.
<b>Use this as the default Ethernet switch type</b>	Select this option to make the selected type of ethernet switch as the default.

Field	Description
<b>Save as the default Username &amp; Password for additional Ethernet switches</b>	Select this option to save the user name and password authentication as default for additional ethernet switches.

 **NOTE:** Username, Password, and Enable Password credentials are optional for **Cisco Ethernet** type of Ethernet Switches.




Click **Previous** to display the **Your Hardware Environment** page.

## Your Hardware Environment: Tape Libraries

 **NOTE:** Lasso does not support Tape Libraries in this release.

In this page, select the type of Tape Library in your SAN environment, enter the details, and click **Continue**.

### Tape Libraries in your environment

Clicking the  image next to the Tape Library provides the validation status. If validation is successful,  image is displayed. Else,  image is displayed.

To edit the selected Tape Library, click **Edit** available next to the Tape Library. Update the required fields and click **Update Tape Library** to save the updates. Else, click **Cancel**.

To delete a Tape Library, click **Delete** available next to the tape library.


To verify the tape devices from the existing user configuration, select the tape device and select **Revalidate Selected Tape Libraries** option.


### Add/Modify Tape Library Information

To add or modify Tape Library information, select the type of Tape Library from the drop down list and enter the data in the required fields. Click **Save New Tape Library** to save, display the information in the **Tape Libraries in your environment** section, and start validation of the Tape Library. Else, click **Cancel**.

Field	Description
<b>Type of Tape Library</b>	Select from the following type of Tape Library(s): <ul style="list-style-type: none"> <li>• <b>ML6000</b></li> <li>• <b>PV132T</b></li> <li>• <b>PV136T</b></li> <li>• <b>TL2000</b></li> <li>• <b>TL4000</b></li> </ul>
<b>IP/hostname</b>	Enter the IP address or the host name for the selected type of Tape Library.
<b>Username</b>	Enter the user name.
<b>Password</b>	Enter the password.
<b>Save as the default Username &amp; Password for additional Tape Libraries</b>	Select this option to save the user name and password authentication information as default for additional Tape Libraries.



 **NOTE:** Only IP address or host name is required for **TL2000** and **TL 4000**.




 **NOTE:** Only IP address or host name and password required for **ML6000**.

Click **Previous** to display the **Your Hardware Environment** page.

## Your Hardware Environment: Hosts

In this page, select the type of host operating system in your SAN environment, enter the details, and click **Continue**.

### Hosts in your environment

Clicking the  image next to the host provides the validation status. If validation is successful,  image is displayed. Else,  image is displayed.

To edit the selected host operating system, click **Edit** available next to the host. Update the required fields and click **Update Host** to save the updates. Else, click **Cancel**.

To delete a host operating system, click **Delete** available next to the host.

To verify the hosts attached to storage arrays from the existing user configuration, select the hosts and click **Revalidate Selected Hosts**.

### Add/Modify Host information

To add or modify host information, select the type of host operating system from the drop down list and enter the data in the required fields. Click **Save New Host** to save, display the information in the **Hosts in your environment** section, and start validation of the host. Else, click **Cancel**.

Field	Description
Type of Host OS	Select from the following Type of Host OS: <ul style="list-style-type: none"><li>• <b>AIX</b></li><li>• <b>HP-UX</b></li><li>• <b>Linux</b></li><li>• <b>Solaris</b></li><li>• <b>VMware</b></li><li>• <b>Windows</b></li></ul>
IP/hostname	Enter the IP address or the host name for the selected type of host operating system.
Username	Enter the user name.
Password	Enter the password.
Root Password	Enter the root password.
Type of Storage Array	Select from the following type of Storage Array(s): <ul style="list-style-type: none"><li>• <b>Celerra</b></li><li>• <b>CLARiiON</b></li><li>• <b>EqualLogic</b></li><li>• <b>MD Series</b></li></ul>




Field	Description
	<ul style="list-style-type: none"> <li>• <b>Compellent</b></li> </ul>
<b>Use this as the default host type</b>	When a storage array is selected, then the array information related to the selected host OS is collected. Select this option to save the selected host type as the default.
<b>All of the hosts on my SAN can be accessed with this Username &amp; Password</b>	Select this option if the user name and password is the same for all the hosts in your SAN environment.
<b>Domain</b>	This field is displayed when the selected type of host OS is <b>Windows</b> . Enter the domain information.
<b>Sudo User with admin rights</b>	The option is displayed when the host type <b>VMware</b> or <b>Linux</b> and the storage array type <b>EqualLogic, MD Series, or Compellent</b> is selected. Select this option to collect the data using Sudo user credentials. Enter the root password if the Sudo user is set for target password.
<b>Collect advance logs</b>	The option is displayed when the host type <b>VMware</b> and the storage array type <b>EqualLogic, MD Series, or Compellent</b> is selected. Select this option to collect additional log information.

Click **Previous** to display the **Your Hardware Environment** page.

## Your Hardware Environment: Enclosures

In this page, enter the details for the selected type of Enclosure in your SAN environment and click **Continue**.

### Enclosures in your environment

Clicking the  image next to the enclosure provides the validation status. If validation is successful,  image is displayed. Else,  image is displayed.

To edit the selected enclosure, click **Edit** available next to the enclosure. Update the required fields and click **Update Enclosure** to save the updates. Else, click **Cancel**.

To delete, click **Delete** available next to the enclosure(s).

### Add/Modify Enclosure information

To add or modify the enclosure information, enter the data in the required fields for the selected type of enclosure. Click **Save New Enclosure** to save, display the information in the **Enclosures in your environment** section, and start validation of the enclosure. Else, click **Cancel**.




Field	Description
Type of Enclosure	<b>M1000e</b> — This type of enclosure is selected by default.
IP/Hostname	Enter the IP address or host name of the selected type of enclosure.
Username	Enter the user name.
Password	Enter the password.
Save as the default Username & Password for additional Enclosures	Select this option to save the user name and password authentication information for all the enclosures.

Click **Previous** to display the **Your Hardware Environment** page.

## Your Hardware Environment: Management & Monitoring Software

In this page, enter the details for the selected type of software in your SAN environment and click **Continue**.

### Management & Monitoring Software in your environment

Clicking the  image next to the software provides the validation status. If validation is successful,  image is displayed. Else,  image is displayed.

To edit the selected software, click **Edit** available next to the software. Update the required fields and click **Update Software** to save the updates. Else, click **Cancel**.

To delete a software, click **Delete** available next to the software(s).

To verify the software(s) from the existing user configuration, select the required software(s) and click **Revalidate Selected Management & Monitoring Software**.


### Add/Modify Management & Monitoring Software Information


To add or modify the software information, enter the data in the required fields for the selected type of software. Click **Save New Software** to save, display the information in the **Management & Monitoring Software in your environment** section, and start validation of the software. Else, click **Cancel**.


Field	Description
Type of Software	<b>HIT Kit for VMware</b> — This type is selected by default.
IP/hostname	Enter the IP address or host name of the selected type of software.
Username	Enter the user name .
Password	Enter the password .
Collect ASM/VE logs	Select this option to collect the ASM/VE logs for VMware.
Save as the default Username & Password for additional Software	Select this option to save the user name and password authentication information as default for the software.

Click **Previous** to display the **Your Hardware Environment** page.


## Device Collection

This page displays all the selected types of devices. The validated device has  image next to the device name.

The devices that failed validation has  image next to the device name. You can either re-validate these devices or remove from the list.

 **NOTE:** Validation of device is necessary for collection to be completed.

To validate the device before collection, click **Edit** next to the device. In the displayed device page, edit the details and

re-validate the device. Click the  image next to the device to check the validation status.

To delete a device, click **Edit** next to the device. In the displayed device page, click **Delete** available next to the device.

After all the devices are verified and validated, click **Start Collection** to start the collection. Click the  image to check the status of the collection.


Click **Cancel Collection** to cancel the collection.

Click **Continue** to parse the data and generate XML and HTML output. The generated files are added to the original collection .zip file. The data that is uploaded to the Dell Technical Support site is encrypted.

## Upload

Use this page to upload the collected files to Dell Technical Support site.


To upload the collected files, the options are:

Options	Description
<b>Open Location</b>	Click to open the location where the collected files are saved.
<b>Upload Full Collection</b>	Select this option to automatically upload the collection files to Dell Technical Support site.  <b>NOTE:</b> If this option is selected, the <b>zip.gpg</b> file is uploaded.
<b>Authenticated Proxy</b>	Select this option to upload the collection files to Dell Technical Support site using proxy.
<b>IP/Hostname</b>	Enter the IP address or hostname.
<b>Port number</b>	Enter the port information.
<b>Username</b>	Enter the user name.
<b>Password</b>	Enter the password.

Select **Yes** in the “Would you like to automatically upload the collection package to Dell?” to automatically upload the file to Dell Technical Support site. Else, select **No**.

In the “Lasso can save your usernames and passwords in an encrypted password vault for future re-use. If the password vault is not used, no usernames or passwords will be saved and will require re-entry to run the Lasso

collection again. Would you like to save it?", select **Yes** to save. Else, select **No**. If saved, the vault is secured as a local file in the `%USERPROFILE%\Del\Lasso` directory.

 **NOTE:** The extent of information saved depends on the security level selected during the installation of Lasso.

Click **Continue** to upload the file. The **Confirmation** page is displayed.

## Confirmation

This page displays the status of the file upload.

If **No** is selected in the **Upload** page, instructions to upload the collection is displayed.

To view the HTML file created during parsing the data, select the **View your SAN Configuration** option. Click **Finish** to open the report.

## Log Files

The following log files are generated when using Lasso:

- **Validate.log** — When devices are validated.
- **Collect.log** — When data is collected.

The validation log file `<DeviceCategory>_<DeviceType>_<IP>_validate.log` is available at `%USERPROFILE%\Del\Lasso\Logs` location.

The collection log file `<DeviceCategory>_<DeviceType>_<IP>_validate.log` is available at `%USERPROFILE%\Del\Lasso\Logs` location.

The device log file for Lasso is available at `%USERPROFILE%\Del\Lasso\Logs` location and the Lasso user interface log file is available at `%USERPROFILE%\ Del\ Lasso\ lasso.log` location.

## Generated File Formats

Lasso generates raw data files, TXT, XML, and HTML files:

- **Raw Data Files** — Lasso generates two types of raw data files:
  - Raw data file with a `.zip` extension.
  - Encrypted raw data file with a `.gpg` extension.
- **TXT files** — Lasso generates `.txt` file that contains the logs.
- **XML and HTML files** — Lasso parses the data collected into XML and HTML files.

The XML files are:

- An XML output file with an `.xml` extension.
- An encrypted XML output file with a `.gpg` extension.

The HTML files are:

- A HTML output file called **SANconfiguration.html**.

To access the XML and HTML files, go to `USERPROFILE%\Del\Lasso\results` directory.

## Viewing Reports


To view the report, perform any of the following:

- After Lasso collects the information, on the **Confirmation** page select **View Your SAN Configuration** option and click **Finish**. Lasso tool is closed and the report is opened in the internet browser.
- Open the files that are saved at the default location `c:\Users\<username>\Dell\Lasso\results\` or in the specified location. For information about the file formats, see [Generated File Formats](#).

# Manual Collection

If you are not able to collect data using Lasso GUI, then you can manually collect the data. To perform manual collection, login to the required device and run the device specific commands. You can manually collect data for the following devices:

- Storage Arrays
- Fibre Channel Switches
- Ethernet and FCoE Switches
- Tape Libraries
- Attached Hosts
- Enclosures
- Management and Monitoring Software

 **NOTE:** Lasso does not support Tape Libraries in this release.

## Manually Collecting Data For Storage Arrays

You can collect the information for the following types of Storage Arrays:

- Celerra
- CLARiiON
- MD Series
- EqualLogic
- EQL FluidFS NAS
- PV FluidFS NAS

## Manually Collecting Data For Celerra Device

Make sure that the following environment variables are set:

- `NAS_DB=/nas`
- `export NAS_DB`
- `PATH=$PATH:$NAS_DB/bin`
- `export PATH`

To collect Celerra device information manually:

1. Using SSH, login to Celerra device as a root user.
2. Run the following command:  
`/nas/tools/collect_support_materials`

The server and event log collection file (**support\_materials\*.zip**) is generated in the `/nas/var/emcsupport/` directory.

3. Run the following command:


```
/nas/tools/.get_spcollect
```

The raid group, volume access, host LUNs, storage groups and SP ports collection file (**SPCOLLECT.zip**) is generated in the **/nas/var/log/** directory.

4. Run the following command:

```
/nas/sbin/log_config -d
```


The collection file (**log\_config\*.gz**) is generated in the **/nas/var/log/** directory. The file includes array related additional information and used for troubleshooting purposes.

 **NOTE:** The `log_config -d` command is functional only if you log in as root user to the Celerra device.

## Manually Collecting Data For CLARiiON Device

Before manually collecting, make sure that the following prerequisites are met:

- Navisphere CLI is installed on your system. By default, it is installed at **%SystemDrive%\Program Files\EMC\Navisphere CLI** location, but may differ depending on the system.

 **NOTE:** Navisphere CLI is installed during Lasso installation.

- Path of the Navisphere CLI is set to **InstallDir\bin\NavisphereCLI** before executing the commands.

To collect the information for CLARiiON manually:

1. Determine the agent revision version using one of the following commands:

```
- navicli -h SPAIPAddress/SPBIPAddress getagent
- naviseccli -user <username> -password <password> -scope 0 -h
  SPAIPAddress/SPBIPAddress getagent
```

The version 6.x, where x is the release version of Navisphere CLI, is displayed.

2. Get SPcollect by using the following command.

```
- For releases 19 and later:
  naviseccli -user <username> -password <password> -scope 0 -h
  SPAIPAddress/SPBIPAddress spcollect
- For releases 6 to 18:
  navicli -h SPAIPAddress/SPBIPAddress spcollect -messner
- For releases earlier than 6, Lasso does not support validation or collection .
```

3. Check the progress of SPcollect using the following command:

```
- For releases 19 and later:
  naviseccli -user <username> -password <password> -scope 0 -h
  SPAIPAddress/SPBIPAddress managefiles -list
- For releases 6 to 18:
  navicli -h SPAIPAddress/SPBIPAddress managefiles -list
```

This command lists **\*data.zip** files, where **\*** is the current system date on the array. The command `spcollect` initially creates **\*\_runlog.txt** file, that gets listed when this command is executed. Continue to check the progress of the SPCollect (using this command) until **\*\_runlog.txt** is deleted and corresponding **\*data.zip** file is created.

Copy the created **\*data.zip** file to the current working directory using one of the following commands:



- For releases 19 and later:  

```
naviseccli -user <username> -password <password> -scope 0 -h  

SPAIPAddress/SPBIPAddress managefiles -retrieve -file <*data.zip>
```
- For releases 6 to 18:  

```
navicli -h SPAIPAddress/SPBIPAddress managefiles -retrieve -file  

<*data.zip>
```

**4. Capture resume data using the following command:**

- For releases 19 and later:  

```
naviseccli -user <username> -password <password> -scope 0 -h  


SPAIPAddress/SPBIPAddress getresume > ./SPIAddress.resume.txt
```
- For releases 6 to 18:  

```
navicli -h SPAIPAddress/SPBIPAddress getresume > ./  

SPIAddress.resume.txt
```

This command copies the **\*resume.txt** file to current working directory.

You may need to connect using Navisphere Manager and use the web GUI to collect the SPCollect. To do this, connect to the SP using the IP Address in the web browser. Right-click on the SP and select SPCollect. Use the **File Transfer Manager** to transfer the SPCollect to the system.

 **NOTE:** When the collection of a Storage Array times out, go to the **SAC.properties** file in the installation directory and increase the polls to be allowed. Example: `total.polls.allowed = 70` which is 50 by default.

## Manually Collecting Data For MD Series Device


To collect information for MD Series device manually:

1. Make sure that ModularDiskStorageManager (MDSM) software is installed on the system. By default, it is installed in **%SystemDrive%\Program Files\Del\MD Storage Manager\client\** location, but may differ depending on the system.
2. Make sure that the path of MDSM software is set before executing the commands.
3. Run the following command:

```
SMcli -c "show storagearray profile;" <IPAddress of MD Array> >  

<USERPROFILE Dir>\Results\Hostname.txt
```

The **Hostname.txt** file is generated at **<USERPROFILE Dir>\Results\** location.

 **NOTE:** When the validation or collection operation of a Storage Array times out, go to the **DasArray.properties** file in the InstallDir and change or increase the timeout value.

Example:

- `mdseries.timeout.value.collection = 200000` which is 120000 by default
- `mdseries.timeout.value.collection = 60000` which is 60000 by default

4. Run the following command: `SMcli.exe -c "save storageArray SupportData file= \"<USERPROFILE Dir>\Results\Hostname.zip\";\"<IP Address of MD Array>` to save the **Hostname.zip** file at the **<USERPROFILE Dir>\Results\** location.

## Manually Collecting Data For EqualLogic Device


To collect information for EqualLogic device manually:

1. Open a SSH session on the array.
2. Capture the output for each of the following commands to a `.txt` file.
  - `show` - Provides high level information for the members, groups, volumes, pools, replication , and so on for the array. This information is required to run the following commands:
    - \* `member show` - Lists the number of members in the array group, their version, status, and so on.
    - \* `member select <MEMBERNAME> show` - Lists network information for the respective member.
    - \* `member select <MEMBERNAME> show controllers` - Lists controller information for the respective member.
    - \* `member select <MEMBERNAME> show disks` - Lists disk information for the respective member.
  - `grpparams show` - Lists all group related information.
  - `volume select <VOLUMENAME> show` - Lists information for the corresponding volume, whose name is specified as part of the command.
  - `volume select <VOLUMENAME> show connections` - Displays the connections and allows you to know the connection of the volume to the related initiator, its connection uptime and other details.
  - `diags "-b -n"` - Collects the diagnostics information.

## Manually Collecting Data For PowerVault Or EqualLogic FluidFS NAS Device

To collect information for PowerVault or EqualLogic FluidFS NAS device manually:

1. For PowerVault FluidFS NAS device, log in to PV FluidFS NAS and for EqualLogic FluidFS NAS device, log in to EQL FluidFS NAS using root privilege through SSH.
2. Run the command **`diag start GeneralSystemDiagnostic`**.  
The output file is generated in the FTP site at **`ftp://<IPAddress>:44421`** location.
3. In Windows Explorer window, type **`ftp://<username>@<IPAddress>:44421`**. For example, **`ftp://admin@10.10.25.21:44421`**.
4. Enter the password when prompted.  
The contents of the ftp site is displayed. You can access the collection file (**`*.tar.gz`**) in the **`diagnostics/archive/results__diagnostic.GeneralSystemDiagnostic_XXXX (timestamp)`** directory.  
Example of a collection file: **`diagnostic.GeneralSystemDiagnostic.25_07_2011-06_42_09.tar.gz`**

 **NOTE:** On SAN consisting of many devices, you may need to increase the time out value. By default, time out value for this device is 15 minutes. You can modify the value `nas.timeout.value` (in milliseconds) in the **`NAS.properties`** file available in the Lasso install directory.

## Manually Collecting Data For Attached Hosts


You can collect the information manually for the following Attached Hosts:

- Windows
- Unix
- VMware

## Manually Collecting Data For Windows OS

You can manually collect the information for the following:


- EMC SAN
- EqualLogic SAN
- MD Series
- CLARiiON
- Celerra
- Compellent

 **NOTE:** You can configure time out for Windows attached hosts using **winhc.properties** file. The default property value is 15 minutes. Set the property for the following types of devices as:

- Compellent, MD Series, and EqualLogic — `whc.eql.timeout.value = 1800000`
- CLARiiON and Celerra — `whc.emc.timeout.value = 900000`


### Collecting Storage Device Information From Windows OS For EMC SAN

1. Copy the appropriate **EMCReport.exe** file from the `<LassoInstallDir>\bin\` to the target Windows system. The default Lasso installation directory is `%Systemdrive%\Program Files\Dell\Lasso\`.

 **NOTE:** For 32-bit and 64-bit operating systems use **Emcrpts\_x86\_v36.exe**.


2. Log in as an administrator to the target Windows system.
3. Run the **.exe** file.  
The output **.zip** file is generated in `%SystemRoot%\EMCReports\Collection\zip\` directory.

### Collecting Storage Device Information From Windows OS For EqualLogic SAN

1. Log in as administrator to the target Windows system.  
 **NOTE:** For 32-bit and 64-bit operating systems use **DellCollector.exe**. Before running **Dellcollector.exe**, make sure that the Windows Management Instrumentation (WMI) service is running.
2. Copy the **ICSharpCode.SharpZipLib.dll** and **DellCollector.exe** files from the `<LassoInstallDir>\bin\` folder to the target Windows system. The files can be found in the Lasso installation directory in the `\Dell\Lasso\Bin\` location.
3. Run the **.exe** file.  
The output **.zip** file is generated in `<SystemRoot>\DellCollector\Collection\zip\` directory.


### Collecting Storage Device Information For UNIX OS

1. Using any secure ftp client (example: scp), copy the appropriate **EMCGrab** from the `<LassoInstallDir>\Bin` directory to the target UNIX system. By default, the Lasso installation directory is `<SystemDrive>\Dell\Lasso\Bin\`.
2. Log in to the target UNIX system using root privilege through SSH.

 **NOTE:** Use dual mode authentication if SSH is not enabled for root.

3. Untar the script: **tar xvf emcgrab\*.tar**
4. Run **EMCGrab**: `/emcgrab.sh -autoexec`
5. Accept the license agreement.

The output file is generated in `/tmp/emcgrab/outputs/` directory and you can copy it to the local system using the secure ftp client.

 **NOTE:** When the collection operation of host times out, go to the **UnixHC.properties** file in the installation directory and change or increase the time out value. Example: `hc.timeout.value = 3600000` which is 1800000 by default.

## Automating Service Tag Collection On Linux OS


1. Copy the **sysreport** utility to the remote system.
2. Change the file access permission to `r-x` (read and executable) for root.
3. Log in to the remote system to collect the service tag with **sysreport | grep Service Tag** and include it in the `%USERPROFILE%\Del\%Lasso\results\[timestamp]\Host_Linux_IPAddress.svctag.txt` file.

## Collecting Storage Device Information For VMware (ESX/ESXi OS)


1. Log in to the VMware server using root privilege through SSH
2. Run the following command:  

```
vm-support -n
```

The output file is saved in the `/root/` directory.
3. Copy the output file to the local system using any secure ftp client.

 **NOTE:** When the collection operation of host times out, go to the **UnixHC.properties** file in the InstallDir and change or increase the time out value. Example: `hc.timeout.value = 3600000` which is 1800000 by default.

## Manually Collecting Data For Tape Library Device

 **NOTE:** Lasso does not support Tape Libraries in this release.

You can collect information for the following tape library devices using Lasso:


- PV136T
- PV132T
- TL2000
- TL4000
- ML6000

## Manually Collecting Data For PV136T, PV132T, TL2000, And TL4000 Tape Library Device

 **NOTE:** Lasso does not support Tape Libraries in this release.

1. Connect to the tape library using:  

```
telnet -f Lasso\Results\hostname.txt <hostname or IP address>
```

 **NOTE:** On Windows 2000, use HyperTerminal and manually capture your telnet session.

2. Run the commands specific to the type of tape library:
  - For PV132T or PV136T — `supportDump` or `loggerDump`
  - For TL2000 or TL4000 — `dumpall`

## Determining Service Port IP For ML6000 Data Collection

 **NOTE:** Lasso does not support Tape Libraries in this release.

To determine service port IP:

1. Navigate to GUI panel of ML6000 library.
2. Log in to the web client. Enter the credentials *admin* for **username** and *password* for **password**.
3. In the home page, click the **setup** tab available in the tool bar.
4. Select the **Network Management** option.
5. Select the IP version 4 and click **Next**.

If the tape library is already assigned to a IP, the IP address is displayed. If not, assign a static or DHCP IP to the tape library. The displayed IP address is called the Service Port IP.

## Collecting Logs Manually For ML6000 Device

To manually collect logs:

1. Connect to the Service port IP address of ML6000 using SSH (putty), and providing the credentials *ilinkacc* for user name and *password* for password.
2. Run the command `cat /proc/net/arp` and get the I/O mode IP address (The IP other than default gateway).
3. Add Telnet to one of the I.O.Module IP addresses by running the command "`telnet`" <I.O.Module IP>
4. Run the command `supportDump`.

Logs collected using the option **Capture Snapshot gathers log files from the library** are a super set of the logs obtained by running the command `supportDump`.

From this super set, to locate the `supportDump` information, save the super set to the local folder. Extract the log files and the `snap.gz` file located in `\var\log\<vendor_name>\<IO_Module_name>\`. Locate the file `snap`. This file contains the same information as the one when you run the command `supportDump`.

## Collecting Logs Using Web Client

To collect logs using web client:

1. Connect to the IPAddress of ML6000 in the web browser.
2. Log in using admin user credentials and navigate to **Tools** → **Capture SnapShot**.
3. Select the **Download the file using the browser** option and click **Apply**.  
After the snapshot is captured, a popup window is displayed to save the snapshot (.tar)

## Manually Collecting Data For Ethernet and FCoE Switches

To collect information for switches:

1. Connect to the switch using Telnet:  


```
telnet -f %USERPROFILE%\Dell\Lasso\results\hostname.txt hostname
```
2. After logging in, enter the command relevant to the type of switch.
  - **PowerConnect B-Series, Brocade B-Series, and M8428K:**
    - \* To run the commands, see [List Of Commands For PowerConnect B-Series, Brocade B-Series, and M8428K](#)
  - **PowerConnect Ethernet:**
    - \* To run the commands, see [List Of Commands For PowerConnect Ethernet](#)

- **Cisco Ethernet:**
  - \* terminal length 0
  - \* To run the commands, see [List Of Commands For Cisco Ethernet](#)
- **Cisco FCoE:**
  - \* terminal length 0
  - \* show startup-config
  - \* To run the sub-commands, see [List Of Commands For Cisco FCoE](#)
- Force 10 Switches
  - \* To run the commands, see [List Of Commands For Force 10 Switches](#).

## Manually Collecting Data For Cisco Ethernet Device

To collect for Cisco Ethernet manually:

1. Log in to Cisco Ethernet switch through telnet.
2. Run the following command to enter the required mode: .
  - Exec — enable
  - Configuration — config
3. For CEE information, run the command `do show tech-support .`
4. Capture the console output

 **NOTE:** On a SAN consisting of many Cisco Ethernet switches, you may need to increase the time out value. By default, the time out value for these switches is 3 minutes (in milliseconds). This value (*ciscoethernet.timeout*) can be modified in the file **ESC.properties** located in the Lasso install directory.

## Manually Collecting Data For Cisco FCoE Device

Lasso provides support to Nexus 5020 and 5548 rFCoE switch.

To collect manually:

1. Login to Cisco FCoE switch through telnet
2. Run the command `config`.
3. Run the following commands
  - `show port-channel summary`
  - `show hostname`
  - `show version`
  - `show running-config`
  - `show environment`
  - `show module`
  - `show policy-map`
  - `show spanning-tree`
  - `show switchname`
  - `show system uptime`
  - `show system resources`

- show vpc
- show vlan
- show clock
- show feature
- show fex
- show fex detail
- show hardware internal cpu-mac mgmt stats
- show interface
- show interface brief
- show interface fex-fabric
- show interface transceiver
- show interface flowcontrol
- show interface priority-flow-control
- show interface switchport
- show interface trunk
- show interface description
- show interface status
- show inventory
- show lldp neighbors
- show mac-list
- show mac-address-table
- show class-map
- show license usage
- show lacp neighbor
- show lacp port-channel
- show port-channel capacity
- show port-channel load-balance
- show port-channel usage
- show port-channel traffic
- show queuing interface
- show system internal ethpm info all
- show spanning-tree mst
- show lldp neighbors detail
- show lldp tlv-select
- show vsan
- show zone
- show flogi database

4. For CEE information, run the command `do show tech-support`

5. Capture the console output



**NOTE:** On SAN having many Cisco FCoE switches, you may need to increase the time out value. By default, the time out value for these switches is five minutes (in milliseconds). This value (*ciscofcoe.timeout*) can be modified in the file **ESC.properties** located in the Lasso install directory.

## Manually Collecting Data For PowerConnect, Brocade B-Series, And M8428K Devices

To collect data for PowerConnect B-Series manually:

1. Log in to Power Connect B-Series FCoE switch through telnet
2. Run the command `supportShow` to display FC information.
3. To display CEE information, run the command `show tech-support`.

If the command fails, in the case of older switch firmware, then run the following commands:

```
- show running-config
- show startup-config
- show system
- show version
- show vlan brief
- show media
- show lldp
- show lldp neighbors
- show interface
- show interface switchport
- show port-channel
- show mac-address-table
- show spanning-tree brief
- show spanning-tree
- show cee maps
- show vlan fcoe
- show ip interface brief
- show interface switchport
- show lldp statistics
- show port-channel summary
- show mac-address-table count
- show spanning-tree mst brief
- show qos rcv-queue multicast all
- show qos interface all
- show fcoe-map
- fos switchshow
- fos cfgshow
- fos zoneshow
- chassisshow
```

4. Capture the console output .



**NOTE:** On SAN having many PowerConnect B-Series switches, you need to increase the time out value. By default, time out value for these switches is 12 minutes (in milliseconds). This value (*powerconnectb-series.timeout*) can be modified in the file **ESC.properties** located in the Lasso install directory.



## Manually Collecting Data For PowerConnect Ethernet And M8428K Device

To collect information for PowerConnect Ethernet manually:

1. Log in to Power Connect Ethernet switch through Telnet.
2. Run the command `show tech-support` to display CEE information. If the command fails, in the case of older switch firmware, then run the following commands

- `show running`
- `show vlan`
- `show spanning-tree`
- `show interfaces configuration`
- `show interfaces status`
- `show interface port-channel`
- `show system id`
- `show stack-port`
- `show storm-control`
- `show storm-control all`
- `show system`
- `show system flowcontrol`
- `show version`
- `show switch`
- `show arp`
- `show bridge address-table`
- `show mac address-table`
- `show port-aggregator vlan summary`
- `show port-aggregator port summary`
- `show switch stack-ports`
- `show switch stack-ports counter`
- `show switch stack-ports diag`
- `show nsf`
- `show switch stack-standby`
- `show checkpoint statistics`
- `Show Slot`
- `Show tacacs`
- `Show spanning-tree active`
- `Show spanning-tree blockedports`
- `Show lldp dcbx interface all`
- `Show lldp interface all`
- `Show lldp tlv-select interface all`
- `Show lldp remote-device all`
- `show classofservice dot1p-mapping`
- `show classofservice traffic-class-group`

- show interfaces traffic-class-group
- show interfaces priority-flow-control
- show interfaces tengigabitethernet <InterfaceName> priority-flow-control
- show interfaces counters tengigabitethernet <InterfaceName>
- show lldp tlv-select interface tengigabitethernet <InterfaceName>
- show lldp interface tengigabitethernet <InterfaceName>
- show lldp dcbx interface tengigabitethernet <Interface Name> detail

### 3. Capture the console output



**NOTE:** On SAN having many PowerConnect Ethernet switches, you may need to increase the time out value. By default, time out value for these switches is 3 minutes (in milliseconds). This value (*powerconnectethernet.timeout*) can be modified in the file **ESC.properties** located in the Lasso install directory.

## Manually Collecting Data For Force 10 Switches

To collect information for Force 10 switches manually:

1. Log in to Force 10 switch through SSH/Telnet.
2. Run the following commands:

- show running
- show vlan
- show spanning-tree 0 brief
- show spanning-tree msti
- show spanning-tree pvst
- show spanning-tree rstp brief
- show interfaces
- show interfaces status
- show interface port-channel
- show system
- show system stack-ports
- show storm-control unknown-unicast
- show storm-control broadcast
- show storm-control multicast
- show interfaces | grep "GigabitEthernet |Flowcontrol"
- show version
- show arp
- show mac-address-table
- show environment
- show inventory
- show vlan brief
- show dcb
- show iscsi
- show interfaces dcbx

- show interfaces ets summary
- show interfaces pfc summary
- show interfaces configured


## Manually Collecting Data For Switches

To collect information, connect to the switch using SSH or Telnet.

If you are using SSH, then:

1. Start putty and enter the hostname or IP address.
2. Enter Port as 22.
3. Select the protocol option as SSH and click **Open**.
4. In the displayed prompt, enter the login credentials to the switch.

If you are using Telnet to connect, then go to `telnet -f %USERPROFILE%\Dell\Lasso\results\hostname.txt hostname`. Enter the commands relevant to the type of switch.

 **NOTE:** On Windows 2000, use HyperTerminal and manually capture your telnet session.


The commands to collect the data for the types of switches are:

- **Brocade:**
  - \* supportShow
- **McData:**
  - \* show all
  - \* If this command fails, see [List of commands](#)
- **McDataBlade:**
  - \* If the show all command fails. see [List of commands](#)
- **Cisco:**
  - \* terminal length 0
  - \* show running-config
  - \* show flogi database
  - \* show startup-config

## Manually Collecting Data For Brocade Device

To collect manually:

1. Log in to Brocade Fibre channel switch through SSH
2. Run the command `supportShow`.
3. Capture the console output

 **NOTE:** On SAN having many Brocade switches, you need to increase the default time out value of 3 minutes (in milliseconds). This value (*brocade.timeout*) can be modified in the **FCSC.properties** file located in the Lasso install directory.

## Manually Collecting Data For Cisco Device

To collect manually:

1. Log in to Cisco Fibre channel switch through SSH
2. Run the commands
  - do show running-config
  - do show flogi database
  - do show startup-config
  - do show inventory
  - do show vsan
  - do show zone
  - do show version
  - do show interface brief
3. Capture the console output

## Manually Collecting Data For McData Device

The following sub-commands are included in the `show all` command. In some older switch firmware, the `show all` command may not work. In this case Lasso attempts a manual collection using the commands:

- `show ip ethernet`
- `show system`
- `show switch`
- `show port config`
- `show frus`
- `show zoning`
- `show port state`
- `show port info`
- `show port technology`
- `show port exit`
- `show loginserver`
- `show feature`
- `show security portbinding`
- `show security switchbinding`
- `show openTrunking config`
- `show thresholdAlerts alerts`
- `show fabric topology`
- `show fabric nodes`

## Manually Collecting Data For McDataBlade Device

The following sub-commands are included in the `show all` command. In some older switch firmware, the `show all` command may not work. In this case Lasso attempts a manual collection using these commands.


- show about
- show chassis
- show donor
- show interface
- show mem
- show perf
- show setup mfg
- show setup radius
- show setup services
- show setup snmp
- show setup system
- show version
- show config port
- show config switch
- show config zoning
- show fabric
- show topology
- show switch
- show domains

## Manually Collecting Data For Enclosures — M1000e

Connect to the M1000e using SSH or Telnet to collect the data.

To collect manually:

1. Start putty and enter the hostname or IP address.
2. In the displayed prompt, enter the login credentials to the M1000e.
3. Run the command: `racdump`.
4. Capture the console output.

 **NOTE:** On SAN having many M1000e, you need to increase the default time out value of 5 minutes (in milliseconds). This value (`enclosure.timeout.value`) can be modified in the **Enclosure.properties** file located in the Lasso install directory.

## Manually Collecting Data For HITKIT Appliance

To collect manually:

1. Login to the HITKIT VM using root privilege through SSH.
2. Select the **Diagnostics** option in the Hitkit VMware  
List of items is displayed.
3. Select **Gather support Information** from the list of items.  
The output file is saved in the CIFS share — `\\<share IP>\database\logfile.zip` file.
4. Run the command: `net use \\<share IP>\database\USER:<share IP>\<username> <password>` to connect to the appliance from the local system.
5. Run the command: `CMD /C MOVE /Y \\<share IP>\database\logfile.zip "User selected path"` to copy the logs to the local system.

6. Run the command `net use \\<share IP>\database /d` to disconnect the appliance from the local system.

## Collecting Data Using CLI

Lasso is normally run from the shortcut that calls a batch file. This batch file launches the Java UI. Once the environment is configured and validated, then Lasso Java UI calls individual scripts to automate the collections. The Java UI process can be automated with Java CLI options.

To start Lasso using CLI, it requires JRE 1.6 or later installed in the system.

Create the configuration file using the GUI, before running Lasso using CLI.

Before running, make sure to set the Java, Navisphere CLI and `<LassoInstallDir>\bin` path, if installer has not set it already.


To start collection, run the following command from `<LassoInstallDir>\bin` path:

```
java -jar lasso.jar <options>
```


Where options are:

- `-Q` — quiet mode; not using GUI. When this option is not specified, it operates in normal GUI mode.
- `-F<filename>` — customer config xml file, absolute path
- `-S#<Security Level>` — device configuration and credentials
- `-P<password>` — required to unlock password vault
- `-OF<Output Filename>` — output filename for collection
- `-IP<Internet Protocol>` — IP address of the device
- `-DT<Device Type>` — device type
- `-UN<UserName>` — user name of the device
- `-PD<Password>` — password of the device
- `-RP<RootPassword>` — root password of the device
- `-A` — HitKit collection for Advanced mode
- `-ST<Storage Array>` — type of storage array
- `-SU<SudoUser>` — sudo user
- `-D<DomainName>` — domain name
- `-UX` — upload xml collection only
- `-UZ` — upload full collection
- `-SECURED` — securing CLI information
- `-deltaSR` — delta service request number
- `-PMMail` — Dell PM mail id
- `-GD` — gather diagnostic data. To gather diagnostic data, include this argument for EqualLogic collection. The value is False by default.
- `-EP` — enable password for Ethernet Switches. If the Ethernet switches are configured with enable password, then `-EP` argument is mandatory in the command.
- `-EFD` — display advance user options
- `-NS` — avoid scanning devices
- `-DEMO` — operation in demo mode. No device calls
- `DEBUG` — all log entries to console

- `-PI<Proxy IP/Hostname>` — proxy server's host name or IP address
- `-PN<Proxy Port number>` — proxy server's port number
- `-PU<Proxy Username>` — proxy server's user name
- `-PP<Proxy Password>` — proxy server's password
- `-RD-<Results directory path>` — customize the results directory path
- `-NU` — disable the report upload
- `-NA` — report not archived

 **NOTE:** `-UZ` argument cannot be used when `-Secured` option is used.

While running Lasso in CLI mode, the `-p<password>` argument in the command is optional. When this argument is not entered, the "Please enter the device password:" message is displayed. To start the collection, enter the password.

 **NOTE:** Authentication of proxy is optional. If proxy is entered, then IP address, port number, user name, and password arguments are optional. If port number is not provided, then default port 80 is used. If proxy user name is included and password is not included, then a prompt requesting for password is displayed. If port number is other than default(80), then IP address is mandatory.

Following are examples of the commands to run lasso:

- The command to run Lasso: `java -jar lasso.jar -Q -F<absolute path of customer config XML file> -P<Password to unlock config XML file>`
- The command to run with secure site option: `java -jar lasso.jar -Q -F<absolute path of customer config XML file> -P<Password to unlock config XML file> -S# <security level> -SECURED`
- The command to run with Delta Service Request number and PM email id options: `java -jar lasso.jar -Q -F<absolute path of customer config XML file> -P<Password to unlock config XML file> -deltaSR<10 digit number> -PMMail<US_Lasso_Support@dell.com>`
- The command to run with input stream option: `java -jar lasso.jar -Q -F<absolute path of customer config XML file>`
- The command to run Lasso and disable upload of the report: `java -jar lasso.jar -DT <device type> -IP <Internet Protocol> -Q -UN <User name> -PD <Password> -NU`
- The command to run Lasso and not archive old reports: `java -jar lasso.jar -DT <device type> -IP <Internet Protocol> -Q -UN <User name> -PD <Password> -NA`

## Collecting For Single Device Using CLI

For single device collection, run the command: `java -jar lasso.jar -Q -OF <O/P FileName> -IP <Device IP> -DT <DeviceType> -UN <User Name> -PD <Password> -D <Domain Name> -SECURED -RD <Results directory path>`

 **NOTE:**

- `-OF` argument is optional in the command.
- If password is not entered in the command, then the input stream is prompted to enter the password.
- `-RD` argument is mandatory when running Lasso using System account.






The following table provides the device types supported by Lasso for single device collection



Devices	Device Types	Parameters Required
Storage Arrays	CLARiiON	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	EqualLogic	-IP <Group/Mgmt IP>, Community String, -DT<DeviceType>
	Celerra	-IP <CS IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	MDSeries	-IP <IP/HostName>, -DT<DeviceType>
	EQLFluidFSNAS	-IP <Mgmt IP>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	PVFluidFSNAS	-IP <Mgmt IP>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	CompellentFluidFSNAS	-IP <Mgmt IP>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
Fibre Switches	Brocade	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	McData	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	McDataBlade	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	Cisco	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
Ethernet & FCoE Switches	CiscoEthernet	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>, -EP<Enable Password>
	CiscoFCoE	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	PowerConnect	-DT <DeviceType> -IP <IP/Hostname> -UN<UserName> -PD<Password> -EP<Enable Password>
	Force10	-OF <O/P FileName> -IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>, -EP<Enable Password>
	Brocade Ethernet	-DT <DeviceType> -IP <IP/Hostname> -UN<UserName> -PD<Password> -EP<Enable Password>



**NOTE:** -EP is optional. If the PowerConnect Ethernet switch is configured, then password is required for Lasso to perform the collection.

Devices	Device Types	Parameters Required
	 <b>NOTE:</b> <code>-EP</code> is not required for PowerConnect B-Series and M8428K.	
Tape Libraries	PV132T	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	PV136T	-IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	TL2000	-IP <IP/HostName>, -DT<DeviceType>
	TL4000	-IP <IP/HostName>, -DT<DeviceType>
	ML6000	-IP <IP/HostName>, -PD <Password>, -DT<DeviceType>
	 <b>NOTE:</b> Lasso does not support Tape Libraries in this release.	
Attached Hosts	Windows	-ST <Storage Array Type>, -IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>, -D <Domain>
	Linux	-ST <Storage Array Type>, -IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>, -RP <RootPassword>, -SU
	Solaris	-ST <Storage Array Type>, -IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	HP-UX	-ST <Storage Array Type>, -IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	AIX	-ST <Storage Array Type>, -IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>
	VMware	-ST <Storage Array Type>, -IP <IP/HostName>, -UN <UserName>, -PD <Password>, -DT<DeviceType>, -RP <RootPassword>, -A, -SU
		 <b>NOTE:</b> -A is used to collect advanced logs (VM support logs) information.
	 <b>NOTE:</b> To provide the Sudo user credentials in Lasso for collecting data from Linux or VMware, the switch <code>-SU</code> is mandatory.	
	 <b>NOTE:</b> <code>-ST</code> can have Celerra, CLARiiON, EqualLogic, MD Series or Compellent types of storage array.	
Enclosures	M1000e	-DT<Device Type> -IP<HostName> -UN<UserName> -PD<Password>

Devices	Device Types	Parameters Required
Management and Monitoring Software	HIT Kit for VMware	-Q -DT<Device Type> HITKITVM -IP<HostName> -UN<UserName> -PD<Password> -A or -B

The following examples provide the command for single device collection for various devices.

- `java -jar lasso.jar -Q -OF OutPutFileName -IP 10.94.26.217 -DT Windows -ST CLARiiON -UN admin -PD password`
- `java -jar lasso.jar -Q -IP 10.94.216.158,10.94.216.159 -DT CLARiiON -UN admin -PD password`
- `java -jar lasso.jar -Q -IP 10.94.102.52,public -DT EqualLogic`
- `java -jar lasso.jar -Q -IP 10.10.78.131 -DT EQLFluidFSNAS -UN admin -PD admin`
- `java -jar lasso.jar -Q -IP 10.10.78.132 -DT PVFluidFSNAS -UN admin -PD admin -SECURED`
- `Java -jar Lasso.jar -Q -DT EqualLogic -IP 10.94.100.9,public -UN grpadmin -PD $services1 -SECURED`
- `java -jar lasso.jar -Q -IP 10.10.78.132 -DT Linux -ST equallogic -UN lasso -PD $services1 -SU`
- `java -jar lasso.jar -Q -IP 10.10.78.132 -DT Linux -ST equallogic -UN root -PD $services1 -deltaSR 1234567890 -PMMail US_Lasso_Support@dell.com`
- `java -jar lasso.jar -Q -DT M1000e -IP 10.94.217.100 -UN root -PD calvin`
- `Java -jar Lasso.jar -Q -DT PowerConnect -IP 10.94.100.10 -UN root -PD password -EP password`
- `Java -Jar Lasso.jar -Q -DT PowerConnect -IP 10.94.100.10 -UN root -PD password`
- `Java -jar Lasso.jar -Q -DT M1000e -IP 10.94.217.100 -UN root -PD calvin`
- `Java -jar Lasso.jar -Q -DT HITKITVM -IP 10.94.218.162 -UN root -PD eql -A`
- `Java -jar Lasso.jar -Q -DT HITKITVM -IP 10.94.218.162 -UN root -PD eql -B`
- `java -jar Lasso.jar -Q -DT <PowerConnect> -IP 10.94.100.10 -UN root -PD password -RD c:\LassoReports\`
- `java -jar Lasso.jar -Q -IP 10.10.78.132 -UN admin -PD admin -DT CompellentFluidFSNAS`

#### Where options

- -Q is quiet mode and is mandatory for all devices.
- -OF is the output file name for collection and is optional for all devices.




# Troubleshooting

Lasso may receive errors when trying to automate validation and collection.

When a collection fails, click the **Error Found** icon and review the log. The error code and the description are available at the end of the log.

Try to run the collection again. For this, select the required device and click **Start Collection**.

If the problem persists, try to run one of the commands related to the device type. To only collect the data and not troubleshoot, see [Manual Collection](#).

 **NOTE:** When there are many Storage Arrays, Switches, and Attached Hosts, then run the collection in multi threaded mode. For this, change the thread level value to 0 in the **Parser.properties** file located in the InstallDir.

`thread.level = 0` — Lasso runs in Forceful multi thread mode.

`thread.level = 1` — Lasso runs in normal mode.


`thread.level = -1 (default)` — Lasso runs in system configuration.

## Troubleshooting Unix Host Collection

To complete the Unix host collection, Lasso uses SSH. The `EMCGrab` or `vm-support` command requires root level access.

The following are required for SSH connection/collection:


- Root credentials — Lasso uses this to connect to the system through SSH protocol.
- Normal user credentials and root password — Lasso uses this to connect to the system through the SSH protocol.
- Sudo user credentials — Lasso uses this to connect to the system through the SSH protocol. The root password is not required for Sudo user with admin rights.

 **NOTE:** For EqualLogic and MD Series SAN, the Sudo user credentials are applicable only to Linux and vSphere.

## Allowing Root Access To Unix Server

To allow root access to a UNIX server, make the change directly to the configuration file. To do this:

1. Login to the system console (or SSH as user and type `su` to gain root access).
2. Edit the file `/etc/ssh/sshd_config`.
3. Change the setting from `PermitRootLogin no` to `PermitRootLogin yes`.
4. Change the setting from `PasswordAuthentication no` to `PasswordAuthentication yes`.


 **NOTE:** In a few Unix systems, the `PasswordAuthentication` is set to `yes` by default.

5. Run the command `service sshd restart`.

## Allowing Root Access Using Multi User Interface (MUI) On VMware

The Multi User Interface (MUI) on VMware ESX 3.0/4.0 can also be used to allow root access. When using the MUI, do the following:

1. Select the ESX server in the VI Client
2. Select Configuration
3. Select Security Profile
4. Choose Properties
5. Select SSH Server and place a check in the box
6. Retry Lasso against this host

 **NOTE:** In few UNIX systems including VMware ESX 3.0, SSH is disabled as root by default. This default behavior prevents Lasso from executing the command through SSH remotely if root credentials are used. For more information, see [Prerequisites For Data Collection](#).

## Troubleshooting MD Series

To troubleshoot MD Series, make sure that:

- MDSM software is installed in the system or you can download this from `%SystemDrive%\Program Files\Dell\MD Storage Manager\client\` location. However, the location may vary depending on the system.
- The path of MDSM software is defined before executing commands.

To troubleshoot:

### MD Series validation:

Run the command `SMcli -A <IPAddress of MD Series Array>`. Example: `SMcli -A 10.15.216.101`

If the IP address is validated successfully, the **SMcli executed successfully** message is displayed. Else, **SMcli failed** message is displayed.


 **NOTE:** When a new MD Series array is added, the device is always validated. This assists in quick connection to each Raid Core 0 IP or Raid Core 1 IP.

Click **Validated** or **Error Found** to view the validation status.

### MD Series collection:

Before troubleshooting, also make sure that the RAID controller module firmware is compatible with the MD Storage Manager software on the management station. If the RAID controller module firmware is upgraded, then upgrade the MD Storage Manager software. Else, there may not be access to the storage array.

1. Run the command `SMcli -c "show storagearray profile;" < IPAddress of MD Array><USERPROFILE Dir\Results\Hostname.txt>`  
The command output is generated in the **Hostname.txt** file in the **USERPROFILE Dir\Results\** location.
2. Run the command `SMcli -c "save storageArray SupportData file=\"USERPROFILE Dir\Results\Hostname.zip\";" < IPAddress of MD Array>`  
The command output is generated in the **Hostname.zip** file in the **USERPROFILE Dir\Results\** location.

 **NOTE:** When the validation or collection operation of a Storage Array is timed out, then check the **DasArray.properties** file in the **InstallDir** location and increase the timeout value.

For example: `mdseries.timeout.value.collection = 200000`. The value is 120000 by default.

To view the collection status, click **Collected** or **Error Found**.

## Troubleshooting EqualLogic

For successful validation or collection, make sure that SNMP is enabled on the EqualLogic. To enable, connect to the array using a browser and provide the <GROUP/Network Management IP Address>.

To troubleshoot:

1. In the EqualLogic Array UI, click **Group Configuration**.
2. Navigate to **SNMP** tab and add a SNMP community string.

 **NOTE:** The string is case sensitive.

If validation or collection fails when the Group IP or Member IP of the array is provided, then make sure that the IP is correct and available. If yes, to verify that the IP is listed:

- a) Connect to the EqualLogic array using the browser and enter **http://groupIPAddress** in the URL. The array GUI is displayed.
- b) Click the **Members** tab and select the required member.
- c) Click **Network** tab and verify that the Member IP provided is in the list.

## Troubleshooting Storage Processor


The following section includes troubleshooting for Storage Processor validation and collection.

To troubleshoot:

### Storage Processor validation

1. Connect to the storage processor using Navisphere Manager by entering **http://hostname\_or\_ipaddress/**.
2. Check if the administrative access to the processor is available with the provided username and password.
3. Make sure that **NaviCLI.exe** is installed in your system and available at the correct path. To verify this run **NaviCLI.exe** at the command prompt.  
If error is displayed, then verify that **NaviCLI.exe** is available in Navisphere install directory. If not, reinstall Navisphere by selecting the option **Install Classic CLI** in **Navisphere CLI Optional Features** page of the installer.

### Storage Processor Collection

1. Use **http://hostname\_or\_ipaddress/** to connect to SP through Navisphere Manager.
2. Right click SPA or SPB to check the SP event logs.
3. Clear all the old SP collection using File Transfer Manager.
4. Clear all listed Privileged Users to open access to all users.  
 **NOTE:** This is the default for CX arrays.
5. Add the entry for the system running Lasso to the array. This will limit access to only the listed users.  
AX arrays have one entry by default. Therefore, SPCollects always fail on AX arrays unless the system running Lasso is added as a privileged user.
6. Connect to Navisphere Manager manually and run the SPCollect.
7. Copy the collection to **%USERPROFILE%\Dell\Lasso\results\**  
While troubleshooting collectio, to edit privilege user on:
  - CX array, see [Edit Privilege User on CX array](#).
  - AX Array, see [Edit Privilege User on AX Array](#).

## Edit Privilege User On CX Array


To edit privileged users on CX array:

1. Use **http://ip.address.of.sp** to login to the setup of the array.
2. Expand the Array tree
3. Right-click on the SP and choose **Properties**.
4. Select the required **Agent**.
5. Clear any entry in the list. The access is now available to all or you can add the system that is running Lasso in the form of **username@host**. Example: samus\_aran@some.system

## Edit Privilege User On AX Array

To edit privileged user on AX array:

1. Use **http://ip.address.of.sp/Setup** to login to the setup for the Array.
2. Select **Set Privileged Users** option or add the system that is running Lasso as **username@host**. Example: samus\_aran@some.system

 **NOTE:** The list of available privileged users cannot be viewed but user is available on all AX Arrays. Therefore, by default SPCollects will not work on the AX array unless an entry is included.

## Troubleshooting Switches

To reproduce the steps Lasso performs when automating Switch validation or collection, add SSH/Telnet to each switch to make sure that the user name/password credentials are correct and the prompt requesting for password change is not displayed.

MCData switches have different password databases for the web UI and CLI. If the CLI administrator password cannot be used, a password reset may be needed. Refer to *McData's documentation for password reset procedures* for the procedure.

To add a user (newuser) to the authentication database using the CLI, run the following commands at the prompt:

1. `config security authentication user add newuser web cli`
2. `config security authentication user role newuser Administrator`
3. `config security authentication user show cli`

The following table provides the list of user name, interfaces, and the user role:

**Interface: CLI**

Username	Interfaces	Role
Administrator	Web, CLI	Administrator
newuser	Web, CLI	Administrator

## Troubleshooting Ethernet Switch


To reproduce the steps Lasso performs when automating Ethernet Switch validation or collections:

1. Add Telnet to each switch to make sure that username/password credentials are correct and the prompt such as password change request is not displayed.



2. Enter the execute mode to make sure that the enabled password is available.

## Troubleshooting Tape Library

 **NOTE:** Lasso does not support Tape Libraries in this release.

To reproduce the steps Lasso performs when automating Tape Library validations or collections:

1. Add Telnet to each switch to make sure that username/password credentials are correct and the prompt such as password change request is not displayed.
2. Test the actual command Lasso runs.

For the commands, see [Manual Collection for Tape Libraries](#).

## Troubleshooting Unix

Validation or collection uses the provided username and password to make a remote connection to the target device and execute a simple command.

- If validation or collection fails for Lasso, error messages are displayed.
- If error is displayed on validation or collection, try running the Lasso commands.
- To test the command, use putty or other SSH client to login to the remote system. Use the same credentials as Lasso. If a non-root id is used to login to the system, run `su-` to make sure that the root password entered is correct. If root prompt is displayed, log out and close putty.

If you wish to collect the data manually, see [Manual Unix Collection](#) or [Manual VMware Collection](#).

## Troubleshooting Windows

Validation or collection uses the provided username and password to make a remote connection to the target device and execute a simple command.

- If validation or collection fails for Lasso, error messages are displayed.
- If error is displayed on validation or collection, try running the Lasso commands.

To test the command:

1. From Start menu open the command prompt window.
2. At the prompt, change to the **bin** directory where Lasso is installed. To do this, enter:`cd c:\Program Files \Dell\Lasso\bin\.`
3. For collection, copy from `mkdir \\Device_Hostname\c$\temp\Dell\Lasso\EMCReports\` the appropriate **EMCReport** to the remote system using the command `copy EMCRPTS_*_V30.EXE \\ Device_Hostname \c$\temp\ Dell\ Lasso\ EMCReports\`. For both validation and collection, run the command `xCmd.exe \hostname /user:<Your_Username> /pwd:<Your_Passwd> hostname`. For collection, run the command `xcopy /y /f \\Device_Hostname\c$\Win*\SystemRoot\EMCReports \collection\zip\*.zip %USERPROFILE%\Dell\Lasso\Results`

The output should be the hostname of the system you are connecting to and the original prompt should be displayed.

If errors are displayed, then the system cannot connect to the remote device.

If you wish to just collect data manually, see [Manual Windows Collection](#)

## Troubleshooting Enclosures

To reproduce the steps Lasso performs when automating Enclosures validation or collection:

- Telnet or SSH to each Enclosure to make sure that user name/password credentials are correct

## Troubleshooting HITKIT Collection

To complete the Hitkit software collection, Lasso uses SSH.

The root credentials are required for SSH connection. Lasso uses this to connect to the system through SSH protocol.

## Troubleshooting PowerVault FluidFS NAS Collection

If validation fails when the Management IP of the array is provided for validation, make sure that the provided IP is correct and available. Also make sure that the FTP connection to the Management IP is established from the Windows host on which Lasso is installed.

## Troubleshooting EqualLogic FluidFS NAS Collection

If validation fails when the Management IP of the array is provided for validation, make sure that the provided IP is correct and available. Also, make sure that the FTP connection to the Management IP is established from the Windows host on which Lasso is installed.

For more information, see [Manual EqualLogic FluidFS NAS Collection](#)

## Troubleshooting Celerra Collection


To troubleshoot:

- Use `http://hostname_or_ipaddress/` to connect to the Celerra control station.
- If you are not using root credentials, then verify that the user name has the *State* enabled, primary group is *nasadmin (operator)*, and groups are *fullnas (nasadmin)*.

## Troubleshooting VMware Collection

To display the error message received during collection, try to run the Lasso commands.

Lasso collection uses the provided user name and password to make a remote connection to the target device and execute a command. If collection fails in Lasso, test the command using the following steps:

1. Use a secure telnet client like putty to login to vmware system using root privilege.  
For steps to allow root access, see [Allowing Root Access To Unix Server](#).  
 **NOTE:** If root access is not enabled through SSH, use dual mode authentication.
2. Run `vm-support-n` and use secure ftp client to transfer the collection created in the root user's home directory. The collection is transferred to the `%USERPROFILE\ Dell\ Lasso\ results` folder.  
To collect the data manually and not troubleshoot, see [Manual VMware Collection](#).

## Troubleshooting Lasso Run As System Account

When Lasso is run using the system account, the report is not saved in the default location. To troubleshoot this:


1. Install PSEXec.
2. Run CMD as Administrator.
3. Navigate to PSEXec.
4. Enter the command `psexec -I -s cmd.exe`.
5. In the new console window that appears, run the command with `-RD` parameter.




# Error Codes

The following table provides the error codes and the messages.

Error Code	Error Message
-20	<p>UPLOAD_UNKNOWN_ERROR</p> <p>Unknown error while uploading.</p>
-21	<p>UPLOAD_OPTION_ERROR</p> <p>Upload option provided is not found. Check the option provided to upload the file.</p>
-22	<p>UPLOAD_FILE_SIZE_ERROR</p> <p>File size is large. Ensure that the file size does not exceed the expected limit.</p>
-23	<p>UPLOAD_CERTIFICATE_ERROR</p> <p>Certificate authentication failed. Ensure that the client certificate is valid and able to authenticate to the server.</p>
-24	<p>UPLOAD_CHUNK_ERROR</p> <p>Not able to split the file into chunks. Ensure that the file size is not equivalent to zero KB.</p>
-25	<p>UPLOAD_SERVER_ERROR</p> <p>Not able to receive acknowledgement for the chunk sent. Ensure that the server is responding to the client's requests.</p>
-26	<p>UPLOAD_INVALID_FILE_ERROR</p> <p>File not found. Ensure that the file is available to upload.</p>
-27	<p>UPLOAD_TIMEOUT_ERROR</p> <p>The upload has timed out. Check the network connection.</p>
-28	<p>UPLOAD_MODULE_INIT_FAILED</p> <p>Failed during the module initialization.</p>
-29	<p>UPLOAD_MODULE_PROXY_ERROR</p> <p>Unable to reach Proxy server. Check the proxy settings in the browser.</p>
-30	<p>UPLOAD_MODULE_PROXY_UNSUPPORTED_AUTH_SCHEME</p> <p>Unsupported type of authentication scheme.</p>
-31	<p>AUTHENTICATION_FAILED</p> <p>Authentication for proxy has failed.</p>
0	<p>Operation completed normally.</p>


Error Code	Error Message
1	Unable to complete operation. Check the log file.
2	Undefined device subtype. Check the log file.
3	Undefined device type. Check the log file.
4	Operation in progress.
5	One or more collection failed. This is applicable only in case of multiple device collection and not for single device collection. When you invoke Lasso in quiet mode (CLI) with a customer configuration file, and if any one of the device collection fails, Lasso will exit with this error.
6	Collection and upload failed. If the collection failed and also the upload, Lasso will exit with this error code.
9	Unknown option. Check the log file.
10	Parameter is already specified for the session. Check the log file.
101	<b>%emcExecutable%</b> not found. The package is either corrupt or not installed correctly. Try to reinstall Lasso. If this error persists, contact Dell at <b>US_Lasso_Support@Dell.com</b> .
102	<b>%dsetExecutable%</b> not found.
103	Failed to determine remote system drive and remote system root. The <b>xCmd.exe</b> program is unable to determine the remote system's drive. Also check the device security settings to verify if the settings are preventing Lasso from running automated scripts.  <b>NOTE:</b> If Lasso is running on Windows 7 (x64) or Windows 2008 server R2 (x64), then validation and collection on Windows 2000 remote server will fail.
104	Failed to create temporary directory on remote host. The <b>xCmd.exe</b> program is unable to determine the remote system's drive. Also check the device security to verify if the settings are preventing Lasso from running automated scripts.
105	Failed to retrieve completed collection from remote system. Lasso is unable to copy the completed collection from the remote system. Make sure that dot net version 2.0 or later is installed on the remote system to run <b>Dell Collector</b> and create the collection file. Try to run Lasso again.
106	Failed to copy EMC Reports to remote host. Lasso is unable to copy the script from the remote system and the script may be suspended. Try to reboot the remote

Error Code	Error Message
107	<p>host. If rebooting failed, try to navigate to <b>Task Manager</b> on the remote host and find an <i>EMCReport</i> process and terminate it.</p> <p>Host collection execution failed.</p> <p>Lasso is unable to copy the script from the remote system and the script may be suspended. Try to reboot the remote host. If reboot failed, try to navigate to <b>Task Manager</b> on the remote host and find the <i>EMCReport</i> process and terminate it.</p>
108	<p>Failed to retrieve completed collection from remote host.</p> <p>Lasso is unable to copy the completed collection from the remote system. Try to run Lasso again. If this error persists, check the <b>%SystemRoot%\EMCReports\collection\zip\</b> directory for a <b>.zip</b> file in the remote host system.</p>
109	<p>Another collection process may already be running on the host.</p> <p>Wait for the process to complete. If the error persists, then the remote script may be suspended. Try to reboot the remote host system. If rebooting failed, try to terminate the <b>EMCReport.exe/DellCollector.exe</b> or <b>emcgrab.sh/dellcollector.sh</b> process by navigating to <b>Task Manager</b> in Windows or <b>ps -elf</b> in the remote host system.</p>
118	<p>Failed to copy <b>HyperVRecognize.exe</b> to remote host.</p> <p>Lasso is unable to copy the script from the remote system and the script may be suspended. Try to reboot the remote host. If rebooting failed, try to navigate to <b>Task Manager</b> on the remote host and find the <i>HyperVRecognize</i> process and terminate it.</p>
119	<p>Host collection execution failed during HyperV Recognition.</p> <p>Lasso is unable to copy the script from the remote system and the script may be suspended. Try to reboot the remote host. If rebooting failed, try to navigate to <b>Task Manager</b> on the remote host and find the <i>HyperVRecognize</i> process and terminate it.</p>
120	<p>Failed to retrieve completed collection from remote host.</p> <p>Lasso is unable to copy the completed collection from the remote system. Try to run Lasso again. If the error persists, check for the <b>.txt</b> file in the <b>%SystemRoot%\temp\Dell\Lasso\HyperV\</b> sub directories on the remote host system.</p>
121	<p>Failed to find debug log file in remote host.</p> <p>Lasso is unable to find the debug log file in the remote host. Try to run Lasso again. If the error persists, check the <b>%SystemRoot%\temp\Dell\Lasso\DellCollector\</b> sub directories for a <b>.txt</b> file.</p>
122	<p>Failed to retrieve debug log file from remote host.</p> <p>Lasso is unable to copy the debug log file from the remote system. Try to run Lasso again. If the error persists, check</p>

Error Code	Error Message
197	<p>the %SystemRoot%\temp\Dell\Lasso\DellCollector\ sub directories for a .txt file in the remote host.</p> <p>Authentication validation failed for HitKit appliance. Make sure that the HitKit password entered is correct.</p>
198	<p><b>xCmd.exe</b> not found. Check for the <b>xCmd.exe</b> file in the bin folder in Lasso installation directory. If the file is not found, then reinstall Lasso.</p>
199	<p>Authentication validation failed! Check user name and password again.</p> <p> <b>NOTE:</b> If Lasso is running on Windows 7 (x64) or Windows 2008 server R2 (x64 system), then validation on Windows 2000 remote server will fail.</p>
200	<p><b>plink.exe</b> not found.</p>
201	<p><b>pscp.exe</b> not found.</p>
202	<p><b>Lasso_grab.sh</b> not found. The error occurs when the package is either corrupt or not installed correctly. Try to reinstall Lasso. If the error persists, contact Dell at <a href="mailto:US_Lasso_Support@Dell.com">US_Lasso_Support@Dell.com</a>.</p>
203	<p>EMC executable not found. The error occurs when the package is either corrupt or not installed correctly. Try to reinstall Lasso. If the error persists, contact Dell at <a href="mailto:US_Lasso_Support@Dell.com">US_Lasso_Support@Dell.com</a>.</p>
205	<p>VMware execution failed. The command <b>vm-support</b> failed for reason such as the collection may have timed out. Try to collect again or try to collect manually.</p>
206	<p>Failed to retrieve completed collection. Check the remote host at the <code>/tmp/Dell/Lasso/[timestamp]</code> location for the collection.</p>
207	<p>Failed to copy EMC executable to remote host. Check the validation and run the collection again or collect manually.</p>
208	<p>Failed to copy <b>Lasso_grab.sh</b> to remote host. Check the validation and run the collection again or collect manually.</p>
209	<p>Failed to execute <b>Lasso_grab.sh</b> remotely. The error occurs when the collection has timed out. Check the validation and run the collection again or collect manually.</p>
210	<p>Failed to determine name of collection file to retrieve. Check <code>/tmp/Dell/Lasso/[timestamp]</code> location for the collection results.</p>



Error Code	Error Message
297	Failed to get Service Tag Information. Refer to Manual UNIX collection and Linux Service Tag Collection.
298	Connection was refused! The remote host did not respond to the connection attempt.
299	Authentication validation failed! Try to validate and check the user name and password. Try to connect manually and verify. Make sure that root has SSH access, SSH is running and the firewall allows SSH.
300	<b>NaviCLI.exe</b> was not found. The file should be in the <b>C:\Program Files\EMC\Navisphere CLI</b> location by default. If file is not found, run the installer again.
301	NaviCli version could not be determined. Make sure that Navisphere CLI is installed. Run the installer again. The installer will check and install.
302	Navisphere CLI command failed trying to retrieve Agent Revision. Verify that SP is accessible on the network, and the firewalls are not blocking the access. See the Troubleshooting section for more details.
303	Failed to retrieve completed SP Collect from SP. Connect to SP through Navisphere Manager and use the <b>File Manager</b> to get the SP Collect.
304	Failed to collect <code>getall</code> . Make sure that the SP is available and running. Also, connect to Navisphere Manager setup page and restart the management server.
305	Failed to collect <code>getlog</code> . Make sure that the SP is available and running. Also, connect to <b>Navisphere Manager</b> setup page and restart the management server.
306	NaviCLI <code>getagent</code> failed. Make sure that the SP is available and running. Also, connect to <b>Navisphere Manager</b> setup page and restart the management server.
307	Failed to create <b>.zip</b> file out of <code>getall</code> and <code>getlog</code> . Manually, you may need to compress the <code>getall</code> and <code>getlog</code> into a <b>.zip</b> file. Then include it in another <b>.zip</b> file so Wrangler can read it.
308	SP collection timed out. Try the collection again. If the error persists, make sure that you have the latest Navisphere CLI. To verify this, run the installer. Also, try to collect the SP Manually. Finally,

Error Code	Error Message
	make sure that the firewall is not blocking Navisphere from retrieving the collection. For more information, see Network Ports.
309	Non-supported SP version found.
310	NaviSECCLI.exe was not found. The <b>.exe</b> should be in <b>C:\Program Files\EMC\Navisphere CLI</b> by default. If it is not found in this location, try to run the installer again.
311	No LUNs found on Storage Array. Configure at least 1 LUN or Hot Spare. Else Dell cannot parse the SPCollect.
312	Not a Valid SPA or SPB Identifier. The IP address entered may not be the Storage Processor A in an EMC array. Verify that the IP address is SPA (and not SPB).
313	Export command is not supported.
314	Navisphere CLI command failed to determine whether EMC Array is having Navisphere Express or Navisphere Manager.
315	Upgrade of Celerra is in progress.
397	One or more commands that were run as part of device collection failed.
398	SPCollect could not be automated. However, <i>getall/getlog</i> was collected. Wrangler can still parse this data, but no Layered Application information will be loaded. You may need to manually connect to Navisphere Manager and collect an SPCollect.
399	Authentication validation failed! Try validation again, and verify the user name and password.
400	<b>SMcli.exe</b> was not found in the path!
411	Switch collection was complete, but collection file not found! You may try to collect switch data manually.
412	Tape Library collection was complete, but collection file not found! You may try to collect tape library data manually.  <b>NOTE:</b> Lasso does not support Tape Libraries in this release.
413	Switch collection file not moved properly! You may try to collect switch manually.
415	Could not open connection to the Specified IP Address!

Error Code	Error Message
416	Manually telnet to the device to make sure it is responsive.
417	Collection timed out. Try to run the collection when the system is not loaded.
418	Switch collection failed. You may try to collect switch manually.
419	Timed out during validation.
420	Collection Failed.
421	Make sure that MDSM software has valid permissions.
422	Failed to retrieve diagnostic files from FTP Site.
489	I/O module does not have any IP that is used for telnet session to be established.
499	Authentication validation failed! Try validation again, and check username and password.
500	For information, see <ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting</a></li> <li>• <a href="#">Manual Collection</a></li> </ul>
501	Unable to bind to the Controller specified. Verify the IP Address.
601	Vault password is incorrect.
602	Connection failed! Make sure that the IP/device is valid and reachable.
700	Failed to copy <b>Dell Collector</b> to remote host. The remote host may be preventing the copy of the script. Lasso has tried to copy the script and it is possible that the remote script is suspended. You may need to reboot the remote host. If rebooting fails, try to use the <b>Task Manager</b> on the remote host and try to terminate the <b>DellCollector</b> process.
701	Failed to copy dependant DLL which are used for zipping the collection files on the remote host.
702	Host collection execution failed. The remote host may be preventing the execution of the script. Lasso has tried to copy the script and it is possible that the remote script is suspended. You may need to reboot the remote host. If rebooting fails, try to use the <b>Task Manager</b> on the remote host and try to terminate the <b>DellCollector</b> process.
703	Failed to rename Collection File name on the remote host.

Error Code	Error Message
704	Failed to move the Collection File from temp directory to <b>%System%\DellCollector</b> directory on the remote host.
705	Failed to delete the temporary folder from the remote host.
706	Unable to find <b>DellCollector.exe</b> on the Management Station. Verify if this file is available after the installation of Lasso in the Management Station
707	Windows host collection timed out!
801	Authentication validation failed. Make sure that: <ul style="list-style-type: none"> <li>• Dell M1000e of Enclosure is available and credentials are correct.</li> <li>• Switch does not have an active SSH and telnet console open.</li> </ul>
802	Another collection process may already be running on the host.
803	Collection timed out for M1000e
804	The IP/hostname and credentials provided for M1000e type of Enclosure are not valid.
805	Collection has failed for M1000e type of Enclosure due to wrong IP/hostname and credentials.
806	Authentication validation failed! Make sure that HITKIT is available, credentials are correct, and does not have an active SSH console open.
807	Another collection process may already be running on the host
808	HitKit for VMware collection has timed out.
809	The IP/hostname and credentials provided for the HITKIT type are not valid.
810	Collection has failed for the HITKIT type due to wrong IP/hostname and credentials.
811	Unable to retrieve the collection files as the <b>.zip</b> file does not exist.
812	Collection has failed for HitKit for VMware.
900	Validation successful. Make sure that the HITKIT is available and credentials are correct. Also, make sure that the HITKIT does not have an active SSH console open to it.lidation successful.
901	Validation failed.

<b>Error Code</b>	<b>Error Message</b>
<b>902</b>	Invalid operation requested.
<b>903</b>	Collection of one or more EqualLogic details failed.
<b>904</b>	Collection of EqualLogic details failed.
<b>905</b>	<b>QLogic SANSurferCLI.exe</b> is not found.
<b>999</b>	Demo Mode Failure. Lasso is running in DEMO mode. Remove command line parameter <code>-DEMO</code> to run in live mode.




## Use Case Scenario

Using Lasso GUI, collect data for devices such as PowerConnect switches, CLARiiON and EqualLogic storage arrays in your SAN environment and upload the collection to Dell Technical Support.

To do this:

1. Before running Lasso, make sure:
  - You have the following details for each device:
    - \* PowerConnect Ethernet Switch — IP address, Username, and Password.
    - \* CLARiiON — SPA IP address, SPB IP address, Username, and Password
    - \* EqualLogic — Group IP address, Management IP address, and Member IP address.
  - Prerequisites are met for data collection. For details, see [Prerequisites For Data Collection](#).
2. Run Lasso. For details, see [Running Lasso](#).
3. In the **Welcome to Lasso** page, select the **Start with a new configuration** option and click **Continue**.
4. In the **Your Company Information** page, enter your company details and click **Continue**.
5. In the **Your Company Contacts** page, enter your company contact details and click **Continue**.
6. In the **Your Hardware Environment** page, select **Ethernet & FCoE Switches** and **Storage Arrays** options and click **Continue**.
7. In the **Your Hardware Environment: Storage Arrays** page, from the **Type of Storage Array** drop down list, select the following storage arrays, enter the information for each array as mentioned in the following table and click **Save New Storage Array** to validate and save the device:

Type of Storage Array	Fields
CLARiiON	<ul style="list-style-type: none"> <li>– <b>SPA IP/Hostname</b> — 10.94.XXX.YYY</li> <li>– <b>SPB IP/Hostname</b> — 10.94.XXX.YY</li> <li>– <b>Username</b> — testuser</li> <li>– <b>Password</b> — testpassword</li> </ul>
EqualLogic	<ul style="list-style-type: none"> <li>– <b>Group/Mgmt IP</b> — 10.94.XXX.YY</li> <li>– <b>Community String</b> — public</li> <li>– <b>Username</b> — testuser</li> <li>– <b>Password</b> — testpassword</li> </ul>

 **NOTE:** The table provides sample values for the fields.

If validation fails, edit the information for the device and update to re-validate. Click **Continue**.

8. In the **Your Hardware Environment: Ethernet Switches** page, from the **Type of Ethernet Switch** drop down list, select **PowerConnect** switch, enter the following information and click **Save New Ethernet Switch** to validate and save the device:
  - **IP/Hostname** — 10.94.XXX.YY
  - **Username** — testuser

- **Password** — testpassword
- **Enable Password** — enablepassword

If validation fails, edit the information for the device and update to re-validate the device. Click **Continue**.

9. In the **Device Collection** page, all the selected devices are displayed. If there are devices that have failed validation, edit and re-validate the devices or remove them from the list. For more details see [Device Collection](#).
10. Click **Start Collection** to start the data collection.
11. Click **Continue** to parse the data and generate the Lasso report. For more information on file formats, see [Generated File Formats](#).
12. In the **Upload** page, click **Open Location** to view the reports. Click **Continue** to upload the report to Dell Technical Support site. For more details, see [Upload Collection](#).
13. The **Confirmation** page displays the status of the file upload.
14. To view the HTML file created during parsing the data, select the **View your SAN Configuration** option. Click **Finish** to open the report.






# Frequently Asked Questions


This section has the following types of frequently asked questions:

- [FAQ — About Lasso](#)
- [FAQ — Passwords and Security](#)
- [FAQ — Dealing with errors](#)

## FAQ — About Lasso

- What is Lasso?
  - Lasso is a stand alone collection utility that automates the collection of all pertinent hardware and software configuration details from the target SAN attached servers, Dell Storage Arrays, Fibre Channel, and Ethernet and FCoE Switches.
- What is Wrangler?
  - Wrangler is a program that gathers the data collected by Lasso, parse the data, and build a SAN object that is uploaded to the Dell database accessed by Dell employees.
- What are the uses of Lasso?
  - Lasso helps to automate data collection from a number of devices, and can decrease the overall time taken to perform the collections. Example: Lasso can be used efficiently to collect data from 3 arrays, 4 switches, and 20 hosts. The collections are run in parallel and hence collected efficiently.
  -  **NOTE:** The data collection by Lasso can also be done manually.
  -  **NOTE:** The configuration of the SAN environment will assist Lasso to collect the data successfully.
- Which language is used to develop Lasso?
  - The Lasso user interface and the collection logic is developed in Java. The parser component is in C#.
- Which third party software is used by Lasso?
  - Lasso uses open-source and free software to complete various tasks. Lasso also uses programs such as GPG, GNU zip/unzip, xCmd, EMCReport, and various EMCGrab scripts.
- Where should Lasso be installed?
  - Lasso can be installed on any Windows OS that has IP connectivity to the SAN with the following caveats:
    - \* For EMC SANs, install on a computer that is not attached to the SAN.
      -  **NOTE:** Use a workstation whose credentials match with the SAN server credentials. This results in automatic discovery and validation of Windows Hosts and saves time.
    - \* EqualLogic SANs are sometimes in an isolated network, and may require connecting a computer to that network to run Lasso.
- How does Lasso operate?

- Lasso initiates scripts against all defined devices. The scripts collect specific information about the devices. Lasso then captures the output of individual process separately for each device. This helps to simultaneously complete the collection. If the time taken for manual login, copy collection (example:EMCReports) for a host is 5minutes, Lasso can collect data against 10 hosts for the same time.


 **NOTE:** The limit for simultaneous processes is 10. The limit can be modified in the **LassoConfig.xml** file.

- What is the time taken by Lasso to run?
  - The time taken is approximately 30 minutes for a normal run. Many factors can modify the estimated time. The approximate time is determined by adding the following:
    - \* Time taken to input profile and environment information (dependent on the user).
    - \* Time taken to copy EMCReports/emcgrab to the remote device (less than 2MB file size. It is fast on a LAN but slow if remote).
    - \* Time taken by the longest device. It is 5-10 for hosts, but may be over 20 minutes on a busy host. For SPCollects, the time taken is approximately 10 minutes, but on a busy SP it is 30 minutes or higher. For switches, less than 5 minutes, but on large switches with error logs, may be 20 minutes or higher.
    - \* Time taken to copy the collection data from the remote device (may be fast on a LAN but slow if remote).
    - \* Time taken to zip and encrypt the data (may be less than a few minutes).
    - \* Time taken to upload the data to Dell's FTP site (may be the longest time depending on the size of the environment and the speed of the Internet connection).

Using the above guidelines, assuming that the profile and environment information is already entered, all devices are on a LAN, the longest device takes 15 minutes, a few minutes to zip/encrypt, and the Internet connection is fast, the entire collection should be completed in less than 30 minutes.

If there are environment specific settings that prevent remote execution of some of the scripts, then troubleshooting may take more time.

- What is Navisphere CLI and where is it available?
  - Lasso uses EMC's Navisphere CLI to initiate commands to CX and AX Storage Processors. Among these commands are SPCollect, getall, and getlog. Navisphere CLI is available at <http://powerlink.emc.com> and also provided with the Lasso package.
- What types of devices are supported by Lasso?
  - For the list of supported types of devices and operating systems, see [Supported Storage Devices and Operating Systems](#).
- What are the system requirements to run Lasso?
  - For information on the system requirements to run Lasso, see [Prerequisites For Data Collection](#).
- How to get support for Lasso?
  - Try one of the following options:
    - \* Verify that the error can be duplicated.
    - \* List the steps to reproduce the error.
    - \* Refer to the other FAQ sections or the relevant section in the online help for solution.
    - \* Use the troubleshooting steps.
    - \* Compile the information including screen shots, details of the systems running Lasso and the intended remote systems, and all relevant logs.
    - \* Email to **US\_Lasso\_Support@Dell.com**

 **NOTE:** Dell employees can view the online training modules and videos on Lasso.

- How can the timeout value for FC Switches be modified?
  - On a SAN having many Brocade and McData switches, increase the timeout value. By default, timeout value for the switch is 3 minutes (in milliseconds). This value can be modified in the file **FCSC.properties** available in the Lasso install directory.
- How can the timeout value for Unix hosts be modified?
  - On a SAN having Linux, Solaris, HP-UX, and AIX hosts, the collection process may exceed the default timeout value of 30 minutes (in milliseconds). Therefore, increase the timeout value in **UnixHC.properties** file, available in the Lasso install directory.
- How can the time out value for validating automatically discovered hosts be modified?
  - On a SAN having many attached hosts, increase the timeout value for the successful completion of automatic validation in:
    - \* **SAC.properties**— while automatically discovering hosts attached to arrays.
    - \* **WinHC.properties**— while validating already discovered hosts in the background. This happens when the customer configuration file is open.
- What are the Storage Arrays supported by Lasso?
  - Lasso collects data from the following Storage Arrays:
    - \* CLARiiON
    - \* EqualLogic
    - \* Celerra
    - \* Power Vault MD Series
    - \* EqualLogic Fluid File System (NAS)
    - \* PowerVault Fluid File System (NAS)
- How to collect data from EqualLogic Storage Arrays?
  - To collect data from EqualLogic Arrays in the SAN, install Lasso on a system that has access to the array using the IP address. If the array is on a non-routable iSCSI network, then install Lasso on one of the iSCSI server or add an additional system to the network to ensure connectivity.

## FAQ — Passwords and Security

- Why is password mandatory?
  - Lasso executes scripts that need access to administrative level resources. This requires remote login to the systems to execute the scripts. Lasso does not save the entered passwords as it is captured from the input and deleted after the connection. Blank password can also be used. The processes (net use, putty, telnet and so on) that launch will prompt for the password . Enter the password multiple times for each device. To avoid this, create a new user dedicated to run Lasso. This user can be deleted after running Lasso. See *Readme* for more information.
- How to ensure that the password is secured?
  - Search for a word or phrase used in your password in the **c:\Program Files\Del\Lasso** file. Also, create a specific user for Lasso that can be disabled after running Lasso.
- Why should administrative Windows password be used?
  - The collection script **EMCReports** requires system access to obtain information about the system. See the directory <ftp://ftp.emc.com/pub/emcgrab/Windows> for more information.
- Why should UNIX Root password be used?
  - The collection script **emcgrab** requires root level system access to obtain information about the system. See the directory <ftp://ftp.emc.com/pub/emcgrab/Unix> for more information.

- What are the other options instead of using UNIX Root password?
  - Enter a blank password, when prompted by the SSH session, before Lasso prompts this authentication. The password may be entered several times for each UNIX host in the spawned windows. Add a new user with root access, or change the password temporarily for the Lasso run. It is not recommended to use central authentication scheme. Future versions of Lasso will allow SSH from a normal user that can then "su" or "sudo" the script.
- How does Lasso provide security and privacy protection?
  - Lasso creates a single **.zip** file that is 2048-bit encrypted (unless this option is disabled, or Lasso is running in a non-exportable country). Only an authorized Dell representative with a valid Wrangler processing utility can load the file and decrypt the contents. Lasso uploads the file to the Dell's ftp site and provides high level of privacy protection and security. This site has "write-only" access to Lasso and the public, and has no read access.
- Who can view the uploaded data collection?
  - From version 2.9.0 and later, a "write-only" ftp site is used and "view" or "read" permission are not available. The data can be uploaded, but no other collections can be viewed. Only a Dell Employee with an administrative login can access the files, and only the Wrangler tool can decrypt these files.
- What network ports does Lasso use?
  - For more information, see [Network Ports](#)
- What is Secure Site option?
  - The Secure Site option is used to remove the Customer Identification Information (CII) such as company name, company address, IP address, MAC address, iSCSI volume names, and Host names from the Lasso output **.xml** file.  
The customer sensitive data is replaced by tokens in the **.XML** file. Mapping between the tokens and customer sensitive data is maintained in an encrypted **.XML** file. This data is secured when the **.XML** file is uploaded to Dell's FTP site.

## FAQ — Dealing With Errors

- What is the description of the error code?
  - For information on the error code and descriptions, see [Error Codes](#)
- Why does the Switch password fail each time even though the login to the Switch Web UI is successful?
  - All Switch collections use SSH/Telnet user name and password. For McData switches, if a user name is accepted with the Web UI, it does not automatically work with the CLI. The access should be granted specifically. To verify that the password enter is valid, telnet into the switch and try the user name/ password. To do this, go to **Start** → **Run** and enter telnet hostname or ip address. If SSH interface is used by lasso and fails, connect to the switch using putty and try the user name/password to manually execute the command(s). See the documentation on the Switch for instructions to configure the user name or see troubleshooting section for more information.
- How to troubleshoot device errors on collection?
  - Make sure to validate the devices. If the devices are already validated and using a saved configuration, then validate them again. The password may have changed. Click **Error found** icon to view the log of the device. This will include the reason for the device to fail collection. Also see the troubleshooting section for steps to run the collections using the CLI to verify or collect the data manually.
- Why is the collection against a VMware ESX 3.0 server failing?
  - To troubleshoot, see [VMware Root Access](#)
- Does Lasso work on a 64-bit system?
  - Yes, Lasso can collect against a 64-bit system. Lasso version 3.5 and later can be installed and run on a 64-bit system with limited support. For more information, see *Readme*.

- What is error code 398 and why is it only a warning?
  - Error code 398 describes that a full SPCollect was not obtained from the Storage Processor. A full `getall` and `getlogis` collected. Wrangler can process the data only for basic storage configuration and layered application configurations is available. For information on complete SP collect, see [Manual Collection For CLARiiON](#).
- Why should Lasso be used when the time taken to troubleshoot problems is longer than manually collecting the data with Lasso?
  - Lasso automates the collection process. The data collected remotely is dependent on the network configuration of the environment . If the access to the system running Lasso to the target devices is blocked, then the scripts can not complete the collection. If all the devices are unavailable, then run the collection scripts manually. Example: If the "admin\$" share is disabled on Windows through a Group Policy, then Lasso can not execute the EMCReports remotely and is a limitation in Lasso.
- How to troubleshoot a failed device?
  - If the Lasso full collection is failing, then manually collect the remaining devices. If there are many devices, then modify the security settings to resolve. Also, report the error for more assistance.
- How to run Lasso against a Meditech host that displayed a blue screen?
  - A Meditech system is not Windows system. EMCReports fails when running on a Meditech system. Lasso automatically runs the EMCReports and the issue can occur if run against a Meditech system. Do not manually or using Lasso, run the EMCReports against a Meditech system. For more details, see the <ftp://ftp.emc.com/pub/emcgrab/Windows> directory.



## License

Various programs are used throughout Lasso, and may have different licenses.

### Dell: Export Compliance Disclaimer

By downloading from Dell's Web site, you are agreeing that you will not use or otherwise export or reexport, directly or indirectly, this Software and/or Technology except as authorized by U.S. law and the laws of the jurisdiction in which the Software and/or Technology was obtained. The Software and/or Technology may not be exported or reexported (i) to any U.S. embargoed country (currently Cuba, Iran, Libya, North Korea, Sudan and Syria) or (ii) to an end-user or end-use prohibited by U.S. law or the laws of the jurisdiction in which the Software and/or Technology was obtained. By downloading the Software and/or Technology, you represent and warrant that you are not located in, under the control of, or a national or resident of any such country and are not a prohibited end-user or engaged in a prohibited end-use.

### Dell Software Disclaimer

TO USERS OF DELL'S SERVICE & SUPPORT WEB SITE: DELL INC. ("DELL") DOES NOT WARRANT THE FILES (INCLUDING ANY FIXES AND UPDATES) PROVIDED IN THE DOWNLOADABLE FILE LIBRARY AREA(S) OF THE DELL SERVICE & SUPPORT WEB SITE (THE "SITE"). ALL FILES AVAILABLE FOR DOWNLOAD (THE "FILES") FROM THE SITE ARE PROVIDED "AS IS." IN CONNECTION WITH THE FILES, DELL MAKES NO WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OF TITLE, OR OF NON-INFRINGEMENT OF THIRD PARTY RIGHTS. USE OF THE FILES BY A USER IS AT THE USER'S RISK AND IS DEEMED ACCEPTANCE OF THESE TERMS. IN NO EVENT SHALL DELL BE LIABLE TO THE USER FOR ANY DAMAGES ARISING FROM USE OF OR INABILITY TO USE THE FILES, INCLUDING ANY DAMAGES AS A RESULT OF VIRUS INFECTION OR OTHER CONTAMINATION, INCLUDING ANY LOST PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF DELL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANOTHER PARTY.

THE DRIVERS PROVIDED FOR DOWNLOAD ON DELL'S WEBSITE ARE THE LATEST ONES THAT HAVE BEEN VALIDATED BY DELL. FOR ANY GIVEN HARDWARE COMPONENT, NEWER DRIVERS MAY EXIST ON THE RESPECTIVE MANUFACTURER'S SITE. PLEASE NOTE THAT DELL HAS NOT VALIDATED ANY DRIVERS NOT DIRECTLY AVAILABLE FROM DELL'S WEBSITE, AND CAN THEREFORE MAKE NO REPRESENTATIONS AS TO THEIR EFFECTIVENESS, STABILITY, APPROPRIATENESS OR SAFETY. IF YOU WISH TO DOWNLOAD AND INSTALL ANY NON-VALIDATED DRIVER, DELL STRONGLY RECOMMENDS THAT YOU MAKE A BACKUP OF YOUR CURRENT WORKING CONFIGURATION SO THAT YOU HAVE SOME ABILITY TO RETURN TO A KNOWN WORKING STATE IF THE NEW DRIVER FAILS TO FUNCTION PROPERLY OR CAUSES SYSTEM PROBLEMS. ANY PROBLEMS ENCOUNTERED WITH NON-VALIDATED DRIVERS SHOULD BE ADDRESSED TO THE RESPECTIVE MANUFACTURER(S) -- DELL WILL NOT HAVE INFORMATION ON ANY NON-VALIDATED DRIVERS.

### Dell Software Copyright

EACH ONE OF THE FILES (AS DEFINED IN THE "DISCLAIMER" SUBSECTION ABOVE) IS THE COPYRIGHTED WORK OF EITHER DELL OR OF THE THIRD-PARTY VENDOR SUPPLYING THE DOWNLOADABLE FILE. USE OF THE FILES IS

SUBJECT TO COPYRIGHT LAWS OF THE UNITED STATES. USE OF ANY OF THE FILES IN ANY MANNER THAT WOULD VIOLATE THE COPYRIGHT LAWS OF THE UNITED STATES IS EXPRESSLY FORBIDDEN.

EMCGrab: [ftp://ftp.emc.com/pub/emcgrab/Unix/Readme\\_EMCGrab\\_v3.8.txt](ftp://ftp.emc.com/pub/emcgrab/Unix/Readme_EMCGrab_v3.8.txt)

EMCReport: [ftp://ftp.emc.com/pub/emcgrab/Windows/EMCRPTS\\_V28\\_README.TXT](ftp://ftp.emc.com/pub/emcgrab/Windows/EMCRPTS_V28_README.TXT)

## GNU GENERAL PUBLIC

Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc. 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

### Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

## GNU GENERAL PUBLIC LICENSE

### TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

1. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications



and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

2. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

3. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a. You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
- b. You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
- c. If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

4. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:
  - a. Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
  - b. Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
  - c. Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any

associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

5. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.
6. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.
7. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

8. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

9. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.
10. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.  
Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.
11. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be

guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

## 12. NO WARRANTY

BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

13. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

# END OF TERMS AND CONDITIONS

## How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

one line to give the program's name and a brief idea of what it does.> Copyright (C) <year> <name of author>

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) year name of author

Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'. This is free software, and you are welcome to redistribute it under certain conditions; type `show c' for details.

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program `Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989

Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.