



# Marvell<sup>®</sup> QLogic<sup>®</sup> QConvergeConsole GUI

2600, and 2700 Series QLogic Fibre Channel Adapters  
578xx and 45000 Series FastLinQ Intelligent Ethernet Adapters  
578xx and 45000 Series FastLinQ Converged Network Adapters

**Installation Guide**



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# Preface

This guide describes how to install, uninstall, and start QConvergeConsole® GUI, a Web-based management tool for configuring and managing QLogic® Fibre Channel Adapters, FastLinQ Intelligent Ethernet Adapters, and FastLinQ Converged Network Adapters from Marvell within SANs.

Throughout this guide, the QConvergeConsole GUI management tool is also referred to as *QCC GUI*, and the terms *target* and *device* are used interchangeably.

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## NOTE

In Windows® environments, when you run the QCS CLI and Management Agents Installer, it will uninstall QLogic Control Suite (QCS) GUI (if installed on system) and any related components from your system.

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## Intended Audience

This guide is for system administrators who are responsible for installing, configuring, and managing Marvell QLogic adapters using QConvergeConsole GUI on Windows and Linux hosts.

## What Is in This Guide

This user's guide contains the basic information you need to get started with QConvergeConsole GUI.

This preface describes the organization of the QConvergeConsole GUI help system, specifies the intended audience, lists related documents, explains typographic conventions used in this guide, and provides technical support and contact information.

The remainder of the user's guide is organized into the following chapters:

- [Chapter 1 System Requirements](#) lists the hardware, software, and operating system requirements that must be met to ensure successful operation of QConvergeConsole GUI.
- [Chapter 2 Installing QConvergeConsole GUI](#) describes how to install and uninstall QConvergeConsole GUI.

- [Chapter 3 Getting Started](#) describes how to start and exit QConvergeConsole GUI and how to access the QCC GUI help system.
- [Chapter 4 Security Considerations](#) provides information on security-related topics for QConvergeConsole GUI.
- [Chapter 5 Troubleshooting](#) provides procedures that may be helpful for troubleshooting installation issues.
- [Appendix A Revision History](#) contains a list of changes made to this guide since the last revision.

At the end of this guide are a glossary of terms used and an index to help you quickly find information.

## What Is in the Help System

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### NOTE

To access help, see [“Getting Help” on page 30](#).

---

The QConvergeConsole GUI help system contains detailed information on features and functionality not covered in this guide, including instructions on configuring and managing adapters using QConvergeConsole GUI.

For instructions on accessing the help system, refer to [“Getting Help” on page 30](#). The help system’s table of contents includes the following top-level topics:

- **QConvergeConsole Overview** briefly summarizes the purpose of the QConvergeConsole GUI management tool and the adapters that it supports.
- **Getting Started** shows how to start using QConvergeConsole GUI and the help system. It also describes how to initiate automatic e-mail notifications and set security on adapters installed for a selected host.
- **Managing Host Connections** describes how to connect to a host, create and use a host group, view host information, and disconnect from one or more host servers.
- **Displaying Host Information** describes how to view general host information.
- **Displaying Adapter Information** describes how to view general adapter information.
- **Displaying Device Information** shows how to view information about a device (disk or tape).
- **Using Reports** describes the different types of reports and how to generate, view, and save them using QConvergeConsole GUI's report facility.



- **Managing Fibre Channel and FCoE Adapters** describes how to do the following for a Fibre Channel Adapter (2500, 2600, and 2700 Series) or Converged Network Adapter (8100, 8200, and 8300 Series):
  - ❑ Display and edit adapter-specific information for the selected adapter.
  - ❑ View and modify adapter configuration and settings.
  - ❑ Update the adapter's flash memory or the Fibre Channel and Fibre Channel over Ethernet (FCoE) driver.
- **Managing Fibre Channel and FCoE Ports** describes how to do the following for a port on a Fibre Channel Adapter or a Converged Network Adapter:
  - ❑ View and modify the parameters and statistics for the selected port.
  - ❑ Use the advanced utilities, manage virtual ports, and run diagnostics.
- **Managing iSCSI Ports** shows and describes the parameters on the iSCSI port management pages for the 4000 Series iSCSI adapters and the 8200, 8300, and 8400 Series Converged Network Adapters.
- **Managing Ethernet (NIC) Ports** shows and describes the parameters and configuration options provided on the NIC port management pages for 3200, and 3400 Series Intelligent Ethernet Adapters, as well as for 8100, 8200, 8300, 8400, 41000, and 45000 Series Converged Network Adapters.
- **Managing Gigabit Ethernet Adapters** shows and describes how to view adapter attributes, manage QLE84xx Ethernet, FCoE, and iSCSI adapters, and manage Marvell QLogic FastLinQ Ethernet, FCoE, and iSCSI adapters.
- **Using the Wizards** describes how to use the QCC GUI wizards to update the flash, drivers, NIC parameters, Fibre Channel and FCoE parameters, parameter files, passwords, and agents.
- **Troubleshooting** describes tools you can use to resolve the problems that can occur when installing and using QConvergeConsole GUI. It also provides the procedures for tracing QConvergeConsole GUI application and agent activity, if directed to do so by your authorized service provider.
- **Technical Support** explains how to obtain technical support, gives instructions for downloading software and documentation, and provides contact information.

## Documentation Conventions

This guide uses the following documentation conventions:

- **NOTE** provides additional information.
- Text in **blue** font indicates a hyperlink (jump) to a figure, table, or section in this guide, and links to Web sites are shown in underlined blue. For example:
  - ❑ [Table 9-2](#) lists problems related to the user interface and remote agent.
  - ❑ See “[Installation Checklist](#)” on page 6.
  - ❑ For more information, visit [www.marvell.com](http://www.marvell.com).
- Text in **bold** font indicates user interface elements such as a menu items, buttons, check boxes, or column headings. For example:
  - ❑ Click the **Start** button, point to **Programs**, point to **Accessories**, and then click **Command Prompt**.
  - ❑ Under **Notification Options**, select the **Warning Alarms** check box.
- Text in `Courier` font indicates a file name, directory path, or command line text. For example:
  - ❑ To return to the root directory from anywhere in the file structure: Type `cd/ root` and press ENTER.
  - ❑ Issue the following command: `sh ./install.bin`.
- Key names and key strokes are indicated with UPPERCASE:
  - ❑ Press CTRL+P.
  - ❑ Press the UP ARROW key.
- Text in *italics* indicates terms, emphasis, variables, or document titles. For example:
  - ❑ For a complete listing of license agreements, refer to the applicable *Software End User License Agreement*.
  - ❑ What are *shortcut keys*?
  - ❑ To enter the date type *mm/dd/yyyy* (where *mm* is the month, *dd* is the day, and *yyyy* is the year).
- Topic titles between quotation marks identify related topics either within this manual or in the online help, which is also referred to as the help system throughout this document.

# 1 System Requirements

QConvergeConsole GUI is a Web-based client and server GUI management tool that provides centralized management and configuration of Marvell QLogic and FastLinQ adapters within the entire network (LAN and SAN).

On the server side, QConvergeConsole GUI runs as an Apache Tomcat™ application server. After QConvergeConsole GUI is launched on the application server, you can connect to QCC GUI through a browser, either locally on the server or remotely from another computer. Your browser window becomes the client used to connect to servers that host the Marvell QLogic adapters and connected storage devices within the network. For optimum performance, QConvergeConsole GUI requires the hardware, software, and operating systems listed in this chapter:

- [Hardware Requirements](#)
- [“Software Requirements” on page 2](#)
- [“Operating System Requirements” on page 3](#)
- [“Supported QLogic and FastLinQ Adapters” on page 4](#)
- [“Using QConvergeConsole GUI” on page 5](#)

## Hardware Requirements

QConvergeConsole GUI requires the following minimum hardware:

### Apache Tomcat application server

- **Server**—Single processor or multiprocessor equivalent to an Intel® or AMD Core™ Duo running at 2GHz or greater. For operating systems on which the Web browser can run, see [“Operating System Requirements” on page 3](#).
- **Memory**—2GB of physical RAM to run QConvergeConsole GUI; 4GB recommended. Running with less memory can cause disk swapping, which severely affects performance.
- **Video card**—Capable of 16K colors and a resolution of 1280×960 pixels
- **Hard disk space**—512MB disk space

### Server agent

- **Adapters**—One or more of the Marvell QLogic and FastLinQ adapters listed under “[Supported QLogic and FastLinQ Adapters](#)” on page 4

### SAN

- **Storage**—Fibre Channel or iSCSI devices, such as disks and RAID subsystems

## Software Requirements

This section lists the minimum software requirements.

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### NOTE

For details on supported software versions, see the QConvergeConsole *Read Me*.

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- QLogic and/or FastLinQ adapter drivers for your operating system.
- QLogic and/or FastLinQ adapter management agents for your operating system
- TCP/IP protocol for Windows® remote management
- Administrative privileges to perform management functions
- User access control disabled on Windows Server® 2016, and Windows 2019 to run the agent service. A LocalHost Only feature is available if needed.
- Domain name service (DNS) running in the network is required if Hostname is used for connection

### Apache Tomcat Application Server Requirements

Apache Tomcat application server must have the following:

- Apache Tomcat (installed automatically by QCC GUI installer if not present)
- QConvergeConsole GUI (before installing, refer to the Note on [page 7](#))

### Web Browser Requirements

The Web browser must be one of the following:

- Google Chrome™
- Mozilla® Firefox®
- Microsoft® Internet Explorer®
- Opera®
- Apple® Safari®

### NOTE

Some auxiliary help features, such as the Search and Index tools, may not work properly in every Web browser.

---

## Operating System Requirements

The client, Apache Tomcat application server, and server agent each have their own operating system requirements.

### Client

The client requires one of the following operating systems to host a supported Web browser (see [“Software Requirements” on page 2](#)):

- Windows Server 2016 and 2019
- Red Hat® Enterprise Linux® (RHEL) Server 7.7, 7.8, 8.0, 8.1, 8.2
- SUSE® Linux Enterprise Server (SLES®) 12 SP4/SP5, 15 SP1/SP2
- Oracle Linux—Unbreakable Enterprise Kernel (UEK R5, R6)
- Solaris® 11.4

### Apache Tomcat Application Server

The server requires one of the following operating systems to host the Tomcat server for QConvergeConsole GUI:

- Windows Server 2016 and 2019
- RHEL 7.7, 7.8, 8.0, 8.1, 8.2
- SLES 12 SP4/SP5, 15 SP1/SP2
- Oracle Linux—Unbreakable Enterprise Kernel (UEK R5, R6)
- Solaris 11.4
- Citrix® XenServer® 7.1, 8.x

### Server Agent

Multiple operating system support allows control of heterogeneous environments. The QConvergeConsole GUI server agent works with the following operating systems:

- Windows Server 2016 and 2019
- RHEL 7.7, 7.8, 8.0, 8.1, 8.2
- SLES 12 SP4/SP5, 15 SP1/SP2
- Oracle Linux—Unbreakable Enterprise Kernel (UEK R5, R6)
- Solaris 11.4

- Ubuntu® Server 18.04, 20.04

---

#### NOTE

To run QConvergeConsole GUI on Solaris 11.4, you must disable the firewall by issuing the following command after each boot-up and before running QCC GUI: `netservices open`

FastLinQ Adapters (3400/8400/41000/45000 Series) currently do *not* support Solaris.

QLE277x Series adapters currently do not support Solaris or Ubuntu.

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#### NOTE

For details on operating system versions, see the QConvergeConsole *Read Me*, which you can obtain from the Marvell Web site, [www.marvell.com](http://www.marvell.com), Downloads and Documentation page.

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## Supported QLogic and FastLinQ Adapters

QConvergeConsole GUI supports the following Marvell QLogic-branded adapters. For support of OEM-branded adapters, contact your OEM.

- 2500, 2600, and 2700 Series Fibre Channel Adapters
- FastLinQ 45000 Series Converged Network Adapters
- FastLinQ 45000 Series Intelligent Ethernet Adapters

---

#### NOTE

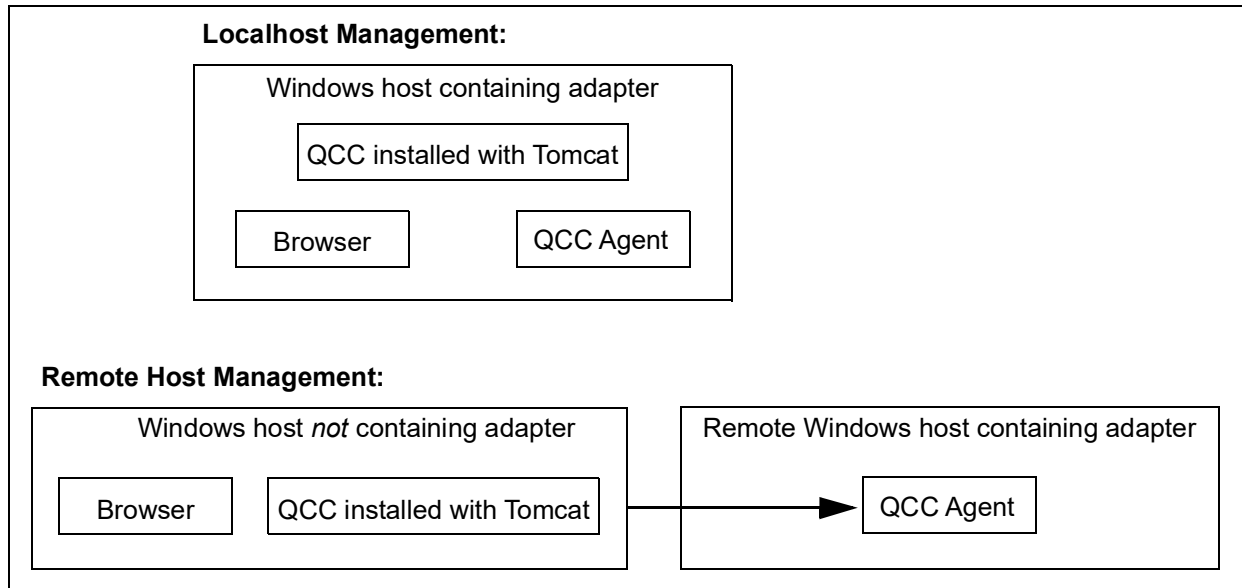
For information about Marvell QLogic and FastLinQ adapters, refer to the Marvell Web site, Products page:

<https://www.marvell.com/products/>

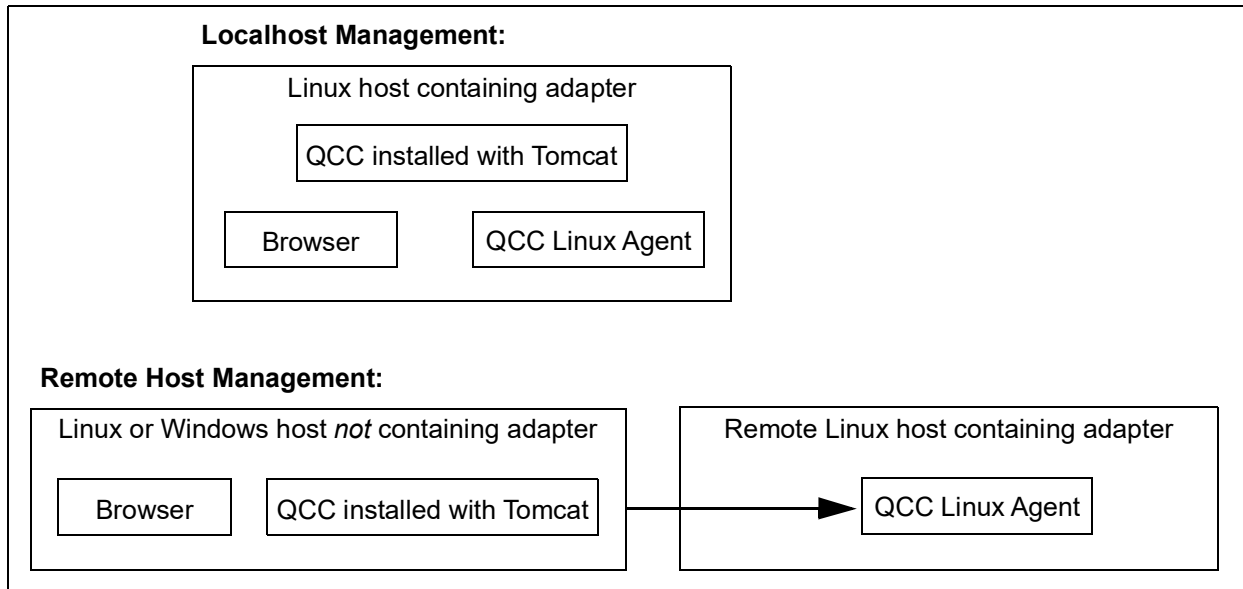
---

## Using QConvergeConsole GUI

The following diagrams illustrate how QConvergeConsole GUI manages adapters and hosts on Windows and Linux systems. QConvergeConsole GUI does not support the management of QLogic adapters in VMware vSphere. For information about managing QLogic adapters on VMware ESXi hosts, refer to the *User's Guide—QConvergeConsole Plug-ins for vSphere*.



**Figure 1-1. Managing FastLinQ and Fibre Channel Adapters on a Windows Host**



**Figure 1-2. Managing FastLinQ and Fibre Channel Adapters on a Linux Host**



# 2 Installing QConvergeConsole GUI

This chapter provides information on downloading, installing, and uninstalling QConvergeConsole GUI, and downloading, and installing management agents:

- [Before You Begin](#)
- [“Downloading and Installing Management Agents” on page 8](#)
- [“Installing QConvergeConsole GUI” on page 14](#)
- [“Uninstalling QConvergeConsole GUI” on page 23](#)

## Before You Begin

Before installing QConvergeConsole GUI, note the following:

- Marvell now supports QConvergeConsole GUI as the *only* GUI management tool across all adapters. QCS GUI is no longer supported for the 3400 Series Adapters and adapters based on 57xx/57xxx controllers, and has been replaced by the QConvergeConsole GUI management tool. QConvergeConsole GUI provides single-pane-of-glass GUI management for all QLogic adapters.
- In Windows environments, when you run the QCS CLI and Management Agents Installer, it will uninstall QCS GUI (if installed on the system) and any related components from your system.
- If you are installing SSMC and NFS along with QConvergeConsole GUI, ensure that TCP ports 8080, 8443, and 111 are not in use. Doing so ensures proper installation of QConvergeConsole GUI. For more information, see [“Installing QLogic QConvergeConsole Beside SSMC and vPower NFS Service” on page 47](#).
- If using Windows firewalls, refer to [“Windows Firewall Configuration” on page 35](#) for information on Windows firewall configuration.

- If upgrading QConvergeConsole GUI from an older version, be sure to clear the browser cache before installing the new version. See your browser’s documentation or help for instructions. Additional information can be found here:  
<http://kb.iu.edu/data/ahic.html>
- If using the default Tomcat port number (8080) will cause a conflict, refer to “[Password Protection for Access Control](#)” on page 33. (You can also manually specify the Tomcat port number.)
- For information on creating a Tomcat log file for troubleshooting, refer to “[Setting a Tomcat Log File](#)” on page 42.
- To enable access to the adapters on a host server, the management agents—qlremote (Fibre Channel and FCoE), qlnxremote (FastLinQ), netqlremote (Ethernet [NIC]), and iqlremote (iSCSI)—must already be installed on the host. For detailed information on obtaining and installing the management agents, refer to “[Downloading and Installing Management Agents](#)” on page 8.

## Downloading and Installing Management Agents

To manage the adapters on a local or remote host, the *management agents* (also called *agents*) used by the host’s adapters must already be installed on the host.

To connect to a remote host, at least one management agent used by any of the host’s adapters must be installed and running on the host. Only protocols whose agents are installed and running are shown under the host’s system tree node.

The management agents include the following:

- `netqlremote` for Ethernet Networking (NIC)
- `qlremote` for Fibre Channel and FCoE
- `qlnxremote` for FastLinQ Adapters

The management agents are *not* automatically installed by the QCC GUI installer and must be downloaded and installed separately. You can use the built-in agent installer (see [Installing the Agents Using the Built-in Agent Installer](#)).

This section includes the following information:

- [Installing the Agents from Downloads](#)
- [Installing the Agents Using the Built-in Agent Installer](#)
- [Installing the QLNXRemote Agent](#)
- [Using the Localhost Only Feature](#)

## Installing the Agents from Downloads

The following procedures show how to install the netqlremote, qlremote, iqlremote, and qlnxremote agents downloaded from the Marvell Web site.

Agent installation by downloading includes the following information:

- [Installing Agents on Windows and Linux](#)
- [Installing Agents on Ubuntu](#)
- [Installing Agents on Solaris](#)

### Installing Agents on Windows and Linux

**To install agents on Windows and Linux (all supported versions):**

1. Download the following for each adapter on the host server:
  - Read Me*
  - Release Notes*
2. Install the agents by running the appropriate installer. For detailed information on running the installer, see the *Read Me* and *Release Notes*.

### Installing Agents on Ubuntu

**To install agents on Ubuntu 14.04 (for qlremote and qlnxremote agents only):**

---

#### NOTE

Marvell supports N-1. Because the latest Ubuntu KLTS is 18.04, install qlremote using the alien.

---

1. To install the alien, issue the following command:  
`apt-get install alien`
2. To install rpcbind, issue the following command:  
`apt-get install rpcbind`
3. To run the installer, issue the following command:  
`alien -i --scripts -k ./<installer name.rpm>`
4. To install libtcl 8.4 (for qlnxremote agents only), issue the following command:  
`apt-get install libtcl8.4`

5. To disable the firewall, issue the following command:

```
ufw disable
```

---

#### NOTE

For more detailed Firewall configuration, go to the following Web site:

<https://help.ubuntu.com/community/UFW>

---

## Installing Agents on Solaris

To install agents on Solaris:

---

#### NOTE

FastLinQ Adapters (45000 Series) currently do *not* support Solaris.

---

1. Download the following for each adapter on the host server:
  - Solaris 10, 11: Installer package files
  - Solaris 11: p5p files
2. Install one or more agents as described in “[Installation with Package Files \(Solaris 11.4\)](#)” on page 10 or “[Installation with p5p Files \(Solaris 11 or Later\)](#)” on page 11.

---

#### NOTE

In each Solaris command in this section, `<agent>` is the name of one of the following management agents (issue each command once per agent being installed):

- `qlremote` for Fibre Channel or FCoE
  - `iqlremote` for iSCSI
  - `netqlremote` for NIC
  - `<version>` is the version number found in the package file name.
  - `<platform>` is either `i386` or `SPARC`.
- 

## Installation with Package Files (Solaris 11.4)

---

#### NOTE

The QLNXRremote agent is not available in Solaris 11.4.

FastLinQ Adapters (45000 Series) currently do *not* support Solaris.

---

**To install the Solaris agents using package files:**

1. Each agent installer package is provided in compressed format and must be uncompressed to obtain the installable package. To uncompress the package, issue the following Solaris command:

```
uncompress <agent>-<version>-solaris-<platform>.pkg.Z
```

2. The `uncompress` command creates a package file named as follows:

```
<agent>-<version>-solaris-<platform>.pkg
```

3. To install QConvergeConsole Solaris agents in `.pkg` format, issue the following Solaris command:

```
pkgadd -d <agent>-<version>-solaris-<platform>.pkg
```

**Installation with p5p Files (Solaris 11 or Later)**

---

**NOTE**

FastLinQ Adapters (3400/8400/41000/45000 Series) currently do *not* support Solaris.

---

**To install the p5p installer, select one of the following options:**

- **Option 1:** Install the Solaris agents by issuing the p5p installer command:

```
pkg install -g <agent>-<version>-solaris-<arch>.p5p qlremote
```

- **Option 2:** Install the Solaris agents using p5p files:

1. Set the environment by issuing the following command:

```
export PKGREPO=/pkgrepo
```

2. Create the repository by issuing the following command:

```
pkgrepo create $PKGREPO
```

3. Receive the package in your repository by issuing the following command:

```
pkgrecv -s /<agent>-<version>-solaris-<platform>.p5p -d  
$PKGREPO <agent>
```

4. Set the publisher by issuing the following command:

```
pfexec pkg set-publisher -p $PKGREPO
```

5. Continue the installation by issuing the following command:


```
pkg install <agent>
```


## NOTE

- Be sure to use same installer type for all the agents that you install. For example, if you use the `.pkg` installer type for `qlremote`, you must also use the `.pkg` installer type for `netqlremote` and `iqlremote`. Mixing installer types, such as using the `.pkg` type for `qlremote` and the `.p5p` type for `netqlremote`, results in an error.
- If an agent is already installed, you must uninstall it before installing a new version.

## Installing the Agents Using the Built-in Agent Installer

To access the Agent Installer within QConvergeConsole GUI:

1. Point to the gear icon , point to **Help**, and then click **Download Agent Installers**.
2. Follow the window prompts.

For detailed installation instructions, refer to the QConvergeConsole GUI help system. (Point to the gear icon , point to **Help**, and then click **Browse Contents**. In the QConvergeConsole Help window, click the **Search** tab, and then search for “agent installer”).

## Installing the QLNXRemote Agent

To run the QLNXRemote Install Wizard for Windows x64:

- In Windows Explorer, double-click the following file:

```
QLNXRemote_xxx-<x.xx.xxxx>\setup.exe
```

## Using the Localhost Only Feature

Note the following regarding the portmap Localhost Only functional behavior:

- On the system where the Localhost Only feature is enabled, QConvergeConsole GUI can connect only to an IP address that is listed in the output of the DOS command `ipconfig`.
- On a system where the portmap setting is enabled for the Localhost Only feature, you can remotely manage the adapter installed on the system. To connect remotely, use a URL that can open QConvergeConsole GUI installed on the system configured for Localhost Only.
- On a Windows system, the portmap Localhost Only feature is supported only if the QLogic ONC/RPC port-mapper is installed (installed only if the Windows RPC port-mapper service does not exist).

### Example

Suppose QConvergeConsole GUI is installed on a Windows system with the IP address `172.27.10.31`, and that the portmap service is configured with Localhost Only enabled. On a second system, you can use the URL `http://172.27.10.31:8080/QConvergeConsole` to connect to the first system at `172.27.10.31`.

Therefore, to completely restrict access to only local host connections, you must install portmap service and QConvergeConsole GUI with the Localhost Only option enabled.

### Using Localhost Only on Windows

On a Windows system, you must reinstall the agent to modify the existing setting of the Localhost Only feature. If Localhost Only is enabled, the registry key `portmap` is created under the key `SOFTWARE\QLogic Corporation\`. The value of key name `LocalhostOnly` is set to `1`.

---

#### NOTE

If you enable the Localhost Only feature and then introduce a new IP address, you must reboot the system.

---

#### To enable and disable the Localhost Only feature on Windows:

- If you are using the standalone agent installer, during installation select either **Yes** or **No** in the message box that prompts you to enable or disable the Localhost Only feature.
- If you are using the SuperInstaller, enable the Localhost Only feature prior to running the SuperInstaller by changing the registry as follows:
  - a. Under the registry key `SOFTWARE\QLogic Corporation\portmap`, determine if the registry key `LocalhostOnly` exists.
  - b. If `LocalhostOnly` does not exist, create it.
  - c. Set the key value of `LocalhostOnly` to `1`.

### Using Localhost Only on Linux

To restrict the portmap service to respond only to requests for connections from a local host, you must edit the following two files:

```
/etc/hosts.allow  
/etc/hosts.deny
```

**To enable the Localhost Only feature on Linux:**

1. Edit the `/etc/hosts.allow` file by adding the following two lines to the very end of the file:  
Line #1: `rpcbind: LOCAL, 127.0.0.1,` (add any allowable IPs)  
Line #2: A blank line (Note: The last line in the file *must* be blank.)
2. Edit the `/etc/hosts.deny` file by adding the following two lines to the very end of the file:  
Line #1: `rpcbind: ALL`  
Line #2: A blank line (Note: The last line in the file *must* be blank.)

## Installing QConvergeConsole GUI

Refer to the appropriate installation procedure for your operating system:

- [Installing QConvergeConsole GUI in a Windows Environment](#)
- [Installing QConvergeConsole GUI in a Linux Environment](#)
- [Installing QConvergeConsole GUI in a Solaris Environment](#)
- [Installing QConvergeConsole GUI in a Console Window](#)

---

**NOTE**

Prior to installation, read the items noted in [“Before You Begin” on page 7](#).

---

## Installing QConvergeConsole GUI in a Windows Environment

The QConvergeConsole Installer for Windows is a self-extracting utility that installs QConvergeConsole GUI and related files. Follow the steps in this section to install QConvergeConsole GUI on a Windows system.

---

**NOTE**

- For information on firewall configuration on Windows systems, refer to [“Windows Firewall Configuration” on page 35](#).
  - The location of the installed QConvergeConsole files depends on which QCC GUI version you run, and the operating system on which you install it, as follows:
    - ❑ QCC GUI x64 version on a 64-bit Windows operating system:  
All QCC files are installed in the folder `Program Files`.
-



**To install QConvergeConsole GUI in a Windows environment:**

1. In the folder where you downloaded the installation file, double-click the `QConvergeConsole_Installer_Windows_<version>.exe` file.
2. If an Open File security dialog box appears, click **Run**.
3. In the Tomcat Port Number Setup dialog box, type a valid port number in the range 1025–65536, or keep the default port number, 8080.
4. Click **Next**.
5. In the next dialog box, select the appropriate option:
  - Yes** - For localhost-only installation.
  - No** - For non-localhost-only installation.

---

**NOTE**

The localhost-only option installs QCC GUI locally so that you must run it locally (remote connection is not possible). To disable the option, you must uninstall QCC GUI and then re-install it, selecting **No** in this step.

---

6. In the Pre-Installation Summary dialog box, verify that the information is correct, and then click **Install**.
7. (Optional) In the Security Login Configuration:
  - a. Type a value in the **Login ID** box.
  - b. Type a value in the **Password** box.
  - c. If applicable, select the **Check this box to enable Security Login** check box.

---

**NOTE**

If you enable the Security Login option, the login ID and password will be required to open QCC GUI. QCC GUI will also automatically log out if it remains idle for more than a few minutes.

---

- d. Click **Next**.
8. A message box prompts you to confirm if you want to enable the secure socket layer (SSL) feature, which allows data to be encrypted within a secure layer before passing it to and from the server:
  - Yes** - Click to enable the SSL feature.
  - No** - Click to disable the SSL feature.

9. In the Install Complete dialog box, click **Done** to exit the installer.

---

**NOTE**

To start QConvergeConsole GUI, see [“Starting QConvergeConsole GUI” on page 27](#).

---

## Installing QConvergeConsole GUI in a Linux Environment

---

**NOTE**

Prior to installation, read the items noted in [“Before You Begin” on page 7](#). In addition, ensure that the sg3\_utils RPM is installed; this package is required so that QConvergeConsole can discover FCoE LUNs.

---

You have the option of installing QConvergeConsole GUI in a Linux environment using either a GUI or command line method.

You can graphically install QConvergeConsole GUI on a Linux host by running a Virtual Network Computing (VNC®) program on a Windows host. The TightVNC Viewer, a VNC program, can remotely control QConvergeConsole GUI installation on a Linux host.

**To install QConvergeConsole GUI in a Linux environment:**

1. Open the directory containing one of the following installer files:  

```
QConvergeConsole_Installer_Linux_IA64_<version>.bin  
QConvergeConsole_Installer_Linux_x64_<version>.bin  
QConvergeConsole_Installer_Linux_ppc64_<version>.bin  
QConvergeConsole_Installer_Linux_ppc64_LE_<version>.bin
```
2. In the terminal window, verify that the installer file has permission to execute by issuing the `ls -lt` command at the prompt.
3. To install QConvergeConsole GUI, in the terminal, issue the following command in the directory in which the installer files were copied:  

```
./QConvergeConsole_Installer_Linux_<arch>_<version>.bin
```

The installer extracts the files and installs QConvergeConsole GUI in the directory `/opt/QLogic_Corporation/QConvergeConsole`.
4. In the installation Introduction dialog box, click **Next**.
5. In the Tomcat Port Number Setup dialog box, type a valid port number in the range 1025–65536, or accept the default port number, 8080. Then click **Next** to continue.

6. In the next dialog box, select **Yes** if you want a localhost-only installation. Or, if you do not want a localhost-only installation, select **No**.

---

**NOTE**

The localhost-only option installs QConvergeConsole GUI locally so that you must run it locally (a remote connection is not possible). To disable the option, you must uninstall QCC GUI and then re-install it, selecting **No** in this step.

---

7. In the Pre-Installation Summary dialog box, read the information, and then click **Install**.
8. (Optional) Complete the following in the Security Login Configuration:
  - a. Type a value in the **Login ID** box.
  - b. Type a value in the **Password** box.
  - c. If applicable, select the **Check this box to enable Security Login** check box.
  - d. Click **Next**.
9. A message box prompts you to confirm if you want to enable the secure socket layer (SSL) feature, which allows data to be encrypted within a secure layer before passing it to and from the server:
  - Yes** - Click to enable the SSL feature.
  - No** - Click to disable the SSL feature.
10. In the Tomcat SSL Port Number Setup dialog box, type a valid SSL port number in the range 1025–65536, or accept the default port number, 8443. Then click **Next** to continue.
11. In the Install Complete dialog box, click **Done** to exit the installer.

---

**NOTE**

See [“Starting QConvergeConsole GUI” on page 27](#) to start QConvergeConsole GUI

---

## Installing QConvergeConsole GUI in a Solaris Environment

### NOTE

FastLinQ Adapters (3400/8400/41000/45000 Series) currently do *not* support Solaris.

---

You can graphically install QConvergeConsole GUI on a Solaris host by running a Virtual Network Computing (VNC) program on a remote host. The TightVNC Viewer, a VNC program, can remotely control QConvergeConsole GUI installation on a Solaris host.

### To install QConvergeConsole GUI in a Solaris environment:

1. Open the appropriate directory containing the installer file:
  - QConvergeConsole\_Installer\_Solaris\_SPARC\_<version>.bin
  - QConvergeConsole\_Installer\_Solaris\_x86\_<version>.bin
2. From the terminal window, verify that the installer file has permission to execute by issuing the `ls -lt` command at the prompt.
3. To install QConvergeConsole GUI, issue the appropriate command on the console:
  - For SPARC:

```
sh QConvergeConsole_Installer_Solaris_SPARC_<version>.bin
```
  - For x86:

```
sh QConvergeConsole_Installer_Solaris_x86_<version>.bin
```The InstallAnywhere GUI utility prepares to install QConvergeConsole GUI and opens the installation Introduction dialog box.
4. Click **Next**.
5. In the Tomcat Port Number Setup dialog box, type a valid port number in the range 1025–65536, or accept the default port number, 8080. Then click **Next** to continue.
6. In the next dialog box, select **Yes** if you want a localhost-only installation. If you do not want a localhost-only installation, select **No**.

### NOTE

The localhost-only option locally installs QConvergeConsole GUI so that you must run it locally (remote connection is not possible). To disable the option, you must uninstall QCC GUI and then re-install it, selecting **No** in this step.

---

7. The Pre-Installation Summary dialog box opens. Confirm the information, and then click **Install**.
8. (Optional) Complete the following in the Security Login Configuration:
  - a. Type a value in the **Login ID** box.
  - b. Type a value in the **Password** box.
  - c. If applicable, select the **Check this box to enable Security Login** check box.
  - d. Click **Next**.
9. A message box prompts you to confirm if you want to enable the secure socket layer (SSL) feature, which allows data to be encrypted within a secure layer before passing it to and from the server:
  - Yes** - Click to enable the SSL feature.
  - No** - Click to disable the SSL feature.
10. In the Tomcat SSL Port Number Setup dialog box, type a valid SSL port number in the range 1025–65536, or accept the default port number, 8443. Then click **Next** to continue.
11. In the Install Complete dialog box, click **Done** to exit the installer.

---

#### NOTE

- See [“Starting QConvergeConsole GUI” on page 27](#) to start QConvergeConsole GUI
  - Some adapters may not support all three protocol agents; check your adapter’s specifications to confirm.
  - QConvergeConsole GUI records all installation activities in the log file, `QConvergeConsole_InstallLog.log`, located in the installation directory `/opt/QLogic Corporation/QConvergeConsole`. If the installation fails, review this log file to find a possible source of failure.
-

## Installing QConvergeConsole GUI in a Console Window

On Windows, Linux, and Solaris systems, you can use a console window to install QConvergeConsole GUI. You can also use the silent option to install QCC GUI in silent mode.

---

### NOTE

Prior to installation, read the items noted in [“Before You Begin” on page 7](#).

---

#### To run the installer from a console window:

- Issue the following command:

```
<installer_file_name>
```

Optional parameters include the following:

- `-i console`: Use this option to run the installer in a console window for command line-driven installation (user interaction is required).
- `-i silent`: Use this option to install in silent mode. This mode is used when no user interaction is required.
- `-DLOCALHOST_ACCESS_ONLY=<value>`: Use this option to enable the localhost-only feature (disables QCC GUI from being run from remote host). Allowed values are 1 (enable) or 0 (disable). Default value is 0.
- `-DSSL_ENABLE=<value>`: Use this option to enable the SSL feature. Allowed values are 1 (enable) or 0 (disable). Default value is 1.
- `-DUSER_INPUT_PORT_NUMBER=<port>`: Use this option to change the Tomcat port number. The default Tomcat port number is 8080.
- `-DSECURITY_LOGIN=<1_OR_0>`: Use this option to enable Security Login feature. Default value is 0.
- `-DSECURITY_LOGIN_STR=<String>`: Login setting for Security Login feature. Default value is QCC.
- `-DSECURITY_PASSWORD_STR=<String>`: Password setting for Security Login feature. Default value is config.
- `-DUSER_INPUT_SSL_PORT_NUMBER`: Use this option to change Tomcat SSL Port Number.
- `-DLOG_LOCATION`: Use this option to change Log directory. Default value is installation folder.

**NOTE**

The `-D` options listed in the preceding are applicable to silent install only.

---

**To run the installer in silent mode on Windows, Linux, and Solaris:**

The following examples show how to run the silent command on Windows, Linux, and Solaris.

**Windows:**

**NOTE**

Be sure to add the `start/wait` parameter in front of the silent install command for Windows only when using silent installation mode.

---

```
QConvergeConsole_Installer_Windows_x64_x_x_x_xxx -i silent -DSSL_ENABLE=0
-DLOCALHOST_ACCESS_ONLY=1
-DUSER_INPUT_PORT_NUMBER=8998
-DSECURITY_LOGIN=1
-DSECURITY_LOGIN_STR=admin
-DSECURITY_PASSWORD_STR=password
-DLOG_LOCATION="c:\tmp\newLogLocation"
-DUSER_INPUT_SSL_PORT_NUMBER=9999
```

**Linux:**

```
QConvergeConsole_Installer_Linux_x64_x_x_x_xxx -i silent -DSSL_ENABLE=0
-DLOCALHOST_ACCESS_ONLY=1
-DUSER_INPUT_PORT_NUMBER=8998
-DSECURITY_LOGIN=1
-DSECURITY_LOGIN_STR=admin
-DSECURITY_PASSWORD_STR=password
-DUSER_INPUT_SSL_PORT_NUMBER=9999
```

**Solaris:**

```
QConvergeConsole_Installer_Solaris_x86_x_x_x_xxx -i silent -DSSL_ENABLE=0
-DLOCALHOST_ACCESS_ONLY=1
-DUSER_INPUT_PORT_NUMBER=8998
-DSECURITY_LOGIN=1
-DSECURITY_LOGIN_STR=admin
-DSECURITY_PASSWORD_STR=password
-DUSER_INPUT_SSL_PORT_NUMBER=9999
```

**NOTE**

FastLinQ Adapters (3400/8400/41000/45000 Series) currently do *not* support Solaris.

---

For detailed information on the silent mode command parameters, refer to the `readme_installer.txt` file.

Figure 2-1 shows an example of running the installer in a console window.

```
-bash-4.1# ./QConvergeConsole_Installer_Linux_x64_5_1_0_176.bin
Preparing to install...
Extracting the JRE from the installer archive...
Unpacking the JRE...
Extracting the installation resources from the installer archive...
Configuring the installer for this system's environment...

Launching installer...

Graphical installers are not supported by the VM. The console mode will be used instead...
Preparing CONSOLE Mode Installation...

=====
QConvergeConsole                               (created with InstallAnywhere)
-----

=====
Introduction
-----

InstallAnywhere will guide you through the installation of QConvergeConsole.

It is strongly recommended that you quit all programs before continuing with
this installation.

Respond to each prompt to proceed to the next step in the installation.  If you
want to change something on a previous step, type 'back'.

You may cancel this installation at any time by typing 'quit'.

PRESS <ENTER> TO CONTINUE: █
```

**Figure 2-1. Example of Console Window Installation**



## Uninstalling QConvergeConsole GUI

Refer to the appropriate uninstallation procedure for your operating system:

- [Uninstalling QConvergeConsole GUI in a Windows Environment](#)
- [Uninstalling QConvergeConsole GUI in a Linux Environment](#)
- [Uninstalling QConvergeConsole GUI in a Solaris Environment](#)
- [Uninstalling QConvergeConsole GUI in a Console Window](#)

### Uninstalling QConvergeConsole GUI in a Windows Environment

Follow these steps to uninstall QConvergeConsole GUI from a Windows system.

**To uninstall QConvergeConsole GUI in a Windows environment:**

1. Start the uninstaller using one of these methods:
  - ❑ **Using Windows Explorer:**
    - a. Change to the directory that contains the QConvergeConsole files. The default location is:  

```
C:\Program Files\QLogic Corporation\QConvergeConsole
```
    - b. Open the `Uninstall_QConvergeConsole` folder, and then double-click the `QConvergeConsoleUninstaller.exe` file.
  - ❑ **Using Add or Remove Programs:**
    - a. From the Windows Control Panel, double-click **Add or Remove Programs**.
    - b. From the list of currently installed programs, select **QConvergeConsole**, and then click **Change/Remove**.
2. In the Uninstall QConvergeConsole GUI dialog box, click **Next** to continue.
3. In the Uninstall Options dialog box, click **Complete Uninstall**. Then click **Next**.

During uninstallation, the uninstaller reports the status and displays a request to wait while the uninstaller removes the components.

4. When the Uninstall Complete dialog box informs you that the uninstallation is complete, click **Done**.

QConvergeConsole GUI has been uninstalled.

## Uninstalling QConvergeConsole Agents in Windows

Follow these steps in Windows to uninstall the QConvergeConsole agents.

### To uninstall the QConvergeConsole agents in Windows:

1. Navigate to Uninstall A Program.
2. Locate the agent to uninstall:
  - QConvergeConsole FastLinQ HBA Management Agent**—for the FastLinQ agent
  - QConvergeConsole iSCSI HBA Management Agent**—for the iSCSI agent
  - QConvergeConsole FC HBA Management Agent**—for the Fibre Channel and FCoE agent
  - QLogic NIC HBA Management Agent**—for the NIC agent
3. To remove the agent, click **Uninstall**.
4. If required, repeat the preceding steps for each additional agent to be uninstalled.

## Uninstalling QConvergeConsole GUI in a Linux Environment

Follow these steps to uninstall QConvergeConsole GUI from a Linux system.

### To uninstall QConvergeConsole GUI in a Linux environment:

1. Change to the directory where QConvergeConsole GUI is installed. The default location is:

```
/opt/QLogic_Corporation/QConvergeConsole/Uninstall_QConvergeConsole/
```

2. To start the uninstallation, issue the following command:

```
#./QConvergeConsoleUninstaller
```

3. When the message box asks whether you want to run or view the contents of the `QConvergeConsoleUninstaller.bin` file, click **Run in Terminal**.
4. In the Uninstall QConvergeConsole dialog box, click **Next** to continue.
5. In the Uninstall Options dialog box, click **Complete Uninstall**. Then, click **Next**.

During uninstallation, the uninstaller indicates its progress, and a message box asks you to wait the while the uninstaller removes the components.

6. When the Uninstall Complete dialog box informs you that the uninstallation is complete, click **Done**.

QConvergeConsole GUI has been uninstalled.

## Uninstalling QConvergeConsole Agents in Linux

To uninstall the QConvergeConsole NIC, Fibre Channel, FCoE, or iSCSI agents in Linux:

- Issue the following command:

```
rpm -e <agent>
```

Where <agent> is one of the following:

- netqlremote for Ethernet NIC
- qlremote for Fibre Channel or FCoE
- iqlremote for iSCSI
- qlnxremote for FastLinQ Adapters

## Uninstalling QConvergeConsole GUI in a Solaris Environment

### NOTE

FastLinQ Adapters (3400/8400/41000/45000 Series) currently do *not* support Solaris.

---

Follow these steps to uninstall QConvergeConsole GUI from a Solaris system. Be sure to exit QConvergeConsole GUI before you uninstall.

**To uninstall QConvergeConsole GUI in a Solaris environment:**

1. From the console, change to the directory where the QCC uninstaller file, QConvergeConsoleUninstaller, is installed. The default location is:

```
/opt/QLogic_Corporation/QConvergeConsole/Uninstall_QConvergeConsole
```

2. To start the uninstallation process, type the following at the console prompt:

```
./QConvergeConsoleUninstaller
```

Uninstall messages appear on the console during the uninstallation process.

## Uninstalling QConvergeConsole Agents on Solaris

To uninstall the QConvergeConsole agents on Solaris, follow the instructions that correspond to the method used to install the agents.

**To uninstall agents installed using package files (Solaris 11.4):**

- To uninstall QConvergeConsole Solaris agents that were installed using .pkg format files, issue the following command:

```
pkgrm <agent>
```

Where <agent> is one of the following:

- QLRemote for Fibre Channel or FCoE

- `iqlremote` for iSCSI
- `NetQLRemote` for Ethernet NIC on x86
- `NQLRemote` for Ethernet NIC on SPARC® and x86

**To uninstall agents installed using p5p files (Solaris 11.4 only):**

- To uninstall QConvergeConsole Solaris agents that were installed using `.p5p` format files, issue the following command:

```
pkg uninstall <agent>
```

Where `<agent>` is one of the following:

- `qlremote` for Fibre Channel or FCoE
- `iqlremote` for iSCSI
- `netqlremote` for Ethernet NIC

## Uninstalling QConvergeConsole GUI in a Console Window

On Windows, Linux, and Solaris systems, you can use a console window to uninstall QConvergeConsole GUI.

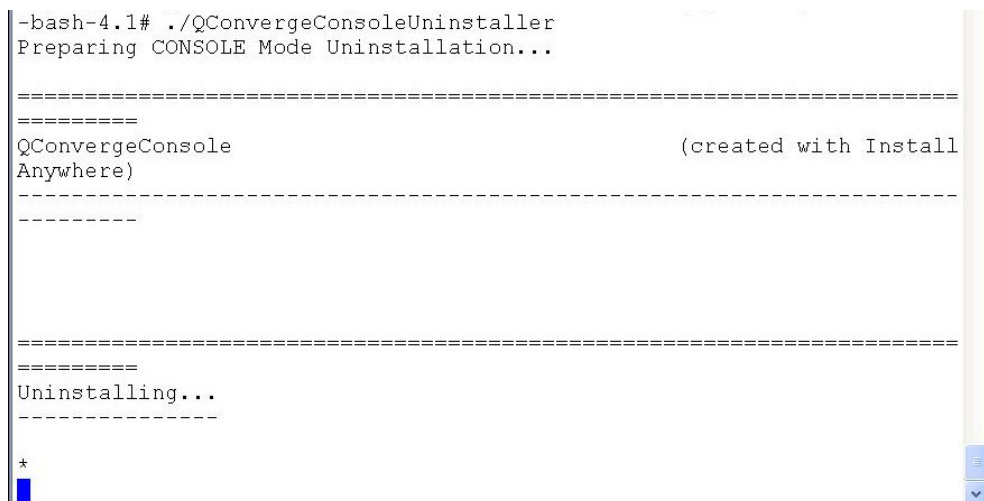
**To run the uninstaller from a console window:**

- Issue the following command:

```
<uninstaller_file_name>
```

Where `<uninstaller_file_name>` is the name of the executable file for the QCC GUI uninstaller.

Figure 2-2 shows an example of running the uninstaller in a console window.



```
-bash-4.1# ./QConvergeConsoleUninstaller
Preparing CONSOLE Mode Uninstallation...

=====
QConvergeConsole (created with Install
Anywhere)
-----

=====
Uninstalling...
-----

*
```

**Figure 2-2. Example of Console Window Uninstallation**

# 3 Getting Started

This chapter provides procedures for starting and exiting QConvergeConsole GUI, and getting help:

- [Starting QConvergeConsole GUI](#)
- [“Exiting QConvergeConsole GUI” on page 30](#)
- [“Getting Help” on page 30](#)

## Starting QConvergeConsole GUI

Start QConvergeConsole GUI by opening its main page in your browser window. You can do this either locally on the server where QConvergeConsole GUI is installed or remotely from another computer. From the main page, you can connect to servers that host Marvell QLogic adapters and devices you want to manage. The procedures are the same in Windows, Linux, and Solaris environments.

This section provides information about:

- [Opening the QConvergeConsole GUI Main Page](#)
- [Connecting to a Host Server](#)

## Opening the QConvergeConsole GUI Main Page

You can open QConvergeConsole GUI locally on the server or from a remote computer. You can also open it using a non-secure or a secure (SSL) connection.

---

### NOTE

SSL is enabled during installation. To use SSL when it has not been enabled, first uninstall QConvergeConsole GUI, and then re-install it, selecting **Yes** when prompted to enable SSL.

---

## Opening QCC GUI on the Local Server

### To locally open QCC GUI:

1. Open a Web browser window.
2. In the address bar, type the following, and then press the ENTER key.

#### For a non-secure connection:

`http://localhost:<port_number>/QConvergeConsole`

Where `<port_number>` is the port number you specified during QConvergeConsole installation. The default port number is **8080**.

#### For a secure (SSL) connection:

`https://localhost:<SSL_port_number>/QConvergeConsole`

The main page of QConvergeConsole GUI opens. [Figure 3-1](#) shows an example.



**Figure 3-1. QConvergeConsole GUI Main Page (Example)**

## Opening QCC GUI on a Remote Server

### To open QCC GUI on a remote server:

1. Open a Web browser.
2. In the address bar, type the following, and then press ENTER.

#### For a non-secure connection:

`http://<server_ip>:<port_number>/QConvergeConsole/`

Where `<server_ip>` is the IP address of the QCC GUI server, and `<port_number>` is the access port number you specified during QConvergeConsole GUI installation. The default port number is `8080`.

**For a secure (SSL) connection:**

`https://<server_ip>:<SSL_port_number>/QConvergeConsole`

Where `<server_ip>` is the IP address of the QConvergeConsole GUI server.

The main page of QConvergeConsole GUI opens, as shown in [Figure 3-1 on page 28](#).

## Connecting to a Host Server

To connect to a host server from the QConvergeConsole GUI main window:

---

### NOTE

To connect to a remote host, at least one management agent (used by the host's adapters) must be installed on that host, and the agent service must be running.

---

1. In the upper-left corner of the QConvergeConsole GUI window, locate the **hostname/address** text box. [Figure 3-2](#) shows an example.



**Figure 3-2. Hostname or IP Address (Example)**

2. Type the host name or its IP address.
3. To initiate the connection, click **CONNECT**.

If successful, the host and its adapters appear in the QCC GUI system tree in the left pane.


---

### NOTE

To choose the protocols that QConvergeConsole will display, select the appropriate **FC/FCoE**, **Ethernet**, and **iSCSI** check boxes. The default is all protocols. For more information, refer to the help system.

---

## Exiting QConvergeConsole GUI

To exit QConvergeConsole GUI, point to the gear icon , point to **File**, and then click **Exit**.

## Getting Help


This section provides the following information:

- [Browsing Help Contents](#)
- [Viewing QConvergeConsole GUI Version Details](#)

### Browsing Help Contents

Access the QConvergeConsole GUI help system to view detailed information about using QCC GUI. For a high-level list of topics covered in the help system, see [“What Is in the Help System” on page viii](#).

**To view the help system from the main page:**

1. Point to the gear icon , point to **Help**, and then click **Browse Contents**.  
The help window opens, showing a navigation pane on the left and a topic pane on the right.
2. In the navigation pane, select one of the following tabs to locate the information you want to view:
  - ❑ **Contents** lists topics organized by task, much like the table of contents in this user's guide. This list also includes book icons that you can open and close to show and hide topics related to the book title. Click a closed book icon to open it and view a list of topics. Click an opened book icon to close it and hide its topics. Click the title of any book or topic to view its content in the topic pane.
  - ❑ **Index** provides an alphabetically arranged list of keywords. To jump to a keyword, start typing it in the text box. Click any index entry to view a related topic in the topic pane. If a keyword has more than one topic associated with it, a popup menu opens, listing related topics you can select.
  - ❑ **Search** provides access to all topics in the help system using advanced search capabilities. Type one or more keywords in the text box, and then press ENTER. The search tool lists all topics that meet your search criteria. Select any topic to view its contents in the topic



pane. The search tool accepts Boolean expressions (such as `AND`, `OR`, and `NOT`), as well as nested expressions. It also accepts exact strings entered between quotation marks. It does not support wild cards.

---

#### NOTE


While QCC GUI supports all the Web browsers listed in “[Software Requirements](#)” on page 2, some of the help system's features, such as the Search and Index tools, may not work properly in all browsers.

---

## Viewing QConvergeConsole GUI Version Details

If you need technical assistance with QConvergeConsole GUI, your technician will request the version number.

**To view the QConvergeConsole GUI version:**

1. Point to the gear icon , point to **Help**, and then click **About**.

[Figure 3-3](#) shows an example of the About QConvergeConsole box, which shows the version numbers for QConvergeConsole, as well as copyright information. (The About box that you view shows the actual product version numbers and copyright year.)



**Figure 3-3. About QConvergeConsole GUI (Example)**

2. To close the message box and return to the QConvergeConsole GUI main window, click **OK**.

# 4 Security Considerations

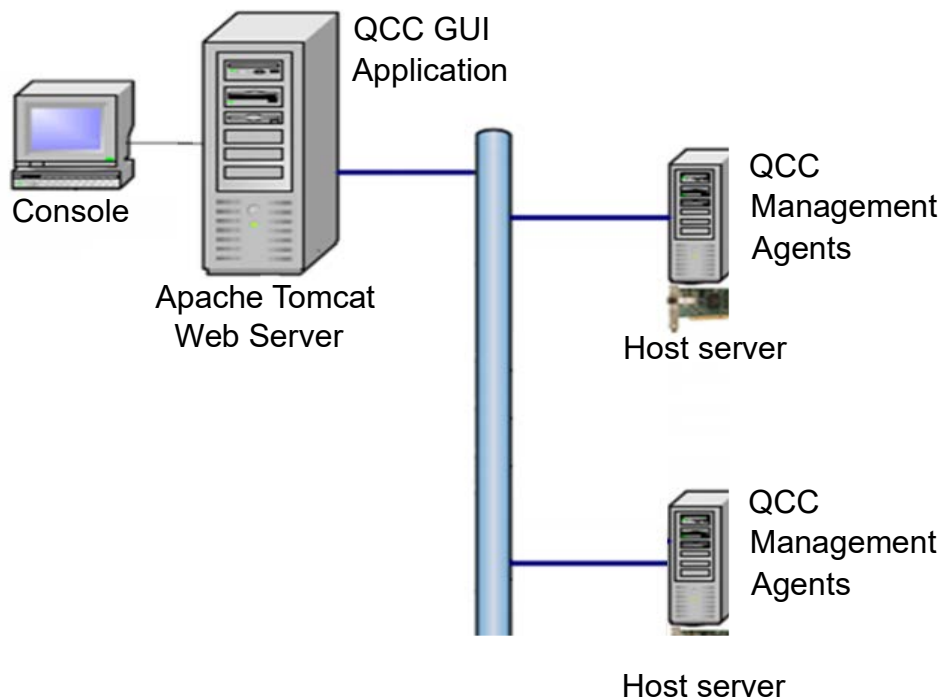
This chapter provides security-related information for QConvergeConsole GUI:

- [Management Connectivity Model](#)
- [Managing Security](#)

## Management Connectivity Model

Figure 4-1 shows how QConvergeConsole GUI communicates in typical deployments.

QConvergeConsole GUI runs as an Apache Tomcat application server. After it is launched on the application server, you connect to QCC GUI through a Web browser.



**Figure 4-1. QCC GUI Management Connectivity**

## Managing Security

QCC security includes local connectivity, password and access control, Windows firewall configuration, and secure sockets layer (SSL) data encryption.

### Connectivity Options

As shown in [Figure 4-1](#), you can connect to QCC GUI using:

- A localhost connection (on the Web application server)
- A remote connection (from another computer)

For information on how to connect to QCC GUI from the local host server or from a remote connection, see [“Connecting to a Host Server” on page 29](#).

For information on how to install QConvergeConsole GUI for local host connections only, see:

- [“Installing QConvergeConsole GUI in a Windows Environment” on page 14](#)
- [“Installing QConvergeConsole GUI in a Linux Environment” on page 16](#)
- [“Installing QConvergeConsole GUI in a Solaris Environment” on page 18](#)

### Password Protection for Access Control

You can password-protect a host server to prevent unauthorized changes to that host’s installed adapters. When you do this, authorization is required to make changes to the following on the host or any of its adapters:

- Adapter parameters
- Flash BIOS
- Adapter driver
- Port configuration
- Password (updates to the password itself)

The default security login password is *config*.

#### Requirements

To set up password protection on a host, you must have administrator or root privileges on that host.

#### Procedure

For detailed information on password protection on a host server, refer to the following topics in the QCC GUI help system:

- [Setting QConvergeConsole GUI Security](#)
- [Viewing Host Security](#)
- [Using Security Check](#)

## NOTE

Security Best Practices include:

- Changing the default password during QCC GUI installation to a strong password that meets corporate security policy.
- Note that changing the QCC GUI password during installation also updates the password for the Tomcat manager.
- Using a localhost only connection to restrict access to the QCC GUI and Tomcat manager improves security.
- The Tomcat Manager GUI is disabled and returns an **Access Denied** error if a user clicks on the Manager Application button.
- The Tomcat AJP is disabled to prevent the addition of unauthorized files in the webapp directories.

---

## Program Numbers Used for QConvergeConsole Agents

Program numbers will be mapped to dynamic ports that can be seen by means of the `rpcinfo -p` command. The program numbers used for QConvergeConsole agents are:

- Program 4397 for qlremote
- Program 4398 for QConvergeConsole FC HBA manager
- Program 351502 for iqlremote
- Program 351503 for QConvergeConsole iSCSI HBA manager
- Program 252525 for QLNXRremote (3400/8400/41000/45000 Series Adapter management agent)

For example:

```
[root@rp-R800-RHEL65x64 ~]# rpcinfo -p 172.27.3.21
  program vers proto  port  service
  351504    1    tcp    871
  351504    1    udp    869
    4397     1    tcp    739
    4397     1    udp    737
  351502    1    tcp    959
  351502    1    udp    957
  351523    1    tcp    679
  351523    1    udp    677
[root@rp-R800-RHEL65x64 ~]#
```

## Windows Firewall Configuration

When Windows Firewall is enabled with default settings, connections between QCC GUI and remote hosts are blocked. To use Windows Firewall but allow connections between QCC GUI and remote hosts, add the following programs to the exceptions list in the firewall settings on both client and server machines:

- For x64 running native x64 GUI and agents:

```
C:\Program Files\QLogic Corporation\QConvergeConsole\
tomcat-x64\apache-tomcat-x.x.xx\bin\tomcatx.exe
C:\Program Files\QLogic Corporation\portmap\portmap.exe
C:\Program Files\QLogic Corporation\nQAgent\ethernet.exe
C:\Program Files\QLogic Corporation\QLRemote\qlremote.exe
C:\Program Files\QLogic Corporation\iQLRemote\iqlremote.exe
C:\Program Files\QLogic Corporation\QLNXRemote\qlnxremote.exe
```

Configure the Windows Firewall as described in the following section.

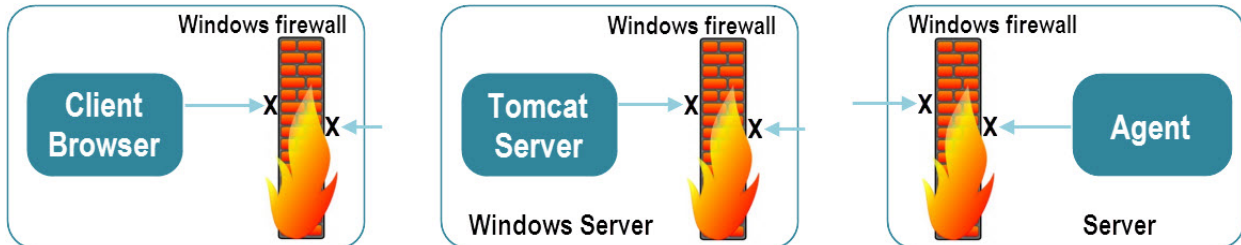
### Firewall Configuration in Windows Server 2016 and 2019

**To configure the firewall on a host or client using Server Manager:**

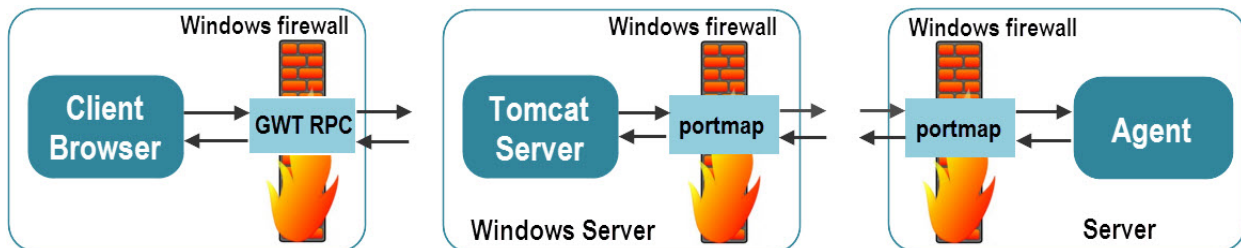
1. Follow the appropriate instructions for your operating system:
  - **Windows Server 2016 or later:** Do *one* of the following:
    - Click **Start**, click **Administrative Tools**, and then click **Windows Firewall with Advanced Security**.
    - Run the Server Manager application, click **Tools**, and then click **Windows Firewall with Advanced Security**.
2. Refer to the list of programs in [“Windows Firewall Configuration” on page 35](#).  
*For the first program in the list:*
  - a. Right-click **Inbound Rules**, and then click **New Rule**.
  - b. In the New Inbound Rule wizard, select **Program**, and then click **Next**.
  - c. Click **Browse** to specify the path to the `.exe` file, and then click **Next**.
  - d. Select **Allow the connection**, and then click **Next**.
  - e. Select **Domain and Public**. Then click **Next**.
  - f. Enter a name and description for the rule, and then click **Finish**.  
Server Manager displays the new rule under **Inbound Rules**.
3. Repeat [Step 2](#) for each program in the list, except in step 2a, click **Outbound Rules** and **New Rules** to open the New Outbound Rule wizard.

4. If any agent was previously running, restart it.

Figure 4-2 shows how the default Windows firewall settings prevent the QCC GUI from connecting to remote hosts, and Figure 4-3 shows how modifying the settings lets the QCC GUI connect to remote hosts.



**Figure 4-2. Default Windows Firewall Settings—QCC Blocked from Remote Hosts**



**Figure 4-3. Modified Firewall Settings—QCC Able to Connect to Remote Hosts**

## Linux Firewall Configuration

If the Linux firewall (iptables rules) is enabled with default settings, connections between the QCC GUI and remote hosts are not allowed. To use Linux firewall but allow connections between the QCC GUI and remote hosts, set up the rules for your Linux distribution as described in the following sections.

### Red Hat Enterprise Linux (RHEL) 7.x+ and SLES 15.x+

#### To configure the firewall:

1. Determine the FirewallD status (enabled or disabled):
2. If FirewallD is enabled:
  - a. Identify the current active zone and related interface:

```
# systemctl status firewalld
```

```
# firewall-cmd --get-active-zones
public interfaces: em1
```

- b. Set a permanent port range of 1–1024 for TCP and UDP protocols (to allow management agents `qlremote`, `netqlremote`, and `iqlremote`, to communicate with the outside world):

```
# firewall-cmd --permanent --zone=public --add-port=1-1024/tcp
# firewall-cmd --permanent --zone=public --add-port=1-1024/udp
```

- c. Allow QCC GUI servers to connect to client machines:

- Identify the current active zone and related interface (displayed by the command in [Step a](#) for the server machine.
- Set options permanently to allow port 8080 for http and 8443 for https:

```
# firewall-cmd --permanent --zone=public --add-port=8080/tcp
# firewall-cmd --permanent --zone=public --add-port=8080/udp
# firewall-cmd --permanent --zone=public --add-port=8443/tcp
# firewall-cmd --permanent --zone=public --add-port=8443/udp
```

---

#### NOTE

The preceding commands reflect the default port numbers of 8080 for http and 8443 for https. If different port numbers were specified during QCC GUI installation, replace the port numbers in the preceding commands with the port numbers specified during installation.

---

3. Reload the firewall settings to make the current permanent settings the new runtime settings. Issue the following command:

```
# firewall-cmd --reload
```

---

#### NOTE

Make sure the **rpcbind** service is running by issuing the following commands:

```
# service rpcbind start
# systemctl enable rpcbind.service
```

---

## Red Hat Enterprise Linux (RHEL) 6.x

### To configure the firewall on RHEL 6.x:

1. To check the firewall status (by default, the command shows chain and rules set for the host), issue the following command:

```
# service iptables status
```

2. If iptables service is set or started:
  - a. Set a port range of 1–1024 for the TCP and UDP protocols (allow management agents qlremote, netqlremote, and iqlremote, to communicate with the outside world):

```
# iptables -I INPUT 4 -p tcp -m state --state NEW -m tcp --dport 1:1024 -j ACCEPT
# iptables -I INPUT 5 -p udp -m state --state NEW -m udp --dport 1:1024 -j ACCEPT
```

- b. To set the options permanently to allow port 8080 for http and 8443 for https (allow QCC GUI servers to connect to clients), issue the following commands:

```
# iptables -I INPUT 6 -p tcp -m state --state NEW -m udp --dport 8080 -j ACCEPT
# iptables -I INPUT 7 -p udp -m state --state NEW -m udp --dport 8080 -j ACCEPT
# iptables -I INPUT 8 -p tcp -m state --state NEW -m udp --dport 8443 -j ACCEPT
# iptables -I INPUT 9 -p udp -m state --state NEW -m udp --dport 8443 -j ACCEPT
```

---

#### NOTE

The preceding commands reflect the default port numbers of 8080 for HTTP and 8443 for HTTPS. If different port numbers were specified during QCC GUI installation, replace the port numbers in the preceding commands with the port numbers specified during installation.

---

3. To make the current settings the new runtime settings, issue the following command to save the firewall settings:

```
# service iptables save
```

## SLES 12.x and 15.x

### To configure the firewall on SLES:

1. Check the firewall status (by default, the command shows chain and rules set for the host) by issuing the following command:

```
# iptables -L
```

2. To add customized rules in iptables, provide the path for customized rules in /etc/sysconfig/SuSEfirewall2:

```
FW_CUSTOMRULES="/etc/sysconfig/scripts/SuSEfirewall2-custom"
#FW_CUSTOMRULES=""
```



3. Allow the management agents qlremote, netqlremote, and iqlremote, to communicate with the outside world. In `/etc/sysconfig/scripts/SuSEfirewall2-custom` in the `fw_custom_before_port_handling( )` function, add the following rules:

```
# iptables -I INPUT 4 -p tcp -m state --state NEW -m tcp --dport 1:1024 -j  
ACCEPT  
# iptables -I INPUT 5 -p udp -m state --state NEW -m udp --dport 1:1024 -j  
ACCEPT
```

4. Set port 8080 for http and 8443 for https to allow QCC GUI servers to connect to clients. In `/etc/sysconfig/scripts/SuSEfirewall2-custom` in the `fw_custom_before_port_handling( )` function, add the following rules:

```
# iptables -I INPUT 6 -p tcp -m state --state NEW -m udp --dport 8080 -j ACCEPT  
# iptables -I INPUT 7 -p udp -m state --state NEW -m udp --dport 8080 -j ACCEPT  
# iptables -I INPUT 8 -p tcp -m state --state NEW -m udp --dport 8443 -j ACCEPT  
# iptables -I INPUT 9 -p udp -m state --state NEW -m udp --dport 8443 -j ACCEPT
```

---

#### NOTE

- The preceding commands reflect the default port numbers of 8080 for http and 8443 for https. If different port numbers were specified during QCC GUI installation, replace the port numbers in the preceding commands with the port numbers specified during installation.
- Providing the `FW_CUSTOMRULES` file path causes custom rules to persist across reboots.

5. To reload customized rules at runtime, issue the following command:

```
# /etc/init.d/SuSEfirewall2_setup reload
```

## Web Server (Apache Tomcat) Security

This section describes security considerations for the Web application server where Apache Tomcat is run.

### Secure Sockets Layer (SSL)

QCC GUI supports secure sockets layer (SSL) connections, in which all information being sent over the connection is encrypted.

To use SSL, the SSL feature must be enabled during the installation of QCC GUI (for detailed information, refer to [“Installing QConvergeConsole GUI in a Windows Environment” on page 14](#)). To use SSL when it has not been enabled, first uninstall QConvergeConsole GUI, and then re-install it, selecting **Yes** when prompted to enable SSL.

For information on how to connect to QCC GUI using SSL, see [“Opening the QConvergeConsole GUI Main Page” on page 27](#).

# 5 Troubleshooting

This chapter lists known issues and describes procedures that may be helpful for troubleshooting, including:

- [Recommendations for Solaris Hot Swap, Dynamic Reconfiguration, Suspend and Resume Operations](#)
- [Setting a Tomcat Log File](#)  
Follow the instructions in this section to set up a log file for troubleshooting.
- [Installing QLogic QConvergeConsole Beside SSMC and vPower NFS Service](#)

## Recommendations for Solaris Hot Swap, Dynamic Reconfiguration, Suspend and Resume Operations

The QConvergeConsole GUI application must be stopped before performing any hot swap, dynamic reconfiguration, suspend and resume operations in a Solaris operating system. Use the following procedures as needed.

### Stopping the QCC GUI Agents

To stop the QCC GUI, issue the following in the command line:

```
# ./etc/rc3.d/S99qlremote stop
# ./etc/rc3.d/S99netqlremote stop
```

---

**NOTE**

All QCC-GUI applications will restart after the system is rebooted.

---

### Starting the QCC Agents Without Rebooting the Server

To start the QConvergeConsole application without rebooting the server, issue the following in the command line:

```
# ./etc/rc3.d/S99qlremote start
# ./etc/rc3.d/S99netqlremote start
```

## Removing QCC GUI Agents for an Ongoing Hot Swap, Dynamic Reconfiguration, Suspend or Resume Operation

To remove the QConvergeConsole GUI application for an ongoing hot swap, suspend, dynamic reconfiguration, or resume operation, issue the following In the command line:

```
#pkgrm QLRemote  
#pkgrm NQLRemote
```

---

### NOTE

Marvell highly recommends that you remove the QCC GUI agents during an ongoing hot swap, dynamic reconfiguration, suspend, and resume operation.

---

## Setting a Tomcat Log File

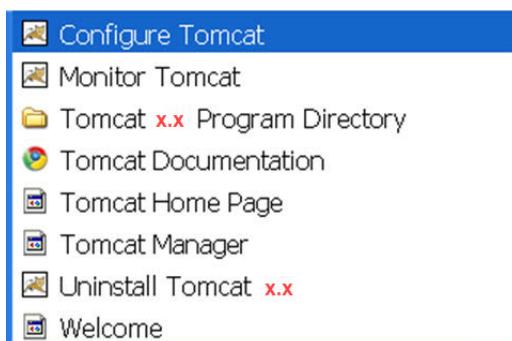
This section explains how to configure Tomcat to direct debug message output from QConvergeConsole GUI to a specific file location. Refer to the appropriate procedure for your OS:

- [Configure Tomcat on Windows-based Systems](#)
- [Configure Tomcat on Linux-based Systems](#)
- [Configure Tomcat on Solaris-based Systems](#)

## Configure Tomcat on Windows-based Systems

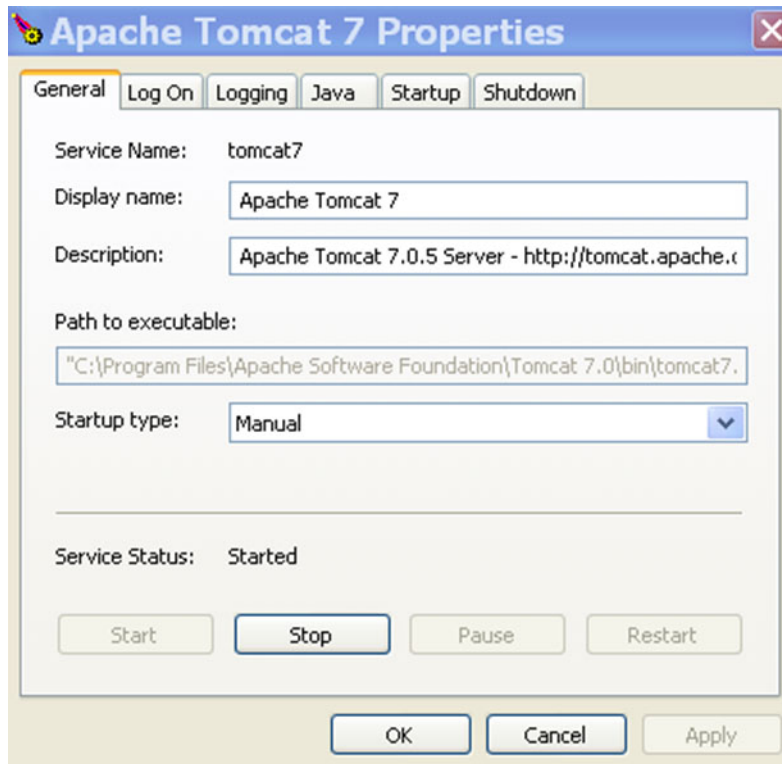
To set a Tomcat log file in Windows:

1. On the **Tomcat Program Files** menu, click **Configure Tomcat**, as shown in [Figure 5-1](#).



**Figure 5-1. Tomcat Program Files Menu**

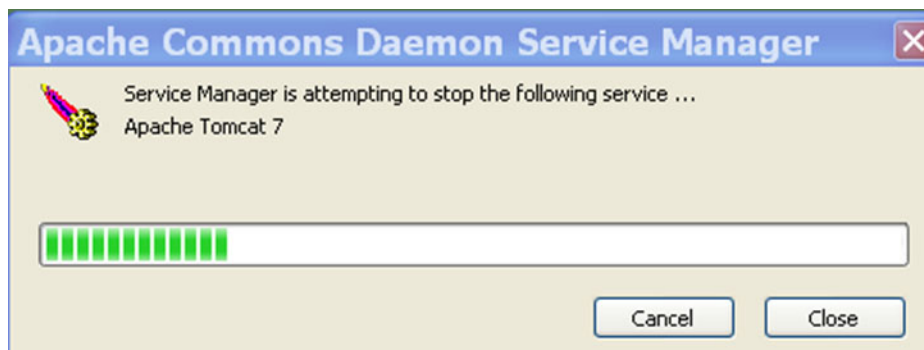
The Apache Tomcat Properties open, as shown in [Figure 5-2](#).



**Figure 5-2. Apache Tomcat Properties**

2. If the Tomcat server is running, the **Stop** button is enabled. Click **Stop** to stop the server.

The Apache Commons Daemon Service Manager dialog box shows the service status. [Figure 5-3](#) shows an example.

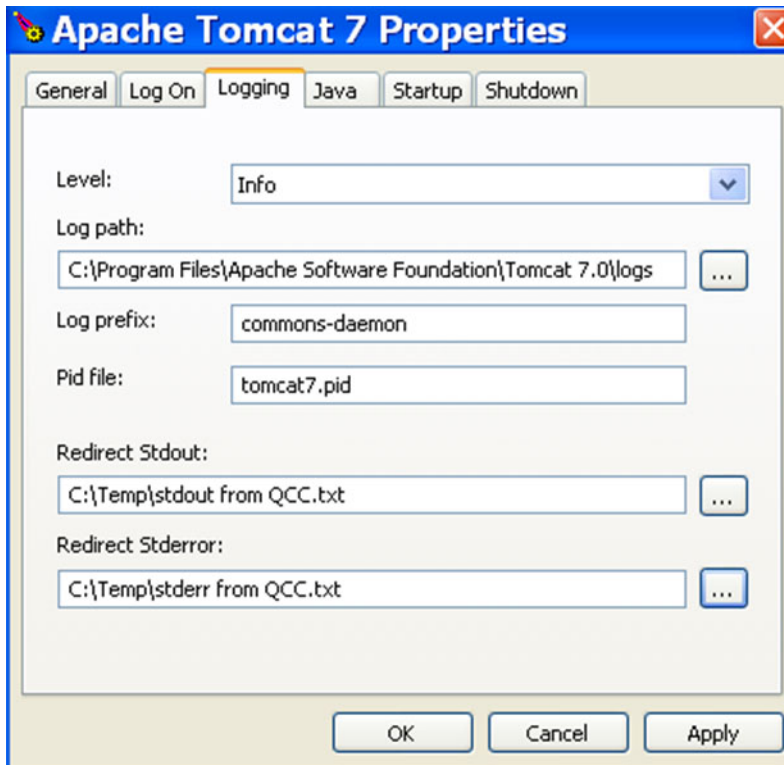


**Figure 5-3. Stopping Server Progress**

3. On the Apache Tomcat Properties, click the **Logging** tab.

4. Modify the Logging page as follows:
  - a. To the right of **Redirect Stdout**, click the browse button, and then select the file location for standard output from QCC GUI.
  - b. To the right of **Redirect Stderror**, click the browse button, and then select the file location for standard error output from QCC GUI.

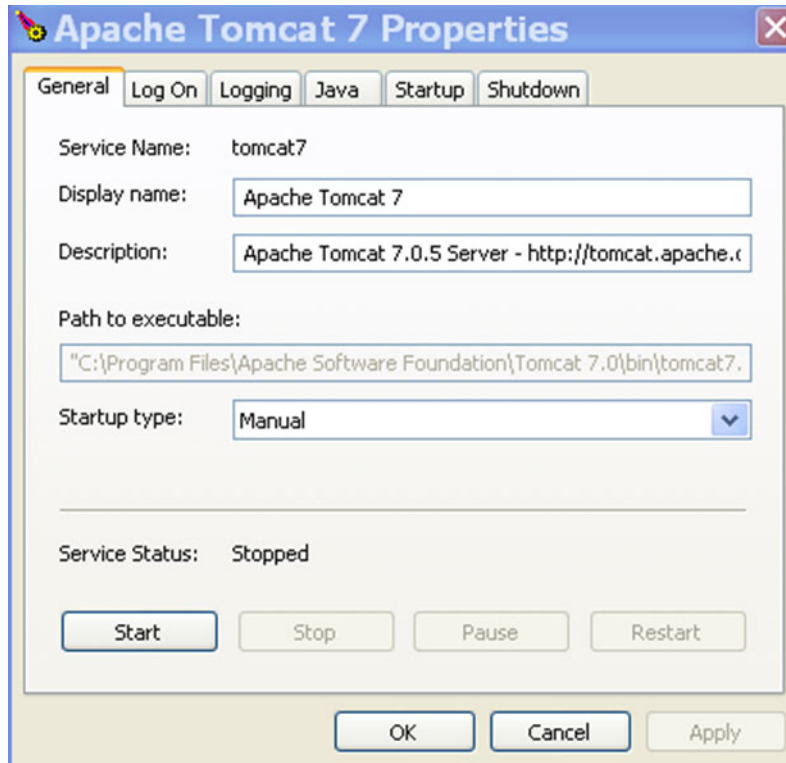
In [Figure 5-4](#), the files "C:\Temp\stdout from QCC.txt" and "C:\Temp\stderr from QCC.txt" are used as examples.



**Figure 5-4. Changing Locations of Output Files**

- c. Click **Apply** to make the changes.

5. Restart the Tomcat service as follows:
  - a. Click the **General** tab.
  - b. On the General page (Figure 5-5), click **Apply**, and then click **Start**.



**Figure 5-5. General Page of Apache Tomcat Properties**

6. Start QConvergeConsole GUI by pointing your Web browser to:  
<http://localhost:8080/QConvergeConsole>  
To run QConvergeConsole GUI in SSL mode, point your Web browser to:  
<https://localhost:8443/QConvergeConsole>
7. Open the log files from the locations entered in [Step 4](#).

## Configure Tomcat on Linux-based Systems

The QConvergeConsole installer installs Tomcat version 7 on Linux systems. For Tomcat 7, the log file is set up in script file `catalina.sh`.

### To update the log file name in Linux:

1. Stop the Tomcat server by issuing the following command on a command line:

```
./catalina.sh stop
```

2. Open `catalina.sh` file for editing. The full path to `catalina.sh` on Linux systems is:

```
/opt/QLogic_Corporation/QConvergeConsole/apache-tomcat-x.x
```

3. Locate the following statement:

```
CATALINA_OUT="$CATALINA_BASE"/logs/catalina.out
```

4. Change the file name in `"$CATALINA_BASE"/logs/catalina.out` to the appropriate file name. For example:

```
CATALINA_OUT="$CATALINA_BASE"/logs/QCC.out
```

5. Save the change and close the file.
6. Restart the Tomcat server by issuing the following command:

```
./catalina.sh start
```

## Configure Tomcat on Solaris-based Systems

The QConvergeConsole installer installs Tomcat version 7 on Solaris systems. For Tomcat 7, the log file is set up in script file `catalina.sh`. The script contains three references to the log file.

### To update the log file name in Solaris:

1. Stop the Tomcat server by issuing the following command on a command line:

```
./catalina.sh stop
```

2. Open the `catalina.sh` file for editing. The full path to `catalina.sh` on Solaris systems is:

```
/opt/QLogic_Corporation/QConvergeConsole/apache-tomcat-x.x/bin
```

3. Locate the following statement:

```
touch "$CATALINA_BASE"/logs/catalina.out
```



4. Change the file name in "\$CATALINA\_BASE"/logs/catalina.out to the appropriate file name. For example:

```
touch "$CATALINA_BASE"/logs/QCC.out
```

5. About 12 lines farther down, locate the following line:

```
>> "$CATALINA_BASE"/logs/catalina.out 2>&1 &
```

Make a similar change to this line as was done in [Step 4](#):

```
>> "$CATALINA_BASE"/logs/QCC.out 2>&1 &
```

6. About 12 lines farther down, locate the following line:

```
>> "$CATALINA_BASE"/logs/catalina.out 2>&1 &
```

Make the same change to this line as was done previously:

```
>> "$CATALINA_BASE"/logs/QCC.out 2>&1 &
```

7. Save the change and close the file.
8. Restart the Tomcat server by issuing the following command on the command line:

```
". /catalina.sh start"
```

## Installing QLogic QConvergeConsole Beside SSMC and vPower NFS Service

To install QLogic QConvergeConsole SSMC and vPower NFS service:

1. Download and extract the QConvergeConsole installer.
2. To ensure that TCP port 8080,8443, and 111 are not in use ([Figure 5-6](#)), issue the following command:

```
netstat -ano | find "0.0.0.0:<port number>"
```

```

Administrator: Command Prompt
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

U:\>netstat -ano | find "0.0.0.0:8080"

U:\>netstat -ano | find "0.0.0.0:8443"
  TCP    0.0.0.0:8443          0.0.0.0:0           LISTENING       38692

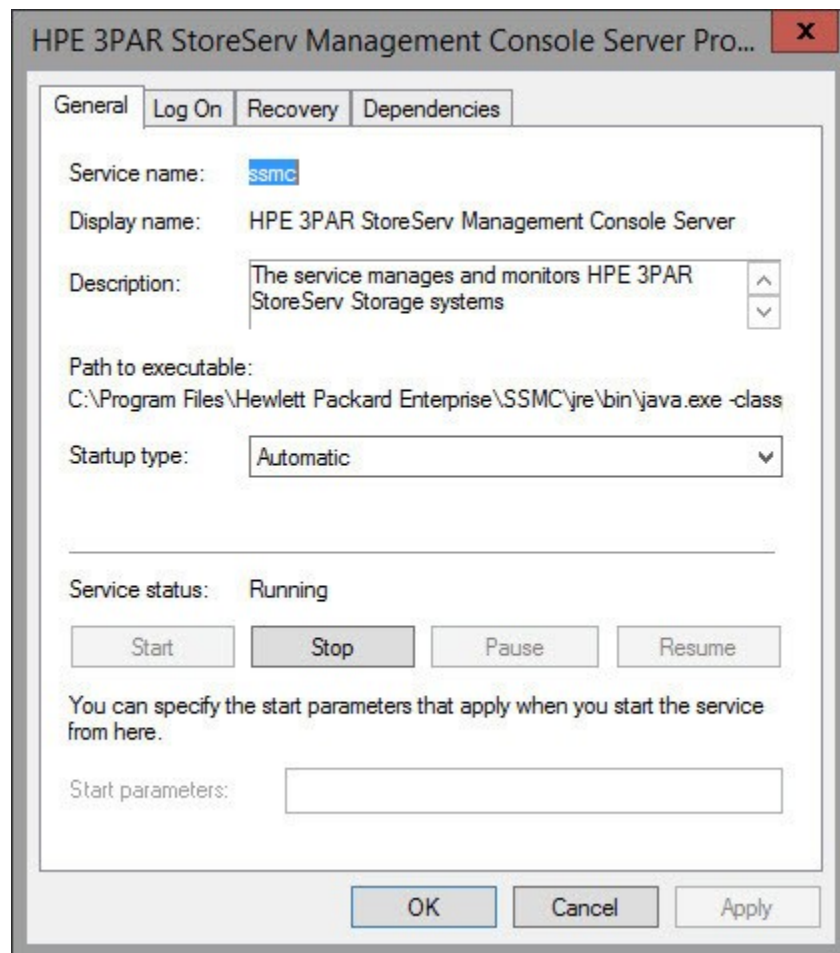
U:\>netstat -ano | find "0.0.0.0:111"
  TCP    0.0.0.0:111         0.0.0.0:0           LISTENING       33000
  UDP    0.0.0.0:111         *:*                  LISTENING       33000

U:\>_

```

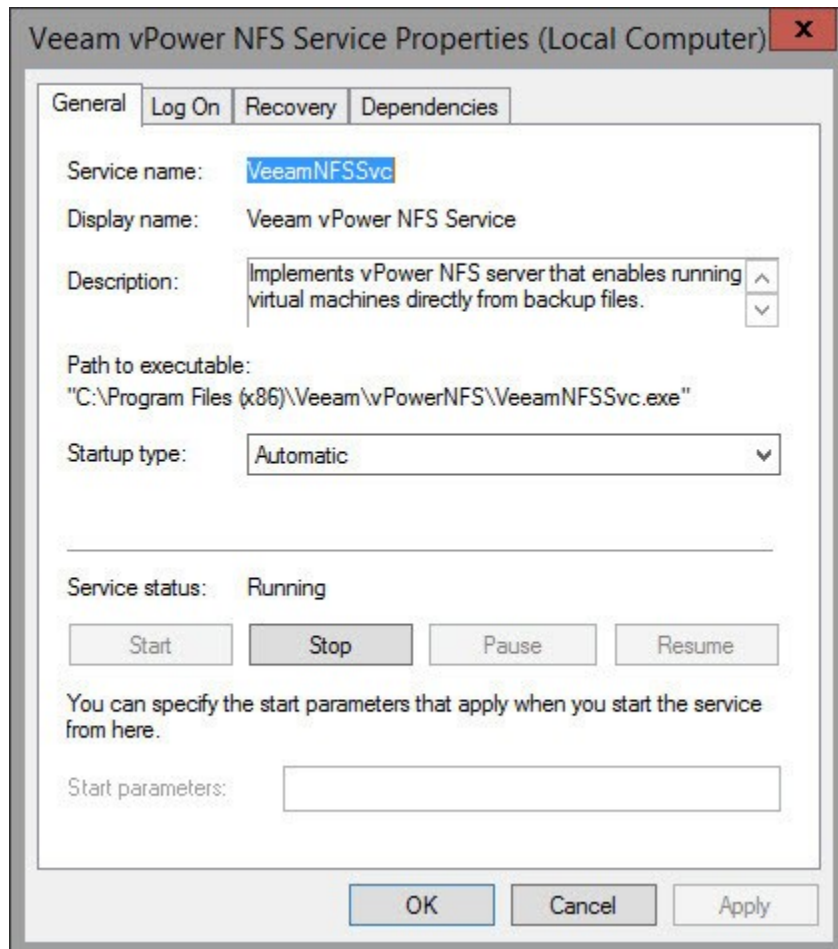
**Figure 5-6. TCP Ports 8080, 8443, and 111 Usage**

3. Complete the appropriate procedure that apply:
  - If any ports listed in [Step 2](#) are in use, continue with [Step 4](#).
  - If no ports listed in [Step 2](#) are in use, skip to [Step 6](#).
4. Complete the following to temporarily stop SSMC and VBR vPower NFS service:
  - a. Open Task Manager or Process Explorer.
  - b. Select and right-click the **ssmc** service, and then select **Properties**.
  - c. In the HPE 3PAR StoreServ Management Console Server Properties, General page, under **Service status**, click **Stop**, as shown in [Figure 5-7](#).



**Figure 5-7. HPE 3PAR StoreServ Management Console Server Properties Window**

- d. Select and right-click the **VeeamNFSSvc** service, and then click **Properties**.
- e. In the Veeam vPower NFS Service Properties, General page, under **Service status**, click **Stop**, as shown in [Figure 5-8](#).



**Figure 5-8. Veeam vPower NFS Service Properties**

5. Repeat [Step 2](#).
6. Launch the QCC installer as an Administrator.
7. Click **Next** until you reach the **Please enter desired port number** window.
8. Click **Install**.
9. Click **Yes** to restrict access to localhost only (if applicable).

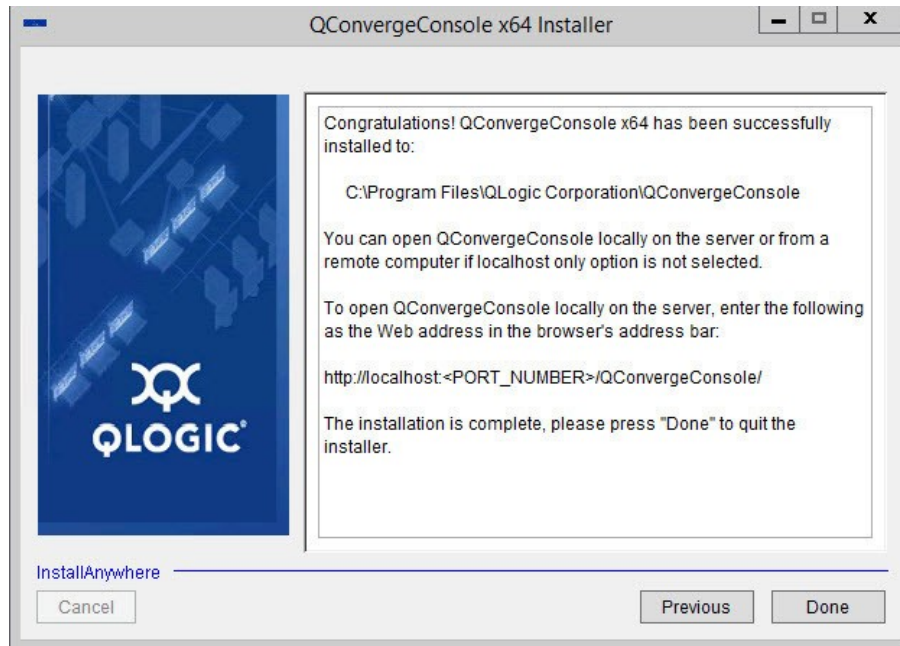
10. In the Security Login Configuration window (Figure 5-9), complete the following:
  - a. Type a value in the **Login ID** box.
  - b. Type a value in the **Password** box.
  - c. Select the **Check this box to enable Security Login** check box (if applicable).
  - d. Click **Next**.



**Figure 5-9. Security Login Configuration Window**

11. Click **Yes** to enable SSL feature (if applicable).

12. Take note of the URL provided as shown in [Figure 5-10](#), and then click **Done**.



**Figure 5-10. QConvergeConsole Installer**

13. Start installing the necessary management agents.

#### NOTE

When you start the installation, the installer will install the **ONCPortmap** service.

14. To check if TCP ports 8080, 8443, and 111 are in use (after all the management agents have been installed), issue the following command:

```
netstat -ano | find "0.0.0.0:<port number>"
```

**NOTE**

All three ports should now be in use as shown in [Figure 5-11](#).

```

Administrator: Command Prompt
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

U:\>netstat -ano | find ":8080"
TCP    0.0.0.0:8080          0.0.0.0:0           LISTENING           11060
TCP    127.0.0.1:8080       127.0.0.1:50166    TIME_WAIT           0
TCP    127.0.0.1:8080       127.0.0.1:50172    TIME_WAIT           0
TCP    [::]:8080           [::]:0             LISTENING           11060

U:\>netstat -ano | find ":8443"
TCP    0.0.0.0:8443         0.0.0.0:0           LISTENING           11060
TCP    127.0.0.1:8443       127.0.0.1:50167    TIME_WAIT           0
TCP    127.0.0.1:8443       127.0.0.1:50173    TIME_WAIT           0
TCP    [::]:8443           [::]:0             LISTENING           11060

U:\>netstat -ano | find ":111"
TCP    0.0.0.0:111         0.0.0.0:0           LISTENING           7292
UDP    0.0.0.0:111         *:*:                LISTENING           7292

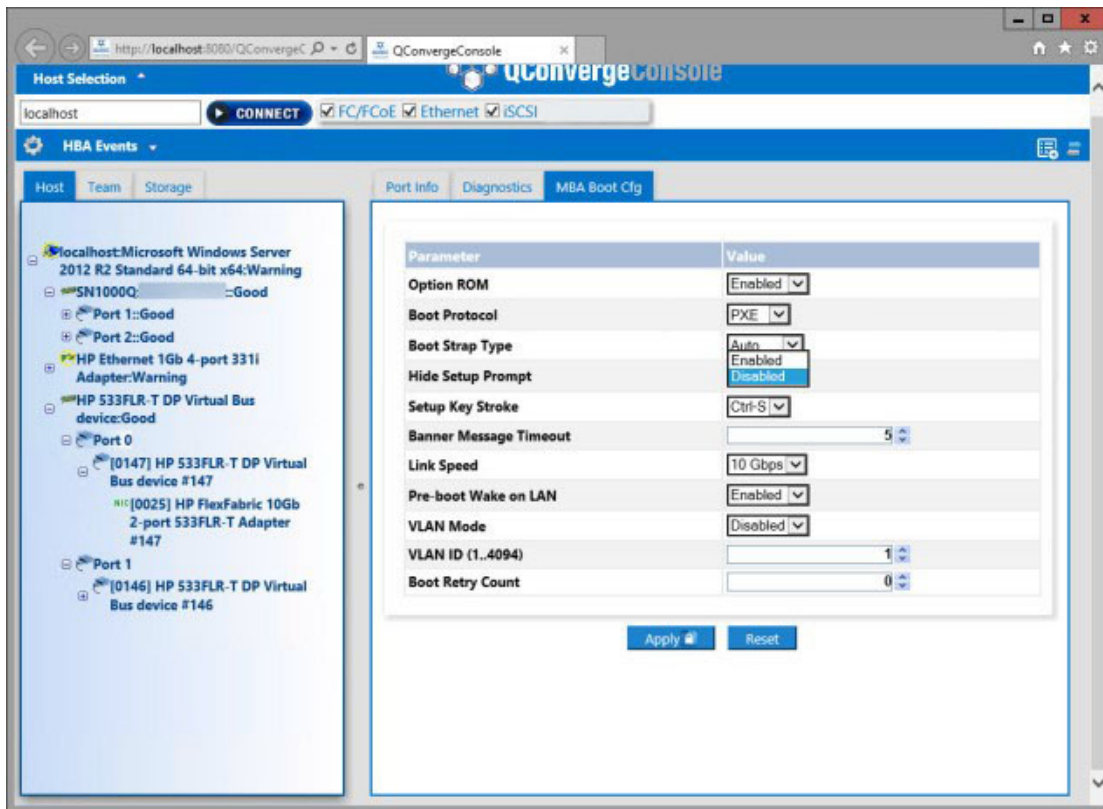
U:\>_

```

**Figure 5-11. TCP Ports 8080,8443, and 111 in Use**

15. Set the following services to manually start:
  - ONC/RPC Portmapper
  - QLManagementAgentJava
  - QLogic Management Suite FastLinQ
  - QLogic Management Suite Java iQAgent
  - QLogicManagementSuiteQLRemote
  - Tomcat7
16. Open a Web browser and go to the URL provided in [Step 12](#).
17. In the **Host Selection** box, type `localhost`, and then click **Connect**.
18. In the QConvergeConsole GUI system tree, select one of the ports.

19. Click the **MBA Boot Cfg** tab, and then complete the following on the MBA Boot Cfg page (Figure 5-12):
  - a. For the **Hide Setup Prompt** option, select **Enabled**.
  - b. Click **Apply**.



**Figure 5-12. MBA Boot Cfg Page**

20. Complete the password information as follows:
  - a. Type the appropriate password in the **Password** box.

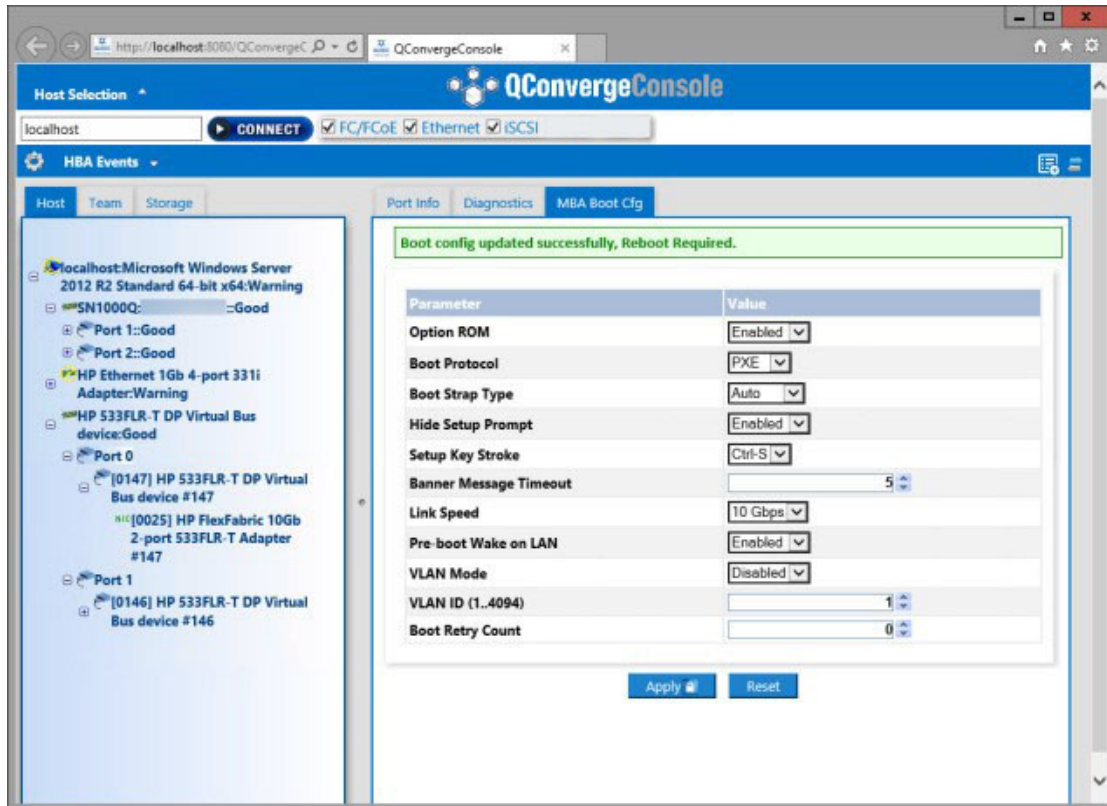
#### NOTE

If the password is not yet set up, the default password is **config**.

- b. Select the **Save password for current session** check box (if applicable).
- c. Click **OK**.

**NOTE**

If you provide the correct password, the message, “Boot config updated successfully, Reboot required” as shown in [Figure 5-13](#).



**Figure 5-13. Boot Config Updated Successfully Message**

21. Reboot the system.
22. Start the SSMC and VBR Services after reboot.



# A Revision History

| Document Revision History            |                   |
|--------------------------------------|-------------------|
| Revision 1, January 21, 2021         |                   |
| Changes                              | Sections Affected |
| Application of Dell/Marvell branding | All               |

# Glossary

## adapter

The board that interfaces between the host system and the target devices. Adapter is synonymous with *host bus adapter (HBA)*, *host adapter*, and *adapter board*.

## adapter port

A port on the adapter board.

## CLI

Command line interface. A program interface driven by entering commands and parameters.

## Converged Network Adapter

Marvell QLogic Converged Network Adapters support both data networking (TCP/IP) and storage networking (Fibre Channel) traffic on a single I/O adapter using two new technologies: [Enhanced Ethernet](#) and Fibre Channel over Ethernet (FCoE).

## command line interface

See [CLI](#).

## device

A [target](#), typically a disk drive. Hardware such as a disk drive, tape drive, printer, or keyboard that is installed in or connected to a system. In Fibre Channel, a *target* device.

## driver

The software that interfaces between the file system and a physical data storage device or network media.

## Enhanced Ethernet

Also called *Data Center Ethernet* or *Converged Enhanced Ethernet*. Refers to new enhancements to the existing Ethernet standard that eliminate Ethernet's inherently lossy nature and make 10Gb Ethernet a viable storage networking transport.

## Ethernet

The most widely used LAN technology that transmits information between computer, typically at speeds of 10 and 100 million bits per second (Mbps).

## FC

See [Fibre Channel](#).

## FCoE

Fibre Channel over Ethernet. A new technology defined by the T11 standards body that allows traditional Fibre Channel storage networking traffic to travel over an Ethernet link by encapsulating Fibre Channel frames inside Layer 2 Ethernet frames. For more information, visit [www.fcoe.com](http://www.fcoe.com).

### **Fibre Channel**

A high-speed serial interface technology that supports other higher layer protocols such as SCSI and [IP](#).

### **Fibre Channel over Ethernet**

See [FCoE](#).

### **Internet Protocol**

See [IP](#).

### **Internet small computer system interface**

See [iSCSI](#).

### **IP**

Internet Protocol. A method by which data are sent from one computer to another over the Internet. IP specifies the format of packets, also called *datagrams*, and the addressing scheme.

### **iSCSI**

Internet small computer system interface. Protocol that encapsulates data into IP packets to send over Ethernet connections.

### **management workstation**

PC workstation used to manage routers remotely by connecting to the routers using the QConvergeConsole GUI or CLI commands.

### **path**

A path to a device is a combination of a adapter [port instance](#) and a target port as distinct from internal paths in the fabric network. A fabric network appears to the operating system as an opaque network between the adapter (initiator) and the target.

Because a path is a combination of an adapter and a target port, it is distinct from another path if it is accessed through a different adapter or it is accessing a different target port. Consequently, when switching from one path to another, the driver might be selecting a different adapter (initiator), a different target port, or both.

This is important to the driver when selecting the proper method of failover notification. It can make a difference to the target device, which might have to take different actions when receiving retries of the request from another initiator or on a different port.

### **port**

Access points in a device where a link attaches. The four major port types are:

- **N\_Port**—a Fibre Channel port that supports point-to-point topology.
- **NL\_Port**—a Fibre Channel port that supports loop topology.
- **F\_Port**—a port in a fabric where an N\_Port can attach.
- **FL\_Port**—a port in a fabric where an NL\_Port can attach.

### **port instance**

The number of the port in the system. Each adapter may have one or multiple ports, identified with regard to the adapter as port 0, port 1 and so forth. To avoid confusion when dealing with a system containing numerous ports, each port is assigned a port instance number when the system boots up. So Port 0 on an adapter might have a port instance number of 8, for example, if it is the eighth port discovered by the system.

**RAID**

Redundant array of independent/inexpensive disks. RAID are fault-tolerant disks that look like either single or multiple volumes to the server.

**RAM**

Random-access memory. The most common computer memory that can be used by programs to perform necessary tasks while the computer is on; an integrated circuit memory chip. RAM allows information to be stored or accessed in any order (randomly), and all storage locations are equally accessible.

**random-access memory**

See [RAM](#).

**redundant array of independent/inexpensive disks**

See [RAID](#).

**SAN**

Storage area network. Multiple storage units (disk drives) and servers connected by networking topology.

**secure sockets layer**

See [SSL](#).

**SSL**

Secure sockets layer. A cryptographic protocol that provides communications security over the Internet.

**storage area network**

See [SAN](#).

**target**

The storage-device endpoint of a SCSI session. Initiators request data from targets. Targets are typically disk-drives, tape-drives, or other media devices. Typically a SCSI peripheral device is the target but an adapter may, in some cases, be a target. A target can contain many LUNs.

A target is a device that responds to a requested by an initiator (the host system). Peripherals are targets, but for some commands (for example, a SCSI COPY command), the peripheral may act as an initiator.

**TCP**

Transmission control protocol. A set of rules to send data in packets over the Internet protocol.

**transmission control protocol**

See [TCP](#).

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