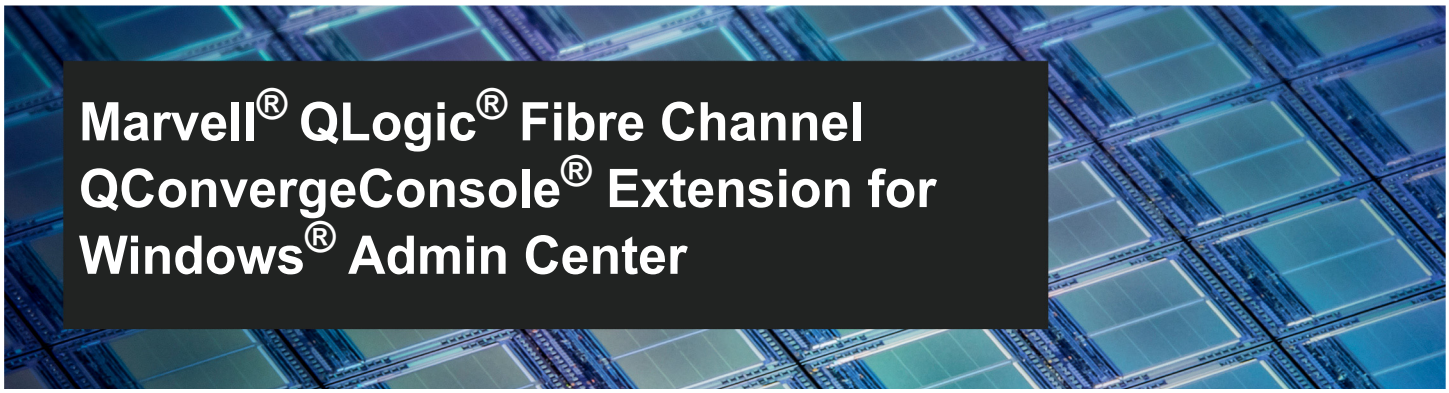

Marvell® QLogic® Fibre Channel QConvergeConsole® Extension for Windows® Admin Center

2600, 2700, 2800 Series Marvell QLogic Fibre Channel Adapters

User's Guide

Doc No. TD-001728 Rev. 6

June 10, 2024

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Preface

This user's guide provides information on installing and using the Marvell QLogic Fibre Channel (FC) QConvergeConsole Extension for Windows Admin Center (WAC). This extension provides the tools to manage the Marvell QLogic 2600/2700/2800 Series Adapters.

The Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center provides functionality similar to Marvell's QConvergeConsole® (QCC) GUI.

Intended Audience

This guide is intended for use by administrators who are planning to use Windows Admin Center to monitor and configure their Marvell QLogic FC adapters.

What Is in This Guide

This user's guide contains information you need to install and navigate the Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center. This preface explains the purpose of the extension, identifies this guide's intended audience, describes the typographic conventions used in this guide, and provides technical support and contact information.

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

- Chapter 1 General Information provides an overview of the Windows Admin Center (WAC), describes the functionality of the Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center, and lists the components you need to run the extension locally or remotely.
- Chapter 2 Installing, Updating, and Uninstalling Marvell QLogic FC QConvergeConsole provides instructions on how to install, update and remove the Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center.
- Chapter 3 Getting Started describes how to use the Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center to configure and monitor your Marvell QLogic FC adapters.

- Appendix A Universal SAN Congestion Mitigation describes Marvell's Universal SAN Congestion Mitigation (USCM) feature and how to use it in the Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center.
- Appendix B USCM Virtual Lanes provides information for USCM virtual lanes feature to Marvell QLogic adapters using WAC Extension.
- Appendix C Revision History contains a list of changes made to this guide since the last revision.

Related Materials

For information about downloading documentation from the Marvell Web site, see "Downloading Updates and Documentation" on page x.

For information about Windows Admin Center, see the following:

Videos

- YouTube: What's new with Windows Admin Center v1904 | Windows Server Summit 2019
- YouTube: Go hybrid with Windows Admin Center | Windows Server Summit 2019

Documents

- Windows Admin Center
  https://docs.microsoft.com/en-us/windows-server/manage/windows-admin-center/overview
- Windows Admin Center Extensions
  https://docs.microsoft.com/en-us/windows-server/manage/windows-admin-center/extend/extensibility-overview

  Tool Extensions

  - https://docs.microsoft.com/en-us/windows-server/manage/windows-admin-center/extend/understand-extensions#tool-extensions

  Solution Extensions

  - https://docs.microsoft.com/en-us/windows-server/manage/windows-admin-center/extend/understand-extensions#solution-extensions
- *Marvell QLogic PowerKit User's Guide*, part number TD-001187

Documentation Conventions

This guide uses the following documentation conventions:

- The Marvell QLogic 2600/2700/2800 adapters are collectively referred to as the *Marvell adapter, Marvell QLogic FC adapter*, or *adapter*.
- The Windows Admin Center is referred to as *WAC*.
- The Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center is also referred to as *Marvell QLogic FC QConvergeConsole*.
- **NOTE** provides additional information.
- **CAUTION** without an alert symbol indicates the presence of a hazard that could cause damage to equipment or loss of data.
- 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 3-6.
  - For more information, visit 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 screen output. For example:
  - To return to the root directory from anywhere in the file structure: Type `cd /root` and press ENTER.

  Text in **`Courier bold`** font indicates a command. For example:
  - 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 within this guide.

Technical Support

Customers should contact their authorized maintenance provider for technical support of their Marvell products.

Downloading Updates and Documentation

To download firmware, software, and documentation:

1. Go to www.marvell.com.
2. Click **Support,** and then under **Tools & Resources**, click **Driver Downloads**.
3. In the Marvell Drivers window:
   a. (MUST) Under CATEGORY, select either FIBRE CHANNEL ADAPTERS or CONVERGED NETWORK ADAPTERS.
   b. (optional) Under PLATFORM/OS, select the platform/OS that matches your system.
   c. (optional) Under PART NUMBER, select the part number for your adapter.
   d. (optional) Under KEYWORDS, type a keyword describing what you are looking for.
4. Click **Apply**.

5. Locate the firmware (boot code), software (drivers, management tools), or document (documentation for user's guides) you need, and then do one of the following:

   a. Click the blue text in the DESCRIPTION column.

   b. Click the arrow in the DOWNLOAD column.

NOTE

Marvell recommends downloading the associated Read Me and Release Notes for more information. To find them, enter either **Read Me** or **Release Notes** in the KEYWORDS search box.

A message may appear asking you to review and accept the Marvell Limited Use License Agreement.

6. If applicable, read the agreement, select the check box, and then click **I ACCEPT** to accept the end license agreement and start the download.

1 General Information

This chapter provides an overview of the Windows Admin Center (WAC), describes the functionality of the Marvell QLogic FC QConvergeConsole, and lists the components you need to run the extension locally or remotely.

NOTE

The Marvell QLogic FC QConvergeConsole provides functionality similar to Marvell's QConvergeConsole GUI, which is no longer supported.

Windows Admin Center

If you are unfamiliar with WAC, the following sections provide a general overview of this product.

NOTE

For more information about the Windows Admin Center, see the information in "Related Materials" on page viii.

If you are familiar with WAC, continue to "Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center" on page 3.

Introduction

Windows Admin Center is a locally-deployed, browser-based (GUI) app for managing Windows Server®(s). It is marketed as a *single-pane-of-glass* for managing multiple Windows systems. After adding WAC to a Windows system, you can interact with the Windows registry, view devices and processes, execute PowerShell® commands, and so on, all from a web browser.

WAC manages the Windows operating system through the *WAC gateway* installed on the Windows Server. The gateway manages servers by using remote PowerShell and Windows Management Instrumentation (WMI) over Windows Remote Management (WinRM). The gateway is included with Windows Admin Center in an .msi package that you can download.

How it Works

When you first open the WAC GUI, all the available connections are listed, as shown in Figure 1-1.

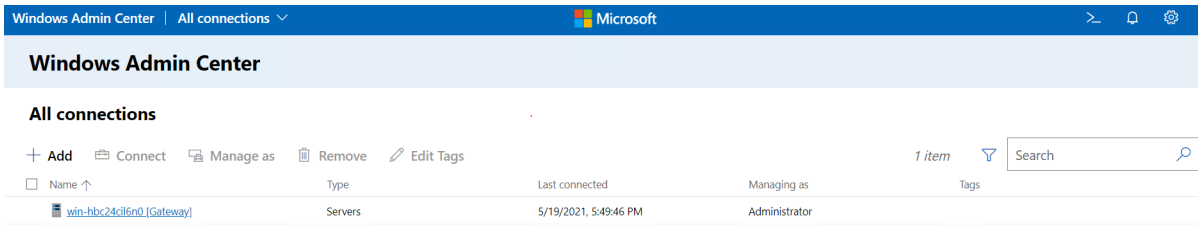

Figure 1-1. WAC Home Page

After you select a connection, WAC displays information about the system (right side) as well as the available tools (left side), as shown in Figure 1-2.

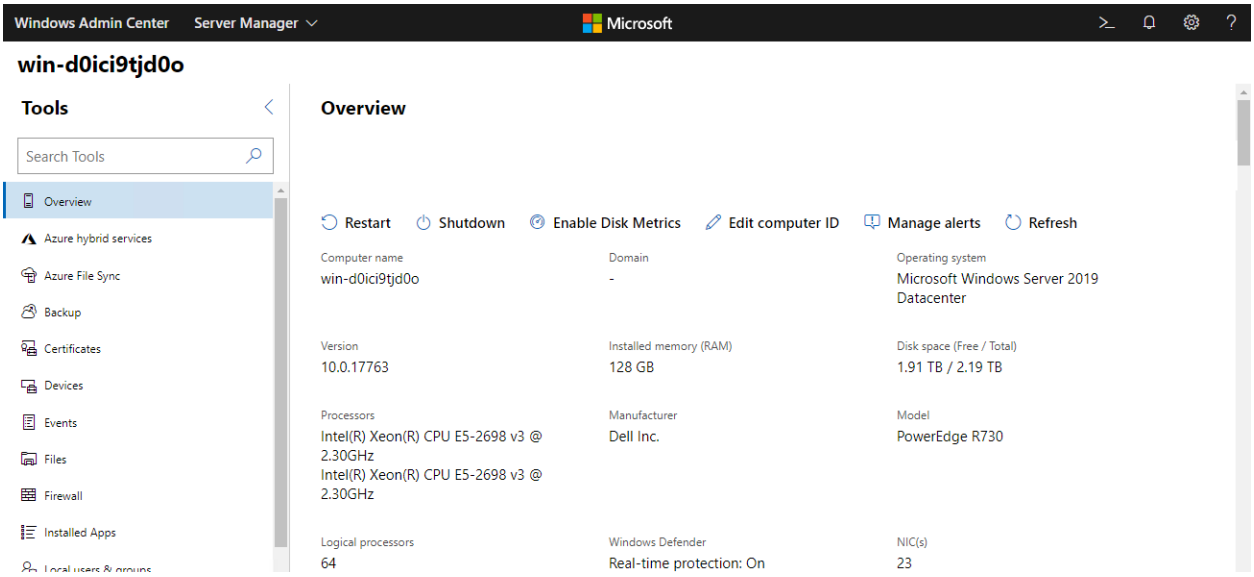

Figure 1-2. WAC When Connected to the Local System

Windows Admin Center Extensions

WAC has been built to be extensible. There are two types of extensions: tool and solution, as shown in Figure 1-2.

Tools

The **Tools** pane, located on the left side of the page, contains a list of available options. After you select a tool, the tool is loaded and displayed on the on the right side of the page.

Extensions

To access the extensions, select **Server Manager** in the top-left of the page. By default, there are four available solution extensions:

- Server Manager
- Computer Management
- Failover Cluster Manager
- Hyper-Converged Cluster Manager

By clicking a different solution extension, the entire list of tools changes. Solutions typically define a unique type of object to be managed through WAC, such as servers, PCs, or failover clusters. In addition, solutions can be developed for connecting to and managing other devices such as network switches, Linux® servers, and so on. The Marvell QLogic FC QConvergeConsole is one such solution.

Marvell QLogic Fibre Channel QConvergeConsole Extension for Windows Admin Center

Microsoft allows the development of WAC extensions. The Marvell QLogic FC QConvergeConsole allows you to access Marvell's Marvell QLogic FC adapters through the WAC GUI interface.

Marvell QLogic FC QConvergeConsole can be installed on either a local or remote system, as described in the following sections.

Local System Configuration

When the local (physical) Windows Server contains the Marvell QLogic FC adapters, Marvell QLogic FC QConvergeConsole and required components are installed on this server, and FC PowerKit cmdlets get and set the Marvell QLogic FC adapter configuration locally though a GUI interface.

Figure 1-3 shows the necessary components and configuration for a local system installation. Components in the blue boxes comprise the Marvell QLogic FC QConvergeConsole.

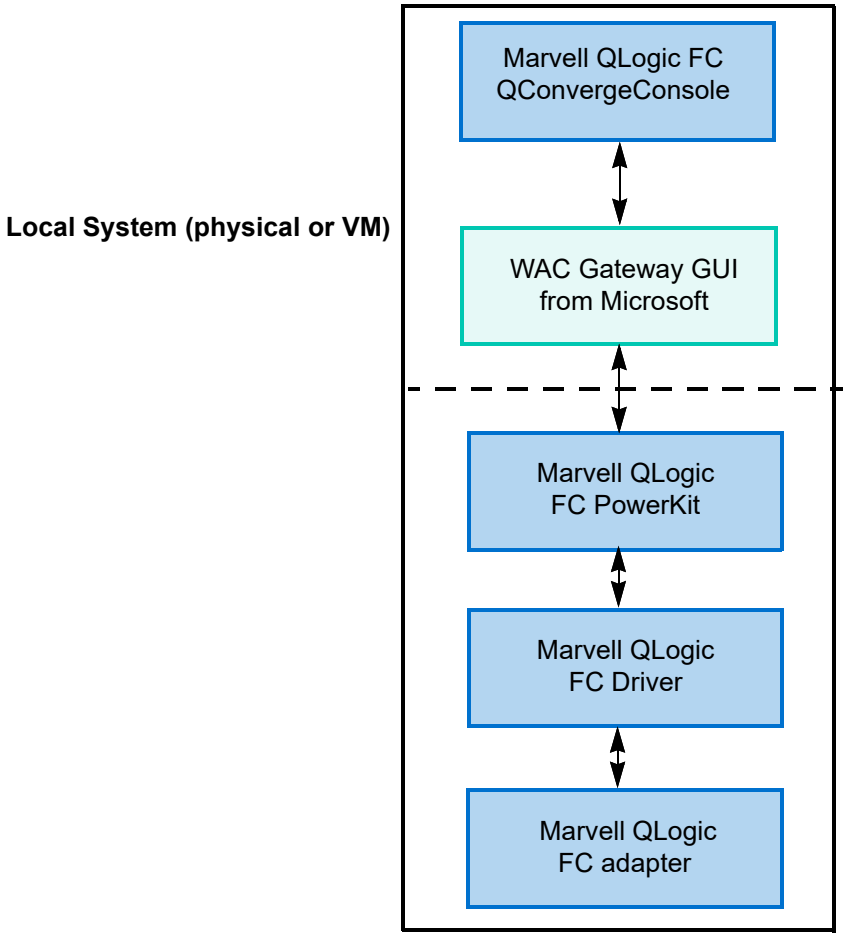

Figure 1-3. Local Configuration of Marvell QLogic FC QConvergeConsole

Remote System Configuration

In a remote system WAC configuration, one local, physical Windows Server or virtual machine (VM) is connected to one or more physical servers.

In a remote connection, the components are installed as follows:

- Local Windows system (physical or VM)
  - ❑ Marvell QLogic FC QConvergeConsole
  - ❑ WAC Gateway GUI from Microsoft

- Remote Windows system (physical server with Marvell QLogic FC adapters installed)
  - ❑ WAC Gateway GUI from Microsoft
  - ❑ Marvell QLogic FC PowerKit
  - ❑ Marvell QLogic FC Driver
  - ❑ Marvell QLogic FC Adapter

The application and required components are connected to each other using an IP address through WAC server connectivity.

A remote system configuration (WAC-to-WAC) is illustrated in Figure 1-4.

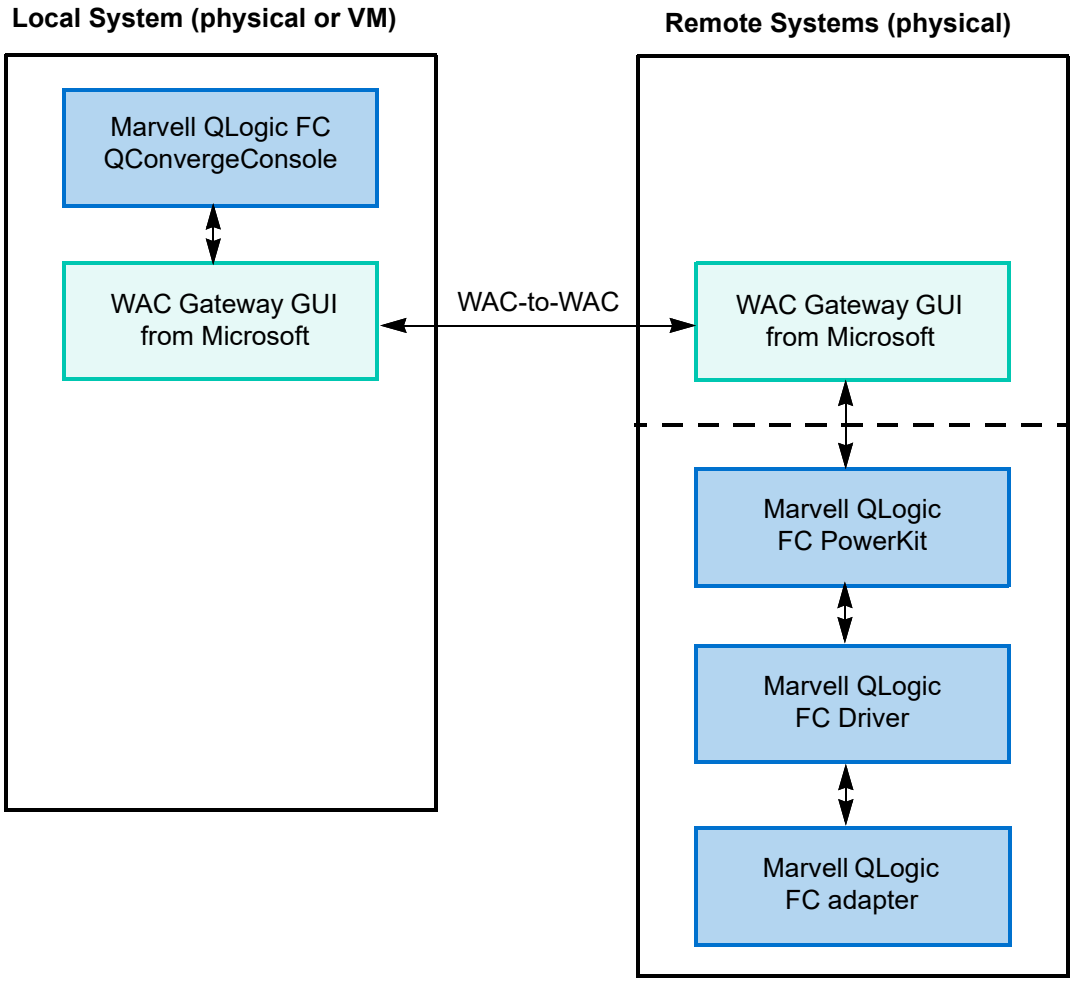

Figure 1-4. Remote Configuration of Marvell QLogic FC QConvergeConsole

System Requirements

This section lists the components you need to use the Marvell QLogic FC QConvergeConsole with Marvell QLogic FC adapters.

NOTE

Before installing the Marvell QLogic FC QConvergeConsole, the most recent version of the Marvell Fibre Channel (MRVLFC) PowerKit must be installed on the server where the Marvell QLogic FC adapters are installed. For PowerKit installation instructions, see the *Marvell QLogic PowerKit User's Guide*.

Hardware Requirements

Marvell QLogic FC QConvergeConsole requires a local or remote Windows Server with one or more of the Marvell QLogic 2600/2700/2800 Series Fibre Channel Adapters installed.

- The local system can be one of the following:
  - A physical system or a VM for a remote connection
  - A physical system for a local connection
- The remote system or systems must be physical servers.

Software Requirements

The following software is needed for Marvell QLogic FC QConvergeConsole:

- Marvell QLogic FC QConvergeConsole package
- Marvell QLogic Fibre Channel (MRVLFC) PowerKit
- Marvell QLogic FC driver

Marvell QLogic FC QConvergeConsole is supported on the following operating systems:

- Windows Server 2019
- Windows Server 2022

NOTE

The Marvell QLogic 2670 Series Adapters are not supported on Windows.

2 Installing, Updating, and Uninstalling Marvell QLogic FC QConvergeConsole

This chapter provides instructions on downloading, installing, updating, and uninstalling Marvell QLogic FC QConvergeConsole.

Before You Begin

Before you install Marvell QLogic FC QConvergeConsole:

1. Install the latest version of the Marvell Fibre Channel (MRVLFC) PowerKit on the server or servers where the Marvell QLogic FC adapters are installed.

   For installation instructions, see the *Marvell QLogic PowerKit User's Guide*.

2. Ensure that you have a browser that supports the Windows Admin Center; download a supported browser if required.

   For a list of supported browsers, go to:

   https://aka.ms/WindowsAdminCenter-Browsers

3. Download and install the Windows Admin Center on all servers on the system. Windows Admin center is located at:

   https://docs.microsoft.com/en-us/windows-server/manage/windows-admin-center/understand/windows-admin-center

During the installation, you are asked to select a port for the Windows Admin Center host (Figure 2-1).

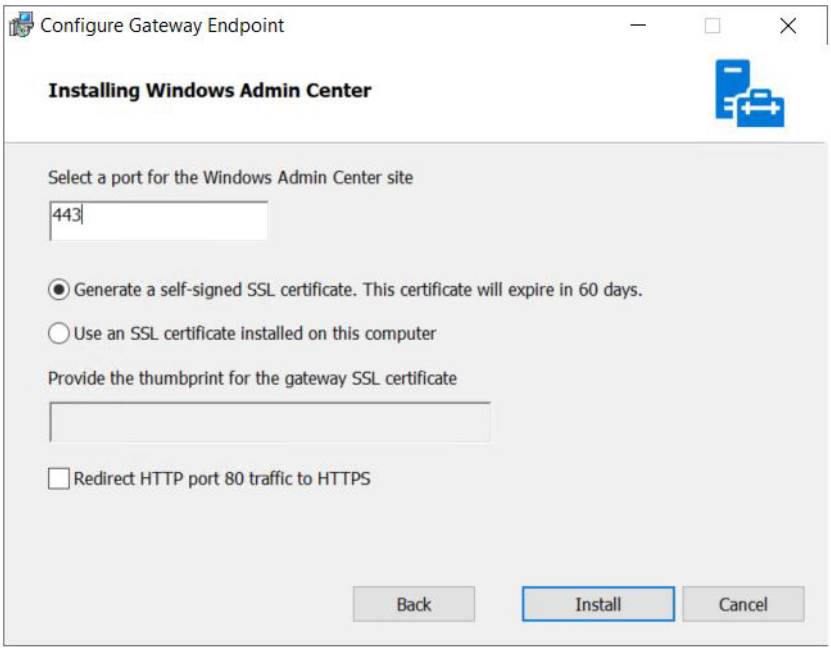

Figure 2-1. Select a Port for Windows Admin Center Site

Do one of the following:

a. To select the default port (443, as shown in Figure 2-1), click **Install**.

b. To select a different port, type the number in the **Select a port for the Windows Admin Center site** box, and then click **Install**.

The final screen (Figure 2-2) contains a link to the host and the corresponding port, as well as a link to a web site listing supported browsers.

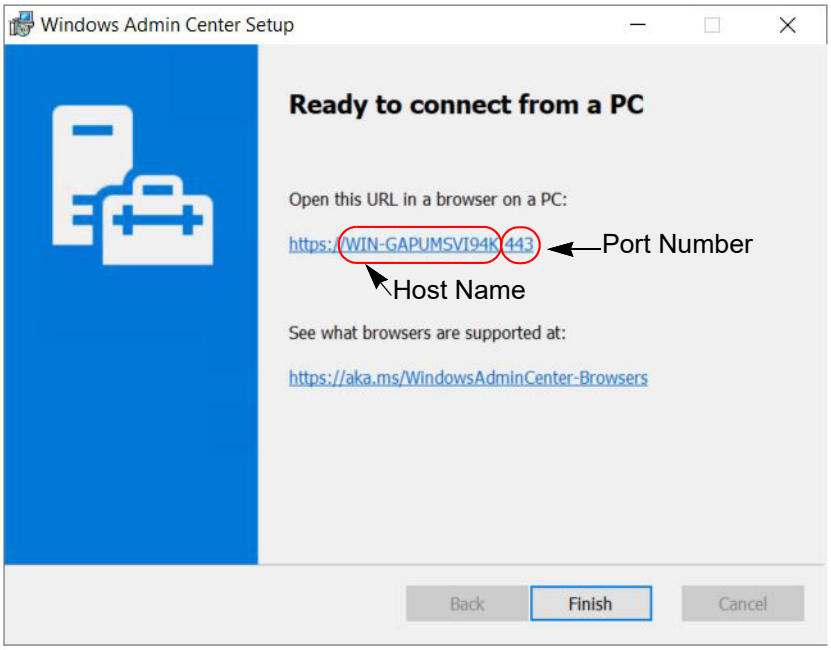

Figure 2-2. Ready to Connect From a PC

c. Do one of the following:

- Click the URL to open Windows Admin Center.
- Click the URL to open a list of browsers that support Windows Admin Center.
- Click **Finish**.

Downloading and Installing Marvell QLogic FC QConvergeConsole

To download and install Marvell QLogic FC QConvergeConsole on the local or remote systems:

1. Create a folder for the Marvell QLogic FC QConvergeConsole package, for example:

```
C:\WAC_pkgs
```

2. Download the Marvell QLogic FC QConvergeConsole package to the folder you created in Step 1.

   The package name is:

   `marvell.fcqconvergeconsole.<version number>.nupkg`

3. On the local host, open Windows Admin Center. The main page appears (Figure 2-3).

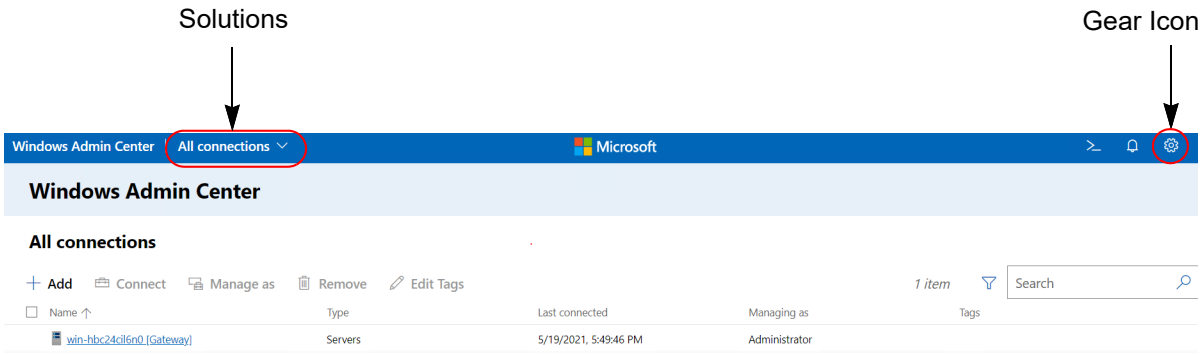

Figure 2-3. Windows Admin Center Main Page

4. Click the gear icon on the top right of the page (see Figure 2-3).

   The **Settings** options appear on the left side of the page (Figure 2-4).

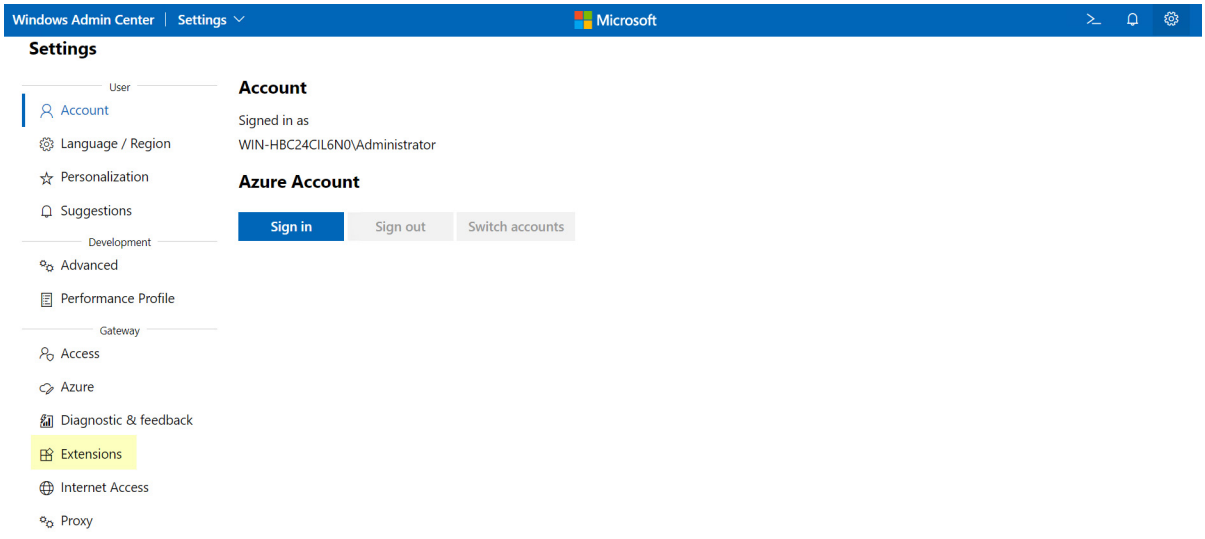

Figure 2-4. Settings

5. From the **Settings** options, under **Gateway**, click **Extensions** (highlighted in Figure 2-4).

   The **Extensions** information appears (Figure 2-5).

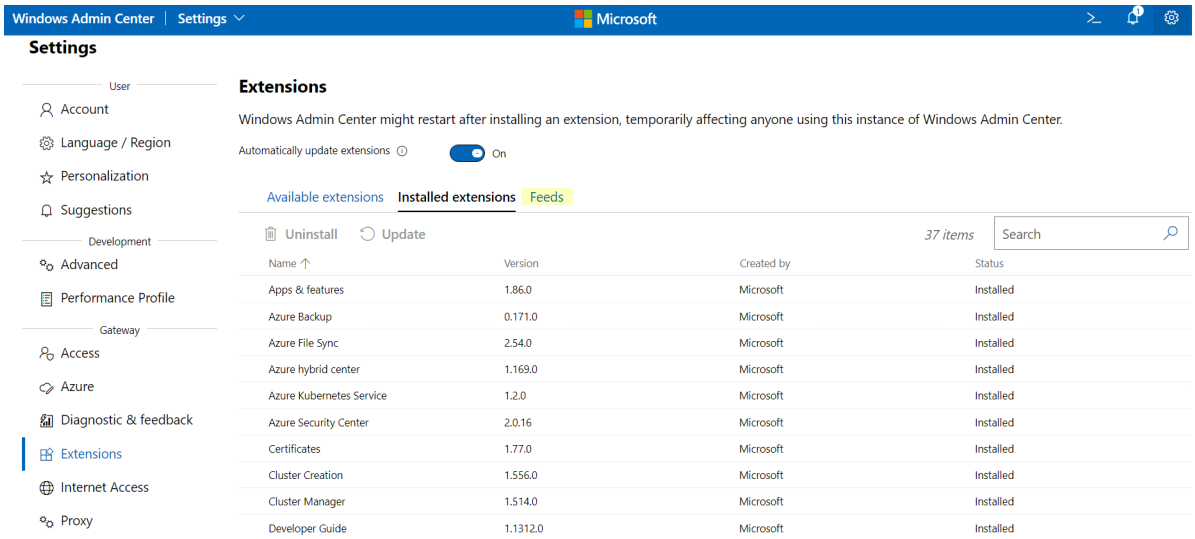

Figure 2-5. Extensions

6. Select **Feeds** (highlighted in Figure 2-5).

   A list of available feeds appears, along with the options to add or remove them.

7. Click **Add**.

The **Add package source** panel appears (Figure 2-6).

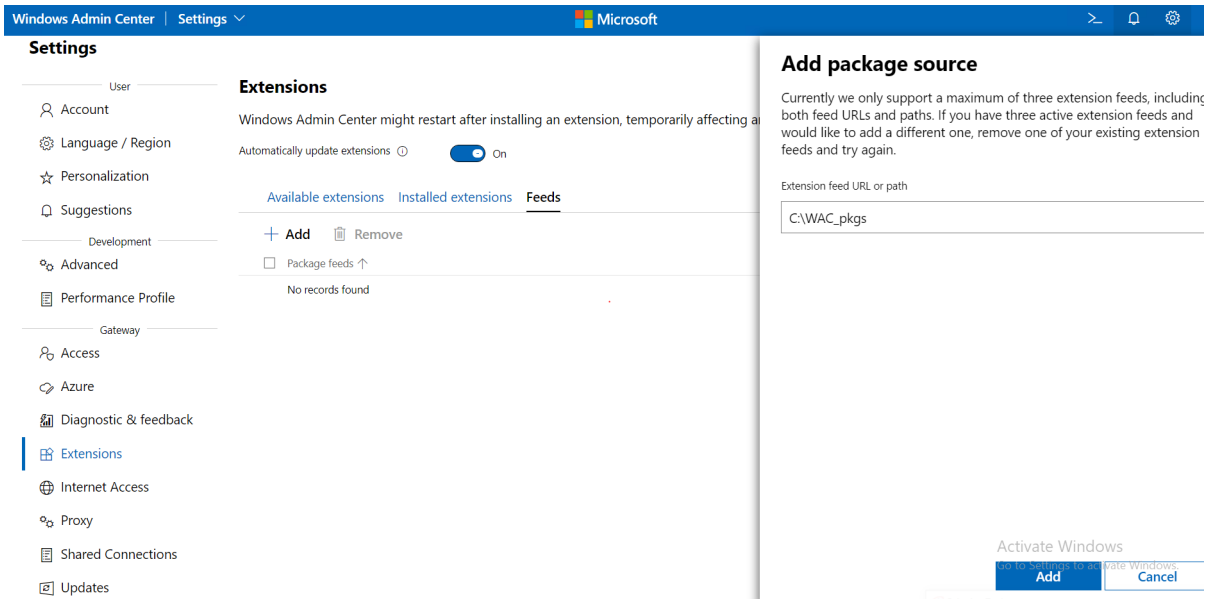

Figure 2-6. Add Package Source

8. In the **Extension feed URL or path** box, type the name of the path to Marvell QLogic FC QConvergeConsole. For example:

   `C:\WAC_pkgs`

9. Click the **Add** button at the bottom-right of the panel.
10. In the **Extensions** section, click **Available extensions**.

Marvell QLogic FC QConvergeConsole should be visible (Figure 2-7). Details about the extension are displayed at the bottom of the page.

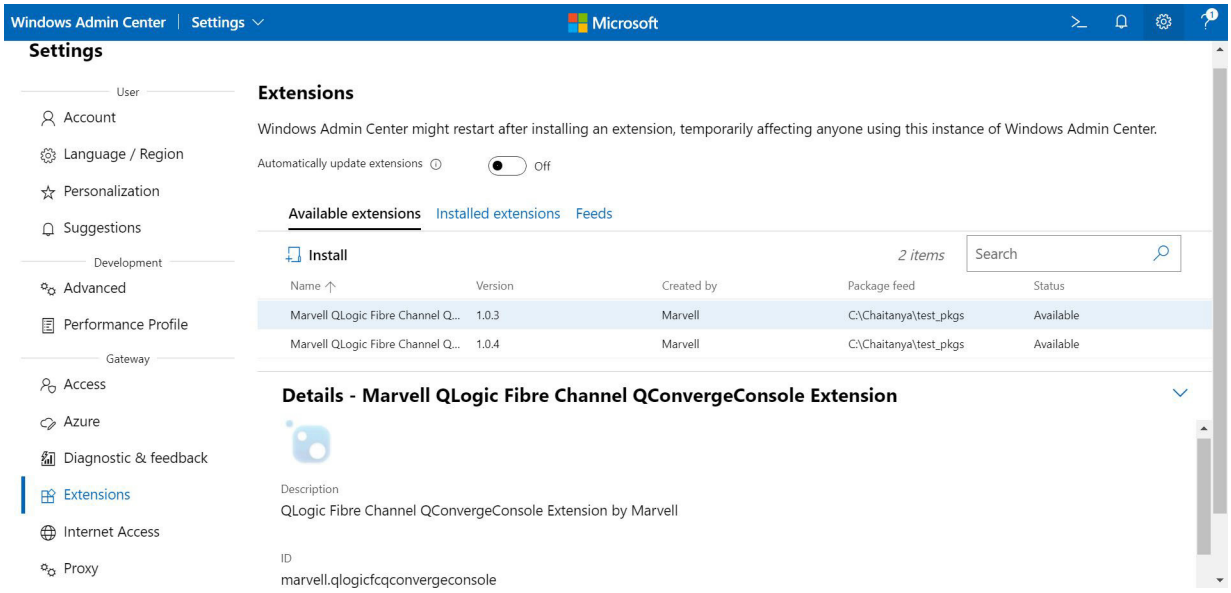

Figure 2-7. Marvell QLogic FC QConvergeConsole

11. Select **Marvell Fibre Channel QConvergeConsole Extension**, and then click **Install**.

    After the installation completes, WAC refreshes automatically. The extension no longer appears in the Available extensions page.

12. In the **Extensions** section, click **Installed extensions**.

Marvell QLogic FC QConvergeConsole should be displayed (Figure 2-8).

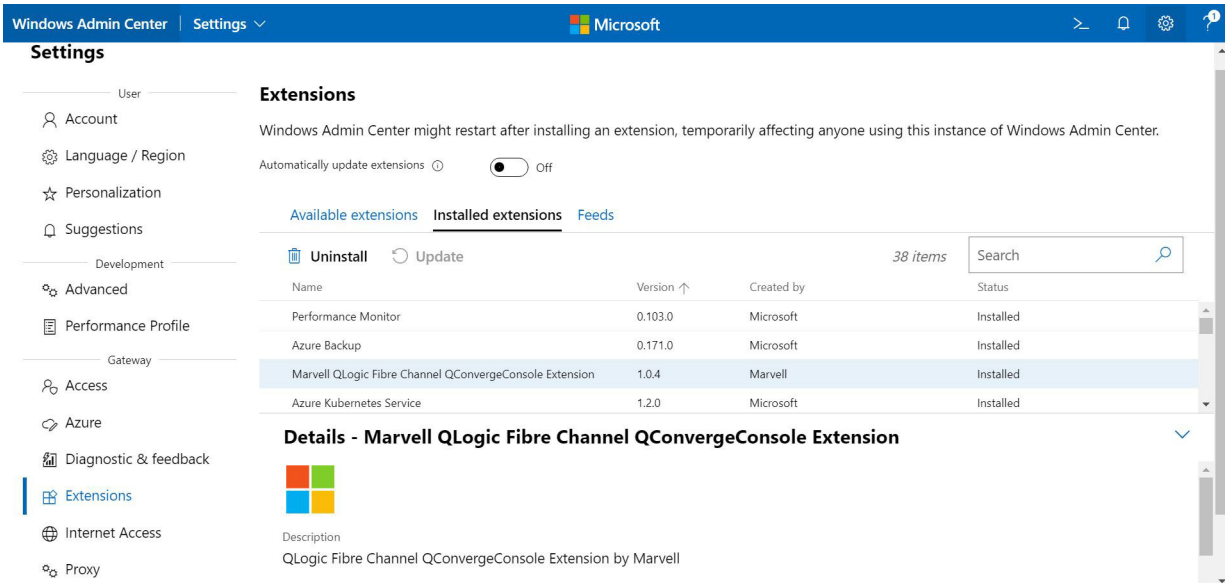

Figure 2-8. Marvell QLogic FC QConvergeConsole Installed Successfully

13. At the top-left corner, click **Windows Admin Center** to return to the main page.

Adding Servers

To add the servers you are using to the Windows Admin Center, do one of the following:

To connect to the server in a local configuration:

1. From the **Server Manager** menu, click **All connections**.
2. In the **All connections** section, click the option that contains the local host name followed by [Gateway]. In Figure 2-9, the name is win-hbc24cil6n0 [Gateway].

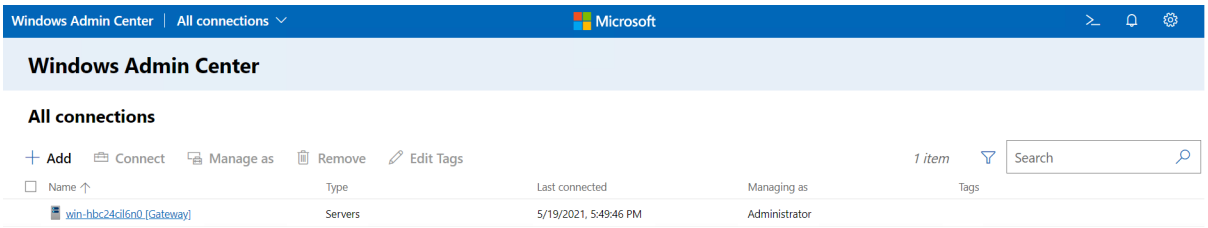

Figure 2-9. Connecting to Marvell QLogic FC QConvergeConsole on a Local Host

To connect a remote server (remote configuration):

1. Click **All connections** or **Server Manager**.
2. Click **Add**.

   The **Add or create resources** pane appears (Figure 2-10).

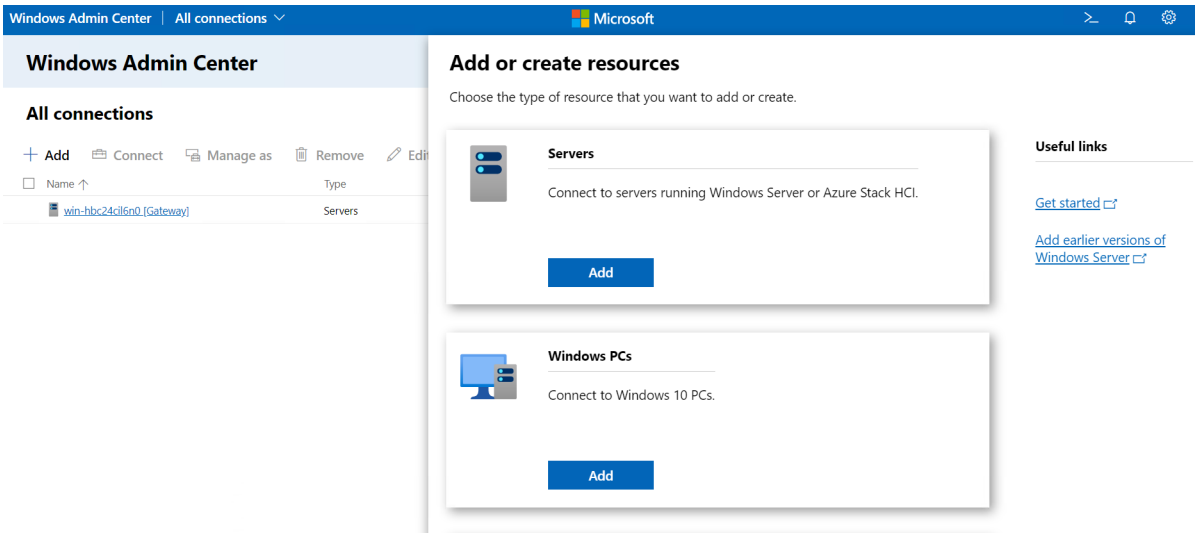

Figure 2-10. Add or Create Resources

3. In the **Servers** box, click **Add**.

The **Connection tags** pane appears (Figure 2-11).

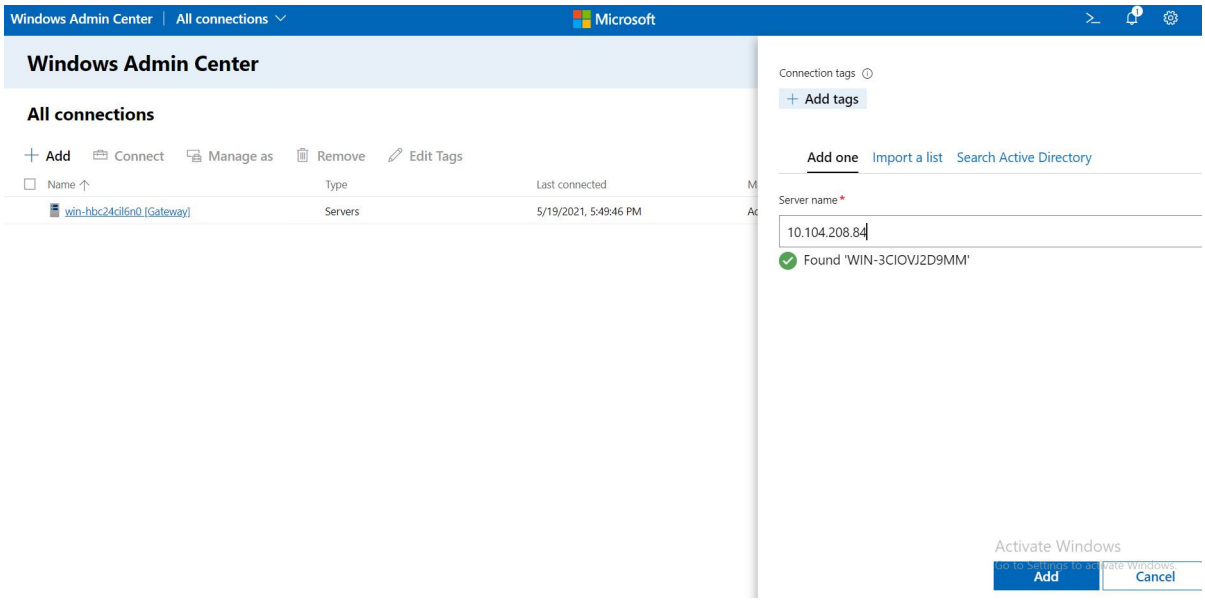

Figure 2-11. Connection Tags

4. In the **Server name box**, type the IP address.

   The server is located and validated.

NOTE

Do not continue until the message **Validating the name** appears and then disappears.

When the server is validated, a green circle with a check mark, followed by the text **Found <server name>**, appears (Figure 2-12).

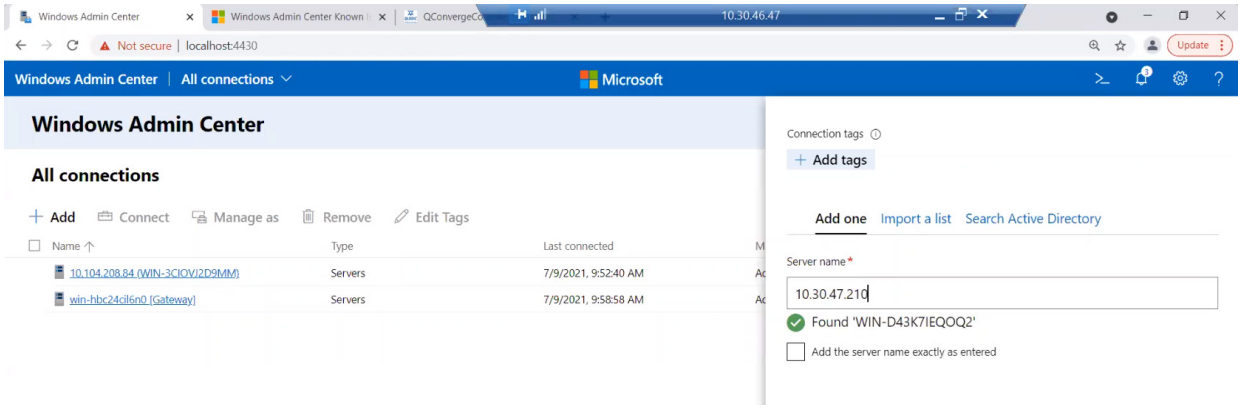

Figure 2-12. Display Remote Server Name

5. Select the check box if you want both the server name (WIN-D43K7IEQOQ2 in Figure 2-12) and the IP address (10.30.47.210 in Figure 2-12) to be displayed at the top of the system tree.
6. Click **Add**.

   The screen automatically refreshes, and the new connection appears on the left side of the screen, under **All connections.**
7. To add another server, repeat this procedure.

When you are done, the **All connections** window shows all the connected servers. Figure 2-13 is an example of a remote configuration with:

- One local Server (server name followed by [Gateway])
  - win-d0ici9tjd0o [Gateway]
- Two remote servers (IP address followed by the server name in parentheses):
  - 10.104.210.109 (WIN-9PQ11)
  - 10.30.39.241 (WIN-K8PE986)

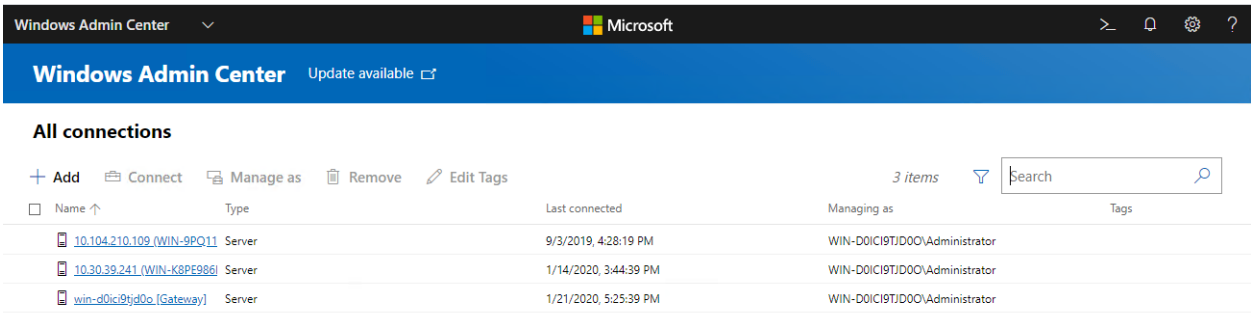

Figure 2-13. Remote Configuration With Three Systems

Validating the Installation

The instructions in this section are performed in Windows Admin Center on either the local or remote system.

To validate the installation:

1. In the **All connections** page, do one of the following:

   - ❑ Click the name of the local host.
   - ❑ Click the name of the remote host.

   The available tools appear in the **Tools** pane on the left side of the page (Figure 2-14).

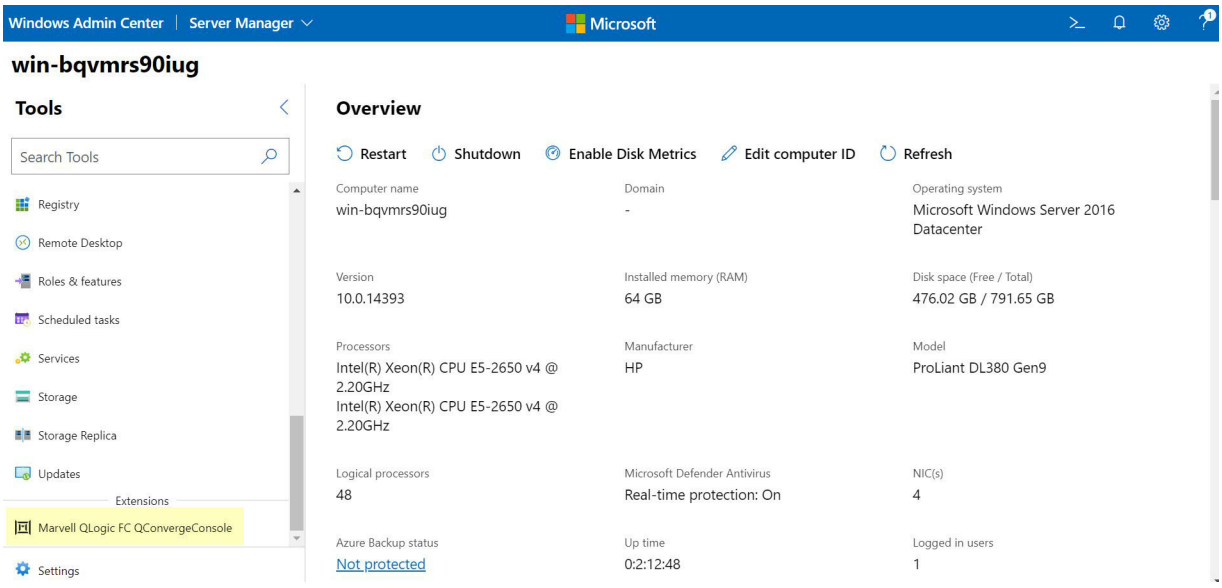

Figure 2-14. Marvell QLogic FC QConvergeConsole Installed

2. Use the bar on the left side of the page to scroll down to the **Extension** section; Marvell QLogic FC QConvergeConsole appears (highlighted in Figure 2-14).

Updating Marvell QLogic FC QConvergeConsole

Following are instructions on how to download and install a newer version of the Marvell QLogic FC QConvergeConsole.

To update Marvell QLogic FC QConvergeConsole:

1. Download the new version of Marvell QLogic FC QConvergeConsole to the same location on your system as the previous version.

   For more details, see "Downloading and Installing Marvell QLogic FC QConvergeConsole" on page 9.

   There are now two versions of Marvell QLogic FC QConvergeConsole on your system.

2. Under **Extensions**, click **Installed extensions**.

   WAC automatically detects the latest version of Marvell QLogic FC QConvergeConsole, as indicated by the **Update available** text to the right of the older version of the extension (Figure 2-15).

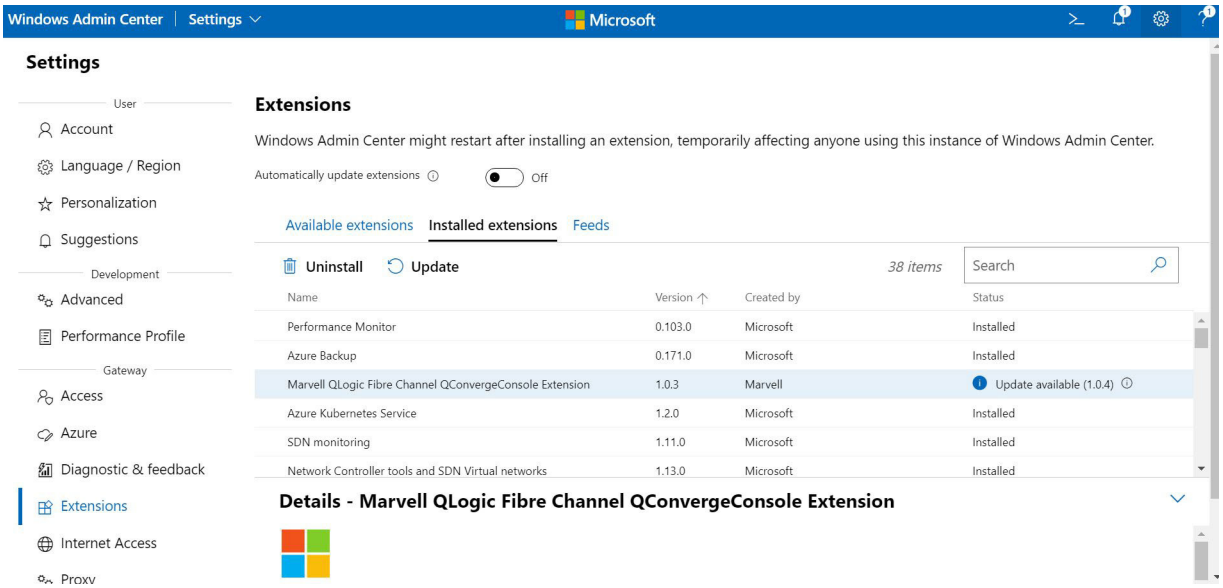

Figure 2-15. Updating Marvell QLogic FC QConvergeConsole

3. Click **Update**.

After a newer version of Marvell QLogic FC QConvergeConsole is installed, it is removed from the **Available extensions** list and appears in the **Installed extensions** list.

The previous package is removed from the **Installed extensions** list and appears in the **Available extensions** list, with the status **Newer version installed** (Figure 2-16).

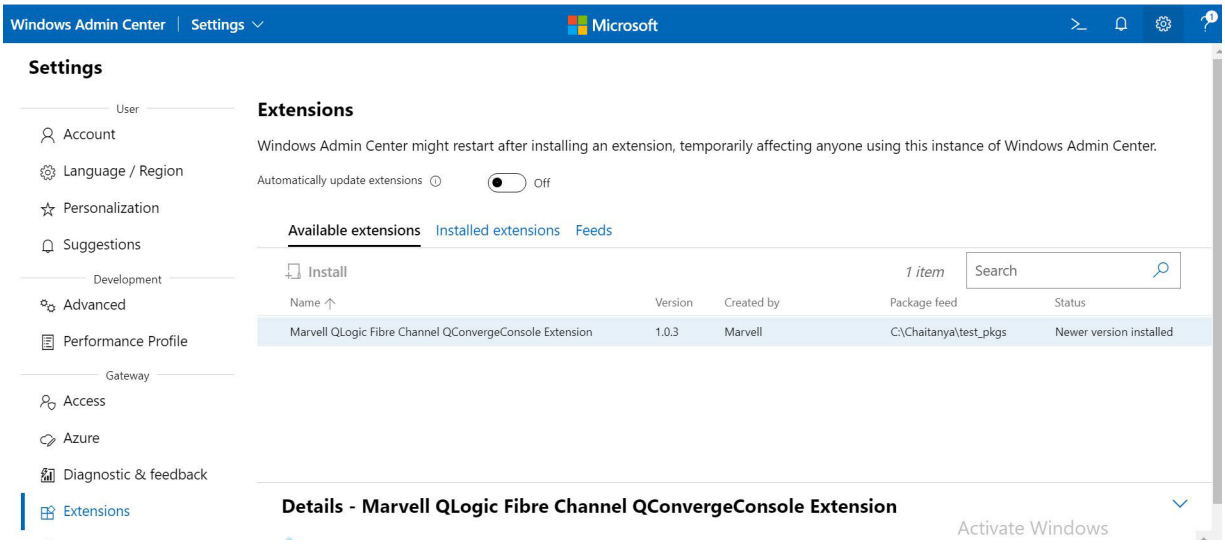

Figure 2-16. Older Marvell QLogic FC QConvergeConsole

Uninstalling Marvell QLogic FC QConvergeConsole

To uninstall Marvell QLogic FC QConvergeConsole:

1. Under **Extensions**, click **Installed extensions** (see Figure 2-15).
2. Select **Marvell QLogic FC QConvergeConsole**.
3. Click **Uninstall**.

   Marvell QLogic FC QConvergeConsole is uninstalled and removed from the **Installed extensions** page. Marvell QLogic FC QConvergeConsole no longer appears in the **Tools** pane, **Extensions** section.

3 Getting Started

This chapter describes how to use Marvell QLogic FC QConvergeConsole in Windows Admin Center to configure and monitor your Marvell QLogic FC adapters.

The GUI for Marvell QLogic FC QConvergeConsole displays the available options (what you can do) on the right side of the screen. These options change depending on whether the host, adapter, port, or LUN is selected from the system tree on the left side. Selecting an option often shows other available options.

Opening Marvell QLogic FC QConvergeConsole

To open Marvell QLogic FC QConvergeConsole:

1. Launch WAC.
2. In the **All connections** section, select the desired system.
3. Under **Tools**, scroll down to the **Extensions** section, and then click **Marvell QLogic FC QConvergeConsole**.

   WAC loads all the devices, and then Marvell QLogic FC QConvergeConsole launches. The GUI displays a system tree (host and attached Marvell QLogic FC adapters) on the left. On the right, the current selection is displayed with the device name at the top (host, adapter, port, target, LUN) and information about the selection. A list of available actions is underneath the hardware name.

In Figure 3-1, the first Marvell QLogic FC adapter in the system tree is selected, and information about the adapter appears to the right. In the available actions line, the current selection is underlined; in this case, **Info**.

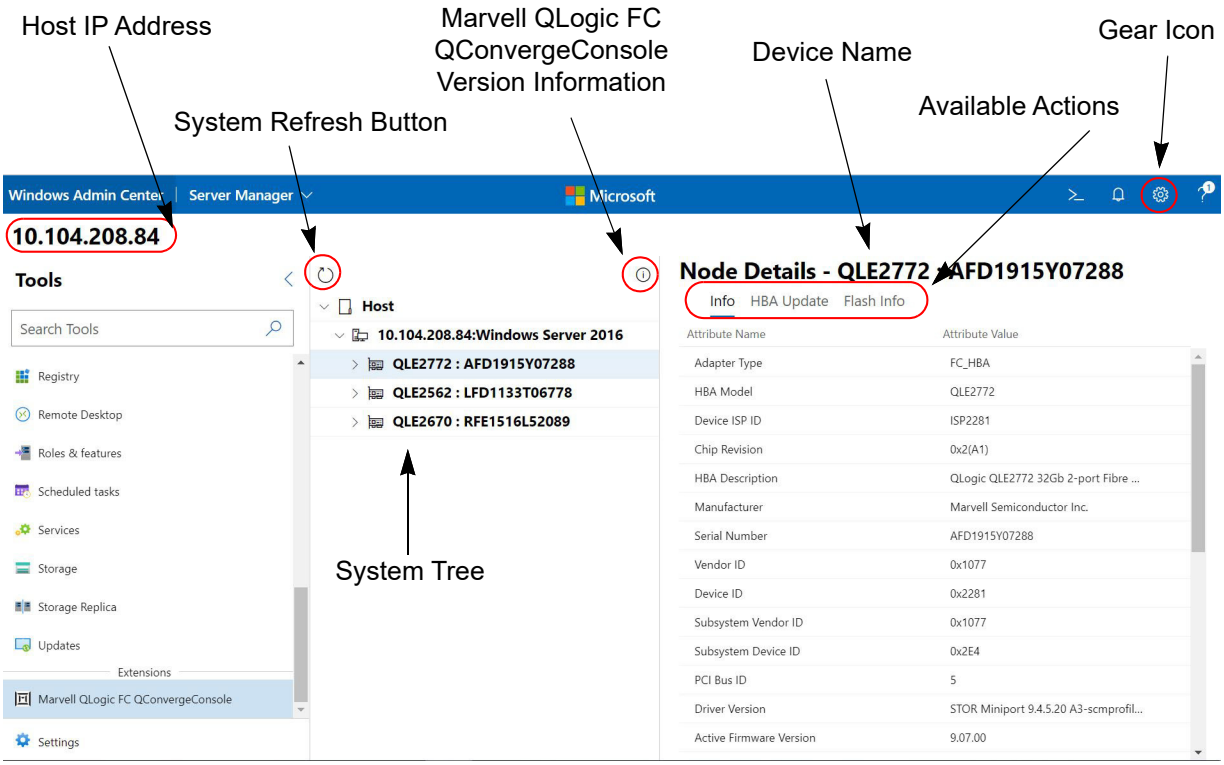

Figure 3-1. Marvell QLogic FC QConvergeConsole—Adapter Information

To view multiple hosts:

1. If needed, expand the **Tools** pane, and then scroll down to the **Extension** section to view Marvell QLogic FC QConvergeConsole.
2. Move the cursor over the extension; an option appears to open another WAC window (Figure 3-2).

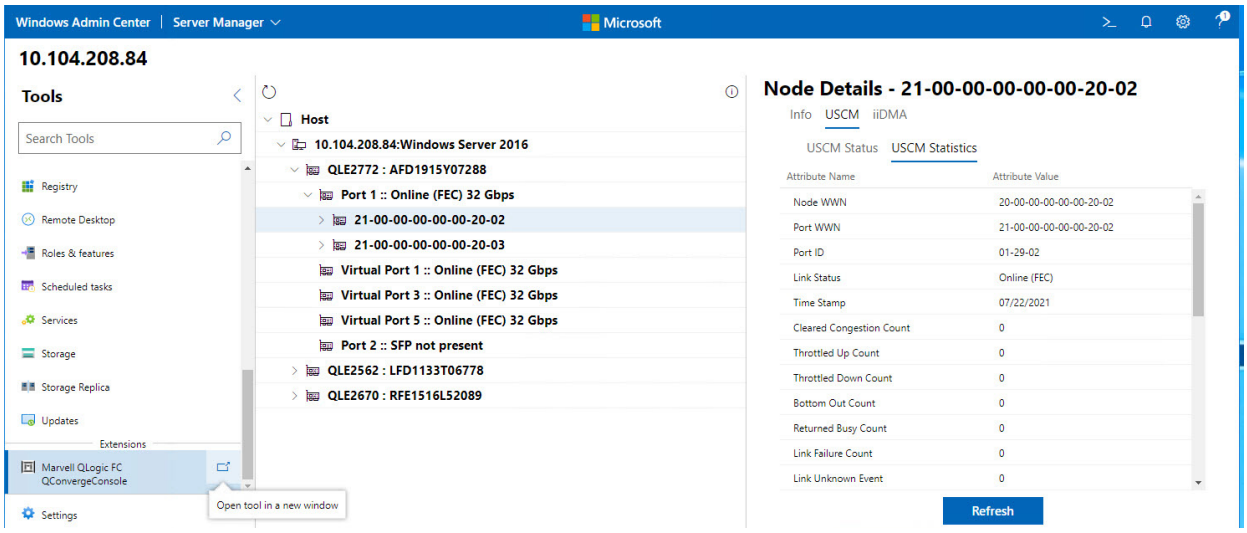

Figure 3-2. Marvell QLogic FC QConvergeConsole—Open a New Window

WAC only allows one system per window; it is a limitation of the software.

Configuring the Marvell QLogic FC Adapters

Marvell QLogic FC QConvergeConsole allows you to perform the following adapter-level activities (not all features are available on all Marvell QLogic FC adapters):

- **Info**: get information about the Marvell QLogic FC adapter (see Figure 3-1).
- **HBA Update**: update the multi-boot image (MBI). You can also save the files (in DAT format) on the host system for the firmware preload table or Fibre Channel board configuration.
- **Flash Info**: view information about the flash.
- **Alias:** view and configure user defined HBA Alias (name of the adapter).

Configuring the Marvell QLogic FC Adapter Ports

Marvell QLogic FC QConvergeConsole allows you to configure the adapter ports.

To configure a Marvell QLogic FC adapter port:

1. Expand the system tree to the port level.
2. Click the desired port.

   Information about the port displays (Figure 3-3).

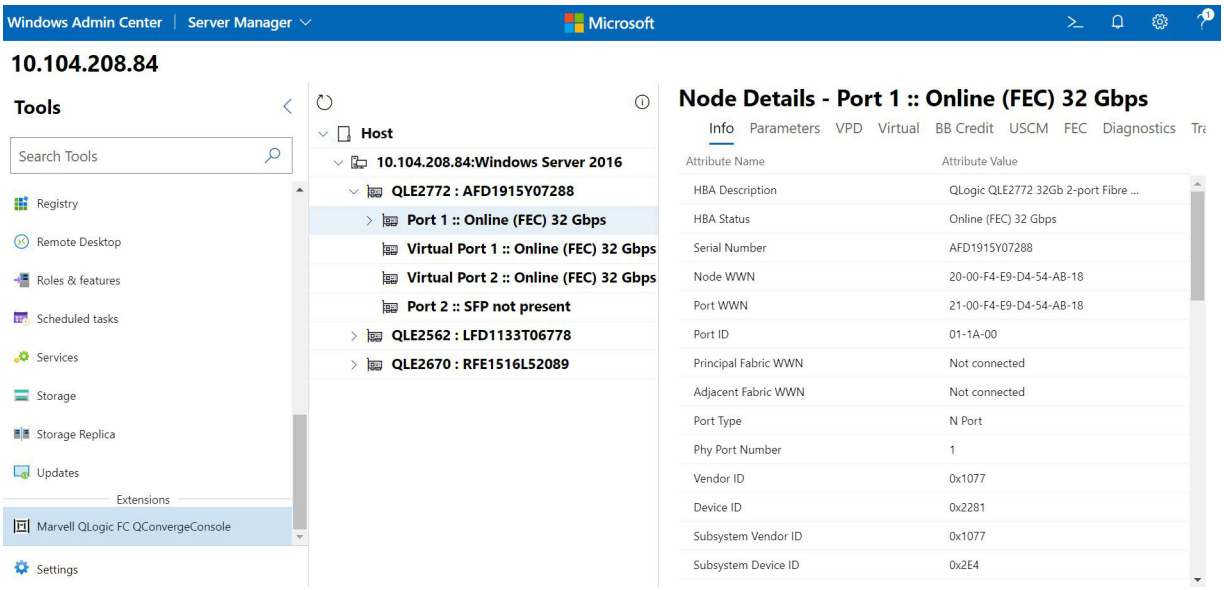

Figure 3-3. Port Information

Marvell QLogic FC QConvergeConsole allows you to perform the following adapter port-level activities (not all options are available on all Marvell QLogic FC adapters):

- View information about the port.
- Modify the port parameters, Fibre Channel Protocol (FCP) boot device parameters, non-volatile memory express (NVMe®) boot device parameters, and save the port parameter information (as a .DAT file) to the host system.
- View vital product data (VPD).
- Create or delete virtual ports. After making changes, click the global refresh button (Figure 3-1) to see the new configuration.
- Enable or disable buffer-to-buffer credit (BBCR), modify the parameters, and view the current configuration.

- View Universal SAN Congestion Mitigation (USCM) status and statistics, reset the statistics, and view and configure profile settings. (See Appendix A Universal SAN Congestion Mitigation).
- Enable or disable forward error correction (FEC), and view the current FEC counters.
- View small form-factor pluggable diagnostics management interface (SFP DMI) transceiver details.
- Enable or disable beaconing.
- View the read diagnostics parameters (RDP).
- Enable or disable the Diagnostic Port (D-Port) and run the D-Port diagnostic test.
- Display the driver and the firmware link statistics, and reset the firmware link statistics.
- View and configure user defined Port Alias (name of the physical and virtual port).

Configuring the Targets

Marvell QLogic FC QConvergeConsole allows you to perform the following target-level activities (not all options are available on all Marvell QLogic FC adapters):

- View target information.
- Select the maximum target link speed intelligent interleaved direct memory access (iiDMA).
- View Universal SAN Congestion Mitigation (USCM) status and statistics for the target. For more information about the status and statistics, see “USCM Target Port Status and Statistics” on page 36.
- View target link statistics.

To view target information:

1. In the system tree, select the desired Marvell QLogic FC adapter, and then click the down arrow to expand the tree to view the ports, followed by the connected targets.
2. Click the desired target in the system tree.

Information about the target displays (Figure 3-4).

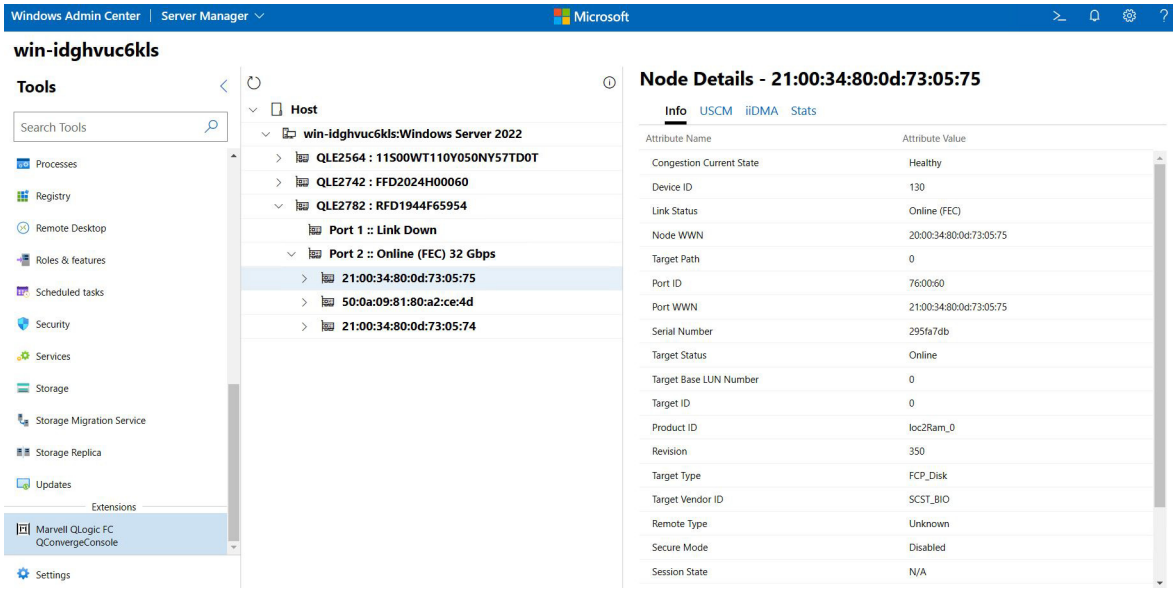

Figure 3-4. Target Information

Viewing LUN Information

Marvell QLogic FC QConvergeConsole allows you to view information about LUNs connected to the FC targets.

To view LUN Information:

1. In the system tree, select the desired Marvell QLogic FC adapter, and then click the down arrow to expand the tree to the view the ports, followed by the connected targets, and finally the attached LUNs.
2. Click the desired LUN in the system tree.

Information about the LUN displays (Figure 3-5).

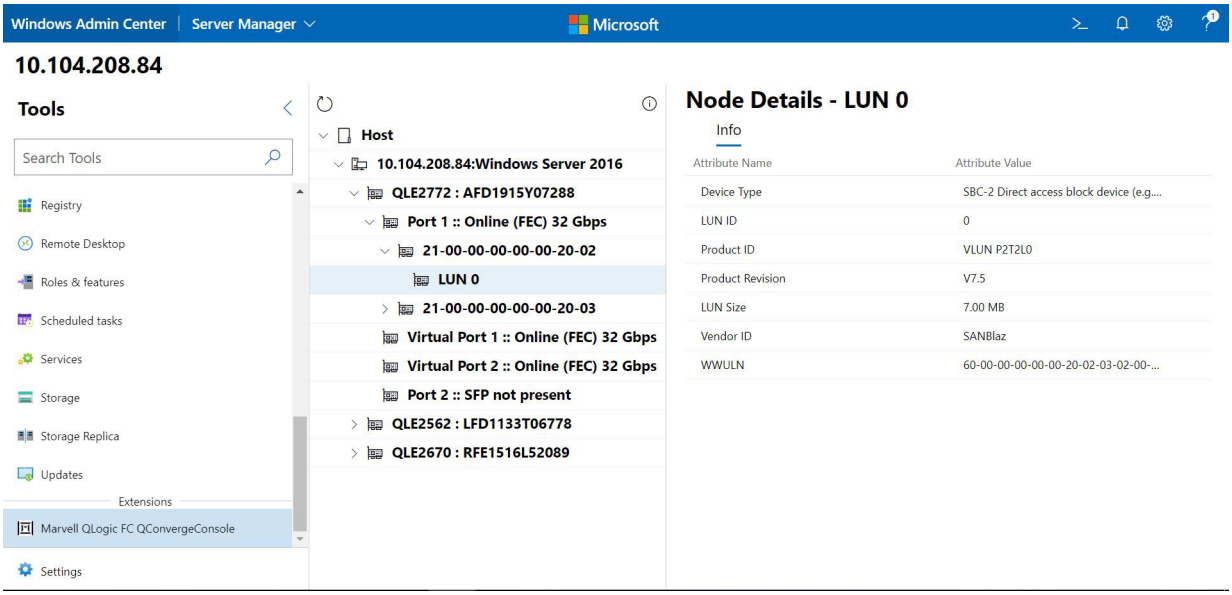

Figure 3-5. LUN Information

A Universal SAN Congestion Mitigation

This appendix describes Marvell's Universal SAN Congestion Mitigation (USCM) feature and how to access it with Marvell QLogic FC QConvergeConsole.

NOTE

SAN congestion management (SCM) is a common noun, and describes a standards-based Fibre Channel technology.

Universal SAN Congestion Mitigation (USCM) is Marvell's IP, and describes Marvell's capabilities that encompass SCM and additional functionalities to further assist users.

USCM is not supported on all adapters.

Overview

USCM statistics are gathered for all ports on the Marvell QLogic FC adapter and connected targets in the configured zones with active sessions.

- USCM statistics are not gathered for other initiators in the configured zones.
- USCM is supported on QLE2870, QLE2770, and QLE2690 Series Adapters.
- USCM statistics track the following types of Fabric Performance Impact Notification (FPIN) Extended Link Services (ELSs) to provide SAN congestion awareness:

FPIN ELS Statistic	Initiator Port	Target Port
Congestion	✓	—
Peer congestion	—	✓
Link integrity	✓	✓
Delivery	✓	✓

- USCM also displays a set of congestion mitigation statistics that reflect actions taken by the adapter to minimize the impact of congestion caused by the endpoints.

You can view the USCM congestion mitigation status and statistics; the statistics can also be reset.

USCM Initiator Port Status and Statistics

To view USCM port information:

1. Expand the system tree and select the desired adapter port (see Figure 3-3).
2. From the list of available actions, click **USCM**.

   The sub-menu of available actions appears; **USCM Status** is selected by default (Figure A-1).

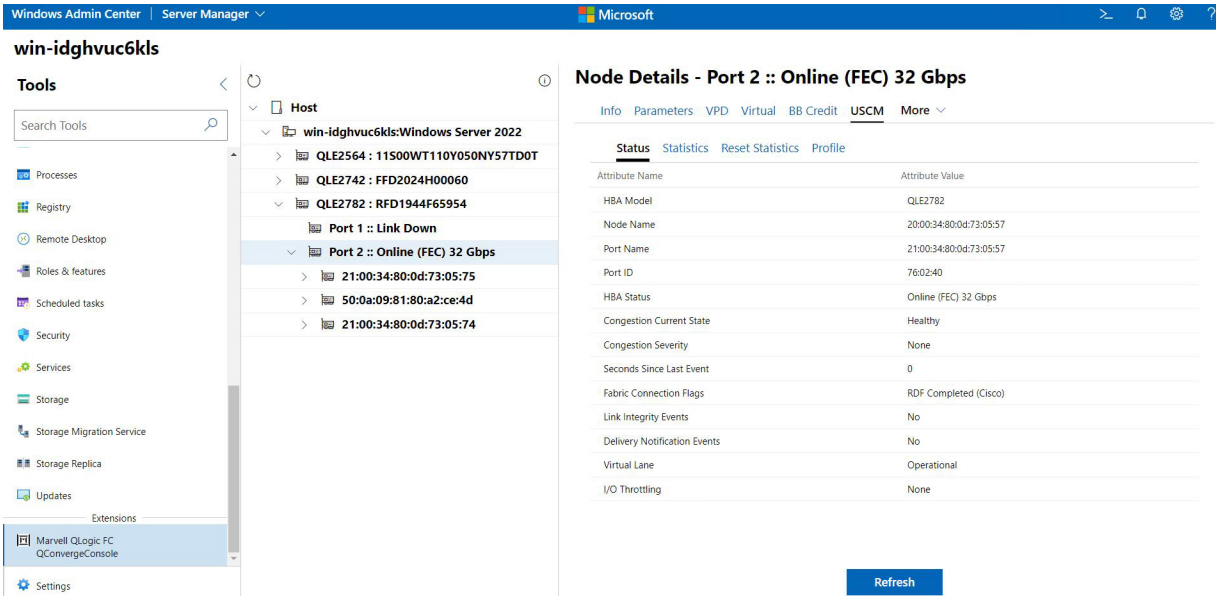

Figure A-1. USCM Port Status

3. To refresh the status information, click **Refresh**.

   The status of the port is refreshed.
4. To view the statistics, click **USCM Statistics**.

Figure A-2 shows the statistics for the Fibre Channel port.

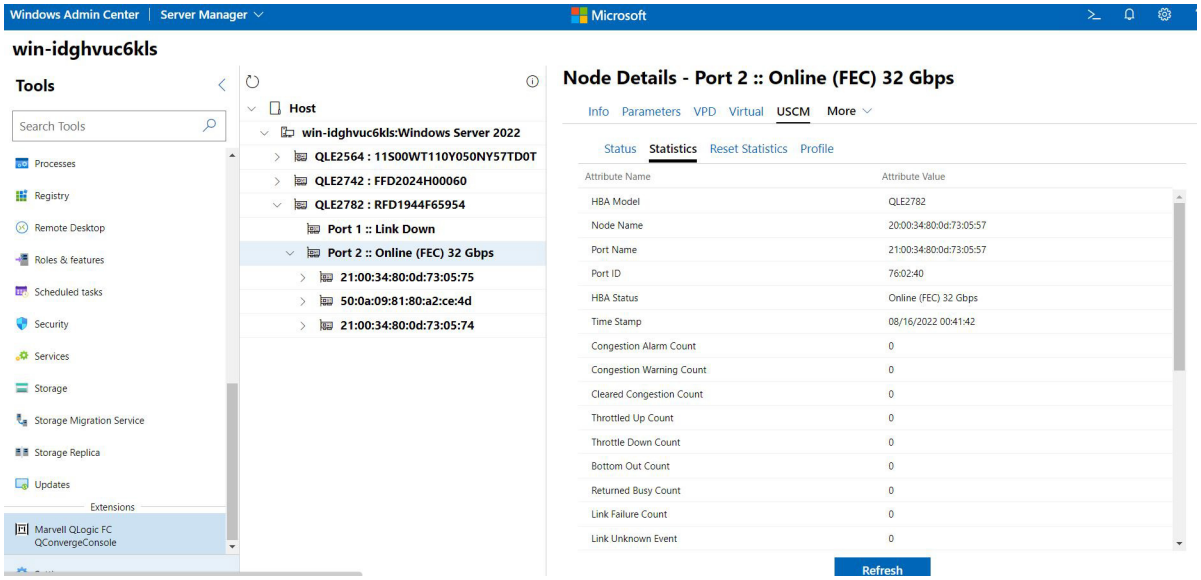

Figure A-2. USCM Port Statistics

5. To refresh the statistics, click **Refresh**.

   The statistics of the port are refreshed.

6. Click **Reset USCM Statistics** (Figure A-3).

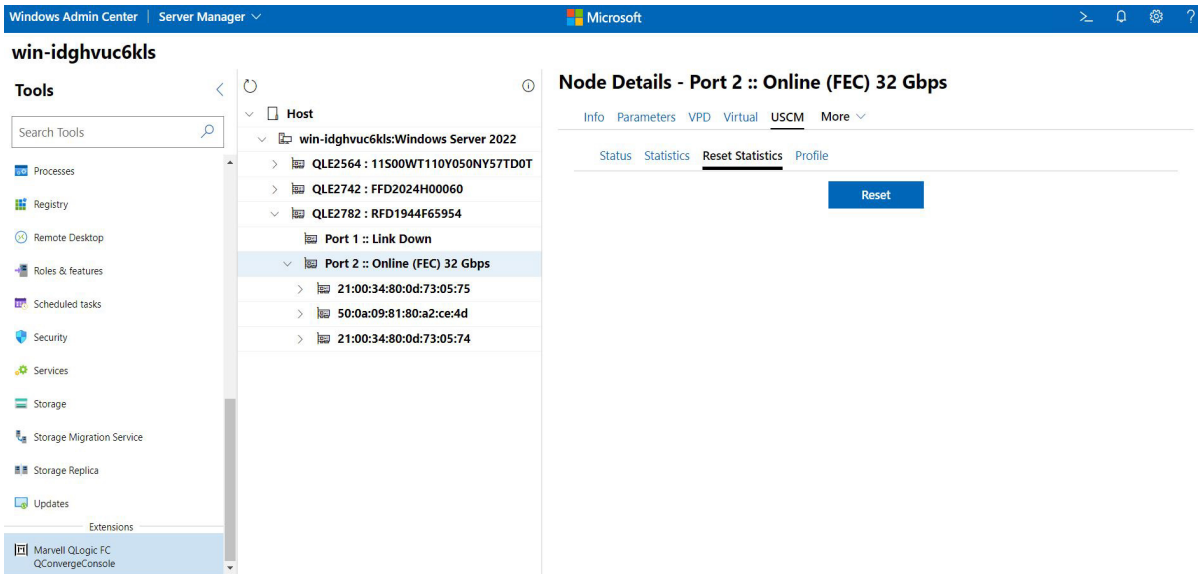

Figure A-3. Reset USCM Statistics

7. Click **Reset**.

   All the USCM statistics for the initiator port and USCM statistics for all the target ports connected to this initiator are cleared.

The USCM port status and statistics are described in the following sections.

USCM Initiator Port Status

The USCM initiator port congestion status (Table A-1) indicates the current status of the particular adapter port, based on congestion events (both ELS and signals) from the switch. At a given point in time, the adapter port is either *Congested* or *Healthy*. The other status indicates the congestion severity and the time since the last congestion event.

Contact the fabric/switch vendor for more information relating to congestion severity within their products.

Table A-1. USCM Initiator Port Status

Status	Description
Congestion Current State	**Healthy** **Congested**
Congestion Severity	**Warning**. Congestion is building and may have reached a severe level. **Alarm**. Congestion has reached a severe level. **None**. No congestion present. **Reserved** ***NOTE:*** For more FPIN information, see the user's guide for your switch.
Seconds Since Last Event	Event time period (in seconds) since the last congestion notification was received.
Fabric Connection Flags	**RDF Reject**. The adapter is either not connected or does not support RDF, or the connected switch does not support USCM. **RDF Completed**. The connected Brocade or Cisco switch does not support virtual lanes or the virtual lanes feature is disabled at initiator port. **RDF Completed (Cisco)**. The connected Cisco switch has virtual lanes up and running. ***NOTE:*** RDF stands for Registration Diagnostic Function.
Link Integrity Events	**Yes**. A link event has been received. **No**

Table A-1. USCM Initiator Port Status (Continued)

Status	Description
Delivery Notification Events	**Yes**. A delivery notification event has been received. **No**
Virtual Lane	**Operational**. Virtual lane negotiation is complete and fully functional. **Non-operational**. Virtual lane negotiation with the switch failed. **Disabled**. Virtual lanes are disabled at either the driver or the initiator port parameter (NVRAM). Virtual Lane is supported on 2770 and 2870 Series Marvell QLogic adapters.
I/O Throttling	**Active**. I/O throttling is currently active. The I/O queue depth is ramping up or down. **None**. I/O throttling is not active. I/Os are running with the normal queue depth value. **Disabled**. I/O throttling is disabled on the adapter. **NA**. I/O throttling is not supported on the adapter. I/O throttling is supported on 2690, 2770, and 2870 Series Marvell QLogic adapters. For more about virtual lanes and I/O throttling features, see the appropriate Marvell QLogic Fibre Channel Adapter User Guide

USCM Initiator Port Statistics

USCM statistics are gathered for all initiator ports of this adapter.

USCM statistics are not gathered for other initiators in the configured zones.

USCM statistics for initiators provide SAN congestion awareness by tracking three types of FPINs: congestion, link integrity, and delivery.

USCM also displays a set of statistics to track the actions taken by the adapter to minimize the impact of congestion in the fabric at the initiator ports.

The initiator congestion mitigation port statistics in Table A-2 are part of Marvell's USCM functionality that reflects actions taken by the Marvell QLogic FC adapter to mitigate the congestion, while providing visibility into the initiator port's performance as a result of SAN congestion.

Table A-2. USCM Initiator Port Congestion Mitigation Statistics

Statistic	Description
Time Stamp	Date the command was issued.
Congestion Current State	See Congestion Current State.
Congestion Alarm Count	Counter for the number of alarm events in Congestion Severity.
Congestion Warning Count	Counter for the number of warning events in Congestion Severity.
Cleared Congestion Count	The number of times the congestion event was cleared for this port.
Throttled Down Count	The fabric is congested at this port. ■ Each increment indicates that the port is receiving congestion notifications from the fabric. ■ For each increment, the port decreases the I/O bandwidth. ■ Incrementing stops when the low watermark performance for the port is reached.
Throttled Up Count	The fabric is *not* congested at this port. ■ Each increment indicates that the port is *not* receiving congestion notifications from the fabric. ■ For each increment, the port increases the I/O bandwidth (up to the maximum I/O bandwidth for the port). ■ Incrementing starts only after the Throttle Down Count increments (and congestion notifications abate). ■ Incrementing stops when the port reaches its optimal performance.
Bottom Out Count	This port is operating at its low watermark performance and the fabric continues to be congested at this port. ■ Each increment indicates that the port is receiving congestion notifications from the fabric. ■ This port cannot decrease the I/O bandwidth any further.

Table A-2. USCM Initiator Port Congestion Mitigation Statistics (Continued)

Statistic	Description
Returned Busy Count	The number of times the driver returns an I/O request queued by the initiator's storage stack. This request must be retried because the port is congested. The count is incremented faster when the driver is throttling down, and slower when the driver is throttling up.

USCM Profiles

The USCM profile allows you to manage adapter congestion by selecting either the driver default profile settings, or customizing different profile settings for each adapter port on a case-by-case basis.

For more information about USCM Profiles, see the appropriate Marvell QLogic Fibre Channel Adapter user's guide.

To view USCM target information:

1. Expand the system tree and select the desired adapter port (see Figure 3-4).
2. From the list of available actions, click **USCM**.

   The sub-menu of available actions appears; **USCM Status** is selected by default (Figure A-1).
3. Click **Profile**.

The USCM profile information appears (Figure A-4).

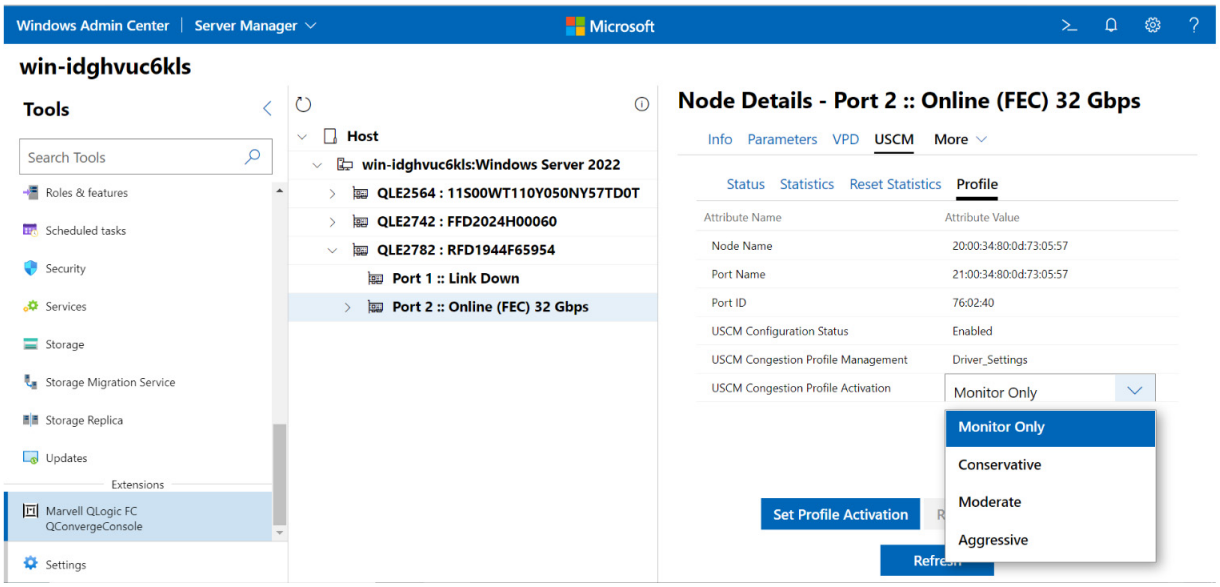

Figure A-4. Fibre Channel Initiator Port—USCM Profile

4. Select the parameters you want to change from the drop-down menus.

   The USCM profile parameters are described in Table A-3.

Table A-3. USCM Profile Information

Parameter	Description
USCM Configuration Status	Indicates if the USCM feature of the specified adapter port is supported. Valid values are: **Enabled** (default) **Disabled**
USCM Profile Management	Indicates the current active profile setting for congestion on the specified adapter port. Valid values are: **Driver_Settings** (default). The USCM profile is set using either a Windows driver registry parameter; or a Linux or VMware ESXi driver module parameter. **NVRAM Settings**. The USCM profile is set in the adapter NVRAM.

Table A-3. USCM Profile Information (Continued)

Parameter	Description
USCM Profile Activation	Valid values are: **Monitor Only** (default). Records adapter performance and congestion history for review. No actions are taken to resolve congestion. **Conservative**. Maintains optimum throughput while gradually reducing congestion. Queue depth (outstanding I/Os) is reduced to half of the current value as part of the throttle down operation. Marvell recommends this setting for high-priority workloads. **Moderate**. Queue depth (outstanding I/Os) is reduced to one-quarter of the current value as part of the throttle down operation. **Aggressive**. Reduces congestion on priority while reducing throughput. Queue depth (outstanding I/Os) is reduced to one-eighth of the current value as part of the throttle down operation. Marvell recommends this setting for low-priority workloads.

USCM Target Port Status and Statistics

To view USCM target information:

1. Expand the system tree and select the desired target (see Figure 3-4).
2. From the list of available actions, click **USCM**.

The sub-menu of available actions appears; **USCM Status** is selected by default (Figure A-5).

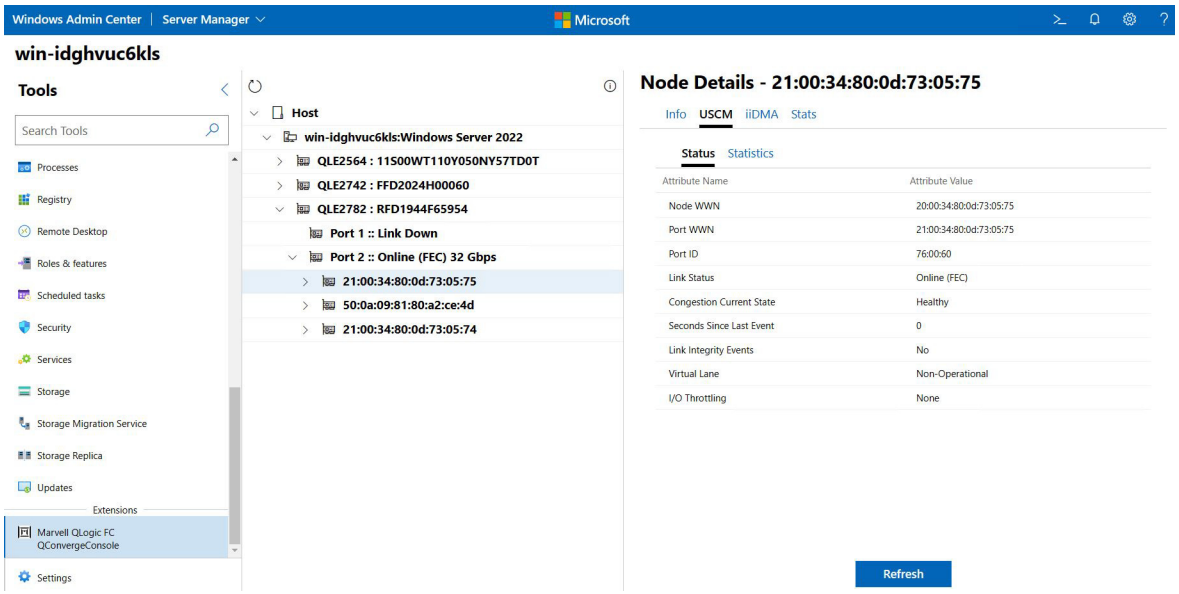

Figure A-5. USCM Target Status

3. To refresh the status information, click **Refresh**.

   The target status information is refreshed.

4. To view the statistics, click **USCM Statistics**.

Figure A-6 shows the statistics for the Fibre Channel target. Use the scroll bar on the right side to view all the statistics.

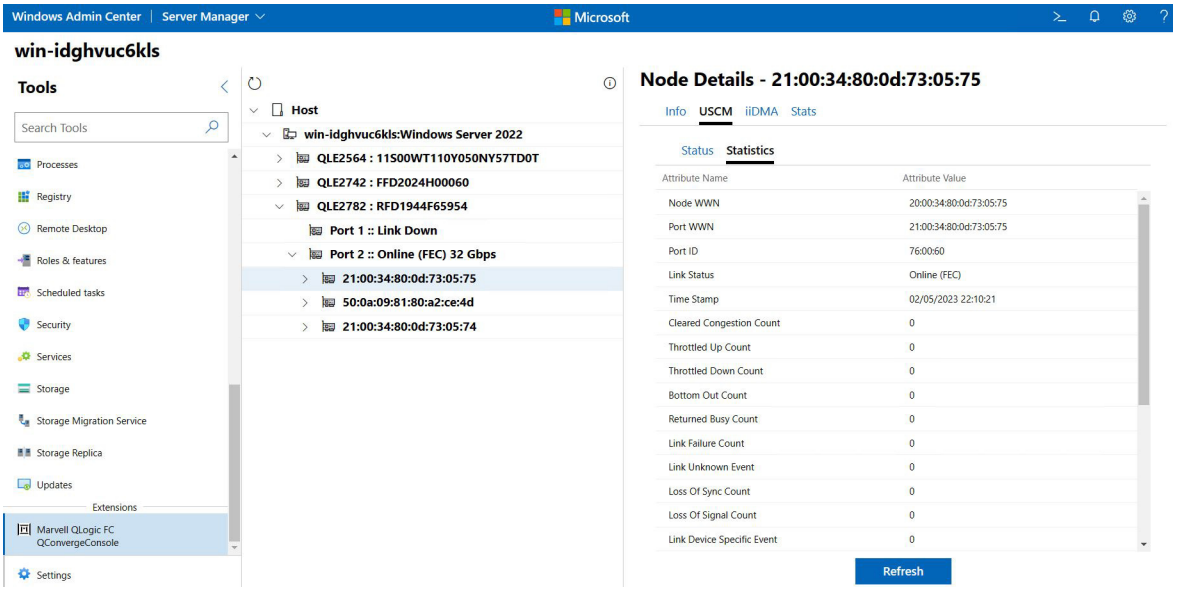

Figure A-6. USCM Target Statistics

5. To refresh the statistics, click **Refresh**.

   The target statistics are refreshed.

The USCM target status and statistics are described in the following sections.

USCM Target Port Status

The USCM target congestion status (Table A-4) indicates the current status/health of connected target ports based on FPIN ELSs received from the switch.

This status includes peer congestion, link integrity, and delivery notifications, as well as details about each of these events for each active target port.

Table A-4. USCM Target Port Status

Status	Description
Congestion Current State	See Congestion Current State.
Seconds Since Last Event	See Seconds Since Last Event.
Link Integrity Events	**Yes**. A link event has been received. **No**.

Table A-4. USCM Target Port Status (Continued)

Status	Description
Virtual Lane [a]	**Slow**. The current target is marked as slow and was moved to a slow virtual lane due to congestion. **Normal**. The current target is healthy. No congestion is detected. **Fast**. Fast traffic is flowing to a fast virtual lane. **Non-operational**. Either virtual lanes is disabled at the initiator or it is not supported by the connected switch. **NA**. Virtual lanes is not supported on the connected adapter and/or the driver.
I/O Throttling [a]	See I/O Throttling.

[a] For more about virtual lanes and I/O throttling, see the appropriate Marvell QLogic Fibre Channel Adapter user's guide.

USCM Target Port Statistics

USCM statistics are gathered for all targets connected to all ports on this adapter in the configured zones with active sessions.

USCM statistics for targets provide SAN congestion awareness by tracking three types of FPINs: peer congestion, link integrity, and delivery.

USCM also displays a set of congestion mitigation statistics to track the actions taken by the Marvell QLogic FC adapter to minimize the impact of congestion in the fabric at target ports.

The target congestion mitigation port statistics in Table A-5 are part of Marvell's USCM functionality that reflects actions taken by the adapter to mitigate the congestion, while providing visibility into the target port's performance as a result of SAN congestion. In Table A-5, *Congestion* refers to the congestion at the target port.

NOTE

The congestion FPINs reflect fabric congestion at the specified target port.

Table A-5. USCM Target Port Statistics

Statistics	Description
Time Stamp	See Time Stamp.

Table A-5. USCM Target Port Statistics (Continued)

Statistics	Description
Cleared Congestion Count	The number of times congestion was cleared for this target.
Throttled Up Count	See Throttled Up Count.
Throttled Down Count	See Throttled Down Count.
Bottom Out Count	See Bottom Out Count.
Returned Busy Count	See Returned Busy Count.
Link Failure Count	Counter for number of link failure events.
Link Unknown Event	Counter for the number of unknown events.
Loss of Sync Count	Counter for the number of loss of sync events.
Loss of Signal Count	Counter for the number of loss of signal count events.
Link Device Specific Event	Counter for the number of device specific events.
Primitive Seq Protocol Error Count	Counter for the number of primitive sequence protocol errors.
Invalid Transmission Word Count	Counter for the number of transmission word errors.
Invalid CRC Count	Counter for the number of invalid CRC events.
Link Uncorrectable FEC Count	Counter for the number of uncorrectable FEC errors.
Congestion Clear Count[a]	Counter for the number of times the peer congestion event was cleared for this target.
Congestion Lost Credit Count[a]	Counter for the number of lost credit events.
Congestion Credit Stall Count[a]	Counter for the number of credit stall events.
Congestion Oversubscription Count[a]	Counter for the number of oversubscription events.

Table A-5. USCM Target Port Statistics (Continued)

Statistics	Description
Congestion Device Specific Count[a]	Counter for the number of device-specific events.
PUN Count	Number of priority update notifications received.

[a] *Congestion* refers to congestion at the target port.

B USCM Virtual Lanes

This appendix provides information for USCM virtual lanes feature to Marvell QLogic adapters using WAC Extension.

Prerequisites

When setting up virtual lanes, consider the following:

- This feature is available only when the adapter is connected to a supported Cisco switch running a fabric OS version that supports the equivalent feature on the fabric.
- USCM must be enabled to use the virtual lanes feature.
- By default, the USCM virtual lanes feature is disabled.
- USCM virtual lanes feature can be enabled on both target and initiator ports.
- The USCM virtual lanes feature is available only on Fibre Channel 2770 and 2800 Series Adapters.
- USCM virtual lanes feature can be enabled/disabled using “USCM support” and “Virtual Lane” port parameters respectively as shown in Figure B-1.

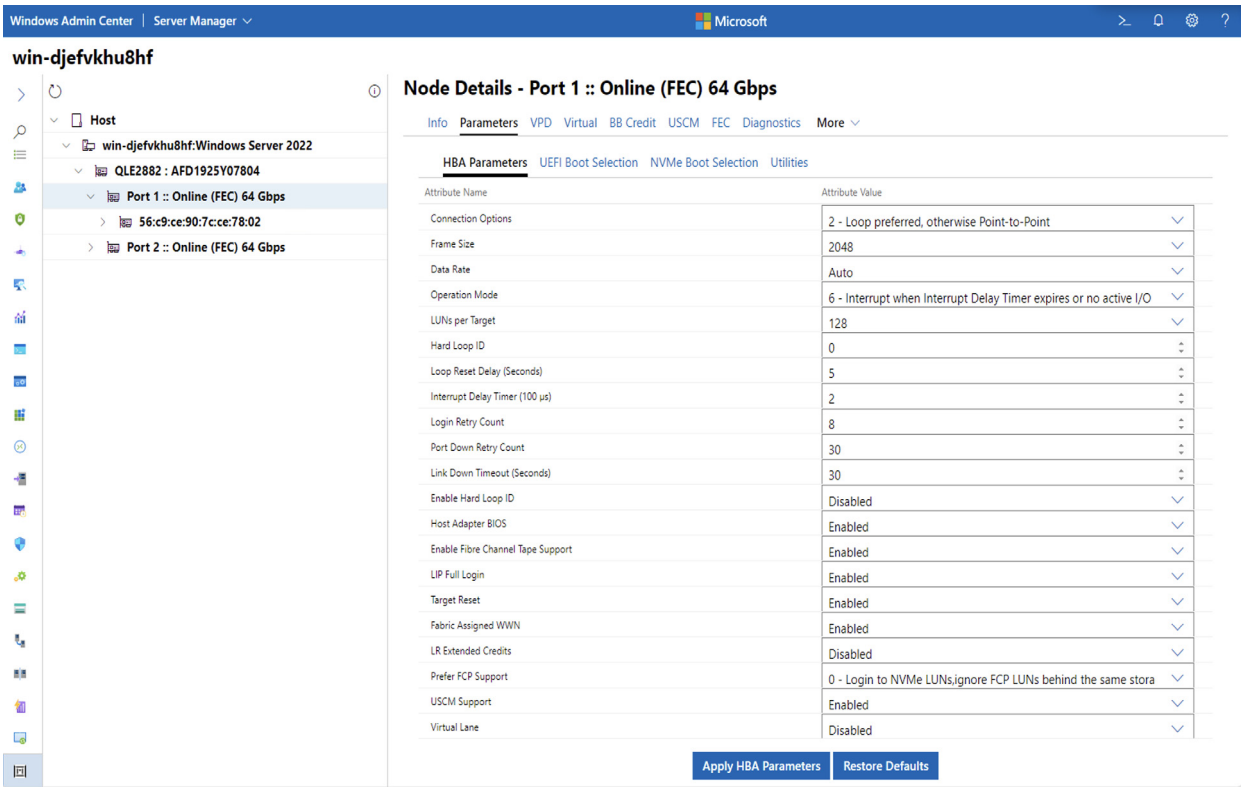

Figure B-1. HBA Parameters for Virtual Lane

C Revision History

Document Revision History	
Revision 1, August 10, 2021	
Revision 2, March 22, 2022	
Revision 3, October 12, 2022	
Revision 4, March 25, 2023	
Revision 5, November 17, 2023	
Revision 6, June 10, 2024	
Changes	**Sections Affected**
In the NOTE, deleted **RHEL 9.0** and **ESXi 8.0**.	“Software Requirements” on page 6.

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