Cisco Wide Area Application Services (WAAS) Software 4.2 Virtual Blade Operations and Management Guide

Contents

What You Will Learn

To assist in acceleration of applications and data over a wide-area infrastructure, Cisco® Wide Area Application Services (WAAS) Software Version 4.2 provides local hosting of branch-office IT services on the Cisco WAAS platform. The Cisco WAAS Central Manager provides a powerful management system for deploying, managing, and using branch-office services through Cisco WAAS virtual blades. This document provides operation information to assist with general virtual blade deployment, use, and maintenance.

Enabling and Creating Virtual Blades

Preparing to Use Virtual Blades

Before you configure and enable a virtual blade on your Cisco WAAS device, verify that virtualization is globally enabled for the device. If virtualization is not globally enabled, perform the following steps:

Step 1. From the Cisco WAAS Central Manager GUI navigation pane, choose **My WAN > Manage Devices.**

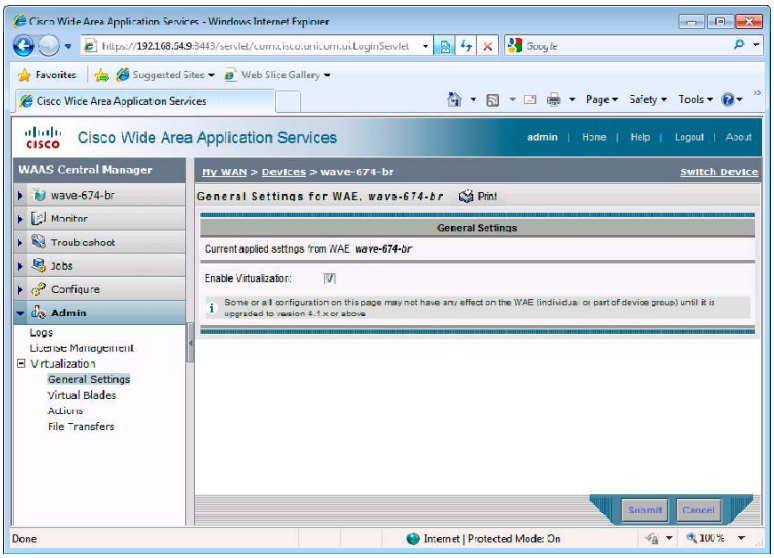
Step 2. Click the **Edit** icon next to the Cisco WAE device that you want to configure.

Note: (1) You can enable virtual blades only on Cisco Wide Area Application Engine (WAE) application accelerators, not on Cisco WAAS Central Manager devices. (2) You can configure virtual blades only on individual Cisco WAAS devices. You cannot configure virtual blades on device groups.

Step 3. From the navigation pane, choose **Admin > Virtualization > General Settings**. The General Settings pane appears (Figure 1).

Step 4. Check **Enable Virtualization** to enable virtualization.

Figure 1. General Settings Pane



Step 5. Click **Submit.**

Note: (1) You are prompted to confirm that you want to modify general settings. Doing so will reboot the Cisco WAE. After the reboot, the Cisco WAE will have a disk partition and other resources reserved for virtual blade use. (2) You will not be able to undo this change unless you restore the Cisco WAE from the rescue CD. (3) When you configure a virtual blade on your Cisco WAE device, system resources are reserved for the virtual blade. These resources are not available to your Cisco WAAS system, even if the virtual blade is not active. This can affect the performance of your Cisco WAAS system.

Step 6. Click **OK.** The Cisco WAE restarts.

Step 7. Locate the disk or image of the operating system that you want to run on the virtual blade. Make sure either that you have the CD-ROM available or that you have copied the disk image to the Cisco WAE hard drive.

To enable virtualization with the Cisco WAAS command-line interface (CLI), use the **virtual-blade** global configuration command.

Configuring Virtual Blades

This section describes how to configure a new virtual blade or edit an existing blade. You can configure the virtual blade identification number, description, boot method, disk allocation, and other parameters. Note that after a virtual blade is initially configured, the only resource parameters that can be changed are memory, the network, and virtual CPU (vCPU) allocation. To change these parameters on a virtual blade, first stop the virtual blade and then restart the virtual blade after you have finished making changes.

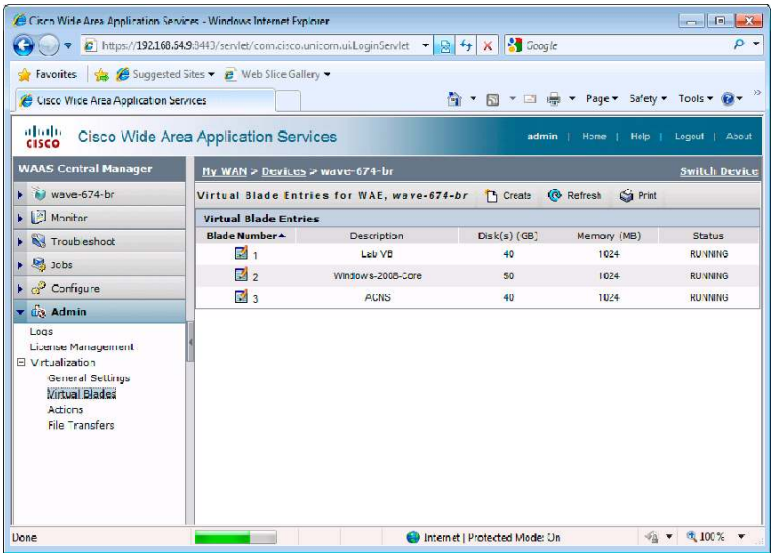
To configure a virtual blade on your Cisco WAE or Wide Area Virtualization Engine (WAVE) device, follow these steps:

Step 1. From the Cisco WAAS Central Manager GUI navigation pane, choose **My WAN > Manage Devices**.

Step 2. Click the **Edit** icon next to the Cisco WAE device that you want to configure.

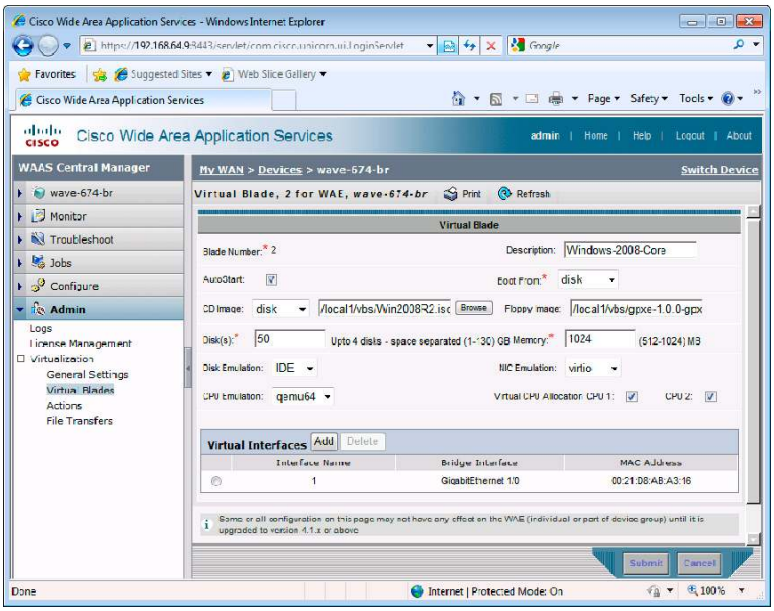
Step 3. From the navigation pane, choose **Admin > Virtualization > Virtual Blades**. The Virtual Blade Entries pane appears (Figure 2). Any existing virtual blade entries are displayed in the Virtual Blade Entries list.

Figure 2. Virtual Blade Entries List Window



Step 4. Click the **Edit** icon next to the virtual blade that you want to configure, or click the **Create** button to create a new virtual blade. The Virtual Blade configuration pane appears (Figure 3)

Figure 3. Virtual Blade Configuration Pane



Step 5. Configure the virtual blade system parameters as needed to run your operating system and applications:

a. If you are creating a new virtual blade, in the **Blade Number** field type a number to identify the virtual blade that you want to create. This number must be unique on the device.

The quantity of virtual blades that can be created per device is dependent on the model of Cisco WAAS appliance, and he amount of memory installed.

b. (Optional) In the **Description** field, type a brief description of the virtual blade.

c. (Optional) Check **Autostart** to set the virtual blade to start automatically whenever the Cisco WAE starts.

d. From the **Boot From** menu, choose a source from which the virtual blade should boot. Choose **cd-rom** to boot the virtual blade from a CD/DVD image, choose **disk** to boot a virtual hard disk drive located on the Cisco WAAS hard drive, or choose **network** to boot the virtual blade from a preboot execution environment (PXE).

e. From the **CD Image** menu, specify a CD-ROM device for the virtual blade:

- If you want to use the physical CD/DVD drive in the Cisco WAAS device, choose **cd-rom**.
- For a virtual CD/DVD disk image (ISO), choose **disk**. You will then need to specify the path to the disk image file on the Cisco WAAS file system (for example, /local1/vbs/windows_2003.iso). For more information about how to place virtual CD/DVD files on the Cisco WAAS device, see Copying a Virtual Disk (ISO) Image to a Cisco WAAS Device.
- If you are not using a CD-ROM device, you can leave this choice blank.

f. If you want to reserve resources for a virtual floppy disk on your virtual blade, or if you want to use an existing virtual floppy disk image, enter the name of the floppy disk image in the **Floppy Image** field.

g. In the **Disk Space** field, allocate the size and number of virtual hard disks for the virtual blade.

You do this by creating a space-separated list of disk sizes, in gigabytes, in the Disk Space field. (For example, **20 30 40** would create three virtual disks, with Disk 1 being 20 GB, Disk 2 being 30 GB, and Disk 3 being 40 GB.)

h. In the **Memory** field, allocate the amount of Cisco WAE memory, in megabytes, that you want to make available for the virtual blade.

The amount of memory that can be allocated for a virtual blade depends on the amount of memory in your Cisco WAE or WAVE appliance and the amount of memory that is assigned to other virtual blades. The minimum amount of memory that you can allocate for a single virtual blade is 512 MB.

i. From the **Disk Emulation** menu, choose the type of disk emulation that the virtual blade uses. Choose **IDE**

The IDE option specifies an IDE (ATA) type disk emulator and is recommended for Cisco WAAS 4.2 virtual blades.

Note: Although virtio disk drivers are listed as an option, these are not recommended for current Cisco WAAS 4.2 releases.

j. From the **NIC Emulation** menu, choose the type of network interface card emulation the virtual blade uses. Choose **rtl8139, e1000,** or **virtio.**

- **rtl8139** specifies a Realtek network card emulator (10/100).
- **e1000** specifies an Intel PRO/1000 network card emulator.
- **virtio** (virtual IO) configures the virtual blade to use paravirtualization for network card emulation. If you select the virtio network device, you must have the paravirtualization drivers installed on your system. For more information, see Installing Paravirtualized (PV) Networking.

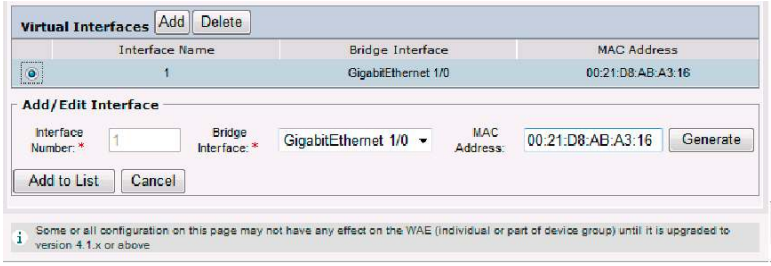
k. From the **CPU Emulation** menu, select either **qemu32** or **qemu64**. Qemu32 specifies a 32-bit (x86) CPU emulation, and qemu64 specifies a 64-bit (x64) CPU emulation.

l. Select **Virtual CPU 1** or **Virtual CPU 2**. This selection determines which virtual CPU the virtual blade uses. If you select both CPUs, the virtual blade will be capable of symmetric multiprocessing (SMP).

Step 6. Configure the interface bridge you want to use between the virtual blade and the physical interfaces on your Cisco WAE by doing the following:

a. In the **Virtual Interfaces** pane, click **Add.** The Virtual Interfaces Add pane is displayed (Figure 4).

Figure 4. Virtual Interfaces Add Pane



b. In the **Interface Number** field, enter the virtual blade interface to be bridged. Valid values are **1** and **2**.

c. From the **Bridge Interface** menu, choose the physical Cisco WAE interface to which that the virtual blade interface is bridged. Choose either **GigabitEthernet** or **PortChannel.**

d. In the **MAC Address** field, enter the MAC address of the bridged interface or click **Generate** to have Cisco WAAS generate the MAC address for you.

e. Click **Add to List** to add the virtual interface to the virtual blade interface list.

Note: You access the virtual blade console through the Remote FrameBuffer (RFB) protocol, commonly used by virtual network computing (VNC). For more information, see Accessing the Virtual Blade Console.

Step 7. Choose the virtual interface by selecting its radio button on the display.

Step 8. Click **Submit.**

Deploying Virtual Blades

Virtual blades support three common methods of deployment to remote offices. You can install a virtual blade system from physical or virtual installation media, from a prebuilt centrally created disk image, or from a network-based remote deployment service.

New Deployment from Physical Media (CD/DVD)

Virtual blades can be deployed directly from physical or virtual CD/DVD disk images. To use this method, you must have physical or virtual disk media available and inserted or copied to the remote Cisco WAAS device.

For physical media, virtual blades can use the physical CD/DVD drive installed in the Cisco WAAS chassis.

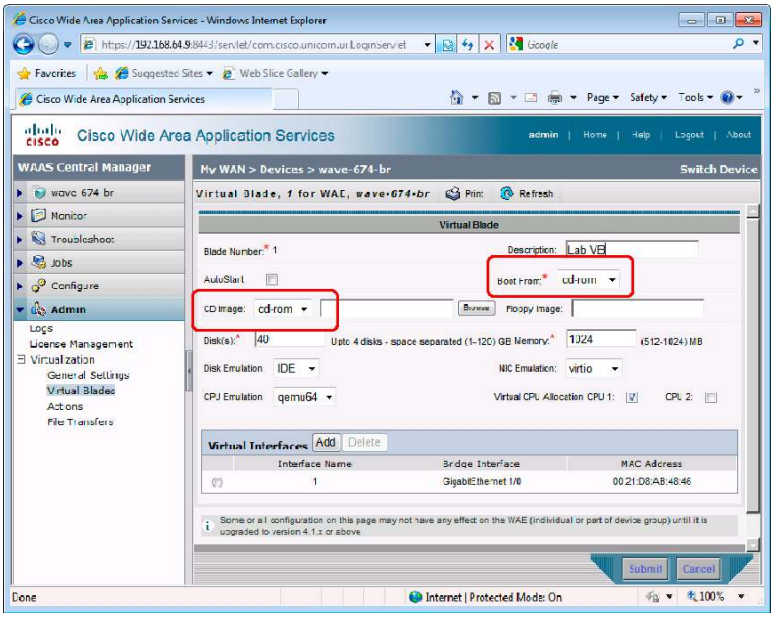
To deploy from a physical disk, do the following (Figure 5):

Step 1. Create a new virtual blade following the steps in the Configuring Virtual Blades section, with the following choices set:

a. In **Step 5,** part d, choose **cd-rom.**

b. In **Step 5,** part e, choose **cd-rom.**

Figure 5. Virtual Blade Configuration Using Physical Device



Step 2. Start the virtual blade and attach it through the console to complete the operating system installation. For more information about starting and connecting to the virtual blade console, see Starting and Stopping Virtual Blades and Accessing the Virtual Blade Console.

New Installation from a Virtual Disk Image (ISO)

Virtual blades can use a prestaged ISO disk file that has been deployed to the Cisco WAAS device. To deploy from virtual media, do the following:

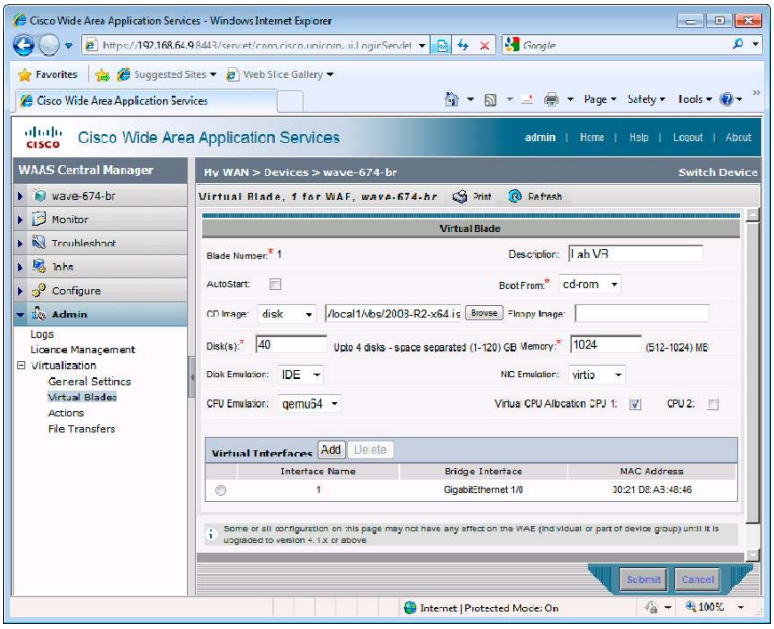
Step 1. Deploy the virtual media to the Cisco WAAS device. For specific instructions, see Copying a Virtual Disk (ISO) Image to a Cisco WAAS Device.

Step 2. Create a new virtual blade following the steps in the Configuring Virtual Blades section, with the following choices set:

a. In **Step 5,** part **d**, choose **disk**.

b. In **Step 5**, part **e**, specify the name and path of the virtual disk media file uploaded in the previous step. This name is usually in the format /local1/vbs/*DISKNAME*.iso (Figure 6).

Figure 6. Virtual Blade Configuration Using Virtual Disk Image



Step 3. Start the virtual blade and attach it using the console to complete the operating system installation. For more information about starting and connecting to the virtual blade console, see Starting and Stopping Virtual Blades and Accessing the Virtual Blade Console.

Deploying a Prebuilt Image Using FTP

To rapidly deploy virtual blades to remote locations, consider creating a virtual blade deployment image for distribution. This approach allows rapid deployment of prebuilt virtual services to remote locations, without the need for a full, interactive installation. This method requires the customer to create the virtual blade deployment image and then clone this image to selected Cisco WAAS devices for deployment.

To deploy virtual blades from a staged image, follow these steps:

Note: You will need a virtual blade–capable Cisco WAAS device to create a virtual blade deployment image. You will also need an FTP server to stage the virtual blade deployment image. Locating both of these in a central location in the core of the network is recommended.

Step 1. Create a virtual blade on a Cisco WAAS device to serve as the virtual blade deployment image. When creating the virtual blade, verify that the configured disk space will be available on all your Cisco WAAS installation targets. For more information about creating a virtual bade, see Configuring Virtual Blades.

Step 2. Start the virtual blade and install the virtual blade operating system.

Step 3. Install the applications, drivers, and services needed for your virtual blade deployment.

Note: Some applications and services do not support installation prior to cloning of a system and must be installed manually after cloning. Check with your application or service vendor for information about cloning your selected applications and services.

Step 4. Prepare the virtual blade for deployment. This operation typically involves removing license keys and security identifiers from the virtual blade image and putting the image in a deployment-ready state. For Microsoft Windows Servers, this process is accomplished through the Sysprep utility. Consult your application and operating system documentation for additional details.

Step 5. Shut down the virtual blade.

Step 6. Back up the virtual blade disk to an FTP server for deployment. For more information about this process, see Copying a Virtual Blade Disk to an FTP Server.

After the virtual blade deployment disk image has been fully transferred to the FTP server, you are ready to begin deployment of the virtual blade to remote locations.

Step 7. On each remote device that will be receiving the virtual blade disk image, create a new virtual blade. Save, but do not start, this virtual blade.

Step 8. Transfer the virtual blade deployment disk image to each remote virtual blade. This is done using the virtual blade restoration function. For more information, see Restoring a Virtual Blade Disk to a Cisco WAAS Device.

Step 9. Verify that the virtual blade deployment disk image has been transferred and then start the virtual blade.

Step 10. Connect to the virtual blade console to perform any remaining installation tasks and application installation processes.

Deployment Using Network Booting (PXE)

Virtual blades also support diskless installations using PXE. This method allows installation without prestaging of disk images or prior creation of virtual blade images for deployment.

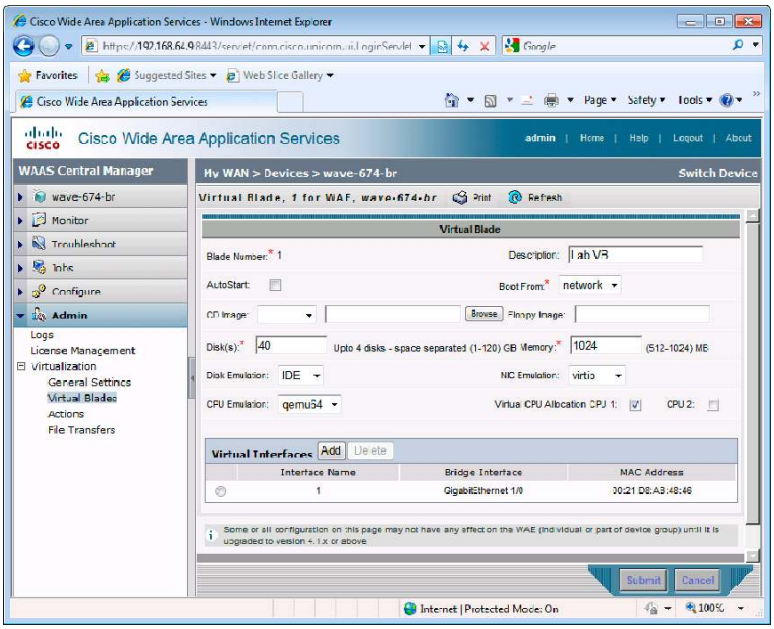
Note: The following steps assume that your preboot execution environment is configured and functioning correctly. For support and assistance with your PXE deployment system, please consult the manufacturers documentation.

To deploy through the network, perform the following steps:

Step 1. Create a new virtual blade following the steps in the Configuring Virtual Blades section, with the following choices set (Figure 7):

a. In **Step 5**, part **d**, choose **network**.

Figure 7. Virtual Blade Configuration for Network Booting



Step 2. Start the virtual blade and attach it using the console to complete the operating system installation. For more information about starting and connecting to the virtual blade console, see Starting and Stopping Virtual Blades and Accessing the Virtual Blade Console.

Note: (1) Verify that the **Boot From** field is changed from **network** to **disk** before any automatic system restart by the operating system installer. This change will prevent the virtual blade from attempting to reinstall the operating system after rebooting. (2) Depending on your PXE deployment, you may be required to press F12 on the virtual blade console to initiate the virtual blade installation.

Virtual Blade Operations

Starting and Stopping Virtual Blades

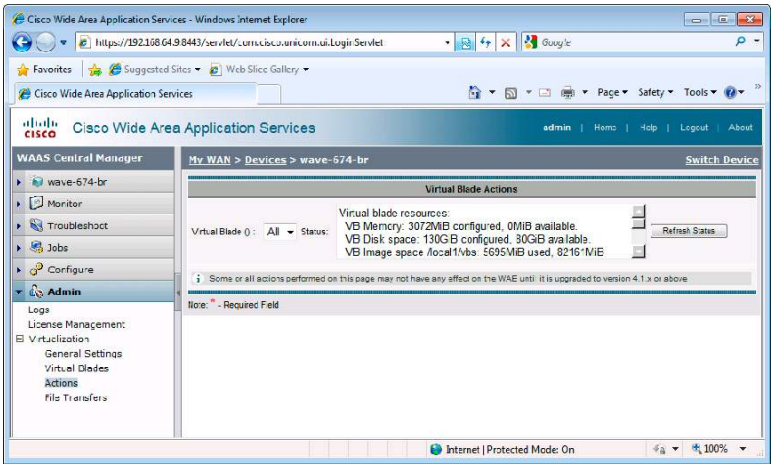
To start or stop a virtual blade on your Cisco WAAS device, follow these steps:

Step 1. From the Cisco WAAS Central Manager GUI navigation pane, choose **My WAN > Manage Devices**.

Step 2. Click the **Edit** icon next to the Cisco WAE device that you want to configure.

Step 3. From the navigation pane, choose **Admin > Virtualization > Actions.** The Virtual Blade Actions pane appears (Figure 8).

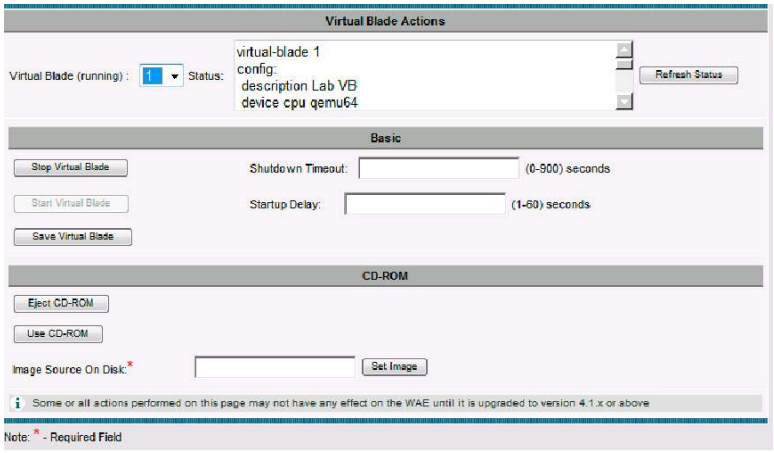
Figure 8. Virtual Blade Actions Pane



Step 4. From the **Virtual Blade()** menu, choose the virtual blade that you want to enable or disable. The status of the virtual blade is displayed in the **Status** field. See Figure 9 for an example.

The default selection for the virtual blade is **All.** When All is selected, the Status field displays the current status for all virtual blades.

Figure 9. Virtual Blade Actions Pane



Start the Virtual Blade

Step 1. Click **Start Virtual Blade** to enable the selected virtual blade.

Step 2. (Optional) Enter a startup delay by typing a value, in seconds, in the **Startup Delay** field.

The startup delay can be used to give you time to connect a VNC session to the console before the virtual blade boots, so you can observe the initial startup.

Stop the Virtual Blade

Step 1. Click **Stop Virtual Blade** to disable the selected virtual blade.

Step 2. (Optional) To give the virtual blade operating system time to shut down the virtual blade after you click the Stop Virtual Blade button, enter a value (in seconds) in the **Shutdown Timeout** field.

The shutdown timeout provides a delay period during which the operating system can shut down

gracefully. If the operating system has not shut down the virtual blade by the end of this period, Cisco WAAS will cancel the shutdown.

If you set the Shutdown Timeout value to 0, Cisco WAAS will force a shutdown immediately. A forced shutdown is comparable to pulling the power cord on a real computer.

To avoid losing data in open programs running on the virtual blade, you should perform a graceful shutdown or have the operating system itself perform the shutdown.

Save the Virtual Blade

Click **Save Virtual Blade** to suspend the selected virtual blade.

Suspending the virtual blade allows you to stop the virtual blade from using computing resources and save the current execution state to disk. Starting the virtual blade after this operation will resume the virtual blade execution state.

Note: To reboot your Cisco WAAS device, you must stop or save all virtual blades.

Resetting a Virtual Blade

In some cases, it is preferable to quickly reset the virtual blade instead of entering separate start and stop instructions to the device. Cisco WAAS provides a facility to do this through the Cisco WAAS CLI. The following command resets Virtual Blade 1:

```
WAE-574# virtual-blade 1 reset
```

Note: This command performs an instant reset and can cause data loss in virtual blades similar to the way that pressing the Reset button on a physical computer can.

Accessing the Virtual Blade Console

During operating system installation and certain maintenance tasks on a server, it's desirable to have access to the physical display console and keyboard. Because of the virtual nature of virtual blades, no such physical devices are present. In this case, Cisco WAAS provides a virtual physical console through the RFB protocol. RFB is most often used in VNC display clients.

To access the virtual console of a virtual blade, you will need a VNC client. Cisco WAAS interoperates with most VNC clients. Common freely available clients include:

- TightVNC (Microsoft Windows and Unix)
- Chicken of the VNC (Mac OS)

After you have a VNC client installed, you can connect to the virtual blade console. Typically, VNC connections are made using the syntax <*IP Address*>:<*Display Number*>. For Cisco WAAS virtual blades, the IP address is the primary interface address of the Cisco WAAS device, and the display number is the virtual blade number.

For example, to connect to Virtual Blade 4 on a Cisco WAVE device with IP 192.168.0.1, you would enter 192.168.0.1:4 in the VNC client

Note: VNC uses TCP, but the display number is not the TCP port number. VNC display numbers 1 through 6 use TCP ports 5901 through 5906, respectively.

Cisco WAAS allows connections to the virtual blade console only after the virtual blade has been started. If the virtual blade is stopped, any remote console connections will be disconnected. If you need to connect to the virtual

blade console before the virtual blade starts, enter a **start** command with a delay time. The virtual blade console will be available during the startup delay. For more information about starting and stopping virtual blades, see Starting and Stopping Virtual Blades.

Note: If you want to reboot the virtual blade without disconnecting the console, enter a reset command from the Cisco WAAS CLI.

Securing the Virtual Blade Console

The virtual blade console is designed to be a lightweight access method for installation and emergency maintenance. Because of this, the console is unsecure. It is recommended that you disable the virtual console when it is not in use. The following command will disable the virtual console for Virtual Blade 3:

```
wae# no virtual-blade 3 vnc
```

To enable the virtual console, enter the same command without the no prefix.

After the virtual blade operating system is installed, you should use the native remote management tools of the operating system instead of the Cisco WAAS virtual console.

Installing Paravirtualized Networking

Paravirtualization is a technology that allows a virtual blade to have more direct access to the hardware of a Cisco WAAS system, providing enhanced performance. In Cisco WAAS 4.2 adds support for paravirtualized network devices.

For a virtual blade to use the paravirtualized virtio network device, the operating system on the virtual blade must have driver support for this device. See the following sections for information about how to use the virtio device drivers.

Microsoft Windows–Based Virtual Blades

Microsoft Windows drivers for the virtio network device (virtio-drivers.iso) can be downloaded from the Cisco Software Center site: http://www.cisco.com/public/sw-center/index.shtml. To install these drivers, do the following:

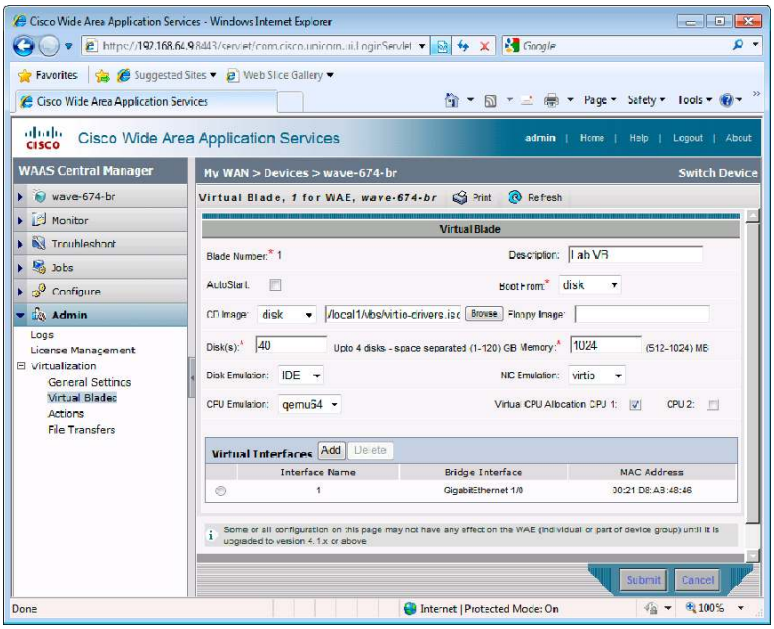
Step 1. Copy the virtio driver disk image to the Cisco WAAS device. For detailed steps for copying files, see Copying a Virtual Disk (ISO) Image to a Cisco WAAS Device.

Step 2. Fully install the virtual blade operating system. For more information about this step, see the Configuring Virtual Blades section.

Step 3. In the Virtual Blade configuration pane, make the following changes (Figure 10):

- From the **NIC Emulation** menu, choose the **virtio** device.
- Verify that the **Boot From** menu is set to **disk.**
- From the **CD Image** menu, choose **disk.**
- In the **CD Image** disk name field, specify the name of the virtio driver disk image file (for example, /local1/vbs/virtio-drivers.iso).

Figure 10. Virtual Blade Configuration Pane



Step 4. Restart the virtual blade.

Note: To avoid restarting the virtual blade, you can specify the virtio device during creation of the virtual blade and prior to the Microsoft Windows installation. However, the virtual blade will not be able to access network resources until the drivers in Step 5 are installed.

Step 5. After the virtual blade has restarted, perform the following steps according to on your Microsoft Windows version.

Microsoft Windows Server 2008 Core and 2008 Release 2 (R2) Core:

At the Microsoft Windows Server 2008 Core command prompt, enter the following command based on your version of Server 2008 Core:

Note: "D:" in the commands shown here represents the drive letter of your virtual CD-ROM drive containing the virtio driver disk image. Your drive letter may differ if more than one virtual disk is present.

Microsoft Windows 2008 x64 Core and Windows 2008 R2 Core:

```
C:\> pnputil -i -a d:\inf\amd64\Win2008\netkvm.inf
```

Microsoft Windows 2008 x86 Core:

```
C:\> pnputil -i -a d:\inf\i386\Win2008\netkvm.inf
```

The virtio drivers should now be installed, and Windows should automatically verify and use the new device.

Microsoft Windows Server 2003 and 2008 Full Installation, and 2008 R2 Full installation:

a. Open the **Microsoft Windows Device Manager**.

b. The virtio network device will likely be listed as an unknown Ethernet controller. Right-click this network device and select **Update Driver Software**.

c. Select **Browse My Computer for Driver Software**.

d. Enter **D:** in the path for the network drivers.

e. Click **Next**.

Windows should find and install the appropriate version of the virtio device driver.

Note: After installation, the virtio interface will appear in Microsoft Windows as a RedHat VirtIO Ethernet Adapter.

Linux-Based Virtual Blades

Linux virtual blades also support virtio paravirtualized network devices. These virtual blades must run kernel 2.6.25 or later and be compiled with the CONFIG_VIRTIO_* options. For more information, please see the documentation with your Linux distribution or view the Linux virtio project site.

Transferring Virtual Blade Files

Cisco WAAS provides an interface to transfer virtual disk images to and from the remote devices through the Cisco WAAS Central Manager interface. This interface enables easy placement virtual disk ISO images on remote devices, as well as backup and restoration of virtual blade disk images.

Note: All file transfers to and from virtual blades use FTP and require an FTP server to copy files to or from.

Copying a Virtual Disk (ISO) Image to a Cisco WAAS Device

To copy a virtual disk image (ISO) to your Cisco WAAS device, follow these steps:

Step 1. From the Cisco WAAS Central Manager GUI navigation pane, choose **My WAN > Manage Devices.**

Step 2. Click the **Edit** icon next to the Cisco WAAS device to which that you want to copy the image.

Step 3. From the navigation pane, choose **Admin > Virtualization > Virtual Blades > File Transfers.** The Virtual Blade File Transfers pane appears (Figure 11).

Step 4. Begin configuring the values to transfer your virtual disk (ISO) image to the Cisco WAAS device as follows:

a. From the **File Transfer Type** menu, choose FTP Image to /local1/vbs.

b. In the **FTP Server** field, enter the IP address or hostname of the FTP server containing the virtual disk image.

c. In the **Remote Directory** field, enter the path to the virtual disk (ISO) image on the remote FTP server.

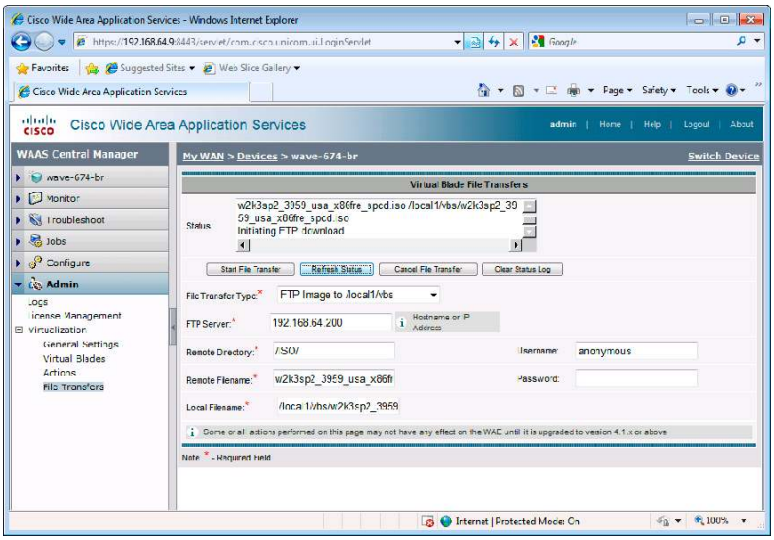
d. In the **Remote Filename** field, enter the filename of the virtual disk (ISO) image.

e. In the **Username** field, enter the username required to access the virtual disk image. For an anonymous FTP server, you may need to use the username anonymous or ftp.

f. In the **Password** field, enter the password for the username used to access the virtual disk image. For anonymous FTP servers, specify a blank password, email address, or other password as required.

g. In the **Local Filename** field, enter the filename of the virtual disk (ISO) image to be stored on the Cisco WAAS device.

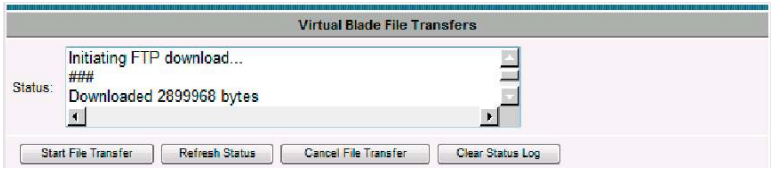
Figure 11. Virtual Blade File Transfers Pane: FTP



Note: (1) All virtual disk image files transferred to a Cisco WAAS device must reside in the **/local1/vbs** directory to be used by virtual blades. (2) A remote directory value of . (period) tells Cisco WAAS to transfer files from the directory used on initial login. This value can save time, eliminating the need to type the full path to the login directory.

Step 5. Click the **Start File Transfer** button to begin the FTP transfer. The file should begin transferring from the FTP server to the device. To view the status of the file transfer, click the **Refresh Status** button. The status of the transfer will appear in the text area above the buttons (Figure 12).

Figure 12. Virtual Blade File Transfers Pane: Status



Copying a Virtual Blade Disk to an FTP Server

To back up a virtual disk from a virtual blade, follow these steps:

Note: The virtual blade must be stopped before you perform a virtual blade disk backup or restore operation.

Step 1. From the Cisco WAAS Central Manager GUI navigation pane, choose **My WAN > Manage Devices.**

Step 2. Click the **Edit** icon next to the Cisco WAAS device from which you want to copy the virtual blade disk image.

Step 3. From the navigation pane, choose **Admin > Virtualization > Virtual Blades > File Transfers**. The Virtual Blade File Transfers pane appears (Figure 13).

Step 4. Begin configuring the values to transfer your virtual blade disk image to an FTP server as follows:

a. From the **File Transfer Type** menu, choose Backup Virtual Blade to FTP.

b. In the **FTP Server** field, enter the IP address or hostname of the FTP server to which you will copy the virtual blade disk image.

c. In the **Remote Directory** field, enter the path to the directory to which you will copy the virtual blade disk image.

d. In the **Remote Filename** field, enter a filename for the virtual blade disk image.

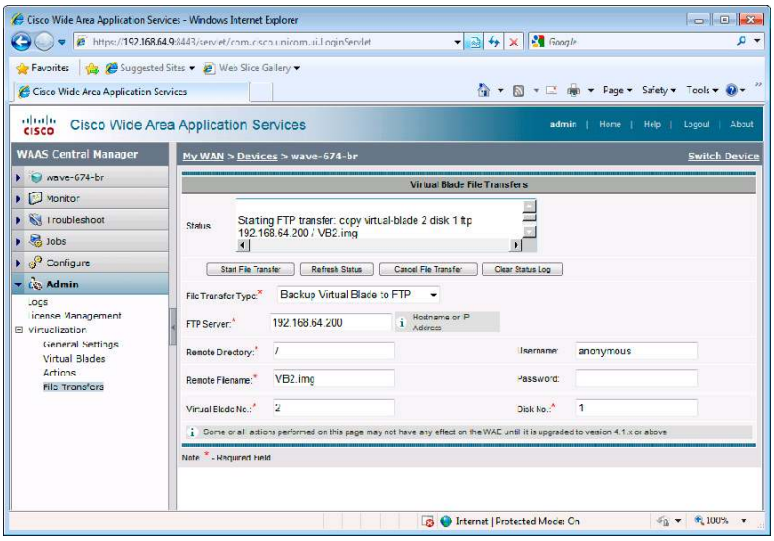
e. In the **Username** field, enter the username required to access the FTP server.

f. In the **Password** field, enter the password.

g. In the **Virtual Blade** No. field, enter the virtual blade number containing the disk image you want to transfer.

h. In the **Disk No**. field, specify the disk number of the virtual blade you want to transfer. Virtual blades can contain multiple virtual disks. See Configuring Virtual Blades for more information.

Figure 13. Virtual Blade File Transfers Pane: Virtual Blade Backup



Note: A remote directory value of . (period) tells Cisco WAAS to transfer files to the directory used on initial login. This entry can save time, eliminating the need to type the full path to the login directory.

Step 5. Click the **Start File Transfer** button to begin the virtual blade disk image transfer. The file should begin transferring from the Cisco WAAS device to the FTP server. To view the status of the file transfer, click the **Refresh Status** button. The status of the transfer will appear in the text area above the buttons

Restoring a Virtual Blade Disk to a Cisco WAAS Device

To restore or deploy a virtual disk to a virtual blade, follow these steps:

Step 1. Create or decide which virtual blade will be transferred the virtual blade disk image. Virtual blade disk images can be transferred only to a configured virtual blade. If you do not have a virtual blade configured, create one. For more information about creating a virtual blade, see Configuring Virtual Blades.

Note: (1) Restoring a virtual blade disk image will overwrite the contents of the virtual disk being restored. (2) Restoring a virtual blade disk image will change the configured disk size of the virtual blade to match the configured disk size of the virtual disk image that is being restored. (3) The virtual blade must be stopped before you perform a virtual blade disk backup or restore operation.

Step 2. From the Cisco WAAS Central Manager GUI navigation pane, choose **My WAN > Manage Devices.**

Step 3. Click the **Edit** icon next to the Cisco WAAS device to which you want to copy the virtual blade disk image.

Step 4. From the navigation pane, choose **Admin > Virtualization > Virtual Blades > File Transfers**. The Virtual Blade File Transfers pane appears (Figure 14).

Step 5. Begin configuring the values to restore your virtual blade disk image to the Cisco WAAS device as follows:

a. From the **File Transfer Type** menu, choose Restore Virtual Blade from FTP.

b. In the **FTP Server** field, enter the IP address or hostname of the FTP server that contains the virtual blade disk image.

c. In the **Remote Directory** field, enter the path to the directory that contains the virtual blade disk image.

d. In the **Remote Filename** field, enter the filename of the virtual blade disk image.

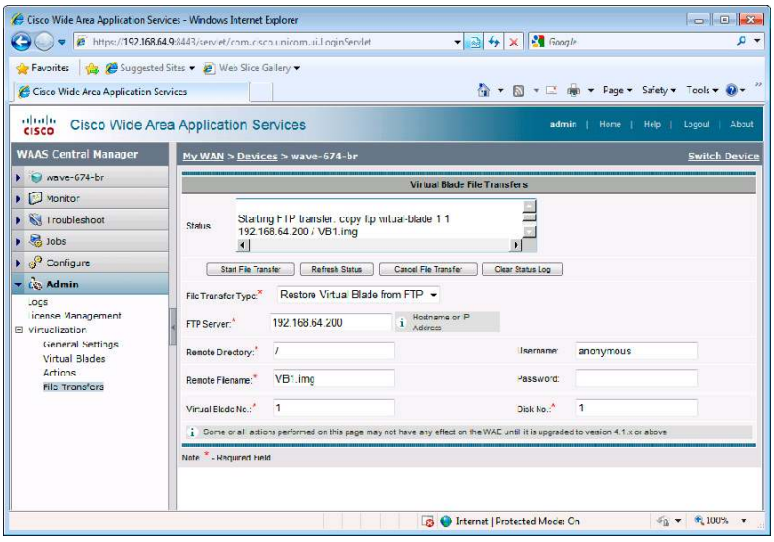
e. In the **Username** field, enter the username required to access the FTP server.

f. In the **Password** field, enter the password.

g. In the **Virtual Blade No.** field, enter the virtual blade number to which you want to restore the virtual blade disk image.

h. In the **Disk No.** field, enter the disk number of the virtual blade you want to restore. Virtual blades can contain multiple virtual disks. See Configuring Virtual Blades for more information.

Figure 14. Virtual Blade File Transfers Pane: Virtual Blade Restoration



Note: A remote directory value of . (period) tells Cisco WAAS to transfer files to the directory used on initial login. This entry can save time, eliminating the need to type the full path to the login directory.

Step 6. Click the **Start File Transfer** button to begin the virtual blade disk image transfer. The Cisco WAAS device should begin restoring the virtual blade disk image from the FTP server. To view the status of the file transfer, click the **Refresh Status** button. The status of the transfer will appear in the text area above the buttons

Backing Up Virtual Blades

A critical function of a virtual blade infrastructure is the backup of unique data from remote virtual blade installations. Virtual blades are targeted for distributed services that typically require infrequent or no backup over the WAN.

However, some custom applications and services may require more frequent backups. In these cases, customers can install their own backup agent or perform a full virtual blade disk image backup.

Agent Backup

Since Cisco WAAS virtual blades are virtual servers, customers can typically use backup solutions similar to those they use today for physical servers. Since virtual blades have no physical backup devices, these solutions will need to back up over the network to a backup system or tape library. This process is usually called an agent backup. Since backup solutions vary widely, consult your backup vendor documentation for information about how to install a backup client agent for use over the network.

Full Disk Image Backup

Cisco WAAS also provides the capability to back up an entire virtual blade disk image at once. This approach enables a full backup of the virtual blade disk, regardless of backup support by the underlying operating system. Specific requirements/features are:

- The virtual blade must be stopped before backup or restoration of the virtual blade.
- The virtual blade disk is transferred to a server using FTP.
- Only the used disk data amount is transferred. If you have a 40-GB disk and only 3 GB in use, 3 GB will be transferred.
- Since the transport is FTP, Cisco WAAS can optimize the backup traffic if a peer device is available.

For more information about backing up and restoring virtual blades, see Transferring Virtual Blade Files.

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