

BIG-IP® Virtual Edition Setup Guide for Citrix XenServer

Version 11.6



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Chapter 1

Getting Started with BIG-IP Virtual Edition

- *What is BIG-IP Virtual Edition?*
-

What is BIG-IP Virtual Edition?

BIG-IP® Virtual Edition (VE) is a version of the BIG-IP system that runs as a virtual machine in specifically-supported hypervisors. BIG-IP VE creates a virtual instance of a hardware-based BIG-IP system running a VE-compatible version of BIG-IP® software.

***Note:** The BIG-IP VE product license determines the maximum allowed throughput rate. To view this rate limit, you can display the BIG-IP VE licensing page within the BIG-IP Configuration utility. Lab editions have no guarantee of throughput rate and are not supported for production environments.*

About BIG-IP VE compatibility with XenServer hypervisor products

Each time there is a new release of BIG-IP® Virtual Edition (VE) software, it includes support for additional hypervisor management products. The Virtual Edition and Supported Hypervisors Matrix on the AskF5™ website, <http://support.f5.com>, details which hypervisors are supported for each release.

***Important:** Hypervisors other than those identified in the matrix are not supported with this BIG-IP version; installation attempts on unsupported platforms might not be successful.*

About the hypervisor guest definition requirements

The XenServer virtual machine guest environment for the BIG-IP® Virtual Edition (VE), at minimum, must include:

- 2 x virtual CPUs
- 4 GB RAM
- 2 x virtual network adapters
- 1 x 100 GB IDE disk
- SCSI disk storage; download the image size that provides sufficient space to meet your requirements. An optional secondary disk might also be required as a datastore for specific BIG-IP modules. For information about datastore requirements, refer to the BIG-IP module's documentation.

***Note:** Refer to *Increasing the disk space allotted to the BIG-IP virtual machine for details on changing the disk size after initial download.**

***Important:** You must supply at least the minimum virtual configuration limits to avoid unexpected results.*

For production licenses, F5 Networks suggests using the maximum configuration limits for the BIG-IP VE system. For lab editions, required reserves can be less. For each virtual machine, the XenServer virtual machine guest environment permits a maximum of 7 virtual network adapters (1 management + 6 dataplane).

There are also some maximum configuration limits to consider for deploying a BIG-IP VE virtual machine, such as:

- CPU reservation can be up to 100 percent of the defined virtual machine hardware. For example, if the hypervisor has a 3 GHz core speed, the reservation of a virtual machine with 2 CPUs can be only 6 GHz or less.
- To achieve licensing performance limits, all allocated RAM must be reserved.
- For production environments, virtual disks should be deployed Thick (allocated up front). Thin deployments are acceptable for lab environments.

Important: There is no longer any limitation on the maximum amount of RAM supported on the hypervisor guest.

Disk space guidelines

This table details the capabilities and limitations of the disk space options you can choose.

Provisioned disk space	Capabilities and Limitations	Special Considerations
7 GB	The Local Traffic Manager (LTM [®]) module is supported, but there is no space available for installing LTM upgrades.	Disk space can be increased if you need upgrade LTM, or decide to provision additional modules.
31 GB	The LTM module is supported. There is also sufficient space available for installing LTM upgrades.	Disk space can be increased if you decide to provision additional modules. You can also install another instance of LTM on a separate partition.
80 GB (OS only) or 100 GB (with Datasore)	All modules and combinations are supported. There is also sufficient space available for installing upgrades.	If you plan to use the Acceleration Module (AM) in addition to other modules, you must add a second 20 GB disk in addition to the 80 GB operating system disk used by the other modules. The 20 GB volume serves as a dedicated Datasore for AM. Do not use this volume for any other purpose. If you need additional space, increase the disk space allotted to this VE. For information on configuring the Datasore volume, refer to <i>Disk Management for Datasore</i> published on the AskF5 [™] web site, http://support.f5.com .

Guest memory guidelines

The general memory requirement recommendation for BIG-IP[®] Virtual Edition (VE) is 2 GB per virtual CPU. Additionally, the following memory guidelines may be helpful in setting expectations, based on which modules are licensed on VE guests.

Provisioned memory	Supported module combinations	Module specific concerns
12 GB or more	All module combinations are fully supported.	N/A
8 GB	Provisioning more than three modules together is not supported.	GTM [™] and Link Controller [™] do not count toward the module-combination limit.
More than 4 GB, but less than 8 GB	Provisioning more than three modules together is not supported. (See module-specific concerns relating to AAM.)	Application Acceleration Manager [™] (AAM) cannot be provisioned with any other module; AAM [™] can only be provisioned as standalone. GTM and Link Controller do not count toward the module-combination limit.
4 GB or less	Provisioning more than two modules together is not supported.	AAM can only be provisioned as dedicated.

Chapter 2

Deploying BIG-IP Virtual Edition

- *Host machine requirements and recommendations*
 - *About BIG-IP VE XenServer deployment*
-

Host machine requirements and recommendations

To successfully deploy and run the BIG-IP® VE system, the host system must satisfy minimum requirements.

The host system must include:

- Connection to a common NTP source (this is especially important for each host in a redundant system configuration)
- XenServer

The hypervisor CPU must meet the following requirements:

- Use 64-bit architecture.
- Have support for virtualization (AMD-V or Intel VT-x) enabled.
- Support a one-to-one thread-to-defined virtual CPU ratio, or (on single-threading architectures) support at least one core per defined virtual CPU.
- If you use an Intel processor, it must be from the Core (or newer) workstation or server family of CPUs.

SSL encryption processing on your VE will be faster if your host CPU supports the Advanced Encryption Standard New Instruction (AES-NI). Contact your CPU vendor for details on which CPUs provide AES-NI support.

The hypervisor memory requirement depends on the number of licensed TMM cores. The table describes these requirements.

Number of Cores	Memory Required
1	2 Gb
2	4 Gb
4	8 Gb
8	16 Gb

About BIG-IP VE XenServer deployment

To deploy the BIG-IP® Virtual Edition (VE) system on Citrix XenServer, you need to perform these tasks:

- Verify the host machine requirements.
- Deploy an instance of the BIG-IP system as a virtual machine on a host system.
- Power on the BIG-IP VE virtual machine.
- Assign a management IP address to the BIG-IP VE virtual machine.

After you complete these tasks, you can log in to the BIG-IP VE system and run the Setup utility. Using the Setup utility, you can perform basic network configuration tasks, such as assigning VLANs to interfaces.

Deploying the BIG-IP VE virtual machine

The first step in deploying BIG-IP® Virtual Edition (VE) is to download the OVA file to your local system. Next, you can run the Deploy OVF Template wizard from within the XenServer XenCenter client. Follow

the steps in this procedure to create an instance of the BIG-IP system that runs as a virtual machine on the host system.

Important: Do not modify the configuration of the XenServer guest environment with settings less powerful than the ones recommended in this document. This includes the settings for the CPU, RAM, and network adapters. Doing so might produce unexpected results.

1. In a browser, open the F5 Downloads page (<https://downloads.f5.com>).
2. Download the BIG-IP VE file package ending with `ide.ova`.
3. Extract the file from the Zip archive.
4. Before starting the import wizard, review the prospective hypervisor environment for the following.
 - Make sure a DHCP server is active on the same network as the XenServer host before you start the XenCenter OVF Appliance.
 - Make sure there are no firewall or other restrictions between the required ports for connectivity between the XenCenter Client and XenServer. For more information and networking requirements, refer to the *XenServer Virtual Machine Installation Guide*.
 - Make sure enough storage space is available on the XenServer for the BIG-IP virtual machine.
5. Start the XenServer XenCenter client and log in.
6. From the XenCenter 6.0 File menu, click **File > Import**.
The Import wizard starts.
7. For the filename use the **Browse** button to locate the OVA file, open it, and then click **Next**.
For example: `\MyDocuments\Work\Virtualization\<BIG-IP_OVA_filename>`
This displays the End-User License Agreement (EULA).
8. Read and accept the license agreement, and click **Next**.
The Location window opens.
9. Under Home Server, select the home server for the BIG-IP VE virtual machine from the list, and click **Next**.
10. On the Storage window, click **Place imported virtual disks onto specified target SRs**, select the 100 GB storage size and location for the BIG-IP VE virtual machine, and then click **Next**.
11. On the Networking window, assign the Management, Internal, External, and HA virtual machines to their respective Target Networks and click **Next**.

Tip: There is no need to enter MAC addresses, MAC addresses will be assigned automatically.

12. In the OS Fixup Settings window, make sure the **Use Operating System Fixup** check box is not selected and click **Next**.

Important: The *Use Operating System Fixup* check box is selected by default.

13. On the Transfer VM Settings window, click **Next**, then on the Finish window, review your settings before continuing. Click **Finish**.
The progress bar and text in the Progress pane indicate when the BIG-IP virtual machine creation is complete.

Powering on the virtual machine

You power on the virtual machine so that you can begin assigning IP addresses.

1. In the XenCenter client window, select the Server View.

2. Select the virtual machine that you want to power on.
3. Click the **Start** icon.

Note: If you do not see the **Start** icon, look at the tool bar under the View menu.

The status icon changes to indicate that the virtual machine is on. The virtual machine boots and becomes ready for configuration.

There are two default accounts used for initial configuration and setup:

- The root account provides access locally, or using SSH, or using the F5 Configuration utility. The root account password is `default`.
- The admin account provides access through the web interface. The admin account password is `admin`.

You should change passwords for both accounts before bringing a system into production.

Assigning a management IP address to a virtual machine

The virtual machine needs an IP address assigned to its virtual management port.

Tip: The default configuration for new deployments and installations is for DHCP to acquire the management port IP address.

1. In the XenCenter client window, select the Server View.
2. In the Resources pane, select the virtual machine to which you want to assign the management IP address.
3. Click the Console tab.
You might need to click the console area and press Enter to activate the console.
4. At the local host login prompt, type `root`.
5. At the password prompt, type `default`.
6. Type `config` and press Enter.
The F5 Management Port Setup screen opens.
7. Click **OK**.
8. If you want DHCP to automatically assign an address for the management port, select **Yes**. Otherwise, select **No** and follow the instructions for manually assigning an IP address and netmask for the management port.

You can use a hypervisor generic statement such as `tmsl show sys management-ip` to confirm that the management IP address has been properly assigned.

Tip: F5 Networks highly recommends that you specify a default route for the virtual management port, but it is not required for operating the virtual machine.

Turning off LRO/GRO from the VE guest to optimize PEM performance

Before you can access the VE guest to turn off LRO and GRO, you must have assigned the guest a management IP address.

To optimize performance if you use the virtual machine with the PEM module, you must turn off large receive offload (LRO) and generic receive offload (GRO) for each network interface card (NIC) that is used

to pass traffic. You must also use SR-IOV. Although there are a number of ways to turn off LRO, the most reliable way is to connect to the VE guest and use the `ethtool` utility.

1. Use an SSH tool to access the management IP address of the BIG-IP® VE system.
2. From the command line, log in as `root`.
3. Use the `ethtool` to turn off rx-checksumming for the NIC.

```
ethtool -K eth<X> rx off
```

Important: In this example, substitute the NIC number for `<X>`.

4. Use the `ethtool` to turn off LRO for the NIC.

```
ethtool -K eth<X> lro off
```

Important: In this example, substitute the NIC number for `<X>`.

5. Use the `ethtool` to turn off GRO for the NIC.

```
ethtool -K eth<X> gro off
```

Important: In this example substitute the NIC number for `<X>`.

6. Use the `ethtool` to confirm that LRO and GRO are successfully turned off for the NIC.

```
ethtool -k eth<X>
```

In the system response to your command, you should see this info:

```
generic-receive-offload: off
```

```
large-receive-offload: off
```

If either of these responses is `on`, your attempt to turn them off was not successful.

Important: In this example substitute the NIC number for `<X>`.

7. Repeat the previous three steps for each of the NICs that the BIG-IP VE uses to pass traffic.

With LRO and GRO successfully turned off, the performance of the PEM module on the BIG-IP VE system will have better performance and stability.

You can achieve optimum performance (throughput and stability) with the PEM module only if you enable SR-IOV.

Chapter

3

Updating a BIG-IP VE Virtual Machine

- *About VE disk space*
- *About updates to the BIG-IP VE virtual machine*
- *Upgrading BIG-IP VE from version 10.x to 11.x*

About VE disk space

BIG-IP® VE can be deployed in a number of different disk space configurations. Because disk space can be a costly resource, it makes sense to install the smallest disk space configuration that is practical for your operation. If you opt for a smaller disk size, but later determine that you need additional space so you can install upgrades and hot fixes, or to run additional module combinations, you can increase the size of the disk space the BIG-IP VE uses to suit your needs.

Important: *At the time of this release, decreasing the VE disk size is not supported. If you decide that you need a smaller disk size, first install a smaller disk size version of BIG-IP VE, and then increase the size to what you want. For example, you might install the 31Gb disk version of BIG-IP VE, but then decide you only need 20Gb. You could install the 7Gb version, and then increase the disk size to 20Gb.*

Increasing the disk space allotted to the BIG-IP virtual machine

You can customize the amount of resources available by using a sequence of hypervisor-specific steps to increase the disk space the hypervisor uses, and follow those with a sequence of `tmsh` commands to increase the size of the directories that BIG-IP® VE uses.

1. The process of expanding the virtual disk size of your hypervisor depends on which hypervisor you use. Consult your hypervisor documentation for specific instructions.
2. After you complete the steps for expanding your hypervisor disk size, reboot the BIG-IP VE to see that new disk size.

Important: *Before the BIG-IP VE can use the additional disk space, you need to increase the size of the directories on the disk.*

3. Submit the following sequence of `tmsh` commands to schedule expansion of the directories in which you need more room.

Tip:

There are four disk directories that can be resized.

- `/config`
- `/shared`
- `/var`
- `/var/log`

-
- a) List the current size of the directories on your disk so you can determine which ones need to be resized.

```
(tmsh show sys disk directory)
```

- b) Expand the size of the directories in which you need additional space.

```
(tmsh modify sys disk directory <directory name> new-size <new directory size in 1KB blocks>)
```

For example, use `tmsh modify sys disk directory /config new-size 3145740` to increase the size of `/config` directory to 3145740 1KB blocks (or roughly 3,221,237,760 bytes).

- c) To confirm that the command you just submitted is properly scheduled, you can show the new list of directories again.

```
(tmsh show sys disk directory)
```

- d) If you change your mind about a submitted size change, you can revoke that size change.

```
(tmsh modify sys disk directory /config new-size 0)
```

In this example, the size of the `/config` directory is left as is, revoking any scheduled size changes.

After you submit this sequence of `tmsh` commands, the directory size changes will be scheduled. That is, the next time the BIG-IP VE is rebooted, the disk directories are re-sized.

4. Reboot the BIG-IP VE.
During the reboot, the directory size increases finish.

About updates to the BIG-IP VE virtual machine

BIG-IP® VE updates within the same major version are installed in the same manner as updates to BIG-IP software already installed on BIG-IP hardware. You do not need to reinstall BIG-IP VE in the hypervisor guest environment to upgrade your system. To update a BIG-IP VE virtual machine, you can use the Software Management tool in the Configuration utility, or you can upgrade the software from the command line. The update procedure described here uses the Software Management tool.

Downloading and importing a BIG-IP VE update

To install an update, BIG-IP software needs access to the ISO file. If the update is a hotfix, you need the ISO files for both the base version and the hotfix before you can successfully import and install a hotfix update.

1. In a browser, open the F5 Downloads page (<https://downloads.f5.com>).
2. Download the version's base ISO file, such as `11.5`, and its associated MD5 checksum file.

***Tip:** The location to which you download ISO files is not significant. Just make sure you can navigate to that location when you perform the import task.*

3. Download the update ISO file, such as `Hotfix-BIGIP-11.5.1-511.0-HF3.iso`, and its associated MD5 checksum file.

***Important:** Before you perform the installation, F5 recommends testing the integrity of the ISO files to verify that you have downloaded clean copies. Use an MD5 verification program to ensure that the downloaded ISO file's checksums match the values in their corresponding MD5 files.*

4. On the Main tab, click **System > Software Management > Image List > Import**.
The Import Software Image screen opens.
5. Click **Browse** to navigate to the downloaded base level installation file.
6. When the image name appears in the **Software Image** field, click **Import** to begin the operation.

***Important:** Do not navigate away from this screen before the operation completes; the system might not import the image successfully. Wait for the operation to complete before continuing with any other work on the BIG-IP VE system.*

The system presents a progress indicator during the operation; when the import is complete, the Import page closes and the downloaded base image displays as an available image.

7. Click the Hotfix List tab.
The Available Images portion of the screen displays any hotfixes you have imported previously.
8. At the right side of the screen, click **Import**.
The Import Hotfix screen opens.
9. Click **Browse** to navigate to the downloaded hotfix installation file.
10. When the image name appears in the **Software Image** field, click **Import** to begin the operation.

Important: Do not navigate away from this screen before the operation completes; the system might not import the image successfully. Wait for the operation to complete before continuing with any other work on the BIG-IP VE system.

The system presents a progress indicator during the operation; when the import is complete, the Import page closes and the downloaded hotfix displays in the list of available images.

Installing a BIG-IP VE update

After you download and import the software installation image, you can initiate the installation operation. There are three boot locations on which you can install images on the BIG-IP® system. The process for installing a hotfix or a base version is essentially the same.

1. On the Main tab of the navigation pane, click **System > Software Management**.
The Software Management Image List screen opens.
2. In the Available Images area, select the software image you want to install and click **Install**.
The Install Software Image popup screen opens.
3. Select the disk you want to install the image on, and then type or select a volume name, and click **Install**.
The upgrade process installs the software on the inactive disk location that you specify. This process usually takes between three and ten minutes.

Tip: If there is a problem during installation, you can use log messages to troubleshoot a solution. The system stores the installation log file as `/var/log/liveinstall.log`.

The software image is installed.

When the installation operation is complete, you can safely reboot the newly installed volume or partition.

Rebooting after a BIG-IP VE update

When the installation operation is complete, you can safely reboot into the newly installed volume or partition.

1. On the Main tab, click **System > Software Management**.
The Software Management Image List screen opens.
2. On the menu bar, click **Boot Locations**.
The Boot Locations screen opens.
3. In the Boot Location column, click the link representing the boot location you want to activate.
The properties screen for the boot location opens.
4. Click **Activate**.
A confirmation screen opens.
5. Click **OK** to initiate the reboot operation.
The system presents progress messages during the restart operation.

When the BIG-IP® VE system reboot is complete, the system presents the login screen. To configure the system, log in using an account that has administrative permissions.

Upgrading BIG-IP VE from version 10.x to 11.x

When a new version is available, you can upgrade from BIG-IP® VE version 10.x to the BIG-IP VE version 11.x that is available for your hypervisor.

***Note:** The BIG-IP VE commands in this procedure are run using the BIG-IP command-line interface within the hypervisor.*

1. Download the base ISO files and MD5 files for versions 10.2.x and version 11.1 from the F5 Downloads page (<https://downloads.f5.com>), and verify the downloaded ISO files against their corresponding MD5 files.

***Important:** If you are installing a hotfix, you must import the ISO for the base version of the hotfix before you can successfully import and install a hotfix update. For installation, you select only the hotfix image, but the base version of the hotfix must be in place before the hotfix can be applied to BIG-IP VE.*

2. Save a UCS file offline for the BIG-IP VE system you are upgrading.

***Important:** A single configuration file (SCF) will not suffice for this procedure.*

3. Make sure to note the host name for UCS restoration.

The command string `tmsh show sys global-settings hostname` will show you the active host name.

4. In the Citrix XenCenter client, power off (shut down) the BIG-IP VE virtual machine.
5. Take a snapshot and back up the BIG-IP VE virtual machine.
6. On the Storage tab for BIG-IP VE, click **Click here to create a DVD drive** and then pick the ISO image from your ISO storage repository.
7. Under **Startup Options**, configure the virtual machine to boot from the DVD drive first.
8. Select the virtual disk from the list and click **Detach**, then click **OK** to confirm the operation.

***Important:** Use **Detach** so that the disk is available for recovery purposes.*

9. Add a hard disk.

- a) On the Storage tab, click **Add**.
- b) Name the disk, delegate a size of 100 GB, choose a location for the disk (if necessary), and click **Add**.

***Important:** Other sizes are not supported, and unexpected problems can occur if a size other than 100 GB is used.*

At this point the system has:

- Configured a CD/DVD drive to attach when powering on the BIG-IP VE 10.2.x ISO image.
- Removed the legacy 40 GB disk.
- Created a new 100 GB disk.

10. Select BIG-IP VE from the inventory screen, and click the **Start** icon.
 11. You are prompted for an unattended default installation; press Enter to continue.

BIG-IP VE version 10.2.2 and later 10.x versions should proceed normally. Versions 10.2.0 and 10.2.1 will return the message: No configuration provided for hardware type Z100. For these versions, use the command `diskinit --style volumes` to format the volume, and then use the command `image2disk --nosaveconfig --instslot HD1.1` to install the image.

This will prepare the disk and automatically install the 10.2.x system onto boot volume HD1.1.
 12. When the installation is complete for version 10.2.2 and later, the system prompt shows this message: Remove media, then press [Enter] to reboot. Press Enter to reboot the machine. For versions 10.2.0 and 10.2.1, type `reboot` and press Enter.
 13. Boot into the 10.2.x BIG-IP VE system.
 14. Log in to the console and run `config` to configure the management port's IP address.
 15. Copy the 10.2.x and 11.1 ISO files to `/shared/images`.
 16. If a hotfix was installed, copy the hotfix ISO file to `/shared/images`, and then perform a live installation of the hotfix onto the system's HD1.2. When finished, reboot into the hotfix image before restoring the UCS.
 17. Copy the UCS to `/var/local/ucs/` on the BIG-IP VE.
 18. Run the command `tmsh modify sys global-settings hostname xxx.xxx`, where `xxx.xxx` is the previously collected host name.
 19. Restore the UCS. For example, if the UCS is named `webfarm1.ucs` and is stored in `/var/local/ucs`, then the restoration command is `tmsh load sys ucs webfarm1`.

At this point, the system is active with the 10.2.x configuration restored.
 20. Perform a live installation of BIG-IP VE 11.1 on the system.
 21. When the live installation is complete, halt and power off the BIG-IP VE virtual machine.
 22. Within the hypervisor, open the guest settings for the BIG-IP VE.
 23. Adjust the memory reservation from 2 GB to 4 GB to match the memory configuration.
-
- Important:** *BIG-IP VE version 11.1 includes new high-availability features. You should consider adding another network interface at this point in order to avoid a reboot at a later time.*
-
24. Power on the BIG-IP VE virtual machine.

The BIG-IP VE virtual machine will boot into version 11.1.

Appendix

A

Deployment Best Practices

- *Best practices for deploying BIG-IP VE on XenServer*

Best practices for deploying BIG-IP VE on XenServer

When deploying BIG-IP® Virtual Edition (VE) on a XenServer host, use these best practices.

Issue	Recommendation
Redundant system configuration	Run the two units of an active/standby pair on separate physical hosts by manually creating a virtual machine peer on each host.
Using XenMotion on live BIG-IP VE virtual machines	Use XenMotion for live migration of BIG-IP® VE virtual machines on idle virtual machines only. Live migration of BIG-IP VE while the virtual machine is processing traffic could produce unexpected results.
Resource reservations	BIG-IP VE is deployed with the hypervisor's default resource settings. The CPU reservation can be set only to the highest setting of the VCPU priority of the virtual machine.
Time synchronization	Configure all BIG-IP VE systems to use an external time synchronization source. You can do this by configuring NTP within BIG-IP VE.
Disable hyper-threading on older processors	F5 Networks recommends turning off Hyper-Threading Technology when using host machines with Intel Pentium 4 era processors. Doing so will prevent possible timing issues with BIG-IP VE.
<hr/> <p>Important: <i>Production licenses are not supported on Pentium 4 processors.</i></p> <hr/>	

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