

# **BIG-IP® Virtual Edition Setup Guide for Microsoft Hyper-V**

Version 11.6





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# Chapter

# 1

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## Getting Started with BIG-IP Virtual Edition

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- *What is BIG-IP Virtual Edition?*

## What is BIG-IP Virtual Edition?

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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.

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**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.*

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## About BIG-IP VE compatibility with Hyper-V 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.

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**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.*

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## About the hypervisor guest definition requirements

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

- 2 x virtual CPUs
- 4 GB RAM
- 3 x virtual network adapters (minimum); more if configured with the high availability option

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**Important:** *The number of virtual network adapters per virtual machine definition is determined by the hypervisor.*

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- 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.

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

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

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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 Hyper-V virtual machine guest environment permits a maximum of 8 network adapters or 1 legacy virtual network adapter as a management port and 8 network adapters as dataplane ports. The legacy network adapter is not supported for the dataplane. For peak performance, F5 recommends using only network adapters.

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.

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

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**Disk space guidelines**

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

<b>Provisioned disk space</b>	<b>Capabilities and Limitations</b>	<b>Special Considerations</b>
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.
104 GB (OS only) or 124 GB (with Datastore)	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 104 GB operating system disk used by the other modules. The 20 GB volume serves as a dedicated Datastore 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 Datastore volume, refer to <i>Disk Management for Datastore</i> published on the AskF5™ web site, <a href="http://support.f5.com">http://support.f5.com</a> .

**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.

<b>Provisioned memory</b>	<b>Supported module combinations</b>	<b>Module specific concerns</b>
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.

<b>Provisioned memory</b>	<b>Supported module combinations</b>	<b>Module specific concerns</b>
		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.

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# Chapter 2

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## Deploying BIG-IP Virtual Edition

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- *Host machine requirements and recommendations*
  - *About BIG-IP VE Hyper-V deployment*
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## Host machine requirements and recommendations

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

The host system must include:

- Microsoft® Windows Server® with the Hyper-V® role enabled. The *Virtual Edition and Supported Hypervisors Matrix*, published on the AskF5™ web site, <http://support.f5.com> identifies the versions that are supported.
- Connection to a common NTP source (this is especially important for each host in a redundant system configuration)

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 Hyper-V deployment

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To deploy the BIG-IP® Virtual Edition (VE) system on Microsoft Hyper-V, 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 steps in deploying BIG-IP® VE are to download the Zip file and extract the virtual hard drive (VHD) file, and save it to the server running Microsoft® Windows Server® 2008 R2 or 2012 with the Hyper-V® role enabled. Next, you configure the virtual machine using Hyper-V Manager and the Settings window.

---

**Important:** Do not modify the configuration of the Hyper-V 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 `vhd.zip`.
3. Extract the file from the Zip archive and save it where your VHD files reside on the Hyper-V server.
4. Start Hyper-V Manager, log in to the Hyper-V server, and from the Actions pane, click **New > Virtual Machine**.  
The New Virtual Machine Wizard opens.
5. In the **Name** field, type a name for the BIG-IP VE virtual machine, such as: `smith_big-ip_ve` and click **Next**.
6. In the **Memory** field, type `4096` and click **Next**.

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**Tip:** To increase performance, you can specify a value up to `8192`.

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7. For the **Connection** setting, select **Management** and click **Next**.
8. Map the source network **HA** to the name of a high-availability network in your inventory.  
An example of a destination high-availability network is **HA**.
9. Select the **Use an existing virtual hard disk** check box, browse to the location where you saved your VHD file, select the file, open it, and click **Next**.
10. In the Summary page, review your settings and click **Finish**.  
The New Virtual Machine Wizard closes, and the new BIG-IP VE shows in the Virtual Machines list.
11. From the Virtual Machines list, select the new BIG-IP VE.  
The name of the BIG-IP VE appears in the bottom half of the Actions pane.
12. In the lower half of the Actions pane, click **Settings**.  
The Settings window for the selected BIG-IP VE opens.
13. From the Hardware list, select **Processor**, and then change the **Number of logical processors** to `2`, and increase the **Virtual machine reserve (percentage)** to `100`.
14. Click **Add Hardware**, select **Network Adapter** and click **Add**. Repeat this for a total of three adapters (or four, for a high-availability configuration).
  - a) Click the second Network Adapter, and then from the Network list select **External**.
  - b) Click the third Network Adapter, and then from the Network list select **Internal**.
  - c) If the BIG-IP VE will be used in a high-availability configuration, click the fourth Network Adapter, and then from the Network list select **HA**.
15. In the Management area, click **Automatic Stop Action** and select **Shut down the guest operating system**.  
This setting ensures that the BIG-IP VE virtual machine restarts with all previously-configured virtual hardware, and at the current system time.
16. Click **OK** to save your changes and close the Settings window.

### Requirements and recommendations for optimum Hyper-V throughput

F5 performance testing has determined a number of configuration adjustments that optimize performance throughput for Microsoft Hyper-V VE. While none of these configuration settings and component recommendations are required for 1Gbps performance, F5 Networks testing has certified maximum throughput levels using these specific settings. Note that you may be able to achieve maximum throughput levels with settings and components other than those described here; follow these guidelines to insure success.

#### Host system recommendations

Optimum settings for the host system include:

- An Intel X520 network interface card (NICs) with two ports, one for the external and one for the internal interface. The NIC used for the management and/or HA interfaces can be a 1G card. For configurations that include an HA VLAN, the virtual switch can either share the NIC used by the management VLAN or use its own NIC.
- Each NIC requires a virtual switch.
- If you are using the Intel X520 NIC, the NIC drivers must be upgraded to a version at least as recent as version 3.8.35.0 NDIS 6.30.
- The driver properties for the 10G NICs must be modified to disable Virtual Machine Queue (VMQ) and Interrupt Moderation. (You can use either the Hyper-V Manager graphic user interface or the PowerShell command line interface to perform this modification.)

#### Hypervisor recommendations

Optimum settings for the Hyper-V Manager include:

- Disable NUMA Spanning.
- Disable VMQ for this specific VE. You should do this even if you've already disabled VMQ for the hypervisor, but especially if you chose not to disable VMQ for the hypervisor NICs.
- Increase the number of licensed TMM cores to 8 and the amount of memory to 16 Gb.

#### BIG-IP VE considerations

You may also increase your VE performance by reducing the interrupt coalescing threshold for the BIG-IP VE. (You can use the following `tmsh` command:

```
tmsh modify sys db scheduler.unicasleeprxlimit.ltm value 16
```

### Powering on the virtual machine

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

1. Open the Hyper-V Manager client.
2. Select the virtual machine that you want to power on.
3. From the Action menu, choose Start.  
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.

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

---

1. In the Hyper-V Manager, locate and highlight the virtual machine to which you want to assign the management IP address.
2. In the Actions pane, choose **Connect**.  
The console window for opens. After a few seconds, a login prompt appears.
3. At the password prompt, type `default`.
4. Type `config` and press Enter.  
The F5 Management Port Setup screen opens.
5. Click **OK**.
6. 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 `tmsh 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.*

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# Chapter

# 3

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## Updating a BIG-IP VE Virtual Machine

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- *About VE disk space*
- *About updates to the BIG-IP VE virtual machine*
- *Upgrading BIG-IP VE from versions prior to 11.3*

## About VE disk space

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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 versions prior to 11.3

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Starting with version 11.3, BIG-IP VE uses a different network adapter type than previous versions. To upgrade to versions newer than 11.3, install the BIG-IP VE and then contact F5 to transfer your license.

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

---

**Important:** *An SCF will not suffice for this procedure.*

---

2. 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.
3. In the Microsoft Hyper-V Manager client, power off (shut down) the BIG-IP VE virtual machine.
4. Perform the Deploying the BIG-IP VE virtual machine task to deploy the current version of BIG-IP VE.
5. Copy the UCS to `/var/local/ucs/` on the newly deployed BIG-IP VE.
6. Run the command `tmsh modify sys global-settings hostname xxx.xxx`, where `xxx.xxx` is the previously collected host name.
7. 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 pre-11.3 configuration restored.



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# Appendix

# A

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## Deployment Best Practices

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- *Best practices for deploying BIG-IP VE on Hyper-V*

## Best practices for deploying BIG-IP VE on Hyper-V

When deploying BIG-IP® Virtual Edition (VE) on a Hyper-V 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.
Resource reservations	BIG-IP® VE is deployed with the hypervisor's default resource settings. The CPU reservation can be up to 100 percent of the defined virtual machine reserve.
Tagged packet transmission	Tagged packets cannot be transmitted from the guest itself. For VLAN tagged packets, configure the VLAN tag on the hypervisor for the specific interface associated with the 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><b><i>Important:</i></b> Production licenses are not supported on Pentium 4 processors.</p> <hr/>	

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