

BIG-IQ[®] Centralized Management: Device

Version 5.0



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BIG-IQ Centralized Management Overview

About BIG-IQ Centralized Management

BIG-IQ[®] Centralized Management lets you centrally manage BIG-IP[®] devices in several ways. From one location you can:

- Install new software images and configurations.
- Backup and restore configurations.
- Synchronize configurations between devices in a cluster.
- Distribute and monitor licenses and certificates.
- Keep an eye on the health of your devices.

Doing these tasks centrally from BIG-IQ saves you time because you don't have to go directly to a single BIG-IP device and log on and make changes only to that device. Instead, you can access devices remotely, and monitor and manage several devices at once.

Device Discovery and Basic Device Management

How do I start managing BIG-IP devices from BIG-IQ?

To start managing a BIG-IP® device, you must add it to the BIG-IP Devices inventory list on the BIG-IQ® system.

Adding a device to the BIG-IP Devices inventory is a two-stage process.

Stage 1:

- You enter the IP address and credentials of the BIG-IP device you're adding, and associate it with a cluster (if applicable).
- BIG-IQ opens communication (establishes trust) with the BIG-IP device.
- BIG-IQ discovers the current configuration for any selected services you specified are licensed on the BIG-IP system, like LTM® (optional).

Stage 2:

- BIG-IQ imports the licensed services configuration you selected in stage 1 (optional).

Note: *If you only want to do basic management tasks (like software upgrades, license management, and UCS backups) for a BIG-IP device, you do not have to discover and import service configurations.*

Adding devices to the BIG-IQ inventory

Before you can add BIG-IP® devices to the BIG-IQ® inventory:

- The BIG-IP device must be located in your network.
- The BIG-IP device must be running a compatible software version. Refer to <https://support.f5.com/kb/en-us/solutions/public/14000/500/sol14592.html> for more information.
- Port 22 and 443 must be open to the BIG-IQ management address, or any alternative IP address used to add the BIG-IP device to the BIG-IQ inventory. These ports and the management IP address are open by default on BIG-IQ.

If you are running BIG-IP version 11.5.1 up to version 11.6.0, you might need root user credentials to successfully discover and add the device to the BIG-IP devices inventory. Root user credentials are not required for BIG-IP devices running 11.5.0 - 11.5.1 and 11.6.0 - 12.x.

Note: *A BIG-IP device running versions 10.2.0 - 11.4.1 is considered a legacy device and cannot be discovered from BIG-IQ version 5.0. If you were managing a legacy device in previous version of BIG-IQ and upgraded to version 5.0, the legacy device displays as impaired with a yellow triangle next to it in the BIG-IP Devices inventory. To manage it, you must upgrade it to 11.5.0 or later. For instructions, refer to the section titled, [Upgrading a Legacy Device](#).*

You add BIG-IP devices to the BIG-IQ system inventory as the first step to managing them.

Note: *The ADC component is automatically included (first) any time you discover or import services for a device.*

1. Log in to the BIG-IQ[®] system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. Click the **Add Device** button.
5. In the **IP Address** field, type the IPv4 or IPv6 address of the device.
6. In the **User Name** and **Password** fields, type the user name and password for the device.
7. If this device is part of a DSC group, from the **Cluster Display Name** list, select one of the following:
 - For an existing DSC group, select **Use Existing** from the list and select the DSC group from the list.
 - For a new DSC group, select **Create New** from the list and type a name in the field.

For BIG-IQ to properly associate devices in the same DSC group, the **Cluster Display Name** must be the same for each member in a group.

8. If this device is configured in a DSC group, select an option:
 - **Initiate BIG-IP DSC sync when deploying configuration changes (Recommended)** Select this option if this device is part of a DSC group and you want this device to automatically synchronize configuration changes with other members in the DSC group.
 - **Ignore BIG-IP DSC sync when deploying configuration changes** Select this option if you want to manually synchronize configurations changes between members in the DSC group.

9. Click the **Add** button at the bottom of the screen.
The BIG-IQ system opens communication to the BIG-IP device, and checks its framework.

***Note:** The BIG-IQ system can properly manage a BIG-IP device only if the BIG-IP device is running a compatible version of the REST framework.*

10. If a framework upgrade is required, in the popup window, in the **Root User Name** and **Root Password** fields, type the root user name and password for the BIG-IP device, and click **Continue**.
11. If in addition to basic management tasks (like software upgrades, license management, and UCS backups) you also want to centrally manage this device's configurations for licensed services, select the check box next to each service you want to discover.

You can also select these service configuration after you add the BIG-IP device to the inventory.

12. Click the **Add** button at the bottom of the screen.

BIG-IQ displays a discovering message in the Services column of the inventory list.

If you discovered service configurations to manage, you must import them.

Importing service configurations for a device

You must add a device to the BIG-IP Device inventory list, and discover associated services, before you can import services to BIG-IQ for the device.

To manage a device's service configuration from BIG-IQ[®], you must import the service configuration from the managed device to BIG-IQ.

***Important:** You, or any other BIG-IQ system user, cannot perform any tasks on the BIG-IQ system while it is importing a service configuration. Large configurations can take a while to import, so let other BIG-IQ users know before you start this task.*

1. Log in to the BIG-IQ[®] system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.

3. At the top of the screen, click **Inventory**.
4. Click the name of the device you want to import a service configuration from.
5. On the left, click **Services**.
6. For the device's configuration you are importing, select the **Create a snapshot of the current configuration before importing** check box to save a copy of the device's current configuration.
You're not required to create a snapshot, but it is a good idea in case you have to revert to the previous configuration for any reason.
7. Click the **Import** button next to the service you want to import to the BIG-IQ system.
If the current configuration on the BIG-IQ is different than the one on the BIG-IP® device, BIG-IQ displays a screen for you to resolve the conflicts.
8. If there are conflicts, select one of the following options for each object that is different, and then click the **Continue** button:
 - **Use BIG-IQ** to use the configuration settings stored on BIG-IQ.
 - **Use BIG-IP** to override the configuration setting stored on BIG-IQ with the settings from the BIG-IP device.

You can now manage the configuration of this service for this device from BIG-IQ.

Managing a device from the device properties screen

You can use a device's Properties screen to manage that device. You can log directly in to the device, remotely reboot it, and create an instant backup of its configuration. You can also view details about the managed device, such as:

- Host name
- Self IP Address
- Build Number
- Software Version
- Status
- Last Contact
- Management IP Address
- Cluster
- Boot Location

From this screen you can also perform the following tasks:

- Log directly into the device from BIG-IQ®.
 - Reboot the device from BIG-IQ.
 - Create an instant backup of the device's configuration.
 - Associate the device to a cluster.
1. Log in to the BIG-IQ® system with your user name and password.
 2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
 3. At the top of the screen, click **Inventory**.
 4. Click the name of the device you want to view.
The device Properties screen opens.

Filtering the BIG-IP inventory list for specific BIG-IP components

With BIG-IQ[®], you can easily search for specific sets of devices from one central location. For example, after you discover several devices, you might want to find a specific device by its name or IP address. To do this, you start by filtering on certain configuration objects. This centralized search saves time by displaying only those devices with the search criteria you specify.

1. Log in to the BIG-IQ[®] system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. To search for a specific object, in the **Filter** field at the top right of the screen, type all or part of an object's name and click the filter icon.
BIG-IQ refreshes the screen to show only those devices that contain the object you filtered on.
5. To modify the filter to include or exclude certain objects, click the gear icon next to the **Filter** field and deselect or select objects.
6. To remove the filter, click the **X** icon next to it.

Exporting device inventory details to a comma separated values (CSV) file

To export the BIG-IP Device inventory to a CSV file, your browser must be configured to allow popup screens.

Using BIG-IQ[®], you can quickly access and view the properties for all the devices you manage in your network. These properties include details about the device's IP addresses, platform type, license details, software version, and so forth. You (or another department in your company) can create custom reports containing this information to help manage these assets. To do this, you can export device properties to a CSV file and edit the data as required.

1. Log in to the BIG-IQ[®] system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. Click the **Export Inventory** button.

You might be prompted to re-enter your user name and password the first time you export the BIG-IP Device inventory. If your user name and password is required, and you don't enter the correct credentials, BIG-IQ can't create the report.

BIG-IQ creates a CSV file and downloads it locally.

What is a BIG-IP Device Service Clustering (DSC) group and how do I start managing it from BIG-IQ?

Device Service Clustering, or DSC[®], is a BIG-IP[®] TMOS[®] feature that lets you organize BIG-IP devices in groups to share configurations. These groups are called *device service clusters* (also DSC). With BIG-IQ[®], you can easily manage devices configured in a DSC from one centralized location.

Before you can manage BIG-IP systems configured in a DSC, you must:

- Add the DSC device members to the BIG-IP Devices inventory.

- Add the DSC group to the BIG-IP Clusters inventory.

When a device service cluster is in the BIG-IP Cluster inventory, you can view its properties and the devices within those groups, and synchronize their configurations, all without having to log in to each device individually.

Note: For specific information about BIG-IP DSC groups, refer to the *BIG-IP® Device Service Clustering: Administration guide*.

Discovering BIG-IP clusters

You must add the BIG-IP® devices configured in a DSC® to the BIG-IQ system's BIG-IP Device inventory before you can add any associated DSC cluster to the BIG-IP Cluster inventory.

All BIG-IP devices in a cluster must be running the same software version and the same settings for:

- Pools
- Traffic-groups
- VLANs
- Tunnels
- Route domains

The BIG-IQ® Clusters inventory screen shows you a centralized view specific to DSC clusters.

Note: The **Cluster Display Name** displays on this screen only for managed BIG-IP devices in a DSC.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. On the left, click **BIG-IP CLUSTERS**.
5. Click the **Discover** button.
6. Select the devices in the **Available** list, and then click the right arrow to add them to the **Selected** list.
This list is populated from the BIG-IP Device inventory list. If you can't see all of the available devices listed, left-click the right bottom corner of the list and use your cursor to expand the dialog box.
7. Click the **Discover** button.

If the BIG-IP devices are part of a DSC, the screen refreshes to show the BIG-IP cluster(s) you added.

Viewing the BIG-IP Clusters inventory and the properties of a DSC cluster

You must add a BIG-IP® device configured in a DSC® to the BIG-IP Devices inventory list, and discover the cluster from the BIG-IP Clusters inventory list before you can see the cluster listed on this screen.

Using the BIG-IP Clusters inventory screen, you can see the following details about each existing DSC cluster, including:

- synchronization status
- name
- cluster type
- last refresh dates

1. Log in to the BIG-IQ® system with your user name and password.

2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. On the left, click **BIG-IP CLUSTERS**.
5. To view the properties of a cluster, including the trust domain certificate associated with this DSC group, click the cluster's name.

Synchronizing configurations between BIG-IP devices in a DSC cluster

You must add a BIG-IP® device configured in a DSC® to the BIG-IP Devices inventory list and discover the cluster from the BIG-IP Clusters inventory list before you can synchronize BIG-IP devices configured in a DSC cluster.

Synchronizing configuration between BIG-IP devices in a DSC cluster saves you time because you don't have to log on to each BIG-IP device in the cluster individually.

Important: *Unmanaged BIG-IP devices in a DSC do not display the **Sync** button.*

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. On the left, click **BIG-IP CLUSTERS**.
5. Click the name of the cluster you want to synchronize.
6. Click the **Refresh Status** button to get the most current sync status for the devices in the DSC cluster.
7. For the **Sync Option** setting, select one of the options:
 - **Device to Group** - Select this option to prompt the BIG-IP device to synchronize its configuration with other device(s) in the DSC group.
 - **Group to Device** - Select this option to prompt the DSC group to load its configuration onto the BIG-IP device.
8. Click the **Sync** button.
9. To close the screen, click the **Close** button.

How can I organize the way devices display in BIG-IQ so they're easier to find and manage?

To more easily manage a large number of BIG-IP® devices, you can organize them into groups. The types of groups you can use are:

- Static groups
- Dynamic groups

A *static group* contains specific devices that you add to it, and those devices stay in that group until you remove them. For example you might want to create a static group named, *Seattle*, and add all of the devices located in Seattle to it.

In contrast, a *dynamic group* is basically a saved query on a group. For example, if you created a static group that contained all of your managed devices located in Seattle and you wanted to view only those

devices running a specific application, you could create a dynamic group with that filter. If one of the devices stops running the specified application, the device no longer appears in that dynamic group.

If you delete a managed BIG-IP device from the parent group, you see that change when you view the dynamic group.

Creating a static group of managed devices

You must license and discover BIG-IP® devices before you can place them into a group.

To more easily manage a large number of devices, you can organize them into groups. For example, you could add devices to groups according to the running applications, geographical location, or department.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. On the left, click **DEVICE GROUPS**.
5. Click the **Add Group** button.
6. In the **Name** field, type the name you want to use to identify this group.
You can change this name at any time, after you save this group.
7. In the **Description** field, type a description for this group.
For example, `BIG-IP devices located in Seattle`.
You can change this description at any time, after you save this group.
8. For the **Group Type** setting, select **Static**.
9. From the **Parent Group** list, select the source for the group you are creating.
10. For the **Available in Services** setting, select the services licensed for this device.

If this BIG-IP device is licensed for services you are not managing, you can reduce the number of devices displayed in the BIG-IP inventory by selecting the check box next to only the services you manage. If you are managing all aspects of BIG-IQ, select the check box next to each service running on this BIG-IP device.

11. From the **Hostname** list, select the device you want included in this group.
To add additional devices, click the + sign and select a device from the new list that is displayed.
12. Click the **Save** button at the bottom of the screen.

If you want to further filter specific devices from within this group, you can create a dynamic group.

Creating a dynamic group of managed devices

You must create a static group before you can create a dynamic group.

To filter a static group on certain parameters, you can create a dynamic group. For example, if you have a static group for all devices located in a particular city, and you want to view only those running a specific version of software, you could create a dynamic group to filter on that version number.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. On the left, click **DEVICE GROUPS**.
4. Click the **Add Group** button.

5. In the **Name** field, type the name you want to use to identify this group.
You can change this name at any time, after you save this group.
6. In the **Description** field, type a description for this group.
For example, `BIG-IP Devices running version 12.0`
You can change this description any time, after you save this group.
7. For the **Group Type** setting, select **Dynamic Group**.
8. From the **Parent Group** list, select the source for the group you are creating.
9. In the **Search Filter** field, type a term on which you want to filter the group.
You can filter on a single term or, if you want to filter on more than one parameter, use the standard Open Data Protocol (OData) format.
10. For the **Available in Services** setting, select the services licensed for this device.

If this BIG-IP device is licensed for services you are not managing, you can reduce the number of devices displayed in the BIG-IP inventory by selecting the check box next to only the services you manage. If you are managing all aspects of BIG-IP, select the check box next to each service running on this BIG-IP device.
11. Click the **Save** button at the bottom of the screen.

This dynamic group reflects any changes made to the static group. For example, if a device is removed from its parent group, it no longer appears in the associated static group. Also, if a device no longer contains the object you filtered on, the device no longer displays in the dynamic group.

License Management

How do I manage software licenses for my devices?

A software license is specific to F5 services (for example, BIG-IP LTM[®], BIG-IP APM[®], and so on) and you manage software licenses by adding them to BIG-IQ[®], and then deploying them to BIG-IP[®] VE devices in your network. If later you decide you don't need that specific device licensed, you can revoke the license instance and grant it to another BIG-IP VE device. This process is similar to a library, where you loan (grant) a license to a BIG-IP VE when its required, and check the license back in to BIG-IQ (revoke it from the device) to grant to another BIG-IP VE. The flexible scalability you get by being able to reassign licenses to your devices, as needed, helps keep your operating costs fixed. You can deploy and revoke licenses for both managed and unmanaged devices in your network.

You can also use BIG-IQ as a local, on-site licensing manager. To do this, you must also have a pool registration key (in addition to the BIG-IQ product registration key). BIG-IQ uses the pool registration key to activate BIG-IP licenses. When you use BIG-IQ as a licensing manager, connectivity is required only between BIG-IQ and the BIG-IP VE you are licensing. No contact between the F5 license server and the BIG-IP VE is necessary; this supports network configurations where BIG-IP VE devices don't have Internet access.

You can activate a registration key in the following ways:

- Automatically - Use this procedure if BIG-IQ is connected to the public Internet.
- Manually - Use this procedure if BIG-IQ is not connected to the public Internet.
- CNN - Use this procedure if the BIG-IQ is in a closed-circuit network (CCN) that does not permit you to export any encrypted information. For this procedure, you must open a case with F5 Support.

Types of F5 licenses

There are three types of F5 licenses.

License Type	Description
<i>Pool licenses</i>	Purchased once, you assign pool licenses to a number of concurrent BIG-IP VE devices, as defined by the license.
<i>Utility licenses</i>	Purchased as you need, utility licenses are billed only when assigned to a BIG-IP VE device and at a specific interval (hourly, daily, monthly, or yearly).
<i>Volume licenses</i>	Prepaid for a fixed number of concurrent devices, you assign volume licenses to BIG-IP VE devices for a set period of time.

Automatically contacting the F5 Networks license server for a license

You must have a base registration key before you can get a license from F5 Networks.

You get a license from F5 Networks to make it available to assign to BIG-IP® VEs in your network. You can automatically contact the F5 license server if the BIG-IQ® system is:

- Connected to the public internet.
 - Able to access the activate.f5.com site.
 - Existing firewalls allow port 443 to pass through.
1. Log in to the BIG-IQ® system with your user name and password.
 2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
 3. At the top of the screen, click **Operations**.
 4. On the left, click **LICENSE MANAGEMENT**.
 5. Click the **New License** button.
 6. In the **License Name** field, type a name to identify this license.
 7. In the **Base Registration Key** field, type or paste the registration key, and into the **Add-on Keys** field, type or paste any associated add-on keys.
 8. For the **Activation Method** setting, select **Automatic**.
 9. Click the **Activate** button at the bottom of the screen.
 10. Review the EULA, and if you agree with the terms, select the check box next to **I have read and agree with the terms of this license**, and click **Next**.

When the activation status displays as **Active**, you can assign a license from the pool to a BIG-IP® VE device.

Manually contacting the F5 Networks license server for a pool license

You must have a base registration key before you can get a license from F5 Networks.

You get a pool license from F5 Networks to make it available for assignment to BIG-IP® VEs in your network. If the BIG-IQ® system on which you are activating licensing is not connected to the public internet, you can get the license using this manual procedure, rather than automatically contacting the F5 license server.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **LICENSE MANAGEMENT**.
5. Click the **New License** button.
6. In the **License Name** field, type a name to identify this license.
7. In the **Base Registration Key** field, type or paste the registration key, and into the **Add-on Keys** field, type or paste any associated add-on keys.
8. For the **Activation Method** setting, select **Manual** and click the **Generate Dossier** button.
The BIG-IQ system refreshes and displays the dossier in the **Device Dossier** field.
9. Select and copy the text displayed in the **Device Dossier** field.
10. Click the **Access F5 manual activation web portal** link.
The F5 Product Licensing site opens.
11. Click the **Activate License** link.
12. Paste the dossier into the **Enter your dossier** text box and click the **Next** button.
Alternatively, click the **Choose File** button and navigate to the location where you saved the dossier.

13. Review the EULA, and if you agree with the terms, select the check box next to **I have read and agree with the terms of this license**, and click **Next**.
14. Select the license and copy and paste it into the **License Text** field on BIG-IQ.
15. Click the **Activate** button at the bottom of the screen.

When the activation status displays as **Active**, you can assign a license from the pool to a BIG-IP® VE device.

Manually contacting the F5 Networks license server for a volume or utility license

You must have a base registration key before you can get a license from F5 Networks.

You get a volume or utility license from F5 Networks to make it available for assignment to BIG-IP® VEs in your network. If the BIG-IQ® system on which you are activating licensing is not connected to the public internet, you can get the license using this manual procedure, rather than automatically contacting the F5 license server.

Volume and utility licenses contain offerings, which you must activate individually.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **LICENSE MANAGEMENT**.
5. Click the **New License** button.
6. In the **License Name** field, type a name to identify this license.
7. In the **Base Registration Key** field, type or paste the registration key, and into the **Add-on Keys** field, type or paste any associated add-on keys.
8. For the **Activation Method** setting, select **Manual** and click the **Generate Dossier** button.
The BIG-IQ system refreshes and displays the dossier in the **Device Dossier** field.
9. Select and copy the text displayed in the **Device Dossier** field.
10. Click the **Access F5 manual activation web portal** link.
The F5 Product Licensing site opens.
11. Click the **Activate License** link.
12. Paste the dossier into the **Enter your dossier** text box and click the **Next** button.
Alternatively, click the **Choose File** button and navigate to the location where you saved the dossier.
13. Review the EULA, and if you agree with the terms, select the check box next to **I have read and agree with the terms of this license**, and click **Next**.
14. Select the license and copy and paste it into the **License Text** field on BIG-IQ.
15. Click the **Activate** button at the bottom of the screen.
The license displays in the list as **Pending**.
16. Click the name of the license.
17. Click the name of a pending offering.
18. Copy the dossier.
19. Click the **Access F5 manual activation web portal** link.
The F5 Product Licensing site opens.
20. Click the **Activate License** link.
21. Paste the dossier into the **Enter your dossier** text box and click the **Next** button.
Alternatively, click the **Choose File** button and navigate to the location where you saved the dossier.

22. Select the license and copy and paste it into the **License Text** field on BIG-IQ.
23. Click the **Activate** button at the bottom of the screen.
24. Repeat steps 17-23 for each pending offering.

When the activation status displays as **Active**, you can assign a license from the pool to a BIG-IP® VE device.

Assigning a license to a BIG-IP VE

Before you can assign a pool license to a BIG-IP® VE device, you must use a pool registration key to get a pool license from the F5 license server, and put it on the BIG-IQ® system. You can assign licenses to managed devices, as well as unmanaged devices (devices in your network, but not in the BIG-IP Inventory). To assign a license to an unmanaged device in your network, you must have the device's admin user name and password.

Pool licenses help you easily manage the licensing process for BIG-IP VE devices running your applications.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **LICENSE MANAGEMENT**.
5. Click the name of the license you want to assign to a device.
6. For utility or a volume license, click the **Offering** name.
7. Click the **License Devices** button.
8. In the **Managed Devices** setting, from the **Devices** list, select the device you want to license and move it to the **Member Devices** list.
9. To license a device you are not managing from BIG-IQ (but that is in your network), for the **Unmanaged Devices** section, type the device's address, user name, and password.
10. Click the **Assign** button at the bottom of the screen.

Revoking a pool license from a BIG-IP VE device

To revoke a license for an unmanaged device in your network, you must have the device's admin user name and password.

When fewer devices are required for your applications, you can revoke licenses to reassign them to other BIG-IP® VE devices, as needed.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **LICENSE MANAGEMENT**.
5. Click the name of the license you want to revoke.
6. For utility or a volume license, click the **Offering** name.
7. Select the check box next to the device you want to remove a license from.
8. Click the **Revoke** button.
9. For an unmanaged device, you must type the admin user name and password in the popup screen.

You can now assign this license to another BIG-IP VE device.

Creating an active usage report for your licenses

After you activate a license, you can create an active license usage report for it.

Create an Active Report to see how you're currently using your licenses. Providing this report in a downloadable CSV format makes it easy for you to reformat and share the information in any way you want.

1. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
2. At the top of the screen, click **Operations**.
3. On the left, click **LICENSE MANAGEMENT**.
4. Click the **Report** button at the top of the screen.
5. For the **Type** setting, select **Active Report**.
6. Select a license type from the list to narrow the results to that license type.
7. From the **Available** list, click the license you want to run a report for, and click the arrow to move it to the **Selected** list.
8. Click the **Download** button at the bottom of the screen to generate the report.

Creating a historical usage report for your licenses

You must have activated a license before you can create a historical usage report for it.

You create an Historical Report, in CSV format, so you can see how you are using your licenses. This information can help you with budget planning and reporting.

1. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
2. At the top of the screen, click **Operations**.
3. On the left, click **LICENSE MANAGEMENT**.
4. Click the **Report** button at the top of the screen.
5. For the **Type** setting, select **Historical Report**.
6. Select a license type from the list to narrow the results to that license type.
7. From the **Available** list, click the license you want to run a report for, and click the arrow to move it to the **Selected** list.
8. In the Usage Period area, in the **Starting Date** and **Ending Date** fields, type the date range for the report. Alternatively, click the calendars and navigate to the dates.
9. Click the **Download** button and select an option to open the file, or save the file.

Creating a utility license usage report and submitting it to F5 for billing

You must have assigned a utility license to a device before you can create a utility usage report for that license.

Note: If BIG-IQ cannot access `api.f5.com` or pass traffic through port 443, you must manually submit the report to F5, instead of submitting automatically. For information about how to manually submit the report, contact F5 Support.

Create and submit a utility license usage report to F5 Networks for billing purposes, at the frequency specified in your license agreement.

BIG-IQ reports your utility license usage to F5 in a specific way to avoid duplication. Your first report includes all license activity (grants and revocations) from the time you activate the utility pool license to the day before the first report is generated. Subsequent reports include all license activity that happened since the last report, up to the day before the current report is generated.

For example:

- If you activated your utility pool on 1-Jan-2016 and generate a report on 1-Feb-2016, the report includes all usage between 1-Jan-2016 to 31-Jan-2016, inclusive.
 - If you generate another report on 1-Apr-2016, the report includes all usage between 1-Feb-2016 to 31-Mar-2016, inclusive.
1. Log in to the BIG-IQ[®] system with your user name and password.
 2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
 3. At the top of the screen, click **Operations**.
 4. On the left, click **LICENSE MANAGEMENT**.
 5. Click the **Report** button at the top of the screen.
 6. For the **Type** setting, select **Utility Billing Report**.
 7. From the **Available** list, click the license you want to run a report for, and click the arrow to move it to the **Selected** list.
 8. For the report options, select **Generate and automatically submit report to F5**.
If you want to manually submit a report, contact F5 Support.
 9. Click the **Submit** button at the bottom of the screen to create and submit the report to F5 Networks.

While BIG-IQ generates the report, the **Submit** button is not available (greyed out). When the report is successfully created and submitted to F5 Networks, it downloads to your local system and the **Submit** button becomes available. If the report fails to create properly, BIG-IQ displays an error message.

BIG-IP Software Upgrades

How do I manage software for BIG-IP devices?

A key feature of BIG-IQ® is the ability to manage software images for multiple remote devices from one location. You can deploy software without having to log in to each individual BIG-IP® device.

There are three steps to managing software images for devices:

1. Download the software image from F5 Networks.
2. Upload the software image to BIG-IQ.
3. Install the software image on a device in the BIG-IP Device inventory in one of the following two ways:
 - Managed Device Upgrade - use this process for installing a software image on managed BIG-IP devices running version 11.5.0 or later.
 - Legacy Device Upgrade - use this process for installing a software image on BIG-IP devices running versions 10.2.4 to 11.4.1.

Note: Before you can manage a legacy device running versions 10.2.0 - 11.4.1, you must upgrade the device to version 11.5.0 or later.

Downloading a software image from F5 Networks

Downloading a software image from F5 Networks is the first step to making it available to install on a managed device.

1. Log in to the F5 Downloads site, <https://downloads.f5.com>, and click the **Find a Download** button.
2. Click the name of the product line.
3. Click the version of the product you want to download.
4. Read the End User License Agreement, and click the **I Accept** button if you agree with the terms.
5. Click the name of the file you want to download.
6. Click the name of the closest geographical location to you.
The screen refreshes to display the progress of your download.

After you download the software image, you can upload it to BIG-IQ®.

Uploading a software image to BIG-IQ

Before you can upload a software image to BIG-IQ®, you must download it from the <https://downloads.f5.com> site.

You upload a software image to make it available to deploy to managed BIG-IP® devices.

Important: To make sure the software image successfully uploads, don't log out of BIG-IQ or close the browser window until the software image name appears in the Software Image list.

1. Log in to the BIG-IQ[®] system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **SOFTWARE MANAGEMENT > Available Images**.
5. Click the **Upload Image** button.
6. Click the **Choose File** button and navigate to the location to which you downloaded the image, and click the **Open** button to upload it to BIG-IQ.
7. Click the **Upload** button.

The screen refreshes to display the progress of the upload.

When BIG-IQ uploads the software, it verifies the image. This verification process can take several minutes. When BIG-IQ is finished uploading and verifying the image, the software image displays as **Verified** and is available for installation on a device.

Installing a software image onto a managed device

Before you can install a software image onto a device, you must download it from the F5 Downloads site, <https://downloads.f5.com>, and upload it to the BIG-IQ[®] system. To apply a hotfix, you must have the base software image (as well as the hotfix) uploaded to, and verified by, BIG-IQ.

Note: You can deploy software images only to BIG-IP[®] devices running version 11.5.0 or later. Refer to the *Upgrading a legacy device* section for specific instructions about upgrading devices running version 10.2.0 - 11.4.1.

Install software images to your managed devices so the versions are up to date, and in sync. This helps you manage your network traffic more efficiently. When you install software images from BIG-IQ, you have the option to stage the software installation for deploying later, as well as the option to have the installation paused after the software image is copied to the device and before the device reboots. While the software installs on the BIG-IP devices, you can continue doing other tasks on the BIG-IQ system.

Tip: Install a software image during a maintenance window when you are not directing traffic to the target BIG-IP device.

1. Log in to the BIG-IQ[®] system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **SOFTWARE MANAGEMENT > Available Images**.
5. Select the check box next to the software image you want to install and then click the **Managed Device Install** button at the top of the screen.
6. In the **Name** field, type a name to identify this installation.
7. For the **Options** setting, you can select any of the following:
 - If you want to copy the image to the device, but wait until later install it, select the check box next to :

Pause after the software image is copied has been copied to devices.

- If you want to wait to reboot the image to the new volume so you can verify the software installation, select the check box next to:

Pause for reboot confirmation.

8. Click the **Add/Remove Devices** button to select devices to install this software on.
9. From the **Available** list, select the devices you want to upgrade and click -> to move it to the **Selected** list.
10. When you're done adding devices to the **Selected** list, click the **Apply** button.
11. To set the location for where BIG-IQ installs this software image, select **Target Volume**.
12. To assign a new location to install the software image, select **New Volume** and type the volume and partition you want it installed.
13. If you want to set the target volume for all the BIG-IP devices you are upgrading, click the **Set Default Volume** button and select an option:
 - **Install at the next available volume** to install the software there.
 - **Volume Name** and type a new volume install the software there.
14. Click the **Run** button to start the installation immediately, or click the **Save** button to save this job for deploying at a later time.

The software installation deployment and its status display in the **Software Installations** list.

If you selected an option save the deployment or to pause the process at certain points, click the name of the software installation on the **Software Installation** list, and click the **Continue** button when you're ready to continue the software installation.

How do I upgrade the BIG-IP REST framework so I can manage it from BIG-IQ?

To properly communicate, BIG-IQ® and BIG-IP® devices must be running compatible versions of the REST framework. If the REST frameworks are incompatible, BIG-IQ displays a yellow triangle next to the device in the BIG-IP Device inventory.

When you upgrade a BIG-IP® device running version 11.5.x to another 11.5.x version, or to an 11.6.x version (for example, from version 11.5.3 to 11.5.4, or from version 11.5.3 to version 11.6.1), you must upgrade the REST framework so BIG-IQ can manage the device. If you upgraded BIG-IQ from version 4.6.0 to version 5.0, you must also upgrade the REST framework for all BIG-IP devices (not running version 12.0.0) currently in the BIG-IP Device inventory.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. Hover over the yellow triangle to display a message to confirm that the reason it is yellow is because the REST framework for the device needs an update.
5. Select the check box next to the device you want to upgrade the framework for.
6. Click the **More** button, and select **Upgrade Framework**.
A popup screen opens.
7. Into the fields, type the required credentials, and click the **Continue** button.
A REST Framework upgrade in progress message displays.

After the REST framework is updated, you can successfully manage this device.

Upgrading a legacy device (version 10.2.0 - 11.4.1)

Before you can upgrade a device, you must first download the software image from the F5 Downloads site, <https://downloads.f5.com> to the BIG-IQ® system. You need the root user name and password for the device to upgrade it.

A BIG-IP® device running versions 10.2.0 - 11.4.1 is considered a *legacy device*. You must upgrade a legacy device to version 11.5.0 or later before you can add it to the BIG-IP Device Inventory and start managing it from BIG-IQ.

If you were managing a device running versions 10.2.0 - 11.4.1 from a previous version of BIG-IQ, and upgraded to version 5.0, the device displays as impaired with a yellow triangle next to it in the BIG-IP Devices Inventory. To manage the legacy device, you must upgrade it to 11.5.0 or later.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **SOFTWARE MANAGEMENT > Software Images**.
5. In the **Software Images** list, select the check box next to the image you want to install and click **Legacy Device Install** button at the top of the screen
6. In the **Device IP Address** field, type the IP address for the legacy device that you want to upgrade.
7. In the **Admin User Name** and **Admin Password** fields, type the administrator's user name and password for this device.
8. In the **Root User Name** and **Root Password** fields, type the user name and password for the root user for this device.
9. Click the **Upgrade** button to start the upgrade.

When the upgrade to version 11.5.0 or later is complete, you can discover the device from BIG-IQ.

UCS File Backup and Restoration

How do I back up and restore a device's configuration?

The configuration details of managed devices (including the BIG-IQ[®] system itself) are kept in a compressed user configuration set (UCS) file. The UCS file has all of the information you need to restore a device's configuration, including:

- System-specific configuration files
- License
- User account and password information
- SSL certificates and keys

You can create a backup of a device's UCS file so that you can easily recover a configuration for a managed device.

Backing up a device's current configuration

Creating a backup (in the form of a UCS file) for all devices in your network, including the BIG-IQ system itself, on a regular basis allows you to easily restore a configuration if a system becomes unstable. It's a good idea to create a backup of a system immediately before performing a software upgrade or before you make a significant configuration changes.

1. Log in to the BIG-IQ[®] system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. Select the check box next to each device you want to create a backup for, click the **More** button and select **Back Up Now**.
5. Type a name to identify this backup, and an optional description for it.
6. If you want to include the SSL private keys in the backup file, select the **Include Private Keys** check box.

If you save a copy of the SSL private key, you can reinstall it if the original one becomes corrupt.

7. To encrypt the backup file, select the **Encrypt Backup Files** check box, and type and verify the passphrase.
8. Use the **Local Retention Policy** setting to specify how long you want to keep the backup file on BIG-IQ.
 - In the **Delete local backup copy** field, select the number of days to keep the backup copy before deleting it.
 - To keep copies of the backups indefinitely, select **Never Delete**.

If you configured BIG-IQ to save backup files to a remote server and that server is unavailable during a scheduled backup, BIG-IQ ignores the local retention policy and retains the local copy of the backup file. This ensures that a backup is always available. To remove those local backups, you must delete them.

9. To keep copies of backups remotely on a SCP or SFTP server:

- a) For the **Archive** setting, select the **Store archive copy of backup** check box.
- b) For the **Location** setting, select **SCP** or **SFTP**.
- c) In the **IP Address** field, type the IP address of the remote server where you want to store the archives.
- d) In the **User Name** and **Password** fields, type the credentials to access this server.
- e) In the **Directory** field, type the name of the directory where you want to store the archives on the remote server.

Storing a backup remotely means you can restore data to a BIG-IP device even if you can't access the archive in the BIG-IQ system directory.

***Tip:** Archived copies of backups are kept permanently on the remote server you specify. If you want to clear space on the remote server, you have to manually delete the backups.*

10. Click the **Start** button at the bottom of the screen.

After the backup is created, it appears in the Backup Files list and you can restore a managed BIG-IP device. When BIG-IQ creates a backup, it saves it in the following format: **backup name_device name_time of backup.ucs**

Setting up a UCS backup schedule

It is important to create a UCS backup for your managed devices on a regularly scheduled basis, so that you can easily restore a recent configuration if necessary.

1. Log in to the BIG-IQ[®] system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **BACKUP & RESTORE > Backup Schedules**.
5. Click the **Schedule Backup** button.
6. Type a name to identify this backup, and an optional description for it.
7. If you want to include the SSL private keys in the backup file, select the **Include Private Keys** check box.

If you save a copy of the SSL private key, you can reinstall it if the original one becomes corrupt.

8. To encrypt the backup file, select the **Encrypt Backup Files** check box, and type and verify the passphrase.
9. Use the **Local Retention Policy** setting to specify how long you want to keep the backup file on BIG-IQ.
 - In the **Delete local backup copy** field, select the number of days to keep the backup copy before deleting it.
 - To keep copies of the backups indefinitely, select **Never Delete**.

If you configured BIG-IQ to save backup files to a remote server and that server is unavailable during a scheduled backup, BIG-IQ ignores the local retention policy and retains the local copy of the backup file. This ensures that a backup is always available. To remove those local backups, you must delete them.

10. For the **Backup Frequency** setting, select **Daily**, **Weekly**, or **Monthly** for the **Schedule Backup** to specify how often backups are created. Based on the frequency, you can then specify the days and time you want to create the backups..
11. For the **Start Date** setting, click the calendar and select the date you want BIG-IQ to start creating backups.
12. Select the **Groups** or **Individuals** option.

13. If you selected **Individuals**, from the **Available** list, click the individual devices you want to back up and -> to move it to the **Selected** list.
14. To keep copies of backups remotely on a SCP or SFTP server:
 - a) For the **Archive** setting, select the **Store archive copy of backup** check box.
 - b) For the **Location** setting, select **SCP** or **SFTP**.
 - c) In the **IP Address** field, type the IP address of the remote server where you want to store the archives.
 - d) In the **User Name** and **Password** fields, type the credentials to access this server.
 - e) In the **Directory** field, type the name of the directory where you want to store the archives on the remote server.

Storing a backup remotely means you can restore data to a BIG-IP device even if you can't access the archive in the BIG-IQ system directory.

Tip: Archived copies of backups are kept permanently on the remote server you specify. If you want to clear space on the remote server, you have to manually delete the backups.

15. Click the **Save** button

After the backup is created, it appears in the Backup Files list and you can restore a managed BIG-IP device. When BIG-IQ creates a backup, it saves it in the following format: backup_name_device_name_time_of_backup.ucs.

Restoring a device with a UCS backup file

You must create a backup UCS file before you can restore it to a device.

You restore a device's UCS configuration to reinstall, or to roll back to a previous version of the device's configuration, without having to recreate it.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **BACKUP & RESTORE > Backup Files**.
5. Select the check box next to the UCS backup file you want to restore.
6. Click the **Restore** button.

The BIG-IQ® system restores the saved UCS backup file to the device.

Important: If you restore a BIG-IP device with a backup that is older than its current configuration, any existing backups that are more recent no longer appear in the Backup Files list. Those files, however, are still stored in the `/shared/ucs_backups` directory until you delete them.

Pausing and restarting a UCS backup schedule

If you need to make a change to a BIG-IP® device's configuration during a scheduled UCS backup, you can suspend the scheduled backup and restart it when you are finished changing the configuration.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.

4. On the left, click **BACKUP & RESTORE > Backup Files**.
5. Select the check box next to the schedule you want to suspend.
6. Click the **Suspend Schedule** button.

BIG-IQ[®] suspends the UCS backup schedule until you restart the schedule.

To restart the scheduled UCS backup, select the device and click the **Restart Schedule** button.

SSL Certificate Monitoring

How do I monitor SSL certificate expiration dates for my managed devices?

When you manage BIG-IP® devices that load balance SSL traffic, you must monitor both their SSL traffic and SSL system certificates. *Traffic certificates* are server certificates that a device uses for traffic management tasks. *System certificates* are the web certificates that allow client systems to log in to the BIG-IP Configuration utility.

BIG-IQ® imports the certificates for every managed BIG-IP device you discover. This makes it easy to monitor the expiration dates all of your devices' SSL certificates from one location.

You can also:

- Set up alerts to let you know when a certain certificate is about to expire within a specified number of days.
- Download the data to a CSV file for reporting purposes.

Configuring SMTP for sending alerts

You must configure a DNS server before you can specify an SMTP server.

You set up an SMTP server to send email to alert certain people when a specific condition happens, such as when an SSL certificate is about to expire.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **System Management** from the BIG-IQ menu.
3. At the top of the screen, click **Inventory**.
4. On the left, click **LOCAL HOST SETTINGS > SMTP Configuration**.
5. Click the **Add** button at the upper right of the screen.
6. In the **Name** field, type a name for this SMTP configuration.
7. In the **SMTP Server Host** and **SMTP Server Port** fields, type the SMTP server and TCP port.
By default, SMTP uses TCP 25.
8. In the **From Email Address** field, type the email address from which to send the alert email.
9. From the **Encryption** list, select the type of encryption to use for the email.
10. To require a user name and password, from the **Use Auth** list, select **Yes**, and type the required user name and password.
11. Click the **Save** button at the bottom of the screen.
12. For the **SMTP Email Recipients** setting, click the **Add** button.
13. In the **Name** and **Email Address** fields, type the name and the email address for the person you want to receive an email when a specified alert condition is met.
14. To add more recipients, click +.
15. When you're done adding email recipients for alerts, click the **Save** button at the bottom of the screen.
16. To verify that you can reach the server you configured, click the **Edit** button at the upper right of the screen, and click the **Test Connection** button.

You must specify at least one email recipient to test the connection.

You can now set up the alert conditions that prompt the BIG-IQ® system to send an email when a certain event happens on a managed device.

Monitoring SSL certificate expiration dates

You must have discovered at least one device before any certificates display in the Certificate Management inventory.

You must also set up SMTP to receive notifications for alerts.

SSL certificates have a set expiration date, and do not renew automatically. So it is important to monitor the SSL certificate's expiration dates for your managed devices.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **CERTIFICATE MANAGEMENT**.
5. Click the **Alert Settings** button.
6. For the **Device Certificate Expiration** condition, select the **Enabled** check box, and in the **Threshold** field, type the number of days notice you want before the certificate expires.
7. To receive an alert when a certificate has expired, for the **Device Certificate Expired** setting, select the **Enabled** check box.
8. Click the **Save** button at the bottom of the screen.

If an SSL certificate is about to expire, or has expired, immediately contact the owner of the device.

About configuration templates

BIG-IQ® can manage multiple devices simultaneously. These devices can be located in several data centers that may be located in many different locations. To help you easily manage required configuration changes (such as changes to DNS, default gateways, route domains, NTP, or SNMP) for a large number of devices, you can use configuration templates.

To start, you create a configuration template, then deploy that template to certain devices. This can save a significant amount of time because you are not required to log in to each device individually to make configuration changes.

Creating a configuration template

You can create a configuration template to deploy a specific configuration to one or more managed devices. Centrally managing these deployments from BIG-IQ® Device eliminates the need to log in to each device individually to specify or update a configuration.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **CONFIG TEMPLATES > Templates**.
5. Click the **New Template** button at the top of the screen.
6. In the **Name** and **Description** fields, type a name and a short description to identify this template.
7. From the **Add New Object** list, select the object you want to add to this template, and then click the **Add** button.
The screen refreshes to display the property fields for the object.
8. In each property field, define the new object property's values.
You can add additional values for some properties by clicking the + sign next to the property field.
For specific information about the configuration options for BIG-IP, refer to the BIG-IP system documentation.
9. For each property, select one of these conditions:

Option	Description
Fixed	The value you define for this option is fixed. A user cannot change this value when deploying the template.
Optional	The value you define for this option is the default. Users can leave this default or specify their own value when deploying the template.
Required	You do not define a value for this option. The users must specify a value when they deploy the template.
10. After you add all of the objects you want to this template, click the **Save** button at the bottom of the screen.

This template is now available for deployment to managed BIG-IP® devices.

Deploying a configuration template to managed devices

You must create a configuration template before you can deploy it to a managed device.

Deploying a configuration template saves time when you want to make a similar change to several managed BIG-IP® devices.

1. Log in to the BIG-IQ® system with your user name and password.
2. At the top left of the screen, select **Device Management** from the BIG-IQ menu.
3. At the top of the screen, click **Operations**.
4. On the left, click **CONFIG TEMPLATES > Deployments**.
5. Click the **New Deployment** button at the top of the screen.
6. From the **Config Template** list, select the template you want to deploy.
7. In the **Name** field, specify the name for this configuration template deployment.
8. From the **Available** list, click the devices you want to deploy the configuration template to, and then click -> to move it to the **Included** list.
9. Click the **Next** button at the bottom of the screen, navigating to the components required for this template, and specifying the configuration.
10. Click the **Deploy** button.

BIG-IQ® applies this configuration to the specified BIG-IP devices.

Legal Notices

Legal notices

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This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This unit generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area

is likely to cause harmful interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Any modifications to this device, unless expressly approved by the manufacturer, can void the user's authority to operate this equipment under part 15 of the FCC rules.

Canadian Regulatory Compliance

This Class A digital apparatus complies with Canadian ICES-003.

Standards Compliance

This product conforms to the IEC, European Union, ANSI/UL and Canadian CSA standards applicable to Information Technology products at the time of manufacture.

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