

# **F5<sup>®</sup> BIG-IQ<sup>®</sup> Centralized Management DCD Sizing Guide**

Version 5.4





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## What is this guide going to tell me?

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Use this guide to determine the resources that are required to handle the data generated by the BIG-IP® devices you manage. Requirements vary according to the type and amount of data you generate. Refer to the table(s) that correspond to the type of data that you want to collect from your BIG-IP devices.

Each table includes a Data Redundancy column to help you consider the additional data collection devices (DCDs) necessary to make sure that your data exists on more than one device.

**What is this guide going to tell me?**

# What should I know about disk space before estimating resource requirements?

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In addition to the alert rate, consider the number of devices you plan to manage, the data retention policy you plan to use, and the average size of the alerts you plan to store on the DCD. When you configure the retention and rotation settings for your alert data, you must consider the available storage on the DCD. Although DCD VE devices allow for expansion of the alert partition, be aware that if you exceed 50% of the available disk space (which is not the same as raw disk space), you will not be able to upgrade your BIG-IQ DCD cluster. After deployment, a certain amount of the disk space is consumed by the BIG-IQ system software and is unavailable.

## Determine available disk space

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If you are planning to upgrade a deployed DCD, you can use the following steps to determine the amount of available disk space.

1. Use SSH to log in to your DCD as root.
2. Check the disk space available by running the `vgdisplay` command.  
For example:

```
vgdisplay
--- Volume group ---
VG Name                vg-db-sda
System ID
Format                 lvm2
Metadata Areas         1
Metadata Sequence No  179
VG Access              read/write
VG Status              resizable
MAX LV                 0
Cur LV                16
Open LV               7
Max PV                 0
Cur PV                1
Act PV                1
VG Size                498.50 GiB
PE Size                4.00 MiB
Total PE              127617
Alloc PE / Size        27936 / 109.12 GiB
Free PE / Size         99681 / 389.38 GiB
```

In this example, the total disk space (VG Size) is 498.50 GB.

3. Identify how the disk space is allocated across your partitions by running the `lvs` command.

For example:

## What should I know about disk space before estimating resource requirements?

```
# lvs
LV          VG          Attr      LSize  ..
dat.log.1   vg-db-vda   -wi-ao--- 7.00g
dat.maint.1 vg-db-vda   -wi-a---- 300.00m
dat.share.1 vg-db-vda   -wi-ao--- 28.00g
dat.swapvol.1 vg-db-vda   -wi-ao--- 1.00g
set.1._config vg-db-vda   -wi-a---- 3.17g
set.1._usr   vg-db-vda   -wi-a---- 3.29g
set.1._var   vg-db-vda   -wi-a---- 10.00g
set.1.root   vg-db-vda   -wi-a---- 440.00m
set.2._config vg-db-vda   -wi-ao--- 3.17g
set.2._usr   vg-db-vda   -wi-ao--- 3.29g
set.2._var   vg-db-vda   -wi-ao--- 10.00g
set.2.root   vg-db-vda   -wi-ao--- 440.00m
```

There are four entries to note in this response:

- dat.log.1 (highlighted in yellow) displays the size of the /var/log partition that is used to store the collected log data.
  - dat.share.1 (highlighted in aqua) displays the size of the /shared partition that is used for ISOs and backups on the BIG-IQ system.
  - set.1.\_var (highlighted in green) displays the size of the /var partition for HD1.1 that is used for the initial software installation.
  - set.2.\_var (also highlighted in green) displays the size of the /var partition for HD1.2 that is used for the upgrade installation. Note that these two partitions on the active and upgrade volumes must be the same size (as in this example).
4. If you determine you need additional disk space, increase the disk space for both volumes to the size you need.

Refer to *Resizing Disk Space on BIG-IQ Virtual Edition* on [support.f5.com](http://support.f5.com) for details.

# What resources do I need if I'm just collecting statistics?

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We've created a spreadsheet and a script to help you determine how many DCDs you need (and how much storage you need on each one) to handle the data generated by the BIG-IP devices you manage. You can download these tools from [downloads.f5.com](https://downloads.f5.com).

The spreadsheet uses metrics that you provide to calculate your resource requirements.

## Using the sizing tools to estimate resources for statistics collection

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The sizing tools uses metrics and a script that help you to calculate your resource requirements. To use the spreadsheet, you must first download it.

1. Log in to [downloads.f5.com](https://downloads.f5.com).
2. Navigate to BIG-IQ Centralized Management, v5.4.0, and click **I Accept** to accept the EULA.
3. Click **F5\_Networks\_BIG\_IQ\_DCD\_Sizing\_Tools.zip**.  
After a brief pause, the Download Locations screen opens.

4. Click a download location to start the download.
5. When the download completes, unzip the file.

Two files will extract:

- F5\_Networks\_BIG\_IQ\_DCD\_Sizing\_Tool.xlsx
  - F5\_Networks\_BIG\_IQ\_Apm\_Dcd\_Sizing\_Metrics.sh
6. Open the spreadsheet to the **Statistics DCD Sizing Tool** tab, and type values that describe the environment, policies, and modules for which you want to collect statistics.
  7. After you fill in all of the fields, the recommended number and configuration of DCDs is calculated and displayed under **Sizing Recommendation for DCD Nodes**. You can see the impact of your storage decisions by noting how the values under **Time Layer Calculations** change when you enter different values.

The calculations performed for these elements are based on some assumptions. Bear these assumptions in mind as you complete the spreadsheet.

- The amount of device data increases marginally as you increase the number of CPUs and interfaces on your BIG-IP devices.
- The amount of pool and pool member data is based on an assumed average number of pool members per pool. For pools that have a larger than average number of pools, the amount of data increases as well.
- The spreadsheet assumes you have an average of 5 events per iRule. If your average number of events per iRule is lower, storage requirements go down; if your average is greater, storage requirements will increase.

**What resources do I need if I'm just collecting statistics?**

# What resources do I need to collect ASM data?

---

Use this table to estimate the number of DCDs necessary to collect and display ASM event data from BIG-IP devices.

- If you are using an off-box logging solution to log ASM events, review a week's worth of alert logs to identify the logging load you need to support. Take note of both the average and maximum alerts per second.
- If you are logging ASM events locally on the BIG-IP device, you can also use those logs to identify your peak event logging rates. Compare the peak rates against the alerts per second (Alerts/Sec column) to estimate the number of DCDs you need.
- If you have not yet deployed an ASM solution in your environment, but you have an estimate of your application's peak HTTP/HTTPS traffic requirements, you can estimate your logging needs by projecting that 10% of your peak traffic could generate logging events. You can then use that value to estimate the number of DCDs you need.

Alerts/Sec	Data Redundancy	Recommended DCD count
10000	No	1
14000	Yes	2
17000	Yes	3
20000	Yes	4
23000	Yes	5
26000	Yes	6

---

**Note:**

- The sizing recommendations in this table assume that you provision your DCDs with 8 cores/CPU and 32 GB of memory.
  - When you choose an alert rate, consider both the average and peak loads that you anticipate. If your peak loads are frequent, consider provisioning additional data-collection nodes for the increased load. Also, when you determine your peak rates, plan for growth by considering the rate at which you expect your traffic load to increase.
-

**What resources do I need to collect ASM data?**

## What resources do I need to collect APM data?

---

For APM<sup>®</sup>, we provide a spreadsheet and a script to help you determine the number of DCDs required to handle the data generated by the BIG-IP<sup>®</sup> devices you manage. You can download these tools from `downloads.f5.com`. The APM data script collects metrics for the data your APM devices generate and stores the data in a file on your BIG-IP device.

The script reads the last 10 days of logging data and provides the metrics you need for the spreadsheet. The spreadsheet uses those metrics to calculate your resource requirements. You enter information about the amount of data you expect to generate each day, and the spreadsheet calculates the number of DCDs required to handle that data.

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***Note:** You can use the script only if you have enabled local db-logging. For information about enabling local-db logging, refer to Overview: Configuring remote high-speed APM and SWG event logging on support.f5.com.*

If you use another logging mechanism, you can run reports (such as log reports or sessions reports) to get this data.

---

***Note:** Unless there has been a recent HA failure event (within the last 3 days), run this script on the active device. In this case, the active device may not have enough data and it is better to run the script on the standby device.*

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Even with the script, it might be tedious to collect data from each of your BIG-IP devices, so we recommend that you take the values from one of the BIG-IP devices with the most users and access profiles to account for the worst-case scenario.

## Using the script to estimate resources for APM data collection

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The sizing tools uses metrics and a script that help you to calculate your resource requirements. To use the spreadsheet, you must first download it.

1. Log in to `downloads.f5.com`.
2. Navigate to BIG-IQ Centralized Management, v5.4.0, and click **I Accept** to accept the EULA.
3. Click **F5\_Networks\_BIG\_IQ\_DCD\_Sizing\_Tools.zip**.  
After a brief pause, the Download Locations screen opens.
4. Click a download location to start the download.
5. When the download completes, unzip the file.  
Two files will extract:
  - `F5_Networks_BIG_IQ_DCD_Sizing_Tool.xlsx`
  - `F5_Networks_BIG_IQ_Apm_Dcd_Sizing_Metrics.sh`
6. After the script has run, navigate to the `/var/tmp` folder on the BIG-IP device and open the output file to see the collected metrics.

```
NUMBER_OF_EVENTLOGS_PER_DAY
400,000
-----
NUMBER_OF_SESSIONS_PER_DAY
20,000
```

## What resources do I need to collect APM data?

```
-----  
LOGS_PER_SESSION  
20  
-----  
NUMBER_OF_ACCESSS_PROFILES  
10  
-----  
NUMBER_OF_ACLs  
50
```

7. Open the spreadsheet to the **Access DCD Sizing Tool** tab, and type the values from the script output file into the appropriate fields on the spreadsheet.  
For example, for the sample output above, you would type 20,000 in the **Number of APM sessions per day** field.
8. After you fill in all of the fields, the recommended number and configuration of DCDs is calculated and displayed in the **Recommended number of DCD nodes** field.

# What resources do I need to collect FPS data?

---

Use this table to estimate the number of DCDs necessary to collect and display FPS alert data from BIG-IP devices.

- If you are using an off-box logging solution to log FPS events, review a week's worth of alert logs to identify the logging load you need to support. Take note of both the average and maximum alerts per second.

To determine the peak alerts/second rate to use in the table, first estimate the peak user load for the protected application over your highest period of production hours, and then plug that value into the following calculation:

$$\langle \text{peak user load} \rangle \text{ users} / (\text{peak duration (h)} * 60\text{m} * 60\text{s}) \approx \text{number of logins/sec} \approx \text{number of alerts/sec}$$

For example, if you estimate that there are, at most, 1 million users logging in to access your FPS environment over a 4-hour timespan, the calculation results in a login rate of:

$$1,000,000 \text{ users} / (4\text{h} * 60\text{m} * 60\text{s}) = \approx 70 \text{ logins/sec} \approx 70 \text{ alerts/sec}$$

Although each user login does not generate an alert, even single user logins or application transactions can generate multiple alerts depending on the protection policy's configuration. For determining the number of DCDs needed to operate during peak conditions, 70 alerts per second is a reasonable assumption for this login rate.

Alerts/Sec	Data Redundancy	Recommended DCD count
100	No	1
200	Yes	2
300	Yes	3
400	Yes	4
500	Yes	5
600	Yes	6

---

**Note:**

- The sizing recommendations in this table assume that you provision your DCDs with 8 cores/CPU's and 32 GB of memory.
- When you choose an alert rate, consider both the average and peak loads that you anticipate. If your peak loads are frequent, consider provisioning additional data-collection nodes for the increased load. Also, when you determine your peak rates, plan for growth by considering the rate at which you expect your traffic load to increase.
- The outgoing data rate from your BIG-IP devices also depends on the FPS policy configuration, the number of simultaneous application users, and their expected transaction rate.
- The scale numbers provided assume the use of three forwarding rules (100% syslog forwarding, 10% SOC forwarding, 10% customer forwarding), and 17000 transform rules.

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**Note:** Increasing the number of forwarding targets or the distance between your data collection devices increases the performance requirements for each node in the DCD cluster.

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**What resources do I need to collect FPS data?**

# What resources do I need to collect data for multiple modules?

---

Use this process to estimate the number of DCDs that you need to collect and display more than one kind of data from your BIG-IP devices.

1. Perform the estimate for each module independently.
2. Record the maximum number of DCDs recommended by any one estimate.
3. Sum the total storage needed by all estimates.
4. Divide the result in step 3 by the result of step 2.

For example:

You've performed the estimate for an ASM module, and the result is 2 DCDs and 60 GB of storage.

You've performed the estimate for Statistics, and the result is 3 DCDs and 120 GB of storage.

In this example, the maximum number of DCDs is 3 and the sum of the total storage is 180 GB. Consequently, the recommendation is 3 DCDs (the maximum, from the statistics estimate) and 60 GB storage (The sum of both, divided by the recommended number of DCDs).

**What resources do I need to collect data for multiple modules?**

# Resizing Disk Space on BIG-IQ Virtual Edition

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## BIG-IQ Virtual Edition Disk Space Overview

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BIG-IQ<sup>®</sup> Virtual Edition (VE) uses *Logical Volume Management (LVM)* to allow you to use utilities to resize file systems. Additional disk space is useful when you need more storage on your BIG-IQ system for things such as logging or database files.

Here is an example of an initial installation of BIG-IQ 5.2 VE with a single installation slot created on volume HD1.1

```
[root@bigiq-console-test-large:Active:Standalone] ~ # tmsl show sys software
```

```
-----  
Sys::Software Status  
Volume  Product  Version      Build  Active  Status  
-----  
HD1.1   BIG-IQ    5.2.0    0.0.5741    yes  complete
```

The size of each file system is determined by a configuration file within the BIG-IQ installation image. (For details, refer to *Default Filesystem Sizes* on [support.f5.com](http://support.f5.com).)

You can use the command `lvs` to see the file structure on your BIG-IQ VE. The response shows all of the default logical volumes created, along with their size, in kilobytes.

Here is an example of an a typical BIG-IQ 5.2 VE file system.

```
[root@bigiq-console-test-large:Active:Standalone] ~ # lvs --unit=k  
LV          VG          Attr          LSize          Pool Origin Data%  Move Log Cpy%Sync  
Convert  
dat.log.1   vg-db-sda  -wi-ao---    7168000.00k  
dat.maint.1 vg-db-sda  -wi-a----     307200.00k  
dat.share.1 vg-db-sda  -wi-ao---   10240000.00k  
dat.swapvol.1 vg-db-sda  -wi-ao---   1048576.00k  
set.1._config vg-db-sda  -wi-ao---    3321856.00k  
set.1._usr   vg-db-sda  -wi-ao---    3452928.00k  
set.1._var   vg-db-sda  -wi-ao---   10485760.00k  
set.1.root   vg-db-sda  -wi-ao---     450560.00k
```

When you upgrade to version 5.3 or 5.4, BIG-IQ, one of the installation steps creates a new slot using the `create-volume` parameter. Another installation step reveals the resulting file structure.

Here is an example from a typical BIG-IQ 5.2 to 5.3 upgrade:

```
[root@bigiq-console-test-large:Active:Standalone] ~ # tmsl install sys software image BIG-IQ-5.3.0.0.0.1119.iso create-volume volume HD1.2  
[root@bigiq-console-test-large:Active:Standalone] ~ # tmsl show sys software
```

```
-----  
Sys::Software Status  
Volume  Product  Version      Build  Active  Status  
-----  
HD1.1   BIG-IQ    5.2.0    0.0.5741    yes  complete  
HD1.2   BIG-IQ    5.3.0    0.0.1119    no  installing 10.000 pct
```

The following example illustrates what the logical volumes look like after you install the new BIG-IQ software.

```
[root@bigiq-console-test-large:Active:Standalone] ~ # lvs --unit=k
LV          VG          Attr      LSize     Pool Origin Data%  Move Log Cpy%Sync
Convert
dat.log.1   vg-db-sda   -wi-ao--- 7168000.00k
dat.maint.1 vg-db-sda   -wi-a---- 307200.00k
dat.share.1 vg-db-sda   -wi-ao--- 10240000.00k
dat.swapvol.1 vg-db-sda   -wi-ao--- 1048576.00k
set.1._config vg-db-sda   -wi-ao--- 3321856.00k
set.1._usr   vg-db-sda   -wi-ao--- 3452928.00k
set.1._var   vg-db-sda   -wi-ao--- 10485760.00k
set.1.root   vg-db-sda   -wi-ao--- 450560.00k
set.2._config vg-db-sda   -wi-a---- 3321856.00k
set.2._usr   vg-db-sda   -wi-a---- 3452928.00k
set.2._var   vg-db-sda   -wi-a---- 10485760.00k
set.2.root   vg-db-sda   -wi-a---- 450560.00k
```

Each installation volume has their own `root`, `/usr`, `/config`, and `/var` filesystems. The filesystems are mounted on logical volumes named using the following naming convention: `vg--db--sda-set.<installation slot>.<filesystem alias>`.

This table illustrates the mapping structure.

Installation Slot	Logical Volume	Mount Point	Notes
Shared	dat.log.1	/var/log	Shared across all instal
Shared	dat.share.1	/shared	Shared across all instal
HD1.1	set.1._config	/config	Slot 1 only
HD1.1	set.1._usr	/usr	Slot 1 only
HD1.1	set.1._var	/var	Slot 1 only
HD1.1	set.1.root	/	Slot 1 only
HD1.2	set.2._config	/config	Slot 2 only
HD1.2	set.2._usr	/usr	Slot 2 only
HD1.2	set.2._var	/var	Slot 2 only
HD1.2	set.2.root	/	Slot 2 only

## Default Filesystem Sizes

The BIG-IQ® installation image contains the information used to configure logical volumes with default sizes. These default sizes are referred to as *plans*. If you install a new BIG-IQ version and the existing logical volumes in the target installation slot are not at least as large as the default size, then the installation process deletes and recreates the entire slot with the default logical volume sizes specified in the plan for the installation image. If you want to see the sizes defined in the plan for your BIG-IQ system, you can use a script named `imageplan`.

Here is an example of the plans defined for a BIG-IQ 5.1 installation:

```
[root@bigiq-console-test-large:Active:Standalone] ~ # imageplan /shared/images/BIG-IQ-5.1.0.0.0.631.iso
product BIG-IQ version 5.1.0 build 0.0.631 (BIGIQ510) selected
Standard plan
Mount point: /, Size: 300000k
Mount point: /usr, Size: 2350000k
Mount point: /config, Size: 1048576k
Mount point: /var, Size: 10485760k
```

```
Tiny plan
Mount point: /, Size: 300000k
Mount point: /usr, Size: 2350000k
Mount point: /config, Size: 1048576k
Mount point: /var, Size: 10485760k
```

Here is an example of the plans defined for a BIG-IQ 5.2 installation:

```
[root@bigiq-console-test-large:Active:Standalone] ~ # imageplan /shared/images/BIG-IQ-5.2.0.0.0.5741.iso
product BIG-IQ version 5.2.0 build 0.0.5741 (BIGIQ520) selected
Standard plan
Mount point: /, Size: 450000k
Mount point: /usr, Size: 3450000k
Mount point: /config, Size: 3320000k
Mount point: /var, Size: 10485760k
Tiny plan
Mount point: /, Size: 450000k
Mount point: /usr, Size: 3450000k
Mount point: /config, Size: 500000k
Mount point: /var, Size: 10485760k
```

As illustrated in these examples, for BIG-IQ version 5.1 and 5.2, the Standard and Tiny plans use the same sizes for the `/`, `/usr`, and `/var` mount points. The size for the `/config` mount point often changes for each plan.

When you install BIG-IQ software, the installation process reads the plan for the version you are installing and then uses either the Standard or the Tiny plan depending upon the total disk size available in the target installation slot.

## Filesystem details

This table describes the contents of a folder structure on a typical BIG-IQ® VE.

File System	Contains	Notes
/shared	<p>Shared across all installation volumes:</p> <ul style="list-style-type: none"> <li>ucs backups <code>/shared/ucs_backups</code></li> <li>BIG-IQ and BIG-IP installation ISO images <code>/shared/images</code></li> <li>ssh keys, <code>known_hosts</code> files, etc. <code>/shared/ssh</code></li> <li>core files <code>/shared/core</code></li> </ul>	<p>Consider resizing this disk if there are many UCS backups (for example, if you have lots of BIG-IP devices to manage) or software installation images, or if the size of the BIG-IQ UCS file itself, which contains data from <code>/var/config</code>, could be too large for a successful upgrade.</p>
/var/log	<p>Processes logging data shared across all installation volumes:</p> <ul style="list-style-type: none"> <li>restjavad logs <code>/var/log/restjavad*</code></li> <li>database logs <code>/var/log/tokumx.log.*</code></li> </ul>	<p>Consider resizing this disk if the default log rotation policies do not handle actual logging volume.</p>

File System	Contains	Notes
	<ul style="list-style-type: none"> <li>configuration search index logs /var/log/searchd/ eslognode*</li> <li>data collection device logs /var/log/elasticsearch/ eslognode*</li> </ul>	
/ (root)	Linux operating system components and configuration	
/usr	BIG-IQ installation binary and configuration components	
/var	BIG-IQ data: <ul style="list-style-type: none"> <li>restjavad configuration data /var/config/rest/toku/data</li> <li>restjavad configuration search indexes /var/config/rest/searchd/data</li> <li>data collection device indexes /var/config/rest/elasticsearch/data</li> </ul>	Consider resizing this disk if the database or index growth will exceed current disk capacity.

## What factors should I consider before resizing my disks for an upgrade?

The commands for extending the filesystem on your BIG-IQ® VE are very straightforward, but there are a few things you should consider before proceeding.

### Questions to ask before you resize

- Do you have enough disk space on the BIG-IQ VE to install the BIG-IQ software?
- How big are the volumes needed by the software you want to install?
- How big are the volumes on your current BIG-IQ installation?
- Do you have an open slot to install the software on?

### Check the disk space on the BIG-IQ VE

Before you create new slots and size them appropriately, you need to check whether there is sufficient physical disk space on the VE. You can use the `pvs` command to check. For example:

```
# pvs
PV          VG          Fmt  Attr PSize  PFree
/dev/sda3  vg-db-sda  lvm2 a--  498.50g 446.82g
```

This device has 446 Gigs of free disk space. That would be more than sufficient for a standard 5.4 install (30G + 5G + 5G + 10G = 50G)

Once you know how much room you need and if there is room on the VE you are installing on, you can start extending the disk. Remember that the volume sizes on the target slot must be at least as big as the volumes on your current slot. So if you have extended the volume sizes on your current installation, you will need larger volumes than the minimum sizes specified in the image plan for the software image you are installing. You need to use the larger of the two values from the checks you just completed. For

example, if the `imageplan` script shows a `/var` size of 10G is needed for the software you want to install, but the `show sys software check` shows a `/var` size of 30G for the version you currently have installed, then you need the `/var` volume to be sized at 30G, not 10G.

### Check the volume sizes required by the software you want to install

F5 has created a script that reads the size requirements from the software image you plan to install and then creates them for you on a new installation slot. To use this script:

1. Copy the software image to the `/shared/images` folder on the BIG-IQ system you plan to upgrade:

```
# cp <big-iq-software-image>.iso /shared/images/<big-iq-software-image>.iso
```

2. Run the `imageplan` script on the software image to determine the filesystem sizes required:

```
# ./imageplan /shared/images/<big-iq-software-image>.iso
product BIG-IQ version 5.3.0 build 0.0.1119 (BIGIQ530) selected
Standard plan
Mount point: /, Size: 450000k
Mount point: /usr, Size: 3450000k
Mount point: /config, Size: 3320000k
Mount point: /var, Size: 10485760k
Tiny plan
Mount point: /, Size: 450000k
Mount point: /usr, Size: 3450000k
Mount point: /config, Size: 500000k
Mount point: /var, Size: 10485760k
```

Now you know the size requirements for the image you plan to install.

### Check the volume sizes on your current BIG-IQ installation

You need to know the volume sizes for your current installation, because if any of the volumes have been extended, you must likewise extend the volumes on the installation slot before you upgrade. Otherwise, the install process can result in loss of data. To check the volume sizes of the existing installation, you can use the `tmsh` command `show sys software`. For example:

```
[root@bigiq-test:Active:Standalone] config # tmsh show sys software
```

```
-----
Sys::Software Status
Volume Product Version Build Active Status
-----
HD1.1 BIG-IQ 5.2.0 0.0.5567 yes complete

[root@bigiq-test:Active:Standalone] config # lvs --unit=k
LV VG Attr LSize Pool Origin Data% Move Log Cpy%Sync
Convert
dat.log.1 vg-db-sda -wi-ao--- 7168000.00k
dat.maint.1 vg-db-sda -wi-a---- 307200.00k
dat.share.1 vg-db-sda -wi-ao--- 10240000.00k
dat.swapvol.1 vg-db-sda -wi-ao--- 1048576.00k
set.1._config vg-db-sda -wi-ao--- 503808.00k
set.1._usr vg-db-sda -wi-ao--- 3452928.00k
set.1._var vg-db-sda -wi-ao--- 31457280.00k
set.1.root vg-db-sda -wi-ao--- 450560.00k
```

The system response shows you the volume sizes of your current installation. The key volumes with their sizes are listed below:

- /config (.5G)
- /usr (3.5G)
- /var (30G)
- /root (.5G)

The slot you upgrade to must have volumes that are at least as big as those on the slot your software is currently installed on. This is especially significant if you decided to extend one of the volumes on your current installation. So if your /var is extended to 30G, you must have at least that much space on the new slot before you install software.

### Check to see if you have an open slot to install the software on

Before you can install new software, you need an open slot. You can use the `lvs` command to determine how many slots there are on your BIG-IQ VE. For example:

```
[root@bigiq-console01:Active:Standalone] config # lvs --unit=k
LV          VG          Attr          LSize          Pool Origin Data%  Move Log Cpy%Sync
Convert
dat.log.1   vg-db-sda  -wi-ao---    8388608.00k
dat.maint.1 vg-db-sda  -wi-a----    307200.00k
dat.share.1 vg-db-sda  -wi-ao---   33554432.00k
dat.swapvol.1 vg-db-sda  -wi-ao---   1048576.00k
set.1._config vg-db-sda  -wi-a----    503808.00k
set.1._usr   vg-db-sda  -wi-a----   3452928.00k
set.1._var   vg-db-sda  -wi-a----  10485760.00k
set.1.root   vg-db-sda  -wi-a----    450560.00k
set.2._config vg-db-sda  -wi-ao---    3481600.00k
set.2._usr   vg-db-sda  -wi-ao---   3584000.00k
set.2._var   vg-db-sda  -wi-ao---  16003072.00k
set.2.root   vg-db-sda  -wi-ao---    512000.00k
set.3._config vg-db-sda  -wi-a----    3321856.00k
set.3._usr   vg-db-sda  -wi-a----   3452928.00k
set.3._var   vg-db-sda  -wi-a----  10485760.00k
set.3.root   vg-db-sda  -wi-a----    450560.00k
```

Each instance of `set.n` represents a slot on the VE. So in this example the VE has 3 installation slots (`set.1`, `set.2`, and `set.3`).

## Resizing disk volumes for a BIG-IQ upgrade (an example workflow)

The workflow for extending your disk volumes so that you can successfully upgrade to a new version of BIG-IQ and preserve your current data is listed below:

- If you need more physical disk space, attend to that first.
- If you have the disk space and an open slot, then F5 has a script that you can use to create the new volumes required for the image you plan to install. `addvol` reads the image plan for the software you plan to install and creates the volumes required.
- If you have extended the disk space on your current installation, F5 has a script that increases volume size as needed. `resizevol` sets the volume size to the value you specify.
- If you need an extra slot, you can add it as part of the installation command. The `create_volume` parameter adds a new slot to your VE and (if you've set up the volume sizes correctly using `addvol` and `resizevol`) when the software upgrades, all of your data fits without any disk resizing. Resizing disks in the middle of an upgrade can cause you to lose data.

The following example tasks step you through the workflow for extending your disk size as part of an upgrade. In this scenario, you check the disk space first, then you create the volumes for the software you plan to install, then you extend a volume to account for an extension you performed on your current installation, and finally, you install the software, adding a new installation slot as part of the process.

## Downloading disk size tools

F5 has created several scripts that are useful if you need to resize your disk volumes as part of the upgrade process. To use these scripts, you must first download them.

1. Log in to `downloads.f5.com`.
2. Navigate to BIG-IQ Centralized Management, v5.4.0, and click **I Accept** to accept the EULA.
3. Click **F5\_Networks\_Disk\_Size\_Tools.zip**.  
After a brief pause, the Download Locations screen opens.
4. Click a download location to start the download.
5. When the download completes, unzip the file.

Three files will extract to the folder you designate:

- `addvol`
- `imageplan`
- `resizevol`

Before you can run these scripts, you need to copy them to the device you are resizing.

## Check the amount of free disk space on your BIG-IQ VE

- Before you can use this workflow to check the amount of free disk space on your BIG-IQ VE, you must download the `imageplan` script from `F5.downloads.com`. For details on downloading this script, refer to *Downloading disk size tools* on `support.f5.com`.

Before you create new slots and size them appropriately, you need to check that there is sufficient physical disk space on the BIG-IQ VE.

1. Use SSH to log in to your DCD as root.
2. Use the `pvs` command to check how much disk space is available for new slots and volumes.

```
[root@bigiq-console-test-large:Active:Standalone] ~ # pvs
PV          VG          Fmt  Attr PSize  PFree
/dev/sda3  vg-db-sda  lvm2  a--  498.50g  446.82g
```

The command response tells you how much free disk space is available.

This device has 446 Gigs of free disk space. That would be more than sufficient for a standard 5.4 install (30G + 5G + 5G + 10G = 50G)

If the amount of disk space available is less than the amount you need before you can install your software, you must increase the free space before you can proceed. Refer to the hypervisor vendor documentation for the workflow to increase the amount of available disk space on your VE.

## Create correctly sized volumes on the new installation slot

- Before you can use this workflow to size the volumes on an installation slot, you must download the `addvol` script from `F5.downloads.com`. For details on downloading this script, refer to *Downloading disk size tools* on `support.f5.com`.

If you are planning to upgrade a BIG-IQ VE, you can use the following steps to create new volumes on the installation slot. The new volumes will be sized correctly for the version you plan to install.

1. Download the image file that you plan to install from `downloads.f5.com`.
2. Use SSH to log in to your DCD as root and copy the image file to the `/shared/images` folder.
3. Use the `addvol` script to create the filesystems defined in the image plan for the software you plan to install.

The script creates the correctly sized volume, but does not install any software. In this example, the image file for BIG-IQ version 5.3.0 is used.

```
# ./addvol HD1.2 /shared/images/BIG-IQ-5.3.0.0.0.1119.iso
create volume HD1.2 for image /shared/images/BIG-IQ-5.3.0.0.0.1119.iso
product BIG-IQ version 5.3.0 build 0.0.1119 (BIGIQ530) selected
Creating new location sda, 2...
info: zero sblock for member device; /dev/vg-db-sda/set.2.root
info: zero sblock for member device; /dev/vg-db-sda/set.2._usr
info: zero sblock for member device; /dev/vg-db-sda/set.2._config
info: zero sblock for member device; /dev/vg-db-sda/set.2._var
[root@bigiq-test:Active:Standalone] ~ # lvs --unit=k
LV          VG          Attr      LSize     Pool Origin Data%  Move Log Cpy%Sync
Convert
dat.log.1   vg-db-sda   -wi-ao--- 7168000.00k
dat.maint.1 vg-db-sda   -wi-a---- 307200.00k
dat.share.1 vg-db-sda   -wi-ao--- 10240000.00k
dat.swapvol.1 vg-db-sda   -wi-ao--- 1048576.00k
set.1._config vg-db-sda   -wi-ao--- 503808.00k
set.1._usr   vg-db-sda   -wi-ao--- 3452928.00k
set.1._var   vg-db-sda   -wi-ao--- 30003200.00k
set.1.root   vg-db-sda   -wi-ao--- 450560.00k
set.2._config vg-db-sda   -wi-a---- 3321856.00k
set.2._usr   vg-db-sda   -wi-a---- 3452928.00k
set.2._var   vg-db-sda   -wi-a---- 10485760.00k
set.2.root   vg-db-sda   -wi-a---- 450560.00k
```

The script reads the image plan and creates new volumes for `/config`, `/usr`, `/var`, and `/root` based on the requirements defined in the plan.

### Check the volume sizes on your current BIG-IQ installation

When you upgrade a BIG-IQ VE, you need to know the volume sizes for your current installation, because if any of the volumes have been extended, you must extend the volumes on the installation slot before you upgrade. Otherwise, the install process can result in loss of data. To check the volume sizes of the existing installation, you can use the `tmsh` command `show sys software`.

Use the following steps to determine the size of the volumes used by your current BIG-IQ installation.

1. Use SSH to log in to your DCD as root.
2. Use the `tmsh` command `show sys software` to check the volume sizes of the existing installation.

```
[root@bigiq-test:Active:Standalone] config # tmsh show sys software
-----
Sys::Software Status
Volume Product Version      Build Active  Status
-----
HD1.1   BIG-IQ   5.2.0  0.0.5567  yes  complete

[root@bigiq-test:Active:Standalone] config # lvs --unit=k
LV          VG          Attr      LSize     Pool Origin Data%  Move Log Cpy%Sync
Convert
dat.log.1   vg-db-sda   -wi-ao--- 7168000.00k
dat.maint.1 vg-db-sda   -wi-a---- 307200.00k
dat.share.1 vg-db-sda   -wi-ao--- 10240000.00k
dat.swapvol.1 vg-db-sda   -wi-ao--- 1048576.00k
set.1._config vg-db-sda   -wi-ao--- 503808.00k
set.1._usr   vg-db-sda   -wi-ao--- 3452928.00k
set.1._var   vg-db-sda   -wi-ao--- 31457280.00k
set.1.root   vg-db-sda   -wi-ao--- 450560.00k
```

The system response shows you the volume sizes of your current installation. The key volumes with their sizes are listed below:

- /config (.5G)
- /usr (3.5G)
- /var (30G)
- /root (.5G)

The slot you upgrade to must have volumes that are at least as big as those on the slot your software is currently installed on. This is especially significant if you decided to extend one of the volumes on your current installation. So if your /var volume is extended to 30G, you must have at least that much space on the new slot before you install software.

## Increase the size of a disk volume

- You need to download the `resizevol` script from `F5.downloads.com`. For details on downloading this script, refer to *Downloading disk size tools* on `support.f5.com`.
- You need to know the volume names that you want to extend and the size that you want to extend them to.

If you need to increase the volume size of a disk volume on your installation slot so that you can install without losing any data, you can use the `resizevol` script.

1. Use SSH to log in to your DCD as root.
2. Use the `resizevol` script to increase size of the volume on the new installation slot to the required size.

The volume sizes required depend on the sizes your current installation uses. See *Check the volume sizes on your current BIG-IQ installation* on `support.f5.com`.

```
# ./resizevol /var 30000000
Requested size 30000000k is less than current size 30003200.00k on /dev/vg-db-sda/set.
1._var, skipping
Resizing logical volumes. OK (y/n)? y
Requested size 30000000k is less than current size 30003200.00k, skipping
e2fsck 1.41.12 (17-May-2010)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
Pass 5: Checking group summary information
set.2./var: 11/655360 files (0.0% non-contiguous), 79696/2621440 blocks
Rounding size to boundary between physical extents: 28.61 GiB
Extending logical volume set.2._var to 28.61 GiB
Logical volume set.2._var successfully resized
resize2fs 1.41.12 (17-May-2010)
Resizing the filesystem on /dev/vg-db-sda/set.2._var to 7500800 (4k) blocks.
The filesystem on /dev/vg-db-sda/set.2._var is now 7500800 blocks long.
# lvs --unit=k
  LV          VG          Attr          LSize          Pool Origin Data%   Move Log Cpy%Sync
Convert
dat.log.1    vg-db-sda  -wi-ao---    7168000.00k
dat.maint.1  vg-db-sda  -wi-a----     307200.00k
dat.share.1  vg-db-sda  -wi-ao---   10240000.00k
dat.swapvol.1 vg-db-sda  -wi-ao---   1048576.00k
set.1._config vg-db-sda  -wi-ao---    503808.00k
set.1._usr   vg-db-sda  -wi-ao---   3452928.00k
set.1._var   vg-db-sda  -wi-ao---   30003200.00k
set.1.root   vg-db-sda  -wi-ao---    450560.00k
set.2._config vg-db-sda  -wi-a----    3321856.00k
set.2._usr   vg-db-sda  -wi-a----   3452928.00k
set.2._var   vg-db-sda  -wi-a----   30003200.00k
```

```
set.2.root    vg-db-sda -wi-a---- 450560.00k
```

The script extends the size of the volume you enter (/var in this example) to the size you enter (30GB in this example).

Now that the volumes are correctly sized, you can proceed with the installation.

### Install BIG-IQ to a new slot

Before you can install a BIG-IQ device to a new slot, you must:

- Download the software image from `F5.downloads.com`.
- Correctly size the volumes on the slot you plan to install the new version on.

You can upgrade BIG-IQ using a `tmsh` command. The process performs the following steps:

- Creates a UCS backup from the current system and saves it in the `/shared` folder.
- Installs a new BIG-IQ image on a new slot.
- When the new image is installed on the new slot, it copies that data was saved in `/shared` into the new database running on the new slot.

1. Use SSH to log in to your BIG-IQ as root.
2. Use the `tmsh install` command to upgrade your software.

---

*Note: The following example uses the `create-volume` parameter so the process creates a new slot and then begins installing the software on it.*

---

```
# tmsh install sys software image BIG-IQ-5.3.0.0.0.1119.iso create-volume volume
HD1.2
```

The process upgrades your BIG-IQ system and restores the data from the current version.

3. After the installation is complete, you can use the `tmsh show sys software` command to check to see that the upgrade was successful and that the `/var` filesystem is the correct size (30M).

```
# tmsh show sys software
-----
Sys::Software Status
Volume  Product  Version      Build  Active  Status
-----
HD1.1   BIG-IQ    5.2.0        0.0.5567  yes    complete
HD1.2   BIG-IQ    5.3.0        0.0.1119  no     complete

# lvs --unit=k
LV          VG          Attr          LSize          Pool Origin Data%  Move Log Cpy%Sync
Convert
dat.log.1   vg-db-sda  -wi-ao---    7168000.00k
dat.maint.1 vg-db-sda  -wi-a----    307200.00k
dat.share.1 vg-db-sda  -wi-ao---   10240000.00k
dat.swapvol.1 vg-db-sda  -wi-ao---   1048576.00k
set.1._config vg-db-sda  -wi-ao---    503808.00k
set.1._usr   vg-db-sda  -wi-ao---   3452928.00k
set.1._var   vg-db-sda  -wi-ao---   30003200.00k
set.1.root   vg-db-sda  -wi-ao---    450560.00k
set.2._config vg-db-sda  -wi-a----   3321856.00k
set.2._usr   vg-db-sda  -wi-a----   3452928.00k
set.2._var   vg-db-sda  -wi-a----   30003200.00k
set.2.root   vg-db-sda  -wi-a----    450560.00k
```

Now that the volumes are correctly sized, you can proceed with the installation.

# Legal Notices

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## Legal notices

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