IBM FlashCache Storage Accelerator 2.2.0

Installation Guide for Virtual

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Caching overview

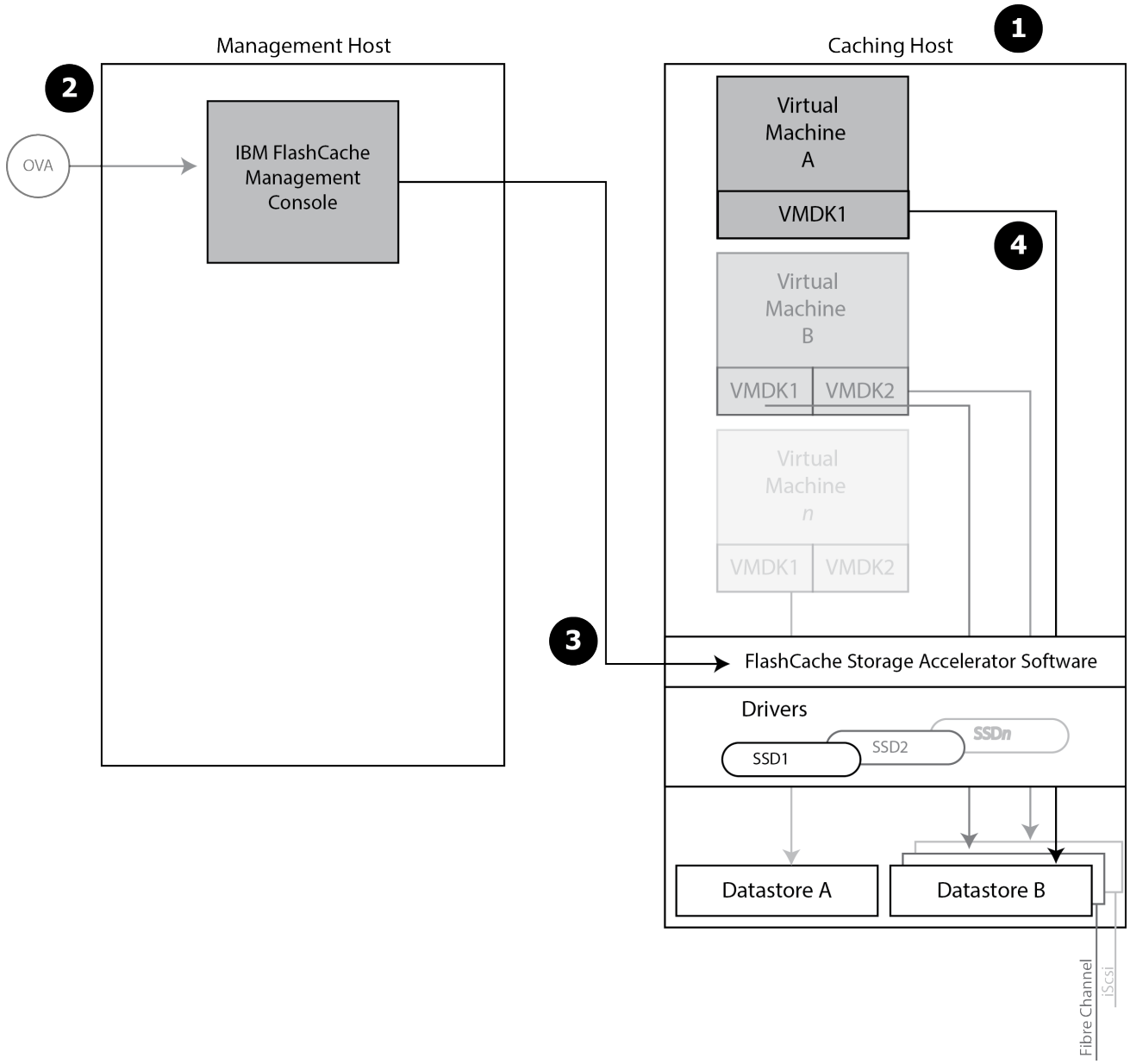
IBM FlashCache Storage Accelerator allows you to cache VMs in a VMware environment and dramatically increase their performance. Caching can be configured in two ways: host-based caching (or hypervisor caching) and guest-based caching:

- Host-based Caching
  - Host-based caching does not require additional software to be installed on your VMs.
  - Host-based caching does not require administrative login credentials for the VM.
- Guest-based Caching
  - On Windows, guest-based caching provides greater granularity in what you choose to cache. For example, on Windows VMs you can cache specific files or specific volumes. With Linux guest-based caching, you can only specify caching at the volume or disk level.
  - As a general rule, guest-based caching performance will be better than host-based caching performance.

The IBM FlashCache Storage Accelerator solution consists of a management server and caching software. The management server is deployed as a virtual machine on a host that is not caching, and the caching software is deployed on hosts that contain SSDs. The following figures illustrate the logical placement of these components.

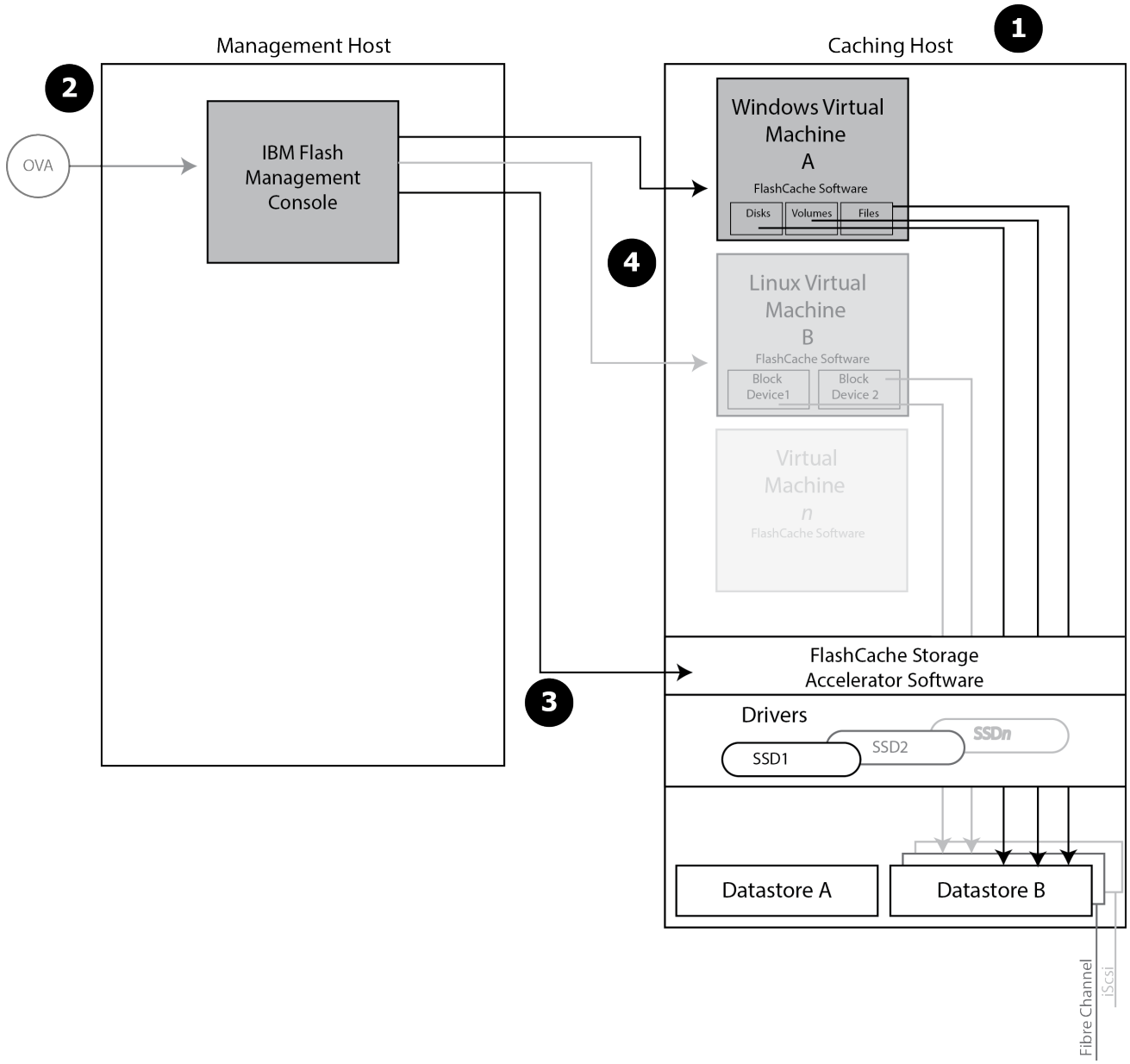
IBM FlashCache Storage Accelerator Hypervisor Caching

Installation Overview



IBM FlashCache Storage Accelerator Guest-Based Caching

Installation Overview



Installation overview

IBM FlashCache Storage Accelerator works in conjunction with VMware vCenter and ESXi hosts to provide caching capability to your virtual machines (VMs). The product consists of the IBM Flash Management Console and various software components that need to be deployed in your VMware environment.

There are six phases in the IBM FlashCache Storage Accelerator deployment process:

1. Obtaining software
2. Preparing network and ESXi hosts
3. Deploying the IBM Flash Management Console
4. Installing SSD drivers on caching ESXi hosts
5. Configuring IBM FlashCache Storage Accelerator
6. Verifying caching configuration

The sections that follow provide details on the deployment steps required in each of these phases.

NOTE-

Refer to the *IBM FlashCache Storage Accelerator for Virtual 2.2.0 Release Notes* for system requirements.

About Memory Requirements

When deploying IBM FlashCache Storage Accelerator on an ESXi host, you will need to ensure that there is adequate memory reserved for both the IBM FlashCache Storage Accelerator software and the IBM ioMemory VSL software. This is accomplished by modifying the System Resource Pool for *user* on the ESXi hosts where you plan to install caching.

The amount of memory to allocate for IBM FlashCache Storage Accelerator and IBM ioMemory VSL software is directly related to the formatted capacity of the IBM High IOPS Adapter or devices that are installed in the host. The table below identifies the *general rule* for reserving memory.

Component	Memory Required
IBM FlashCache Storage Accelerator	.14 % of the total formatted capacity of all IBM High IOPS Adapters in the host
IBM ioMemory VSL software	General application: .5 % of the total formatted capacity of all IBM High IOPS Adapters in the host Worst Case: 2.15% of the total formatted capacity of all IBM High IOPS Adapters in the host

For example, if you were using a 1TB IBM High IOPS Adapter that has been formatted to 80% capacity for caching in a general application environment, you would want to reduce the limit of *user* System Resource Pool on the host by 5369MB:

[(1024 x 1024MB) x .8] * (.005 + .0014) = 5369MB

On a host, then, with 32GB of memory, you would uncheck the "Unlimited" box under Memory Resources in the Edit user Resource Allocation dialog, and reduce the memory "Limit" from a value like 32454MB to 27085MB:

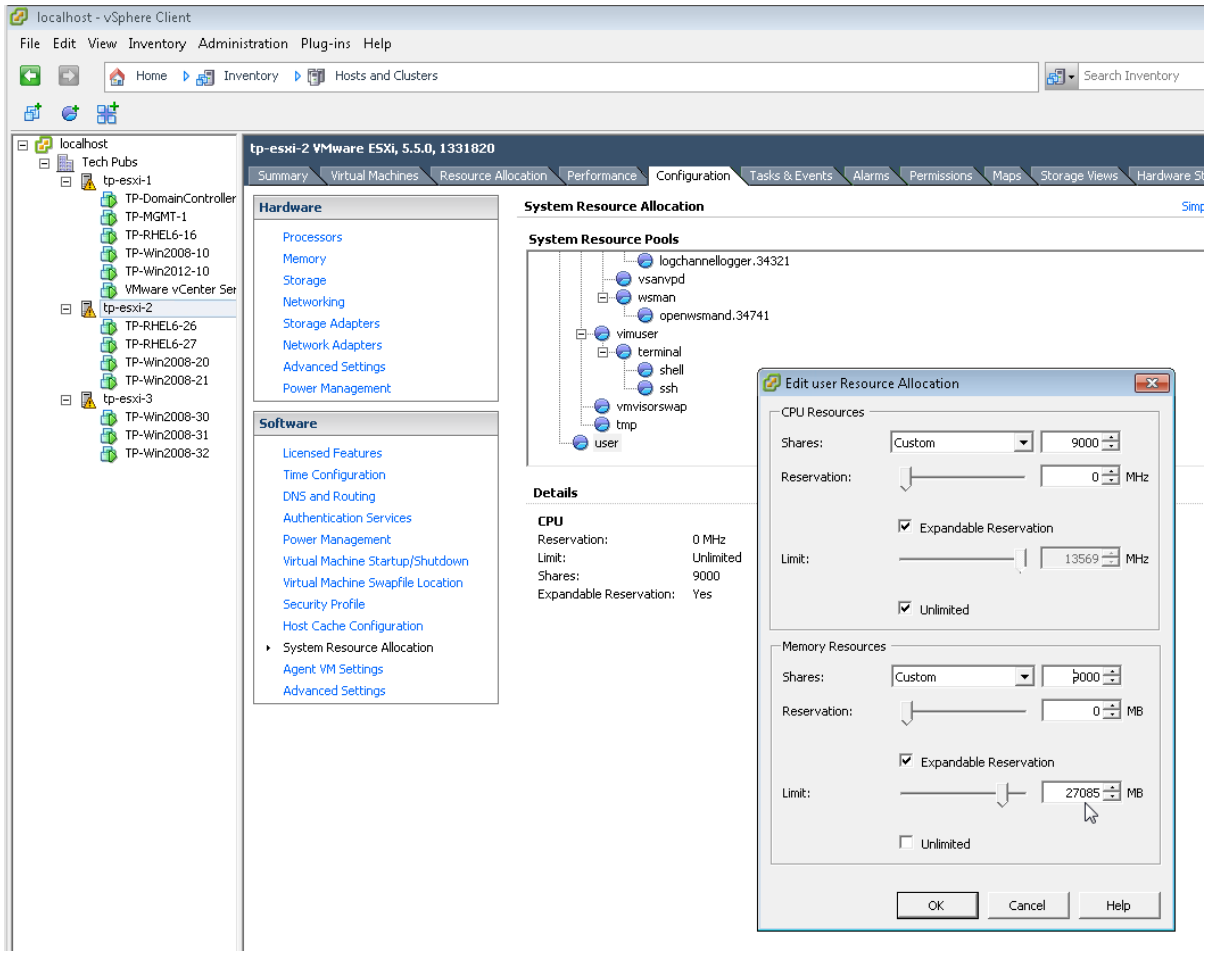
32454 - 5369 = 27085

Using the vSphere client modify user Memory Resources from the host Configuration tab by clicking

- **System Resource Allocation > Advanced > user > Edit Settings > Memory Resource Limits**

Using the vSphere Web Client modify user Memory Resources using the host **Manage > Settings > System Resource Allocation** page.

At the bottom of the edit dialog, in the Memory Resources section, deselect **Unlimited** and then, in the **Limit** field set the max limit to the appropriate amount.



For most applications, then, reserving .64% of the aggregate size of all IBM High IOPS Adapters in the host for IBM FlashCache Storage Accelerator caching will be sufficient. However, the amount of memory that needs to be reserved is workload dependent. In a worst case scenario, you may need to reserve up to 2.15% of the total size of all the ioMemory devices for use by the IBM ioMemory VSL software. In these cases, then, you would need to reserve 2.29% of the aggregate formatted capacity of all IBM High IOPS Adapters in the host for IBM FlashCache Storage Accelerator caching.

For a more detailed discussion of this configuration, refer to the "Modifying a VMware Resource Pool to Reserve Memory" section of the *IBM ioMemory VSL User Guide for VMware ESX and ESXi* as well as the "Sufficient System Memory (RAM)" section of the *IBM ioMemory VSL Release Notes*.

About Cache Device Constraints

In IBM FlashCache Storage Accelerator you can select up to eight devices to cache your VMs. However, there are some constraints on the usable capacity of these devices that vary depending on whether you are caching in guest-based or host-based mode.

For hosts where VMs only utilize guest-based caching:

- Maximum single device size: 16TB
- Maximum aggregate size of all devices: 128TB (8 devices x 16TB). You can assign up to 8TB per VM for guest-based caching, but total capacity assigned to all guest-caching VMs cannot exceed 128TB.

For hosts where VMs only utilize host-based caching:

- Maximum single device size: 16TB. However, only 2.14TB can be used for VMs utilizing host-based caching
- Maximum aggregate size of all devices: 128TB (8 devices x 16TB).. However, only 2.14TB of the aggregate size can be used for VMs utilizing host-based caching .

For hosts where there is a mix of host-based and guest-based caching, aggregate cache size for host-based caching will be limited to 2.14TB but any capacity beyond that can used for guest-based caching.

Example of a Single Cache Device Greater than 2.14TB

If you were using a 3.2TB Enterprise Value Flash Adapter for guest-based caching only, all the space would be available as cache.

Attention!

A 3.2TB Enterprise Value Flash Adapter needs to be down-formatted for use in a caching environment. If you set the cache device using the IBM Flash Management Console GUI, the Enterprise Value Flash Adapter will automatically be formatted correctly. However, if you set the cache device using the CLI make sure you have formatted the Enterprise Value Flash Adapter to 80% of factory capacity.

If you were using the Enterprise Value Flash Adapter for host-based caching only, only 2.14TB of the device would be used for caching and the remaining amount would be unused.

If you were using the 3.2 Enterprise Value Flash Adapter for both guest-based and host-based caching, there would be 2.14TB of cache available for VMs which are caching in either host-based or guest-based mode, and the remaining space would be available for VMs caching in guest-based mode.

Example of a Two Cache Devices Greater than 2.14TB

If you were using two 3.2 Enterprise Value Flash Adapters for guest-based caching only, the combined space of both devices would be available as cache.

If you were using the Enterprise Value Flash Adapters for host-based caching only, only 2.14TB of the combined capacity of the devices would be used for caching and the remaining amount would be unused.

If you were using the Enterprise Value Flash Adapters for both guest-based and host-based caching, there would be 2.14TB of cache available for VMs caching in either host-based or guest-based mode, and the remaining space would be available for VMs caching in guest based mode.

About vMotion support

IBM FlashCache Storage Accelerator supports vMotion of VMs between ESXi hosts, and it dynamically allocates cache capacity as VMs move between hosts. When a VM is vMotioned away from a host, the VMs caching capacity is released and re-allocated to the remaining VMs on the host. Similary, when the VM is vMotioned onto a new host, caching capacity will be assigned to the VM and the caching capacity available for other VMs will be reduced.

Be aware of the following vMotion considerations:

- At a minimum, target hosts for caching VMs must have the IBM FlashCache Storage Accelerator VLUN driver installed. However, we recommend that all target hosts for caching VMs have an IBM High IOPS Adapter and the full IBM FlashCache Storage Accelerator software package installed to maintain the performance of the cached VMs.
- vMotioning a VM invalidates its cache, and the VM's cache will need to re-warm after vMotion is complete.
- VMware should not allow a VM which is caching in either guest-based or host-based mode to vMotion to an ESXi server that does not have IBM FlashCache Storage Accelerator installed. If in some way a caching VM does end up on a host without IBM FlashCache Storage Accelerator, the VM may not be able to start.

Firewall requirements

Review the table below prior to implementing IBM FlashCache Storage Accelerator in your environment. For additional details on ports and connectivity in the vSphere environment refer to the vSphere Security Guide:

http://pubs.vmware.com/vsphere-55/topic/com.vmware.ICbase/PDF/vsphere-esxi-vcenter-server-55-security-guide.pdf

IBM FlashCache Storage Accelerator 2.2.0 Firewall Port Requirements

Component (From)	Firewall Rule	Component (To)	Port	Protocol	Description
vCenter Server	Inbound/Outbound	ESXi Host	HTTPS (443)	TCP	Default ports for VMware I/O -- can be changed.
vCenter Server	Inbound	IBM Flash Management Console	HTTPS (443)	TCP	IBM Flash Management Console operations, install/configure guest.
vCenter Server	Inbound	vSphere Client	HTTPS (443)	TCP	Default ports for VMware I/O -- can be changed.
IBM Flash Management Console	Inbound	vSphere Client	HTTPS (443)	TCP	Provide data from IBM FlashCache Storage Accelerator to vSphere Client UI.
IBM Flash Management Console	Inbound	ESXi Host	Port 80	TCP	Download host package to ESXhost.
IBM Flash Management Console	Outbound	vCenter Server	HTTPS (443)	TCP	IBM Flash Management Console operations, install/configure guest.
IBM Flash Management Console	Outbound	ESXi Host	CIM (5989)	TCP	Communications with the vLUN driver.
ESXi Host	Inbound/Outbound	vCenter Server	HTTPS (443)	TCP	Default ports for VMware I/O --- can be changed.
ESXi Host	Inbound	IBM Flash Management Console	CIM (5989)	TCP	Communications with the vLUN driver.
ESXi Host	Outbound	IBM Flash Management Console	Port 80/443	TCP	Download host package to ESXi host.
vSphere Client	Outbound	vCenter	HTTPS	TCP	Default ports for VMware I/O

Component (From)	Firewall Rule	Component (To)	Port	Protocol	Description
		Server	(443)		-- can be changed.
vSphere Client	Outbound	IBM Flash Management Console	HTTPS (443)	TCP	Pulls data to vSphere Client UI.
vSphere Client	Inbound/Outbound	vCenter Server	HTTPS (8443)	TCP	IBM FlashCache Storage Accelerator plugin to be installed from the vSphere Client.

Phase 1: Obtaining software

In order to install and run IBM FlashCache Storage Accelerator you will need the license file sent to you from IBM as well as the following software components that can be downloaded from http://www.ibm.com/supportportal:

- SSD drivers
- Firmware update file (optional)
- IBM FlashCache Storage Accelerator OVA: IBM_FCSA_Virtual-2.2.0.•••.ova

Phase 2: Preparing network and ESXi hosts

Before installing IBM FlashCache Storage Accelerator, there are some configurations you need to check in your network and your ESXi environment. Work through the checklist below to verify your environment is ready to deploy IBM FlashCache Storage Accelerator software:

- ❑ Ensure that your IBM High IOPS Adapters, Enterprise Value Flash Adapters, or SSDs are installed in your hosts and are properly formatted.

  If you are using a new IBM High IOPS Adapter or Enterprise Value Flash Adapter with factory formatting, you do not need to re-format it. If necessary, IBM FlashCache Storage Accelerator will format the device for optimal caching settings when it is selected as a cache device. We strongly recommend that you let IBM FlashCache Storage Accelerator re-format your IBM High IOPS Adapter or Enterprise Value Flash Adapter

  If you are using an IBM High IOPS Adapter or Enterprise Value Flash Adapter that has been formatted with 512 byte sectors to something other than factory size, IBM FlashCache Storage Accelerator will not change the format. We strongly recommend that the device not be formatted to its maximum size. Providing approxmately 20% unused space on the device can improve the longevity and durability of the device.

  If you are using an SSD that is not an IBM High IOPS Adapter or Enterprise Value Flash Adapter, follow the manufacturer's instructions for properly formatting the device.

- ❑ Ensure the ESXi hosts where you want to deploy caching are in maintenance mode. It is a VMware best practice to put ESXi hosts in maintenance mode before installing software on them.

  However, for new installs IBM FlashCache Storage Accelerator does not require the caching ESXi hosts to be in maintenance mode. If there has been a partial install of IBM FlashCache Storage Accelerator on the target ESXi host (e.g. just the IBM Flash Management Console or just the IBM FlashCache Storage Accelerator software), or if you are updating existing caching software, or if you are uninstalling, then the target ESXi will need to be in maintenance mode. Before putting the target ESXi host into maintenance mode, you can either shut down the VMs on the host or you can vMotion the VMs to a different host while you are installing IBM FlashCache Storage Accelerator.

  If you put an ESXi server where you want to deploy caching into maintenance mode, the VMs will need to be powered on manually after the caching software has been installed on the host. Or, if you vMotioned the VMs to another host, you will need to vMotion the VMs back.

- ❑ Ensure that the ESXi host where you will deploy the IBM Flash Management Console and all ESXi hosts where you want to deploy caching have the following ports open:

  - httpClient (80,443)—When installing IBM FlashCache Storage Accelerator on an ESXi host using the IBM Flash Management Console, this port needs to be open on the target ESXi server during installation. After installation is complete, the port can be disabled.

    If you are installing IBM FlashCache Storage Accelerator from the CLI, you can

temporarily enable httpClient access on the target ESXi server by adding the `forcemodifyfirewallsetting` option to the `iot package install` command.

- CIM Secure Server (5989)

You can enable httpClient access on all the ESXi servers managed by your vCenter using either the vSphere client or the CLI command `iot system --sethostfirewallsetting`.

Using the vSphere client, open the the httpClient or CIM Secure Server ports using the host Configuration tab and clicking

- **Security Profile > Firewall Properties > httpClient**
- **Security Profile > Firewall Properties > CIM Secure Server**

Using the vSphere Web Client, open these ports using the host Manage tab and clicking **Settings > Security Profile** page.

- ❑ If you are using an IBM High IOPS Adapter, ensure that on all the ESXi hosts where you will be caching VMs, you have reduced the limit for user resource memory resources by at least .64% of the aggregate formatted capacity of all IBM High IOPS Adapters in the host. This is necessary to ensure that the VSL driver for the IBM High IOPS Adapter has adequate system memory to run. For more specific information, and for exceptions to this general rule see the About Memory Requirements section.

  For an additional discussion of this configuration, refer to the "Modifying a VMware Resource Pool to Reserve Memory" section of the *IBM ioMemory VSL User Guide for VMware ESX and ESXi* as well as the "Sufficient System Memory (RAM)" section of the *IBM ioMemory VSL Release Notes*.

- ❑ Ensure that you have created a DNS entry for the IBM Flash Management Console with both forward (A record) and reverse (PTR record) lookup entries. All ESXi hosts that will be caching will need to be able to ping the IBM Flash Management Console by name. When you deploy the management server you can set the name of the IBM Flash Management Console VM to match this DNS entry.

- ❑ We recommend that the vCenter server that manages the hosts where you will be caching is not operating in linked mode. If your vCenter is using linked mode, you can either take the vCenter server out of linked mode before installing IBM FlashCache Storage Accelerator or you can register the IBM Flash Management Console with only one vCenter and only use that vCenter to manage caching..

- ❑ Ensure that the ESXi hosts where you want to perform caching are being managed by the same vCenter server that the IBM Flash Management Console will register with.

- ❑ Ensure that each ESXi host is configured with correct date, time, and time zone. If possible in your environment, enable the NTP client on all your ESXi hosts to get time from the same NTP server. VMs using guest-based caching need to have their clocks set to approximately the same time as the IBM Flash Management Console.

- ❑ Ensure the ESXi host where you will be installing the IBM Flash Management Console has an available datastore with at least 25 GB of free space.

- Ensure that the VMs on the caching ESXi hosts are running the latest version of VMware tools. For those VMs where you want to deploy guest-based caching, the VMs must be running the latest versions of VMware tools. For those VMs where you want to use host-based caching, we recommend that these VMs be running VMware tools, but it is not required.

- If you are booting your ESXi host from USB/SD, ensure that each ESXi host has an alternate persistent scratch location defined per VMware best practices.

- If you want to use the vSphere Web Client, you will need to configure vCenter to display classic plug-ins. See Using the IBM Flash Management Console with the vSphere web client or consult the "Enabling Script Plug-In Support in the vSphere Web Client" section of the VMware vSphere 5.5 Documentation Center.

Phase 3: Deploying the IBM Flash Management Console

The IBM Flash Management Console is a virtual appliance that is deployed on a non-caching ESXi host managed by your vCenter. The IBM Flash Management Console is deployed into the VMware environment as an OVA file.

To deploy the IBM Flash Management Console:

1. Copy the IBM_FCSA_Virtual-2.2.0.•••.ova file to the workstation where you will be running the vSphere client.
2. Start the vSphere client and login to your vCenter as a user who has rights to provision and manage virtual machines.
3. From the vSphere client click **File > Deploy OVF Template** and choose

   ```
   IBM_FCSA_Virtual-2.2.0.•••.ova
   ```

   Or, from vSphere Web Client, perform the following steps:

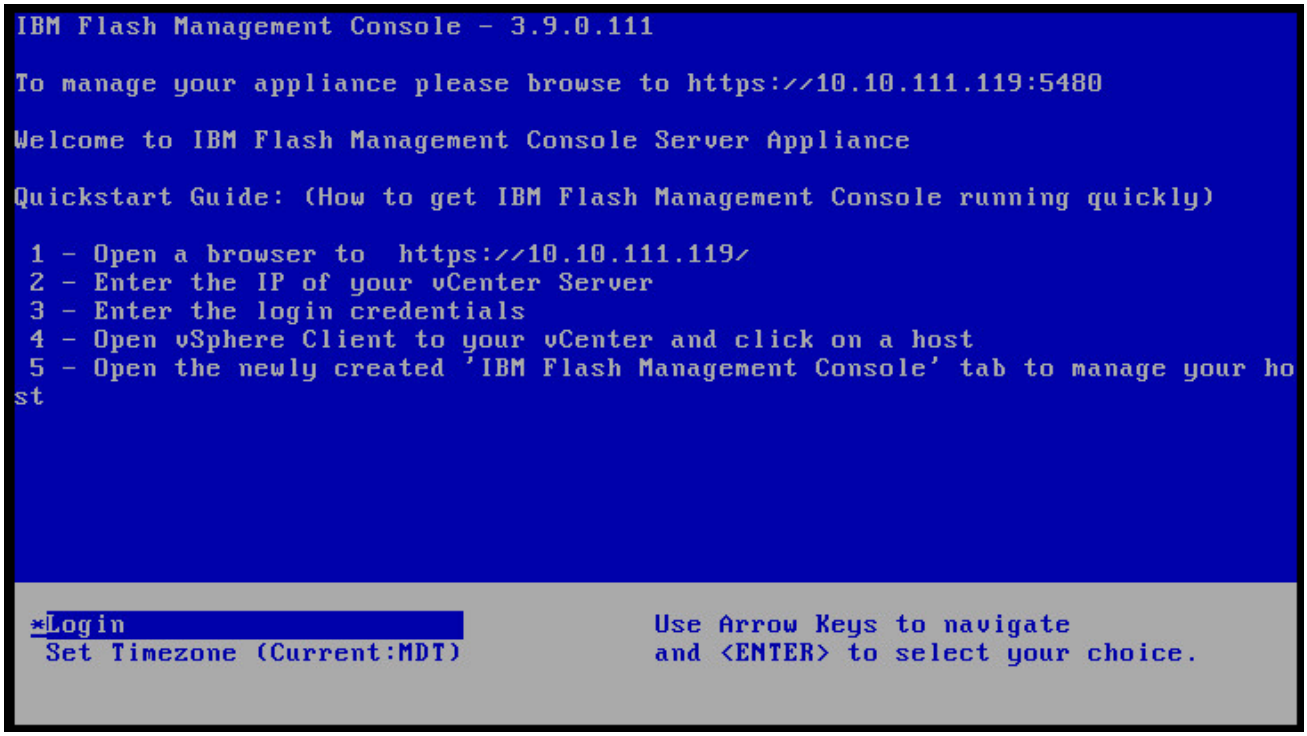
   a. In the Object Navigator click **vCenter > Hosts and Clusters**
   b. Click the arrows to disclose the host where you want to deploy the .OVA file. The management server should not be deployed on an ESXi host where caching is, or will be, taking place.
   c. Right click the Host object, and click **Deploy OVF Template**

4. Work through the installation wizard.

   - On the **Host/Cluster** page, specify the location for the IBM Flash Management Console. We recommend that you install the IBM Flash Management Console on a host where no caching will take place. You can, however, move the IBM Flash Management Console to a caching host after both the host caching software and the IBM Flash Management Console have been installed and configured. If the IBM Flash Management Console is running on a caching host, avoid making changes or issuing CLI commands that will cause the host to reboot (e.g. upgrading the host caching software) or the IBM Flash Management Console to reboot (e.g. configuring the IBM Flash Management Console for guest-based caching). You can configure the IBM Flash Management Console for host-based caching if desired.
   - On the **Properties** page of the vSphere client, or on the **Customize template** page of the vSphere Web Client, provide a fully qualified host name for the IBM Flash Management Console. This host name should have forward (A record) and reverse (PTR record) lookup entries in DNS. Also set a password that will be used for the root and admin users on the IBM Flash Management Console. If you do not set a password, the default password will be "flashcache".
   - If you do not enter any Networking Properties, the IBM Flash Management Console will be configured to use DHCP. We do not recommend DHCP for IBM FlashCache Storage Accelerator, unless you have DHCP reservations set for the IBM Flash Management Console and all caching ESXi hosts in the system.
   - Do not enter more than two comma separated DNS servers.

5. On the Ready to Complete page of the wizard, click **Power on after deployment** and click **Finish.**

6. After the console tab of the IBM Flash Management Console displays the blue IBM Flash Management Console VM screen, click the console screen and then use the arrow keys to select **Set Timezone**. Work through the prompts to set the correct time zone for the IBM Flash Management Console.



7. Consult the blue IBM Flash Management Console VM screen to determine the browser address for the IBM Flash Management Console. In your browser enter the displayed URL:

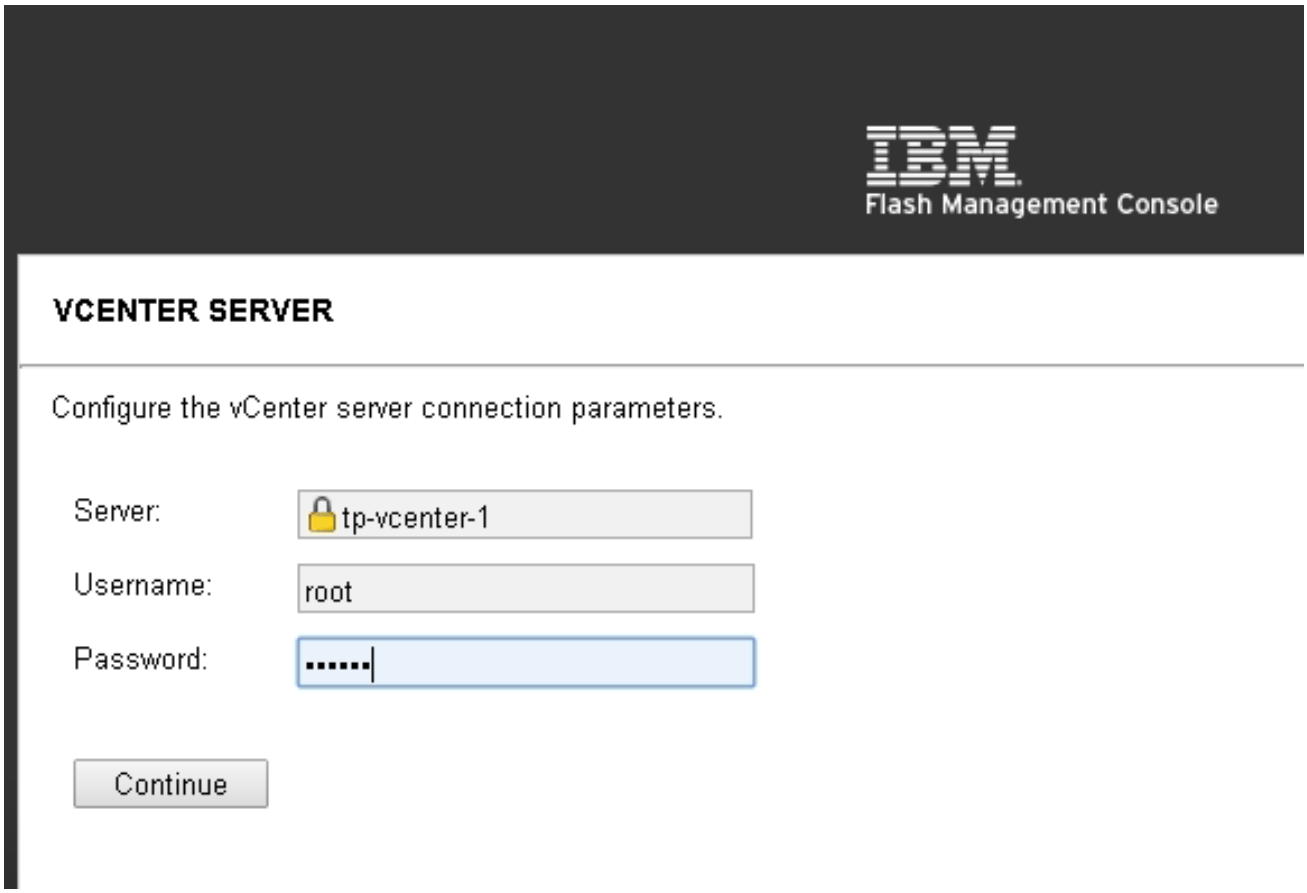
   https://<flashMgmtConsole>/index.html

   where

   - *flashMgmtConsole* is the fully qualified hostname or IP address of the IBM Flash Management Console.

   For example, you might enter something like this: https://tp-fcsa-1/index.html

8. On the IBM Flash Management Console screen, login with user *admin* and password *flashcache*. Or, if you changed the password in step 4, use the password you set.
9. On the vCenter Server Configuration screen, type in the vCenter server hostname or IP address and supply credentials for a user who has sufficient privileges to manage virtual machines and extensions. Then click **Continue**.



10. On the Remote Access screen, click **Use pre-configured SSL Certificate**, or install your own certificate and key, and click **Save Changes**.
11. If Security Warnings display in the vSphere Client, respond to them appropriately.
12. Close the browser.

The IBM Flash Management Console is now installed.

Verifying the IBM Flash Management Console DNS entry

To determine if there are problems with the name resolution of your management server, you can run `iot system --doctor` on the command line of the IBM Flash Management Console. Any DNS issues with the IBM Flash Management Console will be noted in the output of the command.

To run `iot system --doctor`:

1. Login to the IBM Flash Management Console with the following credentials:

   Username: iotcli
   Password: iotcli

2. From the IBM Flash Management Console command line, enter the following command:

```
iot system --doctor
```

The output of the command will look something like this:

```
iotcli@tp-fcsa-1:~> iot system --doctor
[2014/04/29 11:20:04] IP Address 10.1.127.95
[2014/04/29 11:20:04] DNS entry for your host is tp-fcsa-1
[2014/04/29 11:20:04] Hostname tp-fcsa-1 matches DNS entry
[2014/04/29 11:20:04] DNS IP address matches yours
[2014/04/29 11:20:04] Pinging nameserver 10.1.100.30
[2014/04/29 11:20:06] Pinging nameserver 10.1.100.31
[2014/04/29 11:20:08] Pinging nameserver 10.1.100.64
[2014/04/29 11:20:10] Tomcat running as 5306
[2014/04/29 11:20:11] License manager running as 5217
[2014/04/29 11:20:11] Postgres seems to be running as 5273
[2014/04/29 11:20:11] Root disk has sufficient space. 43% left
[2014/04/29 11:20:11] OK
```

Phase 4: Deploying SSD drivers on caching ESXi hosts

Each of the ESXi hosts where you want to deploy caching will require an SSD or IBM High IOPS Adapter or Enterprise Value Flash Adapter with its associated drivers and software. This software can be downloaded from http://www.ibm.com/supportportal.

If you haven't already done so, install and configure the SSDs, IBM High IOPS Adapters, or Enterprise Value Flash Adapters you plan to use as cache devices.

Phase 5: Configuring IBM FlashCache Storage Accelerator

After you have completed deploying the IBM FlashCache Storage Accelerator software on all the caching hosts in your environment, complete the following configuration steps:

1. Deploy the IBM FlashCache Storage Accelerator caching software on hosts
2. License the IBM FlashCache Storage Accelerator software
3. Select cache devices on your hosts
4. Take caching ESXi hosts out of maintenance mode
5. Configure VMs for either guest-based caching or host-based caching

Deploying the IBM FlashCache Storage Accelerator caching software on ESXi hosts

Use either the **IBM Flash Management Console** tab in the vSphere client interface, or the **Classic Solutions** tab in the vSphere Web Client, to install host caching software on ESXi hosts.

1. If you haven't already done so, login to your vCenter using a vSphere client.
2. In the inventory tree, or in the Object Navigator, on the left of the screen, click an ESXi host where you want to cache and then click either the **IBM Flash Management Console** tab or the **Classic Solutions** tab.

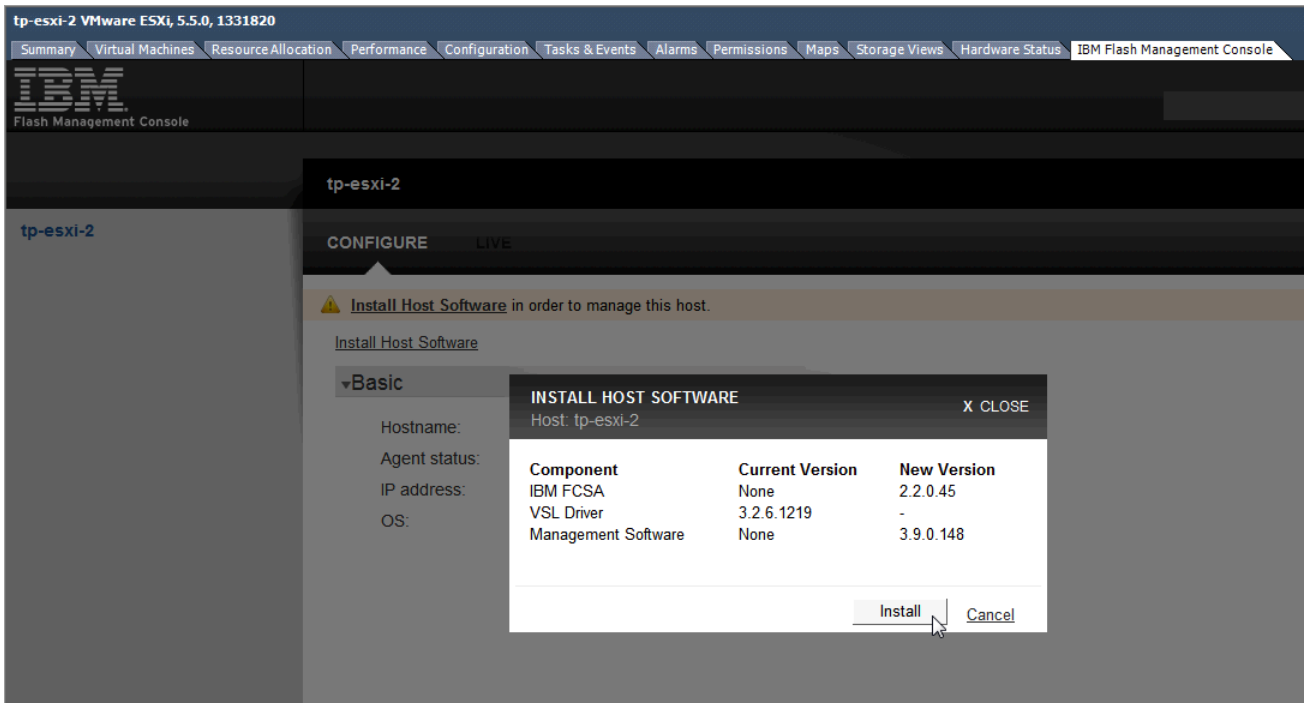
   The IBM Flash Management Console user interface displays the host Configure tab.

3. Click **Install Host Software**.
4. Click **Install**.

   The IBM Flash Management Console installs the caching software on the host.

5. Repeat steps 2-4 on each ESXi host where you want to cache.

IBM FlashCache Storage Accelerator is now installed on your ESXi hosts.



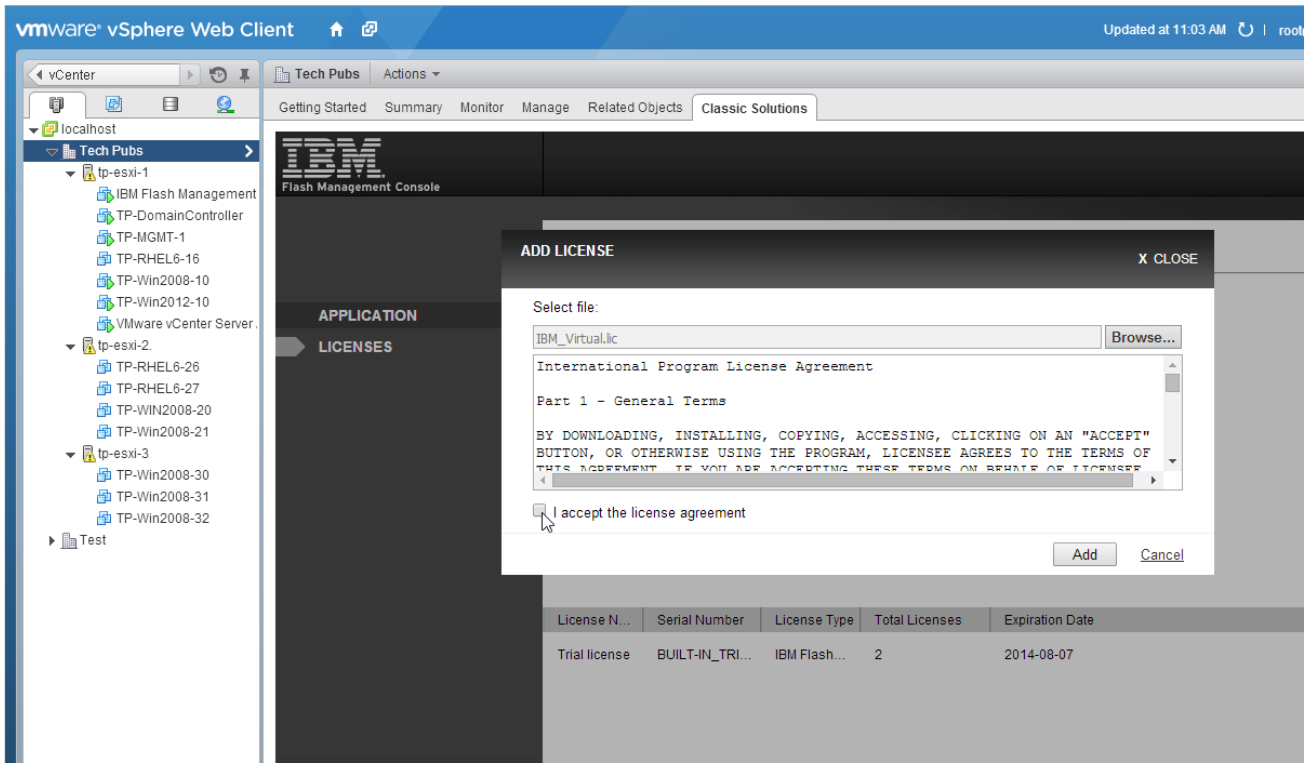
Licensing IBM FlashCache Storage Accelerator

Use either the **IBM Flash Management Console** tab in the vSphere client interface, or the **Classic Solutions** tab in the vSphere Web Client, to license IBM FlashCache Storage Accelerator. All licenses added to the IBM Flash Management Console will be automatically distributed across caching ESXi hosts.

1. If you haven't already done so, log in to your vCenter using a vSphere client.
2. In the inventory tree, or in the Object Navigator, on the left of the screen, click one of data centers managed by your vCenter. Then click either the **IBM Flash Management Console** tab or the **Classic Solutions** tab.

   The Licenses screen displays.

3. In the Licenses windows, click **Add a License**.
4. Click Browse and navigate to the location of the license file.
5. Accept the license agreement.
6. Click **Add**.



The licenses in your license file are added to the IBM Flash Management Console. You can repeat the steps above to add as many licenses to the vCenter as required. Licenses will be consumed by any caching ESXi hosts that is managed by the vCenter when cache devices are selected. Additionally, if a host is added to the vCenter, and the host has IBM FlashCache Storage Accelerator installed and caching devices selected, licenses will be consumed.

Selecting cache devices on ESXi hosts

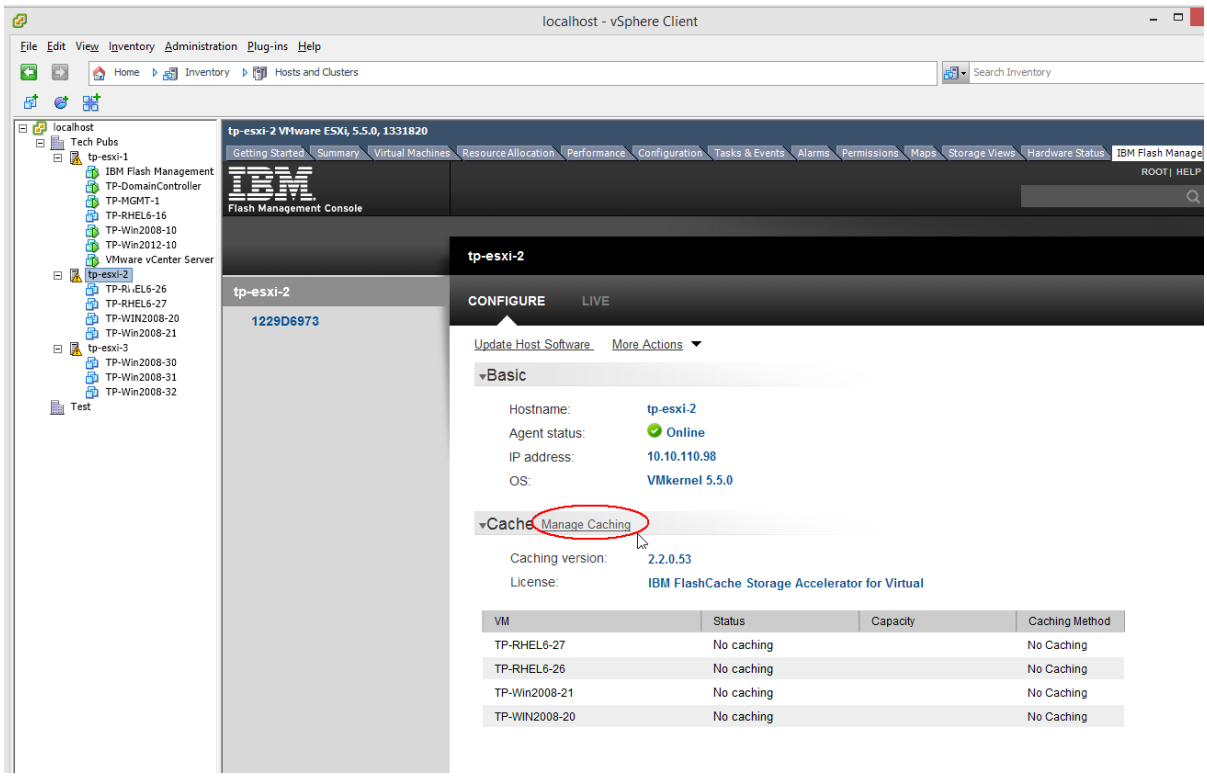
Use either the **IBM Flash Management Console** tab in the vSphere client interface, or the **Classic Solutions** tab in the vSphere Web Client, to select the cache device or cache devices on a host.

To set cache devices on an ESXi host:

1. If you haven't already done so, login to your vCenter using a vSphere client.
2. In the inventory tree, or in the Object Navigator, on the left of the screen, click one of the ESXi hosts you have configured for caching and then click either the **IBM Flash Management Console** tab or the **Classic Solutions** tab.

   The IBM Flash Management Console user interface displays the host Configure tab.

3. Next to the Cache label, click **Manage Caching**.



4. From the manage caching dialog click on one or more devices listed in the cache device table. You can select up to eight cache devices per host.

Attention!

Selecting a device to be a cache device will result in the permanent loss of all data currently on the device.

Attention!

If you are using a new IBM High IOPS Adapter or Enterprise Value Flash Adapter with factory formatting, IBM FlashCache Storage Accelerator may re-format the device to an optimal caching capacity. We strongly recommend that you let IBM FlashCache Storage Accelerator re-format your IBM High IOPS Adapter.

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If you are using an SSD that is not an IBM High IOPS Adapter or Enterprise Value Flash Adapter, follow the manufacturer's instructions for properly formatting the device.

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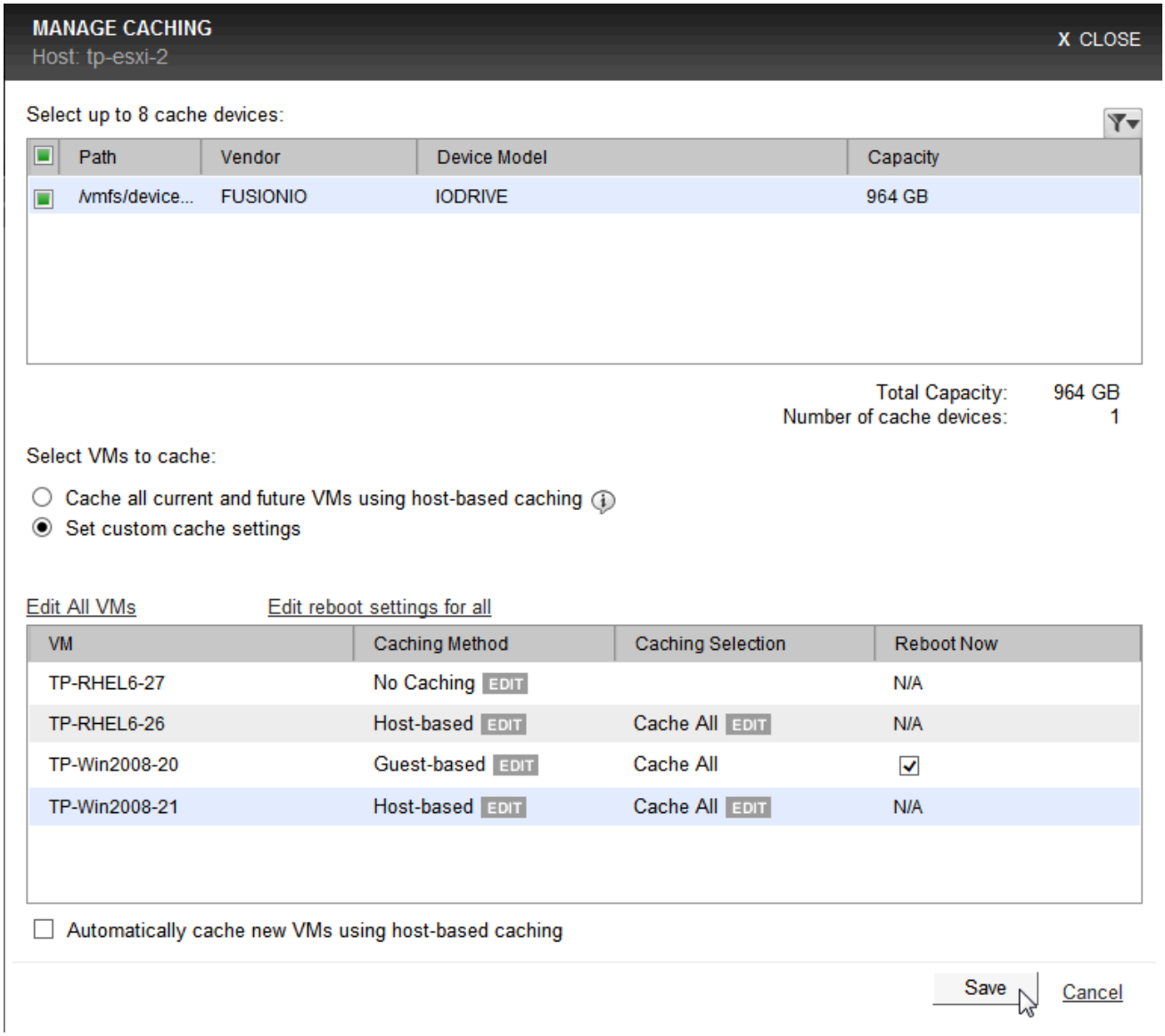
5. Click either **Cache all current and future VMs using host-based caching** or **Set custom cache settings**.
6. If you select **Set custom cache settings**, configure the VMs you want to cache.

> **Attention!**
> Host-based caching on shared VMDKs is not supported.

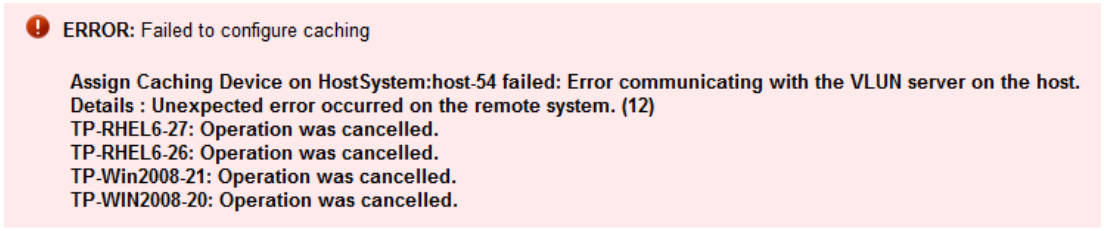


7. Click **Save**.
8. If asked, click **Confirm**.

The selected device or devices are set as cache devices.

Attention!

If you get a "Failed to configure caching" error that says the "Cache device is in use by another host," you may need to reformat the device. **First verify that the device you selected really is the device you want to use for caching.** Then, on the Host Configure tab of the IBM Flash Management Console, click **More Actions > Low-Level format** and then format the device for "High Performance." After the format completes, try setting the cache device again.



Repeat these steps on all caching ESXi hosts.

Taking caching hosts out of maintenance mode

After setting the cache device on your caching ESXi host, use the vSphere client interface to take your ESXi hosts out of maintenance mode.

Power on, or vMotion back, the VMs that will run on the host. Guest-based caching cannot be installed, uninstalled, configured, nor changed from guest-based to "No Caching" mode if the VM is not powered on. However, host-based caching can be configured with the VM in a powered on or powered off state.

Attention!

Configuring a powered-on VM for host-based caching that has large or heavily used disks (i.e. VMDKs) can be time consuming. In some cases it can take several hours. If possible, consider configuring host-based caching on this class of VM while it is powered-off.

Configuring VMs for Caching

There are three caching methods you can set for specific VMs:

- Host-based—the VMDK files of a VM are cached; no software is installed on the VM
- Guest-based—caching software is installed on the VM which allows more granular caching options and slightly better caching performance.
- No Caching

Use the IBM Flash Management Console tab or the **Classic Solutions** tab in the vSphere client interface to configure caching on VMs:

1. If you haven't already done so, login to your vCenter using a vSphere client.
2. In the inventory tree, or in the Object Navigator, on the left of the screen, click one of the ESXi hosts you have configured for caching and then click either the **IBM Flash Management Console** tab or the **Classic Solutions** tab.

   The IBM Flash Management Console user interface displays the host Configure tab.

3. Next to the Cache label, click **Manage Caching**.

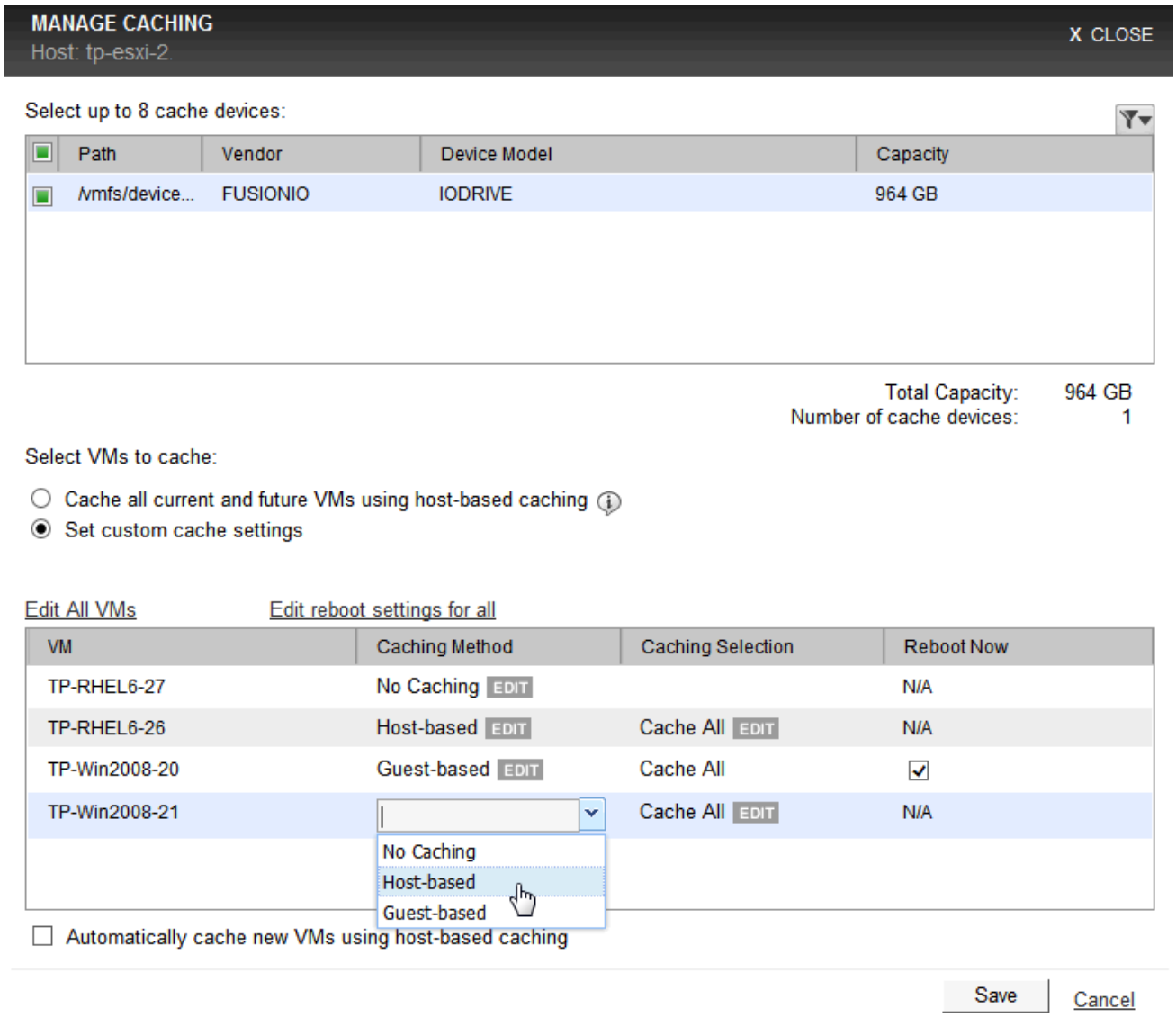
4. Click **Set custom cache settings**.

   If you want to set all the VMs on the host to cache using the same method, then click **Edit All VMs** and select the caching method you want applied to all VMs. Then skip to step 6.

5. In the VM table, in the Caching Method column, click **Edit** next to the VM you want to configure.
6. From the drop down click either **No Caching**, **Host-based**, or **Guest-based**.
7. If you want to enable auto-caching on the host, which means that any new VMs added to the host will be configured to cache all volumes in host-based mode, click "Cache all current and future VMs using host-based caching."
8. After configuring the caching method for the VMs click **Save**.
9. If asked, click **Confirm**.
10. If you have selected guest-based caching, enter the login credentials for a user who has rights to install software on the VM or VMs you want to install guest-based caching on and then click **Done**.

The caching method you selected is set for the VMs on the caching ESXi host.

Repeat these steps on each caching ESXi host in your environment.



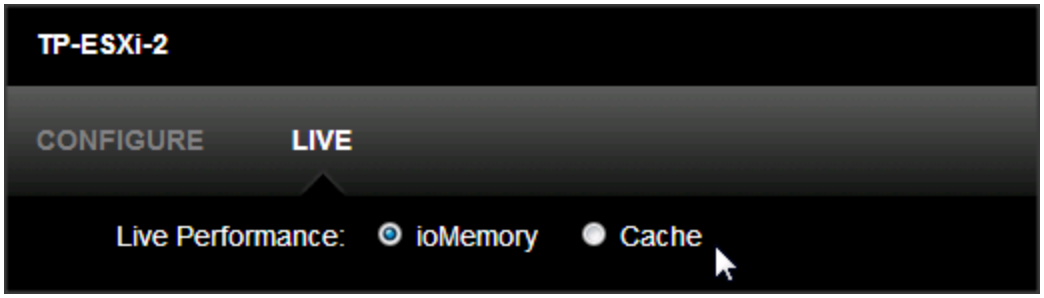
Attention!

For guest-based caching and host-based caching you can also edit the Caching Selection. For details on how to do this refer to the "Editing Caching Selection for VMs Using guest-based caching" and "Editing caching selection for VMs using host-based caching" sections of the *IBM FlashCache Storage Accelerator for Virtual Administrator Guide*.

Phase 6: Verifying caching configuration

An easy way to verify that caching is configured on a host is to view the Live Performance tab in the IBM Flash Management Console tab. If you have configured IBM FlashCache Storage Accelerator correctly, there should be options to view performance on the following two components:

- The IBM High IOPS Adapter
- The IBM FlashCache Storage Accelerator cache



To view Live Performance graphs for High IOPS and Cache:

1. If you haven't already done so, login to your vCenter using a vSphere client.
2. In the inventory tree, or in the Object Navigator, on the left of the screen, click one of the ESXi hosts you have configured for caching and then click either the **IBM Flash Management Console** tab or the **Classic Solutions** tab.

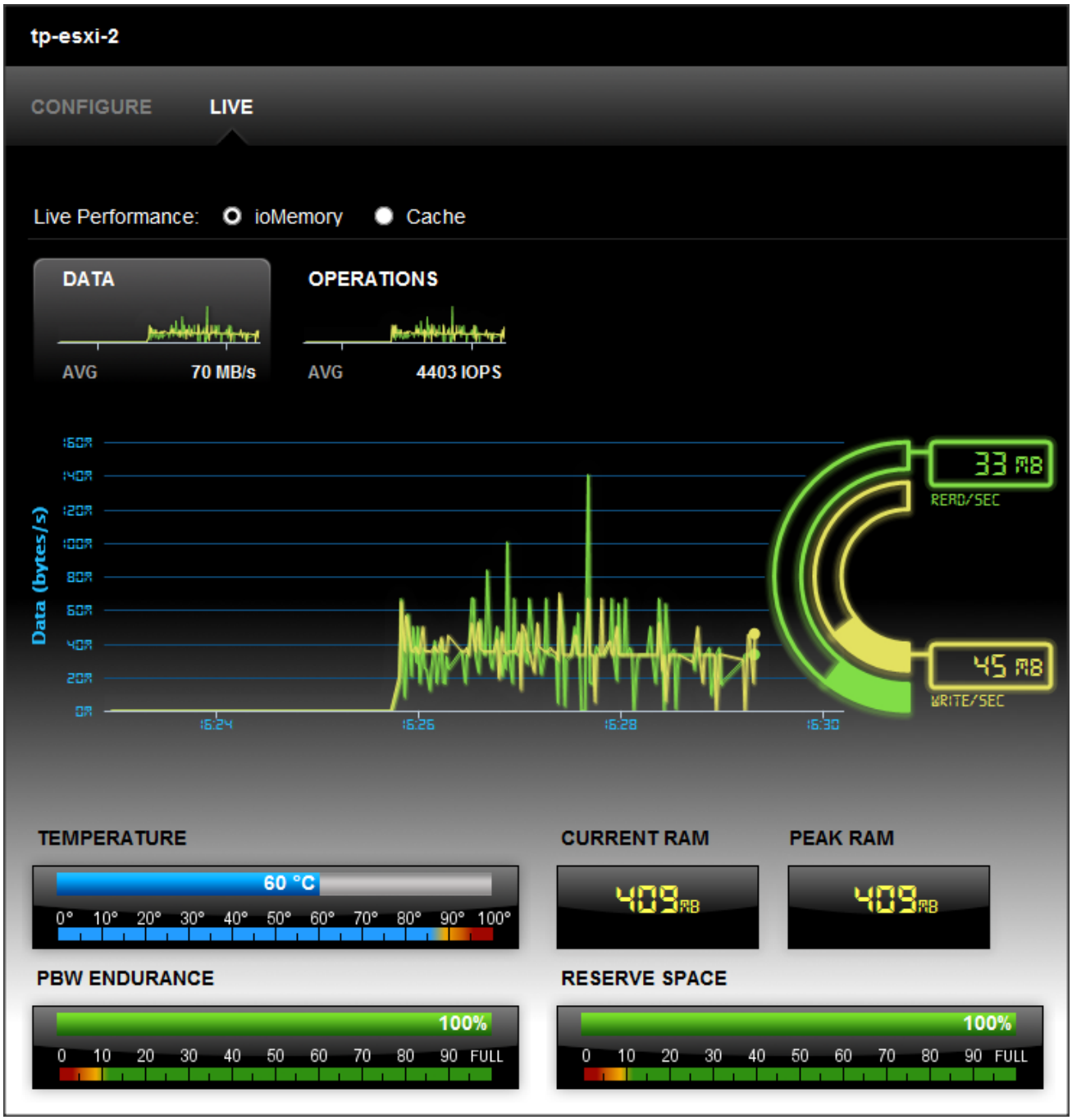
   The IBM Flash Management Console user interface displays the host Configure tab.

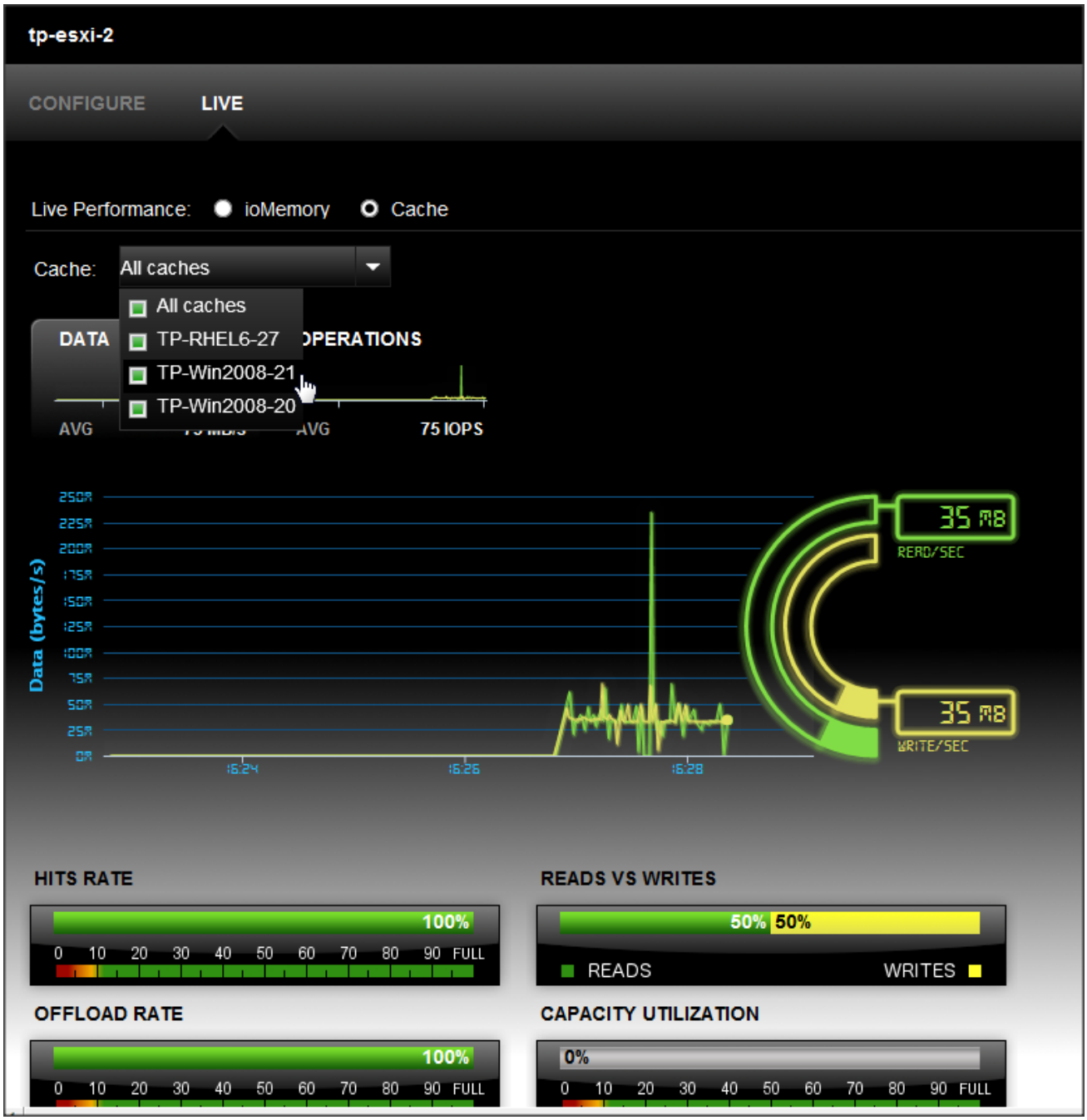
3. Click the **Live** tab.

4. Click either the High IOPS or Cache radio buttons to see the Live Performance graphs.

As a general rule, if you can see activity occurring these graphs, it indicates that IBM FlashCache Storage Accelerator is installed correctly.

For additional details refer to "About Live Performance Graphs for Hosts" and "About Live Performance Graphs for Vms" in the *IBM FlashCache Storage Accelerator for Virtual Administrator Guide*


tp-esxi-2
CONFIGURE
LIVE
Live Performance:
ioMemory
Cache
DATA
AVG
70 MB/s
OPERATIONS
AVG
4403 IOPS
Data (bytes/s)
33 MB
READ/SEC
45 MB
WRITE/SEC
TEMPERATURE
60 °C
0° 10° 20° 30° 40° 50° 60° 70° 80° 90° 100°
CURRENT RAM
409MB
PEAK RAM
409MB
PBW ENDURANCE
100%
0 10 20 30 40 50 60 70 80 90 FULL
RESERVE SPACE
100%
0 10 20 30 40 50 60 70 80 90 FULL


tp-esxi-2
CONFIGURE
LIVE
Live Performance:
ioMemory
Cache
Cache:
All caches
All caches
TP-RHEL6-27
TP-Win2008-21
TP-Win2008-20
DATA
OPERATIONS
AVG
AVG
75 IOPS
Data (bytes/s)
250B
225B
200B
175B
150B
125B
100B
75B
50B
25B
0B
16:24
16:26
16:28
35 MB
READ/SEC
35 MB
WRITE/SEC
HITS RATE
100%
0 10 20 30 40 50 60 70 80 90 FULL
READS VS WRITES
50% 50%
READS
WRITES
OFFLOAD RATE
100%
0 10 20 30 40 50 60 70 80 90 FULL
CAPACITY UTILIZATION
0%
0 10 20 30 40 50 60 70 80 90 FULL

Upgrading caching software

If you want to upgrade your caching software to a newer version, perform the steps below.

Upgrading IBM FlashCache Storage Accelerator 2.1.3 to a newer version

There is not an in-place upgrade for a 2.1.3 IBM Flash Management Console to a 2.2.0 IBM Flash Management Console. To upgrade to a 2.2.0 IBM Flash Management Console, you will need to import settings from an existing 2.1.3 IBM Flash Management Console.

Importing an existing caching environment

To deploy a new 2.2.0 IBM Flash Management Console and import your existing caching environment:

1. Deploy the 2.2.0 IBM Flash Management Console OVA file.
2. Log in to the console of the new 2.2.0 IBM Flash Management Console as user *root*. (The root password was set during deployment of the OVA.)
3. From the command line of the management server enter the following command:

   ```
   iot system --import <fqdn-IP>
   ```

   where

   fqdn-IP—is the fully qualified domain name or IP address of your existing IBM Flash Management Console

A script will run to extract all the information from the existing IBM Flash Management Console and write it to the new 2.2.0 IBM Flash Management Console. After successfully importing the information, the script will shutdown the existing IBM Flash Management Console and change the networking settings on the new 2.2.0 IBM Flash Management Console to match the existing IBM Flash Management Console's settings.

Attention!

The new 2.2.0 IBM Flash Management Console will have its host name set to the match the previous IBM Flash Management Console; however, the vSphere inventory name that you used when deploying the 2.2.0 IBM Flash Management Console will stay the same.

After the upgrade the following IBM Flash Management Console settings should be intact:

- vCenter registration
- Host and VM configurations
- Guest credentials
- Performance stats
- Custom FTP information

Upgrading host caching software

If you want to upgrade the version of the host software running on any of your caching ESXi servers, you can push the new software out from your updated IBM Flash Management Console. Updating your host software uses the same steps as a new install, and the new install will overwrite the existing software and the host will be rebooted.

Upgrading to a new ESXi version

If you have IBM FlashCache Storage Accelerator installed on an ESXi host, and you want to upgrade to a new ESXi version, perform the following steps:

1. Shutdown, or vMotion off, all VMs that are currently running on the host you want to upgrade.
2. Uninstall the IBM FlashCache Storage Accelerator caching software on the host.
3. Upgrade your ESXi host software.
4. Re-install the IBM FlashCache Storage Accelerator caching software.
5. Restart, or vMotion back, the VMs you want to cache on the host.

Uninstalling IBM FlashCache Storage Accelerator

To uninstall IBM FlashCache Storage Accelerator from an ESXi host where caching is taking place, perform the following steps:

1. Stop host-based caching on any VMDKs.
2. Stop guest-based caching on any VMs that are using it and remove the guest-based caching software.
3. Unassign all cache devices.
4. Put the ESXi host in maintenance mode and uninstall from the ESXi server
5. Unregister the IBM Flash Management Console.

Details on how to perform these steps are provided below.

Stopping host-based caching on VMDKs

To stop host-based caching on any VMDKs on the ESXi server:

1. Login to the IBM Flash Management Console.

   Username: iotcli

   Password: iotcli

2. From the IBM Flash Management Console command line, authenticate the IBM Flash Management Console with vCenter by typing the following command:

   ```
   iot vmp --login --vmpaddress  <vCenterAddress> --
   vmpuser  <vCenterUsername> --vmppassword
   <vCenterPassword>
   ```

   where

   - *vCenterAddress* is the IP address or the fully qualified hostname of the vCenter server
   - *vCenterUsername* is the name of a user who has sufficient rights to register or unregister the IBM Flash Management Console.
   - *vCenterPassword* is the password for the user

   For example, you might enter a command that looks something like this:

   ```
   iotcli@tp-vme-1:~> iot vmp --login --vmpaddress tp-vcenter-1 --
   vmpuser root --vmppassword vmware
   Logged in to VMP : tp-vcenter-1
   ```

3. Stop host-based caching on the host by typing the following command:

   ```
   iot provision --vmhost <host name> --stopcache
   ```

   where

   - *host name* is the IP address or fully qualified hostname of the target ESXi server

   For example, you might enter a command that looks something like this:

   ```
   iotcli@tp-vme-1:~> iot provision --vmhost tp-esxi-2 --stopcache
   Successfully completed stop cache operation
   ```

4. For each VM that has VMDKs that are being cached in host mode, remove them from host-based caching.

   You can do this either by disabling caching on all the VMDKs or by removing the specific VMDKs that are being cached.

   If the VM was configured to cache all its VMDKs in host-based mode, you can disable caching on these VMDKs by typing:

iot provision --vmguest <guest name> --disablecachingmode hypervisor

where

- *guest name* is the VM's display name in vSphere, the IP address, or the fully qualified hostname of the guest virtual machine whose VMDK files you want to remove from caching.

For example, you might enter a command that looks something like this:

```
iotcli@tp-vme-1:~> iot provision --vmguest TP-RHEL6-5 --disablecachingmode
hypervisor
Disable Hypercache Mode Task on TP-RHEL6-5 got successfully submitted,
This may take several minutes to complete.
Errorcode : 0
Disable Hypercache Mode Task on TP-RHEL6-5 successfully completed
```

If the VM was configured to cache only specified VMDKs, you can remove these VMDKs by typing.

iot provision --vmguest <guest name> --removevmdk "<fully qualified vmdk name>"

where

- *guest name* is the VM's display name in vSphere, the IP address, or the fully qualified hostname of the guest virtual machine whose VMDK files you want to remove from caching.
- *fully qualified vmdk name* is the name of the VMDK you want to remove from caching. You can determine the fully qualified name by using the `iot list –configuredvmdks` command (see below).

For example, you might enter commands that look something like this:

```
iotcli@tp-iot-1:~> iot list --vmguest TP-WIN2K8-4 TP-WIN2K8-5 --
configuredvmdks --guestuser administrator --guestpassword
Atest12345

No VMDKs configured on the Guest : TP-WIN2K8-4
VMDKs configured on the Guest : TP-WIN2K8-5 are :

VMDK Filename            : [datastore1 (1)] TP-Win2K8-5/TP-
Win2K8-5_1.vmdk
VMDK Label               : Hard disk 2
VMDK Caching Running     : true
VMDK Capacity (GB)       : 10
-----------------------------------------------------

iotcli@tp-iot-1:~> iot provision --vmguest TP-WIN2K8-5 --
```

```
removevmdk "[datastore1 (1)] TP-Win2K8-5/TP-Win2K8-5_1.vmdk"
Delete Primary VMDK Task on TP-WIN2K8-5 got successfully
submitted, This may take several minutes to complete.
Errorcode : 0
Delete Primary VMDK Task on TP-WIN2K8-5 successfully completed
```

Perform these steps on all VMs that are using host-based caching on the ESXi host.

Stopping and removing guest-based caching

To stop guest-based caching on any VMs on the ESXi server

1. Login to the IBM Flash Management Console.

   Username: iotcli

   Password: iotcli

2. From the IBM Flash Management Console command line, login in to the VMware vCenter server that manages the ESXi servers where you want to configure host-based caching by typing the following command:

   iot vmp --login --vmpaddress <vCenterAddress> --vmpuser <vCenterUsername> --vmppassword <vCenterPassword>

   where

   - *vCenterAddress* is the IP address or the fully qualified hostname of the vCenter server
   - *vCenterUsername* is the name of a user who has sufficient rights to register the IBM Flash Management Console.
   - *vCenterPassword* is the password for the user

   For example, you might enter a command that looks something like this:

   ```
   iotcli@tp-vme-1:~> iot vmp --login --vmpaddress tp-vcenter-1 --
   vmpuser root --vmppassword vmware
   Logged in to VMP : tp-vcenter-1
   ```

3. For each VM that is using guest-based caching, stop caching by issuing the following command:

   iot provision --vmguest <guest name> --guestuser <username> --guestpassword <password> --stopvolumecache

   where

   - *guest name* is the VM's display name in vSphere, the IP address, or the fully qualified hostname of the guest virtual machine where you want to stop caching.
   - *username* is the name of a user who has rights to install software on the guest virtual machine.
   - *password* is the password for the user.

Attention!

By default, Windows VMs are caching with volume-level caching. If you have configured guest-based caching at a file of disk level, type the same command replacing `--stopvolumecache` with `--stopfilecache` or `--stopdiskcache`.

For example, you might enter a command that looks something like this:

```
iotcli@TP-IOT-1:~> iot provision --vmguest TP-WIN2K8-4 --
guestuser administrator --guestpassword Atest12345 --
stopvolumecache

Stop Caching Task on TP-WIN2K8-4 got successfully submitted,
This may take several minutes to complete.

Errorcode : 0

Stop Caching Task on TP-WIN2K8-4 successfully completed
```

4. Uninstall guest-based caching on the VM by typing the following command:

   iot package --vmguest <guest name> --uninstall --guestuser <username> --guestpassword <password>

   where

   - *guest name* is the VM's display name in vSphere, the IP address, or the fully qualified hostname of the guest virtual machine where you want to stop caching..
   - *username* is the name of a user who has rights to install software on the guest virtual machine.
   - *password* is the password for the user.

   Attention!

   For Windows VMs, successfully entering this command results in rebooting the VM.

   For example, you might enter a command that looks something like this:

```
iotcli@TP-IOT-1:~> iot package --vmguest TP-WIN2K8-4 --uninstall
--guestuser administrator --guestpassword Atest12345
```

Perform these steps on all VMs that are using guest-based caching on the ESXi host.

Unassigning cache devices

To unassign all cache devices on the ESXi host:

1. Login to the IBM Flash Management Console.

   Username: iotcli

   Password: iotcli

2. From the IBM Flash Management Console command line, login in to the VMware vCenter server that manages the ESXi servers where you want to configure host-based caching by typing the following command:

   ```
   iot vmp --login --vmpaddress  <vCenterAddress> --
   vmpuser  <vCenterUsername> --vmppassword
   <vCenterPassword>
   ```

   where

   - *vCenterAddress* is the IP address or the fully qualified hostname of the vCenter server
   - *vCenterUsername* is the name of a user who has sufficient rights to register or unregister the IBM Flash Management Console.
   - *vCenterPassword* is the password for the user

   For example, you might enter a command that looks something like this:

```
iotcli@tp-vme-1:~> iot vmp --login --vmpaddress tp-vcenter-1 --vmpuser
root --vmppassword vmware
Logged in to VMP : tp-vcenter-1
```

3. Determine all devices that have been assigned for caching by typing the following command:
4. List the LUNs which are available to be used as cache devices by typing the following command:

   ```
   iot list --vmhost <host name> --listssds
   ```

   where

   - *host name* is the IP address or fully qualified hostname of the target ESXi server

   For example, you might enter a command that looks something like this:

```
iotcli@tp-vme-1:~> iot list --vmhost tp-esxi-2 --listssds
DeviceName    : Local FUSIONIO Disk
(eui.23048d1615ec4265002471579b151a8a)
Uuid          : 0100000000313232394436393733494f44524956
Type          : disk
Vendor        : Fusion-io
CanonicalName : eui.23048d1615ec4265002471579b151a8a
Capacity (GB) : 964
DeviceModel   : IODRIVE
```

```
DevicePath    :
/vmfs/devices/disks/eui.23048d1615ec4265002471579b151a8a
LunCount      : 0
Percent       : 99
```

5. For each assigned device, unassign it by typing the following command:

   iot provision --vmhost <host name> --unassigndevice <DeviceName>

   where

   - *host name* is the IP address or fully qualified hostname of the target ESXi server
   - *DeviceName* is the Canonical Name of the device displayed in the **--listssds** commands.

   For example, you might enter a command that looks something like this:

```
iotcli@tp-vme-1:~> iot provision --vmhost tp-esxi-2 --
unassigndevice eui.23048d1615ec4265002471579b151a8a
Unassign Caching Device on eui.23048d1615ec4265002471579b151a8a
got successfully submitted, This may take several minutes to
complete.
Errorcode : 0
Unassign Caching Device on eui.23048d1615ec4265002471579b151a8a
successfully completed
```

Uninstalling IBM FlashCache Storage Accelerator from the ESXi server

To remove IBM FlashCache Storage Accelerator software from the target ESX host:

1. Using the vSphere client put the ESXi server you want to uninstall IBM FlashCache Storage Accelerator from into maintenance mode.
2. Login to the IBM Flash Management Console.

   Username: iotcli

   Password: iotcli

3. Uninstall IBM FlashCache Storage Accelerator from the desired ESXi server by typing the following command:

   iot package --uninstall --vmhost <host name>

   where

   - *host name* is the IP address or fully qualified hostname of the target ESXi server you want remove the IBM FlashCache Storage Accelerator software from.

```
iotcli@tp-vme-1:~> iot package --vmhost tp-esxi-2 --uninstall
If you are upgrading the Host, an automatic reboot of the Host
will be carried out. For fresh installation, Host reboot is not
required. Do you wish to continue? [y/N]y
Uninstall Host package on tp-esxi-2 got successfully submitted,
This may take several minutes to complete.
Errorcode : 0
Uninstall Host package on tp-esxi-2 successfully completed
```

Attention!

Uninstalling IBM FlashCache Storage Accelerator Virtual host software will cause the ESXi server to reboot.

After the ESXi server reboots, IBM FlashCache Storage Accelerator will have been removed from the ESXi server. However any IBM ioMemory VSL software or SSD drivers you may have installed will not be removed.

Unregistering the IBM Flash Management Console

To unregister the IBM Flash Management Console from the vCenter server:

1. Login to the IBM Flash Management Console.

   Username: iotcli

   Password: iotcli

2. From the IBM Flash Management Console command line, authenticate the IBM Flash Management Console with vCenter by typing the following command:

   ```
   iot vmp --login --vmpaddress  <vCenterAddress> --
   vmpuser  <vCenterUsername> --vmppassword
   <vCenterPassword>
   ```

   where

   - *vCenterAddress* is the IP address or the fully qualified hostname of the vCenter server
   - *vCenterUsername* is the name of a user who has sufficient rights to register the IBM Flash Management Console.
   - *vCenterPassword* is the password for the user

   For example, you might enter a command that looks something like this:

   ```
   iotcli@tp-vme-1:~> iot vmp --login --vmpaddress tp-vcenter-1 --
   vmpuser root --vmppassword vmware
   Logged in to VMP : tp-vcenter-1
   ```

3. Unregister the IBM Flash Management Console by typing the following command:

   ```
   iot vmp --unregister --vmpaddress  <vCenterAddress> --
   vmpuser  <vCenterUsername> --vmppassword
   <vCenterPassword>
   ```

   where

   - *vCenterAddress* is the IP address or the fully qualified hostname of the vCenter server
   - *vCenterUsername* is the name of a user who has sufficient rights to register or unregister the IBM Flash Management Consoler.
   - *vCenterPassword* is the password for the user

   For example, you might enter a command that looks something like this:

   ```
   iotcli@tp-vme-1:~> iot vmp --unregister --vmpaddress tp-vcenter-
   1 --vmpuser root --vmppassword vmware
   Successfully Unregistered vCenter Server : tp-vcenter-1
   ```

After the IBM Flash Management Console is unregistered, IBM FlashCache Storage Accelerator has been successfully uninstalled.

Appendix A:
vCenter user permissions

When deploying the IBM Flash Management Console appliance (IBM_FCSA_Virtual-2.2.0.•••.ova), you will need to be logged into the vCenter as a user who has the following minimum permissions:

Datastore

- Allocate space

Extension

- Register extension
- Unregister extension
- Update extension

Global

- Diagnostics

Host > CIM

- CIM interaction

Host > Configuration

- Query patch
- Maintenance
- Security profile and firewall

Host > Local operations

- Reconfigure virtual machine

Tasks

- Create task
- Update task

Virtual Machine > Configuration

- Add new disk
- Add or remove device
- Advanced
- Remove disk

Virtual Machine > Guest Operations

- Guest Operation Modification
- Guest Operation Program Execution
- Guest Operation Queries

Virtual Machine > Interaction

- Power off
- Power on

Virtual Machine > Snapshot

- Create snapshot
- Remove snapshot
- Rename snapshot

Virtual Machine > State (ESXI 5.0)

- Create snapshot
- Remove snapshot
- Rename snapshot

Appendix B: Using the IBM Flash Management Console with the vSphere web client

The IBM Flash Management Console can be accessed from the vSphere web client; however, some configuration is required. The sections below provide details these configuration steps.

Pre-requisites

The following pre-requisites must be met in order to run the IBM Flash Management Console from the vSphere web client:

- The Adobe Flash 11.5.0 (or greater) plug-in needs to be installed and enabled in your browser.
- The VMware Client Integration Plug-in needs to be installed and enabled in your browser.

Enabling script-based plug-ins

For the IBM Flash Management Console to run in the vSphere web client, you need to enable script-based plug-ins in vCenter.

> **Attention!**
>
> The procedure below is written for the vCenter appliance, but the procedure on the a Windows vCenter is analogous.

1. ssh into your vmware appliance as user root.
2. Change to the directory that contains the `webclient.properties` file:

   Linux: `/var/lib/vmware/vsphere-client`

   Windows: `%ProgramData%\VMware\vSphere`

3. Edit the `webclient.properties` file and add the following line at the bottom of the file:

   ```
   scriptPlugin.enabled = true
   ```

4. Restart the web client server process by typing the following at a command prompt:

   Linux: `/etc/init.d/vsphere-client restart`

   Windows:
   ```
   net stop "VMware vSphere Web Client"
   net start "VMware vSphere Web Client"
   ```

After the process restarts, the vCenter will be configured for script-based plug-ins.

Deploying the IBM Flash Management Console

Deploy the IBM Flash Management Console as described in Phase 3: Deploying the IBM Flash Management Console. Take special note of the fully-qualified domain name you give the IBM Flash Management Console in step 4. **When specifying the IBM Flash Management Console in the vSphere web client always use this fully-qualified domain name.** Using only the host name can result in certificate errors.

> **Attention!**
>
> The browser considers different IP addresses and DNS names to be different web sites for security purposes. To have the browser display the IBM Flash Management Console plug-in in the Classic Solutions tab, you must enter a URL with the same host name or IP address as was used by the system to register the plug-in with the vCenter server. This hostname or IP address is displayed on the Settings tab under **Remote Access > Host Name**.

Deploying a custom certificate and key pair

If you are going to deploy a custom certificate and key pair, the best time to do so is in step 10 of Phase 3: Deploying the IBM Flash Management Console. By doing this as part of the initial IBM Flash Management Console configuration, the IBM Flash Management Console's .key file will be updated accordingly and all remote access keys deployed manually, or automatically as part of guest-based caching configuration, will be correct.

To install a custom certificate and key pair, perform the following steps as part of step 10 in the IBM Flash Management Console deployment process:

1. Under the heading **SSL Certificate Options**, click **Custom SSL certificates**.
2. For the custom key, click **Choose File** and navigate to the location of your key and select it.
3. For the custom certificate, click **Choose File** and navigate to the location of your certificate and select it.
4. If your CA Chain is embedded in your custom certificate, skip to step 5. Otherwise, for the CA Chain click **Choose File** and navigate to the location of the chain file and select it.
5. Click **Save Changes**.

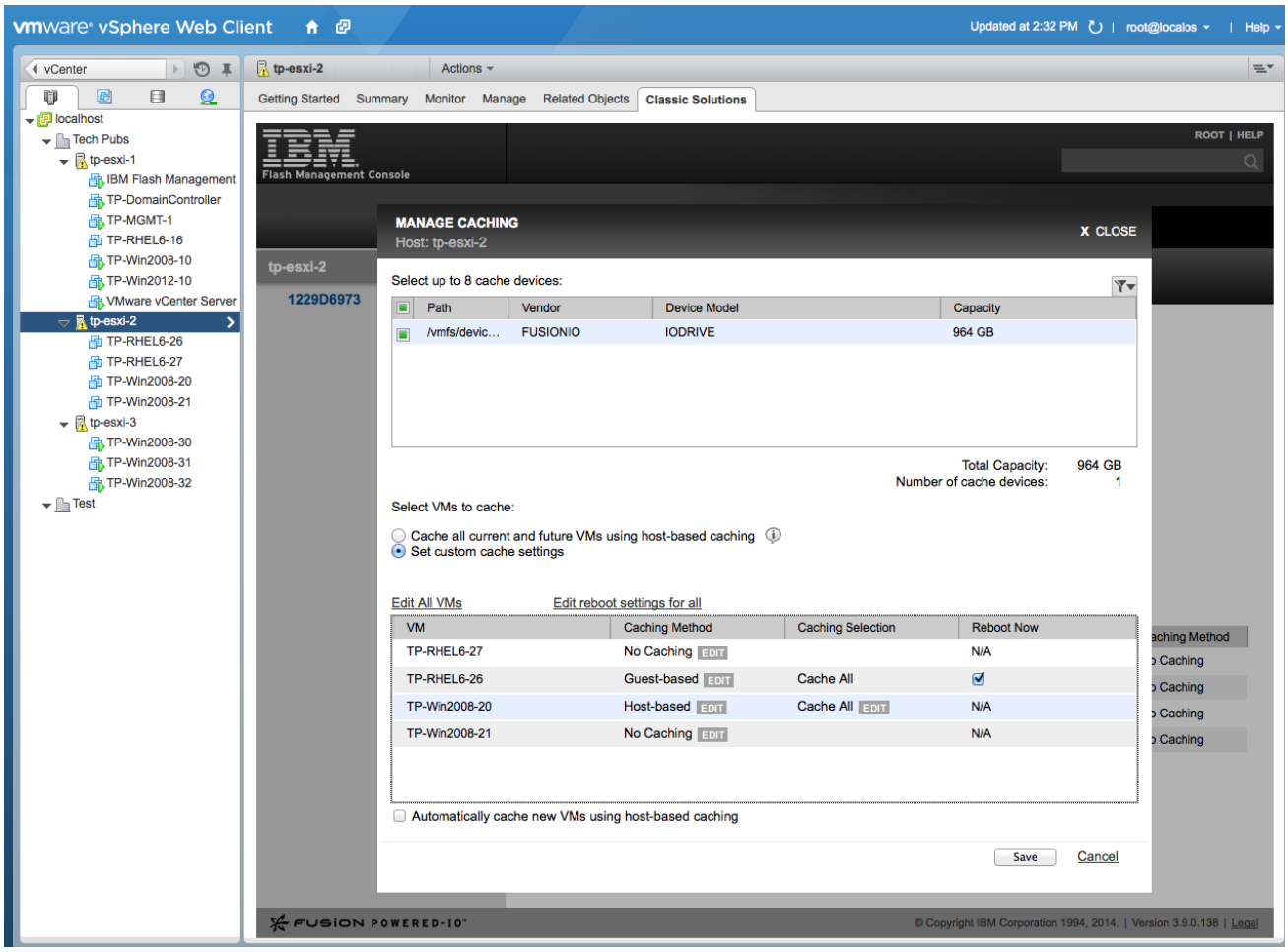
The custom certificate and key pair is now installed in on the IBM Flash Management Console.

Accessing the IBM Flash Management Console from the vSphere web client

After completing the configuration steps above, the classic solutions tab will be visible when a host or VM is selected in the vSphere inventory. If it fails to do so because of an invalid security certificate and lack of a issuer chain, perform the following steps:

1. Open a separate tab in the same browser and enter the fully qualified domain name for your IBM Flash Management Console. This should be the exact, fully qualified name that you used in step 4 of Phase 3: Deploying the IBM Flash Management Console
2. Accept the security risk and wait for the IBM Flash Management Console login page to appear.
3. After the login page appears, return to the vSphere web client tab.
4. In the Classic Solutions tab, right-click in the page and select **Reload Frame**.

The management server should now display in the Classic Solutions tab.


vmware vSphere Web Client
Updated at 2:32 PM
root@localos
Help
vCenter
tp-esxi-2
Actions
Getting Started
Summary
Monitor
Manage
Related Objects
Classic Solutions
localhost
Tech Pubs
tp-esxi-1
IBM Flash Management
TP-DomainController
TP-MGMT-1
TP-RHEL6-16
TP-Win2008-10
TP-Win2012-10
VMware vCenter Server
tp-esxi-2
TP-RHEL6-26
TP-RHEL6-27
TP-Win2008-20
TP-Win2008-21
tp-esxi-3
TP-Win2008-30
TP-Win2008-31
TP-Win2008-32
Test
IBM
Flash Management Console
ROOT | HELP
MANAGE CACHING
Host: tp-esxi-2
X CLOSE
tp-esxi-2
1229D6973
Select up to 8 cache devices:
Path
Vendor
Device Model
Capacity
/vmfs/devic…
FUSIONIO
IODRIVE
964 GB
Total Capacity: 964 GB
Number of cache devices: 1
Select VMs to cache:
Cache all current and future VMs using host-based caching
Set custom cache settings
Edit All VMs
Edit reboot settings for all
VM
Caching Method
Caching Selection
Reboot Now
TP-RHEL6-27
No Caching EDIT
N/A
TP-RHEL6-26
Guest-based EDIT
Cache All
TP-Win2008-20
Host-based EDIT
Cache All EDIT
N/A
TP-Win2008-21
No Caching EDIT
N/A
Automatically cache new VMs using host-based caching
Save
Cancel
FUSION POWERED-IO
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Appendix C: Installing and Upgrading with VUM

The install packages for IBM FlashCache Storage Accelerator are compatible with the VMware Update Manager (VUM). To use VUM to install or update software on ESXi hosts, follow these steps:

1. Download the IBM FlashCache Storage Accelerator install packages (see Phase 1: Obtaining Software).
2. Import the packages into the VUM Patch Repository.
3. Include the packages in a Host Extension baseline.
4. Remediate your ESXi host with the baseline that contains the latest IBM FlashCache Storage Accelerator packages.

Download location

Support related documentation is available at:

http://www.ibm.com/supportportal

Part Number: D0005267-006_1
Printed in the USA