Red Hat JBoss Core Services 2.4.37

Apache HTTP Server Installation Guide

For use with Red Hat JBoss middleware products.

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Legal Notice

Abstract

This book is a guide to the installation of Red Hat JBoss Core Services Apache HTTP Server.

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CHAPTER 1. INTRODUCTION

1.1. ABOUT RED HAT JBOSS CORE SERVICES

Red Hat JBoss Core Services is a set of supplementary software for Red Hat JBoss middleware products. This software, such as the Apache HTTP Server, is common to multiple JBoss middleware products, and is packaged under Red Hat JBoss Core Services to allow for faster distribution of updates, and for a more consistent update experience.

1.2. ABOUT JBOSS CORE SERVICES APACHE HTTP SERVER

The Apache HTTP Server is used in multiple Red Hat JBoss middleware products, and previously the Apache HTTP Server was distributed with each JBoss product. Starting from the following product versions, each product will instead use the JBoss Core Services distribution of the Apache HTTP Server:

- Red Hat JBoss Enterprise Application Platform (JBoss EAP) 7.0 and onwards.
- Red Hat JBoss Web Server 3.1 and onwards.

IMPORTANT

The Apache HTTP Server distribution included as part of Red Hat Enterprise Linux is separate from the JBoss Core Services distribution of the Apache HTTP Server.

NOTE

The difference between the Apache HTTP Server provided with Red Hat Enterprise Linux and the JBCS Apache HTTP Server:

- JBCS httpd is packaged as **zip** and **rpm** but only the **rpm package** is available for Red Hat Enterprise Linux httpd.
- JBCS httpd provides the **mod_security**, **mod_proxy_uwsgi** and the loadbalancing modules **mod_jk** and **mod_cluster**.
- JBCS httpd does not provide nor support **mod_php**. This is supported in Red Hat Enterprise Linux httpd.

1.3. SUPPORTED OPERATING SYSTEMS AND CONFIGURATIONS

For information on supported operating systems and configurations for JBoss Core Services Apache HTTP Server, see https://access.redhat.com/articles/2258971.

1.4. INSTALLATION METHODS

JBoss Core Services Apache HTTP Server can be installed on supported Red Hat Enterprise Linux, and Microsoft Windows systems using archive installation files available for each platform. JBoss Core Services Apache HTTP Server can also be installed on supported Red Hat Enterprise Linux systems using RPM packages.

1.5. UPGRADING TO THE RED HAT JBOSS CORE SERVICES APACHE HTTP SERVER 2.4.37

For systems where an earlier version of the Red Hat JBoss Core Services Apache HTTP Server was installed from a .zip archive, upgrading to the Apache HTTP Server 2.4.37 requires:

1. Installing the Apache HTTP Server 2.4.37.
2. Setting up the Apache HTTP Server 2.4.37.
3. Removing the earlier version of Apache HTTP Server.

Prerequisites

- Administrative access (Windows Server)
- A system where the Red Hat JBoss Core Services Apache HTTP Server 2.4.29 or earlier was installed from a .zip archive.

Procedure

For systems using the Red Hat JBoss Core Services Apache HTTP Server 2.4.29, the recommended procedure for upgrading to the Apache HTTP Server 2.4.37 is:

1. Shutdown any running instances of Red Hat JBoss Core Services Apache HTTP Server 2.4.29.
2. Backup the Red Hat JBoss Core Services Apache HTTP Server 2.4.29 installation and configuration files.
3. Install the Red Hat JBoss Core Services Apache HTTP Server 2.4.37 using the .zip installation method for the current system (see Additional Resources below).
4. Migrate your configuration from the Red Hat JBoss Core Services Apache HTTP Server version 2.4.29 to version 2.4.37.

NOTE

The Apache HTTP Server configuration files may have changed since the Apache HTTP Server 2.4.29 release. It is recommended that you update the 2.4.37 version configuration files, rather than overwrite them with the configuration files from a different version (such as the Apache HTTP Server 2.4.29).

5. Remove the Red Hat JBoss Core Services Apache HTTP Server 2.4.29 root directory.

Additional Resources

- Installing JBoss Core Services Apache HTTP Server on Microsoft Windows .

1.6. KEY DIFFERENCES BETWEEN RED HAT ENTERPRISE LINUX 7 AND RED HAT ENTERPRISE LINUX 8

This section provides an overview of changes in Red Hat Enterprise Linux 8 since Red Hat Enterprise Linux 7.

Removed security functionality

All-numeric user and group names are deprecated in Red Hat Enterprise Linux 7 and their support is completely removed in Red Hat Enterprise Linux 8.

Memory management

Red Hat Enterprise Linux 7, existing memory bus had 48/46 bit of virtual/physical memory addressing capacity, and the Linux kernel implemented 4 levels of page tables to manage these virtual addresses to physical addresses.
With the extended address range, the memory management in Red Hat Enterprise Linux 8 adds support for 5-level page table implementation, to be able to handle the expanded address range. By default, RHEL8 will disable the 5-level page table support even on systems that support this feature.

XFS supports

Red Hat Enterprise Linux 7 can mount XFS file systems with shared copy-on-write data extents only in the read-only mode.
In Red Hat Enterprise Linux 8, the XFS file system supports shared copy-on-write data extent functionality. This feature enables two or more files to share a common set of data blocks.

NFS configuration

In Red Hat Enterprise Linux 8.0, the NFS configuration has moved from the **/etc/sysconfig/nfs** configuration file, which was used in Red Hat Enterprise Linux 7, to **/etc/nfs.conf**.

NOTE

For more differences between Red Hat Enterprise Linux 7 and Red Hat Enterprise Linux 8, refer CONSIDERATIONS IN ADOPTING RHEL 8 .

CHAPTER 2. INSTALLING THE JBOSS CORE SERVICES APACHE HTTP SERVER ON RED HAT ENTERPRISE LINUX

2.1. ARCHIVE INSTALLATION

2.1.1. Prerequisites

The following packages are required to run the Red Hat JBoss Core Services Apache HTTP Server 2.4.37 on Red Hat Enterprise Linux:

- elinks
- krb5-workstation
- mailcap

To install these prerequisites on Red Hat Enterprise Linux, issue the following command as the root user:

```
# yum install elinks krb5-workstation mailcap
```

2.1.2. Download and Extract the Apache HTTP Server

To install Apache HTTP Server, download and extract the installation archive files. Installation can be performed by non-root users if the user account has write access to the intended installation directory.

1. Open a browser and log in to the Red Hat Customer Portal JBoss Software Downloads page.
2. Select the **Apache HTTP Server** in the **Product** drop-down menu.
3. Select the correct JBoss Core Services version from the **Version** drop-down menu.
4. Find **Red Hat JBoss Core Services Apache HTTP Server**in the list, ensuring that you select the correct platform and architecture for your system, and click the **Download** link.
5. Extract the downloaded archive file to your installation directory.

NOTE

We recommend that you install the Apache HTTP Server in the /**opt**/ directory.

The **jbcs-httpd24-2.4/httpd** directory created by extracting the archive is the top-level directory for Apache HTTP Server. This is referred to in this documentation as **HTTPD_HOME**.

2.1.3. Configuring the Apache HTTP Server Installation

Some configuration is required before running JBoss Core Services Apache HTTP Server. This section includes the following configuration procedures:

- Creating an Apache User
- Disabling/Enabling SSL Support
- Running the Apache HTTP Server Post-Installation Script

Creating an Apache User
Follow this procedure to create the **apache** user and its parent group:

As the root user:

1. On a command line, change directory to ***HTTPD_HOME***.
2. Run the following command to create the **apache** user group:

```
# groupadd -g 48 -r apache
```

3. Run the following command to create the **apache** user in the **apache** user group:

```
# /usr/sbin/useradd -c "Apache" -u 48 -g apache -s /sbin/nologin -r apache
```

4. From ***HTTPD_HOME***, issue the following command to assign the ownership of the Apache directories to the **apache** user to allow the user to run the Apache HTTP Server:

```
# chown -R apache:apache *
```

   You can use **ls -l** to verify that the **apache** user is the owner of the directory.

Disabling/Enabling SSL Support
The Apache HTTP Server supports SSL by default, but it can be disabled. Follow this procedure to disable or re-enable SSL support.

1. Go to the ***HTTPD_HOME*/conf.d/** directory and rename the SSL configuration file:
   a. To disable SSL, rename **ssl.conf** to **ssl.conf.disabled**.
   b. To re-enable SSL, rename **ssl.conf.disabled** to **ssl.conf**.

Running the Apache HTTP Server Post-Installation Script

1. On a command line, change to the ***HTTPD_HOME*** directory.
2. Issue the following command:

```
./.postinstall
```

2.1.4. Starting the Apache HTTP Server

To start Apache HTTP Server, on a command line as root user, change to ***HTTPD_HOME*/sbin/** and issue the following command:

```
./apachectl start
```

2.1.5. Stopping the Apache HTTP Server

To stop the Apache HTTP Server, on a command line as root user, change to ***HTTPD_HOME*/sbin/**, and issue the following command:

```
./apachectl stop
```

2.1.6. Running the Apache HTTP Server without root access on Red Hat Enterprise Linux (ZIP installation)

To run the Apache HTTP Server as a non-root user, such as the **apache** user:

1. Stop all instances of the Apache HTTP Server:

```
pkill httpd
```

2. Set the **http** listen port to higher than 1024 in ***HTTPD_HOME*/conf/httpd.conf**:

```
Listen 2080
ServerName <hostname>:2080
```

3. Set the **https** listen port to higher than 1024 in ***HTTPD_HOME*/conf.d/ssl.conf**:

```
Listen 2443
```

4. Change the ownership of the **logs** directory:

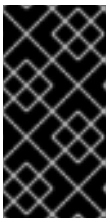
```
chown -R apache:apache HTTPD_HOME/logs/
```

5. Change the ownership of the **run** directory:

```
chown -R apache:apache HTTPD_HOME/var/run/
```

6. Verify that **httpd** is **only** running under the **apache** user, not the **root** and **apache** users:

```
$ ps -eo euser,egroup,comm | grep httpd

apache   apache   httpd
apache   apache   httpd
apache   apache   httpd
...
```



IMPORTANT

To prevent unauthorized access or modification of files and directories by website users and to prevent unwanted changes to the Apache HTTP Server configuration files, limit the file permissions of the **apache** user and enable SELinux .

2.1.7. Using Sysv and Systemd Scripts With RHEL Archive Distribution

Using the Apache HTTP Server with a system daemon provides a method of starting the Apache HTTP Server services at system boot. The system daemon also provides start, stop and status check functions.

The default system daemon for Red Hat Enterprise Linux 7 and Red Hat Enterprise Linux is systemd.

IMPORTANT

Red Hat Enterprise Linux 6 is no longer supported and subsequently was removed from the documentation.

NOTE

To determine which system daemon is running, issue **ps -p 1 -o comm=**.

- For systemd:

```
$ ps -p 1 -o comm=

systemd
```

Setting up the Apache HTTP Server for systemd

As the root user, execute the **.postinstall.systemd** script:

```
# cd HTTPD_HOME
# sh httpd/.postinstall.systemd
```

Controlling the Apache HTTP Server with systemd

Systemd commands can only be issued by the root user.

- To enable the Apache HTTP Server services to start at boot using systemd:

```
# systemctl enable jbcs-httpd24-httpd.service
```

- To start the Apache HTTP Server using systemd:

```
# systemctl start jbcs-httpd24-httpd.service
```

- To stop the Apache HTTP Server using systemd:

```
# systemctl stop jbcs-httpd24-httpd.service
```

- To verify the status of the Apache HTTP Server using systemd (the **status** operation can be executed by any user):

```
# systemctl status jbcs-httpd24-httpd.service
```

For more information on using systemd with RHEL 7, see: RHEL 7 System Administrator's Guide: Managing System Services

For more information on using systemd with Red Hat Enterprise Linux 8, see: RHEL 8 Configuring Basic System Settings: Managing Systems With systemd

IMPORTANT

After running these commands, you can run the following command to revert changes affected by .postinstall.sysv or .postinstall.systemd

```
# cd HTTPD_HOME
# sh httpd/.postinstall.services.cleanup
```

2.2. RPM INSTALLATION

Installing JBoss Core Services Apache HTTP Server from RPM packages installs the Apache HTTP Server as a service. The RPM installation option is available for Red Hat Enterprise Linux 7 and Red Hat Enterprise Linux 8

2.2.1. Using mod_jk,mod_cluster, mod_rt, and mod_bmx with RHEL 8

This section cover proper procedure to install and configure the JBCS modules; mod_jk, mod_cluster, mod_rt, and mod_bmx on the RHEL 8 OS.

Installing httpd
To install httpd run the following command with root access:

```
$ yum install httpd
```

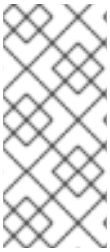
Installing Modules
To install mod_jk, mod_cluster, mod_rt, and mod_bmx, run the following commands with root access:

```
$ yum install jbcs-httpd24-mod_jk-ap24

$ yum install jbcs-httpd24-mod_cluster-native

$ yum install jbcs-httpd24-mod_bmx

$ yum install jbcs-httpd24-mod_rt
```

For **RHEL-8** httpd has its BaseOS modules directory in /usr/lib64/httpd/modules. For the time being, JBCS modules are located in /opt/rh/jbcs/root/usr/lib64/httpd/modules and follow all JBCS rules in regards to naming, directories, and prefixes. This includes mod_jk, mod_cluster, mod_rt, and mod_bmx.

If you want to use these modules, create or modify configuration file to add **LoadModule** command, for example:

```
LoadModule jk_module /opt/rh/jbcs/root/usr/lib64/httpd/modules/mod_jk.so
```



NOTE

- mod_proxy_balancer **MUST** be disabled when mod_proxy_cluster is used.
- mod_proxy **MUST** be enabled when mod_proxy_cluster is used
- If one needs mod_proxy_cluster to use AJP, proxy_ajp_module must be enabled

Alternatively you may include the directory of the installed JBCS modules in the *JBCS_HOME*/httpd/conf.d directory.

2.2.2. Installing the Apache HTTP Server from RPM Packages

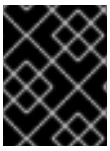
Before downloading and installing the RPM packages, you must register your system with Red Hat Subscription Management and subscribe to the respective Content Delivery Network (CDN) repositories.

For information on registering Red Hat Enterprise Linux, see:

The Subscription Manager for Red Hat Enterprise Linux 7

OR

The Subscription Manager for Red Hat Enterprise Linux 8



IMPORTANT

Red Hat Enterprise Linux 6 is no longer supported and subsequently was removed from the documentation.

NOTE

If more information is needed for the Subscription Manager tool, please refer to this link.

Attaching subscriptions to Red Hat Enterprise Linux (if required)

If the system does not have a subscription attached that provides the Apache HTTP Server:

1. Log in to the Red Hat Subscription Manager .
2. Click on the **Systems** tab.
3. Click on the **Name** of the system to add the subscription to.
4. Change from the **Details** tab to the **Subscriptions** tab, then click **Attach Subscriptions**.
5. Select the check box beside the subscription to attach, then click **Attach Subscriptions**.

NOTE

To verify that a subscription provides the required CDN repositories:

1. Log in to: https://access.redhat.com/management/subscriptions.
2. Click the **Subscription Name**.
3. Under **Products Provided**, you require:
   - Red Hat JBoss Core Services.

Installing the Apache HTTP Server from RPM packages using YUM

1. On a command line, subscribe to the Apache HTTP Server CDN repositories for your operating system version using **subscription-manager**:

```
# subscription-manager repos --enable <repository>
```

- For Red Hat Enterprise Linux 7:
  - jb-coreservices-1-for-rhel-7-server-rpms

2. Run the following command as the root user to install the Apache HTTP Server:

```
# yum groupinstall jbcs-httpd24
```

NOTE

With the release of RHEL 8, JBCS no longer uses the yum groupinstall command. For complete instructions on installing and configuring HTTPD on RHEL 8, please see this link

2.2.3. Configuring the Apache HTTP Server Installation (RPM Installation)

Before starting an RPM installation of JBoss Core Services Apache HTTP Server, there are some optional configurations you can perform. This section includes the following configuration procedures:

- Removing SSL Support

Removing SSL Support
The Apache HTTP Server supports SSL by default, but it can be removed. To remove SSL support, remove the mod_ssl package.

1. At a shell prompt, run the following command as the root user:

```
# yum remove jbcs-httpd24-mod_ssl
```

NOTE

With the release of RHEL 8, JBCS no longer uses the yum groupinstall command. For complete instructions on installing and configuring HTTPD on RHEL 8, please see this link

2.2.4. Starting the Apache HTTP Server

In a shell prompt as the root user, start the Apache HTTP Server service:

- For Red Hat Enterprise Linux 7:

```
# systemctl start jbcs-httpd24-httpd.service
```

IMPORTANT

Red Hat Enterprise Linux 6 is no longer supported and subsequently was removed from the documentation.

NOTE

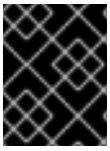
With the release of RHEL 8, JBCS no longer uses the yum groupinstall command. For complete instructions on installing and configuring HTTPD on RHEL 8, please see this link

2.2.5. Stopping the Apache HTTP Server

In a shell prompt as the root user, stop the Apache HTTP Server service:

- For Red Hat Enterprise Linux 7:

```
# systemctl stop jbcs-httpd24-httpd.service
```



IMPORTANT

Red Hat Enterprise Linux 6 is no longer supported and subsequently was removed from the documentation.

NOTE

With the release of RHEL 8, JBCS no longer uses the yum groupinstall command. For complete instructions on installing and configuring HTTPD on RHEL 8, please see this link

2.2.6. Configuring the Apache HTTP Server to Start at Boot

Use the following command to enable the Apache HTTP Server service to start at boot.

- For Red Hat Enterprise Linux 7:

```
# systemctl enable jbcs-httpd24-httpd.service
```

IMPORTANT

Red Hat Enterprise Linux 6 is no longer supported and subsequently was removed from the documentation.

2.3. SELINUX POLICIES

2.3.1. SELinux Policy Information

The Security-Enhanced Linux (SELinux) security model is enforced by the kernel and ensures applications have limited access to resources such as file system locations and ports. This helps ensure that the errant processes (either compromised or poorly configured) are restricted and in some cases prevented from running.

The following table contains information about the SELinux policies provided in the **jbcs-httpd24-httpd-selinux** packages.

Table 2.1. RPMs and Default SELinux Policies

Name	Port Information	Policy Information
mod_cluster	Two ports (**6666** for **TCP** and **23364** for **UDP**) are added for**httpd_port_t** to allow the **httpd** process to use them.	A post installation script configures the context mapping for **/var/cache/mod_cluster** to enable the **httpd** process to write at this location.

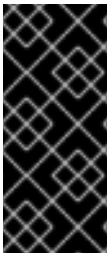
For more information about using SELinux and other Red Hat Enterprise Linux security information, see the *Red Hat Enterprise Linux Security Guide* .

2.3.2. SELinux Policies for an RPM Installation

SELinux policies for the Apache HTTP Server are provided by the **jbcs-httpd24-httpd-selinux** package available in the **jb-coreservices-1-for-rhel-7-server-rpms** and **jb-coreservices-1-for-rhel-6-server-rpms** Content Delivery Network (CDN) repositories.

To enable SELinux policies on the Apache HTTP Server, install the **jbcs-httpd24-httpd-selinux** package for the version of Red Hat Enterprise Linux in use.

2.3.3. SELinux Policies for Archive Installation



IMPORTANT

By default, the SELinux policy provided is not active and the Apache HTTP Server processes run in the **unconfined_t** domain. This domain does not confine the processes, and if you chose not to enable the SELinux policy provided, it is recommended that you restrict file access for the **apache** user to the files and directories required by the Apache HTTP Server runtime.

For this release, SELinux policies are provided in the archive packages. The **.postinstall.selinux** file is included in root Apache HTTP Server folder. If required, you can run the **.postinstall.selinux** script.

To install the SELinux policies for Archive installations:

1. Install the **selinux-policy-devel** package:

```
yum install -y selinux-policy-devel
```

2. Execute the **.postinstall.selinux** script:

```
cd <httpd_home>
sh .postinstall.selinux
```

3. Make and install the SELinux module:

```
cd <httpd_home>/selinux/
make -f /usr/share/selinux/devel/Makefile
semodule -i jbcs-httpd24-httpd.pp
```

4. Apply the SELinux contexts for the Apache HTTP Server:

```
restorecon -r <httpd_home>
```

5. Add access permissions to the required ports for the Apache HTTP Server:

```
semanage port -a -t http_port_t -p tcp 6666
semanage port -a -t http_port_t -p udp 23364
```

6. Start the Apache HTTP Server service:

```
<httpd_home>/sbin/apachectl start
```

7. Check the context of the running process expecting **httpd_t**:

```
$ ps -eZ | grep httpd | head -n1

unconfined_u:unconfined_r:httpd_t:s0-s0:c0.c1023 2864 ? 00:00:00 httpd
```

8. To verify the contexts of the httpd directories, for example:

```
ls -lZ <httpd_home>/logs/
```

CHAPTER 3. INSTALLING THE JBOSS CORE SERVICES APACHE HTTP SERVER ON MICROSOFT WINDOWS

3.1. DOWNLOAD AND EXTRACT THE APACHE HTTP SERVER

To install Apache HTTP Server, download and extract the installation archive files. Installation can be performed by non-root users if the user account has write access to the intended installation directory.

1. Open a browser and log in to the Red Hat Customer Portal JBoss Software Downloads page.
2. Select the **Apache HTTP Server** in the **Product** drop-down menu.
3. Select the correct JBoss Core Services version from the **Version** drop-down menu.
4. Find **Red Hat JBoss Core Services Apache HTTP Server** in the list, ensuring that you select the correct platform and architecture for your system, and click the **Download** link.
5. Extract the downloaded archive file to your installation directory.

NOTE

We recommend that you install the Apache HTTP Server in the **C:\Program Files** directory.

The **jbcs-httpd24-2.4** directory created by extracting the archive is the top-level directory for Apache HTTP Server. This is referred to in this documentation as **HTTPD_HOME**.

3.2. CONFIGURING THE APACHE HTTP SERVER INSTALLATION

Some configuration is required before running the JBoss Core Services Apache HTTP Server. This section includes the following configuration procedures:

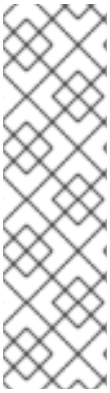
- Running the Apache HTTP Server Post-Installation Script
- Installing the Apache HTTP Server Service
- Configuring Folder Permissions for the Apache HTTP Server Service
- Disabling/Enabling SSL Support

Running the Apache HTTP Server Post-Installation Script

1. At the **Command Prompt** as an administrative user, change to the ***HTTPD_HOME*\etc** directory.
2. Run the following command:

```
call postinstall.httpd.bat
```

Installing the Apache HTTP Server Service



NOTE

By default, the Apache HTTP Server is configured to use port 80. If you have Microsoft IIS installed, ensure that you disable or reconfigure it to avoid port conflicts:

- Stop the **World Wide Web...** service, and change the **Startup Type** to **Manual**.
- Configure IIS to use different ports.

Alternatively, you can edit **httpd.conf** before installing the Apache HTTP Server service and change **Listen** to a port that does not conflict with the IIS ports.

1. At the **Command Prompt** as an administrative user, change to the ***HTTPD_HOME*\bin** directory.
2. Install the Apache HTTP Server service with the following command:

```
httpd -k install
```

A Firewall security dialog prompt may appear asking for networking access for the Apache HTTP Server. Click **Allow** to access this service from the network.

Configuring Folder Permissions for the Apache HTTP Server Service

Follow this procedure to ensure that the account used to run the service has full control over the ***HTTPD_HOME*** folder and all of its subfolders:

1. Right-click the ***HTTPD_HOME*** folder and click **Properties**.
2. Select the **Security** tab.
3. Click the **Edit** button.
4. Click the **Add** button.
5. In the text box, enter **LOCAL SERVICE**.
6. Select the **Full Control** check box for the **LOCAL SERVICE** account.
7. Click **OK**.
8. Click the **Advanced** button.
9. Inside the **Advanced Security Settings** dialog, select **LOCAL SERVICE** and click **Edit**.
10. Select the check box next to the **Replace all existing inheritable permissions on all descendants with inheritable permissions from this object** option.
11. Click **OK** through all the open folder property windows to apply the settings.

Disabling/Enabling SSL Support

The Apache HTTP Server supports SSL by default, but it can be disabled. Follow this procedure to disable or re-enable SSL support.

1. Go to the ***HTTPD_HOME*\conf.d** directory and rename the SSL configuration file:
   a. To disable SSL, rename **ssl.conf** to **ssl.conf.disabled**.

b. To re-enable SSL, rename **ssl.conf.disabled** to **ssl.conf**.

3.3. STARTING THE APACHE HTTP SERVER

You can start the Apache HTTP Server service from the Command Prompt, or with the Computer Management tool.

Starting the Apache HTTP Server Using the Command Prompt

1. At the **Command Prompt** as an administrative user, start the Apache HTTP Server service with the following command:

```
net start Apache2.4
```

Starting the Apache HTTP Server Using the Computer Management Tool

1. Go to **Start → Administrative Tools → Services**.
2. In the **Services** list, right-click the **httpd** service and click **Start**.

3.4. STOPPING THE APACHE HTTP SERVER

You can stop the Apache HTTP Server service from the Command Prompt, or with the Computer Management tool.

Stopping Apache HTTP Server Using the Command Prompt

1. At the **Command Prompt** as an administrative user, stop the Apache HTTP Server service with the following command:

```
net stop Apache2.4
```

Stopping the Apache HTTP Server Using the Computer Management Tool

1. Go to **Start → Administrative Tools → Services**.
2. In the **Services** list, right-click the **httpd** service and click **Stop**.

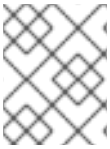
CHAPTER 4. ENABLING HTTP/2 FOR THE JBOSS CORE SERVICES HTTP SERVER

The Hypertext Transfer Protocols are standard methods of transmitting data between applications (such as servers and browsers) over the internet. HTTP/2 improves on HTTP/1.1 by providing enhancements such as:

- header compression - reducing the size of the header transmitted by omitting implied information, and
- multiple requests and responses over a single connection - using binary framing to break down response messages, as opposed to textual framing.

Using HTTP/2 with the Red Hat JBoss Core Services Apache HTTP Server:

- **is supported** for encrypted connections using Transport Layer Security (TLS) (**SSLEnabled="true"**), indicated by the **h2** keyword when enabled.
- **is not supported** for unencrypted connections using the Transmission Control Protocol (TCP) indicated by the **h2c** keyword when enabled.

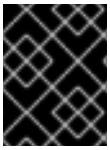


NOTE

HTTP/2 is not available for web servers using the Multi-Processing Module prefork **modules/mod_mpm_prefork.so**

Prerequisites

- Root user access (Red Hat Enterprise Linux systems)
- Administrative access (Windows Server)
- Red Hat JBoss Core Services Apache HTTP Server 2.4.23 or higher
- Modules required:
  - ssl_module **modules/mod_ssl.so**
  - http2_module **modules/mod_http2.so**



IMPORTANT

Red Hat Enterprise Linux 6 is no longer supported and subsequently was removed from the documentation.

Procedure

Enable HTTP/2 for a Apache HTTP Server:

1. Add the http2_module to ***HTTP_HOME*/conf.modules.d/00-base.conf**:

```
...
LoadModule http2_module modules/mod_http2.so
```

2. Add the **h2** protocol in ***HTTP_HOME*/conf/httpd.conf**.

- To enable HTTP/2 support for a virtual host, add the **h2** protocol to the virtual host configuration,
- To enable HTTP/2 support for all server connections, add the **h2** protocol to the 'Main' server configuration section of **httpd.conf**.
  For example:

```
<IfModule http2_module>
   Protocols h2 http/1.1
   ProtocolsHonorOrder on
</IfModule>
```

3. Update the Secure Socket Layer (SSL) configuration in ***HTTP_HOME*/conf.d/ssl.conf**.
   a. Ensure the **SSLEngine** directive is set to enabled (the SSL Engine is enabled by default):

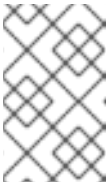
```
SSLEngine on
```

   b. Update the **SSLProtocol** directive to disable the **SSLv2** and **SSLv3** protocols, forcing connections to use the Transport Layer Security (TLS) Protocols:

```
SSLProtocol all -SSLv2 -SSLv3
```

   c. Update the **SSLCipherSuite** directive to specify which SSL ciphers can with the Apache HTTP Server.
   For example:

```
SSLCipherSuite ECDHE-RSA-AES128-GCM-SHA256:ECDHE-ECDSA-AES128-GCM-SHA256:ECDHE-RSA-AES256-GCM-SHA384:ECDHE-ECDSA-AES256-GCM-SHA384:DHE-RSA-AES128-GCM-SHA256:DHE-DSS-AES128-GCM-SHA256:kEDH+AESGCM:ECDHE-RSA-AES128-SHA256:ECDHE-ECDSA-AES128-SHA256:ECDHE-RSA-AES128-SHA:ECDHE-ECDSA-AES128-SHA:ECDHE-RSA-AES256-SHA384:ECDHE-ECDSA-AES256-SHA384:ECDHE-RSA-AES256-SHA:ECDHE-ECDSA-AES256-SHA:DHE-RSA-AES128-SHA256:DHE-RSA-AES128-SHA:DHE-DSS-AES128-SHA256:DHE-RSA-AES256-SHA256:DHE-DSS-AES256-SHA:DHE-RSA-AES256-SHA:!aNULL:!eNULL:!EXPORT:!DES:!RC4:!3DES:!MD5:!PSK
```



NOTE

For information on the SSL module and the supported directives, see: Apache HTTP Server Documentation Version 2.4 - Modules: Apache Module mod_ssl.

4. Restart the Red Hat JBoss Core Services Apache HTTP Server as the root user, to apply the changed configuration.
   a. For systemd (Red Hat Enterprise Linux 7) users:

```
# systemctl restart jbcs-httpd24-httpd.service
```

   b. For Red Hat Enterprise Linux users running Red Hat JBoss Core Services using apachectl:

```
# HTTP_HOME/sbin/apachectl restart
```

c. For Windows Server users:

```
# net restart Apache2.4
```

Next Steps

Verify that HTTP/2 is enabled by reviewing the Apache HTTP Server logs or by using the **curl** command:

- Access the server from a browser or using **curl**, then check the SSL/TLS access or request logs (***HTTP_HOME*/logs/ssl_access_log** or ***HTTP_HOME*/logs/ssl_access_log**) to verify that the connection is configured to support HTTP/2:

```
$ grep 'HTTP/2' HTTP_HOME/logs/ssl_request_log

[26/Apr/2018:06:44:45 +0000] 172.17.0.1 TLSv1.2 AES128-SHA "HEAD /html-single/index.html HTTP/2" -

$ grep 'HTTP/2' HTTP_HOME/logs/ssl_access_log

172.17.0.1 - - [26/Apr/2018:06:44:45 +0000] "HEAD /html-single/index.html HTTP/2" 200 -
```

- Or verify using **curl** (for versions of **curl** that support **HTTP2**):

NOTE

The **curl** package provided with Red Hat Enterprise Linux 7 or earlier does not support HTTP/2. To check **curl** for HTTP/2 support:

```
$ curl -V

curl 7.55.1 (x86_64-redhat-linux-gnu) ...
Release-Date: 2017-08-14
Protocols: dict file ftp ftps gopher http https ...
Features: AsynchDNS IDN IPv6 Largefile GSS-API Kerberos SPNEGO NTLM NTLM_WB SSL libz TLS-SRP HTTP2 UnixSockets HTTPS-proxy Metalink PSL
```

  - For example, when the HTTP/2 protocol is inactive:

```
$ curl -I http://<JBCS_httpd_server>:80/<test.html>

HTTP/1.1 200
...
```

  - But if the HTTP/2 protocol is active, **curl** returns:

```
$ curl -I https://<JBCS_httpd_server>:443/<test.html>

HTTP/2 200
...
```

  - Where:
    - ***<JBCS_httpd_server>*** is the URI of the server (such as **example.com**),

- the port number is dependent on your configuration,
- ***<test.html>*** is any html page for testing the configuration (not provided), and

Additional Resources

- For additional information on using HTTP/2, see: Apache HTTP Server Documentation Version 2.4 - How-To / Tutorials: HTTP/2 guide.
- For information on SSL configuration, see: Apache HTTP Server Documentation Version 2.4 - SSL/TLS Strong Encryption: How-To.
- For information on the HTTP/2 module and the supported directives, see: Apache HTTP Server Documentation Version 2.4 - Modules: Apache Module mod_http2.
- For information on the SSL module and the supported directives, see: Apache HTTP Server Documentation Version 2.4 - Modules: Apache Module mod_ssl.
- The proposed internet standard for HTTP/2: IETF: RFC 7540 - Hypertext Transfer Protocol Version 2 (HTTP/2).

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