TechDoc

Infrastructure Components

*Apache HTTP Server - Commands
(Distributed Systems)*

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Introduction

Document Version

This document describes how to operate the Apache Web Server. The document applies to the following software version(s):

- Apache HTTP Server v2.2.3

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Apache Background Information

Apache Filesystem Directories

There are a number of important directories for the Apache HTTP Server. The base installation directory can be found be executing the following commands:

- su - root
- find / -name httpd.conf 2>/dev/null

This will find the location of the Apache "*conf*" directory. The base installation directory is one level higher than the "*conf*" directory. The base installation directory contains a number of important subdirectories. Among these are:

- bin   (Apache software programs)
- conf   (Apache configuration files)
- logs   (Apache log files)

Apache User and Group IDs

If Apache is to listen to any port with a number less than or equal to 1024 (the default port is 80 for HTTP and 443 for HTTPS), then the Apache HTTP Server (*httpd2*) must be started as "root". This will create a parent process executing as root. The child processes may be started under a different User ID as specified below.

The "conf" directory contains a number of important Apache configuration files. Among these is the "*httpd.conf*" file. This file contains settings that control the User ID and Group that Apache will start child processes under. These values are specified in one of two ways. The first way they may be specified is by using the following the following keywords in the *httpd.conf* file:

- User   (UNIX User ID for child processes)
- Group   (UNIX Group)

The second way that these IDs may be specified is by describing an "include" file in the *httpd.conf* file. This particular include file is typically stored in the "*conf*" directory and named as follows:

- uid.conf   (Apache User ID and Group specification)

Apache Version

The Apache software version can be determined by executing the following command from the Apache "bin" directory:

- cd /*ApacheInstallBase*/bin
- ./httpd2 -v

Apache Operational Control Commands

Background

The Apache commands can be executed in three different ways; which are all described in this Section. These three ways are:

- kill *-signal pid*   (UNIX "kill" command with appropriate signal and Process ID)
- httpd2   (UNIX "kill" command with appropriate signal and Process ID)
- apachectl -k *command*   (UNIX "kill" command with appropriate signal and Process ID)

Program (httpd2) Signals

The Apache HTTP Server program (*httpd2*) accepts standard UNIX signals. The *httpd2* program creates a number of child processes. Signals should always be sent to the parent process. The parent process accepts the following signals:

- TERM   (Stop - Immediate; Kill all child processes, then kill yourself)
- WINCH (Stop - Quiesce; Quiesce child processes, then terminate parent)
- HUP   (Restart - Immediate; kill all child processes, initialize parent, start children)
- USR1   (Restart – Quiesce; Quiesce children; Initialize parent, rolling start of children)

These signals thus provide both a "Stop" and a "Restart" capability. Furthermore, within each capability there is an "Immediate" option and a "Quiesce" option.

Command Verification

The httpd2 program writes information to a log. This log should be checked after every command is issued. The log is found in the following location:

- /*ApacheInstallBase*/logs/error_log

After the "*apachectl*" command has been issued, its progress can be monitored using the following command:

- tail -f /*ApacheInstallBase*/logs/error_log

Start Commands

The preferred method to start Apache is by using the "*apachectl*" command found in the "*bin*" directory. The Start commands are as follows:

- su - root
- cd /*ApacheInstallBase*/bin

- ./apachectl -k **start**   (Start the Apache HTTP Server)
  - -f /*path*/*httpd.conf.file*   (Optional parameter: Identify *httpd.conf* file location)

Restart Commands

The preferred method to restart Apache is by using the "*apachectl*" command found in the "*bin*" directory. Note that the "*graceful*" restart command keeps a constant number of threads in operation. Once initialization has been re-performed, a new child process is started as each old child process is terminated.

The Restart commands are as follows:

- su - root
- cd /*ApacheInstallBase*/bin

- ./apachectl -k **restart**   (Immediate; kill children, initialize, start)
- ./apachectl -k **graceful**   (Quiesce; quiesce children, initialize, rolling child starts)

Stop Commands

The preferred method to stop Apache is by using the "*apachectl*" command found in the "*bin*" directory. The Stop commands are as follows:

- su - root
- cd /*ApacheInstallBase*/bin

- ./apachectl -k **stop**   (Immediate; kill children processes, then parent)
- ./apachectl -k **graceful-stop**   (Quiesce children processes, then kill parent)

Using the Apache "*httpd2*" Command

The preferred method for controlling the Apache processes is to use the "*apachectl*" commands described above. The "*apachectl*" command passes through the parameters to the underlying parent "*httpd2*" process. Instead of using the "*apachectl*" command, the "*httpd2*" command itself may be used directly. This is possible because the "*apachectl*" command takes the same parameters as the underlying "*httpd2*" command and simply passes them through to the underlying "*httpd2*" program. It is preferable, however, to use the "*apachectl*" instead of the "*httpd2*"command because the "*apachectl*" command contains additional logic to ensure that the command environment is correct.

Using the UNIX "*kill*" Command

As was previously noted, the UNIX "kill" command may also be used to stop or restart the Apache processes. The UNIX "*kill*" command should only be used as a last resort. If the child processes cannot be terminated in any other way, they may be individually killed ("-9") and then the parent process can be terminated.

This command would normally only need to be sent to the parent process. The executing Apache processes can be determined using the following command:

- ps –ef | gep –I httpd

The results of this command will identify the Apache parent and child processes. For safety, Apache stores the parent PID in a file. Thus the following command should normally be used so that the PID does not have to be manually determined:

- kill – *signal* `cat /*ApacheInstallBase*/logs/httpd.pid `   (Signal: TERM, WINCH, HUP, or USR1)

Apache Informational Commands

Display Apache Software Version

The following command may be used to display the Apache HTTP Server software version:

- apachectl **-v**

Display Virtual Host Settings

The following command may be used to display the Virtual Host configuration file settings:

- apachectl **-S**

Display Apache HTTP Server Status

The following command may be used to display the Virtual Host configuration file settings:

- apachectl **-status**   (Summary status display)

- apachectl **-fullstatus**   (Full status display; shows state of each child process)

Verify Configuration File Syntax

The following command may be used to verify the syntax of the Apache configuration files:

- apachectl **-t**

Best Practices

- **Apache – HTTP Server – Starting, Stopping & Restarting:** For normal operations, always use the "*apachectl*" command. This command ensures that the environment is correctly set prior to invoking the underlying "*httpd2*" command. Only use the UNIX "*kill*" command as a last resort.

- **Apache – HTTP Server – Command verification:** Always check the log file after executing the "*apachectl*" command. The following command may be used:
    - tail -f */ApacheInstallBase*/logs/error_log

References

- Apache – HTTP Server – Home Page
  http://httpd.apache.org

- Apache – HTTP Server – Documentation
  http://httpd.apache.org/docs/2.4/

- Apache – HTTP Server – Starting
  http://httpd.apache.org/docs/2.4/invoking.html

- Apache – HTTP Server – Stopping & Restarting
  http://httpd.apache.org/docs/2.2/stopping.html

- Apache – HTTP Server – "apachectl" command
  http://httpd.apache.org/docs/2.2/programs/apachectl.html

- Apache – HTTP Server – "httpd2" command
  http://httpd.apache.org/docs/2.2/programs/httpd.html