

Chapter 11

System Startup and Shutdown

Introduction

This chapter covers a variety of topics related to startup and shutdown scripts including the following:

- The overall organization of the startup and shutdown mechanism in HP-UX
- Example of a startup file
- `/etc/inittab` file
- **shutdown** command
- Virtual Partitions (vPars) and startup

System Startup and Shutdown Mechanism

Startup and shutdown scripts for HP-UX 11i are based on a mechanism that separates the actual startup and shutdown scripts from configuration information. To modify the way your system starts or stops, you don't have to

modify scripts, which in general is considered somewhat risky; you can instead modify configuration variables. The startup and shutdown sequence is based on an industry standard that is similar to many other UNIX-based systems, so your knowledge of HP-UX applies to many other systems.

Startup and shutdown are going to become increasingly more important to you as your system administration work becomes more sophisticated. As you load and customize more applications, you will need more startup and shutdown knowledge. This section overviews startup and shutdown and the commands you can use to control your system.

The following components are in the startup and shutdown model:

Execution Scripts

Execution scripts read variables from configuration variable files and run through the startup or shutdown sequence. These scripts are located in **/sbin/init.d**.

Configuration Variable Scripts

These are the files you would modify to set variables that enable or disable a subsystem or to perform some other function at the time of system startup or shutdown. These are located in **/etc/rc.config.d**.

Link Files

These files control the order in which scripts execute. These are actually links to execution scripts to be executed when moving from one run level to another. These files are located in the directory for the appropriate run level, such as **/sbin/rc0.d** for run level 0, **/sbin/rc1.d** for run level 1, and so on.

Sequencer Script

This script invokes execution scripts based on run-level transition. This script is located in **/sbin/rc**.

The following figure shows the directory structure for startup and shutdown scripts.

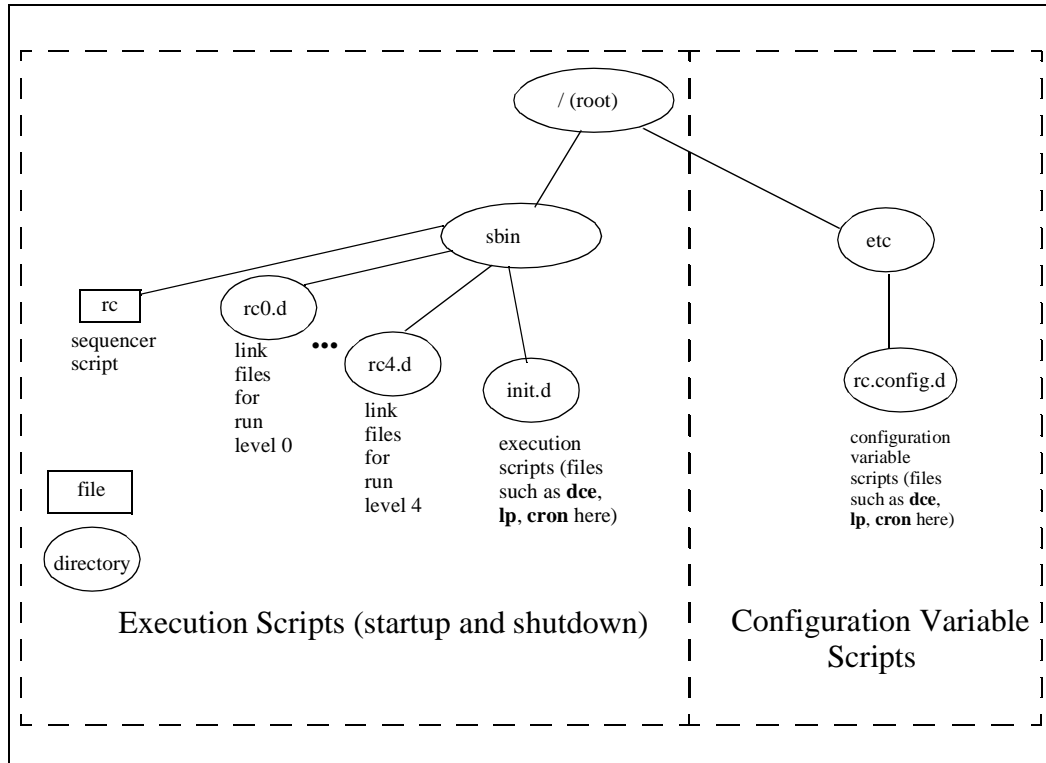


Figure 11-1 Organization of Startup and Shutdown Files

Execution scripts perform startup and shutdown tasks. **/sbin/rc** invokes the execution script with the appropriate start or stop arguments, and you can view the appropriate start or stop messages on the console. The messages you see will have one of the three following values:

OK	Indicates that the execution script started or shut down properly.
FAIL	A problem occurred at startup or shutdown.
N/A	The script was not configured to start.

To start up a subsystem, simply edit the appropriate configuration file in **/etc/rc.config.d**.

Let's look at an example startup and shutdown file for an application loaded onto an HP-UX system that is widely used for Internet applications called Cold Fusion. Like many applications loaded on HP-UX systems, Cold Fusion installs startup and shutdown scripts as a standard part of the installation of the product.

As previously mentioned, the script used as part of the startup and shutdown process is in **/etc/init.d**. In this case, the name of the program is **/etc/init.d/coldfusion** and is shown in the following listing:

```
# cat /sbin/init.d/coldfusion
#!/bin/sh
#
# Start the Cold Fusion servers
#

# set at install
CFHOME=/apps/coldfusion
CFBIN=$CFHOME/bin

export CFHOME

#
# Start/stop processes for Cold Fusion
#

rval=0

case "$1" in

    start_msg)
        print "Starting ColdFusion Application Server"
        ;;

    stop_msg)
        print "Stopping ColdFusion Application Server"
        ;;

    'start')
        #First, check "on/off switch", to set CF_AUTOSTART, in config.d file.
        RCFILE=/etc/rc.config.d/coldfusion
        if [ -f $RCFILE ] ; then
            . $RCFILE
        else
            print "Warning: $RCFILE defaults file missing."
            print "      Starting ColdFusion by default."
            CF_AUTOSTART=1
        fi

        # Start CF if switch is on.
        if [ "$CF_AUTOSTART" -eq 1 ]; then
            if [ -x $CFBIN/start ]; then
                $CFBIN/start
                rval=$?
            else
                print "Error: ColdFusion startup script $CFBIN/start missing."
                print "      ColdFusion not started."
                rval=1
            fi
        fi
    esac

```

```
        fi
    else
        print "Notice: ColdFusion startup disabled in $RCFILE"
        rval=2
    fi
    ;;

'stop')
    if [ -x $CFBIN/stop ]; then
        $CFBIN/stop -force
    fi
    ;;

*)
    echo "Usage: $0 { start | stop }"
    rval=1
    ;;
esac

exit $rval

#
```

The startup and shutdown scripts in **/etc/init.d** generally perform both startup and shutdown functions. The startup and shutdown scripts, including the one in our example, recognize the following four arguments:

- *start_msg* - This is an argument passed to scripts so that the script can report a message indicating what the "start" action will do.
- *stop_msg* - This is an argument passed to scripts so that the script can report a message indicating what the "stop" action will do.
- *start* - The script will start the application.
- *stop* - The script will shut down the application.

You may encounter problems during boot with one of the startup programs being hung. If this is the case, *Ctrl / (control and pipe)* keys normally break out of the script and continue to the next script.

All startup and shutdown scripts, including the one in the previous listing, obtain configuration data from variables in **/etc/rc.config.d**. Our example script checks the value of the "on/off" switch in **/etc/rc.config.d/coldfusion**, which is shown in the following listing, to determine if Cold Fusion should be started:

```
# cat /etc/rc.config.d/coldfusion
# ColdFusion Application Server configuration file
#
CF_AUTOSTART=1 #Set to 1 to restart at boot time
#
```

The variable in this file is set to *I*, so the application starts at the time of system boot.

Startup and shutdown scripts are run based on the directory in which a link to the script appears. Our example script should be started at run level 3. Therefore, a link to the script appears in the directory **/sbin/rc3.d**, shown as the third link in the following listing:

```
# ls -l /sbin/rc3.d
total 0
lrwxr-xr-x 1 root sys 23 Apr 26 14:32 S100nfs.server -> /sbin/init.d/nfs.server
lrwxr-xr-x 1 root sys 19 Apr 26 14:52 S200tps.rc -> /sbin/init.d/tps.rc
lrwxrwxrwx 1 root sys 20 May 16 20:57 S790coldfusion -> ../init.d/coldfusion
lrwxr-xr-x 1 root sys 23 Apr 26 14:44 S990dtlogin.rc -> /sbin/init.d/dtlogin.rc
#
```

The significance of the naming of the link is discussed shortly. For the time being, it is sufficient to know that a link called **/sbin/rc3.d/S790coldfusion** points to our script **/init.d/coldfusion**.

Applications are shut down in the opposite order from which they are started. This means that a link to the startup and shutdown script appears in a lower-level directory for shutdown. In this example, the startup link appears in **/sbin/rc3.d**, but the shutdown link appears in **/etc/rc1.d**, as shown in the following listing:

```
# ls -l /sbin/rc1.d
lrwxr-xr-x 1 root sys 17 Apr 26 14:52 K220slsd -> /sbin/init.d/slstd
lrwxr-xr-x 1 root sys 18 Apr 26 14:45 K230audio -> /sbin/init.d/audio
lrwxr-xr-x 1 root sys 21 Apr 26 14:46 K240auditing -> /sbin/init.d/auditing
lrwxr-xr-x 1 root sys 17 Apr 26 14:43 K250envd -> /sbin/init.d/envd
lrwxr-xr-x 1 root sys 17 Apr 26 14:43 K270cron -> /sbin/init.d/cron
lrwxr-xr-x 1 root sys 15 Apr 26 14:45 K278pd -> /sbin/init.d/pd
lrwxr-xr-x 1 root sys 15 Apr 26 14:45 K280lp -> /sbin/init.d/lp
lrwxr-xr-x 1 root sys 21 Apr 26 14:49 K290hparamgr -> /sbin/init.d/hparamgr
lrwxr-xr-x 1 root sys 20 Apr 26 14:43 K290hparray -> /sbin/init.d/hparray
lrwxrwxrwx 1 root sys 20 May 16 20:57 K300coldfusion -> ../init.d/coldfusion
```

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The link called **/sbin/rc3.d/K300coldfusion** points to the script **/init.d/coldfusion**. Startup for this application takes place at run level 3 and shutdown takes place at run level 1.