

# Alpaquita Linux

## Setting up OpenRC init system



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**be//soft**

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# 1. Overview

The most popular init system on Linux distributions today is [systemd](#). Besides being just an init system, `systemd` provides many additional components, which are intended to replace various common Linux services, such as `syslog`, `cron`, etc. This is why some people consider `systemd` design as too complex and incompatible with the Unix philosophy.

Alpaquita Linux, in contrast, uses [OpenRC](#), a more lightweight init system that works with the `init` program `/usr/sbin/init` provided by [BusyBox](#). Unlike `systemd`, `OpenRC` does not tend to replace common Linux services. In Alpaquita, some functionality that is normally covered by `systemd` in `systemd`-based distributions is covered by separate utilities.

The document provides a quick overview of some `OpenRC` init system features in Alpaquita Linux and includes examples of how to perform the tasks that you perform in a `systemd`-based OS distribution.

## 2. Basic commands

You can manage the OpenRC service using one of the following commands:

- `rc-service <service> <cmd>`
- `/etc/init.d/<service> <cmd>`

For example:

```
rc-service sshd reload
```

```
/etc/init.d/sshd reload
```

The following table describes basic OpenRC commands and their systemd alternatives:

Command	OpenRC	systemd
Start service	<code>rc-service &lt;service&gt; start</code>	<code>systemctl start &lt;service&gt;</code>
Stop service	<code>rc-service &lt;service&gt; stop</code>	<code>systemctl stop &lt;service&gt;</code>
Restart service	<code>rc-service &lt;service&gt; restart</code>	<code>systemctl restart &lt;service&gt;</code>
Reload service	<code>rc-service &lt;service&gt; reload</code>	<code>systemctl reload &lt;service&gt;</code>
Show service status	<code>rc-service &lt;service&gt; status</code>	<code>systemctl status &lt;service&gt;</code>
Enable service at startup	<code>rc-update add &lt;service&gt;</code>	<code>systemctl enable &lt;service&gt;</code>
Disable service at startup	<code>rc-update del &lt;service&gt;</code>	<code>systemctl disable &lt;service&gt;</code>

Command	OpenRC	systemd
List enabled services	<code>rc-update</code>	<code>systemctl list-unit-files --state enabled</code>
List all services	<code>rc-status -s</code>	<code>systemctl list-unit-files</code>

For more information, see the following documentation:

- [Working with OpenRC](#)
- [OpenRC to systemd Cheatsheet](#)

## 3. Configuration files

### `/etc/inittab`

This is a configuration file for the `/usr/sbin/init` program from BusyBox. It is basically used to start OpenRC or `getty` processes on specific ttys depending on the requested action.

For more information, see [/etc/inittab init\(8\)](#) configuration for BusyBox.

### `/etc/rc.conf`

This is the global OpenRC configuration file. In OpenRC, configuration files are simply shell scripts, therefore you do not need to learn a special [syntax](#) as in `systemd`.

### `/etc/conf.d`

This directory contains configuration files for individual OpenRC init scripts. It somewhat corresponds to `/etc/systemd/` in `systemd`-based distributions.



## 4. Logging

Messages that you normally observe by invoking `journalctl` under `systemd`, you can find in the following files when using OpenRC:

- `/var/log/rc.log`
- `/var/log/dmesg`
- `/var/log/messages`

### `/var/log/rc.log`

This file is for OpenRC specific logging that is disabled by default. To enable it, add the following lines to `/etc/rc.conf`:

```
rc_logger="YES"           # enable logging
rc_quiet_openrc="NO"      # disable quiet mode
```

### `/var/log/dmesg`

This file contains the initial `dmesg` log. It is populated by the OpenRC service `bootmisc`. This log is useful in case of long uptime of your system when initial kernel messages have been flushed.

### `/var/log/messages`

This file contains system log messages. Unlike `systemd`, OpenRC does not provide any utilities for system logging. In Alpaquita, BusyBox services `syslogd` and `klogd` are used for system logging.

## Logging kernel messages

By default, `klogd` is disabled and kernel messages are not logged to `/var/log/messages`. To enable and start it by running the following commands:

```
rc-update add klogd boot
rc-service klogd start
```

## Log rotation

systemd provides the `systemd-journald` service for system logging and a wide range of [options](#) for log rotation. `syslogd` provides the following two options:

```
-s SIZE          Max size (KB) before rotation (default 200KB, 0=off)
-b N             N rotated logs to keep (default 1, max 99, 0=purge)
```

The options can be adjusted in `/etc/conf.d/syslog` file. For example, you can set the following options for `syslogd`.

```
SYSLOGD_OPTS="-s 1024 -b 4"
```

For more sophisticated log rotation, consider installing the **logrotate** package.

## Log rules

`journalctl` helps you filter logs in many different ways (by service, priority, facility, and so on). Such powerful filtering is possible, because the `systemd-journald` service stores logs in binary format. `syslogd` stores logs as plain text. For plain text files, you can use `grep`, but you can also set up log rules in `/etc/syslog.conf` for different types of messages to be logged in different files as in the following example.

```
cron.*          /var/log/cron      #all messages of cron facility
*.err           /var/log/error  #all messages with priorities less than or equal
to err
```

For more information, see [syslog.conf.txt](#).



### Note:

If you need more advanced system logging, consider installing the **syslog-ng** package.

## 5. Writing init scripts

OpenRC uses init shell scripts to run services rather than special service configuration files. An init script must start with a shebang `#!/usr/sbin/openrc-run`. The init script code is expected to be compatible with POSIX shell.

Below you can see an example of an init script that moves all tasks to a `cgroup` with specific CPUs and memory nodes assigned to it:

```
#!/usr/sbin/openrc-run

: ${CPUS:="0"}
: ${MEMS:="0"}
# $RC_SVCNAME is a name of the service. By default, it equals a script name.
: ${CGROUP_NAME:=$RC_SVCNAME}
: ${CGROUP_CPUSET_PATH="/sys/fs/cgroup/cpuset"}

# This function specifies dependency information which is needed to start and
# stop the service in the right order in relation to other services.
depend()
{
    # The service must start after the 'cgroups' service.
    after cgroups
    # Don't stop the service when shutting the system down.
    keyword -shutdown
}

# This function contains commands necessary to start the service. Functions
# 'ebegin', 'epend', 'einfo' are defined by openrc-run and used for logging.
start()
{
    cd "$CGROUP_CPUSET_PATH"

    ebegin "Creating cgroup $CGROUP_NAME"
    mkdir "$CGROUP_NAME"
    eend $? || return $?

    echo "$MEMS" > "$CGROUP_NAME/cpuset.mems"
    echo "$CPUS" > "$CGROUP_NAME/cpuset.cpus"

    einfo "Moving all tasks to cgroup $CGROUP_NAME"
    cat tasks | xargs -n1 echo >"$CGROUP_NAME/tasks" 2>/dev/null
}
```

```
    return 0
}

# This function contains commands necessary to stop the service.
stop()
{
    cd "$CGROUP_CPUSET_PATH"

    einfo "Removing all tasks from cgroup $CGROUP_NAME"
    cat "$CGROUP_NAME/tasks" | xargs -n1 echo >tasks 2>/dev/null

    ebegin "Removing cgroup $CGROUP_NAME"
    rmdir "$CGROUP_NAME"
    eend $? || return $?
}
```

If you save this script to `/etc/init.d/isoltasks`, you can use it as a regular service.

```
# /etc/init.d/isoltasks start
* Creating cgroup isoltasks ...          [ ok ]
* Moving all tasks to cgroup isoltasks
# /etc/init.d/isoltasks stop
* Removing all tasks from cgroup isoltasks
* Removing cgroup isoltasks ...          [ ok ]
```

For more information about built-in functions and environment variables used in init scripts, see `man openrc-run` (provided by package **openrc-doc**).

See also:

- [Writing Init Scripts](#)
- [Handbook:X86/Working/Initscripts](#)

## 6. Mounting filesystems

### nfs

To mount nfs targets, install the **nfs-utils** package first.

```
apk add nfs-utils
```

OpenRC does not automatically mount nfs targets specified in */etc/fstab*. Enable the `netmount` service for that.

```
rc-update add netmount default
```

### tmpfs

Under `systemd`, */tmp* is automatically mounted as tmpfs. In Alpaquita, to mount */tmp* as tmpfs, configure the */etc/fstab* as in the following example:

```
tmpfs    /tmp      tmpfs    rw,nosuid,noatime,nodev,size=1G,mode=1777    0 0
```

## 7. Console font

A console font is set by the OpenRC service `consolefont`. Before using it, install some fonts first, for example:

```
apk add terminus-font
```

To change the default font, set the `consolefont` variable in `/etc/conf.d/consolefont` to the name of a file found in `/usr/share/consolefonts/`, for instance:

```
consolefont="ter-v20b.psf.gz"
```

The `consolefont` service is not enabled by default. To enable and start it, run the following commands:

```
rc-update add consolefont boot  
rc-service consolefont start
```

To preview the font, use utility `setfont`.

```
setfont ter-v20b.psf.gz
```

**Note:**

`setfont` changes the font only for the console currently in use.

## 8. getty on the serial console

Under `systemd`, it is enough to specify `console=ttyS0` in the kernel command line and `systemd` automatically starts a getty for it. In Alpaquita, additional configuration is needed. Use `/usr/sbin/init` or `OpenRC` for it.

### `/usr/sbin/init`

To enable `getty` on the serial console using `/usr/sbin/init`, uncomment or add this line to `/etc/inittab`:

```
ttyS0::respawn:/sbin/getty -L ttyS0 115200 vt100
```

For the changes to take effect without a reboot, reload the init process `/etc/inittab`. Use the following command:

```
kill -HUP 1
```

### OpenRC

To enable and start `getty` on the serial console using `OpenRC`, set up the `agetty.ttyS0` service.

```
apk add agetty
ln -s /etc/init.d/agetty /etc/init.d/agetty.ttyS0
rc-update add agetty.ttyS0 boot
rc-service agetty.ttyS0 start
```

You can edit `agetty` options in the `/etc/conf.d/agetty.ttyS0` file. See the `/etc/conf.d/agetty` file for option description and examples.

## 9. Single-user mode

If you need to do something that is not possible at the default OpenRC runlevel, you can try to do it in the single-user mode (also known as the rescue mode). You can enter the single-user mode at different stages of a booting process, namely:

- `initramfs (dracut)`
- `/usr/sbin/init`
- OpenRC

### initramfs (dracut)

Alpaquita uses **dracut** for creating initramfs images. dracut provides the `rd.break` kernel command line option that lets you drop to a shell right before switching to a root filesystem mounted on `/sysroot`. If you exit from the shell, the booting process continues as usual.

**Note:**

Shutdown commands (`halt`, `poweroff`, `reboot`) do not work without the `-f` option in the dracut shell. The `-f` option forces a shutdown without relying on a `/usr/sbin/init` process, which is not started yet at that moment.

It is also possible to drop to a shell at earlier stages. For more information, see `man dracut.cmdline` (provided by the **dracut-doc** package).

### /usr/sbin/init

To enable single-user mode provided by `/usr/sbin/init`, add `single` to the kernel command line. In this case, `/etc/inittab` configuration file is ignored and you drop to a shell right after switching to a root filesystem, but before any OpenRC service starts.

If you want to get to the *default* runlevel from this stage, run the following commands:

```
openrc sysinit
```



```
openrc default  
kill -HUP 1 && exit
```

**Note:**

This works only if services started by the *sysinit* and *default* runlevels do not affect a tty you are currently using (mainly, *agetty.\** services).

## OpenRC

Single-user mode provided by OpenRC is a special runlevel called *single*. When you start it, all services except those in the *sysinit* runlevel are stopped.

To get to the *single* runlevel from the *default* runlevel, run the following command:

```
openrc single
```

To get back to the *default* runlevel, run the command as in the next example:

```
openrc default
```

**Note:**

A tty you are using must be set up via */etc/inittab*, not via *agetty.\** OpenRC services.

For more information, see `man openrc` (provided by the **openrc-doc** package).



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