

EMBEDDED SYSTEM

Mission: DHCP Server

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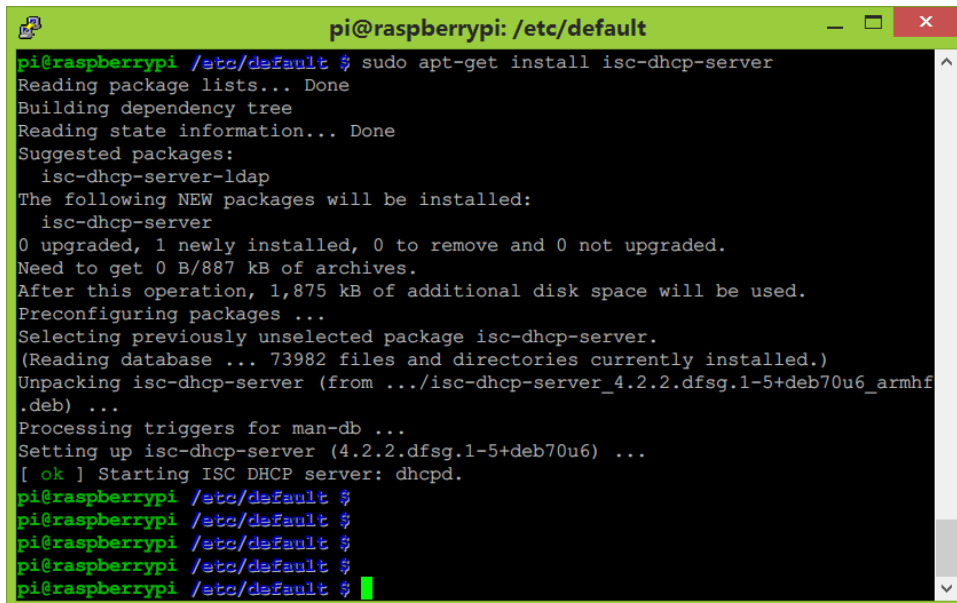
1. Device and Environment

- Devices: RPi, 5V power, net cable, micro USB, wireless LAN card
- Environments: Win 8.1 on PC, wheezy-raspbian on RPi

2. Installation

I chose the software isc-dhcp-server to construct the DHCP server. The installation process is rather simple. Just type the command and start the installation.

```
apt-get install isc-dhcp-server
```

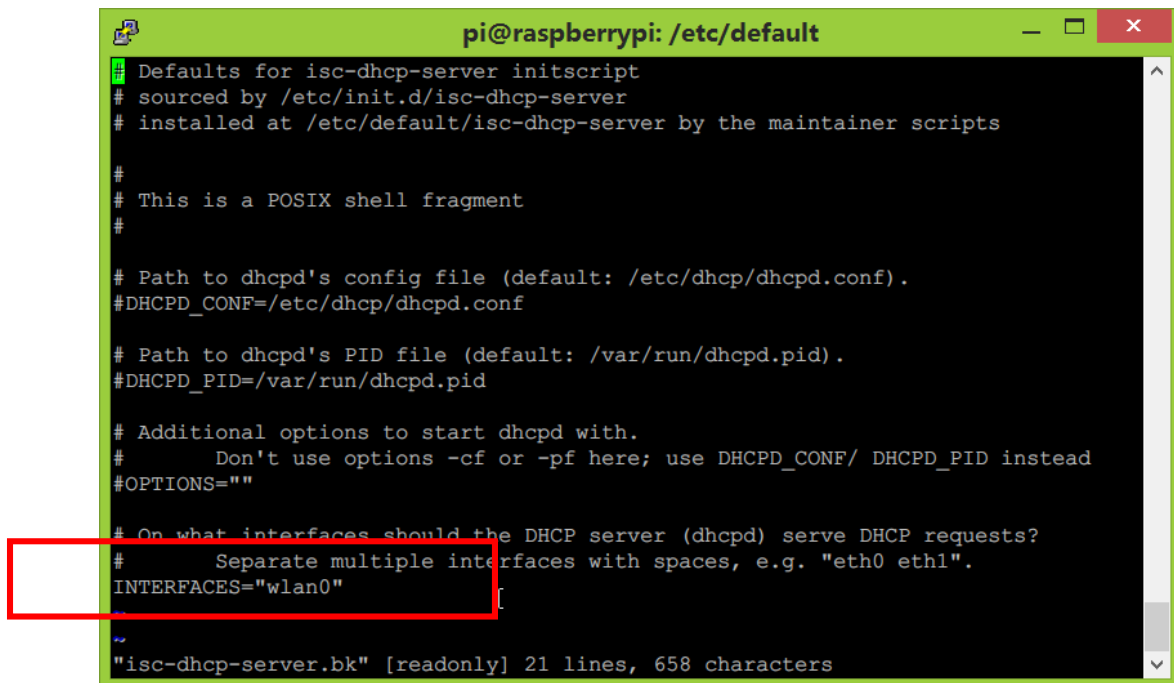


```
pi@raspberrypi /etc/default $ sudo apt-get install isc-dhcp-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  isc-dhcp-server-ldap
The following NEW packages will be installed:
  isc-dhcp-server
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 0 B/887 kB of archives.
After this operation, 1,875 kB of additional disk space will be used.
Preconfiguring packages ...
Selecting previously unselected package isc-dhcp-server.
(Reading database ... 73982 files and directories currently installed.)
Unpacking isc-dhcp-server (from .../isc-dhcp-server_4.2.2.dfsg.1-5+deb70u6_armhf.deb) ...
Processing triggers for man-db ...
Setting up isc-dhcp-server (4.2.2.dfsg.1-5+deb70u6) ...
[ ok ] Starting ISC DHCP server: dhcpd.
pi@raspberrypi /etc/default $
pi@raspberrypi /etc/default $
pi@raspberrypi /etc/default $
pi@raspberrypi /etc/default $
pi@raspberrypi /etc/default $
```

Figure 1 DHCP server installation

When the installation completed, some configuration files should be modified so that the DHCP server works as you need.

3. Configuration: /etc/default/isc-dhcp-server



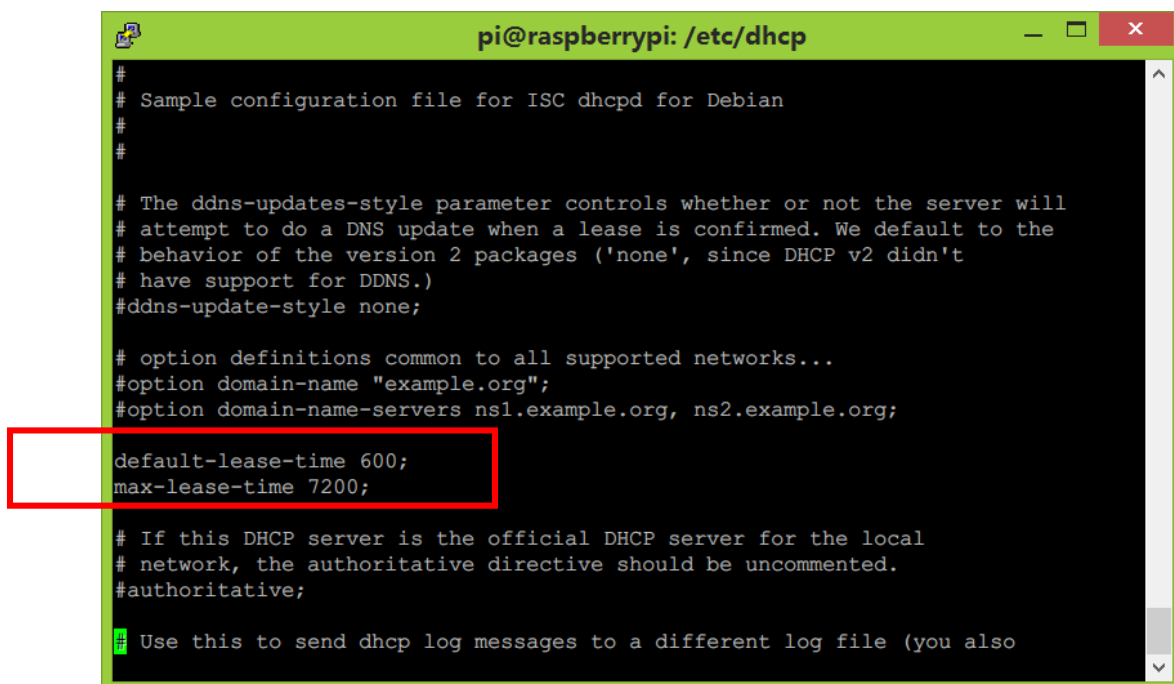
```
pi@raspberrypi: /etc/default
# Defaults for isc-dhcp-server initscript
# sourced by /etc/init.d/isc-dhcp-server
# installed at /etc/default/isc-dhcp-server by the maintainer scripts
#
# This is a POSIX shell fragment
#
# Path to dhcpd's config file (default: /etc/dhcp/dhcpd.conf).
#DHCPD_CONF=/etc/dhcp/dhcpd.conf
#
# Path to dhcpd's PID file (default: /var/run/dhcpd.pid).
#DHCPD_PID=/var/run/dhcpd.pid
#
# Additional options to start dhcpd with.
# Don't use options -cf or -pf here; use DHCPD_CONF/ DHCPD_PID instead
#OPTIONS=""
#
# On what interfaces should the DHCP server (dhcpd) serve DHCP requests?
# Separate multiple interfaces with spaces, e.g. "eth0 eth1".
INTERFACES="wlan0"
#
#
"isc-dhcp-server.bk" [readonly] 21 lines, 658 characters
```

Figure 2 content /etc/default/isc-dhcp-server

The INTERFACES option depends on which network card you want the DHCP service works for. Since I would construct a WLAN server, the option is wlan0, standing for the first WLAN card.

4. Configuration: /etc/dhcp/dhcpd.conf

Set the default-lease-time and the max-lease-time as following.



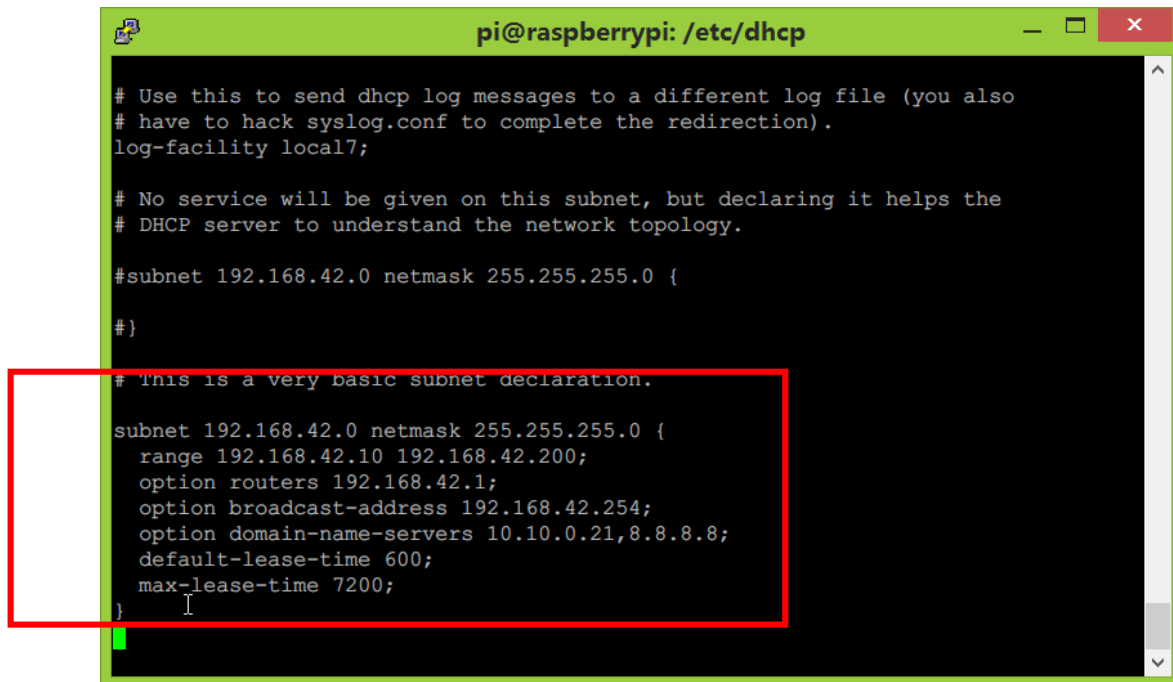
```
pi@raspberrypi: /etc/dhcp
#
# Sample configuration file for ISC dhcpd for Debian
#
#
# The ddns-updates-style parameter controls whether or not the server will
# attempt to do a DNS update when a lease is confirmed. We default to the
# behavior of the version 2 packages ('none', since DHCP v2 didn't
# have support for DDNS.)
#ddns-update-style none;
#
# option definitions common to all supported networks...
#option domain-name "example.org";
#option domain-name-servers ns1.example.org, ns2.example.org;
#
default-lease-time 600;
max-lease-time 7200;
#
# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
#authoritative;
#
# Use this to send dhcp log messages to a different log file (you also
```

Figure 3 configuration

However, if you want the DHCP server provide service to the router process, some additional specification should be added to the text.

Since I set the RPi with IP address 192.168.42.1 and netmask etc, the specification should be added as the picture below.

Any client who want connect to the RPi would get an IP address between 192.168.42.10 and 192.268.42.200. And the DNS service wil comes from the servers you registered here.



```
pi@raspberrypi: /etc/dhcp

# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
log-facility local7;

# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.

#subnet 192.168.42.0 netmask 255.255.255.0 {
#}

# This is a very basic subnet declaration.

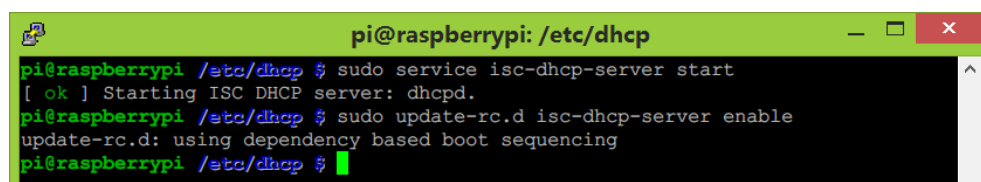
subnet 192.168.42.0 netmask 255.255.255.0 {
    range 192.168.42.10 192.168.42.200;
    option routers 192.168.42.1;
    option broadcast-address 192.168.42.254;
    option domain-name-servers 10.10.0.21,8.8.8.8;
    default-lease-time 600;
    max-lease-time 7200;
}
```

Figure 4 configuration

5. Set Up the DHCP Server

To start the DHCP server, the command below should be executed.

```
sudo service isc-dhcp-server start
```



```
pi@raspberrypi /etc/dhcp $ sudo service isc-dhcp-server start
[ ok ] Starting ISC DHCP server: dhcpd.
pi@raspberrypi /etc/dhcp $ sudo update-rc.d isc-dhcp-server enable
update-rc.d: using dependency based boot sequencing
pi@raspberrypi /etc/dhcp $
```

Figure 5 started successfully

And if you want the service started when booting, type the command and executed it.

```
sudo update-rc.d isc-dhcp-server enable
```

6. Verification

From now on, the DHCP server works. I will test the DHCP server with my mobile and my laptop. See the following pictures, and the WLAN S.H.I.E.L.D is the name of the RPi network. At first, my phone is unconnected.



Figure 6 unconnected

Now connect to the RPi WLAN.



Figure 7 connected

As my laptop...



Figure 8 unconnected



Figure 9 connected

Two devices get their IP address allocated successfully. The IP 192.168.42.14 and 192.168.42.11 are in the range of the IP pool.

In summary, the mission was completed successfully.