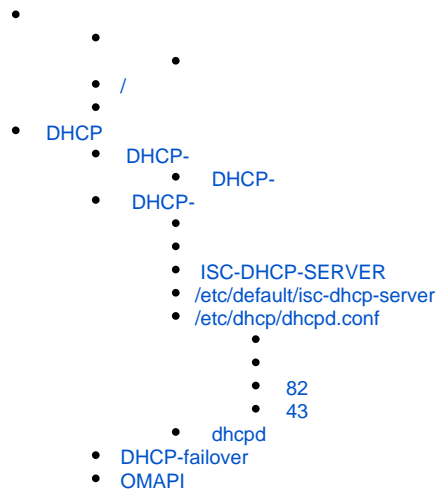


v1.20_ DHCP



```
DHCP    ISC-DHCP-SERVER.  Eltex.SoftWLC    :
```

- () IP- 43 (11 12) , GRE ESR.
- (management,) IP- 43 (10 13) , .
- IP- Wi-Fi , .
- DHCP 82, 60 giAddrField.

ISC-DHCP-SERVER SoftWLC.

```
sudo -s
apt-get update
apt-get install isc-dhcp-server
```

/

•

```
service isc-dhcp-server stop
```

$$\vdots$$

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

—, :

```
service isc-dhcp-server status
```

$$\vdots$$

```
* isc-dhcp-server is running
```

,

```
service isc-dhcp-server status
```

.

```
/var/log/dhcp.log
```

DHCP



,, , !

DHCP-

, L2, DHCP :

- ,
- , ,

, , SSID.

- EMS .

.

DHCP-

:

100.111.70.0/24	
100.111.70.1	
100.123.0.54	(EMS)
100.111.71.0/24	
100.111.71.1	
172.16.0.1, 8.8.8.8	DNS

DHCP , .

DHCP */etc/dhcp/*

```
nano /etc/dhcp/dhcpd.conf
```

dhcp (:) , , domain-name-servers, IP-, . , '#', dhcp.

```

log-facility local7;
default-lease-time 3600;
max-lease-time 3610;

# Eltex
class "ELTEX-DEVICES" {
    match if (
        (substring (option vendor-class-identifier, 0, 14)="ELTEX_WEP-12AC") or
        (substring (option vendor-class-identifier, 0, 14)="ELTEX_WOP-12AC") or
        (substring (option vendor-class-identifier, 0, 14)="ELTX_WEP-12AC") or
        (substring (option vendor-class-identifier, 0, 14)="ELTX_WOP-12AC") or
        (substring (option vendor-class-identifier, 0, 13)="ELTEX_WEP-2AC") or
        (substring (option vendor-class-identifier, 0, 19)="ELTEX_WEP-2AC-SMART") or
        (substring (option vendor-class-identifier, 0, 13)="ELTEX_WOP-2AC") or
        (substring (option vendor-class-identifier, 0, 12)="ELTEX_WEP-1L") or
        (substring (option vendor-class-identifier, 0, 12)="ELTEX_WEP-2L") or
        (substring (option vendor-class-identifier, 0, 12)="ELTEX_WOP-2L") or
        (substring (option vendor-class-identifier, 0, 6)="ESR-10") or
        (substring (option vendor-class-identifier, 0, 6)="ESR-20")
    );
}

#
subnet 100.111.70.0 netmask 255.255.255.0 {
    pool {
        option routers 100.111.70.1;
        range 100.111.70.4 100.111.70.254;
# 43 10 , EMS ( 100.123.0.54)
        option vendor-encapsulated-options 0A:0C:31:30:30:2e:31:32:33:2e:30:2e:35:34;
        allow members of "ELTEX-DEVICES";
        option domain-name-servers 172.16.0.1, 8.8.8.8;
    }
}

#
subnet 100.111.71.0 netmask 255.255.255.0 {
    pool {
        option routers 100.111.71.1;
        range 100.111.71.4 100.111.71.254;
        option domain-name-servers 172.16.0.1, 8.8.8.8;
    }
}

```

DHCP:

log-facility local7 —

default-lease-time — , , , ..

max-lease-time — ,

subnet — (100.111.71.0 255.255.255.0)

option routers — IP- .(100.111.71.1)

range — (100.111.71.4 100.111.71.254)

option vendor-encapsulated-options — 43 10, .

domain-name-servers — DNS. (172.16.0.1, 8.8.8.8).

allow members of "ELTEX-DEVICES" — . , (class "ELTEX-DEVICES", ELTEX_WEP-12AC, ELTEX_WEP-2AC, ELTEX_WEP-2L ..)

/etc/default/isc-dhcp-server , DHCP DHCP. , , , .

```
ifconfig
```

```
, , :
```

```
INTERFACES="eth1.101 eth1.102"
```

```
.
```

```
service isc-dhcp-server restart
```

DHCP-

DHCP- :

- *(inner operator)*- . GUI EMS, SMS gateway NorthboundInterface. (keepalived);
- *(outer operator)*- . . (keepalived);
- *DHCP* Relay- .

```
auto eth1.102 #
    iface eth1.102 inet static
    address 192.168.114.8
    netmask 255.255.255.192
    network 192.168.114.0
    vlan_raw_device eth1

auto eth1.100 #
    iface eth1.100 inet static
    address 172.17.209.9
    netmask 255.255.255.192
    network 172.17.209.0
    vlan_raw_device eth1

auto eth1.101 #      IP
    iface eth1.101 inet static
    address 10.203.5.7
    netmask 255.255.255.192
    network 10.203.5.0
    vlan_raw_device eth1
```

DHCP :

10.203.32.0 – IP- ;

192.168.200.0 – management IP- ;

100.65.64.0– IP- .

/etc/network/interfaces.

```
up ip route add 100.65.64.0/22 via 192.168.114.10
up ip route add 192.168.200.0/22 via 192.168.114.10
up ip route add 10.203.32.0/19 via 10.203.5.1
```

ISC-DHCP-SERVER

/etc/default/isc-dhcp-server

,, :

```
INTERFACES="eth1.101 eth1.102"
```

/etc/dhcp/dhcpd.conf

DHCP-

```
default-lease-time 60;
max-lease-time 120;
log-facility local7;
class "ELTEX-DEVICES" {
    match if (
        (substring (option vendor-class-identifier, 0, 14) = "ELTEX_WEP-12AC") or
        (substring (option vendor-class-identifier, 0, 14) = "ELTEX_WOP-12AC") or
        (substring (option vendor-class-identifier, 0, 14) = "ELTX_WEP-12AC") or
        (substring (option vendor-class-identifier, 0, 14) = "ELTX_WOP-12AC")
    );
}
subnet 192.168.114.64 netmask 255.255.255.192 {}
subnet 10.203.5.64 netmask 255.255.255.192 {}
#first IP
subnet 10.203.32.0 netmask 255.255.254.0 {
    pool {
        option routers 10.203.32.2;
        range 10.203.32.130 10.203.32.230;
        failover peer "dhcp-failover";
        option vendor-encapsulated-options 0B:0c:31:30:2E:32:30:33:2E:35:2E:31:31:32:0C:0C:31:30:2E:32:30:33:2E:
35:2E:31:31:33;
        allow members of "ELTEX-DEVICES";
    }
}
#managed IP
subnet 192.168.200.0 netmask 255.255.252.0 {
    pool {
        option routers 192.168.200.5;
        range 192.168.200.120 192.168.200.164;
        failover peer "dhcp-failover";
        option vendor-encapsulated-options A:F:31:39:32:2E:31:36:38:2E:31:31:34:2E:31:30:34;
        allow members of "ELTEX-DEVICES";
    }
}
#User IP ( )
subnet 200.65.64.0 netmask 255.255.240.0 {
    pool {
        option routers 200.65.64.5;
        range 200.65.64.200 200.65.64.250;
        failover peer "dhcp-failover";
        option domain-name-servers 172.16.0.1, 8.8.8.8;
    }
}
```

IP- (), . /etc/dhcp/dhcpd.conf, :

1. , , **/var/lib/dhcp/touch /var/lib/dhcp/hosts.**

2. .

```
host wep_01 {    hardware ethernet a8:f9:4b:b0:00:00;    fixed-address 192.168.1.1; }
```

,
host wep_01 – .

hardware ethernet a8:f9:4b:b0:00:01 – MAC- . , MAC , .

fixed-address 192.168.200.133 – IP- .

3. :

```
include "/var/lib/dhcp/hosts";
```

4. DHCP- , :

```
chown dhcpd:dhcpd /var/lib/dhcp/static/hosts
```

5. apparmor, **/etc/apparmor.d/usr.sbin.dhcpd** ():

```
/var/lib/dhcp/hosts r,
```

6.

```
service apparmor restart
service isc-dhcp-server restart
```

:

```
subnet 192.168.200.0 netmask 255.255.252.0 {
    pool {
        option routers 192.168.200.5;
        range 192.168.200.120 192.168.200.164;
        option vendor-encapsulated-options A:F:31:39:32:2E:31:36:38:2E:31:31:34:2E:31:30:34;
        include "/var/lib/dhcp/hosts";
    }
}
```

. . .

82

82 :

```

class "NEW_class" {
match if (
    (option agent.circuit-id = "E320-1-210:GigabitEthernet 1/0/2.25030007:2503-7")
    and
        (
            (substring (option vendor-class-identifier, 0, 14) = "ELTEX_WEP-12AC") or
            (substring (option vendor-class-identifier, 0, 14) = "ELTEX_WOP-12AC") or
            (substring (option vendor-class-identifier, 0, 14) = "ELTX_WEP-12AC") or
            (substring (option vendor-class-identifier, 0, 14) = "ELTX_WOP-12AC")
        )
    );
}

```

, :

```

subnet 192.168.200.0 netmask 255.255.252.0 {
    pool {
        option routers 192.168.200.5;
        range 192.168.200.120 192.168.200.164;
        option vendor-encapsulated-options A:F:31:39:32:2E:31:36:38:2E:31:31:34:2E:31:30:34;
        allow members of "NEW_class";
    }
}

```

, .

43

DHCP--.

SoftWLC :

10	EMS-.
11	management-.
12	data-.
13	, .

RFC2132 :

When encapsulated vendor-specific extensions are used, the information bytes 1-n have the following format:

Code	Len	Data item	Code	Len	Data item	Code
-----+-----+-----+-----+-----+-----+-----+						
T1	n	d1 d2 ...	T2	n	D1 D2 	
-----+-----+-----+-----+-----+-----+-----+						

HEX(). ASCII HEX.

'', ''.

:

- 43 (11 12) :

```
option vendor-encapsulated-options 0B:0B:31:30:2E:32:30:33:2E:35:2E:31:30:0C:0B:31:30:2E:32:30:33:2E:35:2E:31:31;
31;
```

:

11, 11, 10.203.5.10;

12, 11, 10.203.5.11.

- 43 (10) :

```
option vendor-encapsulated-options 0A:0D:31:39:32:2E:31:36:38:2E:31:31:34:2E:34;
```

:

10, 13, 192.168.114.4

- 13 :

```
option vendor-encapsulated-options 0D:0A:65:6c:74:65:78:2e:72:6f:6f:74;
```

:

13, 10, : eltex.root



, , . 10 13 :

```
option vendor-encapsulated-options 0A:0D:31:39:32:2E:31:36:38:2E:31:31:34:2E:34:0D:0A:65:6c:74:65:78:2e:72:6f:6f:74;
```

dhcpcd

DHCP , dhcpcd.

dhcpcd -t , -cf

```
dhcpcd -t -cf /path/to/dhcpcd.conf
```

:

```
root@vagrant-ubuntu-trusty-64-test1111:~# dhcpcd -t -cf /etc/dhcp/dhcpcd_test.conf
Internet Systems Consortium DHCP Server 4.2.4
Copyright 2004-2012 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/
/etc/dhcp/dhcpcd_test.conf line 97: semicolon expected.
    range
    ^
/etc/dhcp/dhcpcd_test.conf line 105: Pool declaration with no address range.
    }
    ^
Pool declarations must always contain at least
one range statement.
Configuration file errors encountered -- exiting
```


DHCP-failover

/etc/dhcp/dhcpd.conf

```
:  
  
failover peer "dhcp-failover" {  
    primary;  
    address 192.168.114.8;  
    port 647;  
    peer address 192.168.114.9;  
    peer port 647;  
    max-response-delay 30;  
    max-unacked-updates 10;  
    load balance max seconds 3;  
    auto-partner-down 180;  
    mclt 1800;  
    split 128;  
}
```

```
:  
  
failover peer "dhcp-failover" {  
    secondary;  
    address 192.168.114.9;  
    port 647;  
    peer address 192.168.114.8;  
    peer port 647;  
    max-response-delay 30;  
    max-unacked-updates 10;  
    load balance max seconds 3;  
    auto-partner-down 60;  
}
```

(192.168.200.0)

```
failover peer "dhcp-failover";
```

 DHCP-failover . . .

OMAPI

DHCP, DHCP . , -K

```
root@vagrant-ubuntu-trusty-64-test1111:~# dnssec-keygen -K /etc/dhcp/ -r /dev/urandom -a HMAC-MD5 -b 512 -n  
HOST omapi_key  
Komapi_key.+157+35749
```

```
root@vagrant-ubuntu-trusty-64-test1111:~# cat /etc/dhcp/Komapi_key.+157+35749.key | awk '{print $7 $8}'  
kvxcUNEtU0137tWK/uEKU/MSQxinN0lTifbLwaQd0SvvhtW+PpvlHqSbHJnNLIfO7KSA7KFWtjoEUqIIJXgxmg==
```

DHCP , , omapi_key

```
key omapi_key {
    algorithm HMAC-MD5;
    secret "kvxcUNetu0137tWK/uEKU/MSQxinN0lTifbLwaQd0SvvhtW+PpvlHqSbHJnNLifo7KSA7KFWtjoEUqIIJXgxmg==" ;
};

omapi-port 7911;
omapi-key omapi_key;
```

isc-dhcp-server

```
service isc-dhcp-server restart
```

EMS OMAPI key name, OMAPI key Failover peer name

OMAPI key name	omapi_key
OMAPI key	kvxcUNetu0137tWK/uEKU/MSQxinN0lTifbLwaQd0SvvhtW+PpvlHqSbHJnNLifo7KSA7KFWtjoEUqIIJXgxmg==
Failover peer name	dhcp-failover