1 CRR WiFi Configuration

The document describes how to configure CRR WiFi Access Point and client if the router is equipped with a wireless chip. Section 1.2 presents a configuration example of WiFI Access Point (AP) with an SSID “CRR-WIFI” Section 1.3 shows how to configure DHCP to serves IP addresses to the AP clients. Section 1.4 describes how to configure CRR to connect to an existing WiFi network.

1.1 WlanManager Plugin

In order to enable WiFi configuration (either as an Access Point or as a Client) the ARES WlanManager Plugin must be loaded. To load the WlanManager plugin, add it to the list of enabled ARES plugins:

```
   "Plugins" : {
      "WlanManager" : {}
   }
```

1.2 CRR WiFi Access Point

The following configuration provides an example WiFI Access Point (AP) with an SSID “CRR-WIFI. The configuration sets up an ARES link as a WiFi Access Point on the wlan0 interface. The ARES configuration can be edited by running:

`configure ares`

```
{
   "RouterId" : 42,
   "Links" : [
      {
         "Name" : "eth0",
         // Type WAN enables Network address translation (NAT) on eth0
         "Type" : "WAN",
         "Interface" : {
            "Name" : "eth0",
            "Inet4Addresses" : ["192.168.10.254/24"],
         },

         "Routes" : [
            {"Network" : "default4" , "Via" : "192.168.10.1"}
         ]
      },
      {
         "Name" : "wlan0",
         "Type" : "Simple",
         "Interface" : {
            "Type" : "WiFi",
            "Name" : "wlan0",
            "Inet4Addresses" : [ "10.0.0.1/24" ],
            "DHCP" : { "IPv4" : { "Enable" : true } },
            "WiFi" : {
               "AccessPoint" : {
                  "SSID" : "CRR-WIFI",
                  "Passphrase" : "crrtest123!",
                  "Protocols" : [ "802.11ac" ]
               }
            }
         },
```

```
      }
   ],
   "Plugins" : {
      "WlanManager" : {}
   }
}
```

1.3 DHCP Configuration

Depending on the use case scenario, WiFi clients may be configured with static routes. Alternatively CRR can also be configured to serve IP addresses via DHCP to the WiFi clients. Configuring DHCP involves two steps, 1) enabling DHCP on a given interface 2) configuring IP address blocks to be served on the configured interface. The two steps are described in the following two subsections.

1.3.1 DHCP Interface Configuration

To enable DHCP on one or more interfaces, edit ares configuration file by running the following:

`configure ares`

For each interface you want IPv4 DHCP to be enabled add the following configuration under the ares interface configuration:

```
"DHCP" : { "IPv4" : { "Enable" : true } }
```

The previous section already covers this example configuration. If you also want to enable IPv4 DHCP, the configuration becomes:

```
"DHCP" : {
   "IPv4" : { "Enable" : true },
   "IPv6" : { "Enable" : true }
 }
```

1.3.2 DHCP IPV4 Configuration

To configure IPV4 address ranges to be served by DHCP, edit the DHCP IPv4 configuration via:

`configure dhcp server ipv4`

The following example shows how to configure DHCP to serve addresses from the range 10.0.0.100 to 10.0.0.254 on the subnet 10.0.0.0/24. Notice that the interface where DHCP is enabled on must also be configured with an address in the same subnet for DHCP to work correctly. To ensure that is the case ARES configuration shown earlier does add 10.0.0.1 to wlan0 via the configuration line:

```
"Inet4Addresses" : [ "10.0.0.1/24" ]
```

This is the final IPv4 DHCP configuration:

```
default-lease-time 600;
max-lease-time 7200;

option domain-name-servers 8.8.8.8;

subnet 10.0.0.0 netmask 255.255.255.0 {
   range 10.0.0.100 10.0.0.254;
   option routers 10.0.0.1;
}
```

The above configuration will configure a DHCP lease time of 600s, with a maximum lease time of 7200s. The DHCP server will offer the DNS 8.8.8.8 to DHCP clients. Client addresses will be allocated from 10.0.0.100/24 through 10.0.0.254/24, and will be offered wlan0's IP Address of 10.0.0.1 as the default route.

1.4 CRR WiFi Client

CRR can also be configured to connect to an existing WiFi Network. The following subsections describe WiFi client configuration.

1.4.1 ARES Configuration

The following sample configuration will set up an ARES link as a DHCP WiFi client to a WiFi network with an SSID "BLUE-WIFI". The ARES configuration can be edited by running:

```
configure ares
```

```
{
   "RouterId" : 42,
   "Links" : [
      {
         "Name" : "wlan0",
         "Type" : "Simple",
         "Interface" : {
            "Type" : "WiFi",
            "Name" : "wlan0",
            "Inet4Addresses" : "auto",
            "DHCP" : { "IPv4" : { "Enable" : true } },
            "WiFi" : {
               "Client" : {
                  "SSID" : "BLUE-WIFI",
                  "Passphrase" : "bluewifitest123!"
               }
            }
         }
      }
   ],
   "Plugins" : {
      "WlanManager" : {}
   }
}
```

2 WiFi Configuration Parameters

The following parameters are available for configuration of ARES links of type WiFi.

2.1 Interface

2.1.1 WiFi Access Point

2.1.1.1 Driver

Property: Links::<link>::Interface::WiFi::AccessPoint::SSID

Description: The wireless chipset driver to use.

Type: Driver – One of [hostap, wired, none, nl80211, bsd]

Default: nl80211

2.1.1.2 SSID
Property: Links::<link>::Interface::WiFi::AccessPoint::SSID

Description: The SSID of the access point.

Type: String

Default: None, required

2.1.1.3 Passphrase
Property: Links::<link>::Interface::WiFi::AccessPoint::Passphrase

Description: The passphrase to connect to the wireless network. If ends in ".wpa2" it assumes the passphrase is read from a file with this name.

Type: String or WPA2 File

Default: None (unprotected)

2.1.1.4 SSID Broadcast
Property: Links::<link>::Interface::WiFi::AccessPoint::BroadcastSSID

Description: Enable/disable broadcasting the SSID.

Type: Boolean

Default: true

2.1.1.5 802.11 Protocol Selection
Property: Links::<link>::Interface::WiFi::AccessPoint::Protocols

Description: 802.11 protocols to support.

Type: 802.11 Protocol – One of [802.11a, 802.11b, 802.11g, 802.11n_2G, 802.11n_5G, 802.11ac]

Default: None, required

2.1.1.6 2.4GHz Channel Selection
Property: Links::<link>::Interface::WiFi::AccessPoint::2.4GHzChannel

Description: The channel used for the 2.4Ghz access point.

Type: 802.11 2.4 GHz Channel Number

Default: auto

2.1.1.7 5GHz Channel Selection
Property: Links::<link>::Interface::WiFi::AccessPoint::5GHzChannel

Description: The channel used for the 5Ghz access point.

Type: 802.11 5 GHz Channel Number

Default: auto

2.1.1.8 Allow List

Property: Links::<link>::Interface::WiFi::AccessPoint::AllowList

Description: List of allowed client MAC Addresses. If specified, this list is used regardless of deny list configuration. If not specified, use deny list, if specified, otherwise all clients will be allowed.

Type: MAC Address List

Default: None

2.1.1.9 Deny List

Property: Links::<link>::Interface::WiFi::AccessPoint::DenyList

Description: List of denied client MAC Addresses. If specified, and allow list is not specified, allow all clients except those in this list. If not specified, default to the allow list. If neither is set, allow all.

Type: MAC Address List

Default: None

2.1.2 WiFi Client

2.1.2.1 SSID

Property: Links::<link>::Interface::WiFi::Client::SSID

Description: The SSID of the wireless network to connect to.

Type: String

Default: None, required

2.1.2.2 Passphrase

Property: Links::<link>::Interface::WiFi::Client::Passphrase

Description: The passphrase to connect to the wireless network. If ends in ".wpa2" it assumes the passphrase is read from a file with this name.

Type: String or WPA2 File

Default: None (unprotected)

2.1.2.3 Connection Timeout

Property: Links::<link>::Interface::WiFi::Client::Timeout

Description: The number of seconds to wait to connect to the SSID before failing.

Type: UINT8

Default: 5