

Installing and Configuring NAC Server: Manual Version 1.0

1 Installing NAC Server

The NAC server is a regular DHCP server, enhanced with the ability of providing NDN parameters to users. Please download the latest DHCP version from the following link and install the DHCP server:

<http://www.isc.org/software/dhcp/>

2 Configuring NAC Server

To configure the NAC server, you **MUST** launch a gateway application, and then generate the NDN configuration as is described in section 2.2.

2.1 Launching gateway application

NDN gateway is the host through which the users can connect to NDN network. Administrators must launch a gateway application on the NDN gateway. It is designed for the gateways to receive NDN namespace and other related parameters from users, and construct FIB on NDN gateway.

Note that this application is a temporary solution.

```
Usage: nac_gw <-ga gw_ip> <-gp gw_port> [-ca ccnd_ip]
        [-cp ccnd_port] [-t lifetime]
```

You must specify the IP address and port on which this application is running. Besides that, you can also specify the ccnd's IP address and port. Otherwise, the application assumes that the ccnd uses the same IP address as this application, and the ccnd port is 9695 in default.

2.2 Configuring NAC Server

After install DHCP server, administrators MUST configure it to provide NDN parameters. Three options MUST be added into the configure file "dhcpd.conf":

- Code = 246: NDN NAC server address(es)
- Code = 247: NDN gateway address, port, reachable name space
- Code = 248: NDN name space for client use

A tool (conf_parse.py), which is located in folder "admin", can help administrators to create the such NDN information. It reads a configure file that is in XML format, and generate the configure items. Then, the administrator MUST copy and paste the generated configure items to the dhcpd.conf, and start/restart the DHCP server.

We provide an template file "**nac.conf**" in folder "admin". Administrators can modify it as your own configure file.

Figure 1: An configuration sample file

```

<!--start of the configuration-->
< ndn_config > #
  < nacserver >
    <!--one NAC server-->
    < host >
      <!--address type-->
      < afi > 0 < /afi >
      <!-- IP address -->
      < addr > value < /addr >
    < /host >
    ...
  < /nacserver >

  <!--start of the NDN gateway configuration-->
  < gateway >
    <!--one gateway-->
    < host >
      <!--address type-->
      < afi > 0 < /afi >
      <!--IP address of the application running on the NDN gateway-->
      < addr > value < /addr >
      <!--port number of the application running on the NDN gateway-->
      < port > value < /port >
      <!--one gateway may have multiple prefixes-->
      < prefixes >
        <!--nameprefix-->
        < nameprefix > value < /nameprefix >
        ...
      < /prefixes >
    < /host >
    ...
  < /gateway >

  <!--start of the namespace configuration-->
  <!--All users share the same namespace-->
  < namespace >
    ccnx:/ndn/colostate.edu/netsec
  < /namespace >
< /ndn_config >

```

When editing, please note two points:

(1) You MUST specify the address type, AFI, in the configure file. 0 is IPv4 address, 1 is IPv6 address.

(2) The gateway address and port number for code 247 is not the IP address that the cnd is running on, but the one which the gateway application is using.

Add items into the configuration file The generated items include DHCP options declaration and assignment.

All the declaration MUST be added at the beginning of the configuration file.

Figure 2: DHCP options declaration

- authoritative;
- option NAC_SERVER code 246 = string;
- option NDN_GATEWAYS code 247 = string;
- option NDN_NAMESPACE code 248 = text;

The options assignment part need to be add in the **subnet** or **pool**. Please refer to the dhcpd.conf manual for more details.

Figure 3: DHCP options assignment

- option NAC_SERVER [HexString];
 - option NDN_GATEWAYS [HexString];
 - option NDN_NAMESPACE [Text];
-

Optimization Sometimes, the users want to get both the NDN parameters and IP address in the DHCP process. To support that, the administrator MUST configure the "dhcpd.conf" file to enable the NAC server maintain a IP address pool.

2.3 Configuring SRV RR

If the NAC server is not in your broadcast domain, it is impossible to locate it by broadcasting DHCPINFORM message. To locate NAC server in such scenario, we suggest the administrator add a SRV RR into the DNS server:

Figure 4: nac-server RR format

<code>_nac-server._udp.name</code>	TTL	IN	SRV	priority	weight	67	target
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- name: the domain name for which this record is valid.
- TTL: standard DNS time to live field.
- priority: the priority of the target host, lower value means more preferred.
- weight: A relative weight for records with the same priority.
- target: the canonical hostname of the machine providing the service.

NOTE: Administrators **MUST** change the above fields using your preferred value. To let the NAC server receive the DHCPINFORM message, the firewall **MUST** allow the DHCP messages to go through.

3 Launching NAC Server

run "*sudo dhcpd*"

To run the NAC server, you **MUST** create your own `dhcpd.conf`, and then launch NAC Server. If you are not familiar with ISC DHCP configuration, please refer to the **ISC DHCP manual** on your computer. We also provide a sample `dhcpd.conf` file for you, you can find `dhcpd.conf.example` in folder **admin**.

4 Deploying NAC Server

You have two options when you deploy the NAC server(s) in your domain.

- Option 1: Add the NDN parameters to your existing DHCP server. You do not need to modify the DHCP server code. After you add the NDN parameters to the associated subnet in the existing configuration file "`dhcpd.conf`", the existing DHCP server will provide DHCP OFFERS with NDN parameters.
- Option 2: Keep your existing DHCP servers untouched and add a NDN server to your network. This option makes no changes to your existing DHCP infrastructure. It will not disrupt any of your existing IP DHCP services, but will add NDN functionality after IP addresses have been assigned. You will then configure the server to handout NDN configuration parameters.