Tsinghua Lightweight4over6

Configuration Guide

1. lwAFTR & DHCP Server Configurations

1.1. Introduction

lwAFTR and DHCPv4-over-IPv6 Server(TSV) are collocated.

1.2. Basic Info

System Information:

Module	System	Kernel
lwAFTR	Linux (Ubuntu 10.04LTS)	2.6.32
DHCPv4-over-IPv6 Server(TSV)	Linux	

Interfaces Information:

- IPv4 Interface: eth0
- IPv6 Interface: eth1

1.3. lwAFTR Configurations

Enter the directory of TC/tunnel/, there is a shell script called 'load' which launches the virtual NIC and configures it.

You can modify the IPv4 address of the virtual NIC in the script.

1.4. TSV Configurations

Enter the directory of TC/dhcp/server/. There are two related configuration files: dhcpd.conf, open4v6-eth0.sh

1.4.1. dhcpd.conf

```
shared-network network4_eth0 {
subnet 219.243.208.192 netmask 255.255.255.224 {
   option port-set 0x1234,0xF800;                  →Set port set index &
mask
   option routers 219.243.208.193;                 →Set the GW
   option domain-name-servers 8.8.8.8;             →DNS server
   }
   pool {
   range 219.243.208.197 219.243.208.197;          →addr pool
   #range 219.243.208.209 219.243.208.209;
   }
}
```

PS:

About the line of 'option port-set 0x1234,0xF800;' :

The first number is port-set index which is not the actually assigned port-set index but an arbitrary number

The second number is port-set mask which determines the length of the mask.

1.4.2. open4v6-eth0.sh

#!/bin/bash

rm -f dhcpd.leases →Clear old leases

touch dhcpd.leases →Create new dhcpd.leases file

./dhcpd -4v6 -4v6interface eth0 eth1 -p 67 -cf dhcpd.conf -lf dhcpd.leases –f

→The IPv4 address pool to be allocated (in dhcpd.conf file) should be in the same subnet with the IPv4 address of eth0.

→The eth1 is the IPv6 iface which the server listens on.

1.5. Compile the system

1) Enter the directory of TC/tunnel/
2) make clean
3) rm ioctl
4) make (Compile the virtual NIC module)
5) make ioctl
6) Enter the directory of TC/dhcp
7) ./configure
8) make

1.6. Launch the system

1) Enter the directory of TC/tunnel/
2) sudo ./load
3) sudo ./ioctl –c eth1 (Tell the virtual NIC the IPv6 physical NIC is eth1)
4) Enter the directory of TC/dhcp/server/
5) sudo ./open4v6-eth0.sh

PS:

If you only have one NIC (for example eth0, both IPv4 interface and IPv6 interface on it), you can modify the open4v6-eth0.sh like this:

./dhcpd -4v6 -4v6interface eth0 eth0 -p 67 -cf dhcpd.conf -lf dhcpd.leases –f

When you start the virtual NIC module, you should execute:

sudo ioctl –c eth0

1.7. Add static route

The route of allocated IPv4 address should point to the virtual NIC.

E.g.:

If the allocated address is 219.243.208.197, you should add a static route:

219.243.208.197/32 dev lw4over6

2. lwB4 & DHCP client + CRA Configurations

2.1. Introduction

lwB4 contains the following modules:

- tunnel module
- DHCP client (support port-set extension);
- Client Relay Agent (CRA)
- NAPT module (iptables)

2.2. Basic Info

System Information:

Module	System	Notes
tunnel module	Linux (Ubuntu 10.04LTS)	Kernel 2.6.32
DHCPv4 client	Linux	
Client Relay Agent (CRA)	Linux	
NAPT	Linux	iptables

Interfaces Information:

IPv6 Interface: eth0

2.3. tunnel module Configurations

Modify the script 'load' in the directory of cpe/tunnel/.

Change the parameters 'GW_IPV6_ADDRESS', 'TC_IPV6_ADDRESS', 'TI_IPV6_ADDRESS' and 'INTERFACE' according to your network and system configurations.

2.4. DHCPv4 client Configurations

There are directories used for dhcpcd, which are specified in dhcpcd/config.h .

Create related directories and put their paths in the config.h file. After that, run 'make clean' and then re-make the programs.

2.5. CRA Usage

Enter the directory of TI/cra/, and start CRA using the shell with following options:

./cra OPTIONS

OPTIONS	DESCRIPTION
-h	Display the usage information.
-a IP6ADDR1 IP6ADDR2	Set the local IPv6 address with IP6ADDR1, and the IPv6 address of the remote TSV or TRA with IP6ADDR2.
-b IFNAME1	Set the name of the interface which uses the IP6ADDR1 as its IPv6 address with IFNAME1.
-c IFNAME2	Set the name of the interface on which the DHCP client runs with IFNAME2. Note that this interface can be the same interface as IFNAME1.
-d	Run the CRA with default settings, which are settled in the beginning of the source code :-)

2.6. NAPT Configurations

NAPT functionality is accomplished by using iptables.

- donat.sh

  In the directory dhcpcd/. It will be invoked automatically by dhcpcd after the address and port-set is assigned successfully.

- offnat.sh

  In the directory dhcpcd/. It will be invoked automatically once the dhcpcd process is killed to stop the NAPT function.

2.7. Compile the system

1) Enter the directory of TI/cpe/tunnel/.
2) make clean
3) make
4) modify the TI/dhcpcd/config.h, Create related directories

5) Enter the directory of TI/dhcpcd/.

6) make

2.8. Launch the system

1) Enter the directory of TI/cpe/tunnel/.
2) sudo ./load
3) Enter the directory of TI/cra/.
4) Specify the IPv6 address of lwAFTR and lwB4 when running the CRA. Supposing IPv6 address of lwB4 is 2001::2, while that of lwAFTR is 2001::1.

   sudo ./cra –a 2001::2 2001::1
5) Enter the directory of TI/dhcpcd/.
6) sudo ./open4v6.sh