1 Introduction

This document is a quick guide to show how to implement IPv6 + IPv4 communication on one ENET port based on LWIP.

Environment setup:

- SDK: 2.10.1
- IDE: MCUXpresso 11.4.0
- EVK: i.MX RT1170
- PC: Win10

2 Steps

1. Download the i.MX RT1170 SDK 2.10.1 and import the lwip_udpecho_bm_cm7example project.

2. In lwipopts.h, refer to AN13458SW. Add the code as below:

```c
#define LWIP_IPV6 1
```

3. In lwip_udpecho_bm.c, refer to AN13458SW. Add the code as below:

```c
ip6_addr_t ipaddr_v6;
s8_t chosen_idx;
// IPv6
IP6_ADDR(&ipaddr_v6, PP_HTONL(0xFE800000), PP_HTONL(0x0), PP_HTONL(0x3DD79303), PP_HTONL(0x126c0df0));
netif_add_ip6_address(&netif, &ipaddr_v6, &chosen_idx);
netif.ip6_addr_state[chosen_idx] = IP6_ADDR_VALID;
ip6_addr_assign_zone(ip_2_ip6(&netif.ip6_addr[0]), IP6_UNICAST, &netif);
netif.ip6_addr_set_state(&netif, 0, IP6_ADDR_TENTATIVE);
```

4. Build the project, download it to the target board, and run the project.

5. Connect the PC and the target board, as shown in Figure 1.
6. **Perform the ICMP test.**

Open the CMD window and refer to the log below to test IPv6 and IPv4.

```
C:\Users\nxa16038>ping 192.168.0.102
Pinging 192.168.0.102 with 32 bytes of data:
  Reply from 192.168.0.102: bytes=32 time=2ms TTL=255
  Reply from 192.168.0.102: bytes=32 time=1ms TTL=255
  Reply from 192.168.0.102: bytes=32 time=1ms TTL=255
  Reply from 192.168.0.102: bytes=32 time=1ms TTL=255
Ping statistics for 192.168.0.102:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\Users\nxa16038>ping -6 FE80::3DD7:9303:126C:0DF0
Pinging fe80::3dd7:9303:126c:df0 with 32 bytes of data:
  Reply from fe80::3dd7:9303:126c:df0: time=1ms
  Reply from fe80::3dd7:9303:126c:df0: time=1ms
  Reply from fe80::3dd7:9303:126c:df0: time=1ms
  Reply from fe80::3dd7:9303:126c:df0: time=2ms
Ping statistics for fe80::3dd7:9303:126c:df0:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

7. **Perform the UDP test.**

UDP test needs the tool supporting both IPv6 and IPv4. Such tool is also provided in AN13458SW.
Refer to the log below to perform the test.

C:\Users\nxa16038\Desktop\tt2\udp_test_tool\x64\Debug>udp_test.exe -6 FE80::3DD7:9303:126c:df0 7 5001 test_string_12345
Build date and time: Oct 22 2021, 18:50:48
arc = 6
arg[0] = udp_test.exe
arg[1] = -6
arg[2] = FE80::3DD7:9303:126c:df0
arg[3] = 7
arg[4] = 5001
arg[5] = test_string_12345
Send ok.
Receiving...
Get connection.
Get string: test_string_12345
Remote addr: fe80:0000:0000:0000:3dd7:9303:126c:0df0

C:\Users\nxa16038\Desktop\tt2\udp_test_tool\x64\Debug>udp_test.exe -4 192.168.0.102 7 5001 test_string_12345
Build date and time: Oct 22 2021, 18:50:48
arc = 6
arg[0] = udp_test.exe
arg[1] = -4
arg[2] = 192.168.0.102
arg[3] = 7
arg[4] = 5001
arg[5] = test_string_12345
Send ok.
Receiving...
Get connection.
Get string: test_string_12345, len = 17
Remote addr: 192.168.0.102

3 Adding FreeRTOS

AN13458SW is a BM version code. If FreeRTOS is necessary, import the lwip_udpecho_freertos_cm7 example, and then perform the steps above. When downloading the SDK package, enable both LWIP and FreeRTOS. Then, this example is available.

4 About the SW package

AN13458SW can be built and run on i.MX RT1170 EVK directly.

5 Revision history

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<th>Rev.</th>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>0</td>
<td>15 November 2021</td>
<td>Initial release</td>
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