
CHAPTER 26

IPv6 Addressing

Exercises

1.

- a. 0000:0000:0000:0000:5555:5555:5555:5555
- b. 0000:0000:0000:0000:AAAA:AAAA:AAAA:AAAA
- c. 5555:5555:5555:5555:5555:5555:5555:5555
- d. 7777:7777:7777:7777:7777:7777:7777:7777

3.

- a. 0:FFFF:FFFF::
- b. 1234:2346:3456::FFFF
- c. 0:1::3456::FFFF:1200:1000
- d. ::FFFF::FFFF:24.123.12.6

5.

- a. 0000:0000:0000:0000:0000:0000:0000:0002
- b. 0000:0023:0000:0000:0000:0000:0000:0000
- c. 0000:000A:0002:0000:0000:0000:0000:0003
- d. 0123:0000:0000:0000:0000:0000:0012:0023

7. As discussed in the solution to Exercise 6, the best way is to apply different masks (starting from the longest one) to each address to find a match with the beginning address in a block. The prefix lengths are 10, 9, 8, 7, 6, 5, 4, and 3 as shown in Table 26.1. In other words, in each case, we need to only 1 to 8 tests.

a.

(0::0) AND (/10)	=	0000::/10	→	Not a defined block
(0::0) AND (/9)	=	0000::/9	→	Not a defined block
(0::0) AND (/10)	=	0000::/8	→	IPv4 compatible

In this case, all bits are 0's, the address is an **unspecified address** in this block.

b.

(0::FFFF:0:0) AND (/10)	=	0000::/10	→	Not a defined block
(0::FFFF:0:0) AND (/9)	=	0000::/9	→	Not a defined block
(0::FFFF:0:0) AND (/8)	=	0000::/8	→	IPv4 compatible

In this case, since the last 32 bits are all 0's and the previous 16 bits are all 1's, the address is a **mapped** address for an IP address **0.0.0.0**

c.

(582F:1234::2222) AND (/10)	=	5800::/10	→	Not a defined block
(582F:1234::2222) AND (/9)	=	5800::/9	→	Not a defined block
(582F:1234::2222) AND (/8)	=	5800::/8	→	Not a defined block
(582F:1234::2222) AND (/7)	=	5800::/7	→	Not a defined block
(582F:1234::2222) AND (/6)	=	5800::/6	→	Not a defined block
(582F:1234::2222) AND (/5)	=	5800::/5	→	Not a defined block
(582F:1234::2222) AND (/4)	=	5000::/4	→	Not a defined block
(582F:1234::2222) AND (/4)	=	4000::/3	→	Reserved

d.

4821::14:22 AND (/10)	=	4800::/10	→	Not a defined block
4821::14:22 AND (/9)	=	4800::/9	→	Not a defined block
4821::14:22 AND (/7)	=	4800::/7	→	Not a defined block
4821::14:22 AND (/6)	=	4800::/6	→	Not a defined block
4821::14:22 AND (/5)	=	4800::/5	→	Not a defined block
4821::14:22 AND (/4)	=	4000::/4	→	Not a defined block
4821::14:22 AND (/3)	=	2000::/3	→	Global Unicast

9. We change the seventh bits from 0 to 1 and insert four extra hexadecimal digits (FF-FE) after the sixth digits:

F5	-	A9	-	23	-	12	-	7A	-	B2				
F7	-	A9	-	23	-	FF	-	FE	-	12	-	7A	-	B2

The resulting preface address in IPv6 is **F7A9:23FF:FE12:7AB2**.

11. We assume the subnet identifiers start from $(0001)_{16}$, but they can also start from $(0000)_{16}$.

a. The block for the third subnet is **2000:1110:1287:0003/64**.

- b.** We change the IEEE address to EUI address: F7A9:23FF:FE14:7AD2.
 - c.** We add the interface to the block prefix to get the IPv6 address of the station as **2000:1110:1287:0003:F7A9:23FF:FE14:7AD2**.
- 13.** The address is **::1111:129.6.12.34/128**.
- 15.** The information given cannot belong to a *link local address* because the address starts with 0's instead of 1's.

