19-2   IPv6 ADDRESSES

Despite all short-term solutions, address depletion is still a long-term problem for the Internet. This and other problems in the IP protocol itself have been the motivation for IPv6.

Topics discussed in this section:

Structure
Address Space

An IPv6 address is 128 bits long.

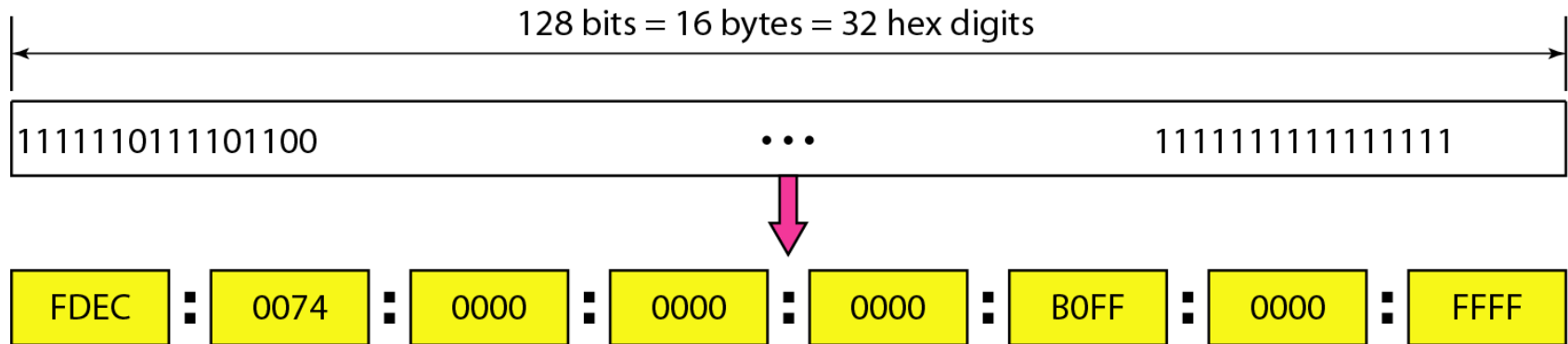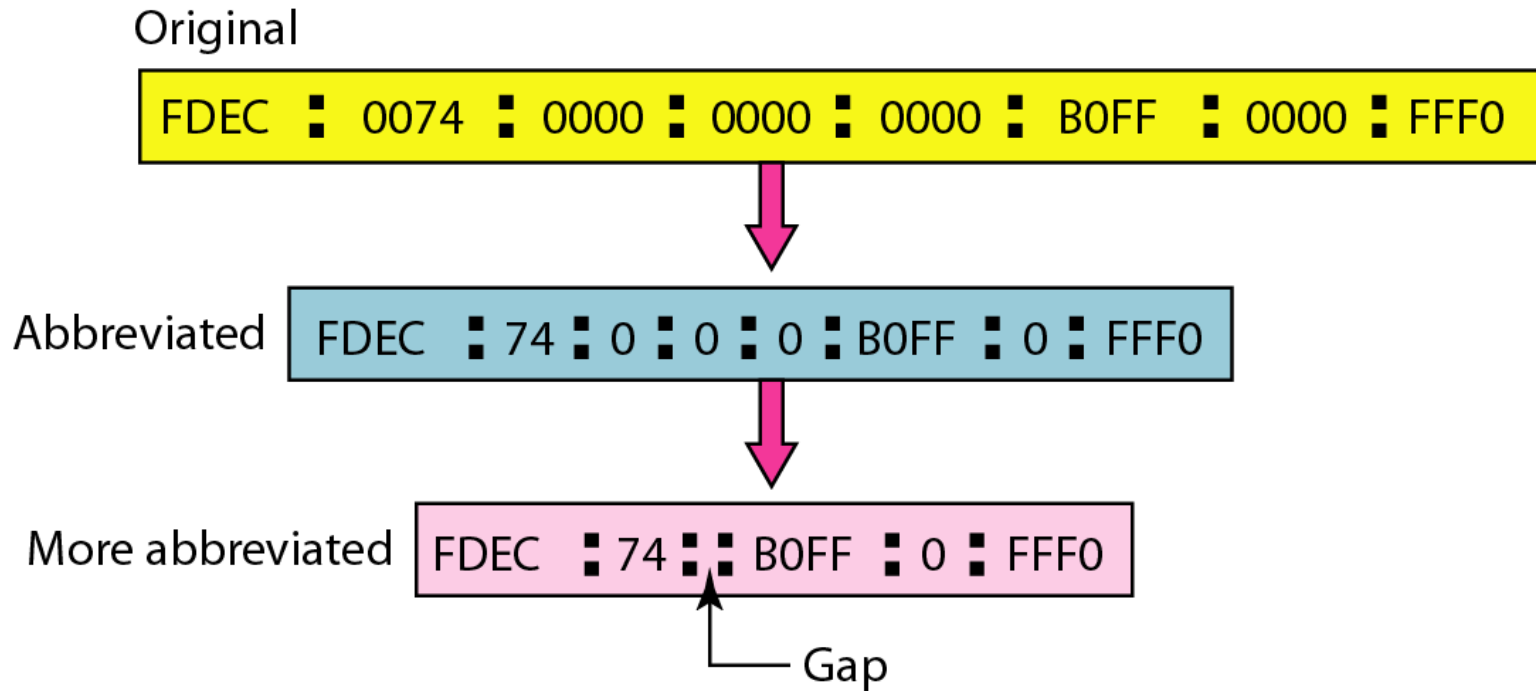# Figure 19.14 *IPv6 address in binary and hexadecimal colon notation*

128 bits = 16 bytes = 32 hex digits

1111110111101100 • • • 1111111111111111

FDEC : 0074 : 0000 : 0000 : 0000 : B0FF : 0000 : FFFF

19.3

Figure 19.15 *Abbreviated IPv6 addresses*

Original

FDEC : 0074 : 0000 : 0000 : 0000 : BOFF : 0000 : FFF0

Abbreviated

FDEC : 74 : 0 : 0 : 0 : BOFF : 0 : FFF0

More abbreviated

FDEC : 74 :: BOFF : 0 : FFF0

Gap

Example 19.11

Expand the address 0:15::1:12:1213 to its original.

Solution

We first need to align the left side of the double colon to the left of the original pattern and the right side of the double colon to the right of the original pattern to find how many 0s we need to replace the double colon.

```
XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX
 0:   15:                  :    1:   12:1213
```

This means that the original address is.

```
0000:0015:0000:0000:0000:0001:0012:1213
```