Cisco CCNA (200-301)

Episode Title: Performing Class C IPv4 Subnetting

Learner Objective: Apply steps to create Class C subnets

Description: The learner will be able to follow the steps presented to logically see and learn how to do Class C subnetting.

Questions

H: How do we do it?

- Scenario: I need to create 4 network that I can support 50 host per subnet from 192.168.10.0/24. Determine the Network ID, Broadcast ID, and Range of availabe IP addresses.

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1. Convert 192.168.10.0 and 24 bit subnet mask into binary to determine the network bits that will not
change
192.168.10.0    = 11000000.10101000.00001010.00000000
255.255.255.255 = 11111111.11111111.11111111.11111111

2. Use binary ANDing to see the bits that will not change and the bits that will change
192.168.10.0    = 11000000.10101000.00001010.00000000
255.255.255.0   = 11111111.11111111.11111111.00000000
                  -----------------------------------
                  11000000.10101000.00001010.00000000
                  (1st 24 bits will not change.  We will subnet using the last 8)
```

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3. How many bits do I need to "borrow" to make 4 network, we will only borrow from Host ID side?
2 bits = 00, 01, 10, 11
                           Network ID       | Host ID
192.168.10.0    = 11000000.10101000.00001010|00000000
255.255.255.255 = 11111111.11111111.11111111|11000000

                           Network ID       | Host ID
192.168.10.64   = 11000000.10101000.00001010|01000000
255.255.255.255 = 11111111.11111111.11111111|11000000

                           Network ID       | Host ID
192.168.10.128  = 11000000.10101000.00001010|10000000
255.255.255.255 = 11111111.11111111.11111111|11000000

                           Network ID       | Host ID
192.168.10.192  = 11000000.10101000.00001010|11000000
255.255.255.255 = 11111111.11111111.11111111|11000000
```

```
4. Determine the network ID, 1st and last available, broadcast ID and new subnet mask

**1st Network**
                          Network ID          | Host ID
192.168.10.0    = 11000000.10101000.00001010.00|000000
NetworkID       =    192  .   168  .   10   .    0    (all host bits are "zeros")
                          Network ID          | Host ID
192.168.10.0    = 11000000.10101000.00001010.00|000001
1st host               =    192  .   168  .   10   .    1    (least significant host bit is a "one")
                          Network ID          | Host ID
192.168.10.0    = 11000000.10101000.00001010.00|111110
last host              =    192  .   168  .   10   .   62    (least significant host bit is a "zero")
                          Network ID          | Host ID
192.168.10.0    = 11000000.10101000.00001010.00|111111
BroadcastID     =    192  .   168  .   10   .   63    (all host bits are "ones")

255.255.255.192 = 11111111.11111111.11111111.11|000000

**2nd Network**
                          Network ID          | Host ID
192.168.10.64   = 11000000.10101000.00001010.01|000000
NetworkID       =    192  .   168  .   10   .   64    (all host bits are "zeros")
                          Network ID          | Host ID
192.168.10.65    = 11000000.10101000.00001010.01|000001
1st host               =    192  .   168  .   10   .        (least significant host bit is a "one")
                          Network ID          | Host ID
192.168.10.0    = 11000000.10101000.00001010.01|111110
last host              =    192  .   168  .   10   .   62    (least significant host bit is a "zero")
                          Network ID          | Host ID
192.168.10.0    = 11000000.10101000.00001010.01|111111
BroadcastID     =    192  .   168  .   10   .   63    (all host bits are "ones")

255.255.255.192 = 11111111.11111111.11111111.11|000000

**3rd Network**
                          Network ID          | Host ID
192.168.10.128  = 11000000.10101000.00001010.10|000000
NetworkID       =    192  .   168  .   10   .   128   (all host bits are "zeros")
                          Network ID          | Host ID
192.168.10.129  = 11000000.10101000.00001010.10|000001
1st host               =    192  .   168  .   10   .   129    (least significant host bit is a "one")
                          Network ID          | Host ID
192.168.10.190  = 11000000.10101000.00001010.10|111110
last host              =    192  .   168  .    10  .   190    (least significant host bit is a "zero")
                          Network ID          | Host ID
192.168.10.191  = 11000000.10101000.00001010.10|111111
BroadcastID     =    192  .   168  .   10   .   191    (all host bits are "ones")

255.255.255.192 = 11111111.11111111.11111111.11|000000

**4th Network**
                          Network ID          | Host ID
192.168.10.192  = 11000000.10101000.00001010.11|000000
NetworkID       =    192  .   168  .   10   .   192      (all host bits are "zeros")
                          Network ID          | Host ID
192.168.10.193  = 11000000.10101000.00001010.11|000001
1st host               =    192  .   168  .   10   .   193      (least significant host bit is a "one")
                          Network ID          | Host ID
192.168.10.190  = 11000000.10101000.00001010.11|111110
last host              =    192  .   168  .    10  .   254      (least significant host bit is a "zero")
                          Network ID          | Host ID
192.168.10.191  = 11000000.10101000.00001010.11|111111
BroadcastID     =    192  .   168  .   10   .  255       (all host bits are "ones")

255.255.255.192 = 11111111.11111111.11111111.11|000000
```

Endnotes, External, etc.

- Objective: 1.6.1c
- Exam 200-301 Objectives