IP Subnetting

Subnet calculation (homework)

A provider has been assigned the network 128.30.0.0/17 and wants to divide it among four customers. Customers A and B need to accomodate 5,000 hosts each, Customer C needs to accomodate 7,000 hosts each, and Customer D needs to accomodate 9,000 hosts each. Can the provider fulfill these requirements?

Subnet calculations (Example)

- Given network: 128.30.0.0/17
- Wanted: Four sub networks
- First step: Find new subnet mask
  - To address four networks we need at least two bits (2^2 = 4).
  - The new subnet mask is 17+2 = 19
- Second step: Find new network addresses (see next slide)
- Third step: Calculate data for new networks (see homework)

Subnet calculations (example)

New netmask: 19 (= 255.255.224.0)
11111111.11111111.11100000.00000000

=> New network 1: 128.30.0.0/19 (← this is the network address)
10000000.00011110.00000000.00000000

=> New network 2: 128.30.32.0/19
10000000.00011110.00100000.00000000

=> New network 3: 128.30.64.0/19
10000000.00011110.01000000.00000000

=> New network 4: 128.30.96.0/19
10000000.00011110.01100000.00000000

Number of hosts: 2^13 – 2 = 8,190: Customer D can not be accomodated! Only can support 8,190 hosts!

Subnet calculations (example)

Why -2 addresses?

- Network address (first address)
- Broadcast address (last address)

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More examples:

https://learningnetwork.cisco.com/servlet/JiveServlet/download/193061-46962/Subnetting.pdf