Address aggregation / Route Summarization / Supernetting

While a subnet address may be thought of as a summarization of a group of sub-subnets, a major network address may be thought of as a summarization of a group of subnet addresses. In each case, the summarization is achieved by reducing the length of the address mask. Address aggregation takes summarization one step further by breaking the class limits of major network addresses. An aggregated address represents a numerically contiguous group of (major) network addresses, know as a supernet.

Route summarization (RFC1518) is a method of representing a series of network numbers in a single summary address. The advantage of route summarization is the conservation of network resources. Advertising fewer routes conserves bandwidth, and CPU cycles are conserved by processing fewer routes. Most important, memory is conserved by reducing the size of the route tables.

Example:

192.168.16.0/24

192.168.17.0/24

192.168.16.0/20

192.168.30.0/24

192.168.31.0/24

Some routing protocols summarize or aggregate routes based on shared network numbers within the network. VLSM (Variable-length Subnet Masks) is used to allow routers to aggregate routes to networks within an IP network.

IP RIP and IGRP support route aggregation based on the major network number. They are called classful routing protocols because they always consider the IP network class. OSPF and EIGRP support route aggregation based on subnet addresses.

For address summarization to work correctly, several restrictions must still be observed:

1. Multiple IP addresses must share the same high-order bits.

2. Routing tables and protocols must base their routing decisions on a 32-bit IP address and prefix length that can be up to 32 bits.

3. Routing protocols must carry the prefix length with the 32-bit IP address.

Step 1

Convert the addresses to binary format and align them in a list.

Step 2

Locate the bit where the common pattern of digits ends. (It might be helpful to draw a vertical line marking the last matching bit in the common pattern.)

Step 3

Count the number of common bits. The summary route number is represented by the first IP address in the block, followed by a slash, followed by the number of common bits. As Figure 1-17 illustrates, the first 22 bits of the IP addresses from 172.16.12.0 through 172.16.15.255 are the same. Therefore, the best summary route is 172.16.12.0/22.

Example:

How to Supernet -Supernetting Tutorial - CCNA IP Supernetting

Supernetting is a core skill needed for the Cisco CCNA certification and basically involves taking two IP addresses and combining them into a minimized network and subnet to make network management easier as well as making it easier for routing protocols and troubleshooting network problems.

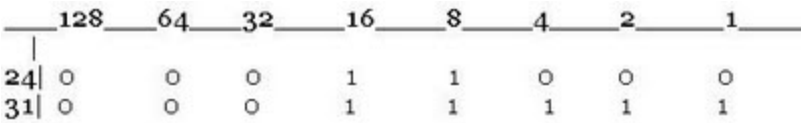
An example of IP supernetting

we have a network **172.24.0.0**

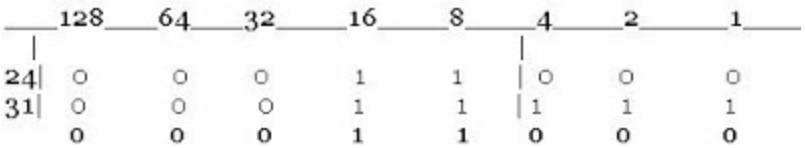
___128___64___32____16____8____4____2_____1_____
|
24|
31|

Here we have to networks in different subnet mask that can be combined using supernetting
172.24.0.0 /24 and 172.24.0.0 /31

The first thing we need to do is draw a simple table so that we can convert the /31 and /24 network into binary so we can break it down



We then look at the binary sequences and draw a line when they are no longer the same



Everything that doesn't match will be converted to zero

gives us
0 0 0 1 1 0 0 0 in BINARY

the orignal IP un-supernetted was 172.24.0.0

it is now /13 or 255.248.0.0

8 + 5 = /13 ,
255 + (128.64.32.16.8) = 248
255.248.0.0

There you have it the supernetting guide hope it wasn't too confusing let me know if you have any questions

172.24.0.0 with network /24 and /31 becomes
172.24.0.0 /13 - 255.248.0.0

Supernetting is the method for combining two or more contiguous network address spaces to simulate a single, larger, address space. You may remember, in Subnetting we are adding the bits from the host part to the network part. But in Supernetting we do the reverse. Here in supernetting we add bits from the network part to the host part. To supernet two contiguous networks is simple. Just convert the networks in to bineries, compare the bits of the two networks. Till where you have the similiar bit pattern, use a subnet mask bit of "1", and after that "0". Use the altered subnet mask for two networks. That's it!

For example, you may want to supernet the networks 192.168.10.0 and 192.168.11.0 to make a single, large network. Following two lines are the conversions of the above network addresses to binaries and the last line is the new subnet mask.

11000000.10101000.0000101 | 0.00000000
11000000.10101000.0000101 | 1.00000000

11111111.11111111.1111111 | 0.00000000

The changed subnet mask is 255.255.254.0 can be used to supernet 192.168.10.0 and 192.168.11.0. The concept of supernetting is used in routing protocols for "route summarization".

In this Supernetting lesson, you have learned what is supernetting and how to supernet two different networks. Click "Next" to continue.

In this lesson you will learn what is Supernetting and how to supernet two different contiguous networks.

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