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IP Summary Addressing Cheatsheet v2 FREE STUDY GUIDE

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IP Summary Addressing Cheatsheet v2

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Section 1: Route Summarization

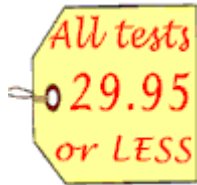
Section 2: Classless Inter Domain Routing (CIDR)

Section 3: Variable Length Subnet Masks (VLSM)

Check out one of our other great Study Guides, "TCP/IP Subnet Cheatsheet v2" ("TCPIP-SUB.PDF") for detailed information on subnet masking.



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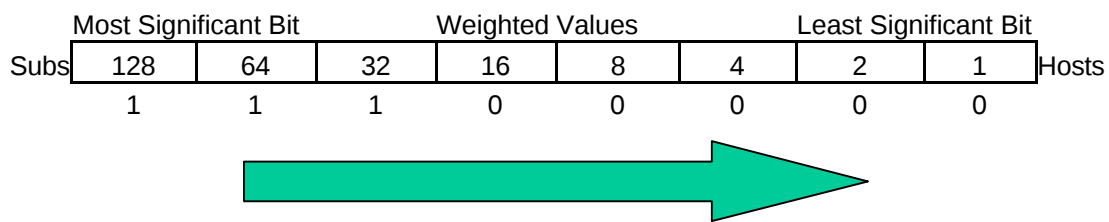
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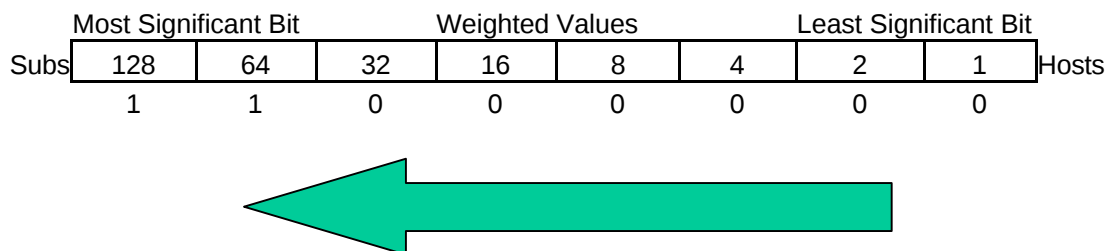
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Route Summarization

The typical reason for Subnet Masking is stealing Host bits to get more Subnets. This means you normally slide the Subnet mask bar from Left to Right.



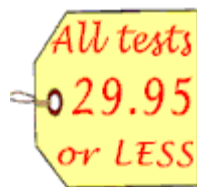
Route Summarization is the idea of giving back Subnet bits to get fewer Subnets. This means you slide the Subnet mask bar backwards from Right to Left.



For all examples, it is important to note that the class of address is irrelevant.



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Route Summarization - Continued

Our goal in this exercise is going to be to take two existing subnet slices (in this case the 64 & 96 subnets), and aggregate them into a single, larger subnet.

In Figure 1, notice we are using 3 bits of subnetting, which gives us $(2^3)-2 = 6$ subnets. This means we have 8 ranges of 32 numbers each (the incremental value).

Most Significant Bit			Weighted Values				Least Significant Bit		
Subs	128	64	32	16	8	4	2	1	Hosts
	1	1	1	0	0	0	0	0	

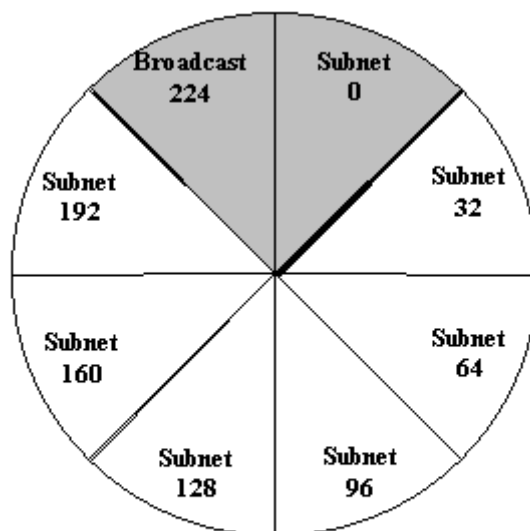
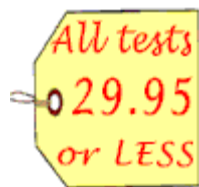


Figure 1: Subnet mask 255.255.255.224
(Incremental Value 32)



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Route Summarization - Continued

As stated previously, we must move backwards the subnet masking slider bar Right to Left, in this case only a single bit.

In Figure 2, we backed up to 2 bits of subnetting, which gives us $(2^2)-2 = 2$ subnets. This means we have 4 ranges of 64 numbers each (the incremental value).

	Most Significant Bit		Weighted Values				Least Significant Bit		
Subs	128	64	32	16	8	4	2	1	Hosts
	1	1	0	0	0	0	0	0	

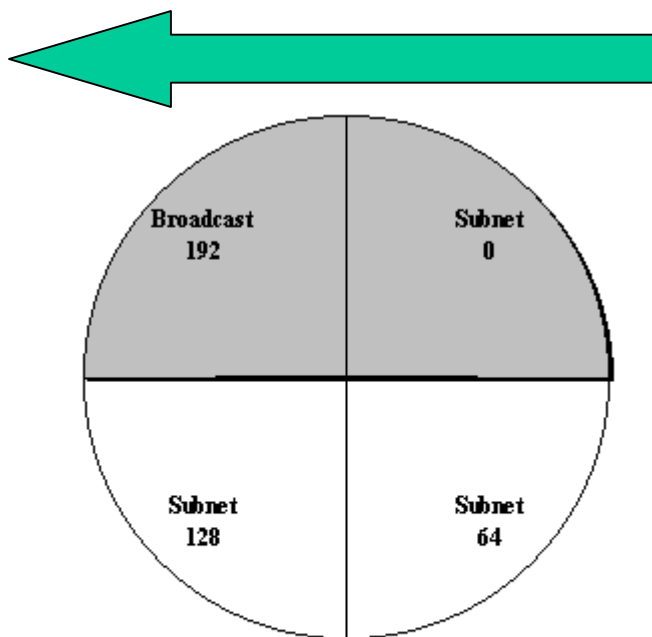
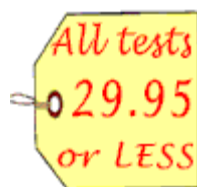


Figure 2: Subnet mask 255.255.255.192
(Incremental Value 64)



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Route Summarization - Continued

**Any route can be summarized by using the powers of 2 shortcut.
The most common powers of 2 include: 2, 4, 8, 16, 32, 64, 128.**

Using a Thermometer for Route Summarization

Original subnet mask 255.255.255.224

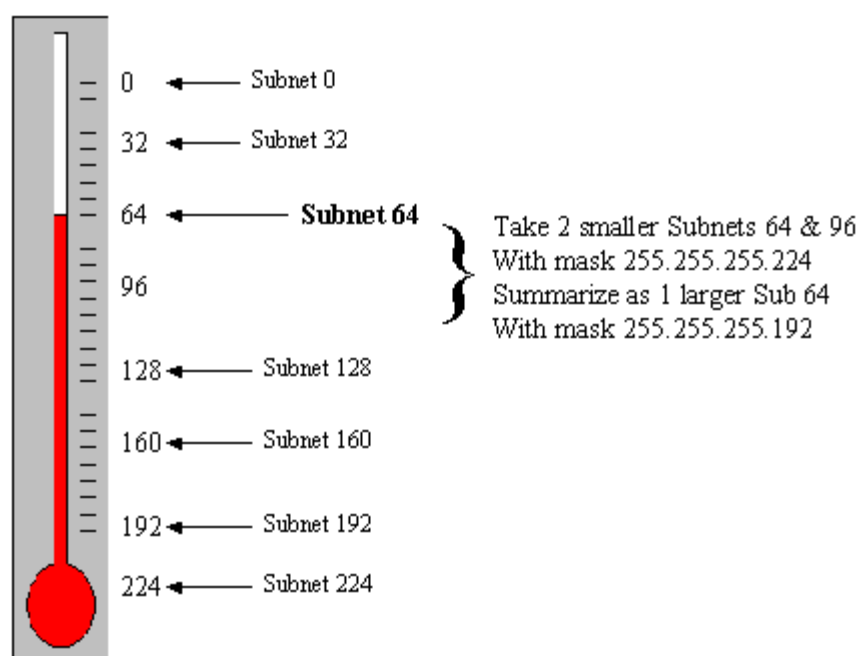
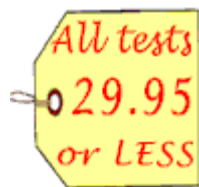


Figure 3: Summarizing is grouping multiple smaller subnets into single larger ones.



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Classless Inter Domain Routing and Supernetting

If you summarize any block of routes using a subnet mask that is smaller than the native Class (A, B, C) of address, then Route Summarization is commonly referred to as Supernetting (typically if being used on the local LAN) or as Classless Inter Domain Routing (typically if being used on the remote WAN).

Often the terms Supernetting and CIDR are used interchangeably, because they have a common requirement. For your routing protocol to support CIDR, it must support carrying the subnet mask information along with the routing update, which by its very nature means it probably also supports Supernetting.

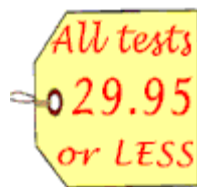
Route Summarization does not REQUIRE carrying the subnet mask information with the routing update, although classless routing protocols make Route Summarization a lot more flexible.

For example, RIP v1 is said to perform automatic route summarization at the classful boundary. This is because RIP v1 does not carry any subnet mask information with its routing update, so RIP v1 will automatically strip off all subnets and summarize at the classful network address (i.e. Class A, B, C). This means classful routing protocols like RIP v1 cannot support Supernetting, CIDR, or VLSM.

Alternatively, OSPF does not perform any automatic summarization, but can be manually configured. Since OSPF does carry subnet mask information with its routing updates, OSPF can support very flexible summarization regardless of class of address (and in fact doesn't care what Class it is). This means classless routing protocols like OSPF can support Supernetting, CIDR, and VLSM.



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Variable Length Subnet Masks

Subnetting allows you to divide big networks into smaller, equal-sized slices.

VLSM allows you to divide big networks into smaller, different-sized slices. This enables you to make maximum use of your valuable IP address space.

Using a Thermometer for Variable Length Subnet Masking

Original subnet mask 255.255.255.192

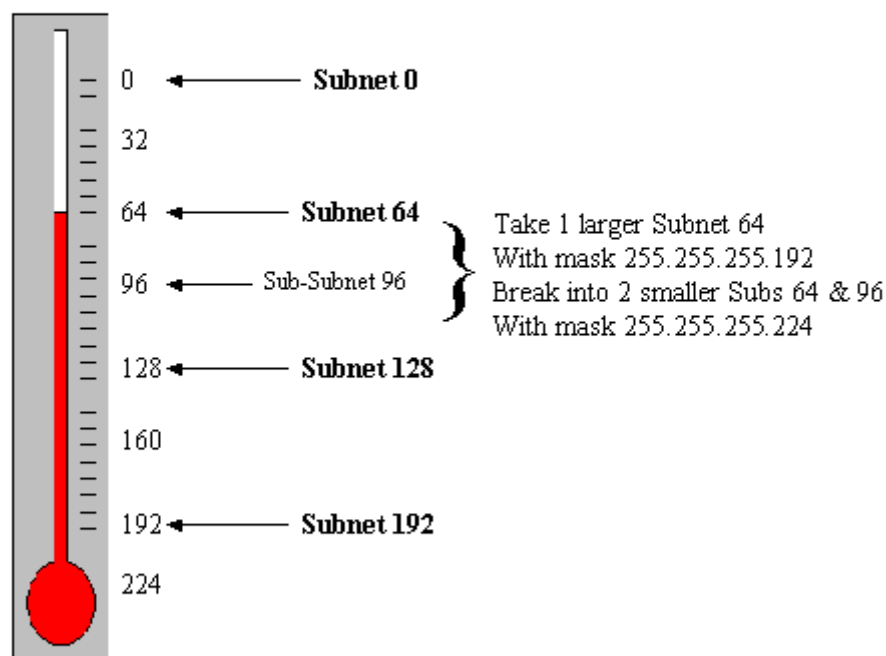


Figure 4: VLSM is taking any subnet, and subnetting it again.



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