

NETWORK SUBNETTING

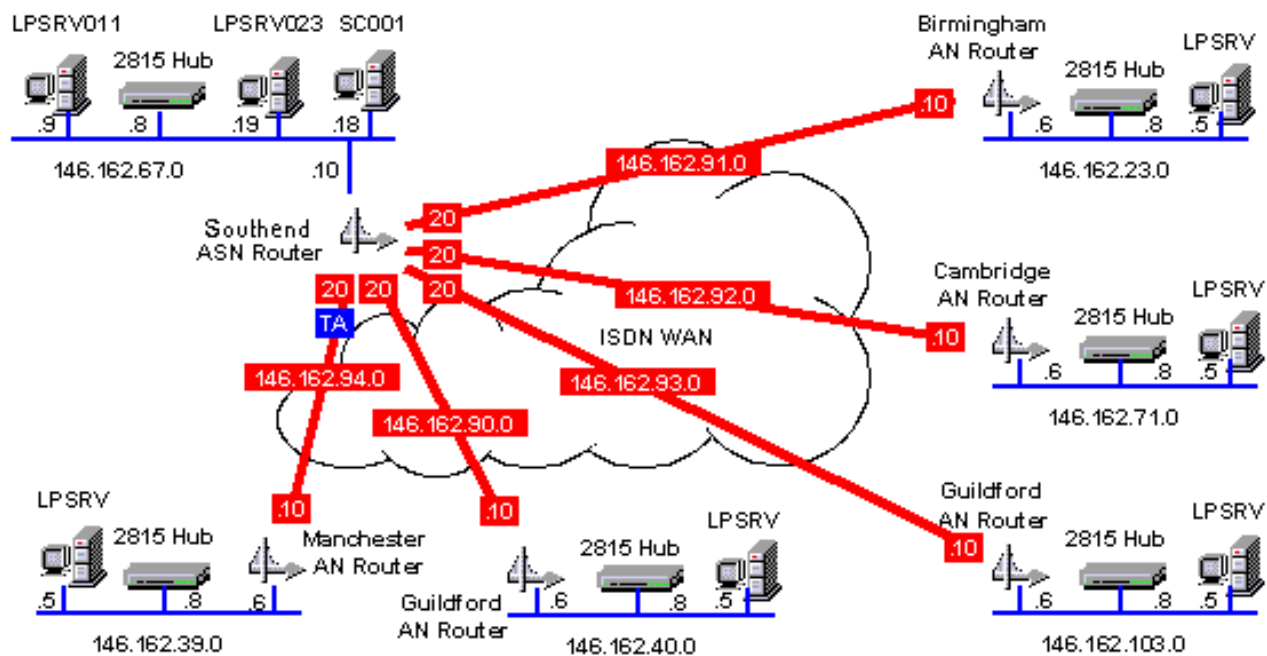
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Network Subnetting A subnet is a segment of a network. Subnetting is a technique that allows a network administrator to divide one physical network into smaller logical networks and, thus, control the flow of traffic for security or efficiency reasons. Dividing a network into several subnets can serve a number of purposes: to reduce network traffic by decreasing the number of broadcasts (if used in combination with a switch), to exceed the limitations in a local area network, for instance the maximum number of allowed hosts, or to enable employees to be able to dial in to the network from home, without opening the entire network up to unwanted visits from the Internet. Subnets are created by using a so-called subnet mask to divide a single Class A, B, or C network number into smaller pieces, thus allowing an organisation to add subnets without having to obtain a new network number through an Internet service provider. Subnets can again be subnetted into sub-subnets. Subnets were originally invented to help solve the lack of IP addresses on the Internet. How subnetting work

An IP address consists of a network portion and a host portion. A subnet is created by borrowing bits from the part of the IP address which normally designates the host and using them to designate one or more smaller, secondary networks (subnets) within the original network. The network prefix and subnet number in combination are called the extended network prefix (in every day talk often, somewhat confusingly, referred to as the network number!). Subnet masks

A 32-bit subnet mask is used as a deciphering key to determine how an IP address is to be divided into extended network prefix and host part. It is used by routers and network devices to determine where traffic should be routed to. Like IP addresses, subnet masks consist of four numbers of 8 bits, separated by dots. They are usually written in the corresponding decimal notation. The typical subnet masks used for Class A, B and C addresses are as follows: All the 0's in the subnet mask specify that this part in a corresponding IP address is the host portion, while the 1's indicate that the corresponding bits in the IP address constitute the network portion. The three subnet masks above set the change from network to host portion at the end of a whole octet - Class A after one octet, Class B after two octets, and Class C after three. However, a subnet masks does not have to follow the address classes, but can specify a host portion that is not a whole octet. The subnet mask 255.255.255.240 (11111111.11111111.11111111.11110000) for instance, marks the breaking point four bits into the last octet. The purpose of having subnet masks defining networks is that the technical devices that the network is build from will be able to determine if traffic should be routed out of the network or kept within it.

Using a mask saves the routers from having to handle the entire 32-bit address, because they can simply look at the bits selected by the mask (and thus not worry about the host portion of the address). Internet routers use only the network number of the destination address to route traffic to a subnetted environment. Subnetting, thus, also has the advantage that it keeps the size of the routing tables on the Internet down because Internet routers only need to know the one common network address for all the individual computers and devices on the different subnets. The route from the Internet to any subnet of a network is the same, no matter which subnet the destination host is on, namely that of the mother network. From there, the local network router(s) divides the communication out into individual subnets and to the individual hosts on these subnets. Subnetting keeps the size of the routing tables on the Internet down, as the Internet routers only use the network number of a subnetted environment to route traffic to any of the subnets. A router within a subnetted environment uses the extended network prefix to route traffic between the individual subnets. The extended network prefix is composed of the network prefix and the subnet number.



Source: <http://computrnetworking.wordpress.com/2012/02/20/network-subnetting/>