Cheatography

Network Design 5-4-3-2-1 Rule Cheat Sheet

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Introduction

The 5-4-3-2-1 rule embodies a simple recipe for network design. It may not be easy to find examples in practice, but this rule neatly ties together several important elements of network design theory.

http://compnetworking.about.com/od/itinformationtechnology/fl/What-is-the-5-4-3-2-1-Rule-in-Computer-Networking.htm?utm_content=5779687&utm_medium=email&utm_source=cn_nl&utm_campaign=computersl&utm_term=

Collision Domains and Propagation Delays

Collision domains: The total span of distance over which a packet can travel and potentially collide with another is its collision domain. When a network packet is transmitted over Ethernet network, it is possible for another packet from a different source to be transmitted close enough in time to the first packet to cause a traffic collision on the wire. The total span of distance over which a packet can travel and potentially collide with another is its collision domain.

Propagation delays: are a property of the physical medium (e.g., Ethernet). Propagation delays help determine how much of a time difference between the sending of two packets on a collision domain is close enough to actually cause a collision. The greater the propagation delay, the increased likelihood of collisions.

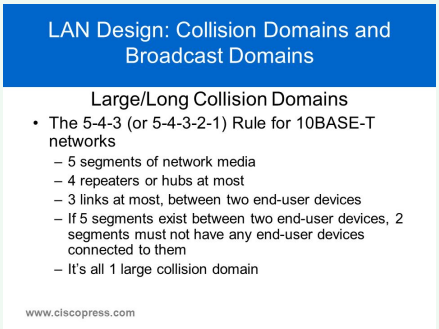
Network Segments

A segment is a specially-configured subset of a larger network. The boundaries of a network segment are established by devices capable of regulating the flow of packets into and out of the segment, including routers, switches, hubs, bridges, or multi-homed gateways (but not simple repeaters). Network designers create segments to physically separate related computers into groups.

This grouping can improve network performance and security. In Ethernet networks, for example, computers send many broadcast packets onto the network, but only other computers on the same segment receive them. Network segments and subnets serve similar purposes; both create a grouping of computers. The difference between a segment and a subnet is as follows: a segment is a physical network construction, whereas a subnet is simply a higher-level software configuration.

Rule: One cannot define a single IP subnet that functions correctly across multiple segments.

5-4-3-2-1 Rule



The 5 Components of This Rule

The 5-4-3-2-1 rule limits the range of a collision domain by limiting the propagation delay to a "reasonable" amount of time. The rule breaks down into five key components as follows:

5 - the number of network segments

4 - the number of repeaters needed to join the segments into one collision domain

3 - the number of network segments that have active (transmitting) devices attached

2 - the number of segments that do not have active devices attached

1 - the number of collision domains

Because the last two elements of the recipe follow naturally from the others, this rule is sometimes also known as the "5-4-3" rule for short.

5-4-3 Rule