

Networking Crash Course

this tutorial is under construction! it will be released shortly!!!

1. Network Performance

Network performance is determined by two variables: latency and throughput.

a) Latency is period of time that takes for a packet to cross the network from sender to receiver. Latency is important for network performance because is perceptible to the user. In order to measure latency we must put an analyser to both ends of the network. There are a lot of network analysers (hardware or software) that can be used. Also there are free network analyser tools, like iperf, very useful, available on FreeBSD, Linux and on commercial UNIX platforms. When we experience latency problems latency the problem could be from client, from server or from connection line.

b) Throughput is the amount of data that a communication channel can carry. We can measure that in bytes/second.

a) Latency

Sources of latency:

- Media Access (example: wait for silence in a busy Ethernet)

- Media Speed (speed supported by wire/devices between links)

- Transmission Delay (distance latency and bandwidth latency - this second includes media speed too)

 - Distance latency is determined by distance and can't be improved without changing physical infrastructure.

 - Bandwidth latency can be minimized by using more bandwidth.

- Switching process

 - Switches, hubs or routers adds delay to your network performance. There are a number of elements involved in switching equipment functionality that may degrade network performance by adding delay. Some of them are: routing time to forward packets, switch process time, filter process time,

- Time to Process

 - Time needed by a host to process requests and reply to the other. A server or a host can add delay if its performance is not good, due to high loads for example.

- Queuing

 - Time spent in a buffer before being transmitted.

All these sources of latency can affect your network latency performance, so we must diagnose, when experiencing latency problems which of them are the cause of latency and improve performance. Sometimes are multiple causes, solving one will result in finding problem in other cause, so all must be solved one by one.

To diagnose latency network analysers can be used (or with ping command). It is a good practice to diagnose performance at different layer. For example if we use ping to test latency, this test is at network layer (ICMP). If the problem is at application layer, the problem will not be found with ping.

Causes of latency can be found in:

- Cabling problems or limitations

- Hardware problems or limitations

- Configuration problems

- Bandwidth

- Device congestions

- Host problems (performance issues due to errors/high loads or misconfiguration),

2. BSD / UNIX / Linux Network Tools

2.1 Ifconfig

2.2 route

2.3 ping

2.4 traceroute

2.5 netstat

2.6 arp

2.7 whois

- 2.8 nslookup
- 2.9 dig
- 2.10 Xinetd
- 2.11 cron
- 2.12 dhcp
- 2.13 bind (dns server)
- 2.14 nfs