Lab Assignment 3:

Network Debugging

Scenario

The network communications group has a small test network which consists of three routers and three hosts. Due to issues during lab migration the documentation of the network has been lost. The two hosts

(i) `landline.cn2lab.cn.tuwien.ac.at`
(ii) `satellite.cn2lab.cn.tuwien.ac.at`,

which were also part of the last assignment, are part of this network. Unfortunately, the third host has no domain name service (DNS) entry.
To rebuild the documentation we need your help in finding out the network parameters, the IP address of the third host, the router IP addresses, and the routing tables.

Assignment

In-depth analysis of network parameters. Attempt to discover nodes and links, along with their parameters, that are used when accessing the multimedia services. You can use various standard-Unix tools that are available on your system. Use active testing tools to probe the network path between your client and the multimedia services and generate reliable statistics (for links and end-to-end connections) for the QoS-relevant parameters. Display these statistics graphically.

Detailed Instructions

1. Discover the IP addresses of the nodes between your computer and the hosts mentioned above.
2. Discover the missing host. It is somewhere in 10.0.0.0/16.
3. Create a network diagram of the nodes within 10.0.0.0/8.
4. Create a routing table for every router consisting of: destination network and next hop for every network. Routing table entries that cannot be determined from your machine should be left out. All subnets within the test network are class C blocks.
5. Measure the latency and packet loss of the links between your computer and every host.
6. Pay attention to the statistical relevance of the measured data, and use this data to display the results graphically.
7. Compare the results with the results from assignment 2.

Deliverables

Report (see report guidelines in `tuwel`) containing

- Description of the solution
- IP of the discovered host
- Network diagram
- Routing tables of the routers
- Measured network parameters
- Graphical representation of the measured data (e.g. Histogram, CDF, …)
- Discussion of the results, comparing with the results from assignment 2.

Upload the report to `tuwel` and enter the IP address of the discovered host in `tuwel` (*Validate Host*) in order to proceed with assignment 4.

Hints:

- Have a look at the documentation of the `ping` program (man page) it offers more capabilities than just measuring the round trip time and packet loss.
- The `tuwel` course contains a link to the `nmap` reference guide.
- To be able to use privileged operations (e.g. ping scan) with `nmap` the command line flag `--privileged` has to be used.
- Scanning large networks with `nmap` can take some time. There are several options to increase the performance of `nmap` (e.g. turn off DNS-resolution). The `nmap` reference guide mentioned in `tuwel` contains information on speeding the scan up significantly (The scan should only take a couple of minutes).
- The network contains 3 hosts and 3 routers.
- The `tuwel` course contains some tips on creating data graphs.
- The `tuwel` course contains a LaTeX-template for writing the report.