Lab Assignment 2:

Voice over IP, QoS, Statistics for WAN

Scenario

Real-world Wide Area Networks (WAN) suffer from various impairments. The quality of service (QoS) that network traffic encounters depends on the route that a packet takes in the network. Selection of appropriate technical network parameters, accurate measurement of these parameters, and sound statistics are imperative in finding root causes of bottlenecks in network communications.
There are two hosts in the lab network using different network connections. Those two hosts are running voice over IP (VoIP) and video echo services. Their corresponding domain name service (DNS) names are:

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

We need help in evaluating the performance of both services.

Assignment

Configure a Multimedia client to register with the given IPv4/IPv6 SIP Registrar and connect to the VoIP and video services that are reachable over potentially distinct links and networks. Observe the subjective QoS for voice and video that you are experiencing. Capture the traffic using `Wireshark` and use `Wireshark`'s statistics modules to determine which main (end-to-end) network parameters influence the QoS.

Detailed Instructions

1. Capture all incoming and outgoing traffic on the computer's interfaces using `Wireshark`.
2. Configure the `linphone` client to register with the SIP registrar with the account data supplied in `tuwel`.
3. Enable voice and video, connect to

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

   and observe the subjective QoS.
4. Filter signaling and media traffic in the traffic dumps; verify that both, signaling and media work correctly.
5. Find useful network characteristics/technical parameters (i.e., metrics) that influence on voice and video transmission quality between client and server.
6. Use `Wireshark` statistics to infer these parameters.

7. Try different codecs (`linphone`: Options →Preferences →Codecs) and compare the subjective QoS.

Deliverables

Report (see report guidelines in `tuwel`) containing

- Description of the solution
- Secret message from the registrar
- Discussion of measured network parameters and subjective QoS for different codecs
- Suitable graphical representation of the measured data (e.g. Histogram, CDF, …)

Upload the report to `tuwel` and enter the secret message in `tuwel` (*Validate Message*) in order to proceed with assignment 3.

Hints:

- `linphone`'s setup wizard is flawed. Instead of using the wizard, go to Options →Preferences →Add and configure your account manually.
- The camera contains a microphone. If you want to connect headphones to the computer, use the green audio jack.
- If you have trouble hearing sound, configure the right sound devices in `linphone` (`linphone`: Options →Preferences →Multimedia) and adjust the microphone volume in the system settings (Windows Key →Settings →Sound →Input).
- The `tuwel` course contains a LaTeX-template for writing the report.