Qosium Scope Lite

Qosium Scope Lite is one of the three measurement controller options of Qosium solution. Scope Lite is a command-line tool, which is the most notable difference from Qosium Scope. That makes it suitable also to environments where a graphical user interface is not available or is not wanted to be used due to processing constraints. Scope Lite is mainly a measurement controller for manual measurements, but it can also be used semi-automatically via scripts for monitoring.

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1. Introduction

As the name hints, it's in a way a lightweight version of Qosium Scope. They both control Qosium measurements and use the same *QMCP* interface. However, Qosium Scope Lite comes only with simple results views. Its primary usage purpose is to carry out measurements and results analysis is then made with another tool after the measurement, for example, with Qosium Scope. Qosium Scope Lite is part of the Qosium *GP*.

Qosium Scope Lite is meant mainly for manual measurements. You can freely choose to use Qosium Scope Lite, but if you have an option to run a *GUI* in your system, consider also using Qosium Scope.

Scope Lite can also be used for monitoring since it can be run in a scripted mode. However, Qosium Scopemon is the main software for automated monitoring, so also consider that before starting with Qosium Scope Lite.

Qosium Scope Lite is mainly used for research purposes and testing.

Learn the Basics First

This guide explains how to use Qosium Scope Lite, but not how to parameterize and perform measurements in order to get sensible results. It is highly recommended that you first learn the basics of Qosium before proceeding. For learning material, see here.

2. Parameterization

Before running the application, check and set the parameters in `qosium_scope_lite.ini` file. The file is in the same directory with the Qosium Scope Lite executable. The file follows format

```
parameter_name parameter_value
```

Please use a plain text editor for editing, since advanced text editors might include some additional control characters, which are not understood by Qosium's parser

3. Manual Usage

3.1. Launching

Open command-line, locate Qosium Scope Lite executable (Windows: `QosiumScopeLite.exe`, other systems: `QosiumScopeLite`) and run it. It is typically in the same directory as Qosium Probe. In some systems (e.g., Windows), you can run Scope Lite directly from a file manager or a shortcut.

Below you see an example output after launching Qosium Scope Lite.

```
-----------------------------------------------------------------------------
|
| Qosium Scope Lite, version: 1.7.9.1 (64 bit)
|         with QMCP, version: 1.11.25.7 (03/2022)
|
| by Kaitotek Oy (www.kaitotek.fi)
|
-----------------------------------------------------------------------------

Reading parameters from qosium_scope_lite.ini...

Main Connection parameters:
 - The User ID = 0
 - Measurement description: "My test measurement"

Topological parameters:
 - Topology: Primary Probe is located at traffic end point
    - Address/host: localhost, port: 8177
 - Topology: No secondary Probe - A single point measurement
 - Sender addressing:
   - Primary Probe IPv4 sender addresses: based on topology
   - Primary Probe Ethernet sender addresses: based on topology
   - Primary Probe IPv6 sender addresses: based on topology

Packet capturing related parameters:
 - promiscuous mode used
 - Automatic filter (my traffic)

Result gathering related parameters:
 - Not requesting packet information results
 - Requesting average results
   - Not printing to a file
 - Not requesting packet QoS results
 - Requesting flow results (flow timeout = 5 s)
   - Not printing to a file
 - Not requesting Pcap results
 - File name prefix set as 'Test'
 - File target path not set

QoS calculation related parameters:
 - Averaging interval [ms]: 1000
 - Packet delay threshold [ms]: 200
 - Packet jitter threshold [ms]: 100
 - Packet idenfication: Automatic
 - Meas ctrl pk sending intrvl [ms] (autoset)
 - Autoset for loss timer is used
 - DPI-calculation is disabled

Results direct distribution parameters:
 - Result distribution is not active

Connection related special parameters:
 - Using robust QMCP connection mode
 - The maximum connection break duration = 60 s

QoE calculation related parameters:
 - GQoSM calculation is off
 - PSQA calculation is off



Idle >>
```

3.2. Available Commands

Qosium Scope Lite is a state machine that has different commands available depending on the state. The processing starts in state *Idle*, which means there is no connection to Qosium Probes yet. You can always type `status` for checking the UI's status in more detail.

The available commands can be listed with `help` command. This shows, for example, in state *Measurement running*:

```
user@control-pc:~
Meas. Running help

Valid Commands:
  help // This menu
  status // Shows the status and parameters of the Qosium UI client
  disconnect // Disconnects from Qosium Probe
  stopmeas // Stop the measurement
  showpk // Shows packet information results (if collecting those)
  showave // Shows average results (if collecting those)
  showabs // Shows absolute results (if collecting those)
  showflows // Shows flow results (if collecting those)
  showpcap // Shows flow results (if collecting those)
  hide // Hides the result viewer
  exit // Exits the SW


Meas. Running >>
```

3.3. Step-by-Step to the Measurement

First, start Qosium Probes at desired measurement points.

The usage of Qosium Scope Lite is straightforward. First, we need to connect to the primary Qosium Probe. This is done by command `connect`, which connects to the Probe defined in the parameters.

```
Idle >> connect
```

If the connection was successful, the following message is printed out:

```
Connecting to Qosium Probe at localhost:8177 ...
Connection successful!
```

But so far we merely have a connection to Probe. Next, we need to subscribe as a controller by issuing command `subscribe`:

```
Connected >> subscribe
```

Without the subscription, Qosium Probe will kick the client out after a while. The following is printed out after executing the command:

```
Subscribing the controller
Subscription Granted with measurement ID: 0
```

Subscription creates the measurement context, and a unique Qosium ID is given to it (the Measurement ID printed is only a part of the whole Qosium ID).

Now it is time to set the parameters to the Qosium Probe(s). This is done by `setparams` command:

```
Adm, 127.0.0.1 >> setparams
```

```
Setting parameters to Qosium Probe...
Parameters set successfully!
Sending filter...
Packet filter set successfully!
```

When setting parameters, the primary Qosium Probe for the first time tries to connect the secondary Probe, if a two-point measurement is to be run.

Also, at this point already, the possible third party destinations for receiving results will be connected. Thus, even though the results won't be sent before the start of the measurement, the connection will be created at this point, so the results receiving party should be ready waiting for the connection. If the third party receivers are not ready, an error message is given.

The parameters in the primary Probe can always be checked with command `getparams`.

After setting parameters, set the listened interface(s) with command `setifs`.

> In a two-point measurement, do not try to set the interfaces before setting the parameters, since there is no connection to the secondary Probe

When interfaces and parameters are set correctly, the measurement can be started. This done with command `startmeas`.

When the measurement is running, nothing is automatically shown in the screen, but you have to enable result showing (e.g., `showave` to show the average results).

3.4. Shortcutting the Startup

If you want to head from *Idle* state directly into the state ready for the measurement, type `autoconf`. It will execute a similar command sequence seen in the previous section: connects and subscribes Probes, sets parameters, and asks you the interfaces to pick. After this, you can start the measurement immediately.

```
user@control-pc:~
Idle >autoconf

Reading parameters from qosium_scope_lite.ini...

Main Connection parameters:
 - The User ID = 501
 - Measurement description: 'Application test run #1'
 - An end-to-end measurement with Qosium Probes in:
    Main: 192.168.1.100:8177
    Secondary: 192.168.1.106:8177
```

3.5. Results

Qosium Scope Lite has only a simple view for ongoing measurement results. Thus, it's suggested that results analysis is carried out by using some other tool after the measurement by saving results to a file – or even in real-time by sending results directly to Qosium Storage or a third-party tool. All Qosium-supported measure formats are in use, namely, averaged results, packet-based results, flow results, and packet capture. The file format for the saved results is the same *CSV* format used by the other Qosium

components. Hence, you can upload Scope Lite collected results in Qosium Scope.

```
user@control-pc:~
*********** Flow results from control packet 241: (24 results, showing all) *
$s$ IP:port -> dst IP:port, protocol, load FWD [kbit/s], load REV [kbit/s], i

192.168.10.50:50003 -> 74.125.205.188:5228, TCP, 0, 0, 5.76, old (5.8 s)
192.168.10.50:65345 -> 104.199.64.117:4070, TCP, 0, 0, 4.55, 4.6 s
192.168.10.50:50264 -> 157.240.194.54:443, TCP, 0, 0, 5.86, old (6 s)
192.168.10.50:49788 -> 162.254.198.133:27020, TCP, 0, 0, 3.05, 3.1 s
192.168.10.50:65126 -> 172.217.20.34:443, UDP, 0, 0, 3.15, 3.3 s
192.168.10.50:57460 -> 172.217.21.134:443, UDP, 0, 0, 2.79, 2.9 s
192.168.10.50:53453 -> 172.217.21.161:443, UDP, 0, 0, 3.19, 3.5 s
185.26.182.111:443 -> 192.168.10.50:64777, TCP, 0, 0, 1.23, 1.3 s
192.168.10.50:57459 -> 192.168.10.1:53, UDP, 0, 0, 2.9, 2.9 s
192.168.10.50:64284 -> 192.168.10.1:53, UDP, 0, 0, 4.07, 4.1 s
192.168.10.44:36612 -> 239.255.255.250:1900, UDP, 0, 0, 4.33, 4.3 s
192.168.10.44:37023 -> 239.255.255.250:1900, UDP, 0, 0, 2.37, 2.3 s
192.168.10.44:46173 -> 239.255.255.250:1900, UDP, 8.386, 0, 0.68, New!
192.168.10.44:55711 -> 239.255.255.250:1900, UDP, 0, 0, 3.14, 3.1 s
192.168.10.50:54915 -> 192.168.10.255:54915, UDP, 2.44, 0, 0.61, 240.6 s
192.168.10.50:64285 -> 193.229.108.15:443, UDP, 98.702, 2615.18, 0.16, 4 s
192.168.10.50:53454 -> 193.229.108.149:443, UDP, 0, 0, 1.19, 5.4 s
192.168.10.50:53448 -> 216.58.207.238:443, UDP, 0, 0, 1.14, 4.6 s
192.168.10.50:53449 -> 216.58.211.3:443, UDP, 0, 0, 3.05, 3.2 s
192.168.10.50:53450 -> 216.58.211.4:443, UDP, 0, 0, 3.06, 3.3 s
04:bf:6d:77:58:30 -> 01:80:c2:00:00:13, 200, 0, 0, 3.76, 17.9 s
30:9c:23:aa:0c:7a -> 04:bf:6d:77:58:30, ARP, 0, 0, 5.34, old (5.3 s)
04:bf:6d:77:58:30 -> ff:ff:ff:ff:ff:ff, 200, 0, 0, 1.56, 4.1 s
04:bf:6d:77:58:30 -> ff:ff:ff:ff:ff:ff, ARP, 0, 0, 5.26, old (5.3 s)
```

4. Semi-Automatic Measurements

As demonstrated, Qosium Scope Lite can be used directly in the console to run manual measurements. However, if you add arguments when starting the software, a different operation mode is activated. In this case, Scope Lite will execute the given fixed-length measurement autonomously, enabling an automated, complex chain of measurements by scripting. The argument setup is as follows:

```
QosiumScopeLite <MD> <HC> <PPII> <SPII>
```

The arguments to give are:

- **MD** - Measurement duration given in seconds
- **HC** - Console visibility: (0 = show console, 1 = hide console)
- **PPII** - Primary Probe Interface Index,
- **SPII** - Secondary Probe Interface Index

For example, to initiate a 30-second measurement with console visible and Probe interfaces set respectively to 2 and 1, execute the following command

```
QosiumScopeLite 30 0 2 1
```

The other measurement parameters are automatically read from the Scope Lite configuration file.

Thus, with this functionality, you can create semi-automatized measurement, if enough measurements parameters are known and set. Extending this concept further, shell scripts can be used to make a measurement happen, e.g., at certain periods, enabling automatic monitoring. This might be sometimes useful if Qosium Scopemon, the primary tool for automatic monitoring, is, for some reason, not suitable for

the job.

5. Glossary

QoS Measurement Control Protocol

Kaitotek's proprietary protocol for controlling measurements and gathering measurement results.

QMCP is a protocol made by Kaitotek to optimize QoS measurement control communications. TCP is used in the transport layer (currently), but QMCP controls its sessions. All Qosium products use QMCP.

General Package

Qosium General Package contains the basic Qosium components required for measurements and monitoring.

Graphical User Interface

User interface which features graphical elements, such as windows, buttons, dialogs, images, and controls.

Comma-Separated Values

Originally CSV was only about values that were separated by commas, but nowadays the separation mark can also be something else like a semicolon.

Qosium, for example, uses tabs as separation marks in its CSV-formatted results files.