



E-Shaper

Efficient, reliable and accurate testing
of data networks



FACULTY OF ELECTRICAL ENGINEERING
Department of Telecommunication
Engineering

DATASHEET

- **TCP / IP / Ethernet communication network emulation** with defined parameters (throughput, packet loss, delay, packet duplication, out-of-order packet delivery) including their changes over time.
- **Universal use in testing ICT applications** - imitation of virtually any situation, typically on the web, in the cloud, the Internet, distributed LAN and WAN.
- **Customized tests.** Pre-configured tests templates for common network situations (for example typically mobile or fixed access technology). These tests can be easily customized to reflect the specific needs of the specific application.
- **Cooperation with F-tester device.** Test result on real network from F-Tester can be transformed to template for emulator **E-Shaper**. The devices are part of the family **F-Lab**.
- **Device or service.** Emulator can be deployed as added network device or purchased as a service delivered by our expert team.

The E-Shaper device is designed to emulate the parameters of communication networks based on the TCP / IP protocol family in order to verify ICT systems under diverse, typically degraded and boundary conditions. These are in particular:

- **Testing of end applications** (SW applications with network communication, cloud services, web services, etc.) and analysis of their behavior typically:
 - on the deterioration of conditions on the physical layer (decrease in signal level, increase in interference),
 - on the increased load on the communication network,
 - on the decrease in the performance of the network element, data link or the entire network (fault conditions),
 - on outages and unexpected conditions,
 - about cyber attack.
- Testing the performance of a network element, data link or the entire network in the above conditions.
- Testing of network monitoring systems and automatic reconfiguration and recovery tools in the above conditions.

Test options

- Independent adjustable parameters of both transmission directions.
- Configuration using a web interface with the definition of individual steps and their grouping into scenarios (test orchestration).
- Ability to load saved and pre-configured scenarios from a file

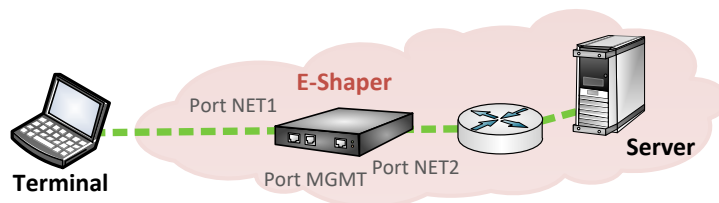
The course of parameters in time

- Permanent settings
- Parameters in time changed in defined steps
- Randomly generated values according to a defined regulation - distribution function

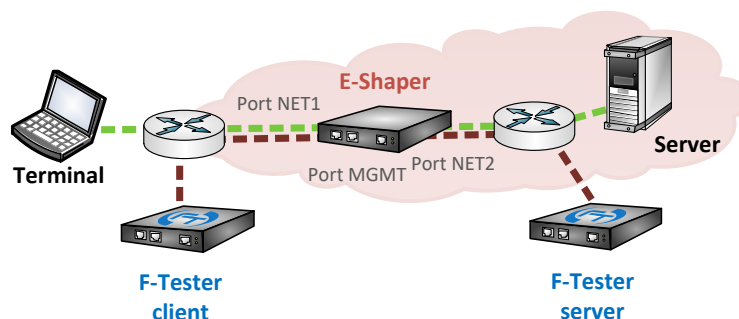
Range of parameters

- Scenario processing and time resolution of individual records:
 - from 1 μ s to hours and days (not limited), min. step 1 μ s
 - limit of the number of records - not limited
 - both channels (transmission directions - TX / RX ports) are controlled independently
 - if a specific parameter does not change, it is kept at the last setpoint

- **Throughput limitations:**
 - from 1 kbps to interface speed (in the basic version 1GE), min. step 1 kbps
 - possibility to define gradual (linear) increase / decrease of throughput
- **Transmission delay:**
 - from 1 μ s until the defined buffer is full (typically up to units with; the default buffer size is set to 262144 packets for each direction of communication), min. step 1 μ s
 - the default process delay is typically in the range of 50-150 μ s (applies to the APU2 HW platform)
- **Packet loss:**
 - from 0% to 100%, min. step $\sim 2.3 \cdot 10^{-8}$ (32 bit resolution)
- **Occurrence of duplicate packets:**
 - from 0% to 100%, min. step $\sim 2.3 \cdot 10^{-8}$ (32 bit resolution)
- **Out-of-order packets:**
 - from 0% to 100%, min. step $\sim 2.3 \cdot 10^{-8}$ (32 bit resolution)
 - packet cluster size out of order from 1 to N (maximum size N is defined in the common part of the scenario, the default value is set to 64 packets)



Typical use case of E-Shaper for all network parameters emulation.



Typical use case of E-Shaper for network parameters emulation with F-Tester generated concurrent data flows.

Technical parameters:

- **data interfaces:**
 - 2 x RJ-45 Ethernet 10/100/1000BASE-T in bridge mode
- **management interfaces:**
 - 1 x RJ-45 Ethernet 10/100/1000BASE-T
 - 1 x DB9 – RS232
- **data storage:** SSD 256+ GB
- **power supply:** 12V DC, maximum power 12 W
- **environmental conditions:** 0–85 °C
- **control:** web interface, terminal
- **IP Code:** IP40