WP progress*

(*) Just the main highlights. I'm not entering in details about what data matters, parameterizing stochastic models, nor validation techniques => Black Box

Agenda

- ➔ Network traffic generators
- ➔ Realistic traffic generation Issues
- ➔ Consolidation: Architecture
- ➔ Status
- ➔ Conclusion

Network traffic generators

- ➔ There are **many** open-source traffic generators and network benchmark tools available (still incomplete list)
- ➔ Each one has its own set of features

Class	Available tools
Application-level traffic generators	EAR, ParaSynTG, Youtube Workload Generator, Graphy-Based Traffic Generator, SURGE, MACE, UniLoG, GenSyn
Flow-level traffic generators	Harpoon
Packet-level traffic generators	D-ITG, Ostinato, Seagull, BRUTE, PackETH, Iperf, Netperf, SourcesOnOff, TG, Mgen, KUTE, RUDE & CRUDE, NetSpec, Nping, TCPreplay, TCPivo, Divide and Conquer, NetFPGA PacketGenerator, NetFPGA Caliper, NetFPGA OSNT, Dpdk MoonGen, Dpdk Pktgen, Dpdk NFPA
Closed loop and multilevel traffic generators	Swing, LiTGen

Realistic traffic generation Issues

- ➔ Packet-Level
  - ◆ Reply engines: TCPreplay, TCPivo, ...

    NEED PCAP STORAGE
  - ◆ Model-based: D-ITG, TG, …

    NOT AUTOMATIC CONFIGURABLE (PACKET AND FLOW LEVEL)
  - ◆ Maximum Throughput: Ostinato, Seagull, …

    NOT AUTOMATIC CONFIGURABLE (PACKET AND FLOW LEVEL)
- ➔ Application level
  - ◆ ParaSynTG(Web), Youtube Workload Generator(video), ...

    TOO SPECIFIC FOR GENERAL PURPOSES

Realistic traffic generation Issues

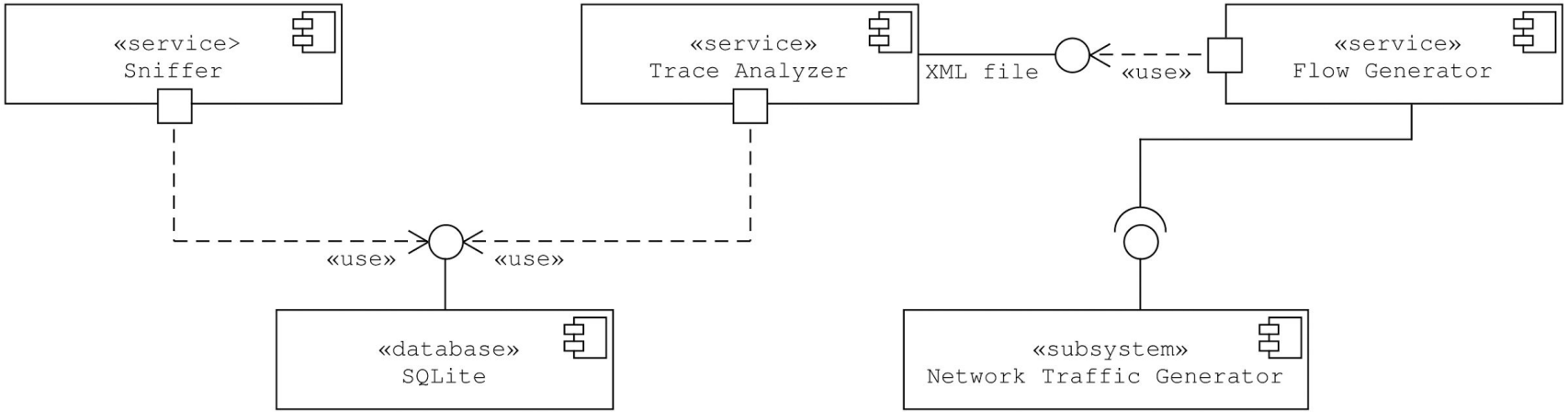
- ➔ Flow-level
  - ◆ Flow-patterns replication (based on a trace): Harpoon

    NOT-ACCURATE MODELS IN PACKET-LEVEL, NOT SUPPORTED ON NEWER KERNELS
- ➔ Multilevel
  - ◆ Multilevel modeling: Swing

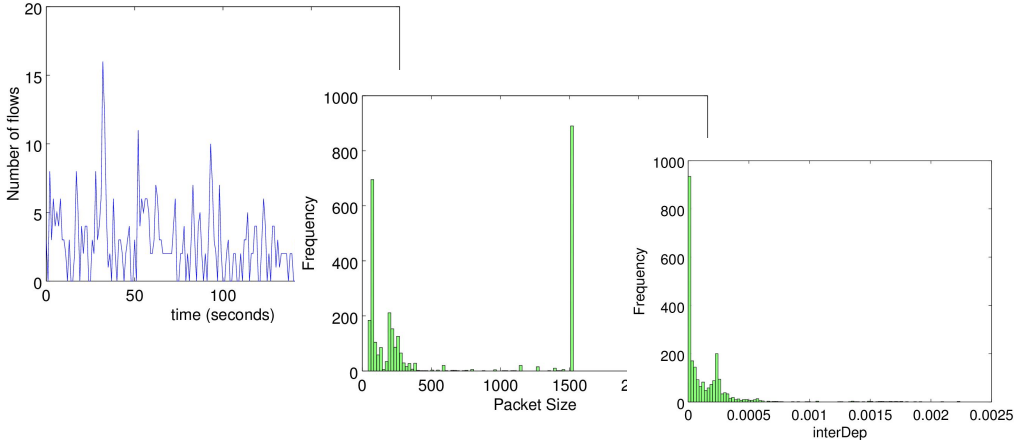
    NOT EXTENSIBLE, FEW PROTOCOLS, COMPLEX MODELS(OVERHEAD)

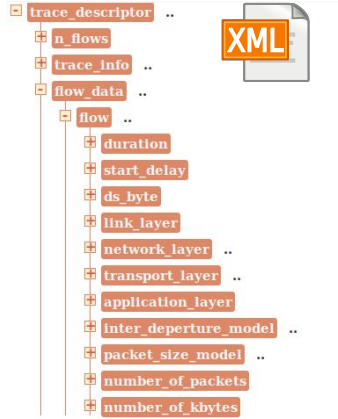
Consolidation: Architecture

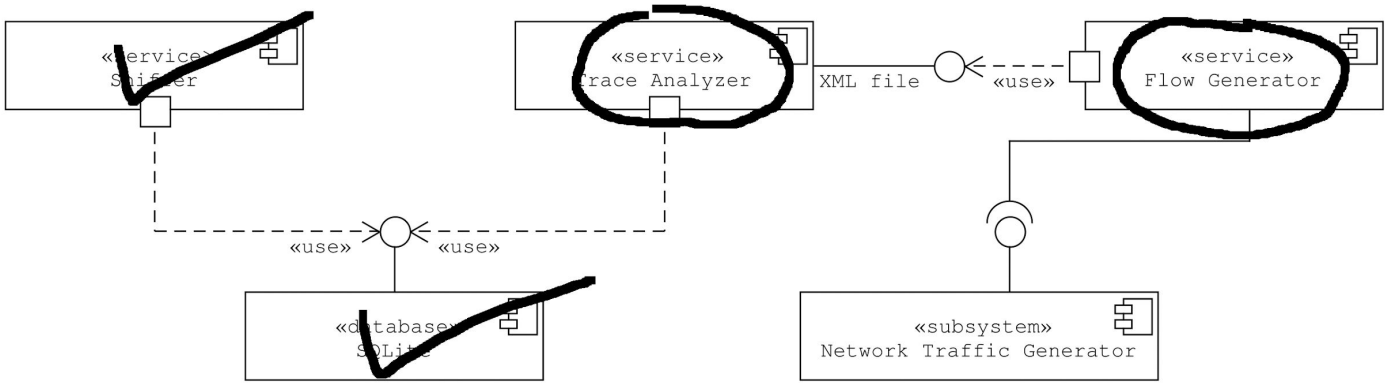
- ➔ Create **flow-level** and **packet-level** models to describe a given-trace, and use it as an input of a flow-generator
- ➔ Flow-Generator: implemented using a traffic-generator API
- ➔ Flow-Generator: extensible to any traffic-generator with API/CLI



Status


Number of flows
time (seconds)
Frequency
Packet Size
Frequency
interDep


XML
trace_descriptor
n_flows
trace_info
flow_data
flow
duration
start_delay
ds_byte
link_layer
network_layer
transport_layer
application_layer
inter_deperture_model
packet_size_model
number_of_packets
number_of_kbytes


«service»
Sniffer
«service»
Trace Analyzer
XML file
«use»
«service»
Flow Generator
«use»
«use»
«database»
SQLite
«subsystem»
Network Traffic Generator

Conclusion

- Next WP
  - Finish Qualification
  - Beta: trace-analyzer and flow-generator
  - First results for D-ITG, and validation
- Future
  - Extend to more Traffic Generators
  - Create a module to exchange of packets between Linux and DPDK (or Pktgen), and extend to NFPA