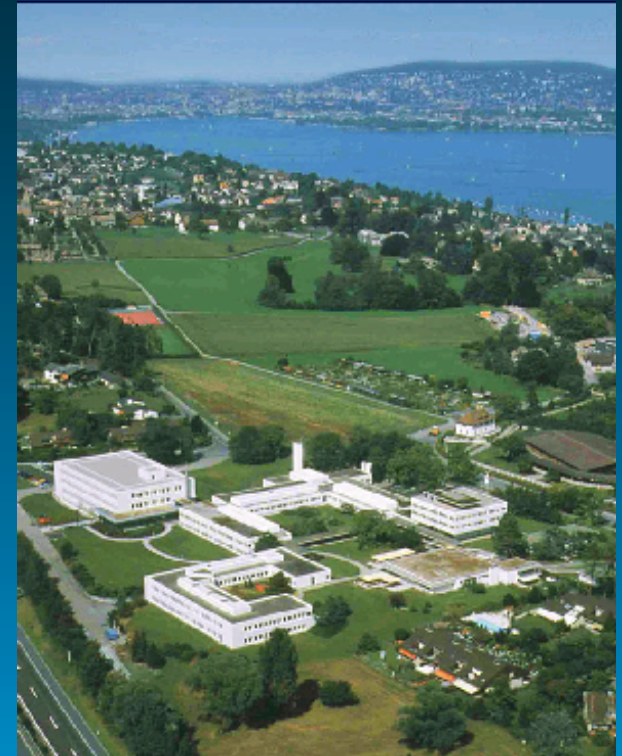


Methodology for Testing High-Speed Network Devices with Predicted Traffic

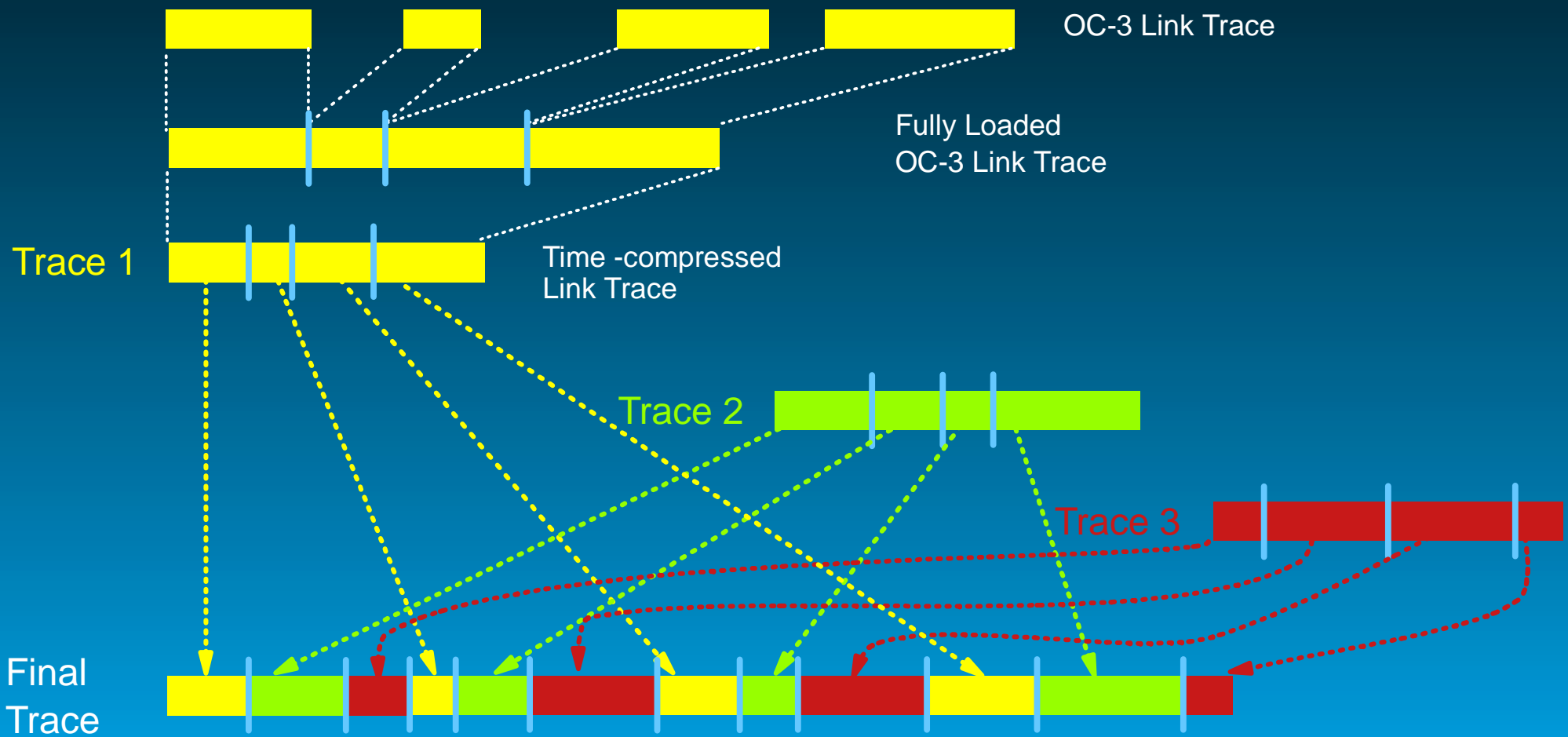
Patricia Sagmeister
IBM Research Zurich



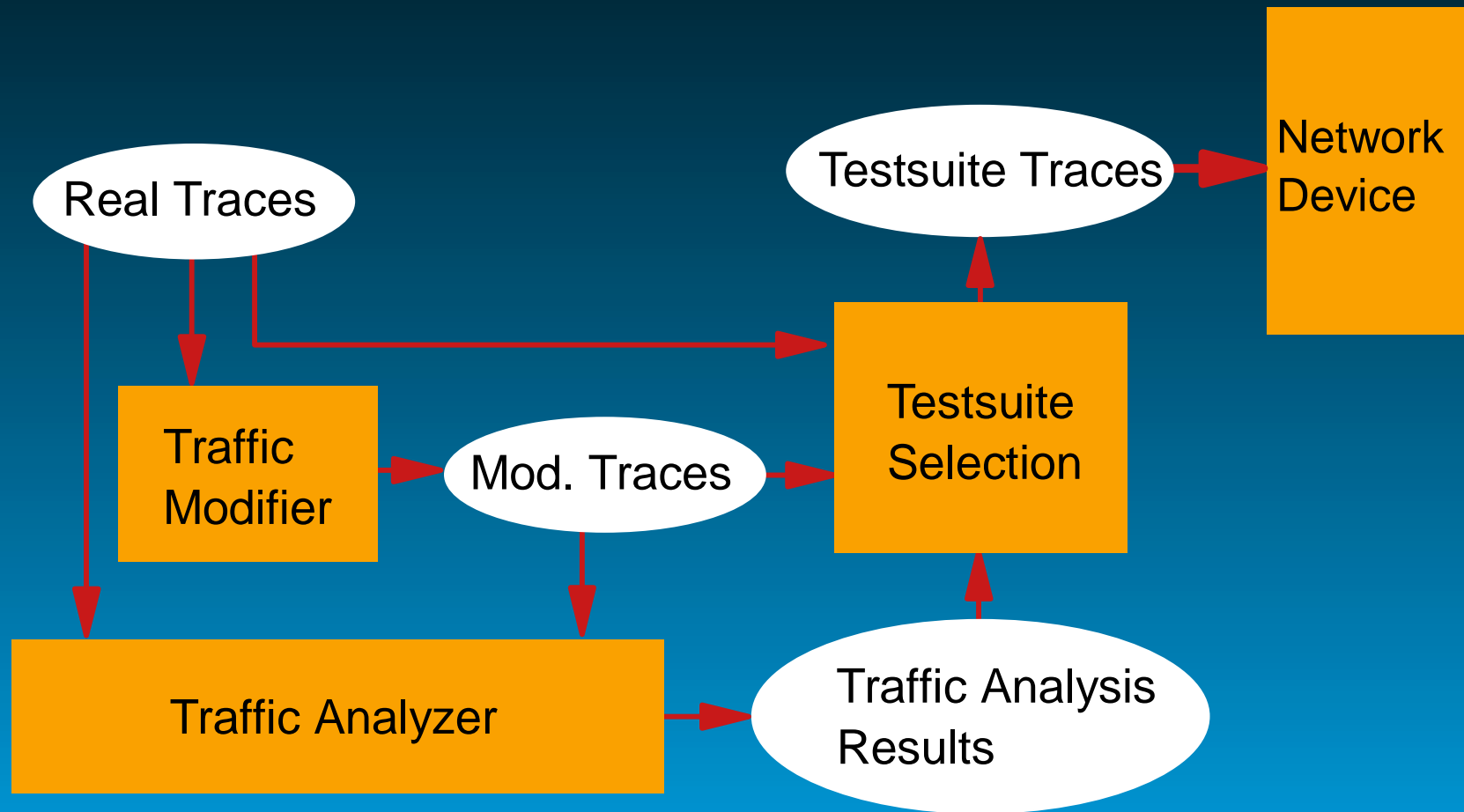
Motivation

- Validation & performance analysis of network devices
- Alternatives
 - Synthetic traffic
 - Actual traffic
- Test traffic requirements
 - Reflect actual traffic characteristics
 - High-speed networking traffic
 - Worst-case conditions
- ➔ Combination of actual traffic characteristics with generation methods

Methodology



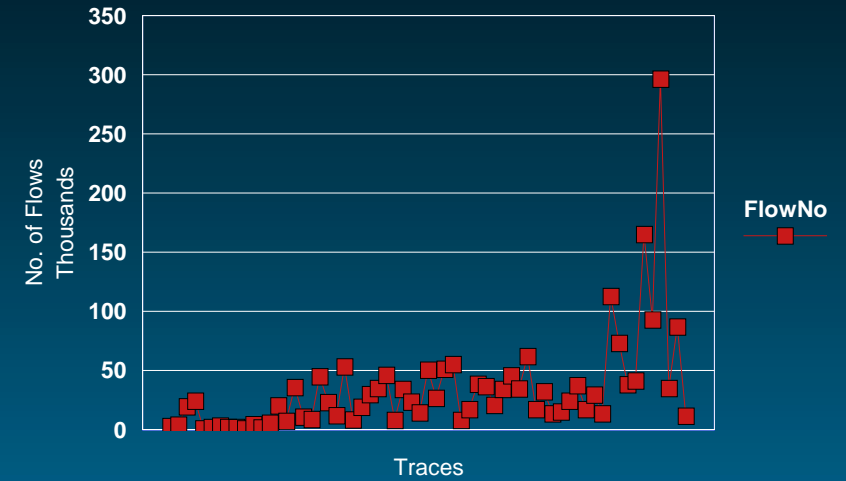
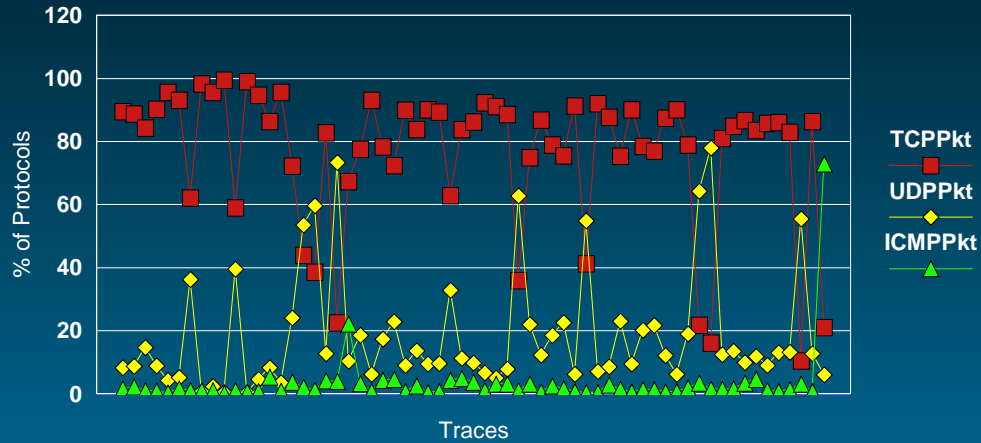
Testsuite Selection



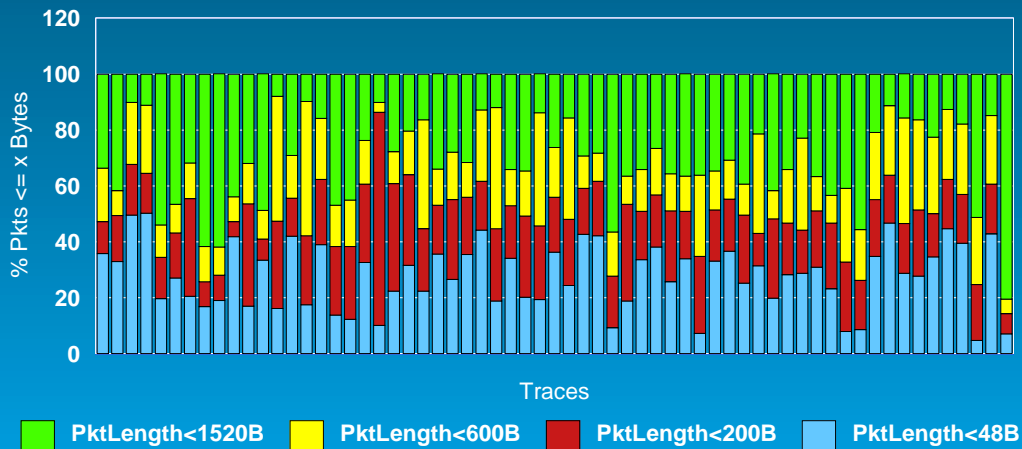
Testsuite Characteristics

Absolute No. of Flows

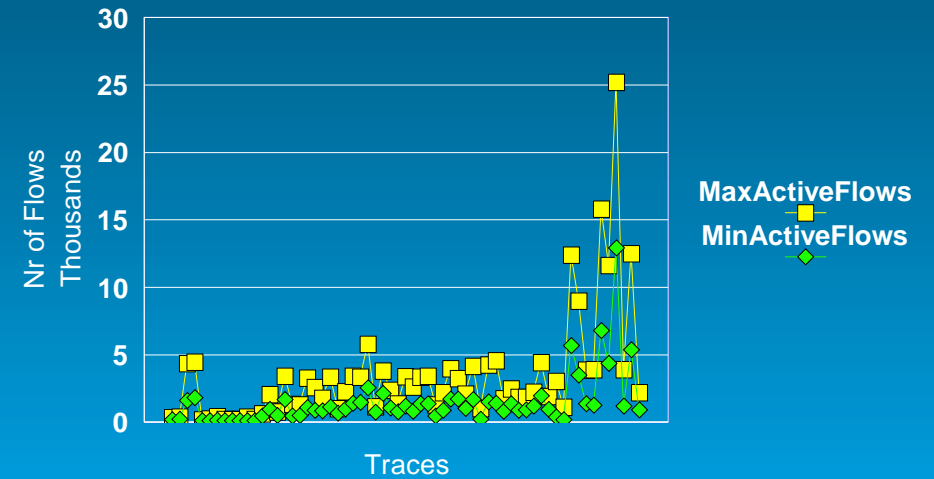
Relative Protocol Distribution acc. to Pkts



Relative No. of Pkts \leq x Bytes

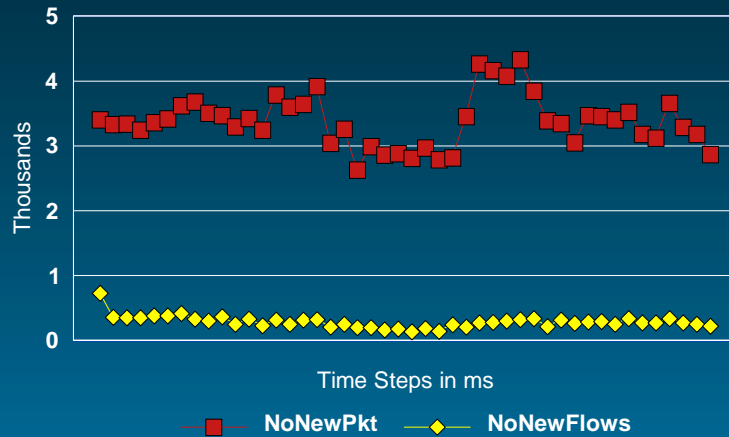


Simultaneously Active Flows

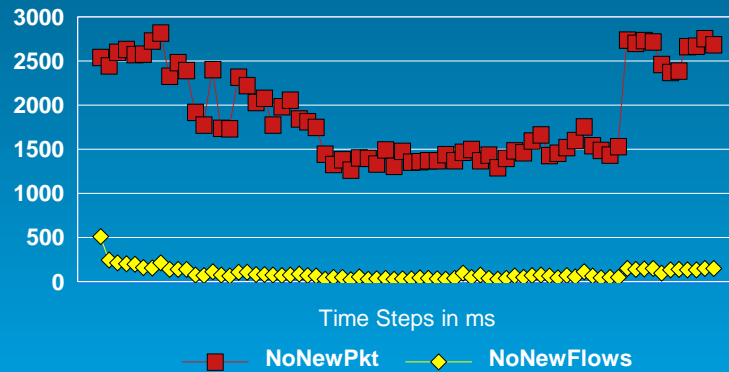


Testsuite Characteristics

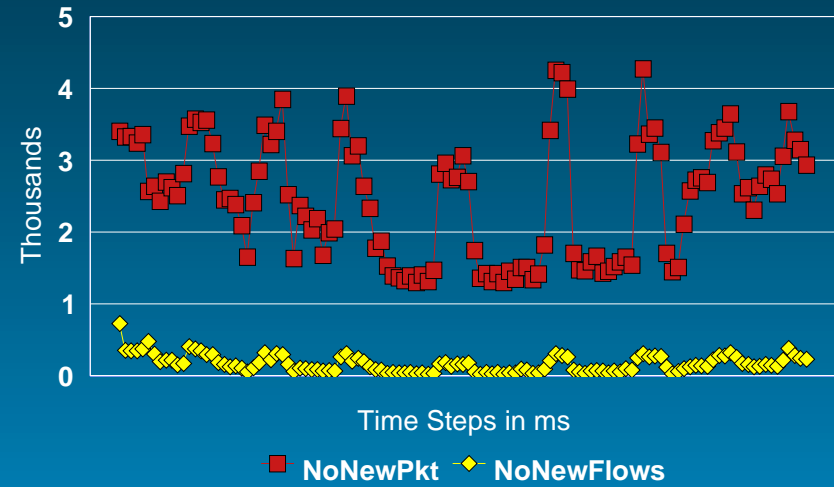
Link 0



Link 1



Combined Links



Conclusion

- Based on real traffic, monitored today, we have presented a method to extrapolate future high-speed traffic behavior
 - Step 1 : compacting of real traces -> leads to a full loaded link
 - Step 2 : time compression -> leads to a high-speed trace
- The resulting trace has the same traffic characteristics as the original actual trace, but shows additional phenomena that represent serious challenges for a network device
 - Higher period of rhythmic fluctuations in packet size within a flow
 - Higher period of fluctuations in the occurrence of hosts and their local share
- Interleaving of the time-compressed traces leads to longer traces. Aggregated high-speed network traffic is obtained through random or one-by-one interleaving. Concatenation of the same trace increases the number of simultaneously active flows
- Additional interleaving method:
 - Step 1 : time correct interleaving of different real traces
 - Step 2 : compacting & time compression