

I²MP- A high precision measurement platform for IP traffic

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For investigations on traffic characteristics in future metro and core networks new traffic models for simulative studies are needed. Beside the influence of new services enabled by higher access bandwidths on the traffic patterns, the impact of traffic aggregation is an interesting aspect. For the dormitories of the University of Stuttgart a large network exists which connects approx. 800 students, with access bandwidths of 100MBit/s each. This setup can be seen as a future scenario of broadband internet access in a residential area provided for higher numbers of end users and it will be used for our data acquisition.

For a verification of traffic models reliable measurement data, concerning loss and time, are required. However in times of increasing bandwidth and utilisation measurement data collected by SW-based tools have limitations in time resolution due to constraints of operating system's time and IO handling and therefore they become more and more inappropriate.

The IKR Internet Measurement Platform (I²MP, Figure 1) does time and performance critical operations with hardware support for getting higher time accuracy. For every incoming ethernet frame with 10, 100 or 1000 Mbit/s, the arrival time is attached as a timestamp and it is passed to a preprocessing module, where filtering is performed with respect to the protocol type of the payload. For reduction of data two independent selection windows are configurable, which define the amount of data of an IP packet that is captured. The captured data and the timestamp are buffered in a queue up to a certain threshold, before they are transmitted to the control PC, where the data is stored for off-line analysis

A comparison between simultaneous measurements based on a HW supported and SW supported platforms can be seen in Figure 2 where the complementary distribution function (cdf) of the inter arrival time (iat) of frames is shown. Traffic was generated with a high precision network analyser with constant iat and 93% link utilisation. The time accuracy of an off-the-shelf computer (PC24), an IO-optimised high-end server (PC40) and our measurement platform can be derived from the graph.

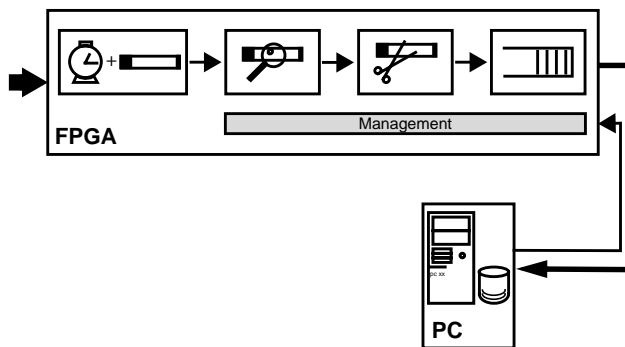


Figure 1 Architecture of the I²MP measurement platform

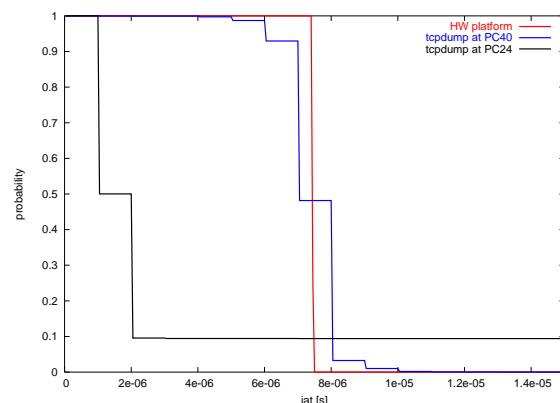


Figure 2 Comparison between iat CDF of SW and HW supported measurement