

PCI-X Activity and UDP measurements using the Intel 10 Gigabit Ethernet NIC.

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This paper discusses the impact of using 10 Gigabit Ethernet Adapters with server quality motherboards. Measurements were made to determine the activity on the PCI-X bus, the CPU load, and the UDP/IP performance using both IA32 and IA64 architectures.

The tests were performed by sending UDP/IP frames between two PCs equipped with Intel PRO/10GbE LR 10 Gigabit Ethernet Server Adapters and connected back-to-back. The IA64 architecture was investigated using two HP Itanium rx2600 IA364 PCs in the CERN Open Lab [1]; to examine the behaviour with IA32 architecture two SuperMicro P4DP8-G2 IA32 PCs from the EU project DataTAG [2] were used.

For each test, the activity on the PCI bus was recorded using a logic analyser and UDPmon [3] was used to measure the network performance. The following network characteristics were measured: memory-memory transfer rates, packet loss rate and loss distribution, round-trip latency, inter-packet jitter, and 1-way delay. The network throughput and loading of the PCI-X bus was measured for different MTU sizes. With a 16114 byte MTU, wire rates of 5.714 Gbit/s for the Itanium and 3.974 Gbit/s for the Xeon were recorded.

The interrupt coalescence behaviour of the NIC was investigated as well as the relation between the PCI-X Maximum Memory Read Byte Count parameter, bus occupancy and throughput.

The paper includes an analysis of the PCI-X traces and discussion of the loading of the i/o bus, the memory bus and the CPU when multi-Gigabit transfers are made using the Intel PRO/10GbE LR 10 Gigabit Ethernet Server Adapter.

References

[1] CERN OpenLab Home Page: <http://www.cern.ch/openlab>

[2] DataTAG Home Page: <http://datatag.web.cern.ch/datatag/>

[3] UDPmon R. Hughes-Jones A tool for investigating network performance. Writeup and tool available from www.hep.man.ac.uk/~rich/net .

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