

Linux 40GbE DPDK Performance

High Speed Packet Processing with Terminator 5

Data Plane Development Kit (DPDK) is a suite of packet processing libraries and NIC drivers optimized for running in user space to boost networking performance. This report provides DPDK benchmark results using Chelsio’s T580-CR Unified Wire Adapter running at 40GbE. The results show record breaking performance, exceeding 47 MPPS in unidirectional tests, and 71 MPPS in bidirectional tests. Furthermore, a superior bandwidth curve showcases line rate throughput at I/O size 256B for both unidirectional and bidirectional traffic.

Test Results

The following graphs show the single port unidirectional and bidirectional throughput and packet rate (MPPS) collected using **DPDK-Pktgen** tool at different I/O sizes.

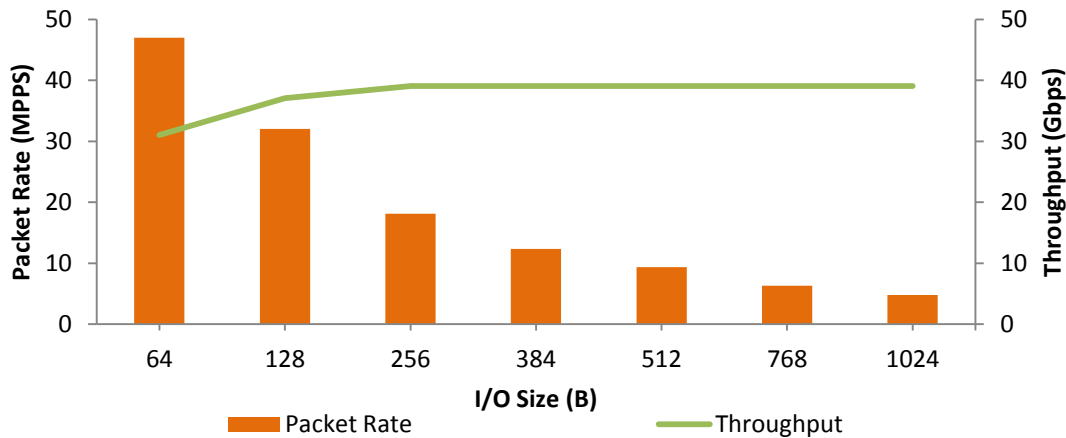


Figure 1 – Single port unidirectional Throughput and Packet Rate vs. I/O size

Chelsio’s T580-CR adapter delivers up to 47 MPPS at the minimum frame size of 64B, nearly saturating the PCI bus when overhead PCI traffic is considered. The above graph also reveals that the adapter reaches 40Gb line rate at I/O size as small as 256B.

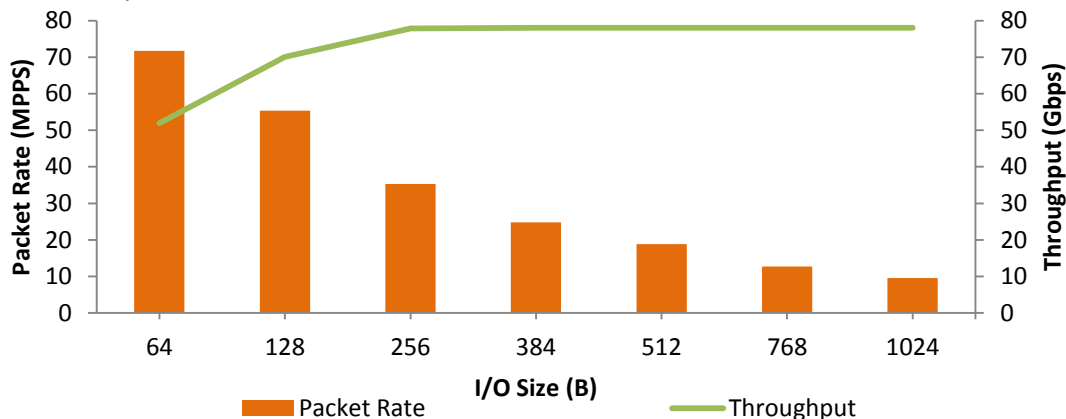


Figure 2 – Single port bidirectional Throughput and Packet Rate vs. I/O size

As the graph above demonstrates, Chelsio's T580-CR adapter delivers more than 71 MPPS in bidirectional testing. Furthermore, similarly to unidirectional testing, full 80Gb bidirectional line rate throughput is reached at I/O size as small as 256B.

Test Configuration

The following sections provide the test setup and configuration details.

Topology

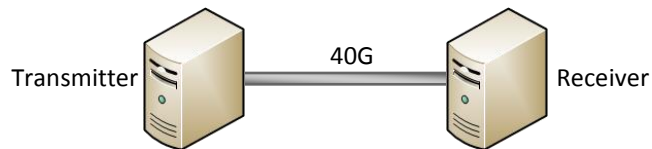


Figure 3 – Test Setup

Network Configuration

The test configuration consists of 2 machines, *Transmitter* and *Receiver*, connected back-to-back using a single port of T580-CR. The machines are configured each with 1 Intel Xeon CPU E5-1660 v2 6-core processor clocked at 3.70GHz (HT enabled), with 64GB of RAM and RHEL6.6 (kernel 3.17.8) operating system. Standard MTU of 1500B is used. Chelsio T5 DPDK driver v1.0.0.1 with UIO support is installed in each machine.

I/O Benchmarking Configuration

DPDK-Pktgen is used to measure the throughput and packet processing rate. The I/O sizes used varied from 64B to 1KB.

Commands Used

The following commands are executed on both *Transmitter* and *Receiver* systems:

Unidirectional

```
root@host:~# pktgen -c fff -n 4 -- -T -P -m "[1-8].0" -N
```

Bidirectional

```
root@host:~# pktgen -c fff -n 4 -- -T -P -m "[1:2-5].0" -N
```

Conclusion

This report provides Linux **DPDK** performance results for Chelsio's T580-CR 40GbE server adapter. The results show exceptional single port performance with up to 47 MPPS for unidirectional and more than 71 MPPS for bidirectional traffic. T5 also delivers excellent unidirectional and bidirectional throughput performance across the board, reaching line rate at I/O size 256B. Such record breaking numbers make T5's DPDK solution an ideal fit for networking applications striving for the best in packet processing performance.

Related Links

[The Chelsio Terminator 5 ASIC](#)

[40Gb TOE vs NIC Performance](#)

[FreeBSD 40GbE Netmap Performance](#)