

Chelsio Switchless Backbone

Integrates Top-Level Rack Switch and concurrent 100Gbps TCP/UDP/iSCSI/iSER/iWARP/NVMe-oF/SMBD and in-line TLS/SSL/DTLS

Overview

Chelsio’s T5/T6 ASIC based 1/10/25/40/50/100Gb Ethernet Adapters supporting PCI Express 3.0 x16 host bus interface, are known for their low latency and line-rate performance with dramatically lower host-system CPU communications overhead. The adapter’s on-board hardware offloads TCP/IP, UDP/IP, iSCSI, FCoE, OVS, RDMA processing, and TLS/SSL/DTLS processing from its host system and frees up host CPU cycles for user applications. As a result, the system benefits from higher bandwidth, lower latency and reduced power consumption.

The T6 ASIC based adapters also support an integrated eSwitch, capable of up to 2x100Gbps full-duplex switching operations. This functionality is supported even when the adapter is simultaneously operating as a 100Gbps offload NIC. This document gives an insight into how T5/T6 integrated eSwitch can be configured as the backbone to connect a set of servers at desired 1/10/25/40/50/100Gb link speeds. This is achieved concurrently along with the adapters supporting TCP/UDP/iSCSI/iSER/iWARP/NVMe-oF/SMBD and in-line TLS/SSL/DTLS Crypto network traffic.

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The T5/T6 integrated eSwitch has a full suite of L2-L7 features including ACL with support for L2 Ethernet switching, L3 routing, NAT, TCP Proxy, and iSCSI proxy. This functionality is configurable through a Linux/FBSD CLI (cxgbtool) and provides APIs to integrate with a third-party management tools.

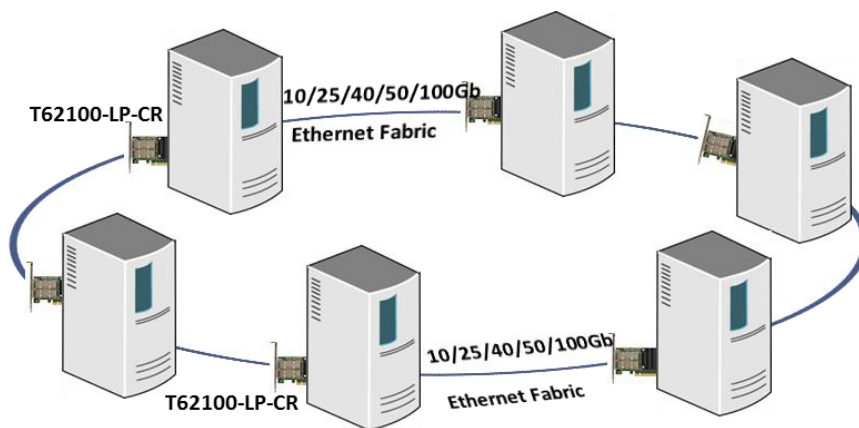


Figure 1 – Chelsio Switchless Backbone Using 100G Adapters

Using this functionality to deploy Microsoft Storage Spaces Direct (S2D) enables a fast path implementation. Using a dual port T6 based 100G adapter (T62100-LP-CR) in each of the S2D nodes, as shown in the Figure 1, each node is connected to its neighboring node, as shown in the Figure 2 below, enabling a backbone 100G network to configure and use a cluster solution like S2D, without any external switch. Please note, a network switch will still be required to communicate outside the backbone network.

Both open and closed backbone configurations are supported as shown in the Figure 2. The Chelsio integrated eSwitch support following functionalities:

- 2 ports, full-duplex 100Gbps per port
- <1us port-to-port latency
- 256 DA + 256 SA
- L2/L3/L4/L7 switching/routing
- ACL
- NAT
- Linux/FBSD CLI and SDK/API

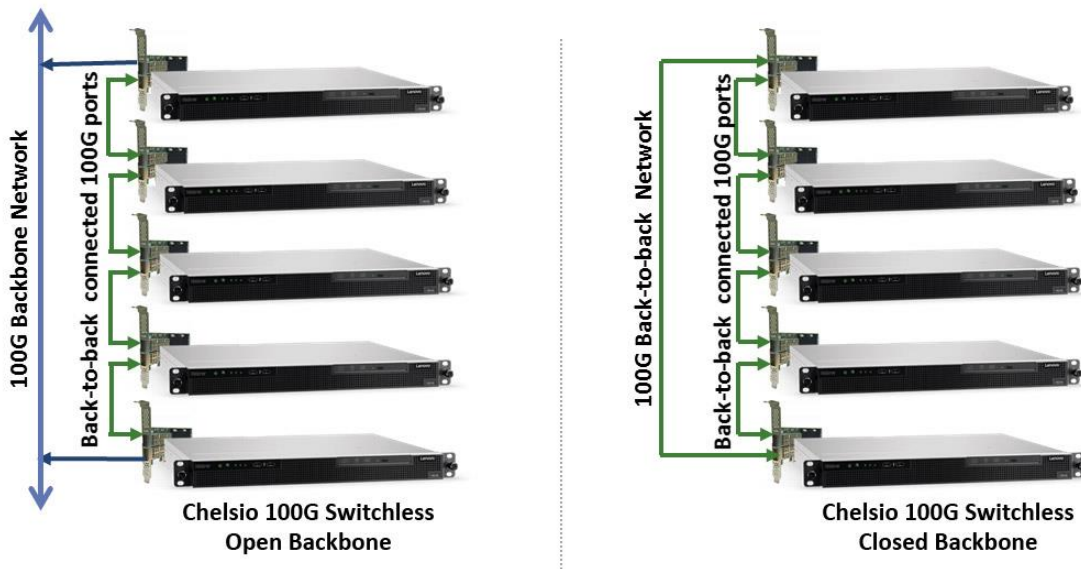


Figure 2 – Open and Closed Switchless Backbone Using 100G Adapters

Chelsio Switchless Backbone Applications

Switchless Backbone configuration is supported under Windows Server 2016 (including S2D Clusters), Linux and FreeBSD platforms, enabling following applications:

- Microsoft Storage Spaces Direct (S2D)
- NVMe fabric rack
- SDN/NFV racks
- Scale out servers, NAS systems, and Ethernet-based storage
- QoS and Traffic Management
- Develop shared-storage systems providing both file and block level services
- Build high performance

The T5/T6 integrated eSwitch enables storage rack designs and NFV racks with servers connected directly without involving a Top of Rack (ToR) switch. These features enable flexible high bandwidth, low latency and high IOPS designs, while at the same time lowering TCO (Total Cost of Ownership), reducing CAPEX (Capital Expenses) by minimizing switch port expenses and OPEX (Operating Expenses) by lowering power usage by employing offload technologies.