

IPoIB Performance Evaluation on QDR Infiniband Network

The Problem

A considerable performance drop has been identified on the PSL-Crill Cluster when using the IPoIB network layer as compared to the standard Infiniband software stack. This project aims to better understand the source of this behavior.

The Solution

Initially explore UDP vs TCP benchmarks to see if drop in performance is something fundamental to IP layer. Based on results of benchmarks, explore TCP parameters to optimize performance of the IPoIB network layer. Measured network bandwidth and latency relative to network transferred message size will be used for analysis. IPoIB results to be compared against performance using standard software stack(verbs). Completeness of message transfer to be validated by simple comparison of sender/receiver message length.

Platform: PSL - Crill Cluster

- Network Interconnect
 - 288 port Infiniband QDR Infinipath Switch
 - 24 port Infiniband SDR switch (I/O switch to the SSD storage)
 - 48 port Netgear GE switch
- Compute Nodes
 - 16 NLE Systems nodes
 - 4x 2.2 GHz 12-core AMD Opteron processors
 - 4xQDR InfiniBand Host Channel Adapters
 - 2 Appro 1326G4 nodes
 - 2x 2.2 GHz 12-core AMD Opteron processors
 - 4xQDR InfiniBand Host Channel Adapters
 - 3 HP DL 160 Gen 8 nodes
 - 2x 2.4 GHz quad-core Intel Xeon E5-2665 processors
 - 4xQDR InfiniBand Host Channel Adapters

Networking Components

- Remote Direct Memory Access
- Usage of non-standard NIC
 - Infiniband adapters [HCA's]
- IP packet transmission over non-standard NIC

Milestones

Milestone	Deliverables	Target Date
One	Profile of behavior using Infiniband software stack over infiniband network. Initial tests using TCP vs UDP benchmarks to profile behavior.	03/29/2019
Two	Profile of behavior using IP packets over Infiniband network. Potential parameter study to optimize performance of IPoIB network layer. Final report of findings.	04/26/2019