

Traffic Classification With Machine Learning On Hybrid CPU+GPU Architecture

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Topics I am going to cover in presentation?

- Research Overview
- PeerDirect RDMA Technology
- CUDA
- Nvidia GPUDirect Technology
- Mellanox InnovalFlex 4 LxEn Network Adapter
- FPGA
- Hybrid model architecture

Research Overview

- Recently in network traffic, most research is focused on classification and identification of users/subscribers.
- My research focused on classification and distribution of network traffic over CPU and GPU.
- For this classification and distributing the network traffic following technologies, we are using
- Mellanox InnovalFlex 4 LxEn programmable Network Adapter
- FPGA to program
- PeerDirect RDMA technology

PeerDirect RDMA Technology

- RDMA allows computers in a network to exchange data in main memory without involving the processors, cache or OS of either computer.
- RDMA enables more direct data movement by implementing a transport protocol in NIC hardware.
- RDMA supports a feature called zero-copy networking.

CUDA

- CUDA is a parallel computing platform and API model created by NVIDIA.
- It allows software developer to use a CUDA-enabled GPU for general purpose computing.
- It also called GPGPU

NVIDIA GPUDirect Technology

- NVIDIA GPUDirect RDMA Technology enables a direct path for data exchange between the GPU and a third-party peer device using standard features of PCI express.
- Third-party devices like network interface, video acquisition, storage adapters.
- Technology introduced in Kelper class GPU and CUDA 5.0
- It has some main features like; accelerated communication with network and storage devices, Peer-to-Peer transfer B/W GPUs, Peer-to-Peer memory access, RDMA.

InnovaFlex

- Mellanox Innova IPsec 4 LxEn adapter card provides security acceleration for IPsec enabled networks.
- IPsec is a protocol suite for secure IP communication.
- Overview of specification of InnovaFlex:
- PCI Express Gen3.0 and higher with x8 edge connector
- Memory - PCIe, SPI, EEPROM
- IPsec offload
- Special handling of Overlay Networks
- RDMA and RDMA over Converged Ethernet (RoCE) technology support

- Mellanox PeerDirect™ Technology
- Storage Acceleration support
- Distributed RAID (Redundant Array of Inexpensive Disks) support

FPGA

- FPGA are widely considered as accelerator for compute intensive applications.
- It is commodity integrated circuits whose logic can be determined or programmed, in the field.
- It enables highly flexible parallelism and associative operations such as broadcast and collective response.
- FPGAs are less dense and slower than ASICs, but their flexibility often more than makes up for these drawbacks.
- Application accelerated with FPGAs often deliver 100-fold speedups per node over microprocessors based systems.

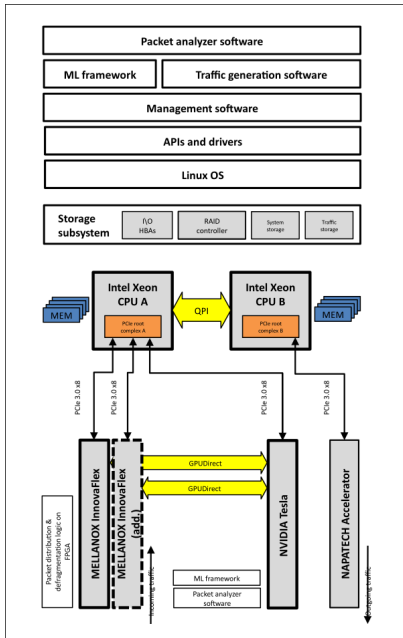


Figure 1: Purposed Hybrid CPU + GPU Architecture

Thank you for your attention.

**Your questions and
suggestions..**