



# PCI Express Over Cable PCIe Gen 3 Product Preview

One Stop Systems



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SYSTEMS

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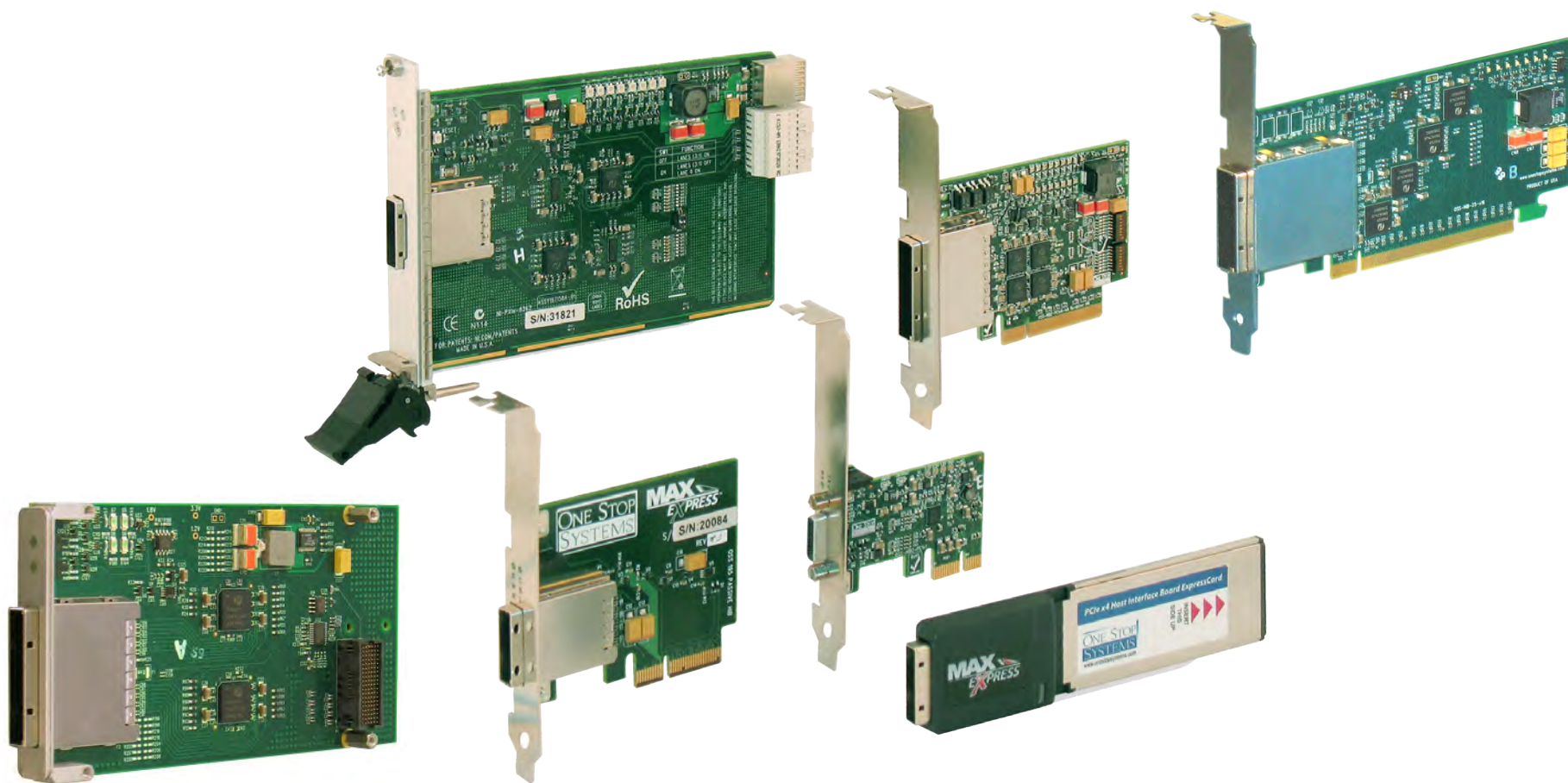
First to market with PCIe over cable products and  
the largest source of PCIe adapters in the world

## OSS Gen 1/Gen 2 Products

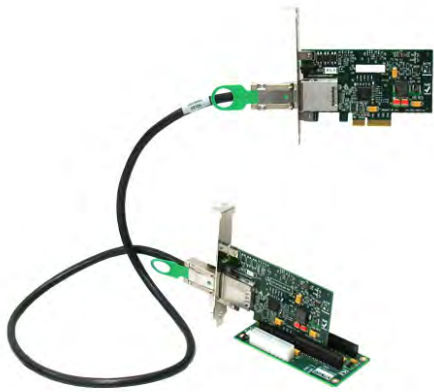
- I/O Expansion
  - ✓ Cable adapters & Expansion Kits
  - ✓ Expansion backplanes and enclosures
- High-Speed Networking
  - ✓ Switch-based cable adapters with NT ports
  - ✓ ExpressNet driver installed on each system

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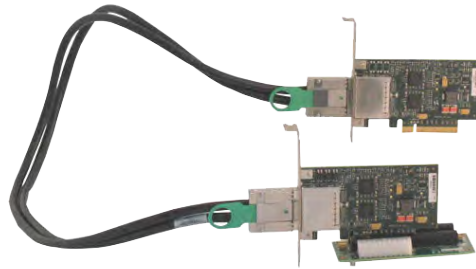
# OSS Gen 2 Cable Adapters



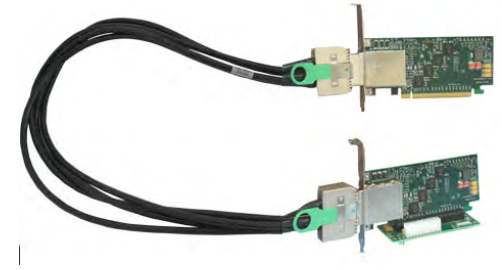
# Gen 2 Expansion Kits



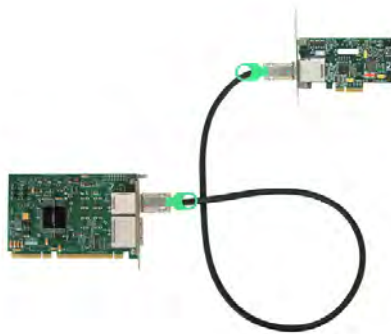
PCIe x4 host and target adapters  
in 2-slot backplane



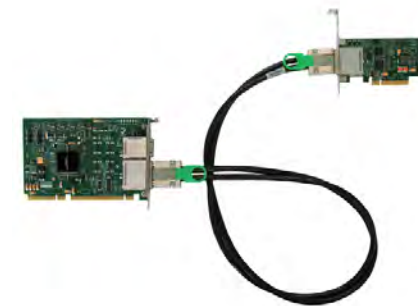
PCIe x8 host and target adapters  
in 2-slot backplane



PCIe x16 host and target adapters  
in 2-slot backplane

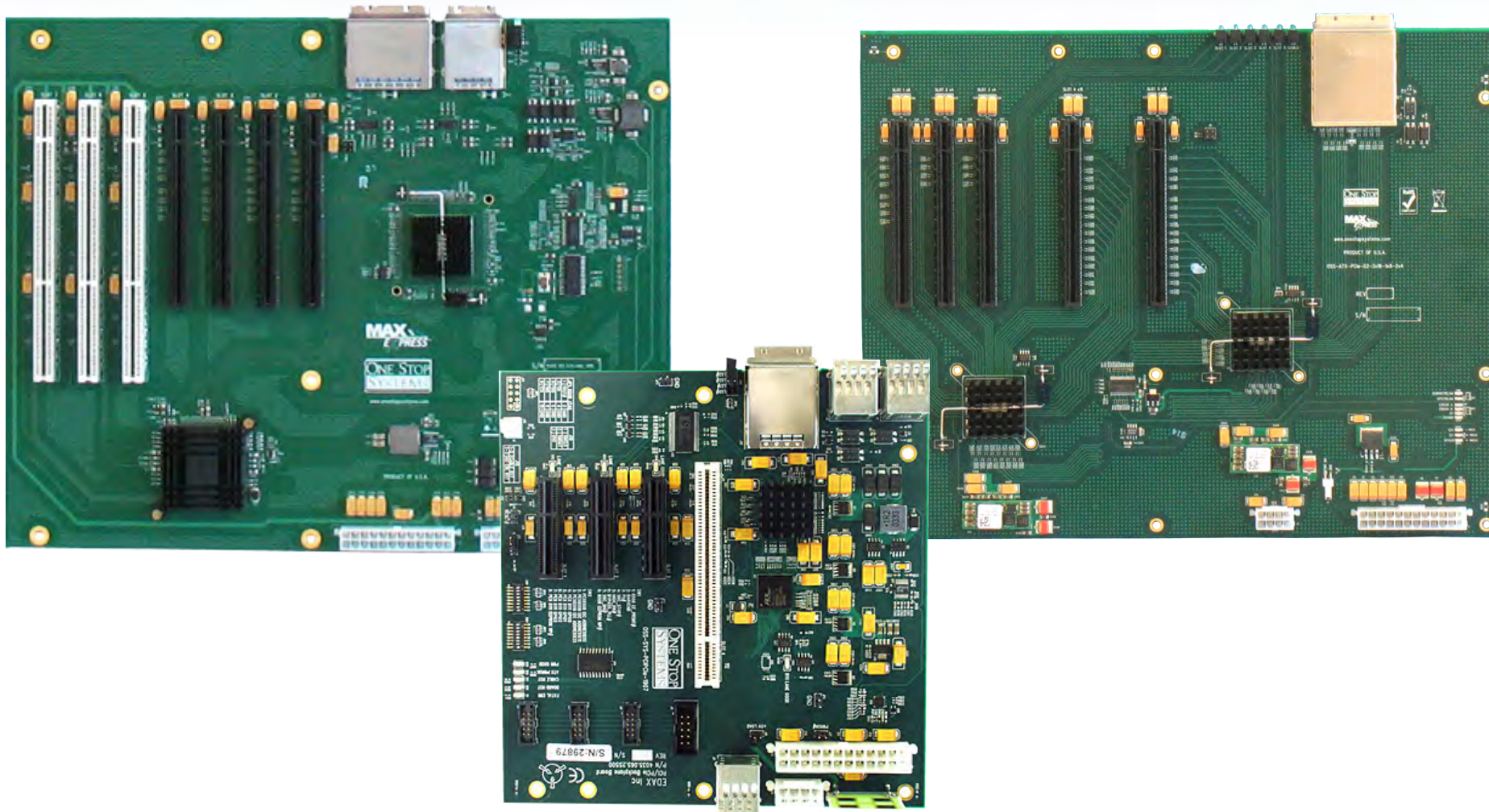


PCIe x4 host adapter and expansion board



PCIe x8 host adapter and expansion board

# Gen 2 Expansion Backplanes



# Gen 2 Expansion Systems

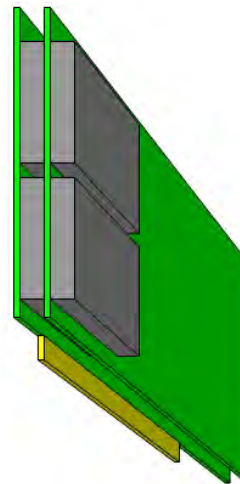
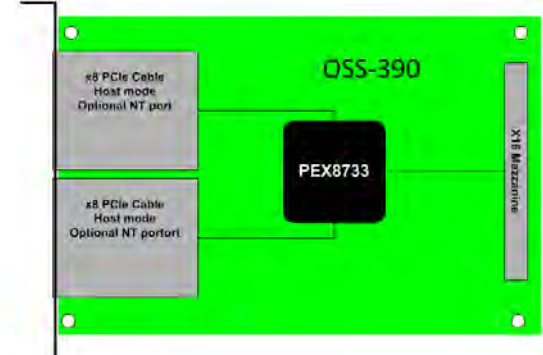
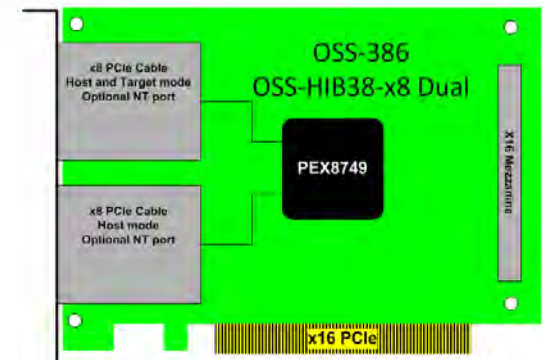


## OSS Gen 3 Roadmap

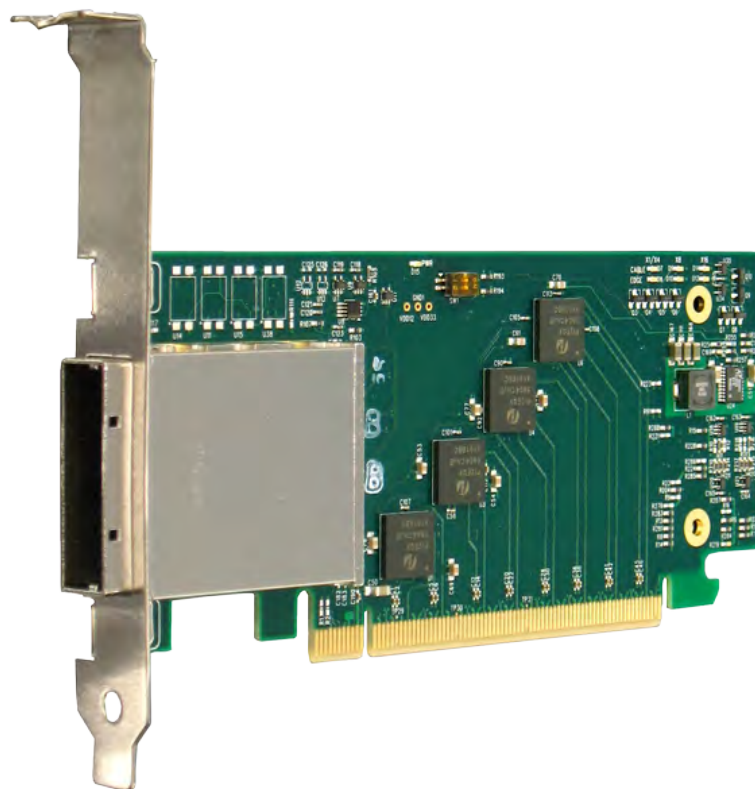
- 1U expansion system with 2 canisters, holds 4 GPU cards Gen 3
- 2U expansion system with 4 canisters, holds 8 GPU cards Gen 3
- 3U expansion system with 8 canisters, holds 16 GPU cards Gen 3
- 3U expansion system with 4 canisters, holds 16 SSD or GPU cards Gen 2  
(up to 160TB with Fusion io cards added)
- HIB 38 x8 – dual and –quad Gen 3
- HIB 38 x16 Gen 3
- HIB-38's support both CPU-to-I/O and CPU-to-CPU networking
- ECA x8 Gen 3
- 2-slot target expansion backplane (x16 connector) Gen 3
- ExpressNet 3.0 networking over PCIe cable – Linux Gen 3

## HIB 38-x8 Dual / Quad

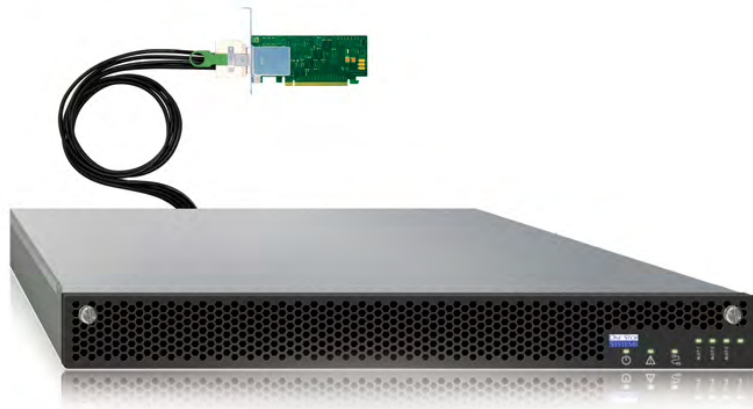
- Dual
  - ✓ X16 Card edge
  - ✓ Two x8 PCIe Cable Connectors
  - ✓ Half Length
  - ✓ DIP Switch Selectable Modes
    - Host
    - Target
    - NT
- Quad (Mezzanine)
  - ✓ Four x8 PCIe cable connectors



## PCIe x16 Gen 3 Switch-based Cable Adapter



# Gen 3 Expansion Systems



## Gen 3 Expansion Enclosures

1U



- Holds 4 double-wide GPU's
- Two dual canisters
  - ✓ Each with a PCIe x16 Gen 3 cable interface
- Two 1,200 watt power supplies

2U



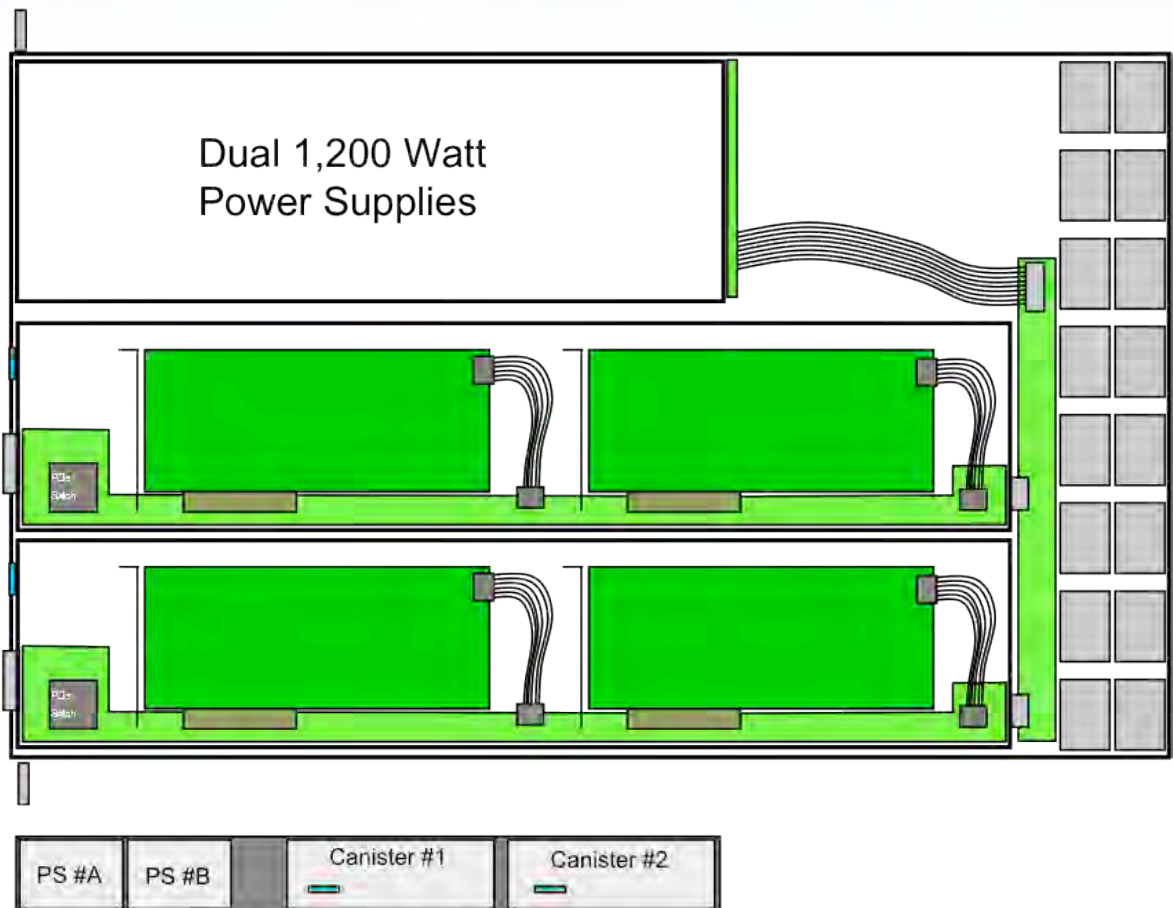
- Holds 8 double-wide GPU/SSD cards
- Four dual canisters or two quad canisters
  - ✓ Each with a PCIe x16 Gen 3 cable interface
- Four 1,200 watt power supplies

3U



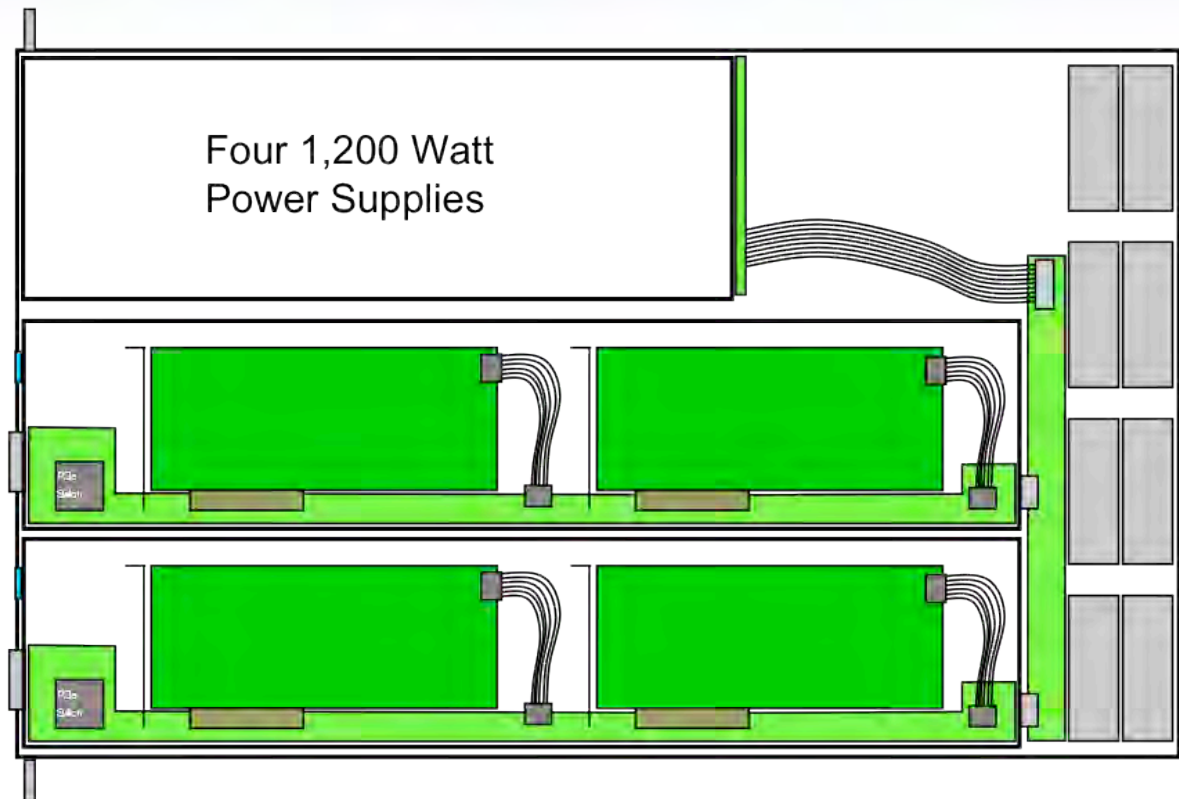
- Holds 16 double-wide GPU/SSD cards
- Eight dual canisters or four quad canisters
  - ✓ Each with a PCIe x16 Gen 3 cable interface
- Four 1,200 watt power supplies

## 1U Gen 3 2-Uplink Enclosure



- 2 removable canisters
- 2 double-wide slots per canister
- Each canister has one PCIe x16 Gen 3 cable interfaces to host server
- Dual 1,200 watt power supplies

## 2U 8-slot Expansion Enclosure



PS #A	PS #B	Canister #1	Canister #2
PS #C	PS #D		

- 2 or 4 removable canisters
- 2 or 4 double-wide slots per canister
- Each canister has 2 or 4 PCIe x16 Gen 3 cable interfaces to host server
- Four 1,200 watt power supplies

## 3U 16-slot Expansion Enclosure



- 4 removable canisters
- 4 double-wide slots per canister
- Each canister has one PCIe x16 Gen 3 cable interface to host server
- Four 1,200 watt power supplies

# High-Speed Networking

Network connectivity  
at 10-20Gb/s

- Redundant servers with ExpressNet
  - ✓ Server to server communication
  - ✓ Windows or Linux OS



1U PCIe switch

- 1U PCIe switch
  - ✓ 128Gb or 32Gb upstream interface
  - ✓ Eight 32Gb downstream interfaces

# HPC Cluster

- 1U PCIe switch
  - ✓ 32Gb connections between servers
- Two to eight servers
  - ✓ Server to server communication
    - 32Gb PCIe
    - 10Gb Ethernet
    - 20Gb Infiniband
- Multiple 1U or 2U GPU systems
  - ✓ Two to eight GPU's/SSD's per appliance
  - ✓ 128Gb/s connectivity to server

Network connectivity



1U switch

Server to Server at 32Gb/s



1U servers

GPU/SSD appliance



Server to appliance connectivity at 128Gb/s

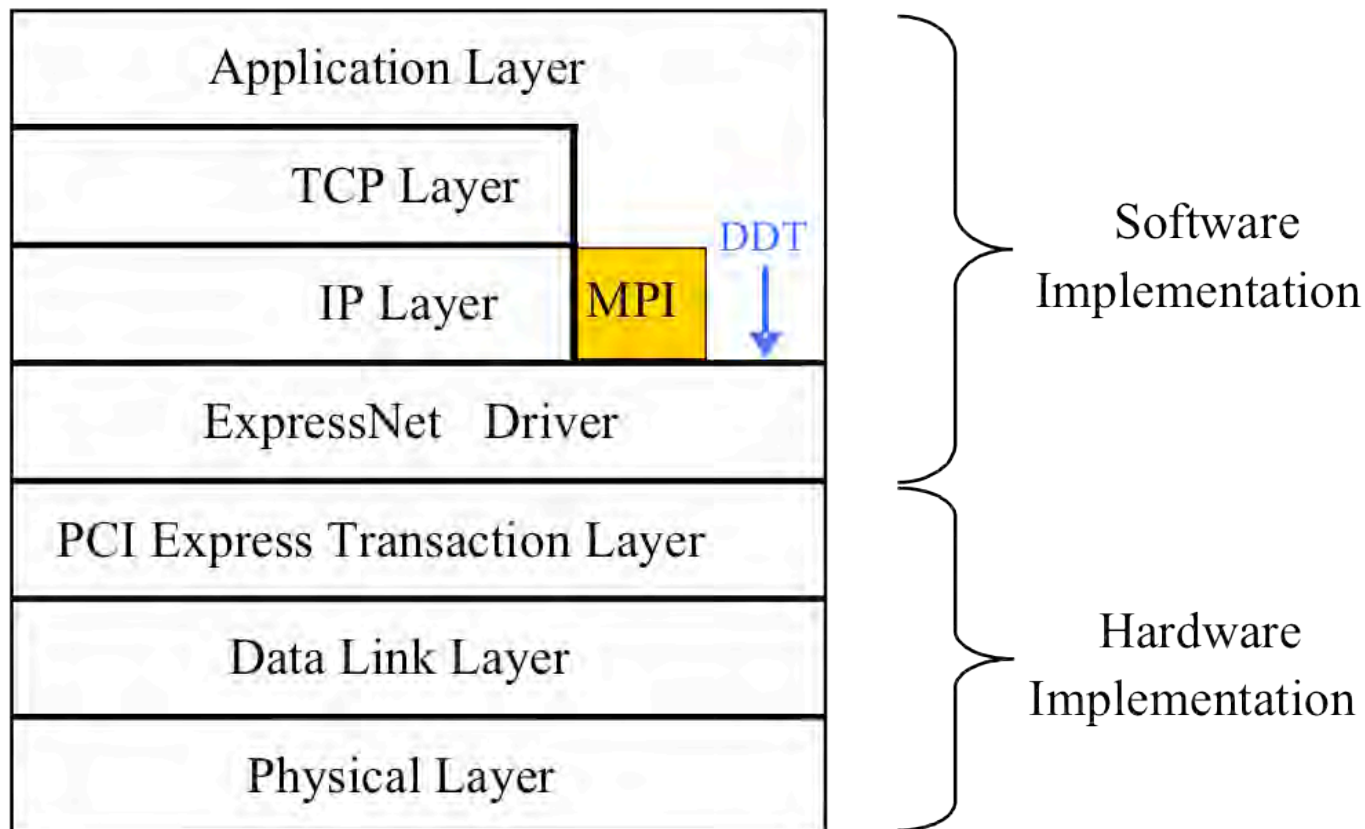
GPU/SSD appliance



# ExpressNet Software

- Initialization and fabric management S/W
  - ✓ Runs on host CPU within external switches
  - ✓ Sets up network and manages hot-swap events
- Driver S/W
  - ✓ Runs on each CPU blade
  - ✓ Configures NT bridges
  - ✓ Sets up address spaces to allow access to other CPU's memory
  - ✓ Allocates local memory for other CPU's to write into
  - ✓ Two software interfaces
    - Direct data transfer
    - TCP/IP

# ExpressNet OSI Model



# Competitive Price Analysis

## Connectivity for 8 users

- 40Gb Infiniband **\$19,308**
  - ✓ Includes switch, host adapters, & cables
  
- 10Gb Ethernet **\$16,711**
  - ✓ Includes switch, host adapters, & cables
  
- 40Gb PCI Express **\$6,387**
  - ✓ Includes switch, host adapters, & cables

## Summary

- OSS was first to market with PCIe over cable products and today has the largest selection of PCIe over cable products world-wide
- We provide PCIe over cable products for both I/O expansion and high-speed networking applications
- PCIe over cable has greater performance at less cost than other expansion solutions
- OSS is currently developing Gen 3 cable adapters, expansion backplanes and expansion systems.