

KEY BENEFITS

Low Latency: Direct photonic connectivity minimizes latency, allowing for optimal machine resource utilization in clusters.

Extended Distance: Overcome data center distance constraints with photonics that eliminate physical locality limitations.

Simplified Complexity: Reduce data center complexity by eliminating stacked switch hierarchies, protocols, and overlays.

Enhanced Efficiency: Grouping resources around workloads via direct connect maximizes utilization, resolving stranded resource challenges.

Improved Security: Isolated workloads minimize transgression across racks, spines, and cores.



Redefining Data Center Efficiency with High-Density Resource Management

Overview

The **Drut Photonic Resource Unit (PRU) 2500** is a leading-edge, high-density PCIe Gen5 chassis that revolutionizes data center infrastructure. This advanced system boasts an impressive 16-slot configuration, meticulously designed to maximize versatility and performance. The layout comprises 12 full-height, full-length (FHFL) device slots and four dedicated host slots, offering unparalleled flexibility for diverse computing needs. Among the 12 device slots, which support Gen5 x16 PCIe devices, ten are engineered to accommodate double-width components, while the remaining four are optimized for single-width devices.

The PRU 2500 design ensures compatibility with a wide range of high-performance hardware. The four host slots are specifically tailored for Drut's advanced Fabric Interface Cards (tFIC 2500), each leveraging Gen5 x16 capabilities, facilitating seamless integration into Drut's state-of-the-art photonic switching fabric.

By enabling the connection of external servers and resources through its advanced fabric, the system delivers unprecedented levels of flexibility, scalability, and cost-effectiveness. This versatility extends beyond GPU support, encompassing a diverse array of PCIe devices up to Gen5, including FPGAs, SmartNICs, IPU, TPU, and NVMe storage cards.

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Scalable GPU as a Service: Expand PRU capacity horizontally to meet growing demand.

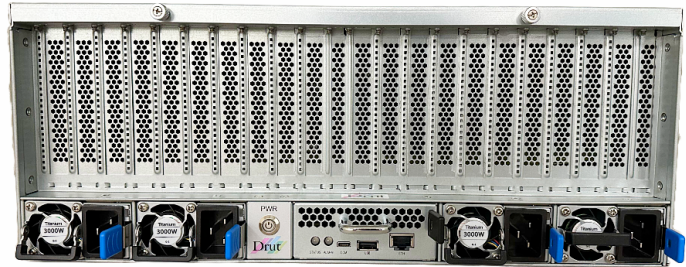
Storage Integration: Attach storage remotely to optimize workloads.

Multi-Vendor GPU Deployments: Build solutions with GPUs from different vendors.

Repurpose Existing Equipment: Leverage legacy or new servers and GPUs for cost efficiency.

Bandwidth Adaptability: Configure bandwidth to meet application-specific needs.

The PRU 2500's ability to effortlessly mix and match device types and vendors allows for the creation of highly customized solutions, precisely tailored to meet the specific demands of various workloads.



PRU 2500 Advantages:

High Density and Capacity: Contains total of 16 slots (12 PCIe Gen5 x16 Device slots + up to four PCIe Gen5 x16 Host slots), enabling industry-leading resource density.

Exceptional Performance: Over 1Tbps bandwidth per slot with up to four Drut (Fabric Interface Cards) tFICs for balanced external and internal performance.

Device Diversity: Accommodates heterogeneous device types and vendors, empowering users to design versatile machine configurations.

Discreet Upgrade Paths: Isolated resource pools allow device upgrade independent of server/CPU complexes.

Optimized Utilization: Compose resources around workload requirements, achieving better utilization than traditional datacenter architectures.

Dynamic Attach/Detach: The PRU2500 allows PCIe resources to be hosted and seamlessly connected or disconnected from servers in real-time, managed efficiently through Drut's Fabric Manager (DFM) software.

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tFIC Advantages

Scalable

Connectivity: Up to four tFIC cards can be deployed per PRU.

Modern Cabling: Uses MPO16 connectors for increased space efficiency.

Advanced Tech: Co-packaged optics technology for high density.

Low Power: Save cost on power and cooling.

Bandwidth

Adaptability:

Configure bandwidth to meet application specific needs.

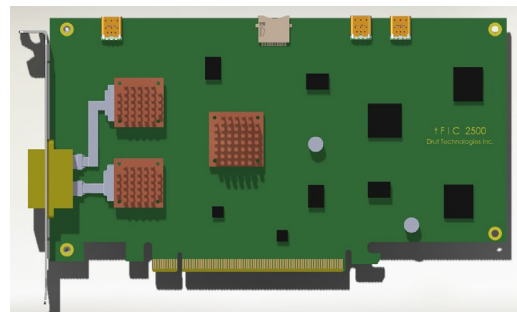
Target Fabric Interface Card (tFIC 2500) Included

The tFIC 2500 is a leading-edge photonic fabric card engineered to revolutionize application workload acceleration through advanced PCIe remoting technology.

This next-generation card serves as a critical link between compute resources and servers equipped with Initiator Fabric Interface Cards (iFIC 2500), leveraging state-of-the-art photonic interconnects to achieve unprecedented performance. The tFIC 2500 utilizes two co-packaged optical engines, each capable of 8x100 gigabit transmission, resulting in a staggering total bandwidth of 1.6 terabits across 16 100-gigabit channels.

The tFIC 2500's versatile architecture offers two powerful configuration options to meet diverse computational needs. In its primary configuration, it delivers full Gen5 x16 PCIe bandwidth between devices in the Photonic Resource Unit (PRU) and any host, utilizing two MPO16 optical cables for maximum throughput. Alternatively, it can be configured to support Gen5 x8 PCIe bandwidth for more connectivity.

The optical cables used with the tFIC can be directly connected to servers or seamlessly integrated into optical switch networks, including the Drut Photonic Switch (PXC), enabling the creation of highly scalable and dynamically reconfigurable computing environments. By supporting industry-standard protocols such as PCIe 5.0 and Compute Express Link (CXL), the tFIC 2500 ensures broad compatibility and future proofing for next-generation data center architecture.



PRU 2500 Technical Specifications

Component	Details
Main Board	2x Broadcom PEX89144 (PCIe 5.0 Switch)
IO Card	BMC - Aspeed AST2500 Connectors - USB, LAN, LCD -
Device Slots	PCIe Single-width Slots - Four (4) PCIe 5.0 x16 FHFL PCIe Double-width Slots - Eight (8) PCIe 5.0 x16 double-width FHFL (Up to 450W per slot)
Host Slots	Up to four Drut Fabric Interface Cards (tFICs)
Power Supply	Four (4) 3000W Hot Swappable Power Supplies
FANs	Six (6) 120mm x 38mm fans mounted to the front bezel of the chassis Hot swap
Environmental Specifications	Temperature - 0°C ~ 35°C (32°F~ 95°F) Non-operating Temperature: -20°C to 70°C (-4°F to 158°F) Operating Relative Humidity: 10% to 90 (non-condensing) Non-operating Relative Humidity: 0% to 95% (non- condensing)
Compliance Standards	AS/NZS CISPR32, Class A / EN 55032, Class A / EN 55024 / EN 61000- 3-2 / EN 61000-3-3 / RoHS
Dimensions and Weight	Depth 650mm, Width 447mm, Height 175mm
Compatible Devices	Standard PCIe devices
System Management	Redfish®, RESTful API

Why Choose the PRU 2500?

The PRU 2500 leverages photonic fabric technology to disaggregate data center resources, enabling unmatched performance, scalability, and efficiency. This innovative approach eliminates the limitations of traditional data center designs, allowing for modern, adaptable infrastructures. By integrating the PRU 2500 chassis with Drut's advanced tFIC 2500 and optical photonic technology, organizations can achieve unprecedented flexibility and performance to meet the demands of AI/ML, HPC, and other resource-intensive workloads.

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