

# AI Networking Solution: Chelsio T7 DPU and S7/T6 SmartNICs

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## Introduction

As Artificial Intelligence (AI) continues to revolutionize industries, the demand for high-performance and low-latency networking solutions has increased significantly. Chelsio Communications is leading this transformation with its advanced T7 DPU and S7/T6 SmartNIC products. These solutions are designed to accelerate AI workloads, optimize data center operations, and provide exceptional performance, scalability, and flexibility.

## Features and Benefits of Chelsio T7 DPU and S7/T6 SmartNICs

The Chelsio T7 DPU and S7/T6 SmartNICs have the following features and benefits:

### High-Performance Networking

- **Ethernet Connectivity:** T7 DPU supports quad-port 1/10/25/50/100Gb, dual-port 40/100/200Gb, or single-port 400Gb Ethernet. The S7 SmartNIC supports quad-port 1/10/25/50/100Gb or dual-port 40/100/200Gb Ethernet, while the T6 SmartNIC supports dual-port 1/10/25/40/50/100Gb Ethernet. These configurations offer unparalleled data transfer speeds and flexibility.
- **Offload Capabilities:** All these products offload a wide range of protocols, including TCP/IP, UDP/IP, iSCSI, iWARP, and NVMe-oF/TCP, significantly reducing host-system CPU load and improving efficiency. The T7 DPU and S7 SmartNIC also support RoCEv2, offering advanced RDMA features for low-latency communication. The T7 DPU includes embedded Arm A72 cores that provide programmable DPU solutions for tailored processing needs.

### Scalability and Flexibility

- **PCIe and Memory Options:** The T7 DPU features a PCIe Gen5 interface for high-speed data transfer, integrated PCIe switch and bridge capabilities, and card memory and memory-free operation support. The S7 SmartNIC supports memory-free operation using host memory, offering cost-effective scalability. The T6 SmartNIC supports a unified wire approach for LAN, SAN, and cluster applications, simplifying network infrastructure and reducing costs.

### Enhanced Security and Reliability

- **Advanced Encryption:** Both the T7 DPU and S7/T6 SmartNICs provide robust security features, including AES 128/256, SHA1/SHA2 offload, TLS/SSL, and IPsec support, ensuring secure data transmission.
- **Data Integrity and Protection:** The T7 DPU includes integrated features such as deduplication, compression, RAID, and erasure coding support, ensuring high data integrity and reliability.

## Use Cases in AI Training and Inference

### Use Case 1: Accelerating the AI Training

Training the AI models involves processing massive datasets, requiring significant computational resources, and efficient data handling. The T7 DPU and S7/T6 SmartNICs significantly enhance AI training environments with the following features:

- **High Throughput and Low Latency:** The advanced networking solutions support high-speed Ethernet connectivity and ensure rapid data transfer between the storage and compute nodes. This high throughput is essential to feed the large datasets efficiently into the AI models.
- **Comprehensive Offload Capabilities:** Offloading intensive network processing tasks such as TCP/IP and NVMe-oF frees up the host CPU resources, allowing for faster model training and reduced training times.
- **Scalability:** The compatibility with T7, S7, and T6 silicon software enables seamless scalability, supporting the growth of data and model complexity without requiring significant infrastructure changes.

### Use Case 2: Enhancing AI Inference

AI inference requires processing real-time data to provide immediate responses, making low latency and high reliability critical. The T7 DPU and S7/T6 SmartNICs offer the following benefits for an AI inference:

- **Low Latency Networking:** Optimized for low-latency performance. These solutions are essential for real-time AI inference tasks such as natural language processing and image recognition. Hardware offloading minimizes delays, ensuring quick data processing, and response times.
- **Data Security and Integrity:** Robust security features protect sensitive data during AI inference, including TLS/IPsec offloading, and data-at-rest encryption.
- **Cost-Effective Scalability:** The memory-free operation reduces overall cost and allows more inference nodes to be deployed without significantly increasing expenses. This scalability supports real-time analytics across various applications.

## Conclusion

The T7 DPU and S7/T6 SmartNICs from Chelsio Communications are essential in advancing AI training and inference capabilities. These products deliver the high performance, scalability, and security required for modern data centers, empowering businesses to leverage AI technologies completely.

## Join Us

Explore how the Chelsio AI networking solutions can transform your data center infrastructure. Contact us today to learn more about our T7 DPU and S7/T6 SmartNIC products and schedule a consultation with our experts.

## Related Links

[T7 Product Brief](#)

[S7 Product Brief](#)