

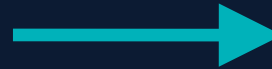


# Liquid-Markets-Solutions

## ÜberNIC... It Just Works...

v2024-05-02

# Reminder... Things Have Changed...





# Deployed Systems \$\$\$ to Buy & Maintain

**US\$ 3.155 Million**

4x Racks

US\$ 410,400

10G Co-Lo Links

US\$ 759,600

Market Data

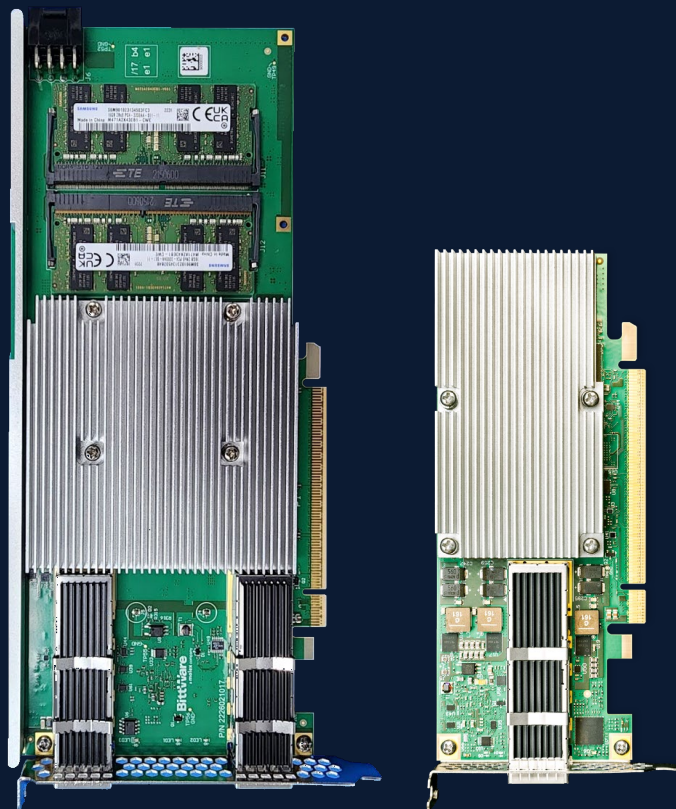
US\$ 916,680

10G External Links

US\$ 1,068,540

Annual Recurring Cost for One NY-Based Exchange Co-Lo Data Center w/External Connectivity to NY Metro and Chicago Metro

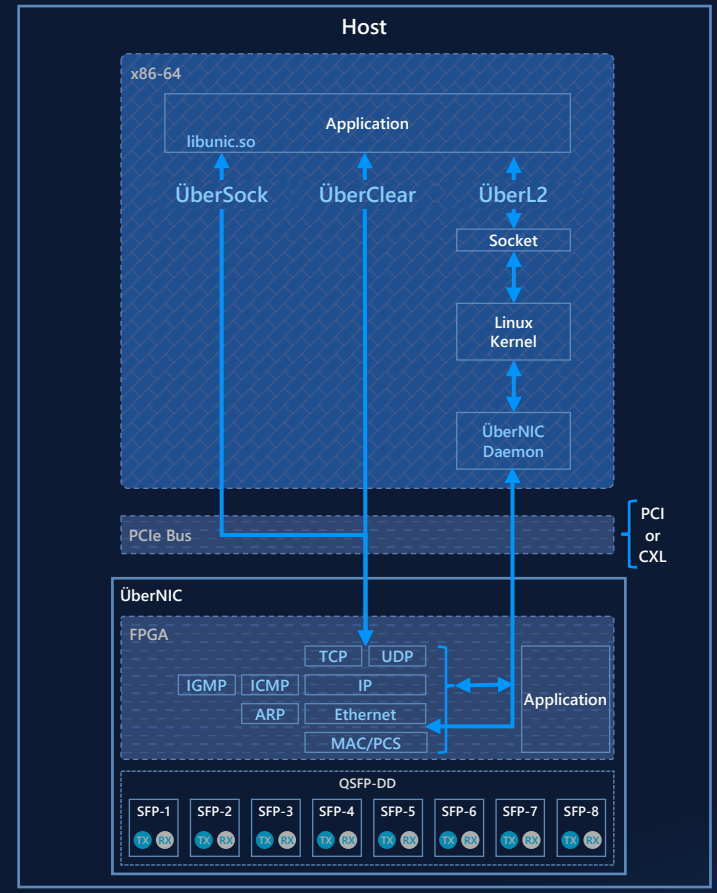
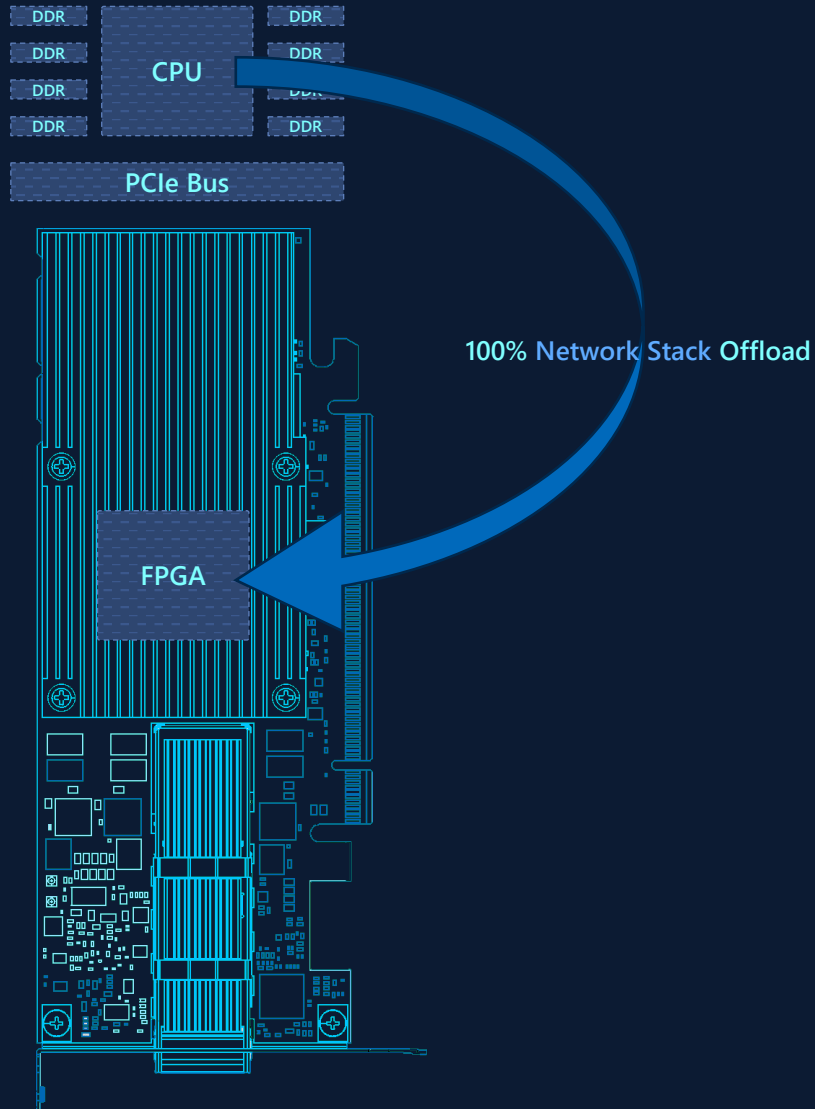
# ÜberNIC Maximizes Value



- 100% FPGA-Based Standards-Compliant Network Stack
- Supports PCIe 3.0, 4.0, 5.0 & CXL 1.1, 2.0
- Significant Fiber Density; Max 16 FPs
- Multi-GB On-Board Memory; Max 64GB
- MAC-Level Timestamp, PCAP & Port Span
- PPS, NTP, PTPv2, PTM, TGPIO PPS, & White Rabbit
- SmartNIC Capabilities:
  - Add-On LMS Extensible Logic
  - Add-On End-User or 3rd Party Logic
- Single PCIe Slot, HH 1/2L or FH 3/4L

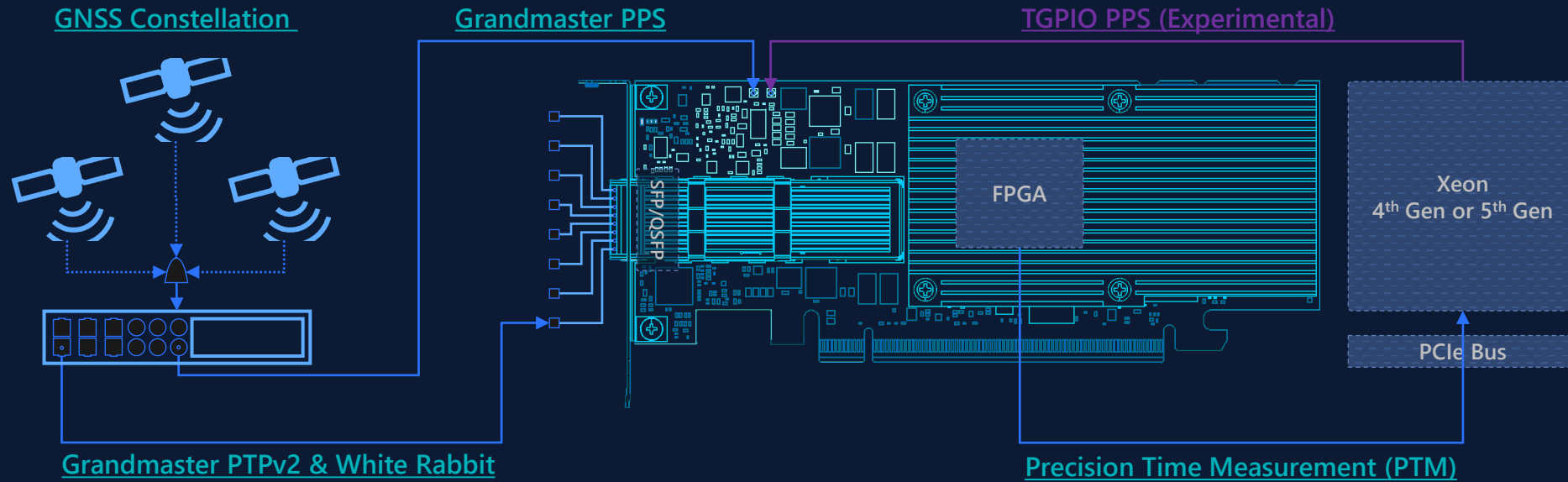


# ÜberNIC User I/O w/100% Offloaded Stack





# ÜberNIC Precision Time Synchronization



LMS is a Member of the OCP Time Appliances Project and a Founding Member of the CERN White Rabbit Collaboration Partnership



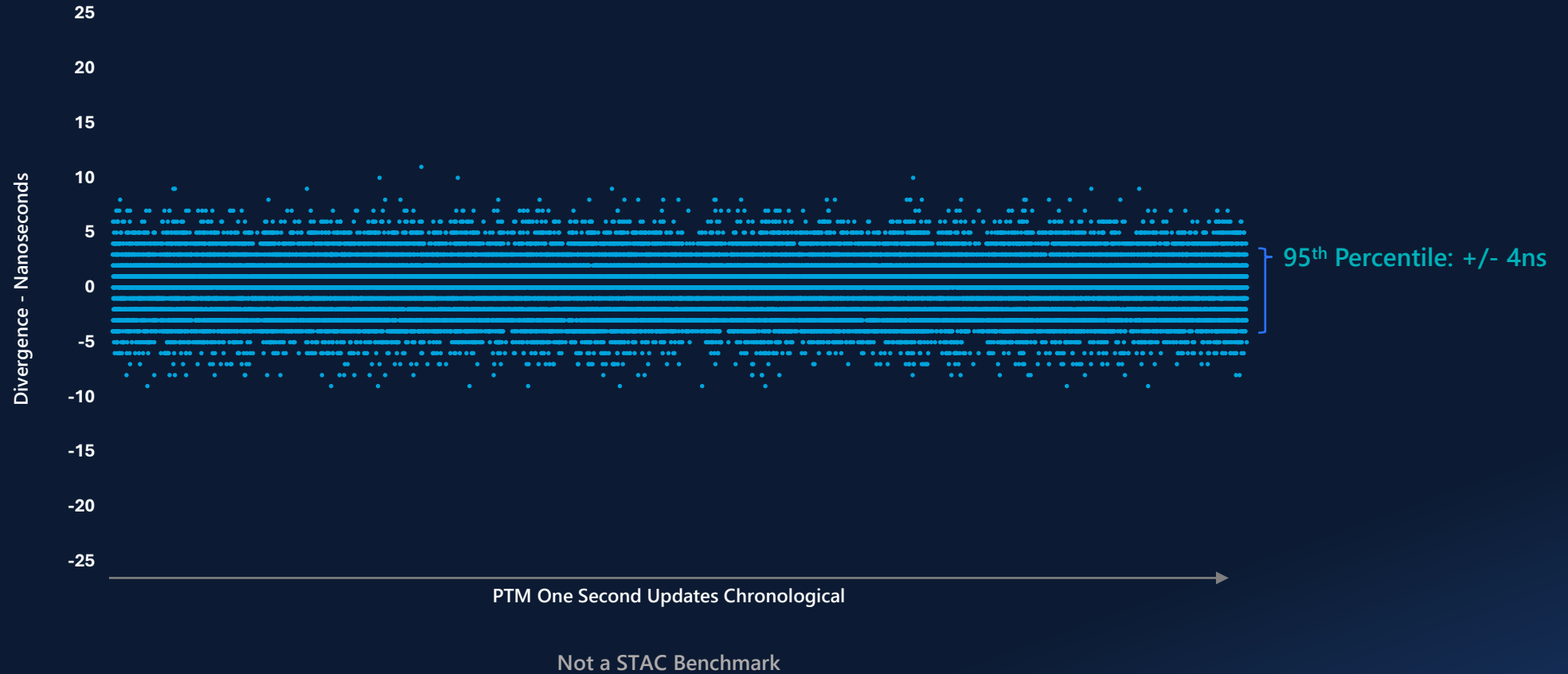




# ÜberNIC Performance

# ÜberNIC PTM Synchronization

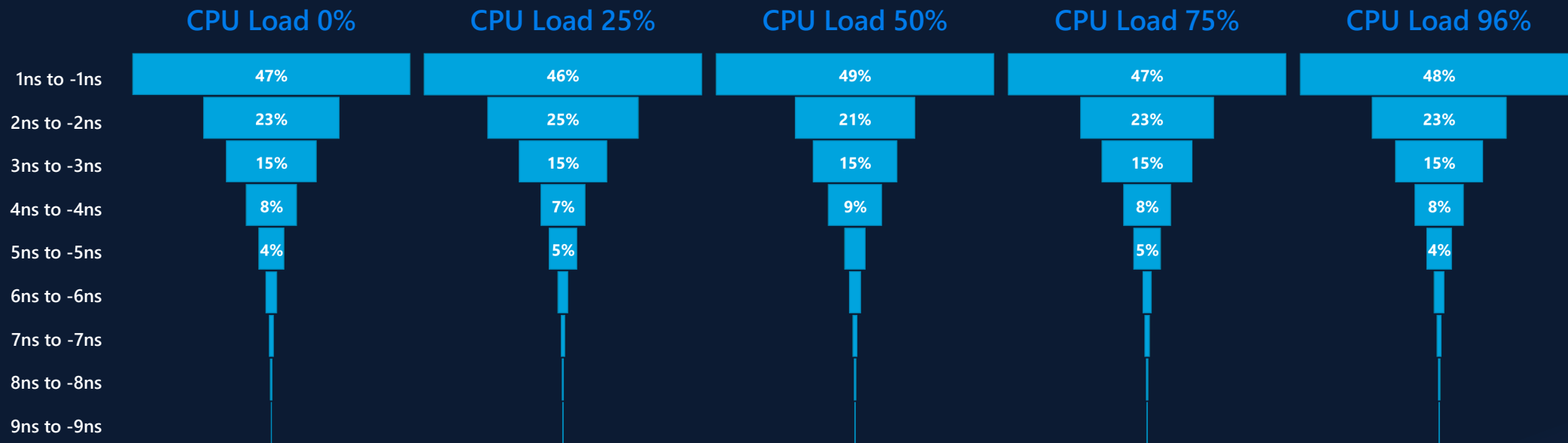
## Host/ÜberNIC Host Real-Time Clock Post-Update Time Value Divergence



27180 One-Second Updates | | SuperMicro X13SEI-F w/Xeon 4<sup>th</sup> Gen 6442Y

# ÜberNIC PTM Synchronization & CPU Load

## Host/ÜberNIC Host Real-Time Clock Post-Update Time Value Divergence

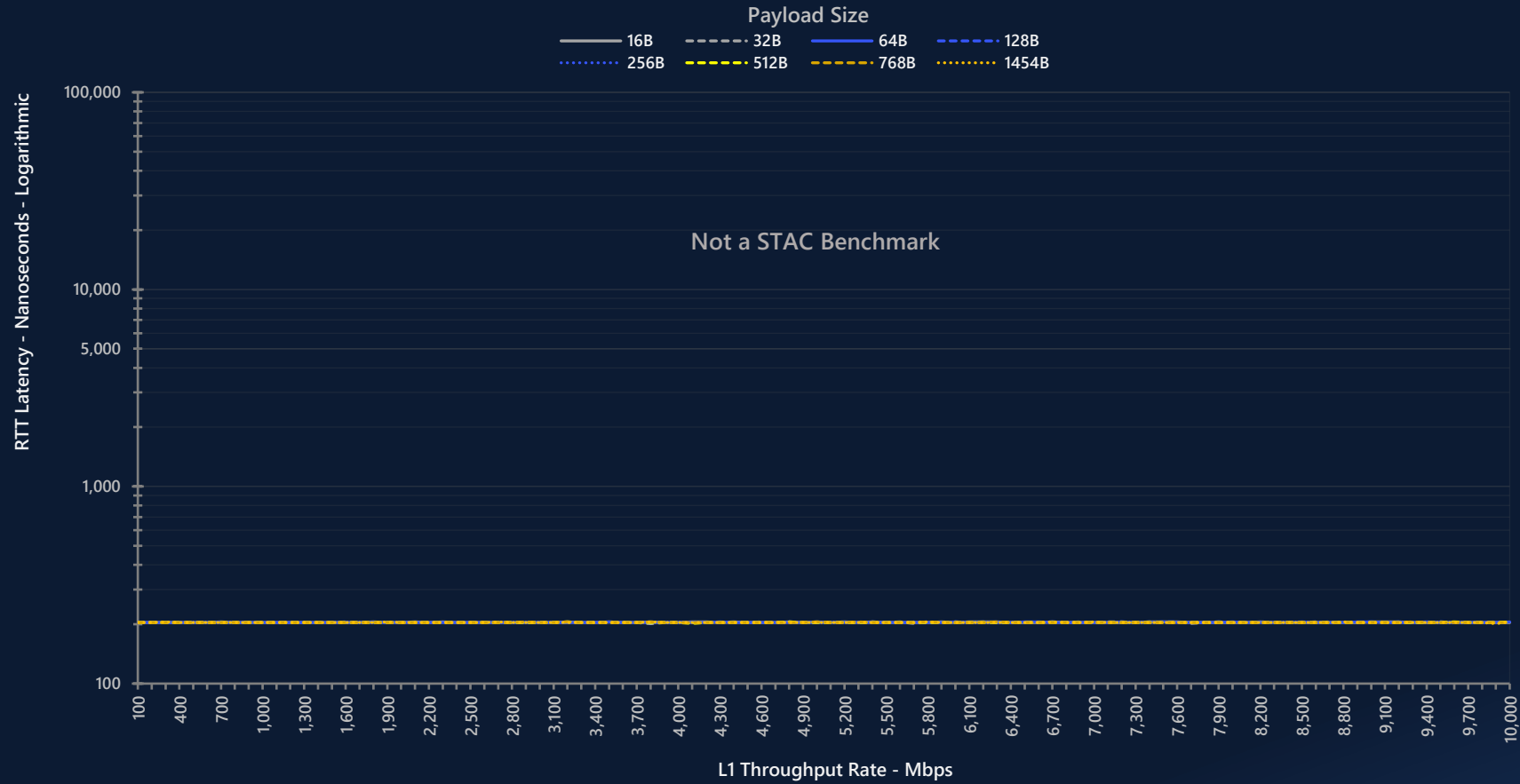


Not a STAC Benchmark

27180 One-Second Updates Per CPU Load Percentage | SuperMicro X13SEI-F w/Xeon 4<sup>th</sup> Gen 6442Y

# ÜberNIC Network I/O RTT Intra-FPGA - UDP

95th Percentile Transceiver-to-Transceiver Latency & Throughput Characteristics

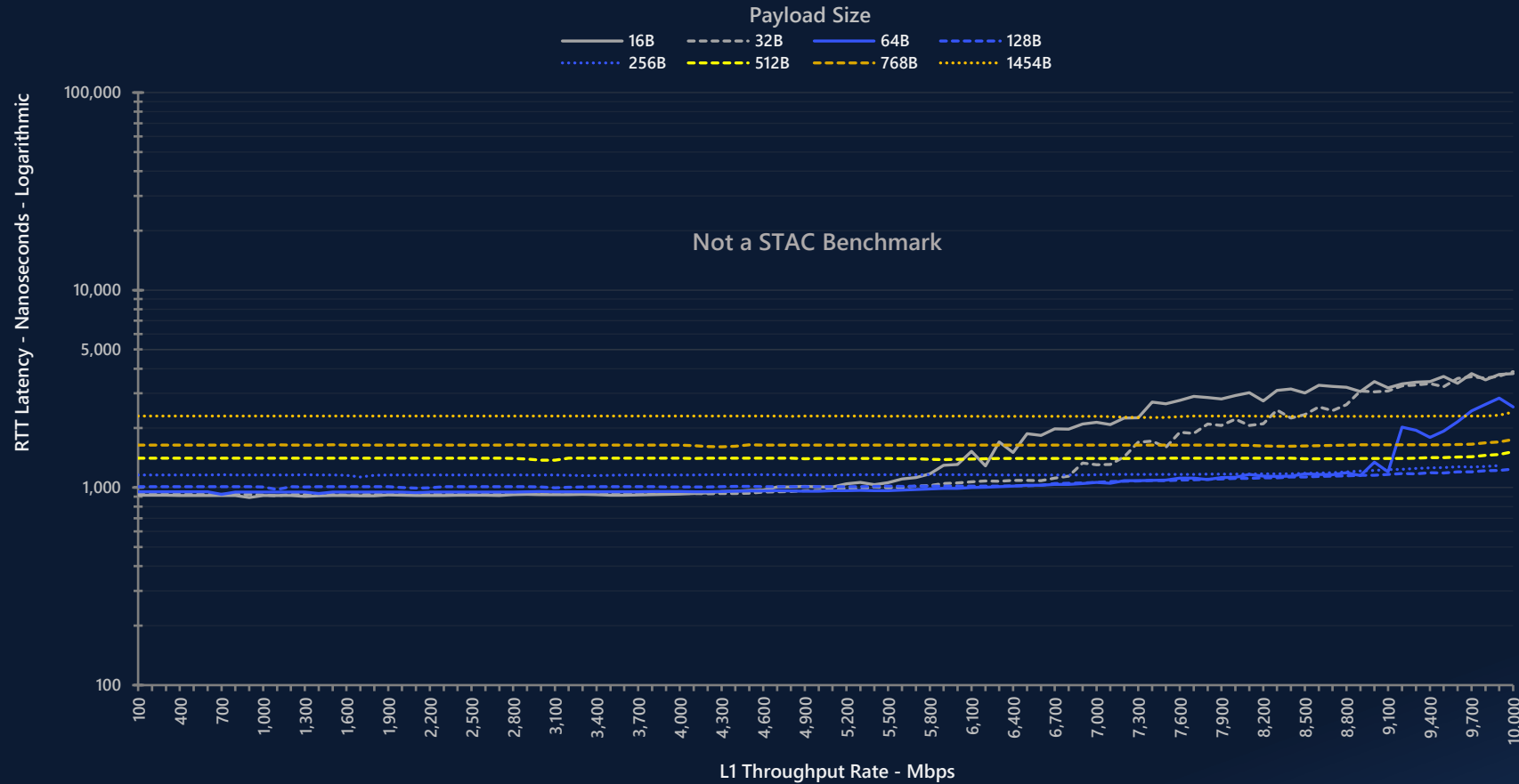


Tested By Naros.TaSR

43,960,000 Frames | Multi-Step Variable Throughput Rate | 10GbE

# ÜberNIC Network I/O RTT CXL - UDP

95th Percentile Transceiver-to-Transceiver Latency & Throughput Characteristics

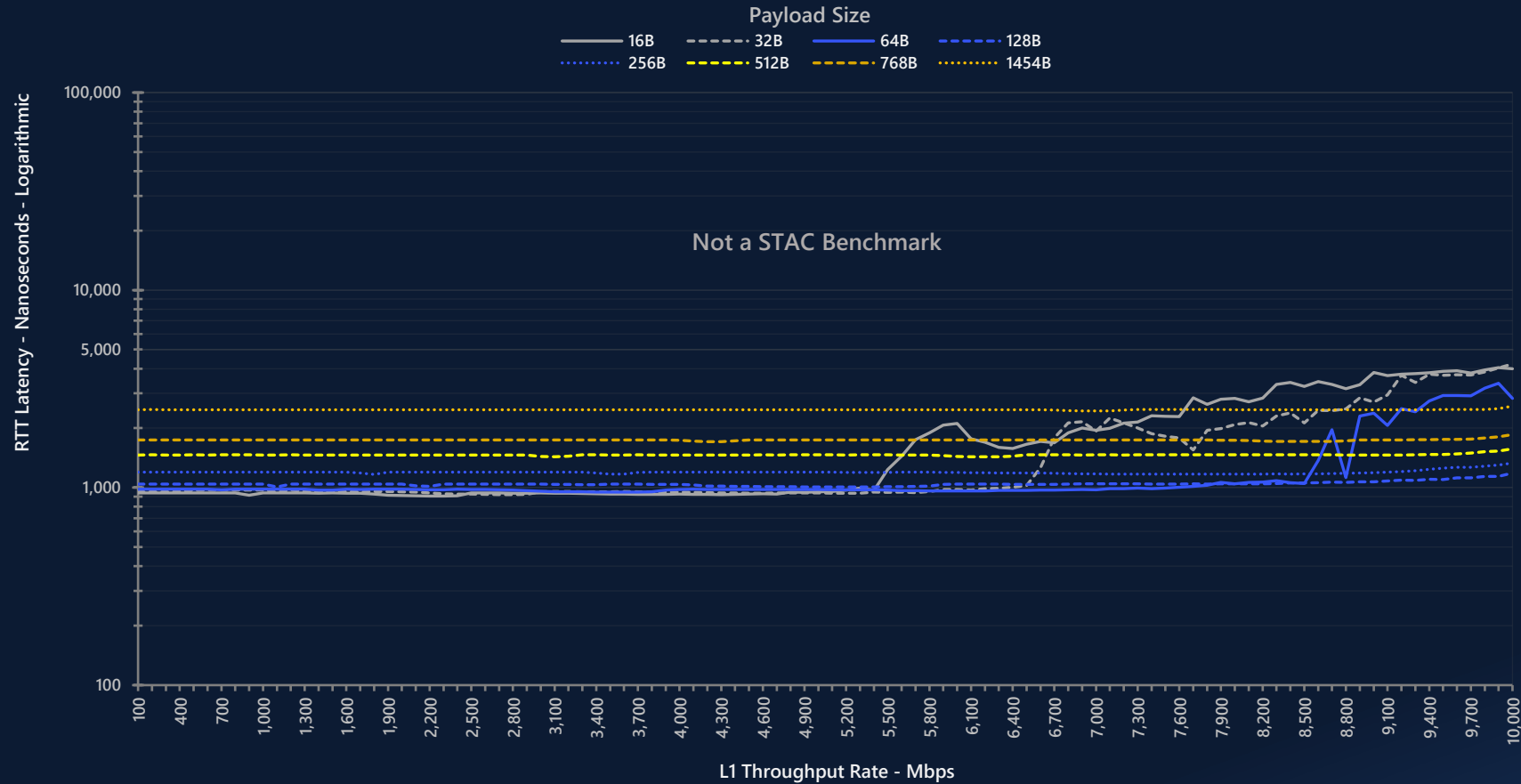


Tested By Naros.TaSR

43,960,000 Frames | Multi-Step Variable Throughput Rate | 10GbE | Asus WS790 SAGE w/Xeon 4<sup>th</sup> Gen W7-2495X

# ÜberNIC Network I/O RTT PCIe - UDP

95th Percentile Transceiver-to-Transceiver Latency & Throughput Characteristics



Tested By Naros.TaSR

43,960,000 Frames | Multi-Step Variable Throughput Rate | 10GbE | Asus WS790 SAGE w/Xeon 4<sup>th</sup> Gen W7-2495X



# ÜberNIC

Available Exclusively via BittWare



<https://www.bittware.com/contact/>



# ÜberNIC

It Just Works



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