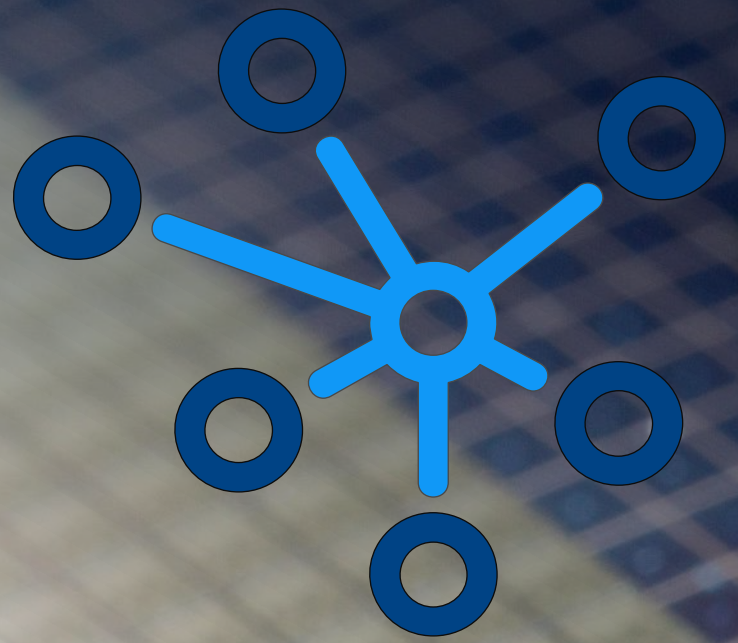


LMS

LIQUID-MARKETS SOLUTIONS

THE POWER OF THE POSSIBLE™

"We Have a Data Latency & Ingestion Problem"

June 1, 2022

"We Have a Data Latency & Ingestion Problem"

PROBLEM

"We Think..."

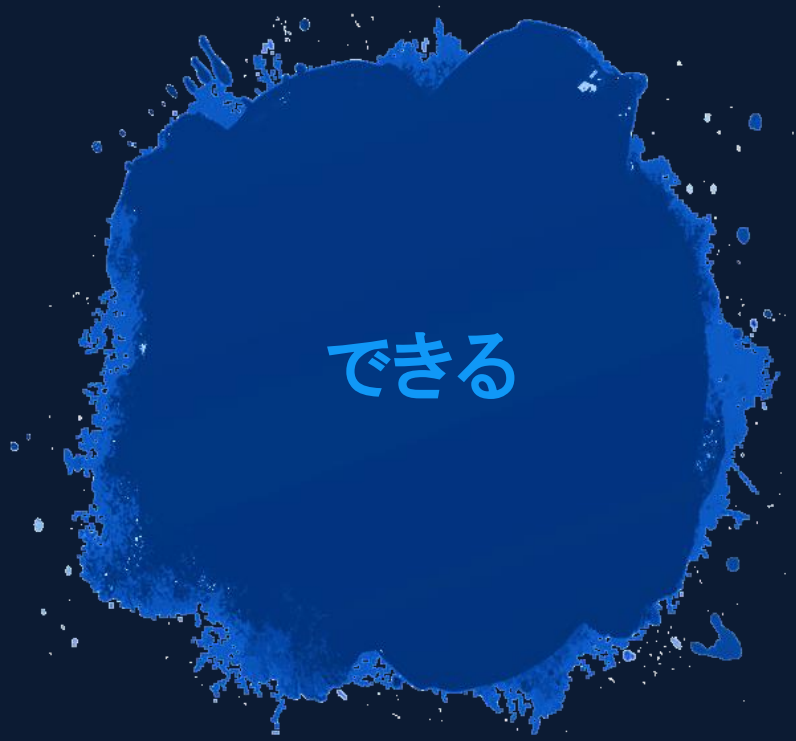
Shoganai… “It Can’t Be Helped”

Accepting A Less Than Desirable Outcome Because It Is Assumed Nothing Better Is Possible.

How Is Your Business Impacted By Shoganai?

Dekiru… “It’s Possible”

Understanding What Is Possible and Insisting on Nothing Less.



THE POWER OF THE POSSIBLE™

FPGA-Based Network-Attached-Compute

LMS Naros.TaSR™

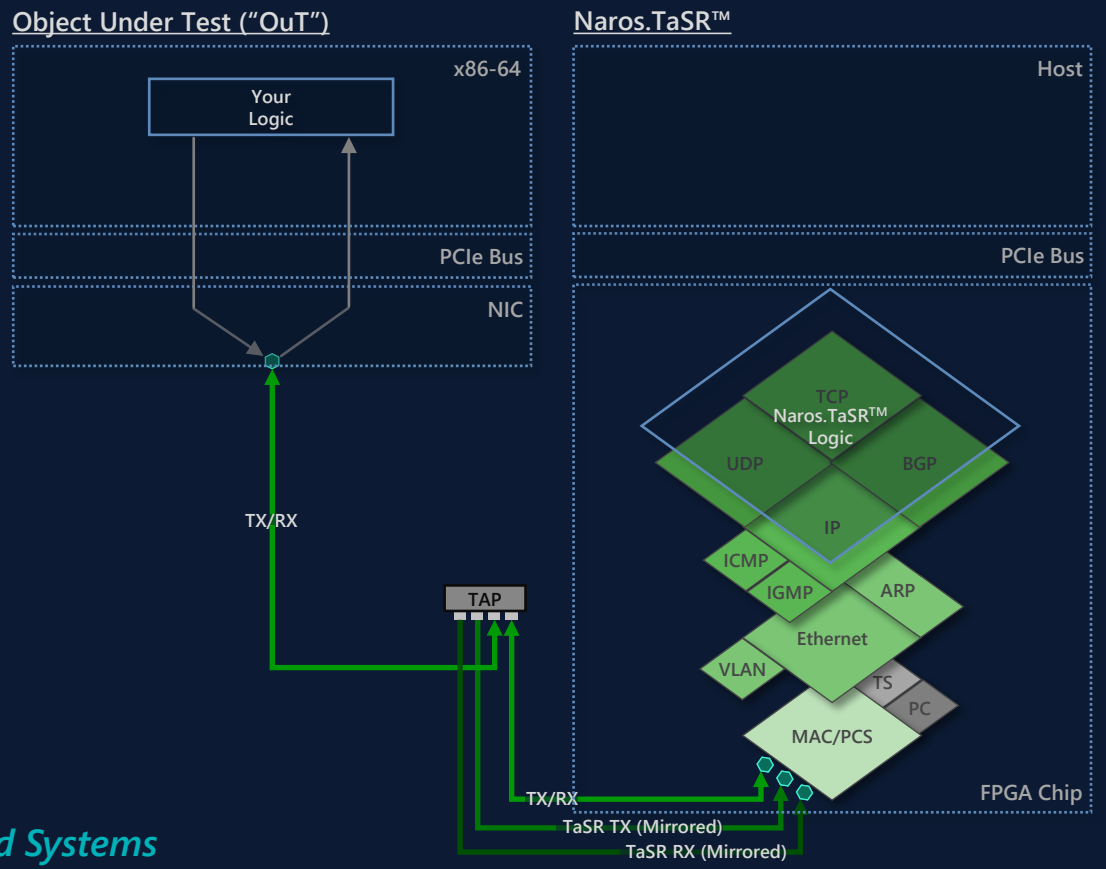
Solving The Totality of the Testing & Measurement Challenge

Naros.TaSR™ – Testing and Simulation Rig

Nanosecond-Scale Performance Testing & Profiling

Measure | Know

- Naros.Transport™ Foundation Delivers Unparalleled Network Performance
- No Real-Time PCIe Dependency
- Internal PCAP & Hardware Timestamping
- RFC 2544 (Ethernet) Compliant Including:
  - Throughput, Burstability, Latency, Frame Loss, System Recovery
- Non-RFC 2544 Functionality Including:
  - Variable Interframe Gap; Max 30 Individually-Configurable Steps Per Run
  - Packet Capture, Replay, Internal Clock Timestamp
- Layer 2 Start-Of-Frame FIFO, FILO, LILO Performance Measurements
- Configurable Traffic Generation: Protocol, Fields, Payload, Throughput Rate



Use Case: Industry-Agnostic; Cost-Efficient Measurement of Network-Attached Systems

"If You Can't Measure It, You Can't Improve It"

Peter Drucker

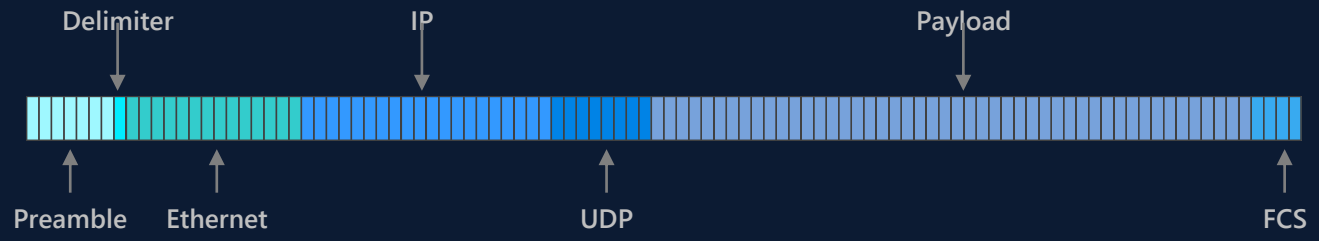
Identifying & Understanding the Interconnected Layers of Detail

An Ethernet Frame - What Data is Being Processed?

What You Need to Know to Validate Claims

- What is the Test?
  - Payload Size & Total Frame Size
  - Protocol Type
  - Throughput Rate
  - Clock-Cycle-Frequency & Data-Size Per Cycle
- What is the Result?
  - Median, Minimum, Nth Percentile
  - Number of Frames in Test
  - Measurement Object: Frame, Payload, Message
  - Measurement Type: FIFO, FILO, LILO

Ex. 880bit UDP Frame (64Byte Payload)



Ask Questions & Peel The Onion To Separate Fact From Fiction

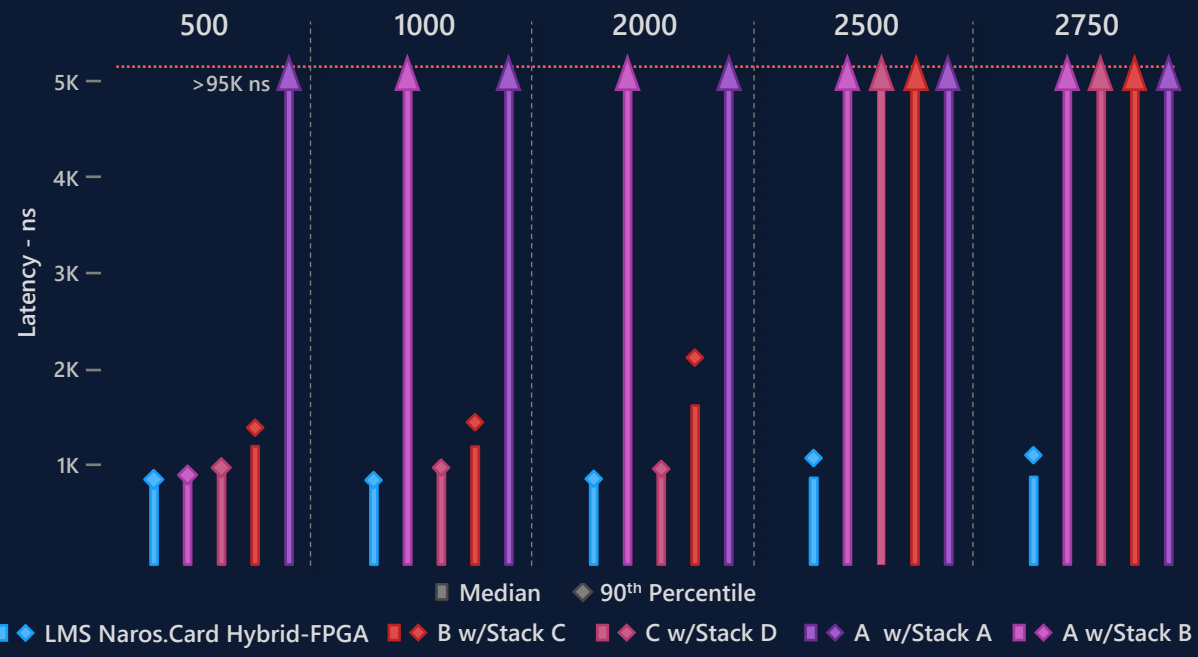
Reality vs Claims

Naros.TaSR™ Delivers Clarity

Data Ingest & Latency Challenges

- Typical Daily Burst Demands Range From 810Mbps to beyond 3500Mbps
- Legacy Solutions Are Insufficient
- Board/Stack Insufficiencies Create:
  - Monetary, Regulatory & Reputational Risk
  - Drive Loss & Lost Opportunities
  - Regulatory Non-Compliance

Latency @ Throughput Rate (Mbps)



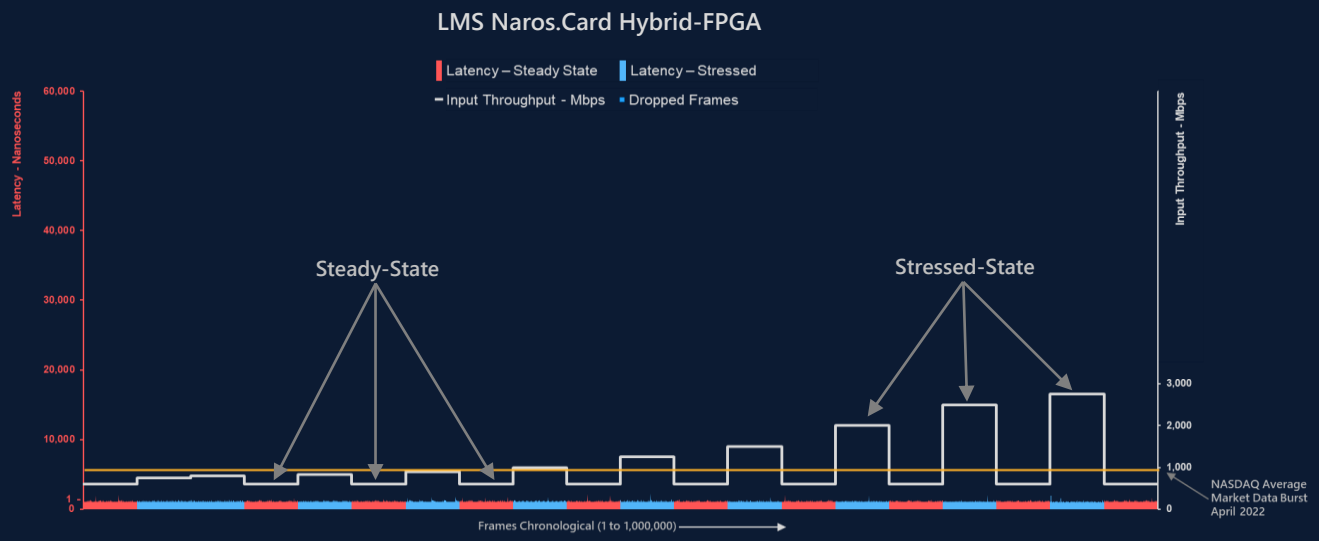
Broad-Stroke Results Useful But Obfuscate Important Details

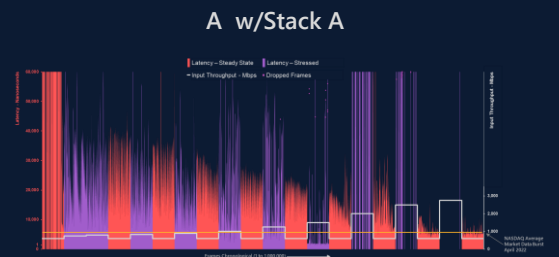
Tested By Naros.TaSR™ (Not a STAC Benchmark)

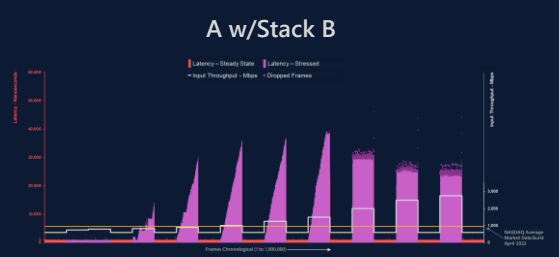
Continuous Run | 1 Million Frames | 64B UDP Payload | L2 SOF to SOF | Variable Throughput | Excluding Business Logic

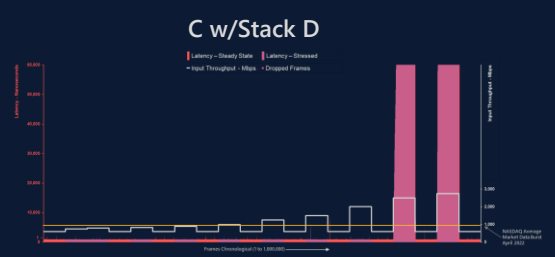
Seamless Variable-Rate Testing Recreates Real-World Scenarios

Naros.TaSR™ Empowers You









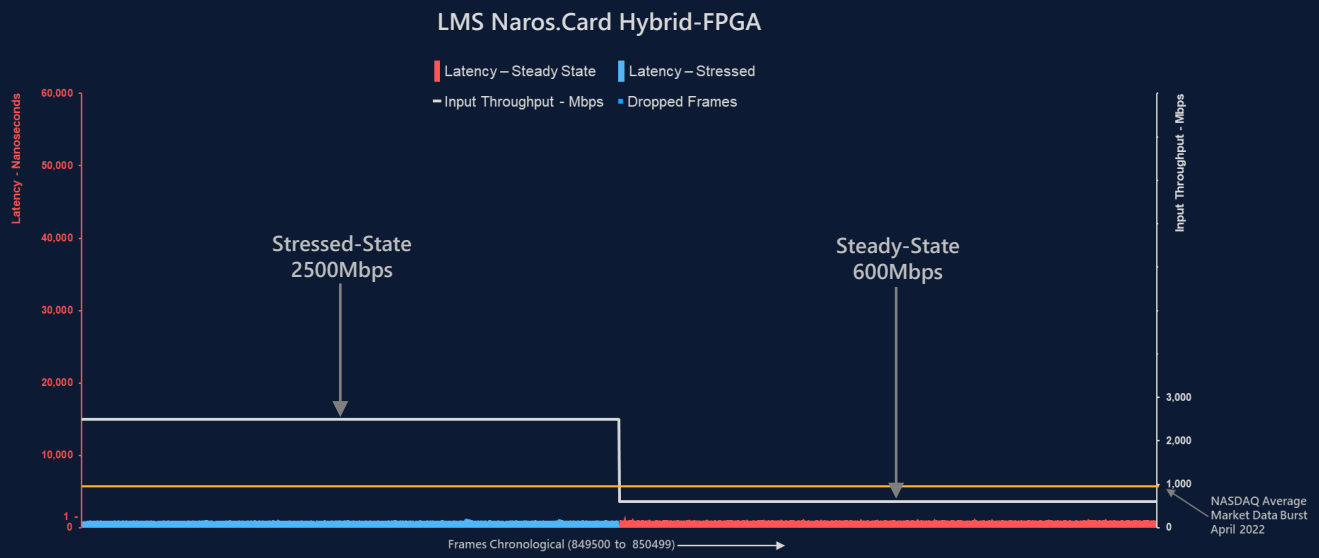
High-Level Is Valuable But Nth Percentile Buckets Aren't the Whole Story

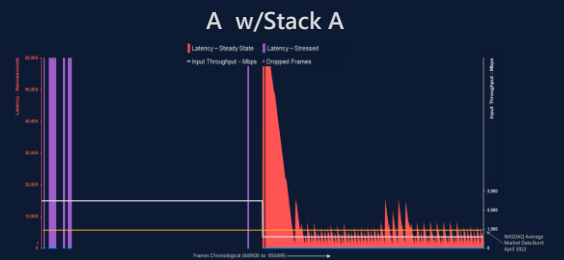
Tested By Naros.TaSR™ (Not a STAC Benchmark)

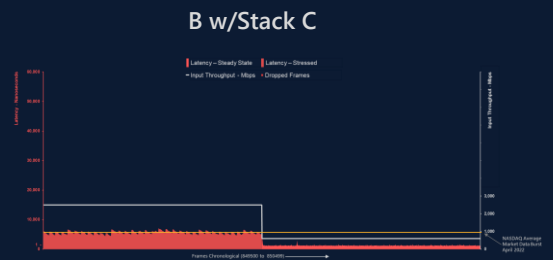
Variable Rate (50,000 Frames Per Step) | 1 Million Frames | 64B UDP Payload | L2 SOF to SOF | Variable Throughput | Excluding Business Logic

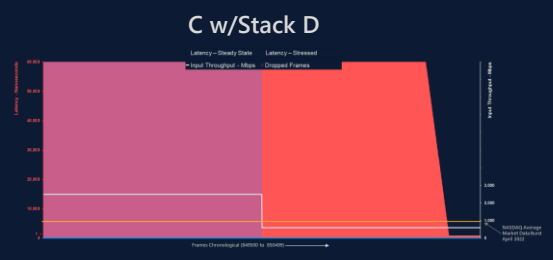
Summaries Useful But Reality Occurs Frame-by-Frame

Naros.TaSR™ Uncovers Details









It's the 10% Tail That Actually Wags the Dog!

Tested By Naros.TaSR™ (Not a STAC Benchmark)

Variable Rate (Frames 849500 to 849999 @ 2500Mbps AND Frames 850000 to 850499 @ 600Mbps) | Extract From 1 Million Frame Run | 64B UDP Payload | L2 SOF to SOF | Variable Throughput | Excluding Business Logic

FPGA-Based Network-Attached-Compute

LMS Naros.TaSR™

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Lets.Talk@liquid-markets.com

CH: +41-79-877-6185 | US: +1-212-784-6145 | JP: +81-50-5539-9608 | SG: +65-8515-8557