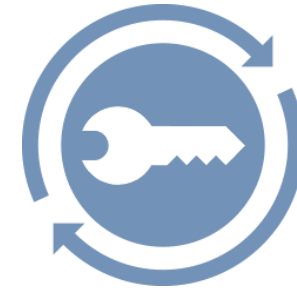# NOVASPARKS™

Pure FPGA Market Data Solutions

Product Update

Always better performance and broader coverage!

STAC - Fall Summits 2016

Chicago, London, New York

NOVASPARKS at a Glance

Pure FPGA Turnkey Solution

Sub microsecond latency

Highest Determinism

Appliance Solution

Easy deployment

Scalability, Fan-out

Focus on Market Data

Coverage, Robustness, Feature set

Architectural Innovations that reduce Latency

- New advanced book building engine.

- New ultra low latency 10Gig Rx and Tx interfaces

- Several other optimizations
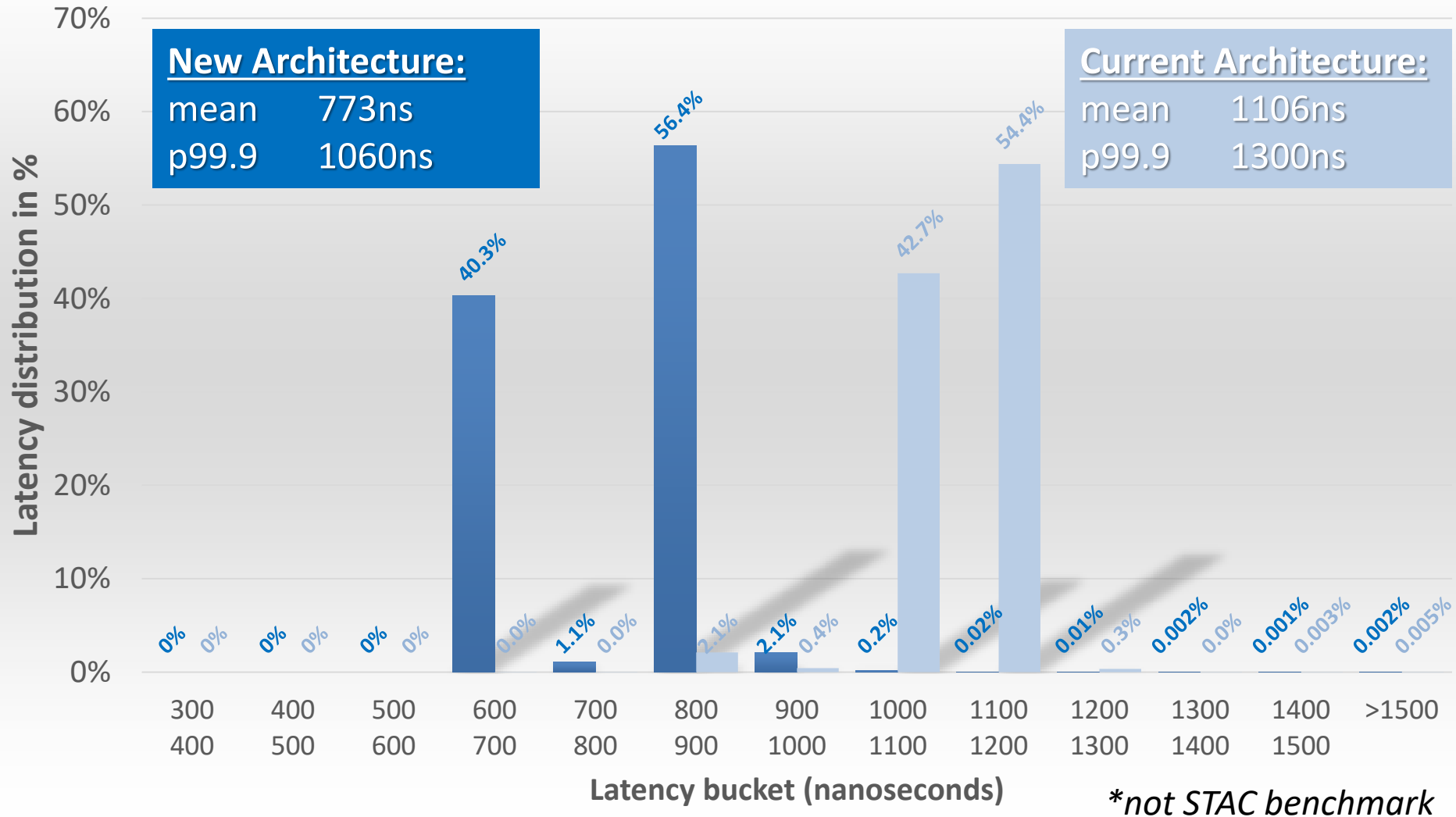
300ns (25%) reduction in latency

All NovaTick outputs are impacted

Output Option	Latency for the NASDAQ TotalView ITCH feed configured for the full universe of instruments*	
	Current Architecture	**New Architecture**
10Gig Ethernet Multicast measured wire-to-wire	1100 nanoseconds	800 nanoseconds
NovaLink measured wire-to-trading-FPGA-core	1050 nanoseconds	750 nanoseconds
PCIe Direct Memory Access measured wire-to-server-memory	1550 nanoseconds	1250 nanoseconds

not STAC benchmark

Current Vs New Architecture

Wire-to-wire latency - Nasdaq TotalView ITCH
(10x replay speed - EOP to SOP - includes PHY/MAC - full instrument universe)

New Architecture:
mean   773ns
p99.9   1060ns

Current Architecture:
mean   1106ns
p99.9   1300ns

not STAC benchmark

Coverage

- Includes all the main equities, futures and fixed income feeds in US, Canada and Europe.

- 50 feeds milestone will be reached by year end.

Here are the latest additions:

- ❑ Canada
  - ✓ Omega ATS

- ❑ Europe and Africa:
  - ✓ NASDAQ Nordics
  - ✓ Johannesburg Stock Exchange
  - ✓ Oslo Stock Exchange

- ❑ Asia
  - ✓ JPX Arrowhead
  - ✓ Osaka Stock Exchange
  - ✓ CHI-X Japan
  - ✓ SBI JapanNext
  - ✓ CHI-X Australia
  - ✓ ASX
  - ✓ Hong Kong Stock Exchange

THANK YOU…

Contact: sales@novasparks.com