



High Performance FPGA Market Data Solutions

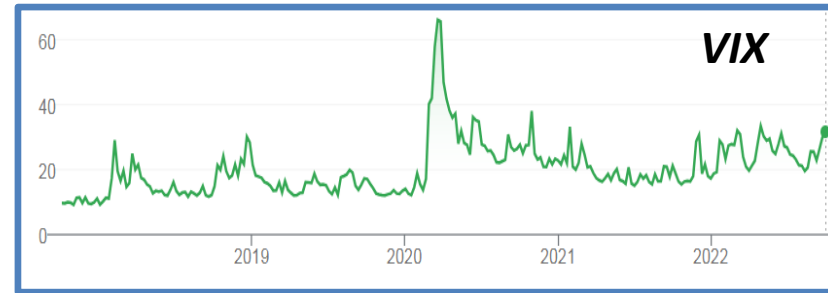
***We are ready
for the new SIP***

STAC - October 19, 2022

Pierre Gardrat, CTO

Big Changes in US Equity Markets since COVID-19

More Instruments...
More Traders...
More Volatility...

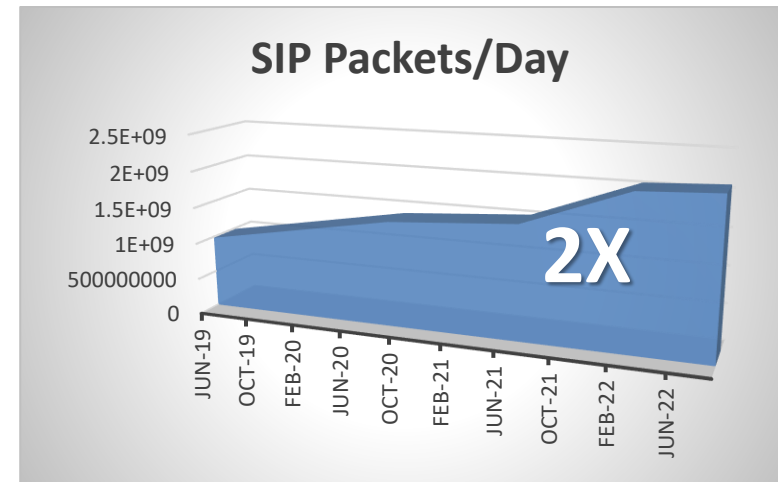


Packets:

+300% at peak, +100% on average

Live Orders:

+250% at peak, +150% on average

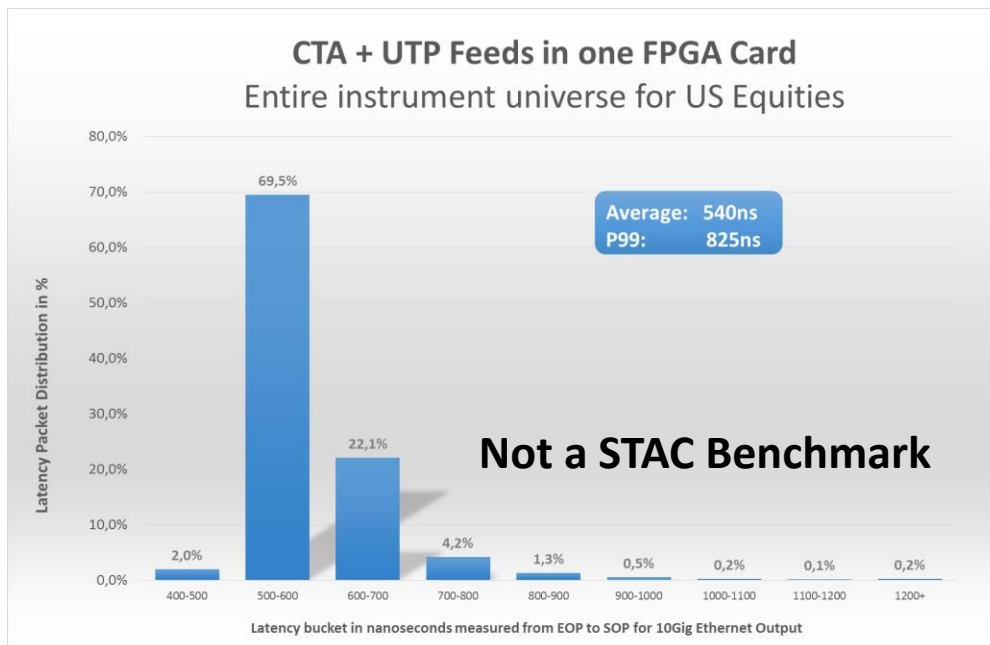


UTP
CTA

10% Latency Reduction: January 2020 580ns -> January 2022 520 ns

SIP Feed Handlers

- Support both CTA and UTP with the following characteristics:
 - Normalization of all the messages in NSWF, NSMDA C++ API or NovaLink hardware bus
- Footprint: **1 FPGA card**
 - Single Bay or 1 PCIe Card
- Performance:

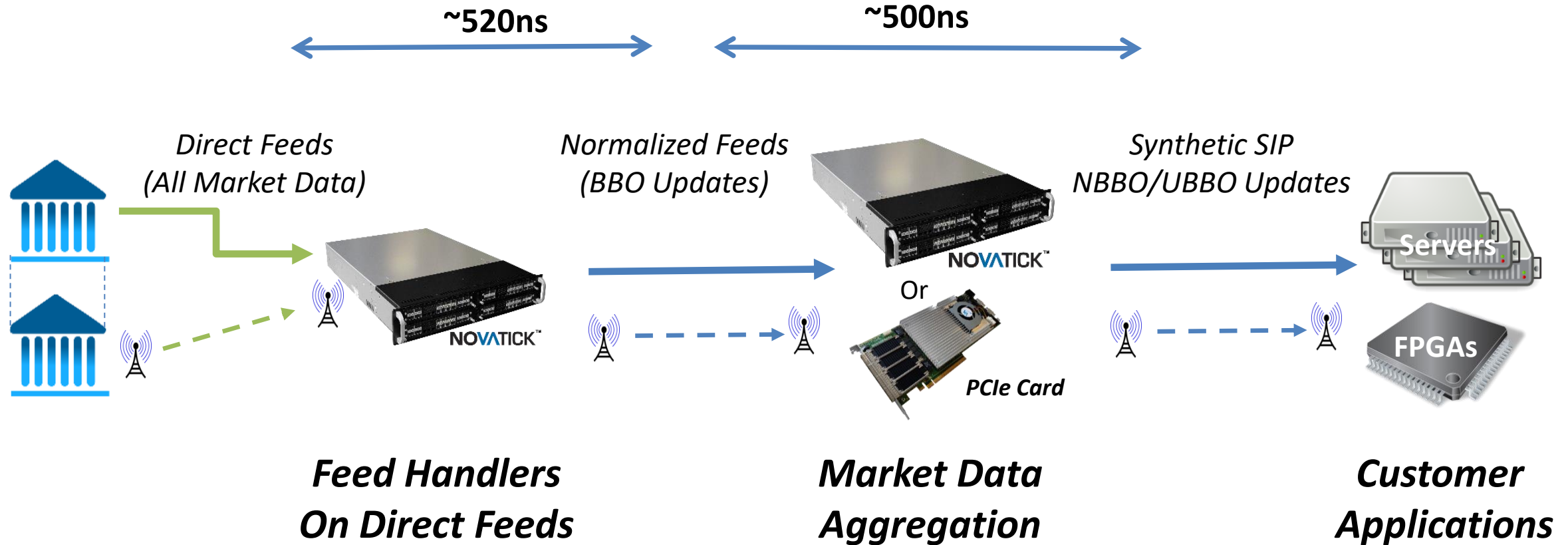


Synthetic SIP

- Fast version of SIP with potentially different/additional content (depth, auction, odd lots...)
- Based on Direct Feeds from US exchanges
 - CBOE, Nasdaq and NYSE and regional or SIP feeds
- Footprint: **5 FPGA cards**
 - 1 fully loaded 2U appliance + 1 PCIe card
- Performance:
 - Feed Handling and Aggregation in **~1 micro-second** on All US Equities
- Full customization of the quotation data consolidation rules
- In production since 2019

NOVAPARKS Synthetic SIP in ~1 micro-second

Not a STAC Benchmark



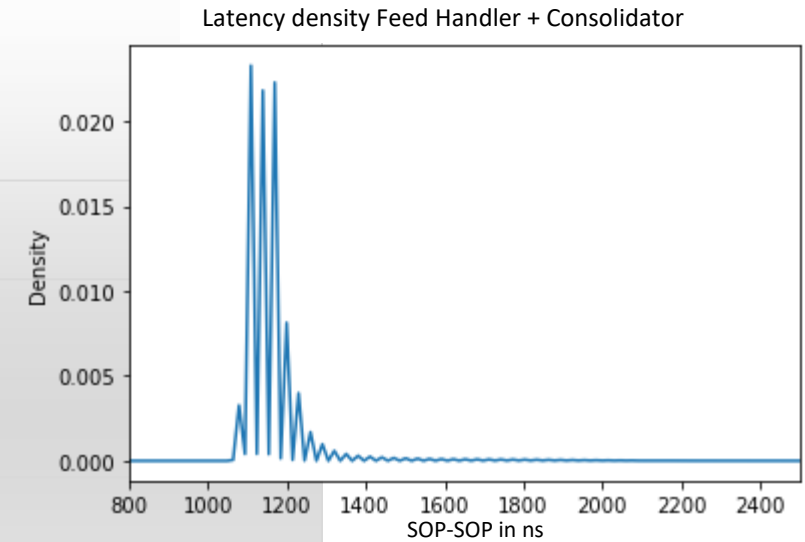
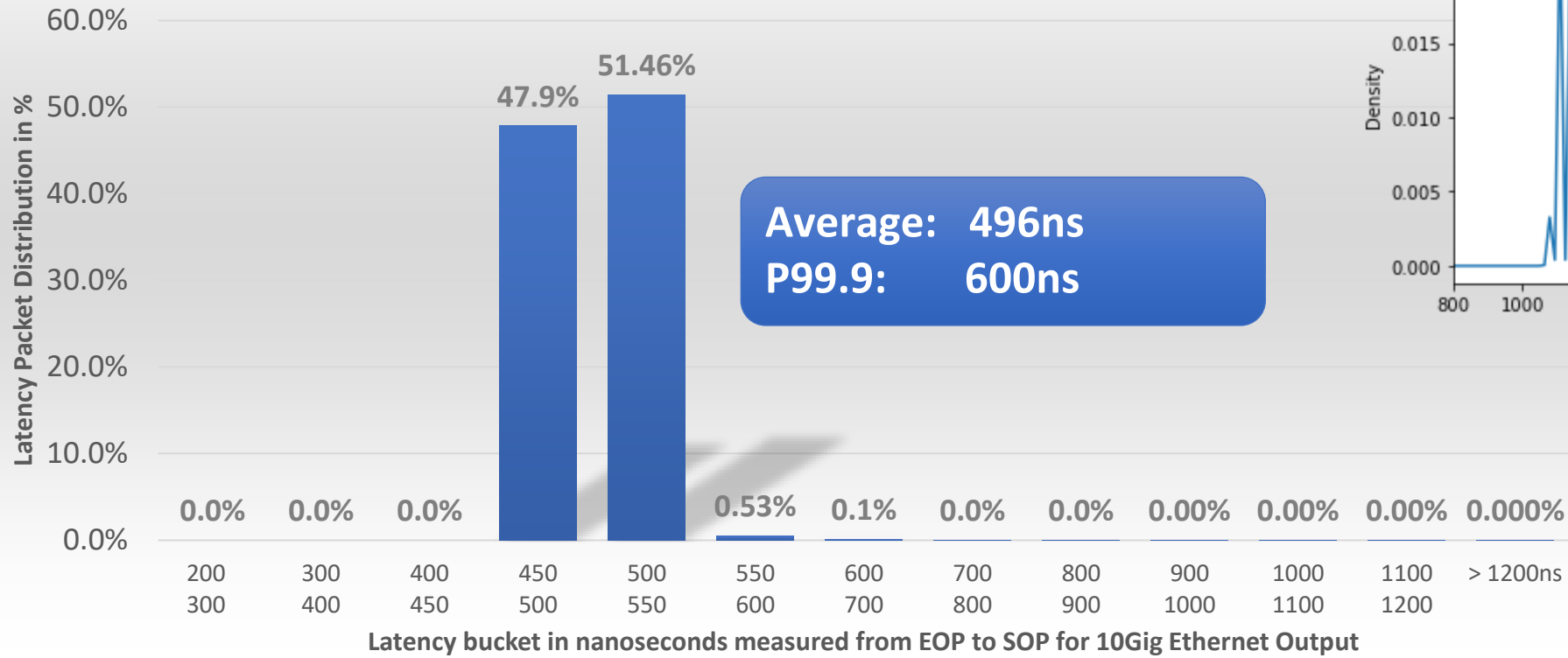
"Over the past year, we have used NovaSparks' U.S. Equities feed handlers and User Defined BBO consolidator to dramatically improve performance during market bursts resulting in consistently lower latencies during high volume periods. This remarkable innovation gives us the opportunity to focus our development efforts in other areas." **Anand Prakash**, Cutler Group



NOVAPARKS Synthetic SIP Aggregation Latency Profile

Book Consolidation on Main US Equities Markets

Entire Instrument Universe - 5 Level Aggregation
Whole Day Measurement from March 5th, 2021



Not a STAC Benchmark

New SIP Content and Challenges

- Add 5 levels depth below/above NBBO, odd lots quote, Imbalance and Auction Data
- Based on direct feeds provided by US equities exchanges
 - Remove proprietary throttled TCP feeds
- New SIP distributed in all liquidity Centers (Carteret, Secaucus, Mahwah)
 - Find NBBO local to your trading venue
- New SIP market data volume is expected to outgrow current SIP volume **by 3x-4x**
 - Major challenges for **new SIP feed handler vendors** and new SIP providers, aka **Competing Consolidators**

FPGA solutions are required for scalability/resiliency/performance

We are ready for the new SIP!



Check the NovaSparks box on your card
if you would like to learn more about
the SIP or our platform