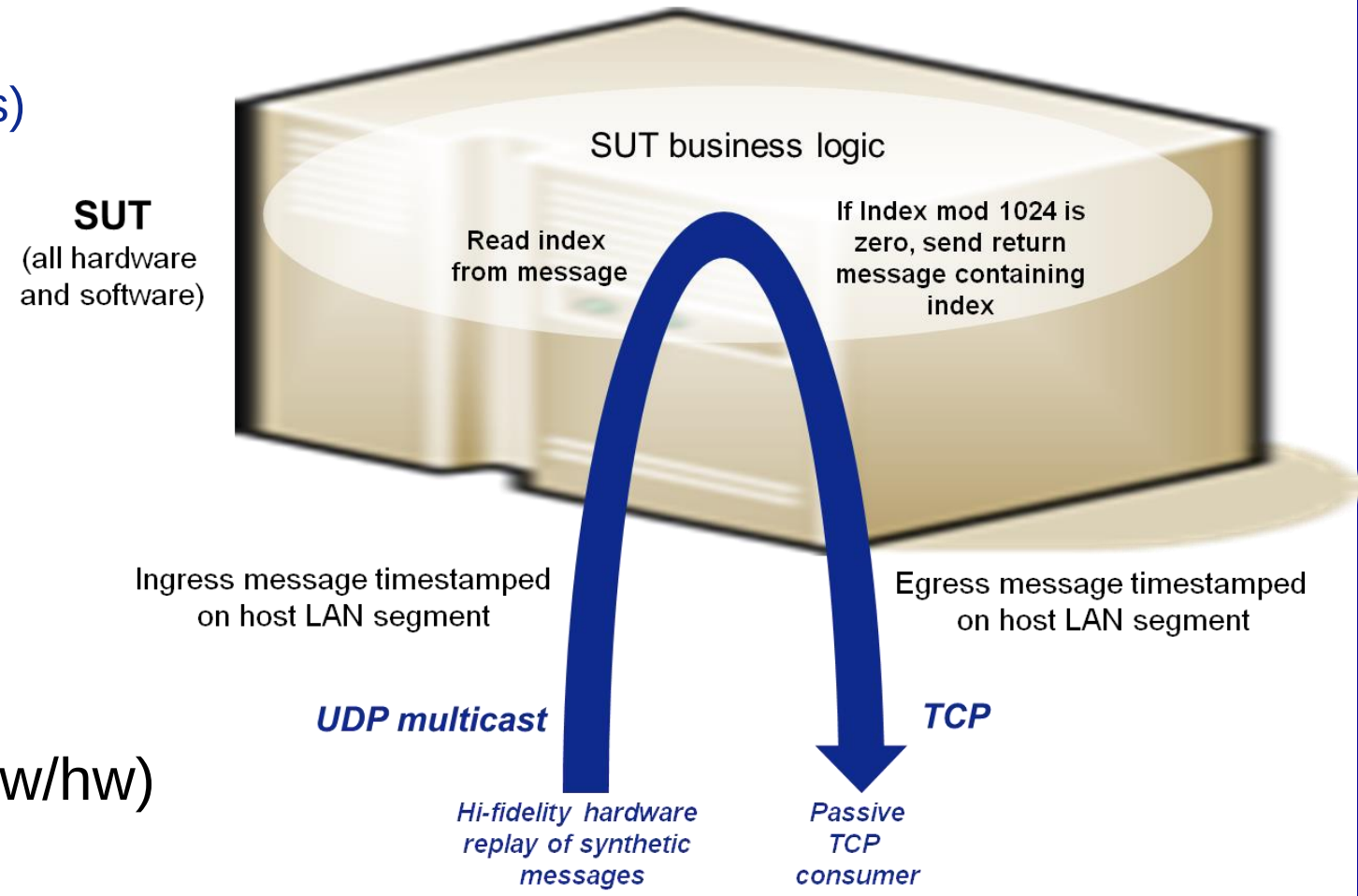
STAC Update for Fast Data

Peter Lankford
Founder and Director, STAC

peter.lankford@STACresearch.com

STAC-T0

- Tick-to-trade pattern
  - UDP in (507B or 68B frames x 3 rates)
  - TCP out (118B frames)
- Isolates network I/O latency
  - Latency that cannot be squeezed out of business logic
  - Does not co-mingle I/O latency with market-specific logic
- Extremely high accuracy
- Works with any trading platform (sw/hw)
- Key metric: Actionable Latency
  - STAC-T0.ACTIONABLE.LAT: $t_{FO} - t_{IND}$



Copyright © 2017 Securities Technology Analysis Center LLC

STAC®
SECURITIES TECHNOLOGY ANALYSIS CENTER

First, some new old news

- Last year we reported STAC-T0 results for a solution from LDA, Solarflare, Penguin
- We recently learned that some of those results used an incorrect calculation

- Rough explanation:
  - STAC-T0 infers some bit timestamps from observed bit timestamps, using known propagation delay of the medium (in this case 10GbE)
  - 10GbE runs at 10.3125 billion bits/second at layer 1
  - Our STAC-T0 captures were from layer 2, where it is 10 billion bits per second
  - So inferred latencies were off, especially for large messages
- More detailed explanation (tldr):
  - We need to use layer 1 speed but take into account 64b/66b encoding, control bits, etc.
- Final analyses coming, but here is a heads-up

Copyright © 2017 Securities Technology Analysis Center LLC

STAC
SECURITIES TECHNOLOGY ANALYSIS CENTER

Highlights of adjustments

- FIFO latencies did not change (those are measured directly)
- Actionable Latency, LIFO, FILO did change. Actionable is most important.
- Max Actionable Latency*
  - At 1.4M frames/sec ingress with 68-byte frames: reported as 98ns – actual value was ~97ns
  - At 237K frames/sec ingress with 507-byte frames: reported as 109ns – actual value was ~102ns

* Does not incorporate all measurement uncertainty. Final analysis coming soon.

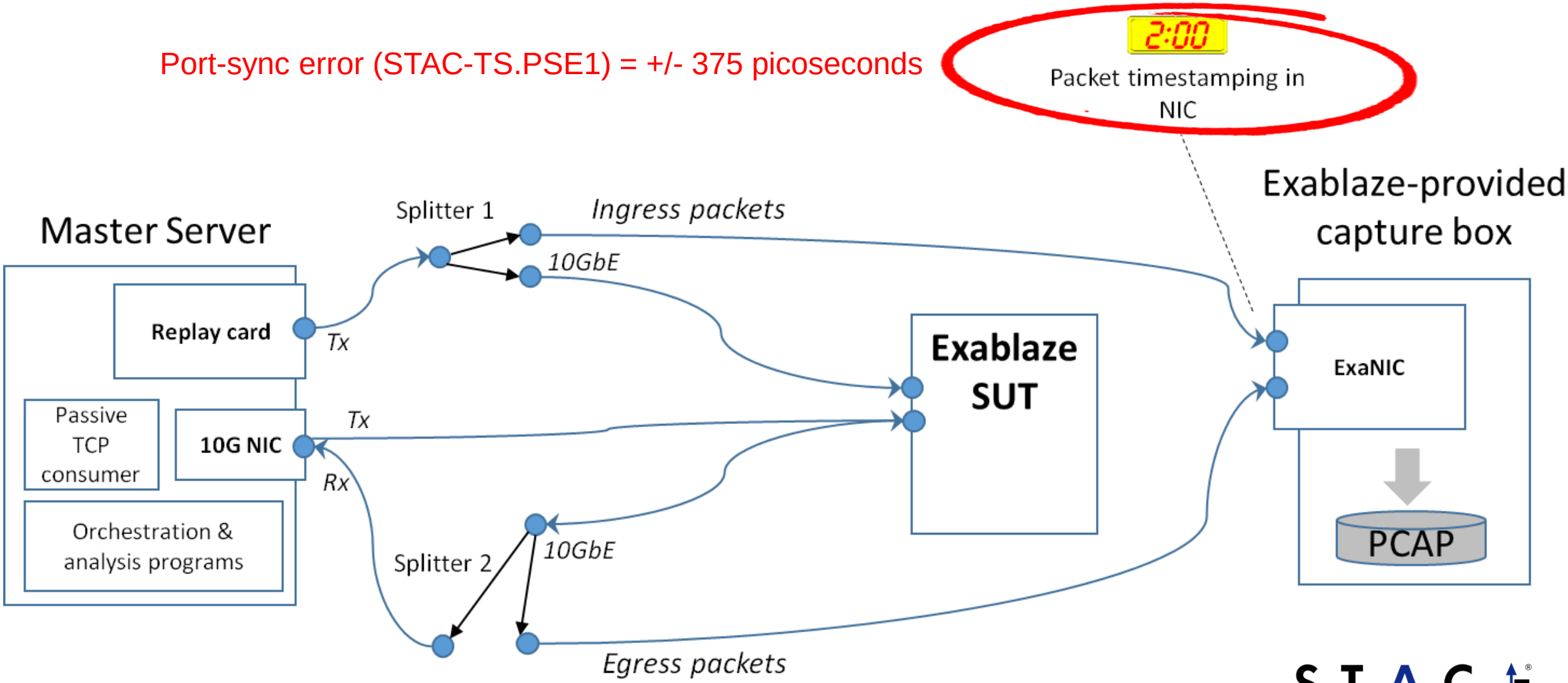
Adjusted STAC Report coming soon

Copyright © 2017 Securities Technology Analysis Center LLC

Now some new news

- Recently subjected a pure Exablaze solution to STAC-T0

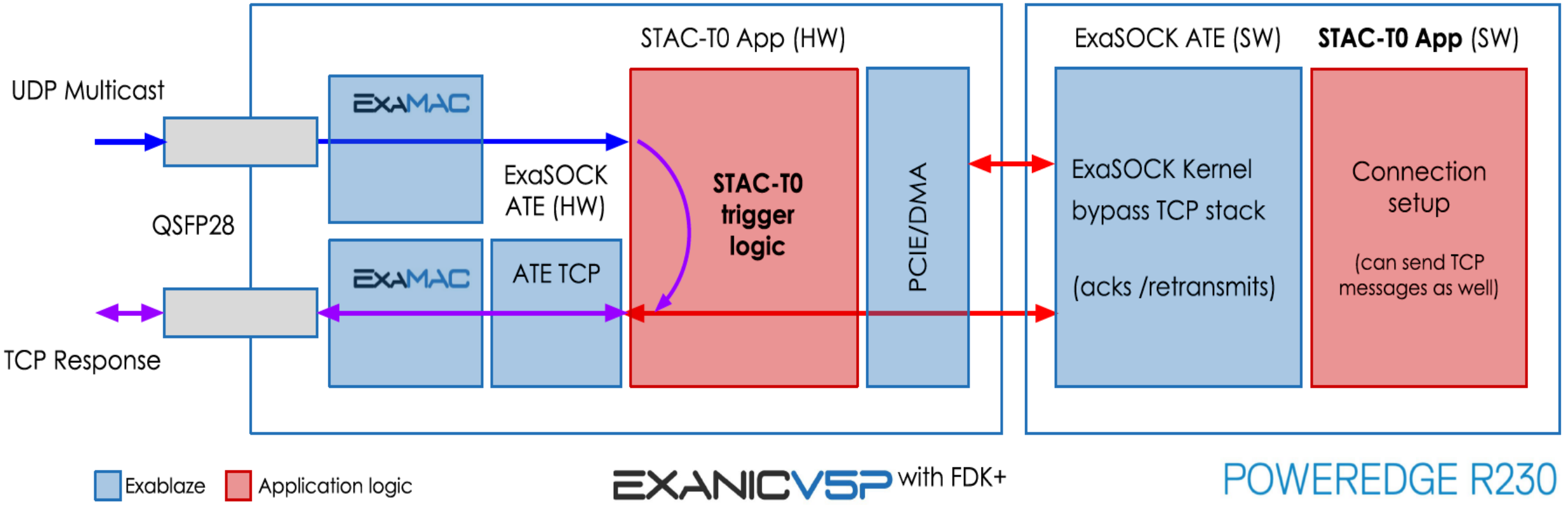
Port-sync error (STAC-TS.PSE1) = +/- 375 picoseconds



Copyright © 2017 Securities Technology Analysis Center LLC

STAC
SECURITIES TECHNOLOGY ANALYSIS CENTER

The SUT, under the covers



Copyright © 2017 Securities Technology Analysis Center LLC

Results highlights

- New high ingress rates tested:
  - 1.9 million packets per second for 507B frames (= 7.7 Gbps)
  - 11 million packets per second for 68B frames (= 6.2 Gbps)
- Set new records in every measurement
- Over 50% lower latency than previous records

STAC Report coming soon

Across all message sizes and all message rates...

- Actionable latency*:
  - Max of ~44 nanoseconds (STAC-T0.β1.*.*.ACTIONABLE.MAX)
  - Min of ~31 nanoseconds (STAC-T0.β1.*.*.ACTIONABLE.MIN)

* Does not incorporate all measurement uncertainty. Final analysis coming soon.

Copyright © 2017 Securities Technology Analysis Center LLC

STAC
SECURITIES TECHNOLOGY ANALYSIS CENTER