STAC Update
Tick-to-Trade

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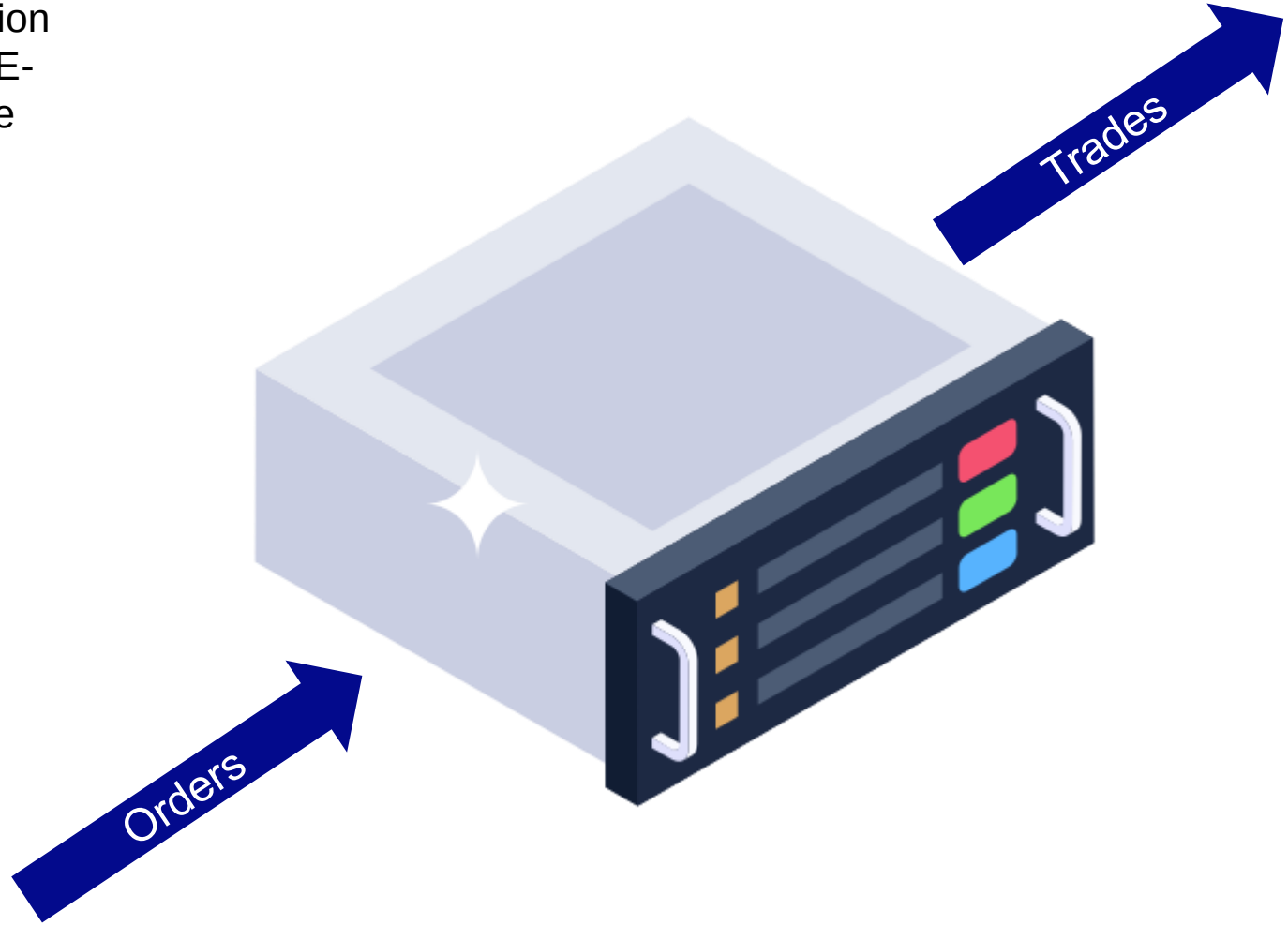
STRATEGIC TECHNOLOGY ANALYSIS CENTER

STAC-T1.EMINI

- Measures the tick-to-trade latency of any trading solution capable of consuming recorded market data for CME E-mini futures and sending orders to simulated exchange gateways using the FIX 4.2 protocol
  - UDP in
  - TCP out

- Uses wire timestamps
  - High accuracy
  - Work with any trading platform (sw/hw)

- Includes protocol handling
  - Market data decoding
  - Trading logic
  - Order encoding



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ADHOC HFFT-02A FPGA (Versal Premium) Based ULL HFT Solution

SUT Details

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SUT

- ADHOC HFFT-02A 1U Appliance
- Redundant 2x50 W Power supply (1 active)
- 1x AMD XILNX Versal Premium
- 4GiB LDDR4, 144MiB MemoryCypress QDR-IV SRAM
- All software written in VHDL, run on FPGA side of Versal Premium
- ARM processing side of Versal Premium not utilized

Latency Monitor

- ADHOC HFFM-01A Precision Measurement & Analysis Solution
- Solarflare X2522 card (validation)

Testing Points

- Updated Spec to Rev C to use a more recent quadruple witching day
- Separate A & B feeds playback with tcpreplay

www.STACresearch.com/ADHC240918

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Test Setup

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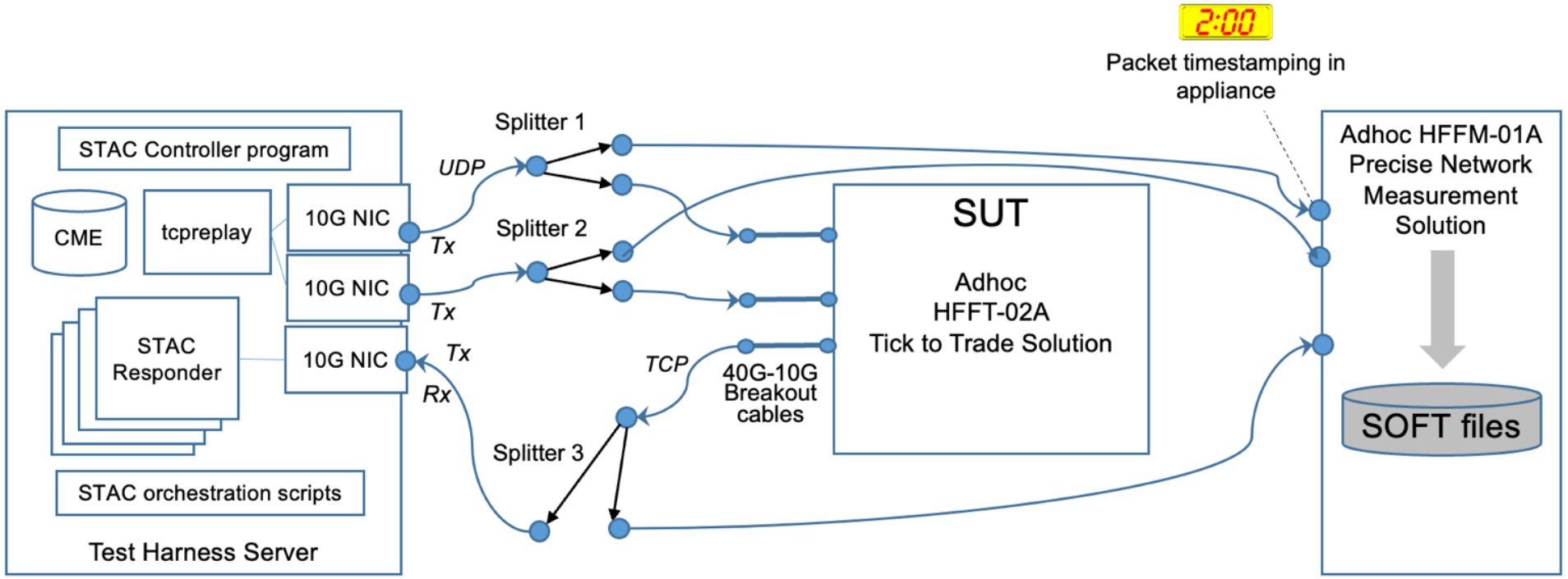

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Loopback Testing

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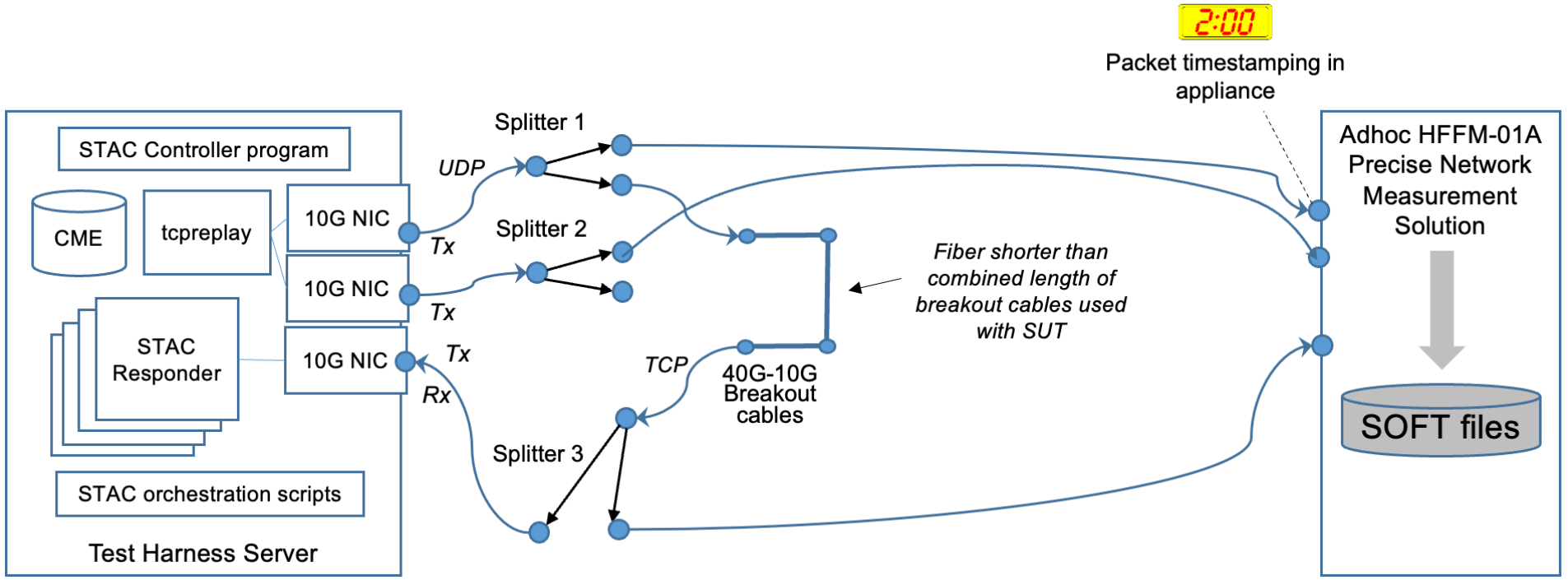

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Latency Monitor Validation

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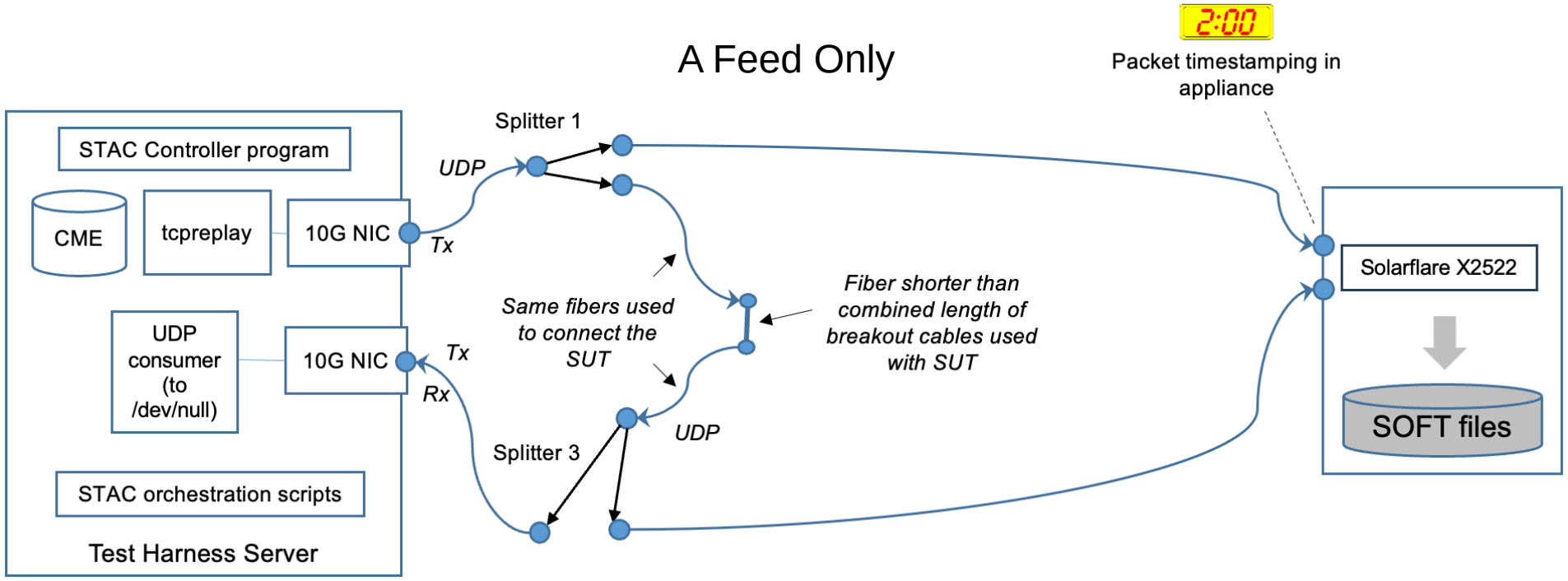

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Key Results

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Latency from start of the market data message to the start of the order frame (in nanoseconds):

1X (STAC-T1.EMINI.vB.1x.SOM-to-SOF)

- 115.07 (mean)
- 9.45 (standard deviation)

8X (STAC-T1.EMINI.vB.8x.SOM-to-SOF)

- 115.35 (mean)
- 11.66 (standard deviation)

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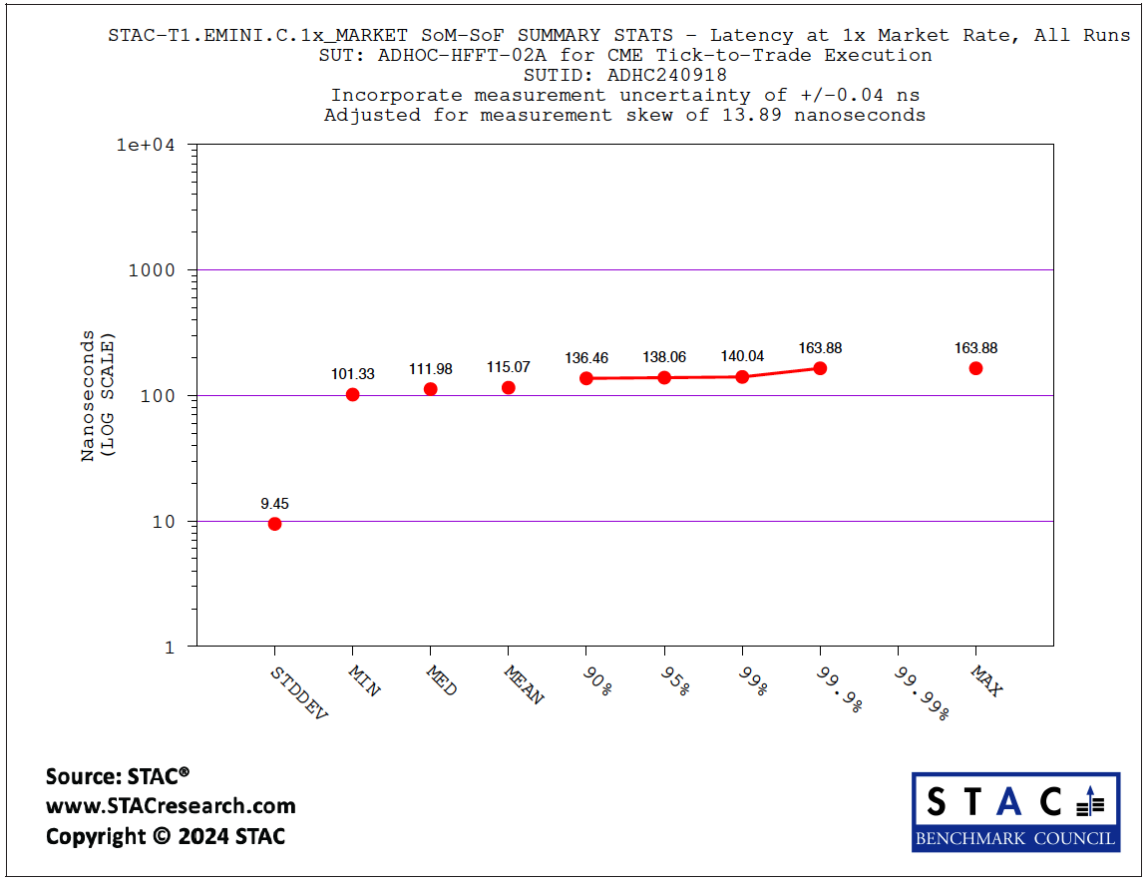
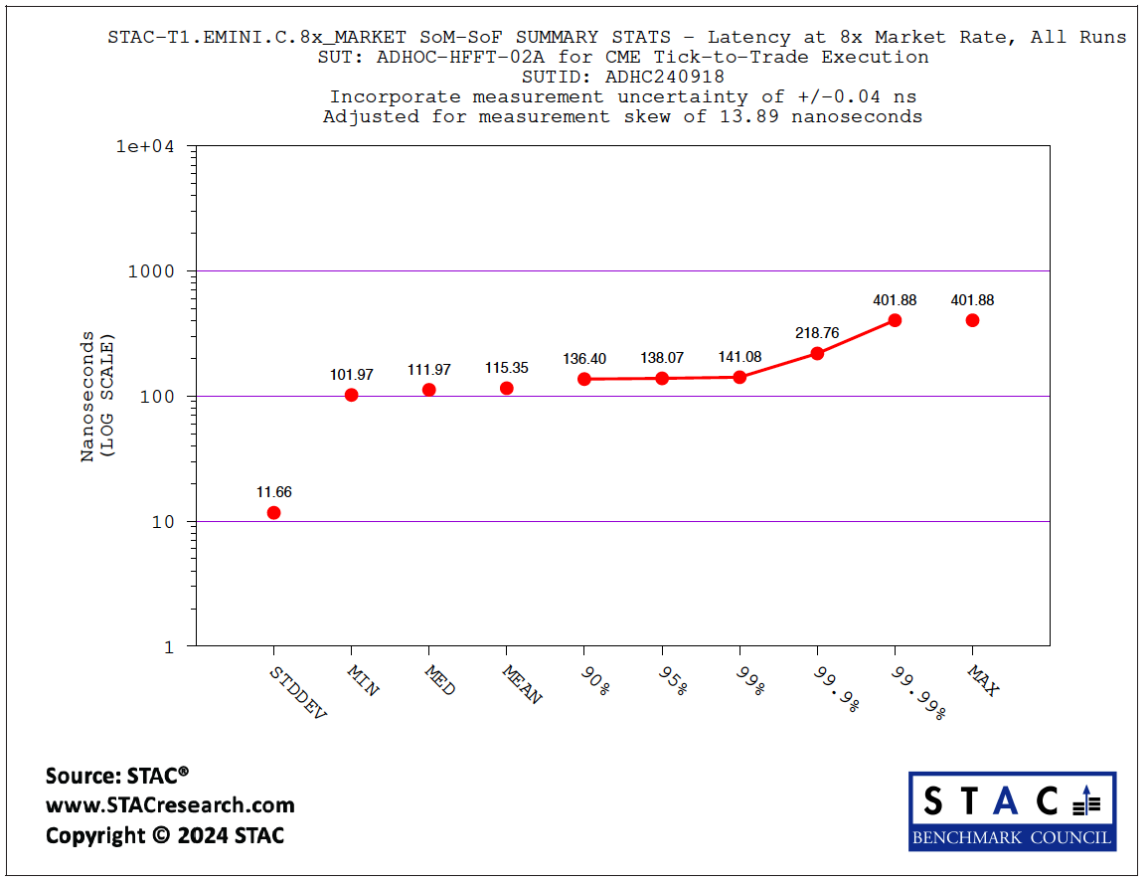
Latency for Start of Message (SOM) to Start of Frame (SOF)

STAC-T1



SUMMARY STATS,1X



SUMMARY STATS,8X

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ADHOC HFFT-02A FPGA (Versal Premium) Based ULL HFT Solution

Latency for End of Trigger (EOT) to Start of Frame (SOF)

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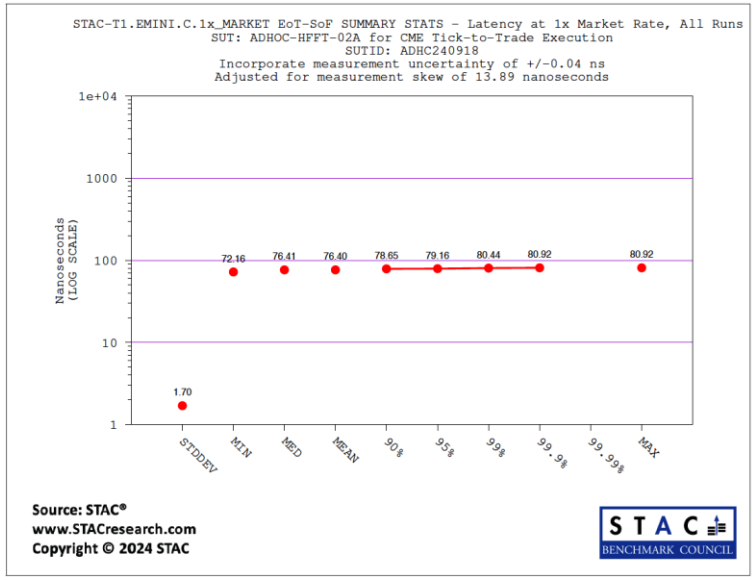
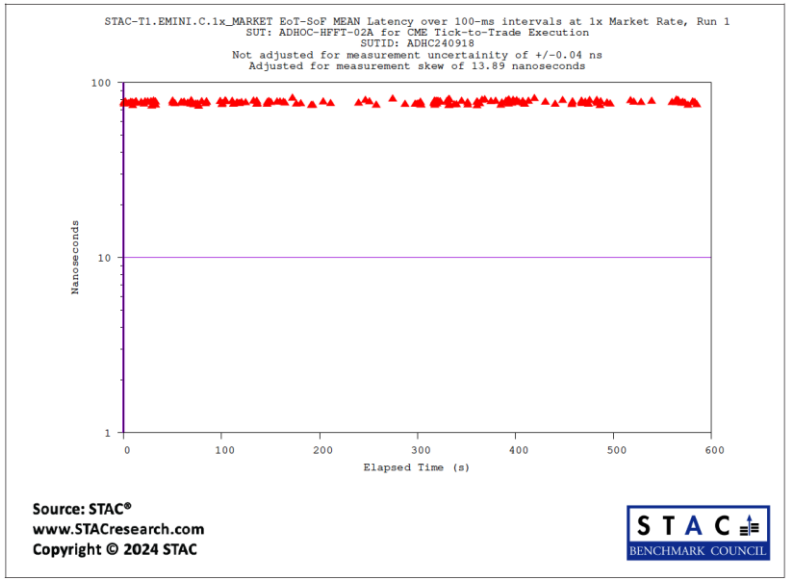
EOT-SOF is a proposed metric shows the time the “algo” takes to trade once it has all the information to act.

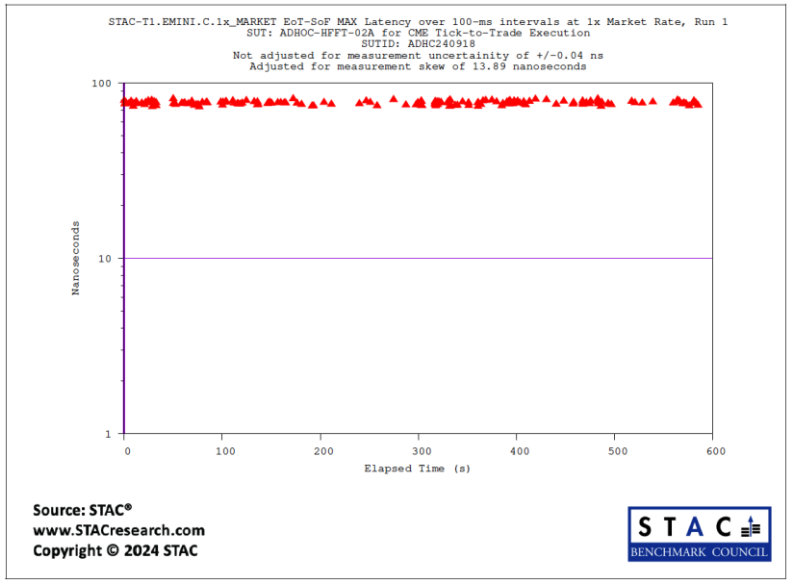
When a frame contains multiple messages, a valid trigger may be in any one or multiple messages, which adds both latency and jitter to the metric SOM-SOF. ADHOC proposes this as a more realistic measure of the time the SUT requires to act for given messages.



SUMMARY STATS,1X



MEAN LATENCY over time, 1X



MAX LATENCY over time, 1X

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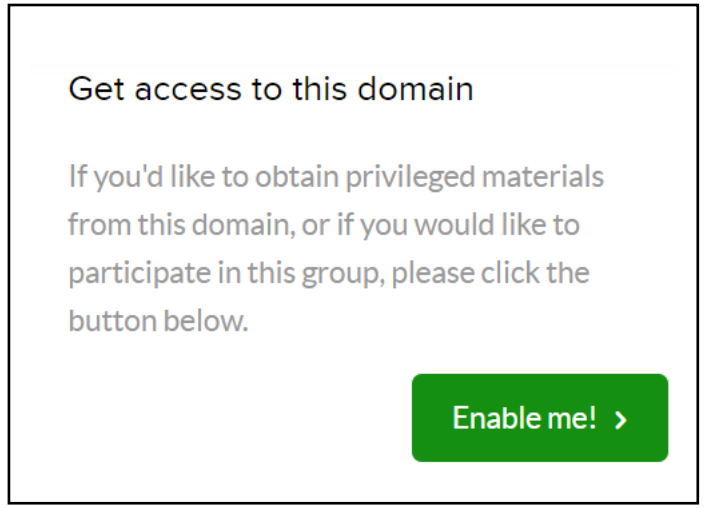
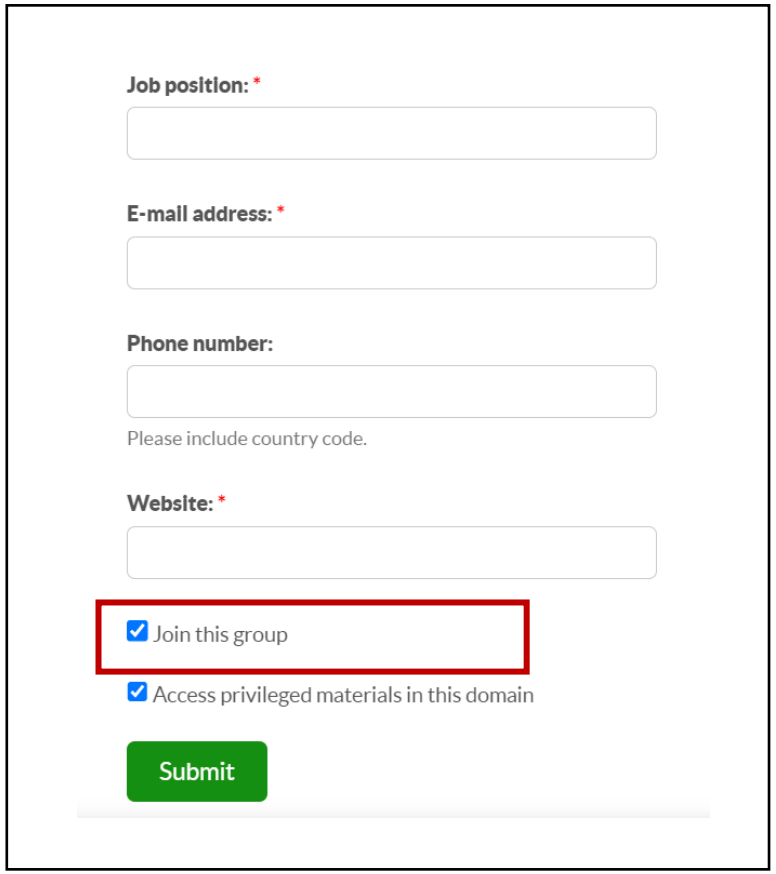
How to get involved

Join the Tick-to-Trade working groups

STACresearch.com/t1





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