STAC-T1.EMINI

STAC-T1.EMINI:
Tick-to-trade benchmarks based on CME E-mini futures

STAC-T1.EMINI measures the wire-to-wire I/O latency (including market data decoding/filtering and execution protocol encoding) of any solution used to trade CME E-mini futures. STAC developed STAC-T1.EMINI in collaboration with the CME and a proprietary trading firm active on the CME.

Under STAC-T1.EMINI, the "stack under test" (SUT) can be any type of solution, from a distributed system consisting of ticker plants, trading apps, and execution gateway servers to a tightly contained system that handles all market data, algorithmic, and execution functions for a given set of instruments in a single node. By minimizing the load imposed by the trading algorithm (simply requiring orders upon receipt of every so many market data messages), STAC-T1.EMINI indicates how much of a trading firm's latency budget a given SUT will require in order to process market data and send orders.

Test Setup

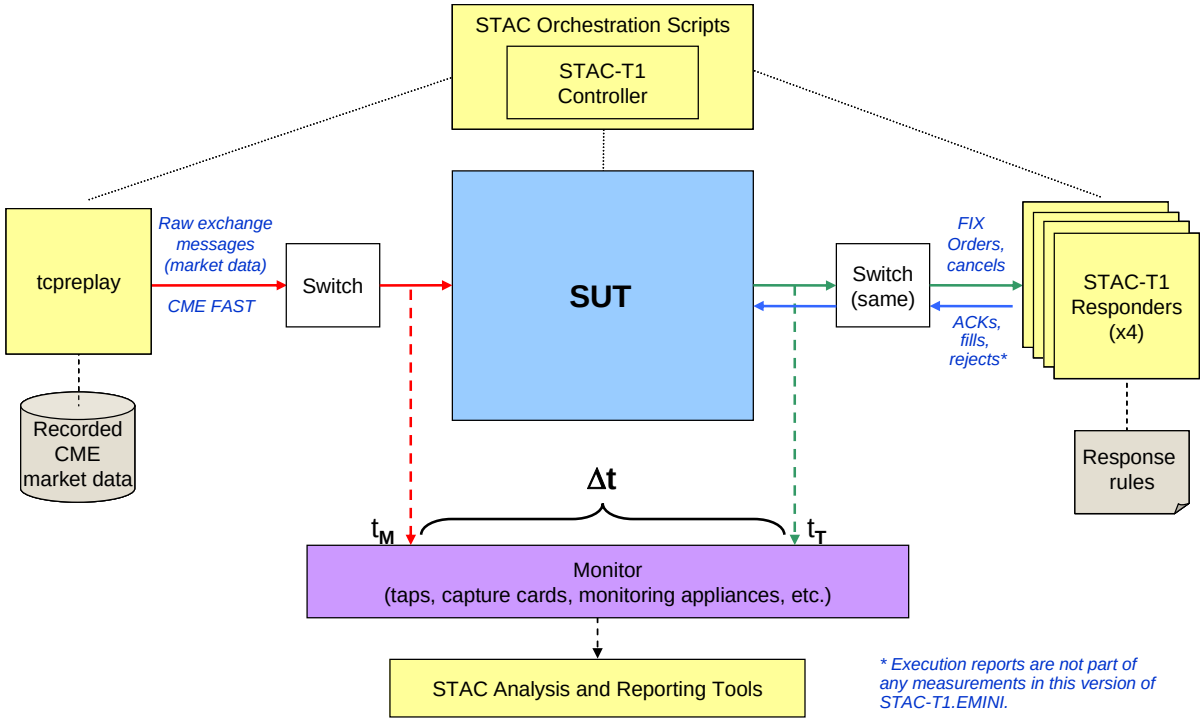

Figure 1 illustrates the STAC-T1.EMINI test setup. The market data feed consists of selected channels from a CME feed captured on a particular date. For simplicity, the harness uses tcpreplay to play the market data to the SUT (the aggregate data rate from these channels is low compared to US equities or options, for which STAC would use hardware-based replay).

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On the other side of the SUT are STAC Responders, which are software processes that simulate gateways at the CME that accept orders and provide ACKs, fills, rejects, etc. STAC-T1.EMINI calls for four instances of the STAC Responder for CME iLink. The STAC Responders are configured to follow rules (probability distributions for fills/partial fills, ACK latencies, etc.) considered typical of what a trading firm is likely to experience in practice, depending on connectivity and other variables. Distinct physical or virtual LANs are used to separate market data from exchange-gateway traffic.

The STAC-T1.EMINI Test Harness is designed to be integrated with any latency monitoring system that captures and parses market data and execution messages (denoted by "Monitor" in Figure 1). A Monitor includes all equipment and software used to capture and timestamp traffic on the wire and compute pairwise latencies using particular match criteria. Wire-to-wire latency measurement provides a complete view of the SUT's end-to-end latency, including latencies due to the network stack on the SUT host. The SUT may or may not include a switch, depending on the intent of the benchmarking project (because the real world includes both switched and switchless configurations).

Latency for a trade is defined as the egress time of the trade message minus the ingress time of the market data message triggering the trade. Timestamps in the diagram are defined as follows:

- t_M is the time that a triggering market data message is available to the SUT;
- t_T is the time that the egress trade message exits the SUT.

Thus, the latency for a given trade is always (t_T - t_M). Correlation of trade messages with their triggering market data message requires information from the trading application. STAC-T1.EMINI requires the trade message to carry information about the market data message that triggered it.

Two test sequences are defined for STAC-T1.EMINI:

- 1x_MARKET: Market data is played back at the same rate at which it was recorded
- 8x_MARKET: Market data is played back at eight (8) times the rate at which it was recorded.

STAC-T1.EMINI orchestration software controls the entire test process from end to end to eliminate human factors from affecting repeatability. This software iterates through the configured test sequences, runs tests, collects the low-level data, and launches the analysis and reporting tools.

Get the most from STAC-T1

Any interested party can analyze public STAC Reports to compare the performance of different systems. However, members of the STAC Benchmark Council are able to put these reports to much greater use. Qualified members may:

- Read the detailed test specifications
- Access additional reports in the confidential STAC Vault
- Obtain the materials to run the STAC-T1 Benchmarks on their own systems
- Discuss benchmarks, technologies, and related business issues with their peers.

To get acquainted with STAC-T1.EMINI, read one of the public reports at
www.STACresearch.com/t1

For more information, please contact
council@STACresearch.com