

Drinking from the firehose: streaming ingest benchmarks

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Background

- Ingest and analysis of streaming data keep coming up in benchmark discussions
- Time to jump in



Two projects to discuss

Benchmarks of 3Forge AMI data visualization platform

• Prototype of database ingest tests

(Some tests of the two look similar but are actually quite different)



Why did we benchmark a display platform?

- Despite the automation trend in capital markets, human analysis is still crucial
 - In fact, automation increases the need for it (e.g., supervision of algorithms)
- Human analysis requires visual tools
 - Charts, tables, etc.
 - Dynamic exploration
- Some customers tell us:
 - Front-office tools not well suited to broader enterprise use
 - Big-name visualization tools can't cope with streaming data
- Many firms build custom solutions
- 3Forge offers a product: AMI

Testing project

- Basic questions:
 - Query response time
 - Data freshness
- Finding the max ingress capacity was not a project objective
 - Studied the above at a reasonable fixed ingress rate
 - 25,000 messages per second = 700,000 database fields per second
- Basic setup
 - 1 server (low spec Linux box)
 - 1 client (Chrome on Windows)
 - Direct network connection



Test setup



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An example of a tablular display in this project

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An example of a chart in this project

Response times:

- Average response time for 40 table rows, during ingest: 317 milliseconds
- Average response time for 40 table rows, not during ingest: 273 milliseconds
- Average response time for a chart with 2 million data points, not during ingest: 3.67 seconds
- Data freshness:
- Average age of most recent data returned in request/response queries during ingest: 149 milliseconds
- Average age of most recent data displayed in an auto-updating table during ingest: 247 milliseconds

Two projects to discuss

• Benchmarks of 3Forge AMI data visualization platform

(Some tests of the two look similar but are actually quite different)

Motivation

- Use case categories
 - Collecting data for tick histories, like the historical data represented by STAC-M3
 - Realtime analysis of streaming data (e.g.,
- We hear interest in many timeseries databases. There are a lot to choose from:
 - At least 10 open source
 - At least 15 proprietary software
 - At least 6 DBaaS
 - Not to mention stuff developed in-house!
- The current STAC-M3 assesses the speed of analysis on historical data
- But firms confront two questions even before they get to analytics performance...

Two big questions

- 1. Can we consume the realtime data to build up a history in the first place?
 - Ingest capacity
- 2. If we want to do analysis in real time, how realtime are the data in my queries?
 - Availability latency

- And a third question (perhaps): What impact does realtime ingest have on historical query response time?
- We have heard an interest from several user firms in having benchmarks to answer these questions

Traditional benchmark specification approach (waterfall)

- 1. WG meets to decide requirements (user firms have the vote).
- 2. Repeat #1 until requirements set.
- 3. Vendors do implementations.
- 4. A motivated vendor engages STAC for an audit.
- 5. Vendor and STAC discover specification questions/problems.
- 6. Wild scramble to address them with the WG.

Not the fastest process in the world. (And no shortage of stress.)

Trying a new "agile" approach

- 1. WG members express interest in tests, broadly defined.
- 2. Motivated vendor and STAC work on prototype.
- 3. Vendor and STAC present results to WG as a starting point.
- 4. WG iterates requirements (user firms have the vote)
- 5. Initial vendor and other vendors iterate on implementations.
- 6. By the time specs are finalized, one or more vendors have implementations ready.

This should yield good benchmark specs faster

Test setup for ingest benchmarks

Prototype benchmark specifications:

- Ingest capacity
- Estimated availability latency (EAL)
- As-of query performance (market snapshot)
- No persistence checks

Key questions for the Council:

- Minimum viable benchmark specs?
- Feedback on the details?
- Treat historical and realtime as separate?
- How to treat persistence?
- Complex queries on realtime?
- Continuous queries/filters?

= part of SUT = STAC component

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Motivated vendor in this case: QuasarDB

- You heard about QuasarDB in the Innovation Roundup earlier
- QuasarDB have prototyped an implementation of proposed benchmarks
 - And contributed tools to support the benchmarks
- Edouard Alligand, Founder & CEO will present those next
- Just to be clear: Results are not STAC Benchmark results
 - The specifications have not been vetted by a STAC Working Group
 - The results are unaudited by STAC

