



STAC Update: Time series stacks

Peter Nabicht
President, STAC

peter.nabicht@STACresearch.com

- Performance benchmarks for enterprise tick analytics
 - Language/DBMS neutral
 - Developed by banks and hedge funds
- Workload:
 - Synthetic data modeled on NYSE TAQ
 - Simulates concurrent access with varying number of users
 - Mix of I/O- and compute-intensive operations
- Many years of comparison points on diverse architectures

www.STACresearch.com/m3

STAC Packs

- Wide range of implementations
 - Databases: kdb+, shakti, eXtremeDB
 - Clustered file systems, parallel file systems, NFS, flash arrays, NVME over Fabric, direct-attached SSD, NAND and post-NAND Flash (e.g. Optane)
 - Single database server, database cluster (bare metal and cloud)
- Analytics STAC Track subscribers can access STAC Pack source code
 - Understand how to develop for a given database
 - Run tests: Mark your own stacks to market
 - Discover code optimizations

council@STACresearch.com

STAC-M3 / kdb+ / Dell PowerScale F900 All-Flash NAS, 3-node cluster

- Ran baseline (Antuco) and scale (Kanaga) benchmarks
- Demonstrates F900 handling larger data sets
- A follow-on to Antuco-only on PowerScale F900 (KDB210929)
- STAC-M3 Pack for kdb+: Compatibility Rev H



www.STACresearch.com/KDB220506

STAC-M3 / kdb+ / Dell PowerScale F900 All-Flash NAS, 3-node cluster

- Stack:

- kdb+ 4.0
- 8 x Dell PowerEdge R7525 servers, each with:
 - 2 x AMD EPYC 7H12 64-core CPU
 - 512GiB DRAM
 - Ubuntu 20.04.03 LTS
 - NFS v3
- 3 node Dell PowerScale F900 All-Flash Scale-Out NAS
 - Dell OneFS 9.2 storage cluster operating system
 - 251 TiB total physical capacity



www.STACresearch.com/KDB220506

Vs. previous generation of Dell EMC flash storage appliance*

- Outperformed in 14 of 17 STAC-M3 Antuco mean response-time benchmarks, including:
 - 16.9x speed-up in the 10-user market snapshot (STAC-M3.β1.10T.MKTSNAP.TIME)
 - 4.1x speed-up in the 100-user unpredictable interval stats (STAC-M3.β1.100T.STATS-UI.TIME)
 - 3.4x speed-up in the 50-user unpredictable interval stats (STAC-M3.β1.50T.STATS-UI.TIME)
- Comparison SUT used kdb+ 3.6 and STAC Pack Compatibility Rev E



www.STACresearch.com/KDB220506

* SUT ID KDB190430

Vs. cloud-based solution with 12 DB servers and local storage*

- Outperformed in 4 of 17 STAC-M3 Antuco mean response-time benchmarks, including:
 - 2.9x speed-up in NBBO (STAC-M3.β1.1T.NBBO.TIME)
 - 2.4x speed-up in 1-user unpredictable interval stats (STAC-M3.β1.1T.STATS-UI.TIME)
- In STAC-M3 Kanaga mean response-time benchmarks:
 - Faster in all 5 involving 100 users (STAC-M3.β1.100T.YR{1,2,3,4,5}VWAB-12D-HO.TIME)
 - Faster in 3 of 5 involving 100 users (STAC-M3.β1.50T.YR{3,4,5}VWAB-12D-HO.TIME)
- Comparison SUT was kdb+ in sharded mode



www.STACresearch.com/KDB220506

* SUT ID KDB211210