2008

5,000 txn/sec

H-Store: A High-Performance, Distributed Main Memory Transaction Processing System

VLDB 2008
On Predictive Modeling for Optimizing Transaction Execution in Parallel OLTP Systems

VLDB 2011
2008
5,000 txn/sec

2010
11,000 txn/sec

2012
50,000 txn/sec

Skew-Aware Automatic Database Partitioning in Shared-Nothing, Parallel OLTP Systems
SIGMOD 2012
2008
5,000 txn/sec

2010
11,000 txn/sec

2012
50,000 txn/sec

2015
4,000,000 txn/sec

TicToc: Time Traveling Optimistic Concurrency Control
SIGMOD 2016
ONLY MAXIMIZING OLTP THROUGHPUT LEADS TO AN UNFULFILLING LIFE.
Apple Acquires Durable Database Company FoundationDB

Posted Mar 24, 2015 by Matthew Panzarino (@mpanzer)

Apple has acquired FoundationDB, a company that specializes in speedy, durable NoSQL databases, TechCrunch has learned.
The company I'm working for is looking for a way to scale our DB-layer. Anyway, FoundationDB was more or less the only candidate against MySQL.

Does anyone know of any good (and proven) alternatives to FoundationDB?

It's funny you mention that.. but actually hiring a part-time PostgreSQL DBA is all but impossible, I reached out to most of the support companies listed on the north american website... mainly I wanted for someone to setup a small (3-node) replica set of the most recent version of postgres with plv8 some sane backup scripts and pretty much nobody replied... EnterpriseDB won't talk to you without laying out at least $10k to start, and I would rather pay a person (or small company) I can call that to get things running... more if it kept running well.
AVERAGE SALARY FOR DATABASE ADMINS IN 2015 WAS $81,710.

Source: Bureau of Labor Statistics
A DBMS THAT CAN CONFIGURE, TUNE, AND OPTIMIZE ITSELF WITHOUT ANY HUMAN INTERVENTION.
YES

DATABASE DESIGN
DATA PLACEMENT
QUERY OPTIMIZATION
KNOB CONFIGURATION
BACK-UP & RECOVERY
PROVISIONING

NO

SECURITY & ACLs
DATA INTEGRATION
UNPLANNED HALTS
VERSION CONTROL
What's New?

Previous efforts are reactive & human-driven.

A self-driving DBMS has to be predictive.
Why Now?

Recent advancements in hardware and deep neural networks make autonomous operation now possible.
Peloton

Non-volatile

IN-MEMORY

OLTP + OLAP

LLVM EXEC

AUTONOMOUS
THE BRAIN

INTEGRATED DEEP LEARNING FRAMEWORK TO MODEL, PREDICT, AND OPTIMIZE HTAP DATABASE WORKLOADS.
Workload Categorization

- Unsupervised Clustering
- SQL Traces

- 24 Hrs
- 7 Days
- 40 Days
**Workload Categorization**

- SQL Traces
- Unsupervised Clustering

**Workload Forecasting**

- Long Short-Term Memory
- Recurrent Neural Net
Workload Categorization

Workload Forecasting

Optimization Planning

Catalog

Benefit

Unsupervised Clustering

SQL Traces

Action Sequence

Action Catalog

Cost Benefit
EVALUATION

SYNTHETIC WORKLOAD BASED ON REDDIT TRAFFIC DATA. FORECAST WITH TENSORFLOW. ADAPTIVE STORAGE.
1 min intervals

Error Rate: 14.7%
CPU Training: 25min
Probe: 2MS
Update: 5MS
Size: 2MB

1 hour intervals

Error Rate: 17.9%
CPU Training: 18min
Probe: 2MS
Update: 5MS
Size: 2MB
Adaptive Storage

Change the layout of data over time based on how it is accessed.

Bridging the Archipelago Between Row-Stores and Column-Stores for Hybrid Workloads

SIGMOD 2016
UPDATE myTable
SET A = 123,
    B = 456,
    C = 789,
    D = "xxx"
WHERE D = "xxx"

SELECT AVG(B)
FROM myTable
WHERE C < "yyy"
SELECT AVG(B) FROM myTable WHERE C < "yyy"

UPDATE myTable
SET A = 123, B = 456, C = 789
WHERE D = "xxx"
Current Status

Single-node only.
Looking for real-world deployments to test.
Apache 2.0 license
END

@ANDY_PAVLO