Oracle TimesTen Scaleout – World's Fastest OLTP DB

RACLE

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TimesTen In-Memory DB using Intel Optane DC Persistent Memory







TimesTen: World's Fastest OLTP Database

In-Memory Relational Database

- ORACLE
- Pure in-memory
- ACID compliant
- Standard SQL
- Entire database in RAM

Persistent and Recoverable



- Database and transaction logs persisted on local storage
- Automatic recovery after failure

Extremely Fast



- Microseconds response time
- 10s of millions of TPS
- Billions of queries per second

Highly Available, Extremely Scalable



- High performance replication
- Elastic scalability with K-safety



In-Memory Database Startup

Today

- Copy database image from persistent storage into volatile DRAM
- 1.35 TB database



With Intel persistent memory

- Different implementation
- Database in Intel persistent memory **is** the persistent storage
- 'Startup' is instantaneous
- 2.7 TB database



In-Memory Database Startup

Today

- Copy database image from persistent storage into volatile DRAM
- 1.35 TB database \rightarrow 13m 20s



With Intel persistent memory

- Different implementation
- Database in Intel persistent memory <u>is</u> the persistent storage
- 'Startup' is instantaneous
- 2.7 TB database \rightarrow **0.4s**

4000x improvement!



Transaction Durability

Today

- Log buffer in volatile DRAM
- Transactions commit to buffer...
- ... then buffer written synchronously to storage
- Peak throughput



With Intel persistent memory

- Different implementation
- Log buffer is in Intel <u>persistent</u> <u>memory</u>
- Persistence is <u>immediate</u> on commitNo need to wait for write to storage
- Peak throughput



Transaction Durability

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- Log buffer in volatile DRAM
- Transactions commit to buffer...
- ... then buffer written synchronously to storage
- Peak throughput \rightarrow 170 K TPS



With Intel persistent memory

- Different implementation
- Log buffer is in Intel <u>persistent</u> <u>memory</u>
- Persistence is <u>immediate</u> on commitNo need to wait for write to storage
- Peak throughput \rightarrow **1.1 M TPS**

6.5x improvement!







Intel persistent memory enables new capabilities and enhanced performance for In-Memory Databases

- 4000x faster database startup
- 6.5x faster durable transaction performance
- Timesten Info:
 - Hands On Lab: 10/23 5:15pm, 10/24 12:45pm
 - Timesten Session: 10/24 11:15 am
 - Timesten Demo Booth

