NSF/IUCRC CAC PROJECT

INTEGRATED VISUALIZING, MONITORING, AND MANAGING HPC SYSTEMS

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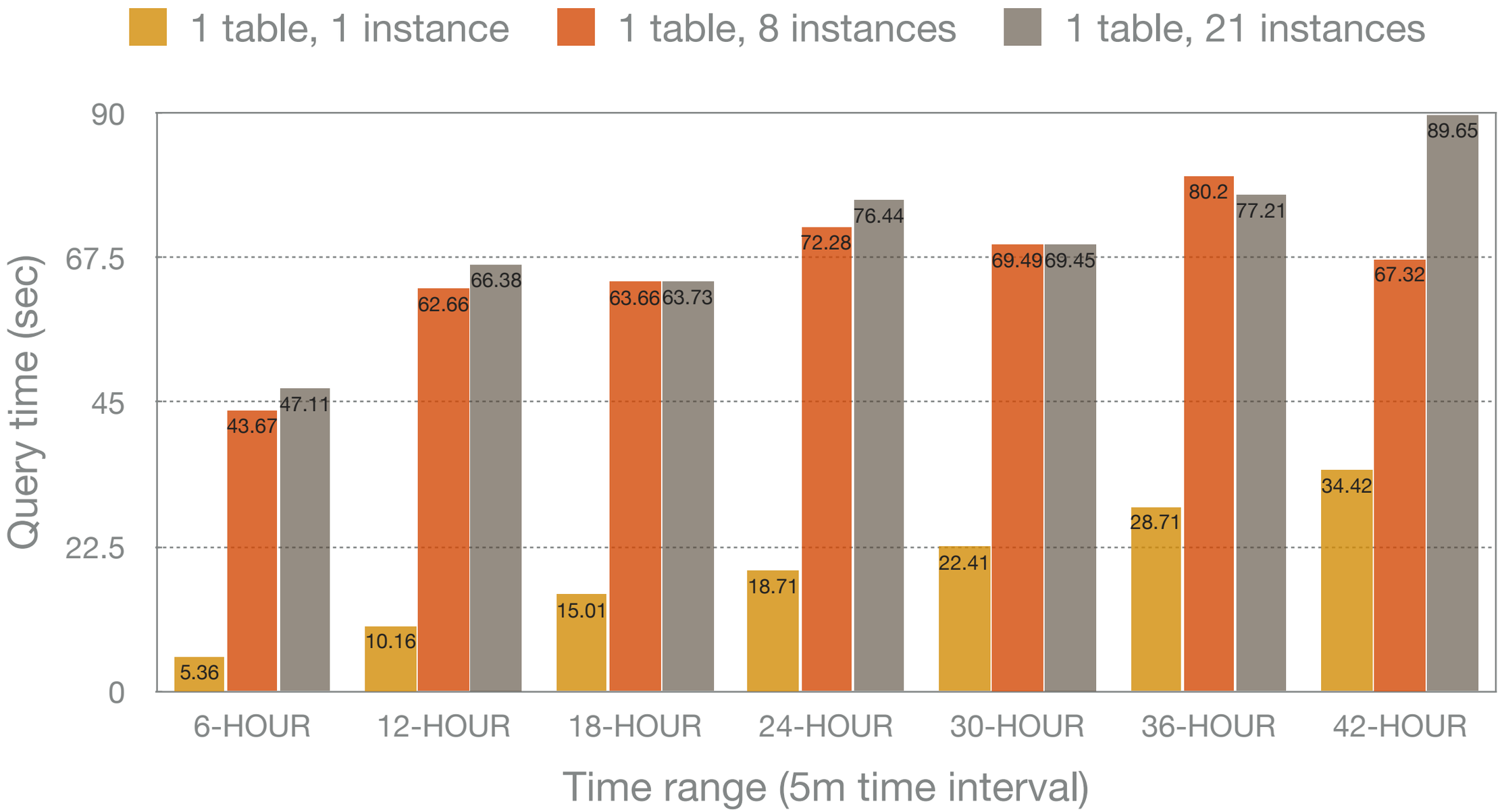
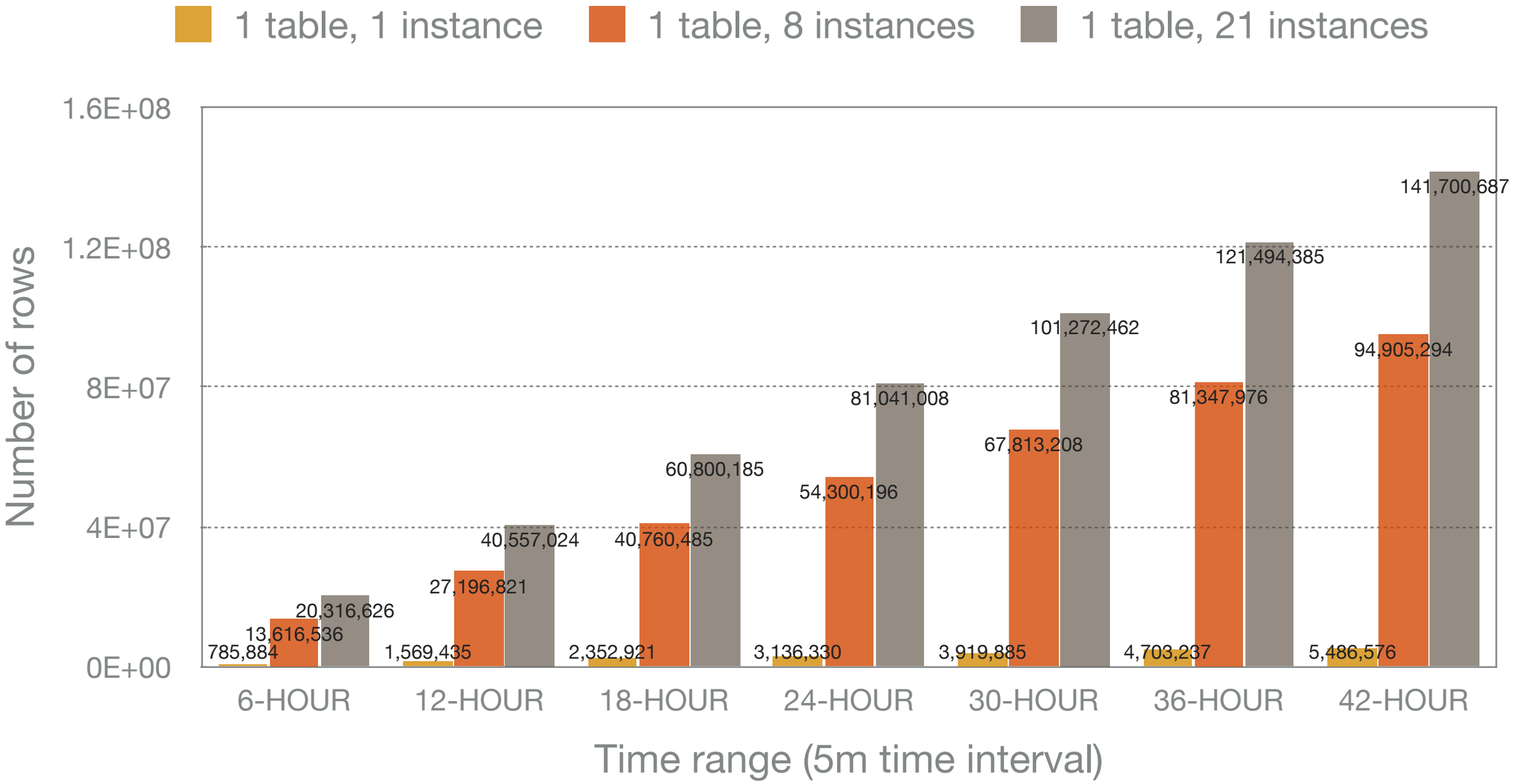
TIMESCALEDB



Query metrics (1 table) of 240 nodes from TimeScaleDB concurrently

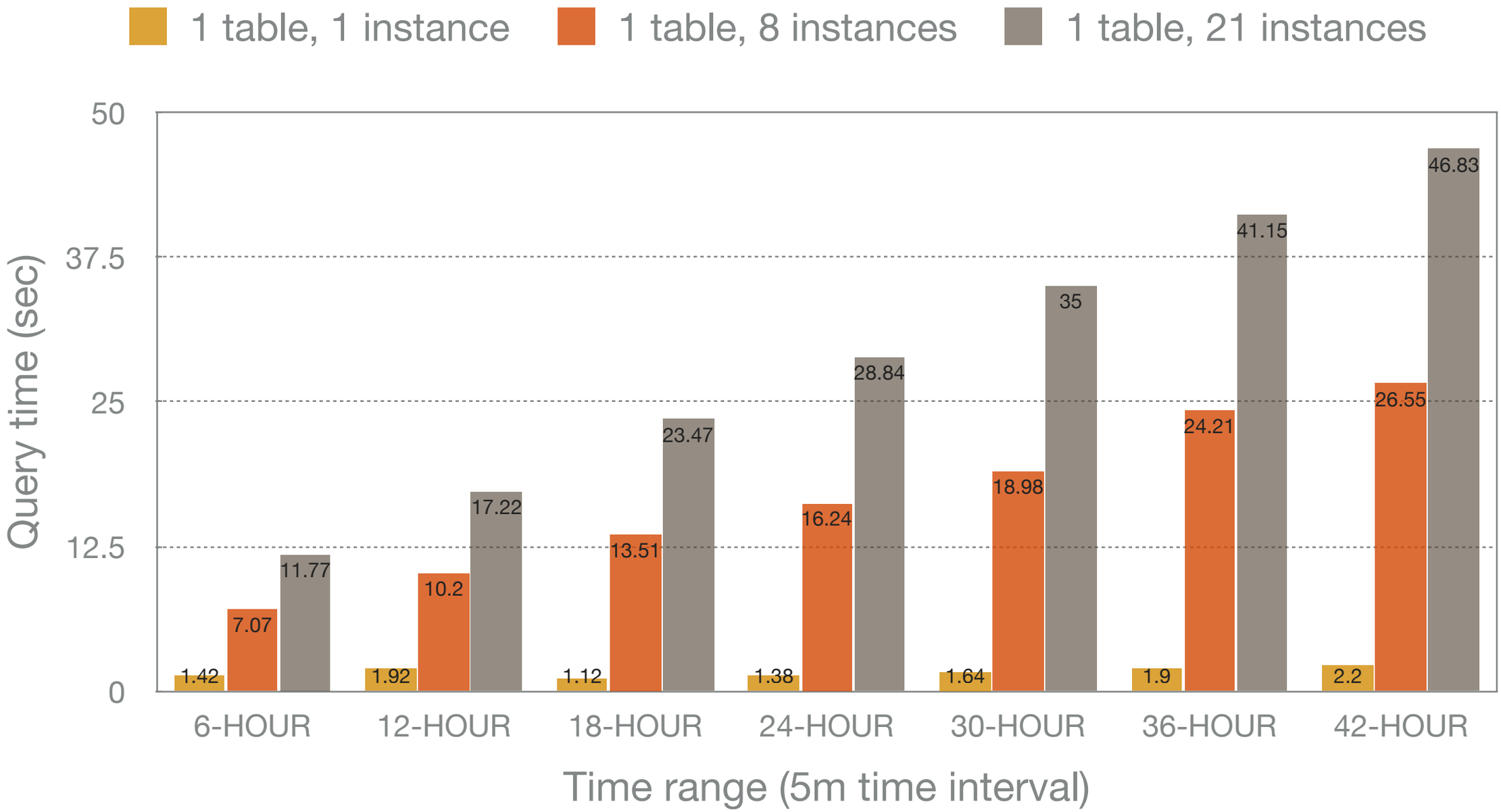
```
SELECT time_bucket_gapfill('{interval}', timestamp) as time, {aggregate}(value) from slurm.{metric} WHERE nodeid =
{host_id} AND timestamp >= '{start}' AND timestamp < '{end}' GROUP BY time ORDER BY time;
```

TIMESCALEDB



Query metrics (1 table) of 240 nodes from TimeScaleDB concurrently

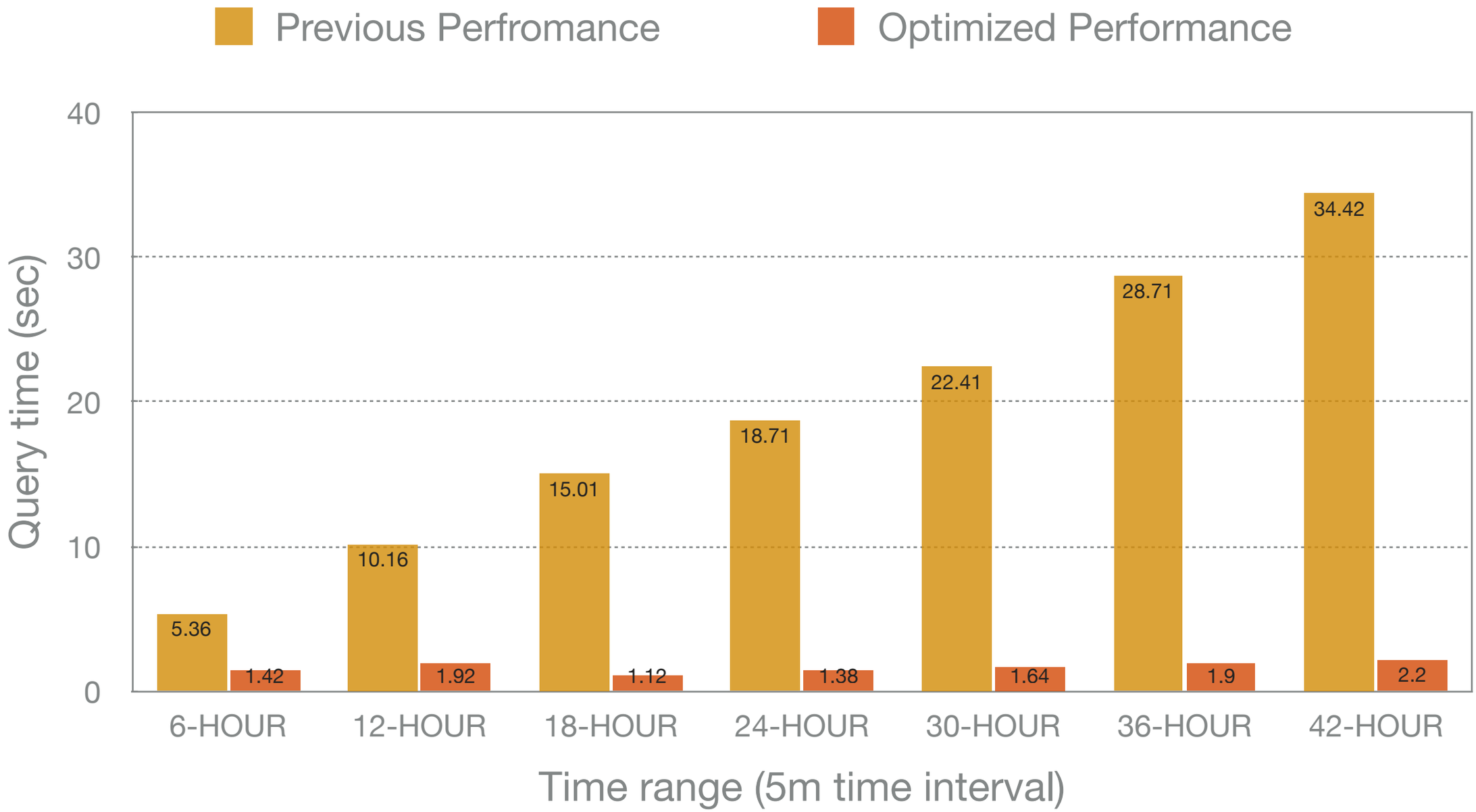
TIMESCALEDB - OPTIMIZED



Query metrics (1 table) of 240 nodes from TimeScaleDB

```
SELECT time_bucket_gapfill('{interval}', timestamp) as time, nodeid, array_agg(jobs) as jobs, array_agg(cpus) as cpus from slurm.{metric} WHERE timestamp >= '{start}' AND timestamp < '{end}' GROUP BY time, nodeid, jobs, cpus ORDER BY time;
```

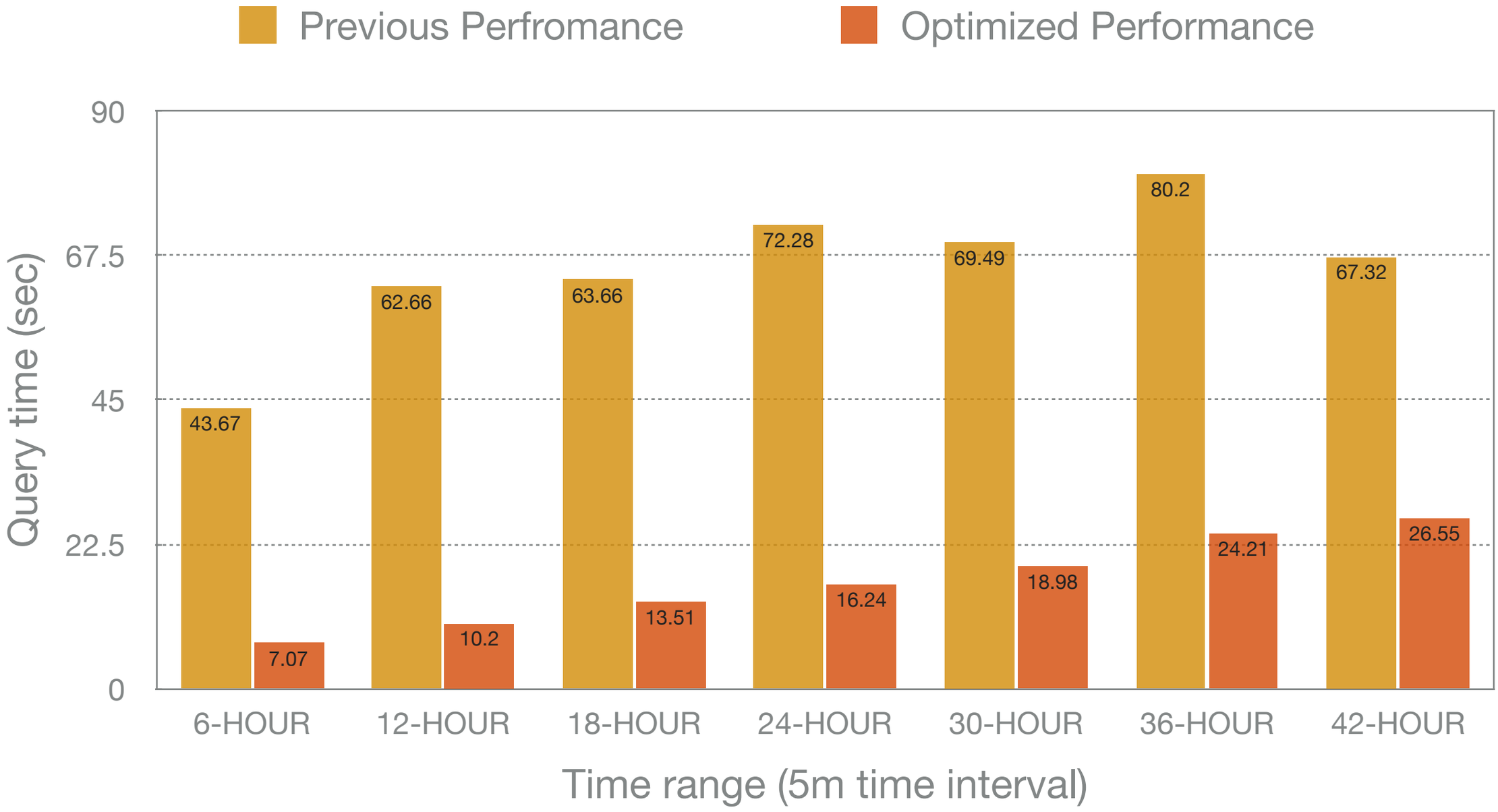
IMPROVEMENT



Query metrics (1 table, 1 instance) of 240 nodes from TimeScaleDB

Up to 15X improvement

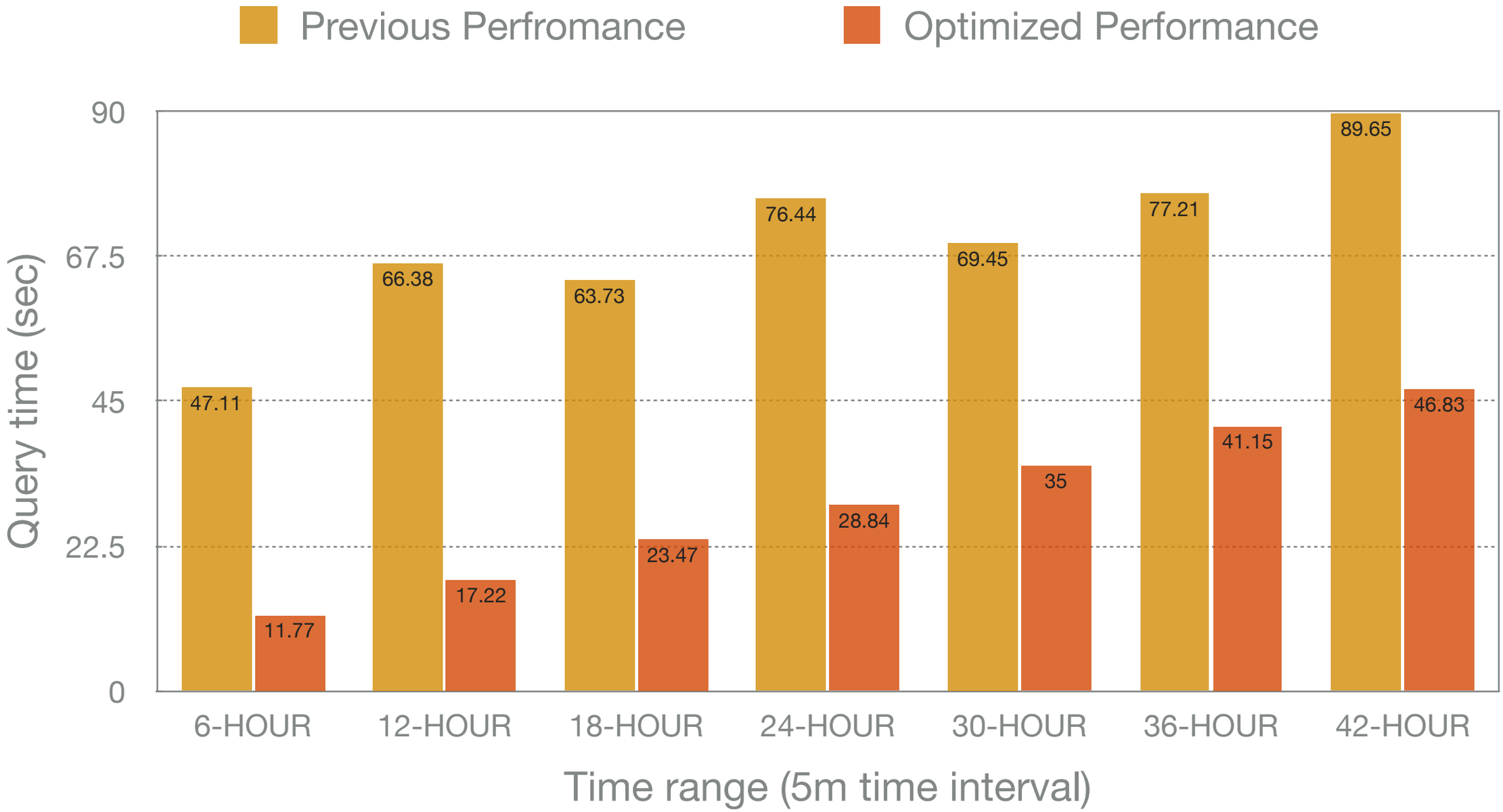
IMPROVEMENT



Query metrics (1 table, 8 instances) of 240 nodes from TimeScaleDB

Up to 6X improvement

IMPROVEMENT



Query metrics (1 table, 21 instances) of 240 nodes from TimeScaleDB

Up to 4X improvement

DISCUSSION

Previous SQL

```
SELECT time_bucket_gapfill('{interval}', timestamp) as time, {aggregate}(value)
from slurm.{metric} WHERE nodeid = {host_id} AND timestamp >= '{start}' AND
timestamp < '{end}' GROUP BY time ORDER BY time;
```

Optimized SQL

```
SELECT time_bucket_gapfill('{interval}', timestamp) as time, nodeid,
array_agg(jobs) as jobs, array_agg(cpus) as cpus from slurm.{metric} WHERE
timestamp >= '{start}' AND timestamp < '{end}' GROUP BY time, nodeid, jobs,
cpus ORDER BY time;
```

- The node id constraint in the SQL degrades the query performance
- Instead of filtering nodes by TimescaleDB, a better approach is to query all the data using only time constraints and then filter the nodes by ourself.

DISCUSSION

- The size of the collected data has reached to **2.8 T** (From March 17 to May 13), consuming **47.5%** of the data storage disk (5.9T) on Hugo.
- **the query overhead will increase** with the entire data size, even the query itself is the same.

https://medium.com/timescale/optimizing-queries-timescaledb-hypertables-with-partitions-postgresql-6366873a995d

QUESTIONS?/COMMENTS?