Oracle performance: Dual CPU Woodcrest versus Dual CPU Clovertown

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Hardware and Software Specification

Test machines:

- **Dual CPU Woodcrest (5140)**
  - 4 cores in total @ 2.33GHz
  - 8GB RAM
  - 160 GB NAS storage volume
  - RHEL4 (Nahant Update 4), x86_64
  - Oracle RDBMS 10.2.0.3, x86_64

- **Dual CPU Clovertown (E5345)**
  - 8 cores in total @ 2.33GHz
  - 16GB RAM (Oracle forced to use 8GB)
  - 160 GB NAS storage volume
  - RHEL4 (Nahant Update 4), x86_64
  - Oracle RDBMS 10.2.0.3, x86_64

Tests done:

- SecDB:

✓ data loading with SQL*Loader

✓ querying data with dbtop command

- Logical IO capacity measurements (LIOCM)
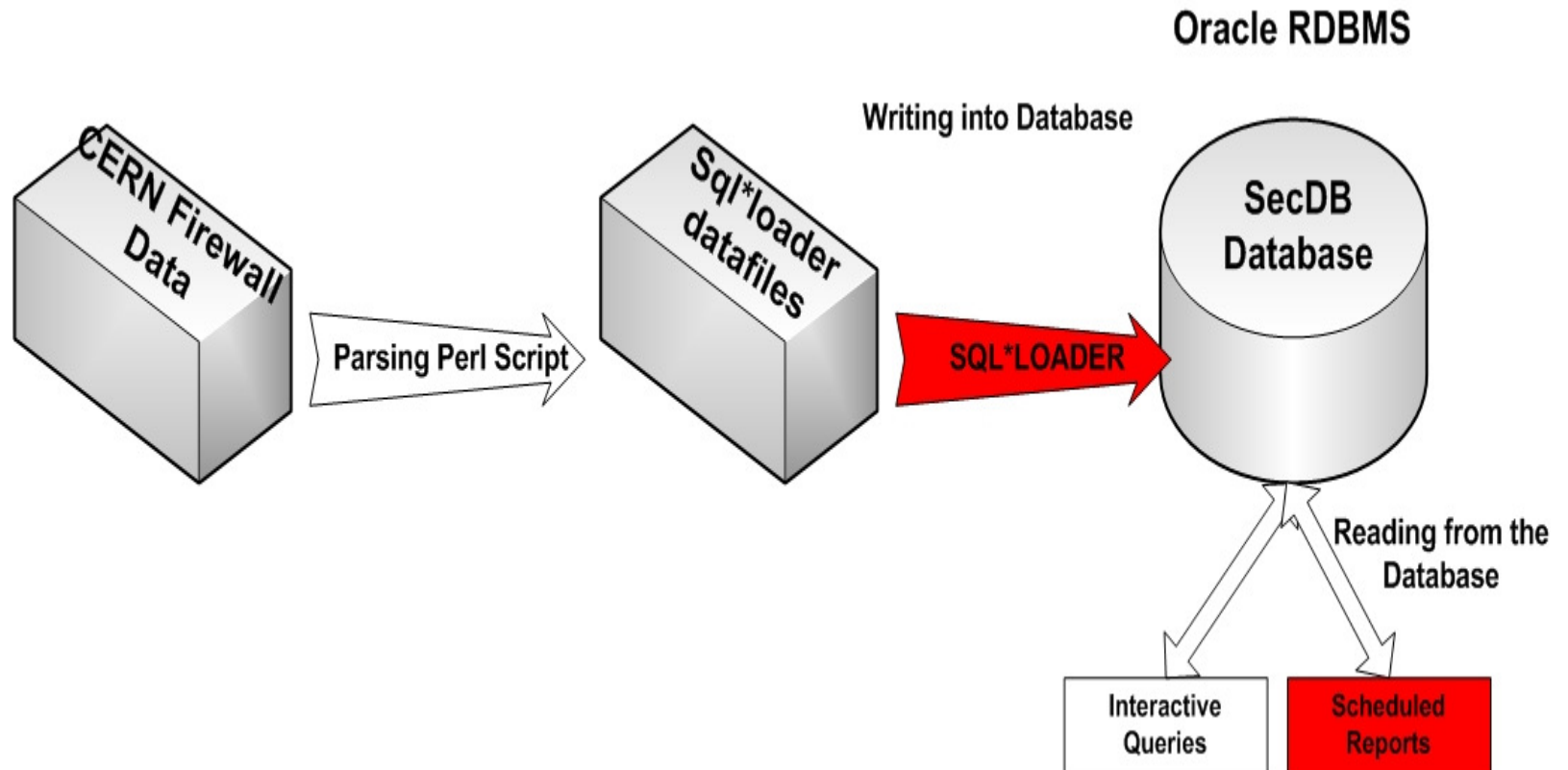
Security data warehousing application

SecDB - Security data warehousing application

✓ Developed and managed by Lionel Cons

✓ 3 types of workflow:

- Constant flow of data into the database (sqlldr)
- Large SQL reports/analysis (dbtop)
- Small interactive queries

Security data warehousing application
Schema

Oracle RDBMS

Writing into Database

CERN Firewall Data

Parsing Perl Script

Sql*loader datafiles

SQL*LOADER

SecDB Database

Reading from the Database

Interactive Queries

Scheduled Reports

SQL*Loader: test description

Test setup

- Approx. 25GB of firewall information imported
- Information files were stored on NAS volume
- Sqlldr was launched from a remote machine

Results/conclusions

- The load time for files varies for the machines, but there is no strong tendency in favour of one of the machines. This is due to fact that sqlldr used single thread.
- The total time difference for two machines is 8.5 minutes (1.7%) in favour of Clovertown.

SQL*Loader Test

Dbtop: test description
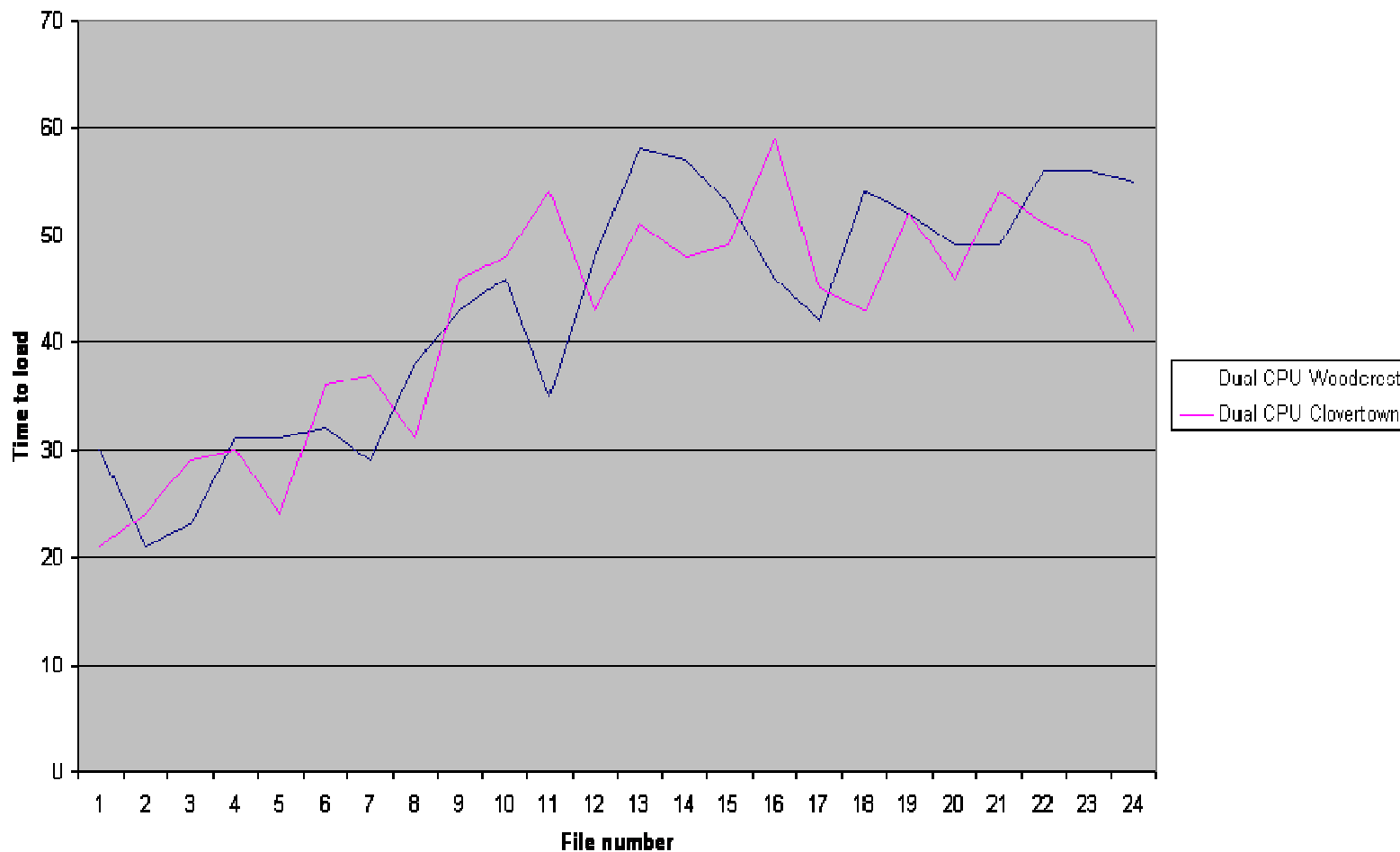
Test Setup

- dbtop command from SecDB toolkit showed to be very CPU bound, good for our test.

- First executions of the command took long time due to reading from disk big amount of data

- 4th and next executions showed identically fast results, generating huge load on CPU

- Bash script with 10x loop of dbtop command was used for the real test.

- WASSH was used for remote execution of the BASH script on the defined quantity of lxplus nodes (database clients)

dbtop: test results
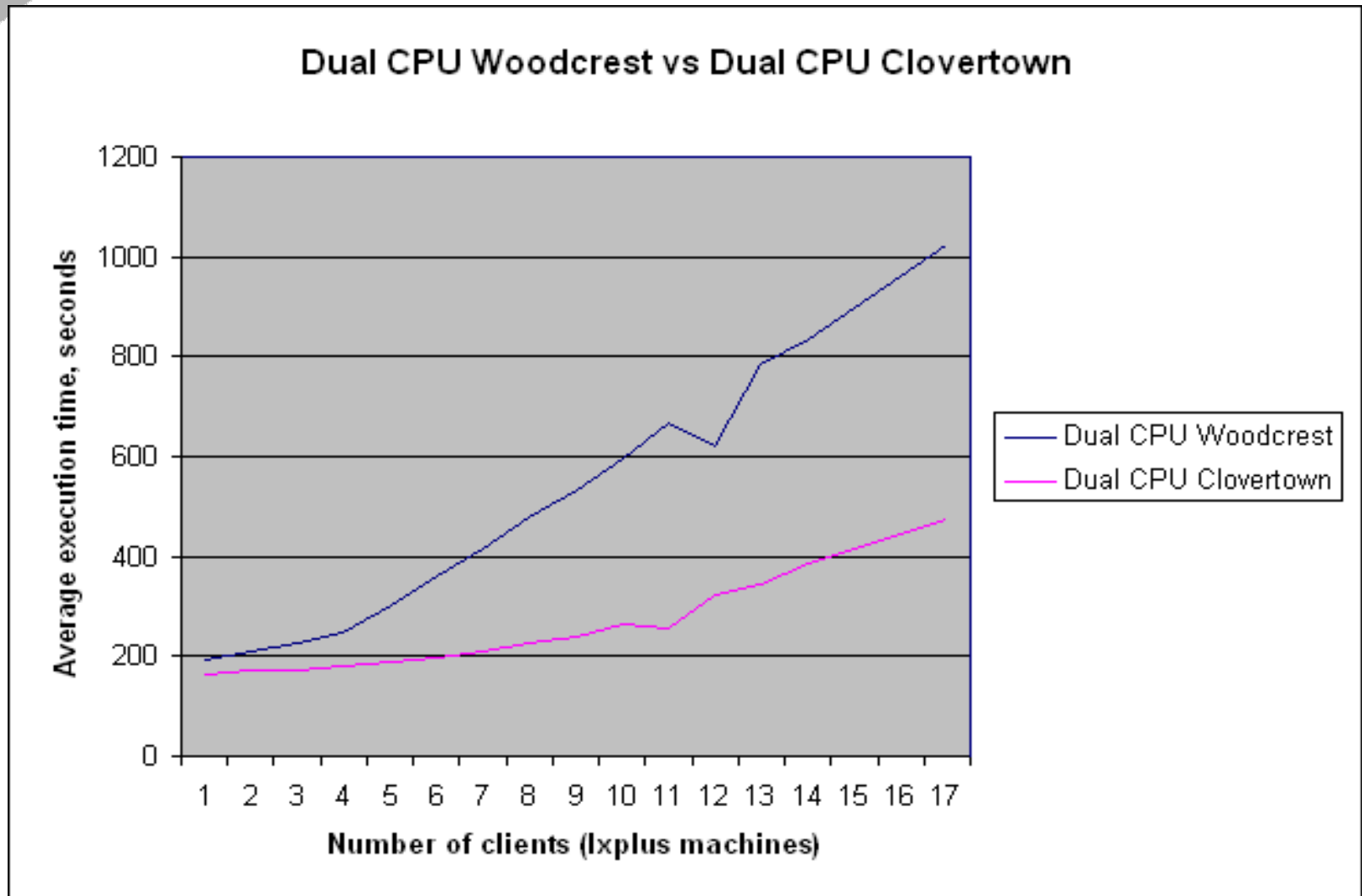
dbtop : Observations and conclusions

Observations:

- Both machines perform relatively identical up to 4 simultaneous dbtop executions
- Above 4 simultaneous executions Woodcrest machine is performing slower then Clovertown, which is an expected result
- Above 8 simultaneous executions, Clovertown showed twice slower increase trend in executing times when Woodcrest after 4
- The time increase trend after point 4 for Woodcrest and point 8 for Clovertown is almost stable.

Conclusions:

- For CPU intensive work dual CPU Clovertown with its 8 cores have big advantage over dual CPU Woodcrest.
- Oracle seems to utilize properly all available cores

LIOCM: test description

Test objectives:

- To measure logical IOPS done by oracle on Woodcrest and Clovertown machines as f(# of parallel threads,# of table rows)
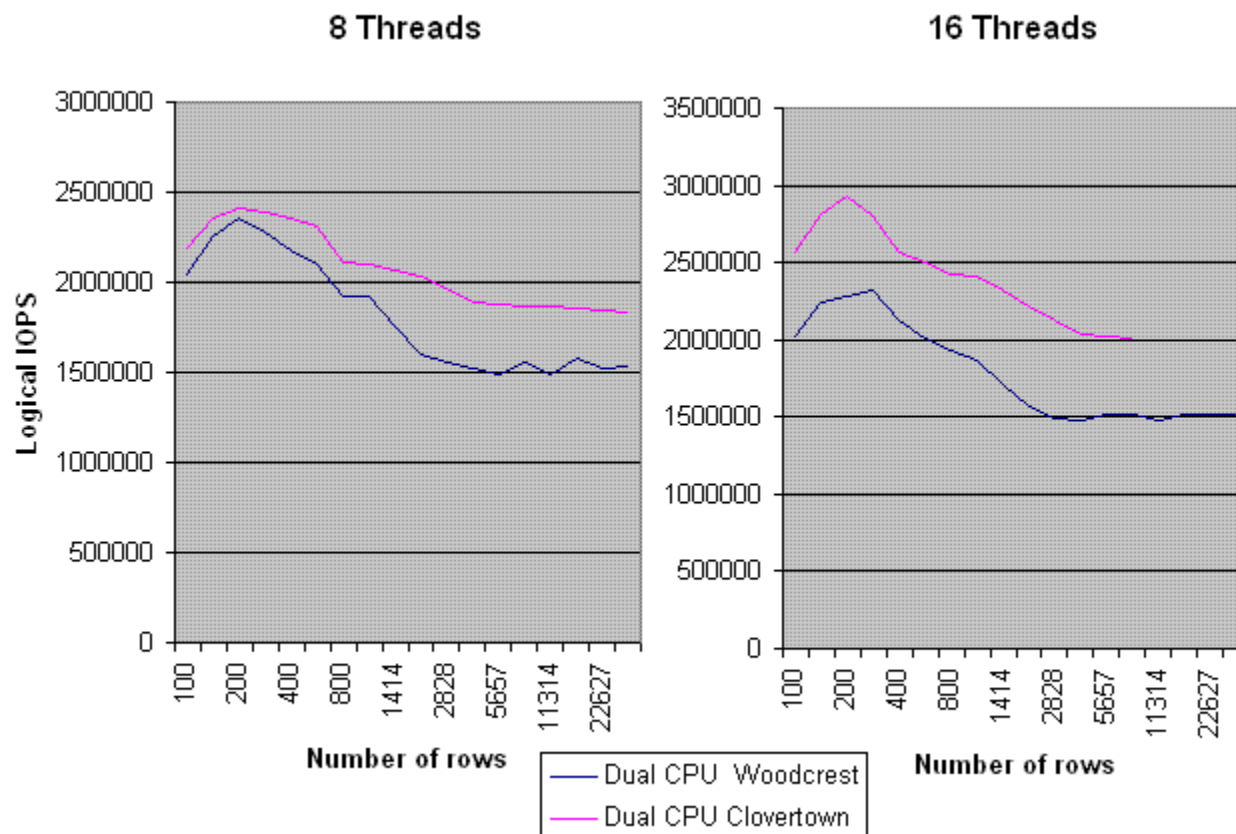- Logical IO is very CPU intensive, more cores should be an advantage.

Test setup:

- In-memory cached tables
- Row quantity varies from test to test (100-256000)
- 1 row = 1 block = 8KB
- Number of parallel thread varies from 1 to 16
- One table per thread, full table scan, 10 000 iterations
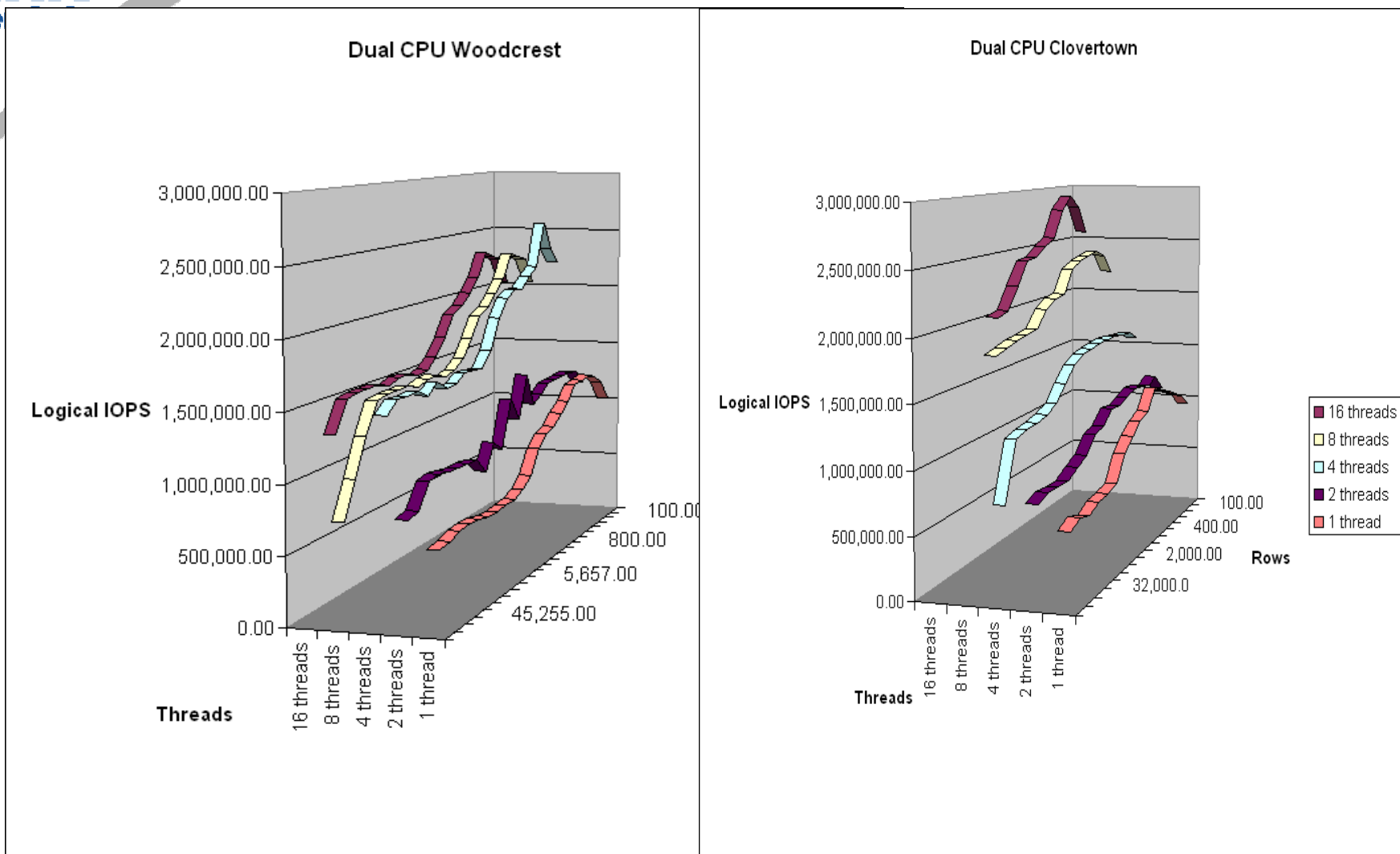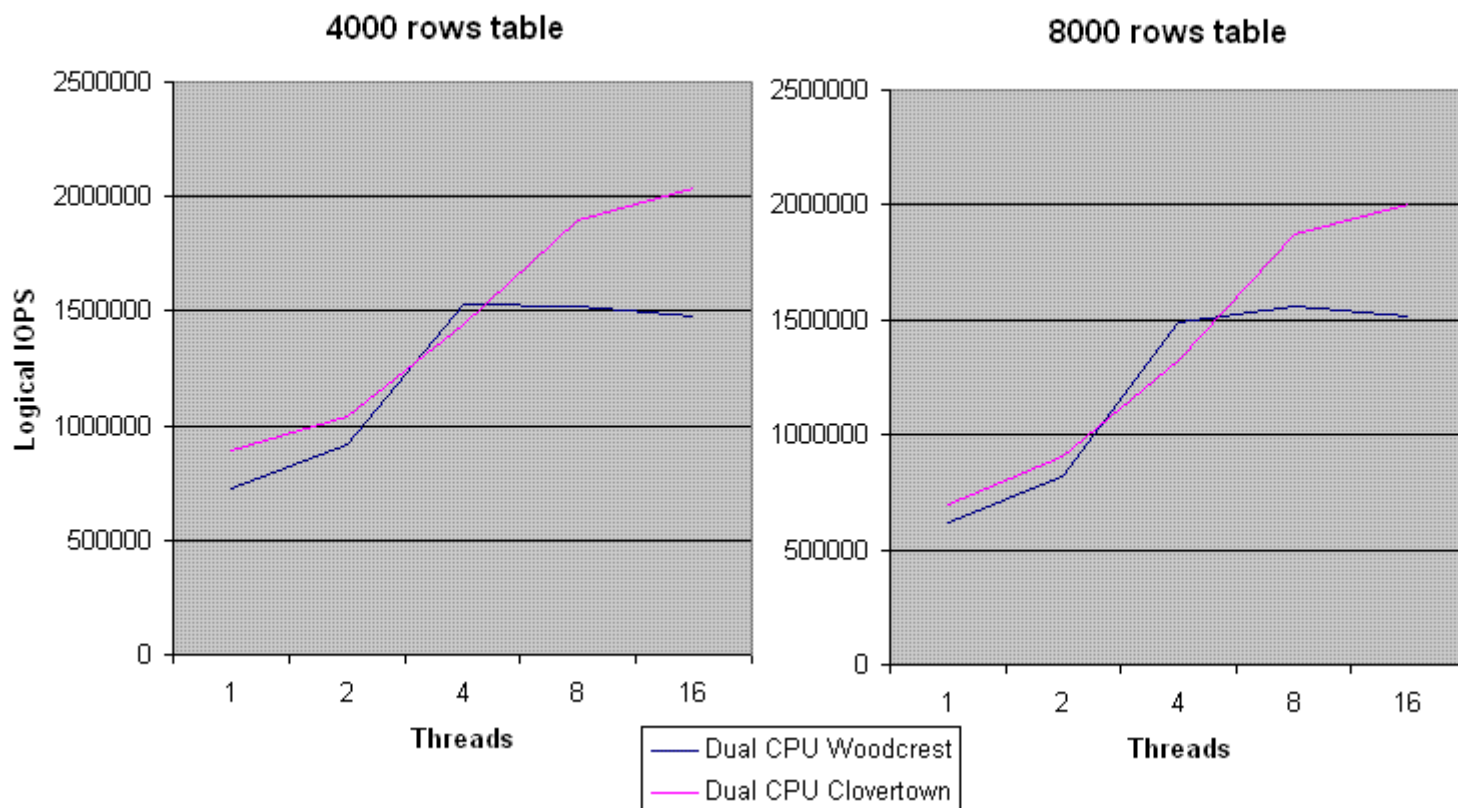
LIOCM: observations and conclusions

Observations:

- # threads influence on LIOPS: Woodcrest machine achieve it's maximum LIOPS capacity at around 4 threads point. Clovertown get's the maximum around 8 threads.

- # table rows influence on LIOPS: both machines achieve its maximum around 200 rows point, and then decrease. This is due to processor-level cache.

- For 16 threads case the Logical IO capacity difference between the machines is almost constant all the time, around 500k IOPS

Conclusions:

- The test proved that oracle utilizes all the cores available

- In general Clovertown gets 1/3 better Logical IO capacity

- The difference between 8 threads and 16 threads scenario shows that 8 threads are not enough to saturate the Clovertown CPUs, i.e. single test run does not utilize totally the core it is offered.

Q&A

Thank You!