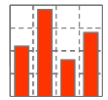
BENCHWARE

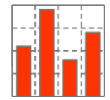


Introduction to OLTP Transaction (DBX) Performance Tests with Oracle

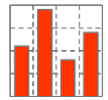
Technical Presentation

September 2014

Contents

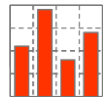


Why measure OLTP Transaction performance?



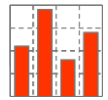
- Projects need understandable key performance metrics for capacity planning
  - OLTP transaction throughput
  - OLTP transaction service times
  - Number of physical I/O per transaction
  - Ratio of database size to buffer cache size
  - Buffer cache hit rate

What is measured?



- Typical Oracle SELECT and UPDATE transactions
- System throughput
  - Transactions per second [tps]
  - SQL service time [s]
  - REDO service time [s]
  - #physical reads per transaction
  - #logical reads per transaction
  - Buffer cache hit rate
- Scalability
  - Throughput per process for n = {1, 2, 4, 8, …, n}
- Efficiency of
  - All platform layers
  - Oracle buffer cache configuration

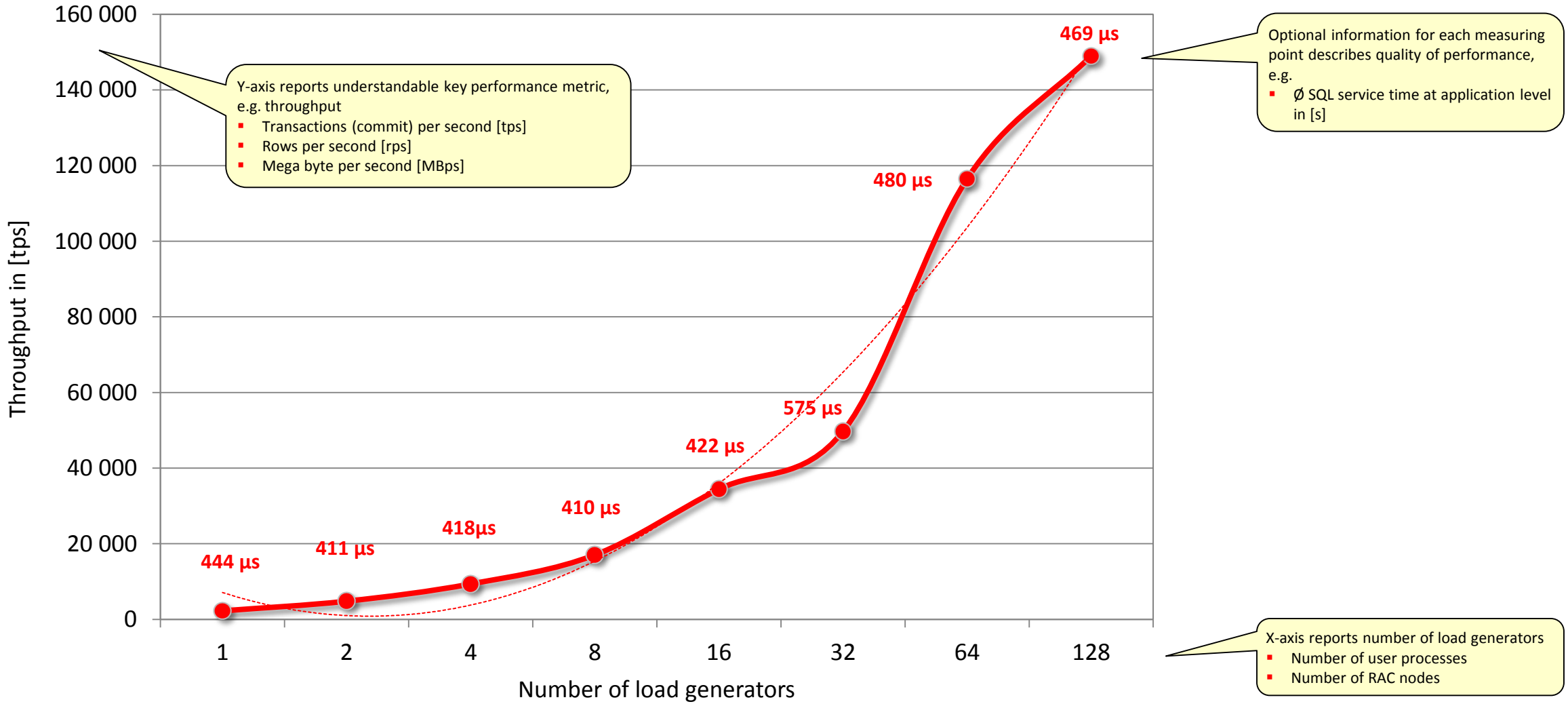
Overview of DBX performance tests with Benchware test codes



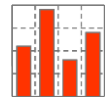
Database Performance OLTP Transactions 1 hit per transaction No think time between transactions	Test Code for DEFAULT Storage	Test Code for DB Flash Cache	Test Code for Cell Flash Cache
▪ Select transaction Returns 1 row per SQL statement	DBX-12	DBX-13	DBX-14
▪ Select transaction Returns Ø 25 rows per SQL statement			
▪ Update transaction Changes 1 row per transaction	DBX-22	DBX-23	DBX-24

Monitoring DBX performance tests

All load profiles from single process to saturation



Monitoring DBX performance tests



- Key Performance Metrics
  - Throughput in transactions per second [tps]
  - SQL service time in seconds [s]
  - Number of physical I/O per transaction

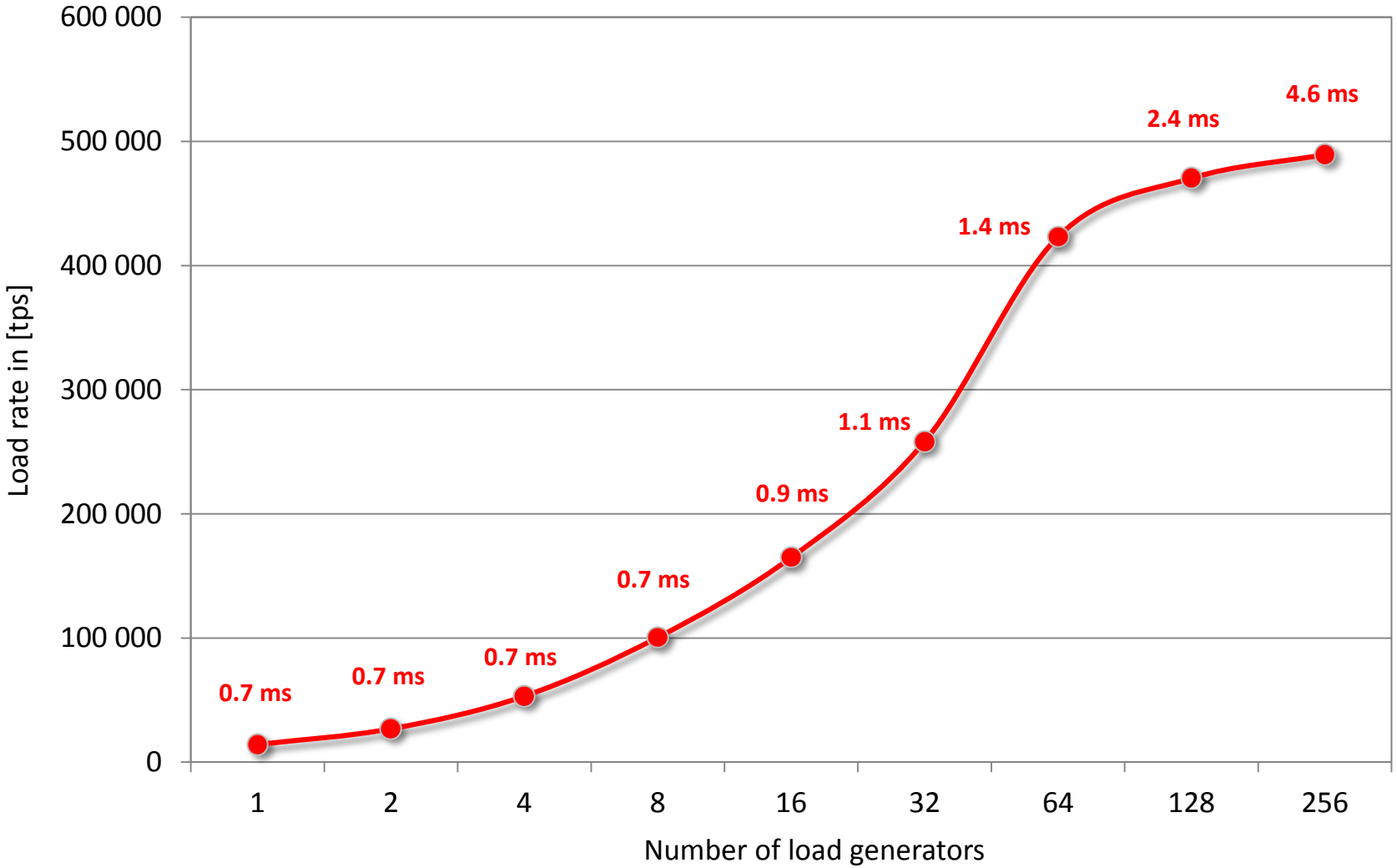
Ø SQL service time:
- Measured at application level

Run	Tst	Code	#N	#J	#T	CPU busy [%]	CPU sys [%]	Throughput rows/sec [rps]	Throughput txn/sec [tps]	SQL service time [s]	Physical read [iops]	Physical write [iops]	REDO write [iops]	Hitrate db flash [%]	Hitrate exa flash [%]	Physical read [MBps]	Physical write [MBps]	Elap time [s]
14	13	DBX-12	1	1	1	1	0	2.242E+03	2.242E+03	4.437E-04	1154	7	1	0	0	9	0	165
	14	DBX-12	1	2	1	2	0	4.800E+03	4.800E+03	4.113E-04	2434	7	1	0	0	19	0	185
	15	DBX-12	1	4	1	4	1	9.352E+03	9.352E+03	4.182E-04	4886	9	3	0	0	38	0	182
	16	DBX-12	1	8	1	7	1	1.702E+04	1.702E+04	4.104E-04	8949	6	1	0	0	70	0	200
	17	DBX-12	1	16	1	16	3	3.441E+04	3.441E+04	4.222E-04	17092	6	1	0	0	134	0	200
	18	DBX-12	1	32	1	37	9	4.970E+04	4.970E+04	5.749E-04	28491	7	1	0	0	223	0	201
	19	DBX-12	1	64	1	48	10	1.165E+05	1.165E+05	4.798E-04	76675	14	6	0	0	599	0	207
	20	DBX-12	1	128	1	79	20	1.490E+05	1.490E+05	7.144E-04	112684	11	4	0	0	880	0	213

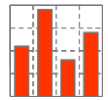
Throughput:
- In rows per second [rps]
- In transactions per second [tps] which is equal to #commit per second

Example of DBX performance test results

Database OLTP update performance, 1 row per transaction



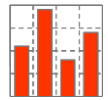
Example of DBX performance test results



Database OLTP update performance, 1 row per transaction

Run	Tst	Code	#N	#J	#T	CPU busy [%]	CPU sys [%]	Throughput rows/sec [rps]	Throughput txn/sec [tps]	SQL service time [s]	Physical read [iops]	Physical write [iops]	REDO write [iops]	Hitrate db flash [%]	Hitrate exa flash [%]	Physical read [MBps]	Physical write [MBps]	Elap time [s]
16	11	DBX-22	1	1	1	2	1	1.421E+03	1.421E+03	6.982E-04	1291	3240	1262	0	0	10	13	183
	12	DBX-22	1	2	1	4	1	2.688E+03	2.688E+03	7.285E-04	2630	6528	2050	0	0	21	26	186
	13	DBX-22	1	4	1	7	2	5.319E+03	5.319E+03	7.123E-04	4885	9475	2168	0	0	38	51	188
	14	DBX-22	1	8	1	13	4	1.005E+04	1.005E+04	7.534E-04	8940	15071	1994	0	0	70	94	189
	15	DBX-22	1	16	1	26	9	1.649E+04	1.649E+04	9.140E-04	14329	20967	1361	0	0	112	157	188
	16	DBX-22	1	32	1	41	14	2.582E+04	2.582E+04	1.151E-03	22200	29270	795	0	0	173	248	189
	17	DBX-22	1	64	1	40	12	4.232E+04	4.232E+04	1.403E-03	32832	44619	323	0	0	257	409	190
	18	DBX-22	1	128	1	48	14	4.704E+04	4.704E+04	2.435E-03	37464	41566	161	0	0	293	412	196
	19	DBX-22	1	196	1	58	16	4.943E+04	4.943E+04	3.486E-03	38738	40952	116	0	0	303	414	227
	20	DBX-22	1	256	1	62	17	4.894E+04	4.894E+04	4.560E-03	39380	40566	112	0	0	308	410	235

Summary



Reviewing Database OLTP Transaction (DBX) Performance

- Database OLTP performance is important for all kind of applications
  - ERP
  - CRM
  - Core Banking
  - . . .
- Benchware proofs real world database transaction performance for Oracle databases and deliver representative key performance metrics for capacity planning
  - Transaction throughput for different transaction profiles
  - Transaction service time

swiss precision in performance measurement

www.benchware.ch

info@benchware.ch