peakmarks® Executive Summary

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The peakmarks® Software is a powerful tool that quickly and accurately identifies key performance metrics for database services, whether hosted on-premises or in the cloud. These performance metrics serve as a solid foundation for

- **Evaluations.** Performance metrics evaluate the price/performance of various database platforms, technologies, components, and configurations.
- **Capacity planning.**
- **License cost optimization** by identifying the optimal infrastructure components.
- **Quality assurance.** Database service is regularly audited for its performance specifications.

peakmarks® Software is a comprehensive tool that covers over 30 workloads. peakmarks® is updated regularly to support new Oracle versions and technologies, distinguishing it from open-source tools. A detailed analysis of each workload is presented in a PowerPoint presentation, and AWR reports are also provided for a thorough performance evaluation. This report summarizes the most important key performance metrics for the decision-maker's convenience.

Database Service – peakmarks Reference System

Platform	Database Server	Storage Server	Database	peakmarks® Software
Oracle Exadata X7-2 Elastic Configuration - 2 x Exadata X7 database servers - 3 x Exadata X8 storage servers	2 x Exadata X7 Database Server (launch 2017), each - Intel Xeon 8160, 2.1 – 3.7 GHz - 2 sockets, 48 cores, 96 threads - 786 GByte DDR4 2.6 GHz - PCI Gen 3	3 x Exadata X8 Storage Server High Capacity (launch 2018), each - 12 x 14 = 168 TByte HDD (raw) - 4 x 6.4 = 25.6 TByte flash cache - ASM normal redundancy	Oracle 19.25 EE - db block size 8 kByte - 384 GByte buffer cache - data guard off - archiving off - encryption off	Version 10.3 - Build 250225 - database size 2 x 4 TByte

peakmarks® Key Performance Metrics for platform components in database operations

Category	Key Performance Metric	Throughput		Response time		peakmarks® Workload
Server System All accessed data is stored entirely in the database buffer cache. No I/O operations.	Throughput of mixed queries and scans	419,577	qps	0.226 - 0.452	ms	SRV-MIXED2
	Throughput logical reads	62,028,345	dbps	-		SRV-REPORT
	Buffer cache scans	268,260	MBps	-		SRV-SCAN
Category	Key Performance Metric	Throughput		Service time		peakmarks® Workload
Storage System Database SQL statements generate all I/O operations.	SQL sequential I/O throughput	11,014	MBps	-		STO-READ
	SQL sequential I/O throughput - using smart scan	74,308	MBps	-		STO-OFFLOAD
	SQL random read throughput - 100% read	744,351	IOPS	< 500	µs	STO-RANDOM
	SQL random read throughput - 80% read	584,805	IOPS	< 500	µs	STO-RANDOM
	SQL random write throughput	450,846	dbps	-		STO-SCATTER

peakmarks® Key Performance Metrics for critical database background processes

Category	Key Performance Metric	Throughput		Latency		peakmarks® Workload
Log Writer (LGWR)	Commit throughput and latency for small transactions, 1 kByte REDO	213,423	tps	1.341	ms	LGWR-LAT (1)
	Log writer throughput	1,160	MBps	-		LGWR-THR
Category	Key Performance Metric	Throughput				peakmarks® Workload
Database Writer (DBWR)	Database writer throughput	477,177	dbps	-		DBWR-THR

Abbreviations and metrics:

[qps]	queries per second	[dbps]	database blocks per second	[µs]	microseconds
[tps]	transactions per second	[rps]	rows per second	[ms]	milliseconds
[ops]	operations/executions per second	[rpt]	rows per transaction	[s]	seconds
[IOPS]	I/O operations per second	[MBps]	megabyte per second		

peakmarks® Key Performance Metrics for representative database operations

Category	Key Performance Metric	Throughput		Throughput		peakmarks® Workload
Data Load	Throughput transactional data load - using the buffer cache, 5 rpt	136	MBps	474,629	rps	DL-BUFFER
	Throughput data warehouse data load - bypassing the buffer cache	1,700	MBps	5,942,711	rps	DL-DIRECT
Category	Key Performance Metric	Throughput		Throughput		peakmarks® Workload
Data Analytics	Throughput data scan - using the storage system	11,739	MBps	37,983,509	rps	DA-STORAGE
	Throughput data scan - using smart scan	70,991	MBps	208,729,455	rps	DA-OFFLOAD
	Throughput data scan - using row store	264,356	MBps	874,444,473	rps	DA-ROWSTORE
	Throughput data scan - using column store	47,732,367	MBps	139,168,917,647	rps	DA-COLSTORE
Category	Key Performance Metric	Throughput		Response time		peakmarks® Workload
Transaction Processing	Read-intensive OLTP operations - throughput and response time	7,951	tps	11.985	ms	TP-MIXED1
	Write-intensive OLTP operations - throughput and response time	6,982	tps	13.624	ms	TP-MIXED2

peakmarks® Key Performance Metrics for PL/SQL application programs

Category	Key Performance Metric	Throughput		Elapsed time		peakmarks® Workload
Stored PL/SQL Application Programs	Throughput of mixed PL/SQL operations	750.50	Mops	-		PLS-MIXED2
	Execution time prime number (n = 8000), data type NUMBER	-		83	s	PLS-PRIME

Abbreviations and metrics:

[qps]	queries per second	[dbps]	database blocks per second	[μs]	microseconds
[tps]	transactions per second	[rps]	rows per second	[ms]	milliseconds
[ops]	operations/executions per second	[rpt]	rows per transaction	[s]	seconds
[IOPS]	I/O operations per second	[MBps]	megabyte per second		