VIRTUAL INSTRUMENTS

INFO SHEET
ORACLE WORKLOADS

Modeling Oracle Workloads

An example of how to test and validate Oracle database application performance in a pre-production environment

WorkloadWisdom combines a storage workload modeling application, WorkloadWisdom, with a purpose-built load generator to help storage architects and engineers to accurately characterize storage performance. In this info sheet, we'll explain how we modeled a customer's Oracle-based application workload.

Production workloads are modeled in order to accurately run tests to measure items such as IOPS, throughput and latency. Once baselined, the user can tweak the workload profile to find sweet spots and blind spots, quantify array performance headroom, compare performance of different arrays, and even find the best combination of tiers on which to run your application(s).

Extracting the data and building the logic

The challenge with database applications is that they do not present a single I/O profile, so one must create a model that emulates several profiles. In this example, the first step was extracting the I/O profiling data from the actual customer's Oracle-based application. This was captured using the vendor's standard storage monitoring tool, EMC's Unisphere. We created a simple spreadsheet which represented each LUN and its I/O profile. As shown in Figure 1 below, each color-coded line represents LUNs with common metrics. The blue row represents database LUNs with similar I/O profiles while the green database row/ LUN has a much larger block size. The pink row represents redo logs, which are heavily write intensive, and grey are miscellaneous services. This is a condensed version of what began as several LUNs. We now have our guide.

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> *Aggregation of results is our enemy. We want to see results from individual components as they all have differing effects and interactions on a storage array. With WorkloadWisdom we can trace, track, and compare anything — all the protocol-level details we want.*
>
> **Steve Downer**
> TEST ENGINEERING DIRECTOR
> ORACLE

Name	Host IOs/sec	%Writes	%Reads	Avg I/O Size	Capacity (GB)	%RR	%SR	%RW	%SW
dbf	**2395.5**	7.38	92.62	**30.90**	213.60	**87**	**6**	**7**	**0**
22df	**201.4**	1.5	98.5	**237**	256	**94**	**4**	**1**	**0**
redo	**138.3**	95.25	1.75	**21**	32	**2**	**0**	**89**	**9**
other	**10.6**	68.2	31.8	**120.7**	99.7	**30**	**1**	**65**	**4**

Figure 1. Consolidated I/O metrics representing different Oracle database LUNs.

Constructing the model in WorkloadWisdom

The Composite Workload feature of WorkloadWisdom is used to construct the model. The first step is to build a workload for each of the 4 rows in our above table. These workloads represent the common DB LUNs, the LUN with the outsize block size, the redo log LUNs and the misc. services LUNs. For each line of the table/workload, we specified the access pattern (read/writes), % random or sequential for reads/writes, block size distribution for reads/writes, MPIO policy, and the load as defined by actions/second and number of LUNs. We then built a Composite Workload as diagrammed in Figure 2.

The clients on the left represent two ports on the WorkloadWisdom Workload Generator, to correspond to the two server connections used in the production environment. A "workload" box was opened up for each and the workload type was specified that corresponds to the 4 services on the right. Finally, the composite workload was executed on the WorkloadWisdom Workload Generator.

Results

After profiling and modeling the Oracle database, performance statistics are now available including throughput and latency, in a pre-production test lab environment that accurately emulates the customer's production application. The customer can then tweak the numbers to find where potential bottlenecks might occur as the application grows, or as changes are made to the infrastructure. They can also execute the workload on a different array or different configuration and easily compare performance.

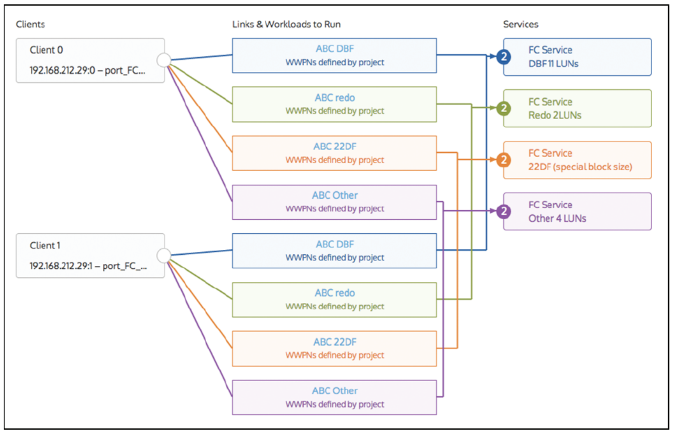

Figure 2. The Oracle database test configuration using the Composite Workloads feature in WorkloadWisdom.

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