



# RED HAT ENTERPRISE VIRTUALIZATION: SCALING ORACLE DATABASE

## EXECUTIVE SUMMARY

### The goal

Determine the scalability of Oracle database workloads running on the Red Hat Enterprise Virtualization platform by running an Oracle Online Transaction Processing (OLTP) workload across different scenarios.

### Why should I care?

OLTP is a common database implementation exercising both the memory and I/O subsystems of virtual machines. Good performance on this test means good performance for your database applications running on Red Hat Enterprise Virtualization.

### WHAT WAS TESTED?

|  |
|--|
| OLTP WORKLOAD  |
| ORACLE 10g   |
| RED HAT ENTERPRISE LINUX 5.3 GUEST                               |
| RED HAT ENTERPRISE LINUX 5.4<br>(WITH INTEGRATED KVM HYPERVISOR) |
| HP PROLIANT DL370 G6<br>(INTEL XEON W5580-NEHALEM)               |

### What was the result?

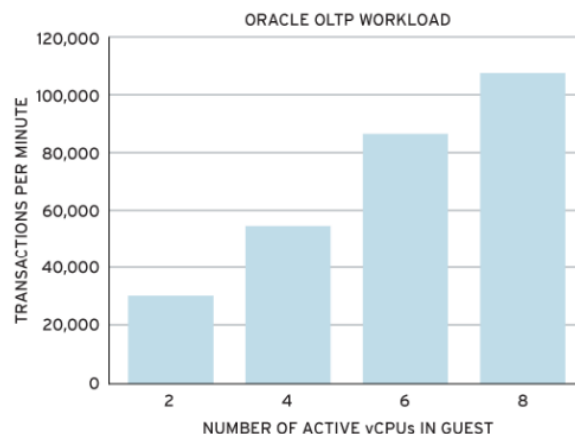
Red Hat Enterprise Virtualization scaled nearly linearly in all configurations tested, with low overhead costs of virtualizing multiple hosts and multiple virtual CPUs. **Oracle workload performance on Red Hat Enterprise Virtualization scaled equally well in increasing numbers of virtual machines/hosts and numbers of vCPUs/guests.** Red Hat Enterprise Virtualization affords architectural flexibility in deploying virtualized Oracle workloads.

## ORACLE DATABASE AT UP TO 93% OF BARE METAL PERFORMANCE, GOOD SCALABILITY

The performance of Oracle database workloads was measured on Red Hat Enterprise Virtualization running on a two-socket Intel Nehalem server with 16 logical CPUs. Red Hat Enterprise Virtualization exhibited excellent scaling and performance across multiple configurations.

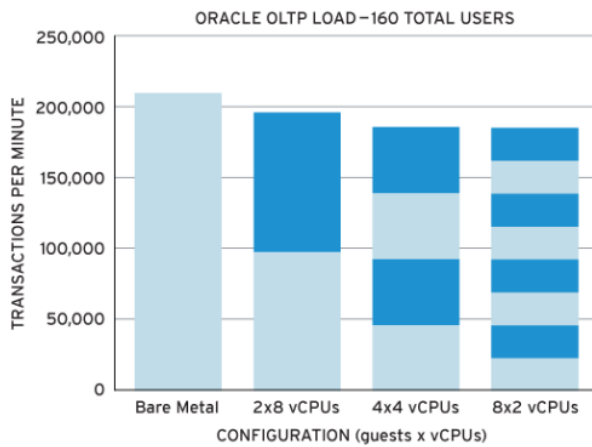
Scale-up of a single VM with 2, 4, 6, or 8 vCPUs yields good scaling. As vCPUs are added, throughput per vCPU decreases slightly due to I/O contention, lock management, and virtualization overhead. Scaling up multiple VMs with multiple vCPUs on a single host also exhibits good scaling.

### SCALING vCPUS AND MEMORY ON A SINGLE GUEST



Scale-out of multiple virtual guests on a single host shows 90-93% of bare metal performance on the same host and almost no difference between scaled-up and scaled-out virtual machines, reflecting Oracle's suitability for either architectural strategy.

## VIRTUALIZATION EFFICIENCY: CONSOLIDATION



### WHAT WAS THE GOAL?

Red Hat tested the performance of Oracle database workloads on Red Hat Enterprise Virtualization. Red Hat chose an Oracle Online Transaction Processing (OLTP) workload, a popular type of workload for database servers, as the target for its performance testing. The results of Red Hat's Oracle testing are scalability and performance measurements that are relevant for Oracle database workloads that provide insights into sizing and configuration of infrastructure for relational database virtual hosting.

### WHAT WAS TESTED?

The OLTP workload emulates a common database workload that typically taxes both the memory and the I/O subsystems of database servers.

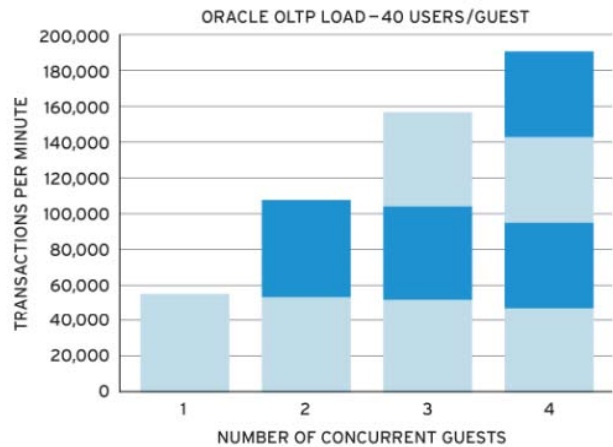
### Scaling up the VMs

First, the performance of the OLTP workload was measured by loading a single VM on the server, and assigning it 2, 4, 6, or 8 vCPUs in the VM with 2.5 GB memory for each vCPU. As shown in the graph "Scaling vCPUs and Memory on a Single Guest" above, the total throughput increases, although the throughput per vCPU decreases slightly as vCPUs are added as a result of I/O contention, distributed lock management, and virtualization overhead.

### Scaling out the VMs

A second series of tests involved scaling out multiple VMs of 2, 4, or 8 vCPUs with 2.5 GB memory per vCPU. The performance of the OLTP workload shows good scalability as shown in the graph below.

## SCALING MULTIPLE 4-vCPU GUESTS





### **Oracle workloads show good consolidation efficiency and performance versus bare metal**

As shown in the graph "Virtualization Efficiency: Consolidation," the Oracle workload scales up (high number of vCPUs per guest) and out (high number of guests with same number of vCPUs) equally well on Red Hat Enterprise Virtualization, giving users added architectural flexibility.

#### **WHAT NEXT?**

For more information, visit: [redhat.com/rhev/server](https://redhat.com/rhev/server) or contact your local Red Hat Enterprise Virtualization reseller.



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