RED HAT ENTERPRISE VIRTUALIZATION: SCALING JAVA APPLICATIONS

EXECUTIVE SUMMARY

The goal

Determine the scalability of Java applications running on the Red Hat® Enterprise Virtualization platform by running a simulated Java workload across different scenarios.

Why should I care?

This test simulates the performance of three-tier, server-based Java applications. Good performance on this test means good performance for your Java applications running on Red Hat Enterprise Virtualization.

What was tested?

JAVA WORKLOAD
JAVA VIRTUAL MACHINE
MICROSOFT WINDOWS SERVER 2008 R2 RC
RED HAT ENTERPRISE LINUX 5.4 (WITH INTEGRATED KVM HYPERVISOR)
DELL POWEREDGE R710 (INTEL XEON X5550 - NEHALEM)

What was the result?

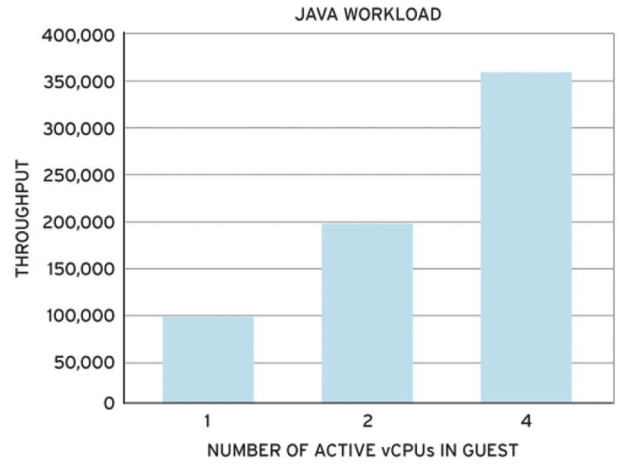
Red Hat Enterprise Virtualization scaled nearly linearly in all configurations tested, with low overhead costs of virtualizing multiple hosts and multiple virtual CPUs. Java application performance on Red Hat Enterprise Virtualization scaled equally well in increasing numbers of virtual machines/hosts and numbers of vCPUs/guests. Red Hat Enterprise Virtualization affords architectural flexibility in deploying Java server-based virtualization applications.

JAVA APPLICATIONS AT UP TO 92% OF BARE METAL PERFORMANCE, NEAR LINEAR SCALABILITY

The performance of Java applications 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.

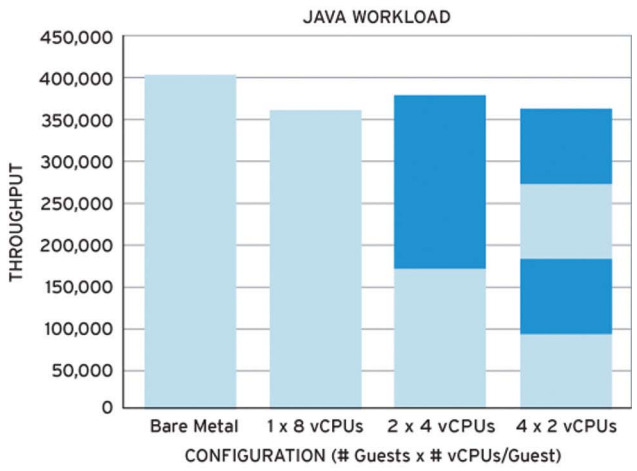
Scale-up of a single VM with 2, 4, or 8 vCPUs yields near-linear scaling (90-99%). Scaling up multiple VMs with multiple vCPUs on a single host also exhibits near-linear scaling (95-105%).

SCALING vCPUs AND MEMORY ON A SINGLE GUEST



Scale-out of multiple virtual guests on a single host shows 89-93% of bare metal performance on the same host and virtually no difference between scaled-up and scaled-out virtual machines, reflecting Java's suitability for either architectural strategy.

VIRTUALIZATION EFFICIENCY: CONSOLIDATION



WHAT WAS THE GOAL?

Red Hat tested the performance of Java applications hosted on Red Hat Enterprise Virtualization. Red Hat chose a popular benchmark for testing the performance of server-side Java as the target for its performance testing. The results of Red Hat's Java testing are scalability and performance measurements that are relevant for Java applications that provide insights into sizing and configuration of infrastructure for Java application virtual hosting.

WHAT WAS TESTED?

Red Hat tested a simulated three-tier Java application with business logic and object manipulation predominating the load. Clients are database-simulated with increasing amounts of workload applied to simulate real-world application loads.

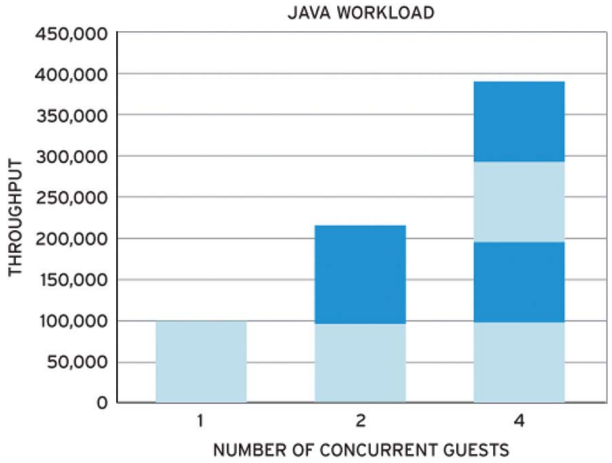
Scaling up the VMs

First, the performance of the Java workload was measured by loading a single VM on the server and assigning it 2, 4, or 8 vCPUs in the VM with 3 GB memory for each vCPU. As shown in the graph "Scaling vCPUs and Memory of a Single Guest" above, the performance scales linearly from 2 to 4 vCPU guests, and then scales slightly less than linearly from 4 to 8 vCPUs as a result of the increased Java workload saturating the memory bandwidth of the host.

Scaling out the VMs

A second series of tests involved scaling out multiple VMs of 2 or 4 vCPUs with 3 GB memory per vCPU. The performance of the Java workload shows linear scalability across 2-vCPU and 4-vCPU scale-out as shown in the graph below.

SCALING MULTIPLE 2-vCPU GUESTS



Java applications scale up and out on RHEV

As shown in the graph "Virtualization Efficiency: Consolidation," Java applications scale 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** or contact your local Red Hat Enterprise Virtualization reseller.

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