Network Data Center Performance Tests

The Impact of Virtualization on Telecom Applications

Virtualization Brings Simplicity, Efficiency, Agility and Security to Data Centers

Many companies are looking to evovle their data centers into the next generation, with lower material and operating costs, 24/7 availability, automation and simplicity, while ensuring the best security level. Along with power and cooling, automation, and security, virtualization is a key element in this transformation.

The Virtualization Services Market Segment

Between 2006 and 2011, IDC forecasts companies will invest more than 40 percent of their annual data center budgets in services linked to virtualization in the x86 market segment. This figure will grow from $5.5 billion in 2006 to $11.7 billion by 2011.[1]

According to this report, systems integration and IT consulting shares will be the fastest growing budget segments. On the other hand, the hardware support services share will decrease.

This opens ways to the big systems integrators that are able to demonstrate those skills.

HP & Intel's Approach to Virtualization

To help companies gain the benefits of virtualization in their data centers, HP has built an Adapted Infrastructure Offering that includes the Network Data Center initiative to help telecoms migrate their data centers to the next generation.

HP's Virtualization Portfolio combines expertise and technology, including servers, blades, storage, operating software, and services, currently resulting in a 60 percent growth rate in sales: Servers include the latest Intel® Xeon® processors with Intel® Virtualization Technology (Intel® VT), which increases performance and helps Intel and HP's network companies develop their virtualization applications.

HP's software allows management of both physical and virtual resources with a single tool. HP's services help customers assess their infrastructures, determine if a virtualization project will help, and then tailor a solution to the specific business needs. HP and Intel are helping customers choose the server virtualization solutions that best fit their organizations' needs, working with them every step of the way to ensure the best outcome.

Virtualization and Telecommunications

Although many SMEs and enterprise IT companies have started on their virtualization journey, some fears and questions remain for telecoms, preventing them from trying virtualization and enjoying its benefits.

Telecommunications companies can have many questions about implementing virtualization:

What actions should we take? How should we plan them? What are the pitfalls to avoid? Aren't the initial investments (materials, associated, maintenance, and training costs) too heavy? Can all applications be virtualized, even the I/O-intensive ones? Will people and processes ever adapt to the two levels of operation (virtual and physical) and to the pooling and sharing of resources? Will virtualization have a heavy impact on system performances? When can carrier workloads be virtualized?

Since telecom applications are robust and mission-critical, any problem in the new infrastructure could translate into massive -and unacceptable- service interruption for subscribers. To discover the impact of virtualization on system performance, HP and Intel decided to conduct a benchmark at the EMEA HP Intel Solution Center facilities.

[1] [IDC, 2007. "The Impact of Virtualization Within the Services Market"]

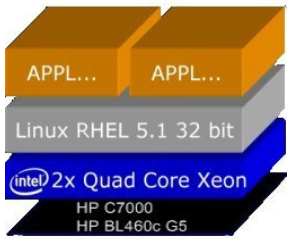
Benchmark Description

The main objective of this benchmark was to compare the performances of a reference platform, called "native Linux", with a virtualized solution running on the same hardware. The same two applications were running on top of the two architectures.

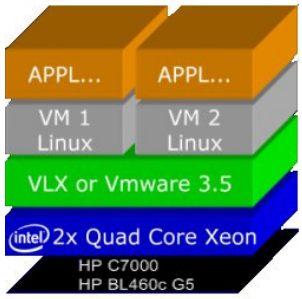
To insure consistency between the two testing environments, every application on both native Linux and the virtual machines ran on quad-core Intel® Xeon® processors so that any difference in system performance would only be a consequence of the virtualization layer.

Two virtualization software providers participated in the benchmark:

1. VirtualLogix, telecom and real time system-oriented, is an affiliate member of the Intel® Communications Alliance, a community of communications and embedded developers as well as solutions providers
2. VMware, public and data-oriented, is the leader in virtualization applications. It is an HP partner.



Native Linux



Virtual machines

The tests used different benchmark tools to stress the native platform and the virtualization solutions, and were conducted at different levels:

Primitive tests:
- CPU only (OpenSSL- encryption)
- CPU + memory (SPECint, SPECft, SPECjbb))

Advanced tests to simulate a telecom environment:
- Java SIP stack: CPU + memory + network
- Network database: DB transactions per second
- Layer 3 forwarding: Network I/O

Results

For primitive tests, the impact of the virtualization layer was less than 10 percent. For advanced tests, the overhead due to the virtualization layer ranged between 10 and 20 percent.

Nevertheless, HP and Intel's virtualization software providers have proven that the virtualization layer can be customized depending on the application needs of the customers (I/O intensity for example).

Conclusion

Our tests were very intensively focused on resources, reaching the system's resource limitations. Given that real telecom applications deployments are designed to avoid reaching these limits, customers may see even better results.

Today the virtualization solutions tested are stable and mature enough to host telecom applications, bringing confidence in virtualization solutions in the telecom market segment.

HP & Intel Key hardware components

HP BladeSystem c7000 Enclosure

The BladeSystem c7000 enclosure provides all the power, cooling, and I/O infrastructure needed to support modular server, interconnect, and storage components today and throughout the next several years. The enclosure is10U high and holds up to 16 server and/or storage blades plus optional redundant network and storage interconnect modules.

Intel® Virtualization Technology

Intel® Virturalization Technology is a processor hardware enhancement that assists virtualization software, enabling more efficient virtualization solutions and greater capabilities including 64-bit guest operating system support. The quad-core Intel® Xeon® processor 5300 series includes new Intel® VT extensions around interrupt handling that will further optimize virtualization software efficiency.

Intel Xeon processors

The Intel Xeon processor 5300 series is built with 45nm enhanced Intel® Core™ micro-architecture with up to eight cores in a two-processor configuration. The Intel Core micro-architecture delivers more performance in the same platforms and at the same power consumption, giving customers the flexibility to match performance, power, and cost with their unique requirements and delivering advantages beyond just pure performance.

The HP Intel Solution Centers provide complete telecom infrastructures for demonstrating the Communications Media and Entertainment Solution Portfolio to HP customers and partners. The centers are located in three cities: Grenoble, France; Richardson, Texas, USA; and Shanghai, China. These unrivalled technical facilities offer our customers and partners, the unique opportunity to evaluate new services in real-world environments, test new technologies and select the solutions most likely to succeed.

Technology for better business outcomes

For more information, visit http://www.hpintelco.net