

Neusoft Telecom BSS Virtualized Application Performance on the Intel® Xeon® Processor 7500 Series using VMware vSphere* 4



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Neusoft Telecom BSS application on Intel® Xeon® processor 7500^A series-based servers in a virtualized environment

Neusoft is the leading IT solutions and services provider in China. The Neusoft Telecom BSS (Business Support System) application is a traditional BSS solution targeting large-scale telecom operators. This paper discusses how Intel and Neusoft took advantage of the performance and scalability of Intel® Xeon® processor 7500 series-based servers to address some of the critical challenges in the telecom industry.

Challenges

The telecom industry serves one of the fastest growing and most competitive markets in China. To meet the needs of an already enormous user base and to compete effectively for new customers, China telecom operators need:

- High-quality and high-performance solutions that can scale easily to meet growing needs.
- Solutions that are cost-effective, easy to manage and easy to maintain, to enable low total cost of ownership (TCO).
- Reliable solutions to ensure high-quality service.

Solution

To help their telecom customers meet these challenges more effectively, Neusoft collaborated with Intel to optimize the Neusoft Telecom BSS solution stack. Intel engineers worked closely with Neusoft engineers to define a virtualized reference architecture based on the Intel Xeon processor 7500 series and Intel® Virtualization Technology¹ (Figure 1).

Neusoft constructed the entire BSS architecture based on two four-socket Intel Xeon processor 7500 series-based servers as shown in Figure 2 on the next page. The hypervisor used was build #186700 of VMware ESX Server 4.0* and the guest OS was Red Hat Enterprise Linux* 5.4 x86-64.

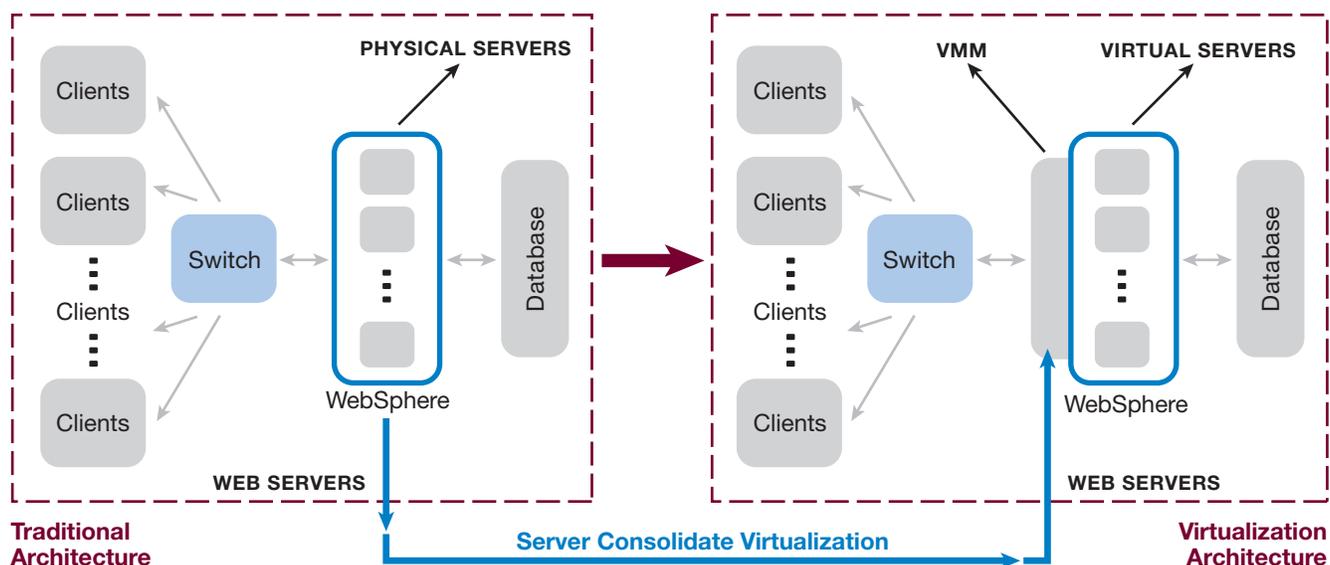


Figure 1. Neusoft Telecom BSS virtualization reference architecture.

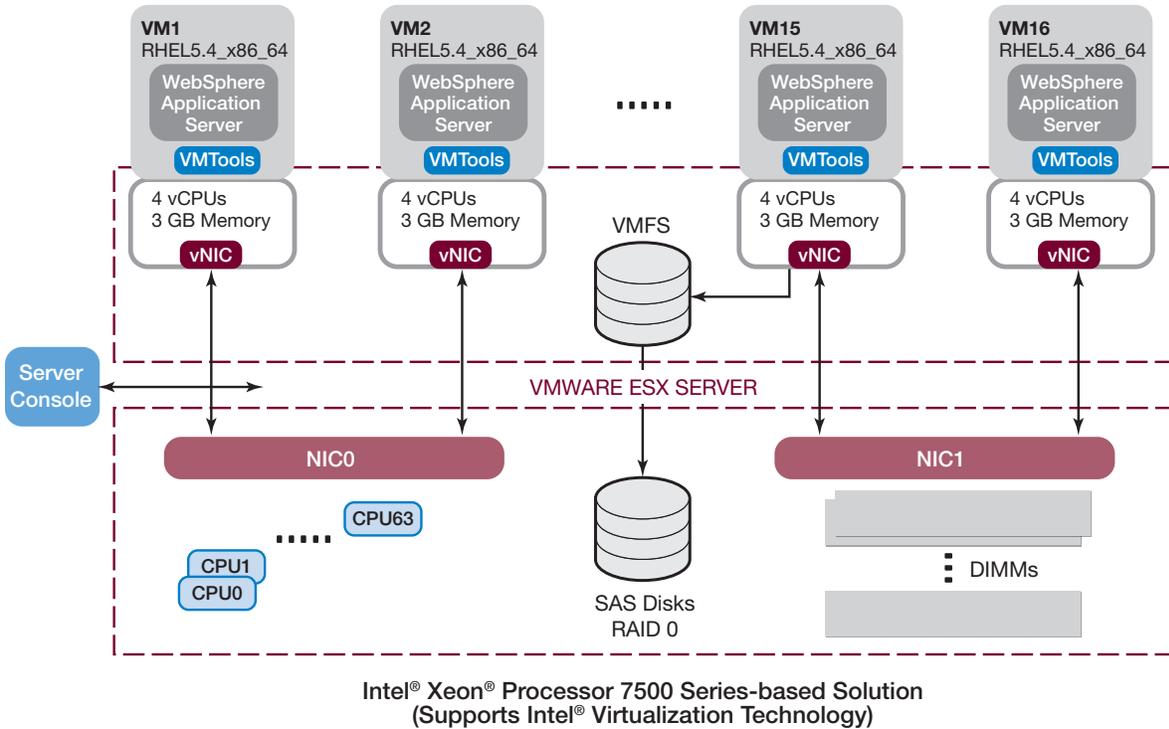


Figure 2. Neusoft Telecom BSS virtualization solution on Intel® Xeon® processor 7500 series-based servers.

To verify performance, Neusoft and Intel engineers ran Neusoft’s proprietary workload on the new Intel Xeon processor 7500 series-based servers and also on previous-generation Intel Xeon processor 7400 series-based servers. The configurations were similar, except for the number of virtual machines implemented on each system. The six-core Intel Xeon processor 7400 series was able to support six virtual machines per server. With eight cores and Intel® Hyper-Threading Technology,² the Intel Xeon processor 7500 series was able to support 16 virtual machines per server.

How Intel Benefits Neusoft Telecom BSS

Neusoft Telecom BSS has been tuned and optimized to take advantage of the Intel Xeon processor 7500 series, which delivers the biggest performance increase ever for the Intel Xeon processor family. Compared with the previous generation, these new processors provide:

- More cores (eight versus six) and more execution threads (sixteen versus six)
- Massive increases in system bandwidth with Intel® QuickPath Interconnect Technology
- Higher memory bandwidth and capacity with two integrated memory controllers and the Intel® Scalable Memory Interconnect
- Performance on demand for peak workloads with Intel® Turbo Boost Technology.³
- Next-generation Intel Virtualization Technology, including Intel® Extended Page Tables and Intel® Virtualization Technology for Directed I/O (Intel® VT-d), which enables near-native I/O performance in virtual machines.

“Performance is critical for telecom applications. Neusoft Telecom BSS with VMware ESX* Server requires high-performance servers to perform everyday high stress routines. We are glad to see that the Intel® Xeon® processor 7500 series can provide exciting computing capability to our product. The performance boost of 3.29x versus the Intel® Xeon® processor 7400 series is impressive.”

– Wang Aimin, Vice GM of Neusoft Telecom Division

Performance Test Configuration

Hardware Configuration		
Platform	Intel® Software Development Platform	Intel® Software Development Platform
Processor	Intel® Xeon® processor 7500 ^A series	Intel® Xeon® processor E7400 ^A series
Processor Details	2.27 GHz	2.67 GHz
Cores per Processor	8	6
Intel® Hyper-Threading Technology	Yes	N/A
Intel® Turbo Boost Technology	Yes	N/A
NUMA	Yes	N/A
Intel® Extended Page Tables	Yes	N/A
Intel® VT-d	Yes	N/A
Memory	64 GB (16 x 4 GB)	64 GB (32 x 2 GB)
Memory Details	DDR3-1066	Fully-Buffered DDR2 667
Software Configuration		
Hypervisor	VMware ESX Server* build #186700	VMware ESX Server build #186700
Guest Operating System	Red Hat Enterprise Linux* 5.4 x86-64	Red Hat Enterprise Linux 5.4 x86-64

Performance Results

Using the Intel Xeon processor 7500 series-based platform, Neusoft Telecom BSS achieved major performance and performance per watt improvements versus the previous-generation Intel Xeon processor 7400 series-based platform, including:

- Up to 3.29x better performance⁴
- Up to 3.49x better performance per watt⁴

During the performance testing, several new processor features were shown to deliver significant performance improvements when turned on, including Hyper-Threading Technology (20 percent), NUMA technology (7.5 percent), Intel Extended Page Tables (37.5 percent), and Intel Turbo Boost Technology (5 percent). Intel VT features have also helped Neusoft accelerate new deployments, provide effective isolation and speed system recovery, which have helped improve manageability and reliability for the BSS solution.

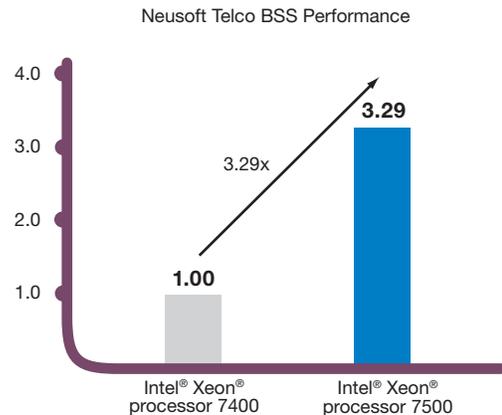


Figure 3. Intel® Xeon® processor 7500 series-based servers improved performance for the Neusoft Telco BSS application by 3.29x versus previous-generation Intel® Xeon® processor 7400 series-based servers.

“Neusoft Telecom BSS integrated virtualization technology is a key part of the solution and it is exciting to see the new features of the Intel® Xeon® processor 7500 series help our product to gain performance boost. According to the tests, features such as Intel® HT, Intel® EPT and Intel® Turbo Boost Technology all benefit the performance a lot. It is really a wonderful platform.”

– Wang Aimin, Vice GM of Neusoft Telecom Division



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⁴Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See www.intel.com/products/processor_number for details.

¹Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

²Intel® Hyper-Threading Technology requires a computer system with a processor supporting HT Technology and an HT Technology-enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. For more information including details on which processors support HT Technology, see here <http://www.intel.com/info/hyperthreading>.

³Intel® Turbo Boost Technology requires a Platform with a processor with Intel Turbo Boost Technology capability. Intel Turbo Boost Technology performance varies depending on hardware, software and overall system configuration. Check with your platform manufacturer on whether your system delivers Intel Turbo Boost Technology. For more information, see <http://www.intel.com/technology/turboboost>.

⁴Source: Intel and Neusoft measurements, February 2010. Intel® Xeon® processor X7500, 2.27 GHz; 64 GB (16x4 GB DDR3-1066) versus Intel® Xeon® processor X7400, 2.67 GHz; 64 GB (32x2 GB DDR2 667 FB).

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