OPEN-XCHANGE

Open-Xchange™ and SUSE Linux Enterprise 10 Whitepaper

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1. Introduction

The Open-Xchange Server 5 is an Open Source-based, full featured Messaging and Collaboration solution that runs on Linux enterprise distributions: Red Hat Enterprise Linux 4 and SUSE Linux Enterprise Server 9.

This whitpaper describes why there is a demand for running Open-Xchange Server 5 on SUSE Linux Enterprise Server 10. It presents several alternative approaches to provide a supported environment for Open-Xchange Server 5 using virtualization technology. This whitepaper shows the benefits of using virtualization such as cost savings through better server utilization, reduced power consumption, easier provisioning of servers and testing environments as well as the advantages for availability and desaster recovery. Finally it discusses the long term aspects of virtualization regarding the operation of different versions of SUSE Linux Enterprise Server.

2. Why SUSE Linux Enterprise Server 10

There is a basic question that needs to be answered: Why is there a demand for running Open-Xchange 5 on SLES 10. There are two main arguments:

- Hardware certification and support

- Uniformity of the server infrastructure

An important argument is the question of support and certification for current server hardware on SLES 9. Many new servers are only either certified for the 64-Bit version of SLES 9 or for SLES 10.

The other argument is that of uniformity: It may be that a whole server infrastructure is based on SLES 10, it therefore makes it very undesirable to run a single SLES 9 machine that break the uniformity of the environment.

3. Virtualization

The issue of missing hardware certification and support for SLES 9 can be addressed by running SLES 10 on the physical server machine and running SLES 9 as a virtualized guest system inside that physical SLES 10 system. This then provides a supported environment for Open-Xchange Server 5 while maintaining the physical standard. This section explains two approaches to run a virtualized SLES 9 system on a SLES 10 host and describes several other existing virtualization solutions.

3.1. General Virtualization Benefits

The most important benefits of virtualization are common to all virtualization solutions: First, the ability to run multiple virtual servers on a single physical machine can significantly reduce hardware costs. Second, space utilization is much more efficient. Third, power consumption can be greatly

reduced. Forth, with many different operating systems running on a single hardware platform (for example virtual Linux and Windows servers can run on the same physical server) virtual servers can be easily duplicated (cloned). This simplified cloning ability means that new server deployment is much faster; testing environments can be set up easily and by saving a virtual server image remotely disaster recovery solutions become much easier. In advanced clustered virtualization setups it is even possible to restart virtual servers automatically on different physical server when a failure occurs. Some virtualization solutions also provide live migration of virtual servers from one physical server to another, so that planned downtimes for hardware maintenance can be avoided.

3.2. Virtualization Solutions for SLES 10

The virtualization solutions described in the following sections can be run on a physical SLES 10 Server installation. Novell actually encourages virtualization by only requiring one SLES subscription for each physical server. No additional subscriptions are required for virtual images, no matter if it runs SLES 9 or SLES 10.

VMware Server

VMware Server is a free virtualization product by VMware Inc. VMware Server is VMware's entry level virtualization product, for advanced features VMware offers VMware Infrastructure suite as a commercial product.

VMware Server can be dowloaded from the VMware Website and is easy to install and set up. VMware also provides good documentation, a knowledge base and there is communitiy support in the form of public discussion forums. Vmware also offers a professional support service as an option.

The impact of installing VMware on a server is no more than installing any other application, with the exception of CPU and I/O resources. Also SLES 10 and 10 SP1 are already listed as supported host systems in the upcoming VMware Server 2.0 (in beta at the time this paper was written). The documentation for VMware Server 1.0.x states experimental support for SLES 10, but this combination is already known to work well. SLES 9 as a guest operating is already supported with version 1.0.

The VMware Server does not require any special virtualization features to be present in the CPU as long as only 32-bit guest operating systems are used. It must be noted that as VMware servers always provides full virtualization, it has more resource overhead compared to the paravirtualization approach provided by Xen. This is discussed in the next section.

Xen

Xen was initially developed by researchers at the University of Cambridge with an approach often called "paravirtualization". In contrast to full virtualization, which provides hardware abstraction by emulation, the paravirtualization approach requires guest operating systems to be specifically aware of virtualization. The advantage of paravirtualization is a lower resource overhead due to the fact there is no hardware emulation. The drawback is that paravirtualization requires a modified operating system. To provide full virtualization, Xen requires special virtualization CPU features.

Xen was further developed by XenSource that created a commercial product based on Xen. XenSource was recently bought by Citrix. Citrix is now seen as investing in virtualization technology with a goal to compete against VMware. Xen is licensed under the GPL, which means that further derived development must be published. This then means that Linux distributors can package the software with their distributions.

SLES 10 comes complete with Xen virtualization technology. On host computers running SLES 10 SP 1, the following SLES 9 operating systems are supported as guests: SLES 9 SP3 in full virtual mode only and SLES 9 SP4 both paravirtual and full virtial mode. SLES 9 SP4 has been available from 18 Dec 2007. The basic setup of Xen on SLES 10 is simple and the installation of SLES 9 virtual servers is supported by YaST.

Unlike Vmware, that is implemented in the user space, Xen requires a special kernel for the host system. The virtualization layer has to run in kernel space. That means that the system must be booted with a different kernel to use Xen virtualization. In Xen, the booted system is a special privileged virtual instance, the so called domain 0. When booting with Xen for the first time, changes to the system may occur, for example the order of network interfaces may be reorganized etc. This must be considered when setting up Xen on a SLES 10 server that is already in production. It is also recommended to upgrade to SLES 10 SP1 when using Xen virtualization because the latest patches are not available for SLES 10 without SP1.

It is clear that Novell is trying to compete against other virtualization solutions by providing similar features such as graphical administration interfaces and high availability. With ZENworks Orchestrator, Novell offers a management tool for physical and virtual computers. As Xen virtualization is much younger than VMware, it should be considered that it is not as mature too.

3.3. Other Virtualization Solutions

Generally any virtualization solution that support SLES 9 can be used. This section will cover some of those available. In contrast to the previous section, the solutions described here are not based on SLES 10 but rather on proprietary (generally Linux based) systems. Please note that the following list is not complete and other solutions can be used that support SLES 9 virtual machines.

VMware Infrastructure 3

VMware Infrastructure 3 is a commercial software virtualization solution suite that ranges in scale from single server to full data center virtualization. It also has optional high availability and load balancing capabilities. The core virtualization technology is proprietary but still Linux based. Almost everything can be administrated from a graphical interface tools, but some administration tools and components require Microsoft Windows. This solution is quite mature but also quite expansive.

Citrix XenServer (former XenSource)

Citrix offers Xen based virtualization products for single or multiple servers. There is even a limited edition available for free. All products provide a graphical administration interface and SLES 9 virtual machines are supported. With the Enterprise edition Citrix is now clearly competing in the virtualization solutions market. Like all Xen based virtualization solutions, XenServer requires AMD-V or Intel VT hardware virtualization technology to run fully virtualized virtual servers. Advanced features such as high availability are planned for future releases but not yet available. According to the FAQ on the Citrix XenServer Website, the Xen commercial version is a combination of Xen version 3.1 plus a large number of fixes from xen-unstable.

Virtual Iron

Virtual Iron is another Xen based virtualization solution. The Enterprise product also provides advanced features like high availability. A graphical administration tool is also included in the product. AMD-V or Intel VT hardware virtualization technology is a requirement for the virtualization server. When managing multiple physical servers an additional management server is re-

quired. SLES 9 virtual machines are supported but SLES 10 virtual machines are not, even in version 4 planned for release in September 2007.

3.4. Long Term Aspects of Virtualization

Generally it is a good practice to unify the Linux operating systems used such as choosing between SUSE Linux Enterprise Server or only Red Hat Enterprise Linux. Further trying to standardise on a single version, like SLES 10, is also very hard especially in the long term. For instance it is almost impossible to upgrade all servers at the same time to a new version. A lot of applications require a certain version of operating system and upgrading systems in production usually requires prior testing with the newer versions. By using virtualization these problems can be resolved more efficiently. Different versions of operating systems can coexist on the same physical server and the installation of a new operating system version for testing purposes does not require a new physical server to be installed. An example for the future might be the migration from Open-Xchange 5 to the next version.

Another long term aspect of virtualization is the abstraction of hardware by the virtualization layer. The hardware presented to virtual machines remains the same even if the physical hardware changes. Only the virtualization layer must support the changed hardware by drivers while the virtual machines remain unchanged. This helps avoid hardware compatibility problems with new servers.

4. Running Open-Xchange Server 5 natively on SLES10

Native support of Open-Xchange Server 5 on SLES 10 is not planned. In principle running Open-Xchange Server 5 natively on SLES 10 is possible but only with a custom installation and higher maintenance costs. It is not supported by Open-Xchange and the quality assurance of this combination must be performed individually on each installation.

5. Conclusion

The main question this paper intents to answer is how to operate Open-Xchange 5 on SLES 10. Until Open-Xchange releases a version that natively supports SLES 10, the only solution is virtualizion. If Open-Xchange 5 is going to be installed on a SLES 10 server that is already in production, it is recommended to use a VMware Server because it has the lowest impact on the operating system. For a new server installation, using SLES 10 with Xen should be considered. For optimal performance the SLES 9 virtual server should run in paravirtual mode. This is possible now because SLES 9 SP 4 was made available from December 2007. To meet high availability requirements a commercial virtualization solution like VMware Infrastructure or Virtual Iron should be considered.