

Getting Started with JeOS

Getting Started with SUSE® Linux Enterprise JeOS on VMware* ESXi

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Build Your Own Custom Virtual Appliance Using the JeOS Configuration of SUSE® Linux Enterprise

Are you considering downloading the bare minimum SUSE Linux Enterprise JeOS through the VMware ESXi environment? Are you wondering what exactly it is, what you get and what you can do with it? Read on. We'll explain all of that and more in this short white paper.

Overview

What Is a JeOS?

Major operating system distributions are notorious for their bulk and complexity. This is because these operating systems must support every software function and option required by end users. However, most applications and end users require only a fraction of the full functionality of these OS environments. The extra, unused packages become a liability from a security and management perspective.

JeOS (pronounced “juice”) is a slimmed-down configuration of an OS that is designed to fit the needs of a particular application. JeOS provides the exact OS functionality, resources and components that an application requires—and nothing else. The result is a lightweight configuration of an existing operating system that consumes fewer compute resources, improves security and is easier to maintain. In addition, a JeOS is particularly well suited for use in virtual appliances where compute resources are often at a premium.

What Is a Virtual Appliance?

A virtual appliance is a type of software appliance. A software appliance is a tightly

integrated package of enterprise application software and an operating system that is designed to run on a standard industry platform. Think of the two as follows: If the appliance is designed to run on a standard server, it is a software appliance. If it is designed to run on a hypervisor, it is a virtual appliance. In implementation, a software appliance can function much like a black box, providing a business function to end users with the complexity hidden from view. The appliance is portable and easy to move, as long as it runs on the hardware or hypervisor for which it is designed. Much of the complexity of configuring the OS and the application, including creation of the JeOS, is taken care of when the appliance is created, thus simplifying installation and support for the end customer.

Why Would You Want to Build Your Own Appliance?

Virtual appliances address the complex deployment and support issues associated with enterprise applications. With virtual appliances, ISVs are able to enter new markets that were previously uninterested in enterprise applications because of such complexity. Turnkey deployment is achieved through preconfiguration of the software and operating system to tune both for a specific use case, leaving only a small number of parameters for the end customer to configure at initial installation. Simplified support is achieved by transferring the problematic appliance image from the customer to the vendor, where the vendor can address any issues on the appliance before returning it to the customer. Together, this simplified deployment and support means that customers don't need specialized application and Linux* skills to benefit from a Linux-based software appliance. The appliance value proposition is

particularly attractive to small and medium businesses, where these specialized skills are difficult to find.

This simplified deployment and management is also very attractive to large enterprises. Many enterprises find software appliances compelling for distribution of their own software because they make the entire software distribution process faster, easier and more secure:

- *Commercially accepted procedures, such as digital signatures, can be used to check the package integrity of virtual appliances. Users are assured that an appliance has not been modified since signed by the author.*
- *Virtual appliances can be compressed to simplify and accelerate distribution to any connected office.*
- *Virtual appliances can be scaled up to rapidly respond to unexpected demand quickly, and then scaled back down when the peak has passed, freeing computing resources for other tasks.*
- *Virtual appliances can be easily moved from server to server, depending on workload, enabling the dynamic management of the IT environment.*

What is the Bare Minimum SUSE Linux Enterprise JeOS?

SUSE Linux Enterprise Server 10 SP2 is a trusted enterprise-quality operating system designed to handle mission-critical workloads. It offers an open, scalable, high-performance solution that features integrated virtualization technology, application security and systems management across a full range of hardware architectures. It offers industry-leading interoperability with your existing data center infrastructure, including Windows*. Supported and certified by the world's leading hardware and software vendors, SUSE Linux Enterprise Server is backed by award-winning Novell® technical support and a global ecosystem of partners and services.

SUSE Linux Enterprise Server is deployable as a general-purpose or real-time operating

system, or it can be tailored to run a variety of specialized workloads, including virtual appliances. That's where the JeOS edition of SUSE Linux Enterprise comes in. The bare minimum SUSE Linux Enterprise JeOS is a minimal configuration of SUSE Linux Enterprise. It is a bootable image that enables a user to log in, configure some basic parameters, such as the network, and includes Zypper, a utility for adding additional SUSE Linux Enterprise packages to the bare minimum JeOS. In this way, end users can build an operating system tailored to their specific needs from the bottom up.

What Can You Do with the JeOS?

SUSE Linux Enterprise JeOS is a minimal installation of SUSE Linux Enterprise Server 10 SP2, and can be the starting point for building your own custom virtual appliance. Downloading the JeOS is free¹. You can then add additional SUSE Linux Enterprise packages and your desired application software to easily create your own virtual appliance. The JeOS uses the same code base as SUSE Linux Enterprise 10 SP2, so any applications or middleware certified by Novell for SUSE Linux Enterprise Server will run on the JeOS with the appropriate packages installed. In addition, you can run open source software or even your own certified software on the JeOS.

Some of the categories of appliances you can create with the JeOS include:

- *Application development and testing appliances*
- *Infrastructure management appliances*
- *Collaboration and teaming appliances*
- *CRM and business process appliances*
- *Storage appliances*
- *Security and networking appliances*
- *And many more*

The JeOS is an appliance-ready OS. Simply install and configure an application on it to create a virtual appliance.

SUSE Linux Enterprise JeOS is a minimal installation of SUSE Linux Enterprise Server 10 SP2, and can be the starting point for building your own custom virtual appliance.

¹ *Downloading the JeOS to create and demonstrate appliances is free. Once you go to market with an appliance or go into a production environment, you will need to purchase a license or enter a redistribution agreement. For more details, please visit: www.novell.com/linux/appliance*

SUSE Linux Enterprise JeOS allows you to build your appliance once and then package and distribute it in many different formats, including VMware and Xen, hard disk images, USB drives and OVF formats.

Why SUSE Linux Enterprise JeOS?

The JeOS version of SUSE Linux Enterprise is the perfect operating system for virtual appliances for several reasons:

- **SUSE Linux Enterprise JeOS is SUSE Linux Enterprise Server.** *SUSE Linux Enterprise JeOS is a simple, minimal installation of SUSE Linux Enterprise Server 10 SP2, maintaining all of its benefits:*
 - SUSE Linux Enterprise JeOS is an enterprise-grade OS designed for mission-critical data center workloads.
 - It is preferred by SAP and certified for Oracle* and hundreds of leading ISVs.
 - It features a robust development environment operating system for custom J2EE* solutions, and can now be extended with Mono® to support .NET solutions.
 - It is optimized for server workloads, such as DNS, DHCP, e-mail and more.
- **No special engineering has been done.** *The SUSE Linux Enterprise JeOS kernel is exactly the same as SUSE Linux Enterprise Server 10 SP2.*
 - Thanks to a standardized kernel, support is simplified. All certifications for SUSE Linux Enterprise Server are maintained for SUSE Linux Enterprise JeOS. What this means for your virtual appliances is that your support matrix isn't complicated when you start building appliances in different form factors: virtual disks, USB drives, hard disks, OVF files and others.
 - In addition, service packs, maintenance updates and versions of SUSE Linux

Enterprise Server are applicable to the JeOS.

- **Optimizations make it the perfect virtual machine guest OS.** *SUSE Linux Enterprise is optimized for VMware, Xen* and other popular virtual environments. SUSE Linux Enterprise JeOS allows you to build your appliance once and then package and distribute it in many different formats, including VMware and Xen, hard disk images, USB drives and OVF formats. This way, you are able to develop best practices for configuring and deploying your software as an appliance—and leverage that work across multiple end targets.*
- **This enterprise-ready Linux distribution is fully supported by a team of OS experts.** *Using SUSE Linux Enterprise JeOS, you don't need to become an expert on modifying and maintaining your own proprietary Linux distribution to build appliances. You are freed to focus on what you do best—creating better software for your customers.*
- **Mono .NET application support.** *With SUSE Linux Enterprise JeOS, you can migrate .NET applications to the Mono platform and run them in a supported Linux environment. This gives you the ability to package .NET applications as appliances with all the benefits that an efficient, fully supported environment entails.*
- **Security resources.** *SUSE Linux Enterprise JeOS features essential security capabilities: encryption, a firewall, security-certificate creation and management, user authentication and access control. With all these security resources at hand, you can protect your or your customer's mission-critical data, reduce system administration costs, and prevent downtime and lost revenue.*
- **Common-sense subscriptions.** *With SUSE Linux Enterprise JeOS, you are no longer tied to complex licensing programs. You can buy what matters: a rock-solid OS, updates and patches that help you run your*

business. For ISVs, we only earn revenue when you do, and we match our pricing to your business model. You pay a small percentage for each appliance sold—and pay us on the same schedule as your customers pay you. For enterprises building their own appliances, you simply pay as you would with a traditional OS.

- **Fastest growing supported Linux ISV program.** *Novell is working hard to grow its vendor portfolio, which is quickly approaching 2,000 certified ISVs on SUSE Linux Enterprise. These vendors have easy access to the appliance delivery platform.*

We invite you to download the JeOS, add your favorite application and see how easy it is to create and use SUSE-powered virtual appliances on VMware's ESXi.

Getting Started

This section defines how to get started with the SUSE Linux Enterprise JeOS, including where to find it and download the code, and how to import it into a VMware ESXi server.

Download SUSE Linux Enterprise JeOS through ESXi

1. In the left-hand column of the VMware Infrastructure Client, browse to the host.
2. Choose the **Getting Started** tab, if it is not already selected.
3. On the Getting Started tab, under Basic Tasks, click **Import a virtual appliance**.
4. The Import Virtual Appliance Wizard opens.
5. Select the radio button next to *Import from the VMware Virtual Appliance Marketplace*.
6. Click **Next >**.
7. You are taken to the VMTN screen, which lists the virtual appliances that are available for download.
8. Select **SUSE Linux Enterprise JeOS** for your server hardware: both i686 or x86 platforms are supported.
9. Click **Download Now**.
10. You are taken back to the *Import Virtual Appliance* wizard, where you see the

Virtual Appliance Details screen, which includes the name, download size, size on disk and description.

11. Click **Next >**.
12. Tick the **Accept all license agreements** check box.
13. Click **Next >**.
14. On the Select a Name and Location for This Virtual Appliance screen, give the SUSE Linux Enterprise JeOS a name. Feel free to accept the default.
15. Click **Next >**.
16. The next screen, the Ready to Complete Virtual Appliance Import screen, provides a summary of the JeOS download details.
17. Click **Finish** to begin downloading SUSE Linux Enterprise JeOS.
18. A dialog box will appear to indicate the download status.

How to Download SUSE Linux Enterprise JeOS as a File

If you have difficulty downloading the JeOS through ESXi, you can download the file directly from Novell.

How to Set Up VMware ESXi 3i for SUSE Linux Enterprise JeOS

To be able to run SUSE Linux Enterprise JeOS, configure it as you would a virtual server. In VMware ESXi, set up your desired disk space, network and memory configuration for this virtual server. (Refer to your user manual for additional details.) After that, you will be able to boot into JeOS.

1. Add a virtual hard disk in VMware:
 1. In the left-hand column of the VMware Infrastructure Client, browse to the virtual machine.
 2. Choose the **Summary** tab, if it is not already selected.
 3. In the right-hand column, under Commands > Virtual Machine, select **Add Hardware** to start the *Add Hardware* wizard.
4. Add a virtual hard disk:

We invite you to download the JeOS, add your favorite application and see how easy it is to create and use SUSE-powered virtual appliances on VMware's ESXi.

1. On the Hardware Type screen, choose **Hard Drive**, and click **Next >**.
2. Select **Create a new virtual disk** on the Disk Type screen. Click **Next >**.
3. On the Capacity and Location screen:
 1. Enter the disk capacity.
 2. Select the location as either **Use the virtual machine's datastore** or **Use a specific datastore**.
 3. If you selected **Use a specific datastore**, browse for the datastore location.
 4. Click **Next >**.
4. Set advanced options:
 1. Specify the SCSI node for the virtual device. Feel free to accept the default.
 2. Select **Independent** to make the disk independent. Independent disks are not affected by snapshots.
 3. If you selected Independent, select one of the two modes for independent disks:
 - **Persistent**—The disk operates normally except that changes to the disk are permanent, even if the virtual machine is reverted to a snapshot.
 - **Nonpersistent**—The disk appears to operate normally, but whenever the virtual machine is powered off or reverted to a snapshot, the contents of the disk return to their original state. All later changes are discarded.
 4. Click **Next >**.
 5. Review the information on the Ready to Complete screen, and click **Finish**.

How to Boot Into SUSE Linux Enterprise JeOS

Now that you've set up your VMware ESXi server with all of the virtual machine resources you want—network, memory, hard drive, CPU utilization—you can now boot into the JeOS and configure the OS:

1. Boot the SUSE Linux Enterprise JeOS:
 1. In the left-hand column of the VMware Infrastructure Client, browse to the virtual machine.
 2. Choose the **Getting Started tab**, if it's not already selected.
 3. On the Getting Started tab, under Basic Tasks, click **Power on the virtual machine**.
 4. Choose the **Console tab**.
 5. You will see the SUSE Linux Enterprise Server splash screen.
 6. Hit the **Esc** key to leave the splash screen and view the detailed boot screen.
 7. You will receive a login prompt.
2. Log in for the first time:
 1. Login as the **root** user with the default password linux.
 2. You will receive a command prompt.
 3. Change the default password:
 1. Type the **passwd** command to change the default password
 2. Type your new password at the New Password prompt.
 3. Reenter your new password at the Reenter New Password prompt to confirm.

How to Enable SSH

1. Enable the SSH daemon to start on boot (it's installed in the JeOS—just not activated):
 1. Enter the **rcsshd start** command. The SSH daemon will then start.
 2. Use the **insserv sshd** command to enable SSH on boot.

How to Configure the Hard Disk

1. Create a new directory to mount the disk to using the **mkdir** command.

Example: `mkdir /data`
2. Use **fdisk** to enter the fdisk command menu for formatting the virtual hard disk:

Example: `fdisk /dev/sdb`

1. Set up a partition using the fdisk command **n**.
2. Type **p** for primary partition.
3. Enter a **1** for partition number 1.
4. Select the default of **1** for the first cylinder.
5. Select the default **652** for the last cylinder to use the entire disk.
6. Type **p** to print the partition table, so you can check that everything was modified as desired.
7. Enter **w** to write the table to disk and exit.
8. The disk is now formatted

3. Create the filesystem using the **mkfs.ext3** command.

Example: `mkfs.ext3 /dev/sdb1`

4. Mount the partition to the directory you created earlier using the **mount** command.

Example: `mount /dev/sdb1 /data/`

5. Ensure the filesystem is mounted on boot by editing the `/etc/fstab` file with `vi`:

1. Open the `fstab` file with `vi`.

Example: `vi /etc/fstab`

2. Press the **Insert** key to enter the `vi` editor's insert mode.
3. Add a line to the `fstab` file to specify the mount point for the newly added virtual hard disk.

Example `/dev/sdb1 /data ext3 defaults 0 0`

4. Press the **Esc** key to exit the `vi` editor's insert mode.
5. Type **w** to write the file.
6. Type **q** to quit the editor.
6. Type **reboot** at the command prompt to reboot the system and test your changes.
7. For more information on adding a virtual hard disk, consult your VMware manual.

Configuring the Network

You will need to manually configure the network to switch from DHCP to a static IP configuration for the virtual appliance. JeOS does not ship with YaST installed.

Novell is the vendor that best meets the criteria, combining the world's most advanced Linux technology with more than 20 year's experience in enterprise-ready software, support and services.

For more information on this topic, refer to "Configuring a Network Connection Manually" section in the SUSE Linux Enterprise Server 10 SP2 Installation and Administration Guide.

Summary

Novell: The Clear Choice for Virtual Appliances

According to IDC, "It is imperative to look into how software appliances could potentially disrupt existing business models or how end users could leverage them over the next few years instead of purchasing a standard traditional application stack."² Virtual appliances are a step up from software appliances, comprising the application, OS and metadata required to automatically and securely install, configure and run on a virtualization platform.

When it comes to building virtual appliances, Novell is the vendor that best meets the criteria, combining the world's most advanced Linux technology with more than 20 year's experience in enterprise-ready software, support and services.

What's Next?

Now that you've booted into SUSE Linux Enterprise JeOS, you can treat it like a bare bones install of SUSE Linux Enterprise Server. In the next white paper in this series, we will show you how to create your own software appliance using Kiwi, the open source image creation tool found at:

<http://kiwi.berlios.de>

For more information, visit: www.novell.com/linux/appliance

² Source: Worldwide Software Appliance 2008 Top 10 Predictions: What to Look for in 2008. Brett Waldman and Al Gillen, February 2008, IDC #211015, Volume: 1

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