



SpotCloud Appliance Creation Guide

Enomaly's SpotCloud is an open marketplace for cloud computing capacity. SpotCloud enables you to choose a cloud service provider anywhere in the world -- based on price, quality, and location -- and to quickly and easily run your own Virtual Machine appliances on that provider's cloud through the integrated SpotCloud control panel.

This guide will help you through the process of creating a virtual machine image (an "appliance") that will work well with SpotCloud.

*NOTE: Advanced virtualization users working under Linux can skip forward to the section **Creating a SpotCloud VM from Scratch.***

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Virtual Machine Design Guidelines

Before beginning the process of creating or migrating your virtual machine for the SpotCloud environment, to optimize the performance of your appliance, and to avoid surprises, we suggest you follow the guidelines below:

- Good appliance design calls for using only the software and configuration that is required to solve the problem or to provide the service. Install your guest Operating Systems and optional software in the minimal configuration that will meet your needs, without unnecessary components or features. This is known as Just Enough Operating System (JeOS). One good suggestion is to use [Ubuntu JeOS](#).
- For security reasons, you should also have the bare minimum set of system services running on your appliances.
- You will not have a direct remote console into the VM, so be sure to setup your remote access procedures (ssh, remote desktop, VNC, etc) before uploading your VM.
- It's also highly recommended that you use ssh keys (RSA or DSA) instead of login passwords for remote access (see <http://sshkeychain.sourceforge.net/mirrors/SSH-with-Keys-HOWTO/> for more information). If you must use passwords, be sure to set them to something complex enough that ssh port scanners won't be able to guess the password easily.
- SpotCloud providers can be located anywhere in the world and the provider's hardware is not guaranteed to indicate the proper time of day, so be sure to include time sync (i.e. NTP) enabled at boot on your VM's.
- You may be charged for disk space used on a SpotCloud provider, so don't create a larger hard drive than you need for your appliance. You are also limited to a maximum appliance size of 2GB per VM within SpotCloud.
- Provision times can vary widely depending on the provider and the appliance you create. To help minimize slow provision times, use the smallest possible hard drive image, and be sure to clear the free space on the drive before packaging (on Linux and other similar platforms you can use the following command to clear the free space: `dd if=/dev/zero of=zerosfile.dat && rm zerosfile.dat`). This is especially important if you've had many files created and deleted during the process of creating your appliance.
- If your Virtual Machine is meant to be in use long term, be sure to have an update / patch maintenance schedule in place or consider running your updates automatically from a script.
- Virtual Machines on SpotCloud can be shut down by the end provider at any time. Be sure that your VM has appropriate startup scripts in place to ensure that all services will recover on a restart.
- Because SpotCloud appliances are transient in nature and limited in duration, it is a good idea to include a phone home capability within your appliances which announces when a new appliance boots and becomes available to execute a job.

- Be aware of anything in your VM that could potentially change ethernet and hard drive device numbering under Linux or BSD. Allowing these to occur may result in an appliance that will no longer boot or have network access.

Requirements



The following table outlines the requirements for creating or migrating a virtual machine for SpotCloud:

- Desktop workstation to be used for VM creation with at least 1GB (2GB+ is preferred) of RAM, running Windows XP/Vista/7, OS X 10.5.x+, or Linux (e.g., Ubuntu, Fedora, RHEL, CentOS).
- A Raw Disk Image of your virtual machine. (For the SpotCloud Beta only, this guide suggests using Oracle's free VirtualBox software (<http://www.virtualbox.org>) to assist in creating and testing the VM appliance.)
- Basic command line knowledge for your desktop operating environment.
- Stable Internet connection for uploading images to the SpotCloud system
- SpotCloud packaging tool (Windows or *nix)
- SpotCloud Buyer Account (register at www.spotcloud.com)

Process Overview

Before you can utilize the capacity of SpotCloud as a buyer of cloud capacity, you must create virtual machine appliances for use on the system. This section provides an overview of the process for creating a SpotCloud-compatible virtual machine appliance, or migrating an existing virtual machine to be SpotCloud-ready.

SpotCloud uses a [Raw Disk Image](#) of your operating system, loaded with your application(s). There are many ways to create a Raw Disk Image. For the SpotCloud Beta only, this guide describes a method using Oracle's free VirtualBox software.

- Download and install the VirtualBox software (<http://www.virtualbox.org/wiki/Downloads>)
- Obtain the base operating system that you wish to use within the SpotCloud environment. SpotCloud providers have full function hypervisors, so any OS (Linux, BSD, Windows, Solaris) should work without modification. If you have not already chosen your operating system, one good suggestion that works well with SpotCloud is the lightweight version of Ubuntu Linux called [Ubuntu JeOS](#).
- Install the OS within the VirtualBox environment. Please see the detailed instructions in the **Creating Virtual Machines** section of this document for important instructions.
- Install and configure your application software into your VM and test all operations of the software. See the **Virtual Machine Design Guidelines** section of this document for more information.

- Export your VM's hard drive into a Raw formatted image.
- Use the Enomaly packaging script to convert your Raw drive export into a SpotCloud compatible XVM2 package.
- Upload Package to SpotCloud.

See the section **Creating a SpotCloud VM from Scratch**, below, for detailed instructions.

Alternatively, you can export an existing Xen or KVM virtual machine for use in SpotCloud -- see the section

Creating a SpotCloud VM from Scratch

This section provides a detailed step-by-step walkthrough of the process of creating a SpotCloud-compatible virtual machine image.

Take the time to become familiar with the operation of the VirtualBox product by reviewing the documentation found here: http://www.virtualbox.org/wiki/End-user_documentation

1. Start the process by clicking the "New" button in VirtualBox to create a new Virtual Machine. Be sure to have your appliance OS (ISO image) ready to use.
2. Go through the New VM wizard, being careful to set the RAM values to fit within the free RAM on your desktop OS (tip: Most OS's can install with 256 megs of RAM). Also, be sure that "Create New Hard Drive" is selected, the "Use Existing Hard Drive" option is not supported. Dynamically expanding storage and fixed-size are both supported, so either is fine.
3. Before starting the VM click on the "Settings" option, click on the "Storage" tab and be sure to remove the SATA controller, this device is not supported in SpotCloud. You can re-add the hard drive you created in the wizard by selecting the IDE Controller and clicking the Add Attachment Icon, then Add Hard Disk option.
4. Before exiting this screen, be sure to set the operating system ISO you wish to boot from by clicking on the CD-ROM device (usually below the Hard drive you just added), click on the Folder Icon, beside the "CD/DVD Device" drop down, and add your ISO image to the VirtualBox library. When you are done, be sure that the ISO you want is selected in the "CD/DVD Device" drop down box.
5. Start the virtual machine with the "Start" button in VirtualBox, and proceed with your regular operating system installation process.
6. Customize the operating system to include all the necessary software you wish to run on the remote SpotCloud provider's infrastructure. See the Virtual Machine Design Guidelines section for more information.
7. Test your appliance extensively to ensure all aspects of the system are working to your satisfaction.
8. Convert your VirtualBox VDI hard drive into Raw format by running the following command: `VBoxManage internalcommands converttoraw <image>.vdi d0.img` Replace

the <image> with the hard drive name. Note: The location of the VirtualBox hard drives differs depending on the platform, please see the VirtualBox documentation for locations of hard drive images.

Now continue with the steps described in the section Creating and Uploading SpotCloud Packages, below.

Creating a SpotCloud VM from an existing Xen or KVM virtual machine (Advanced)

SpotCloud's utilizes the same device model as KVM and Xen HVM allowing you to directly package your RAW and QCOW2 disk images. The process for creating SpotCloud packages from a Xen or KVM image involves configuring the OS and applications under your existing virtualization environment, and then running the SpotCloud packager on your existing VM image. Be sure to first change into the directory in which your KVM or XEN HVM disk image is stored, then continue with the steps described in the section **Creating and Uploading SpotCloud Packages**, below.

Creating and Uploading SpotCloud Packages

After creating or migrating a virtual machine into the required format, you will need to package and upload it to SpotCloud. This section describes the required procedure.

Before you can run your VM on a SpotCloud certified provider, you must package the VM into the SpotCloud format.

1. Download the SpotCloud packaging tool to your desktop:
 - Windows: <http://dl.enomaly.com/packagingwindows>
 - Linux / OS X: <http://dl.enomaly.com/packaginglinux>
2. Run the SpotCloud packaging tool in the current directory and it will ask for the following:
 - Package Name - Any name will be fine, this is the display name you will see in SpotCloud
 - Image Path - Usually d0.img. This is the image you just exported from VirtualBox
 - Add Another Disk - No, unless you've created and exported multiple disks in Virtual Box
 - Use PAE - This is to enable Physical Address Extensions on the SpotCloud providers environment. This is useful if you have a 32 bit machine that may use

- more than 4GB of memory.
 - Use ACPI - This ensures better compatibility with most guest operating systems, only disable if you've been instructed to do so by the support team.
 - USE APIC - Also a safe default, do not disable unless instructed.
3. When the process is complete, it will produce an XVM2 package file which can be uploaded through your SpotCloud Buyer account. Log into your account and select the Upload option with the XVM2 image selected.

Troubleshooting

Q: My Appliance uploaded properly but when I try to run it, the IP address only shows "Detecting".

A: This can be the result of multiple problems. You will need to check the following:

- Did you remove the SATA controller from your VirtualBox VM and add the hard drive under the IDE controller? SpotCloud does not support the VirtualBox SATA controller.
- Are you using a Debian or Ubuntu derived distribution? If so, your ethernet interface has probably been renumbered. You can solve this by setting up an eth1 entry under the OS with DHCP configuration, or you can remove the OS's ability to change by removing the `/etc/udev/70-persistent-net-rules` file when designing the VM.

Support & Additional Service

If you have questions or need additional support Enomaly offers two options.

- Free online SpotCloud support Forum: <http://dl.enomaly.com/scsupport>
- Paid Support - Please contact us at www.enomaly.com / phone 416.848.6036 / email sales@enomaly.com