VMware ESXi in a Cloud-based Lab

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WHITE PAPER

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Contents

Executive Summary

VMware ESXi is VMware's vSphere hypervisor, used to run multiple virtual servers on a single physical server. It's available in a free version (called the Free VMware vSphere Hypervisor) and commercial editions such as vSphere Enterprise Plus. Traditionally, a vSphere edition is purchased with some level of advanced features, the ESXi hypervisor is loaded on the physical servers, and vCenter is used to manage those physical hosts. Your physical servers, running your company's critical applications, can then be turned into virtual machines such that you can run multiple virtual servers on a single physical server. vSphere offers tremendous cost reduction in the datacenter and it makes the life of a server admin vastly more efficient.

Historically, ESXi has been great for running on physical servers, but customer demand and increased adoption within development and testing has made running ESXi within a virtual machine for even further cost savings very difficult, and has been unsupported or rarely offered by cloud service providers. When we discuss running "VMware ESXi in the Cloud," we are illustrating how to create a virtual machine, in the public cloud, that runs the vSphere ESXi hypervisor inside. This is generally not done for production purposes, such as running production machines inside the ESXi VM, but instead, done for development, testing, demos, and learning in a virtual lab environment. By providing the ability to run ESXi within a virtual machine, cloud service providers can give customers the ability to replicate production in a highly scalable and easy-to-use manor.

This paper will be of interest to IT management professionals as well as development and test professionals who are interested specifically in how ESXi can be used in a cloud environment. It is structured in three parts: 1) A high-level overview of scenarios that are enabled by ESXi in a cloud-based lab, 2) A set of steps that show how to run ESXi in a cloud-based lab, and 3) A set of detailed examples that show how users of ESXi can optimize using Skytap.

The Build-Deploy-Test Scenario

The option to run VMware ESXi as a virtual machine in a cloud-based lab is a common request by customers who want the flexibility that it offers in a variety of scenarios.

By way of example, I'll be illustrating using Skytap—though running VMware ESXi should work with a variety of cloud providers that use the vSphere hypervisor. So let's look at four key scenarios that relate to running VMware ESXi in a cloud-based lab.

I. Learning

VMware ESXi is the leading datacenter server virtualization solution today, used by 98% of the Fortune 500. Because VMware ESXi is the market leader and also the leader in innovation—inventing features like vMotion, svMotion, DRS, and HA—most developers and server administrators need to test and learn VMware ESXi.

VMware ESXi works much differently than Windows Server and functions as a whole new operating system. VMware ESXi introduces the concepts of its own role-based security, virtual hardware, vSphere plugins, virtual datacenters, resource clusters, and third-party add-on applications. And these new concepts and configurations must be learned in a test environment—not on production.

Examples of key vSphere concepts for developers and server admins to learn:

» Logging in to ESXi from the vSphere client

» Configuring an ESXi host from the console, using the direct console user interface (DCUI), or the command line mode

» Understanding virtual hardware inside VMs

» ESXi server configuration

» Configuration of advanced features like vMotion, svMotion, high availability (HA), and distributed resource scheduler (DRS)

II. Training and Certification

If you are a developer interested in training and certifications, the VMware Certified Professional (VCP) and VMware Certified Advanced Professional (VCAP) are the two most popular and respected virtualization certifications in the world. Demand for those with certifications is high. However, building your own lab is expensive and time consuming.

You may have attended official VMware training, but after the class was over, you had no way to practice what you learned to help prepare for the exams. The vast majority of the topics on the VCP and VCAP exams can be practiced in a virtual lab. With ESXi in the cloud, you can have your own virtual lab up and running in a few clicks and start learning vSphere to help prepare for your exams.

III. Development

With vSphere being the most popular server virtualization solution in use today and with demand for vSphere management applications being high, application development is an excellent potential use for a virtual ESXi lab solution. Application developers can write applications that manage, monitor, backup, and interface with VMware vSphere. Those applications could be tested on complex, multi-host vSphere infrastructures with vCenter and even shared storage.

IV. Testing

Testing is another ideal scenario for VMware admins who manage their company's vSphere infrastructure. Today, you can't test upgrades, implementations of advanced vSphere features, or important configuration changes as these changes could bring down the entire vSphere infrastructure—and all of your company's critical servers and applications. You could build your own vSphere lab on premise, but in addition to the upfront hardware cost, you will have to consider the space to store the hardware, power to run it, vendor maintenance costs, and eventual need to upgrade it.

If you're running your own VMware ESXi lab in a cloud-based lab, you can:

» Create new ESXi hosts in seconds for multi-host testing

» Test vSphere patches and upgrades, in minutes instead of days

» Test the implementation of new advanced features like DRS or HA

» Test configuration changes to the vSphere infrastructure

» Test PowerCLI scripts

Running ESXi in a Cloud-based Lab, Step by Step

Typically, if you wanted to learn about VMware vSphere, you would start off by purchasing some physical servers to run it on. While ESXi can be installed inside a desktop or laptop running VMware Workstation or Fusion, this typically takes quite a bit of work, can perform slowly, and make your regular applications perform even slower. None of these options compare to the virtual ESXi template in Skytap. If you follow these instructions, you'll see that VMware ESXi in Skytap, along with a Windows VM to run the vSphere client, can easily be provisioned and spun up in fewer than 60 seconds.

I'm going to run the following scenarios using Skytap. If you have a Skytap login, you can follow along. If you don't have a login yet, you can start a free trial at **www.skytap.com/free-trial**.

Click Templates in the tab section. In the Search box, type 'vmware' to locate the VMware ESXi template. (Fig. 1)

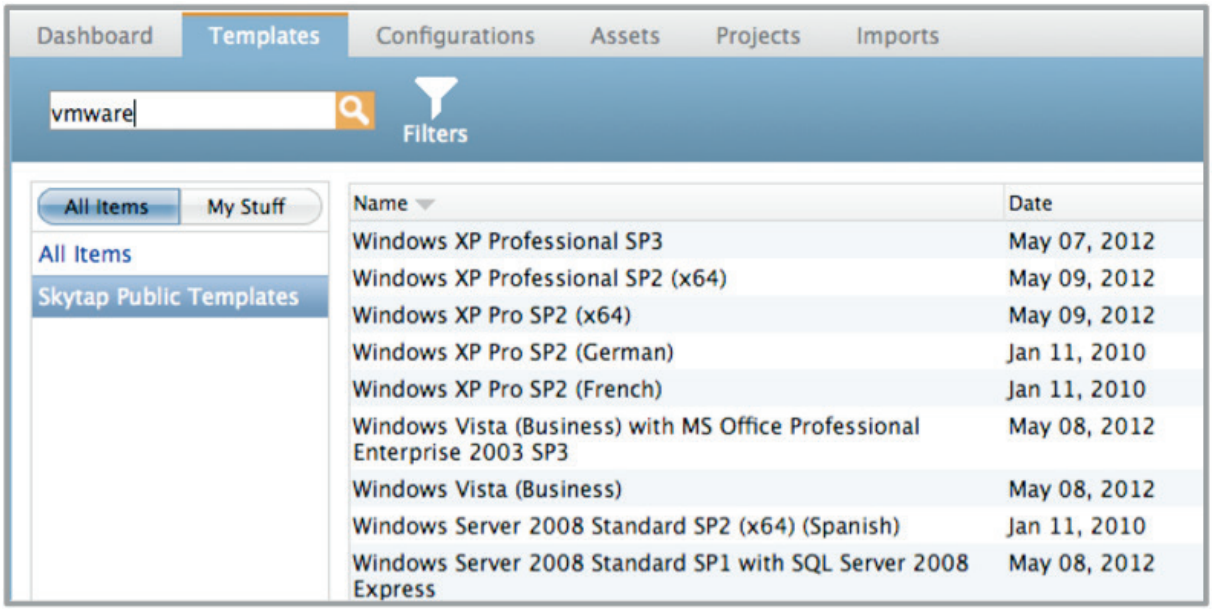

Fig. 1

You'll see that two templates exist today. One for ESXi 4.1 and one for ESXi 5. (Fig. 2)

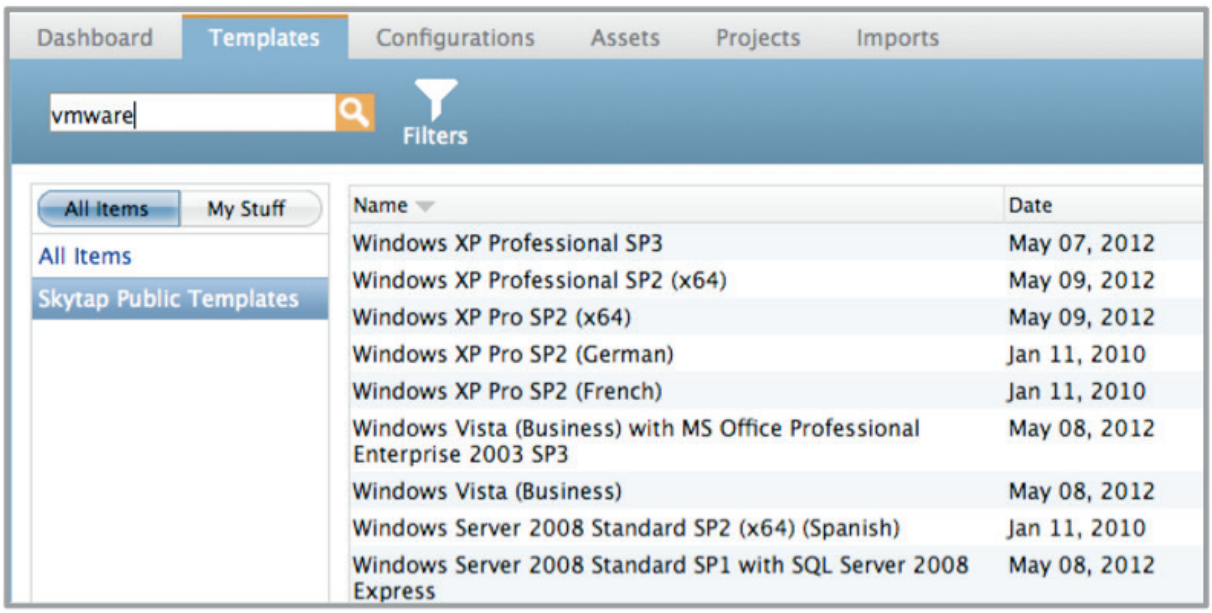

Fig. 2

Select the template you want to deploy. In my case, it was ESXi 5. Choose Configurations in the tab section, and here's what you'll see:

Fig. 3

Click Run (Fig. 3) to start the configuration. Within seconds, your ESXi host and your Windows client VM will be running. Click View Desktops (Fig. 3) to bring up the consoles for your new ESXi virtual lab deployed in Skytap. (Fig. 4)

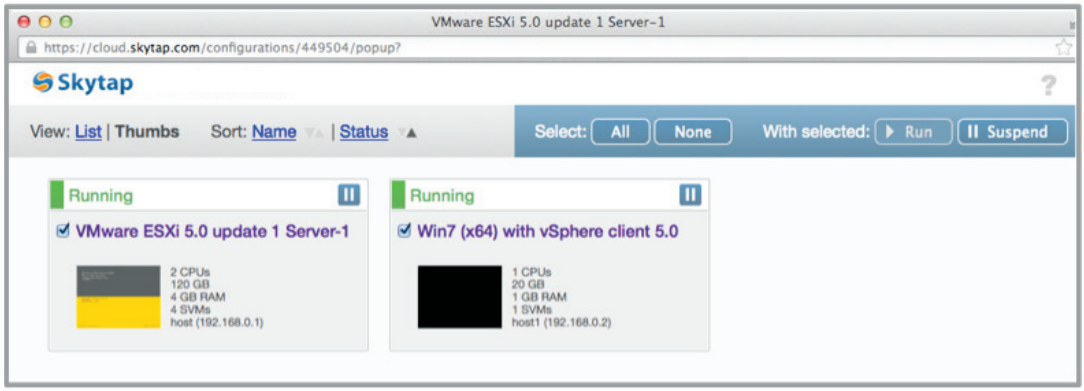

Fig. 4

As you can see, you have access from this window to both your new ESXi 5 virtual server and your Windows 7 client desktop, so that you can administer ESXi with the vSphere client. Both ESXi and the vSphere client are pre-loaded and ESXi is pre-booted. What this means is that you don't have to wait to download ESXi, install ESXi, or even boot ESXi.

From here, you can access the ESXi direct console user interface (DCUI) by pressing F2, and logging in with the root user account and default password. That root password can be found on the Credentials link of the VM Settings configuration. (Fig. 5)

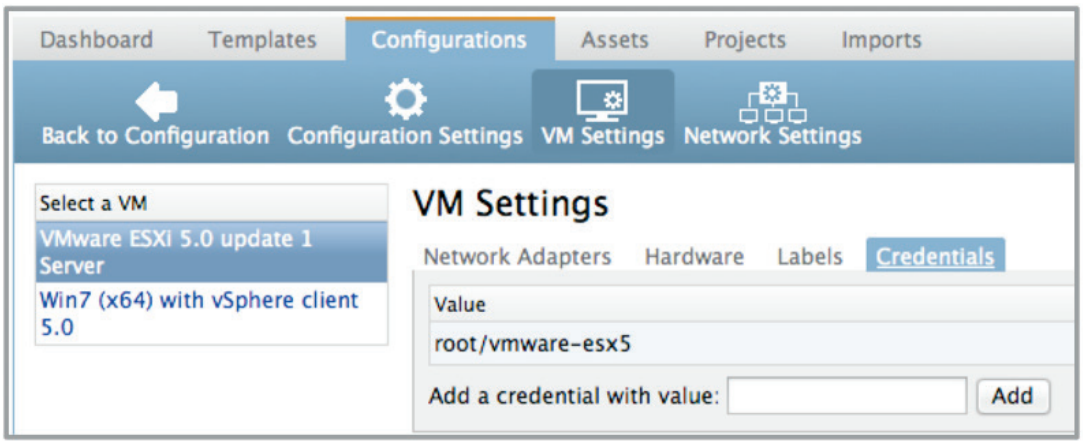

Fig. 5

In this case, the root password is vmware-esx5, but that could change in future configurations.

Upon logging in to the ESXi DCUI, you can create configurations or access the ESXi shell— i.e., the local command line. (Fig. 6 and Fig. 7)

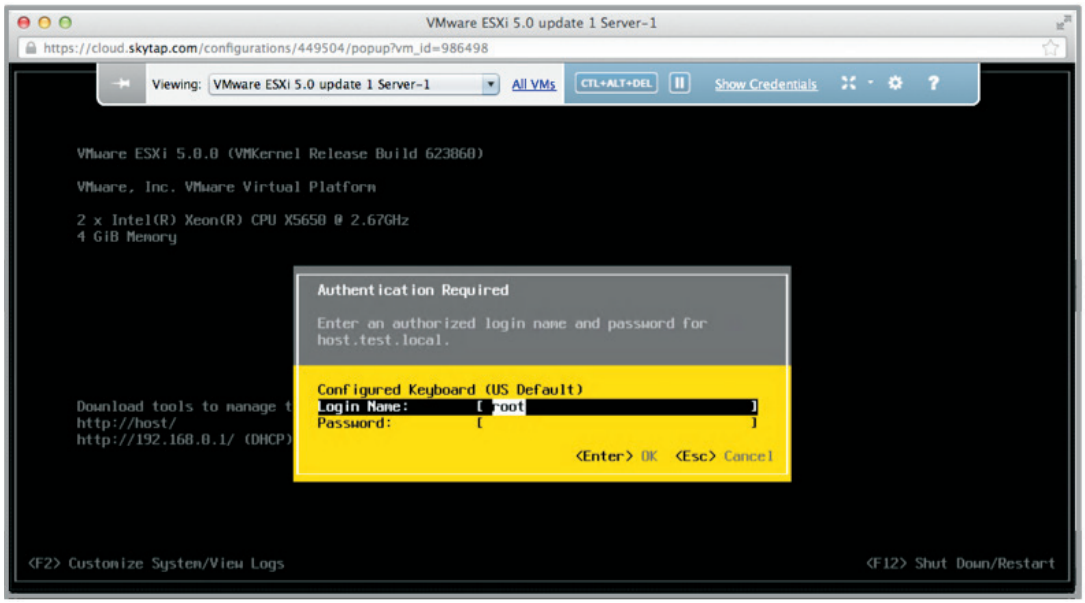

Fig. 6

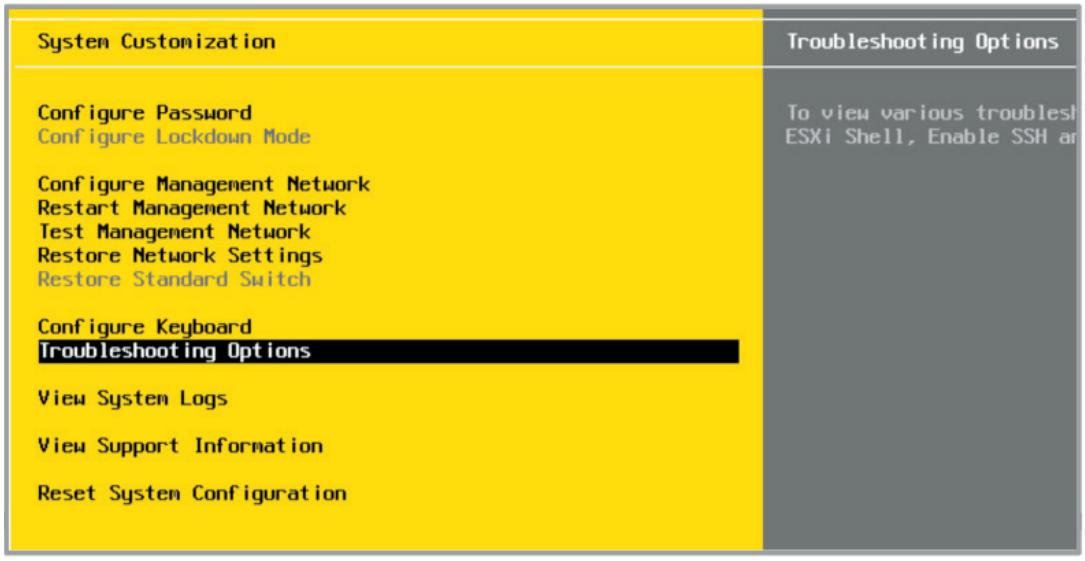

Fig. 7

By going to the Windows VM, you can run the vSphere Client and log in to your virtual ESXi host. (Fig. 8)

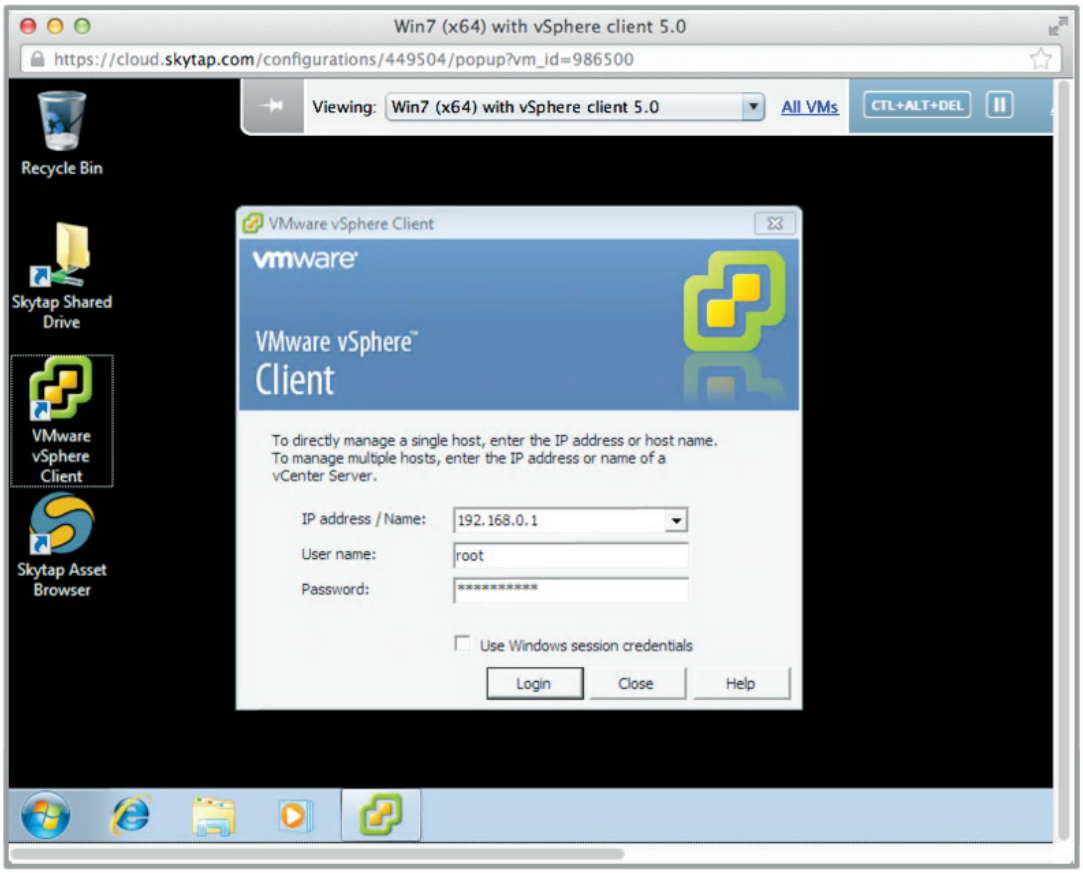

Fig. 8

Once logged in, the vSphere client works just as it would if it were connected to a real physical ESXi host. (Fig. 9)

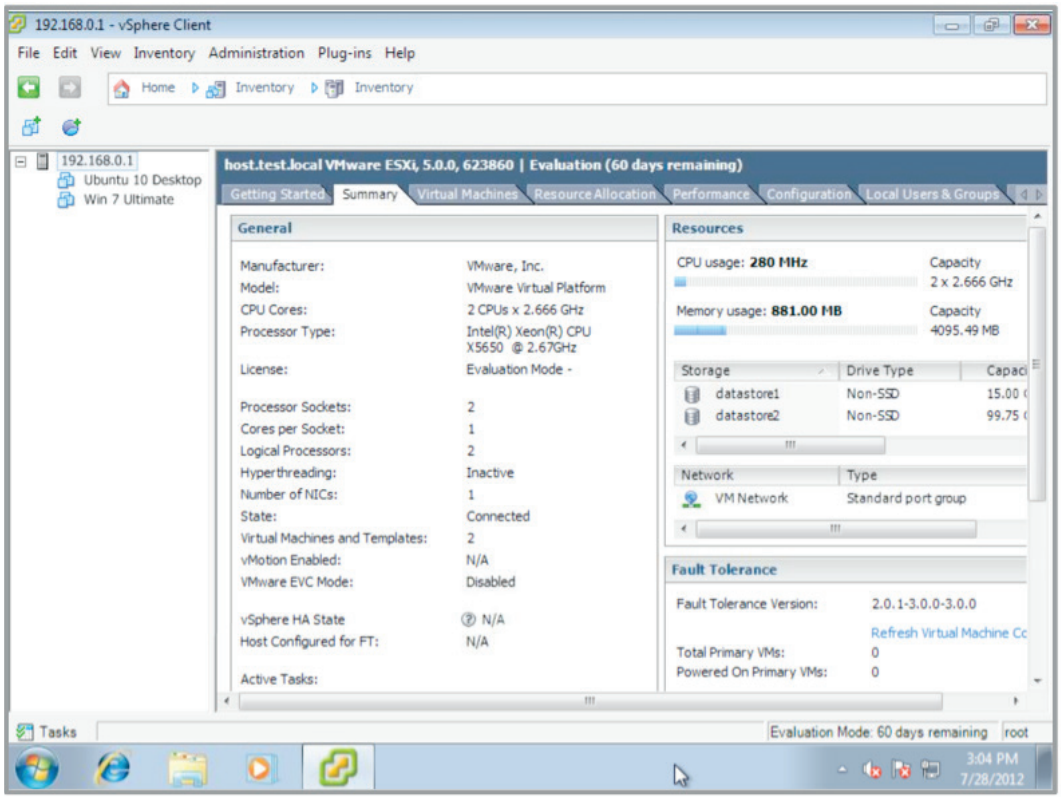

Fig. 9

As you can see below, the virtual ESXi lab in Skytap comes pre-built with Ubuntu Linux and Microsoft Windows 7 virtual machines. These VMs can be quickly powered on to use for a variety of test and learning purposes, including testing your applications against running ESXi virtual machines. (Fig. 10)

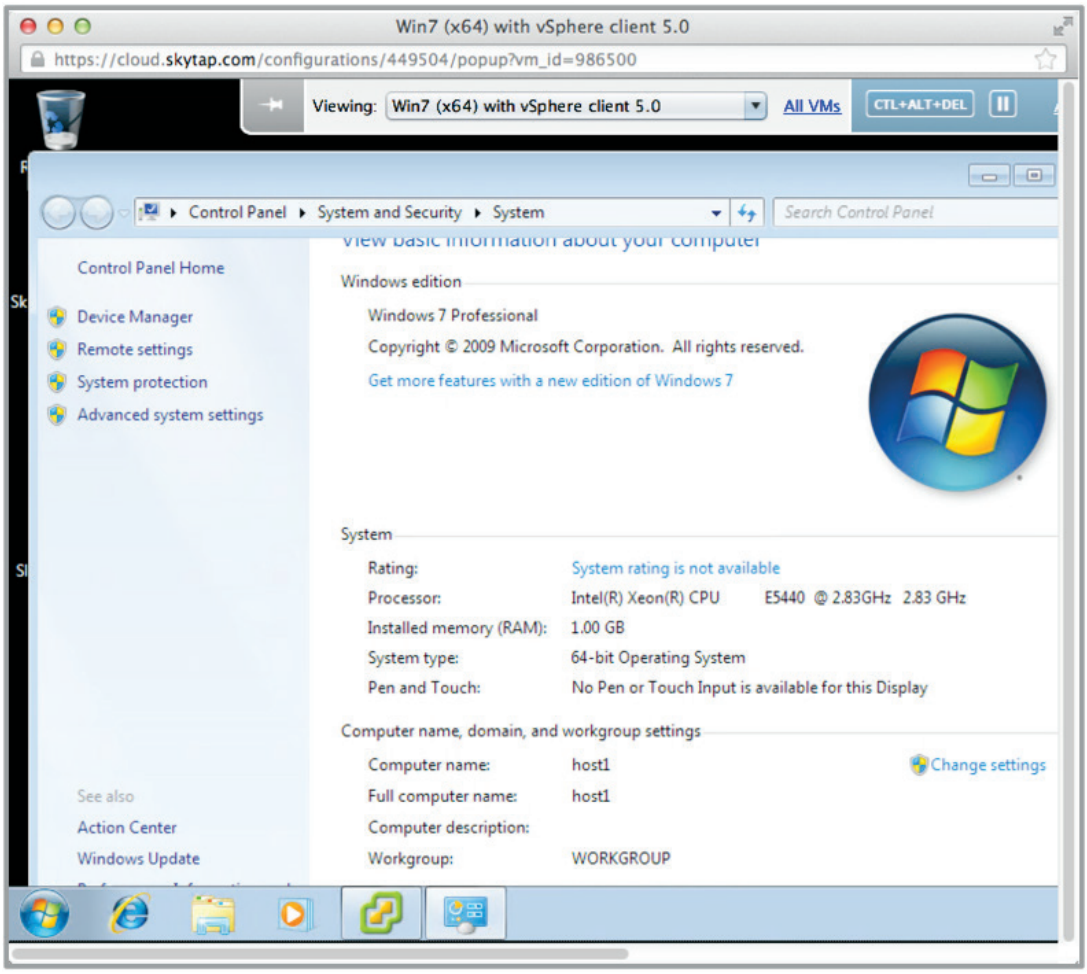

Fig. 10

5 Ways to Maximize ESXi in Skytap

Once you have your virtual ESXi lab running in Skytap, you can get started with your learning, certification training, development, or testing. In doing so, you may have some questions and may be wondering what this lab is capable of. Here are 5 ways to maximize your new VMware virtual lab in Skytap:

1. Add More ESXi Servers

One of the high value features of Skytap is the ability to add more virtual machines, from a template, in just a few seconds. You can use this to expand your VMware virtual lab with a few clicks of a mouse. To do this, click Add VMs, then add the ESXi VM from a template. (Fig. 11)

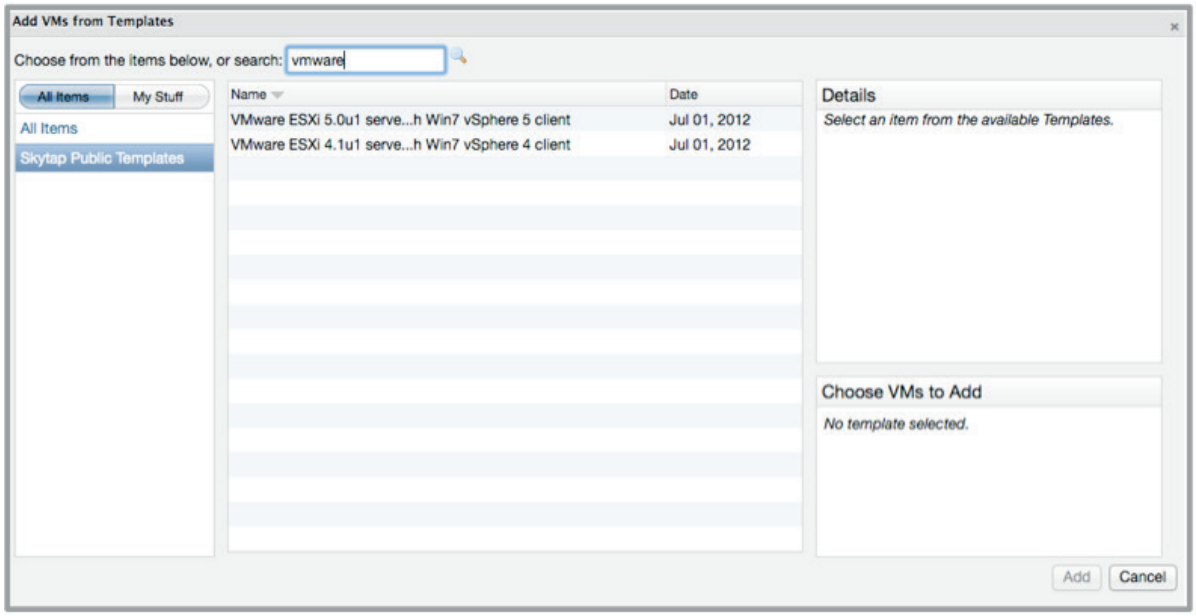

Fig. 11

Here you see my Skytap configuration running with three ESXi hosts and one Windows VM. (Fig. 12) Notice how all three of the ESXi VMs have automatically generated hostnames and IP addresses.

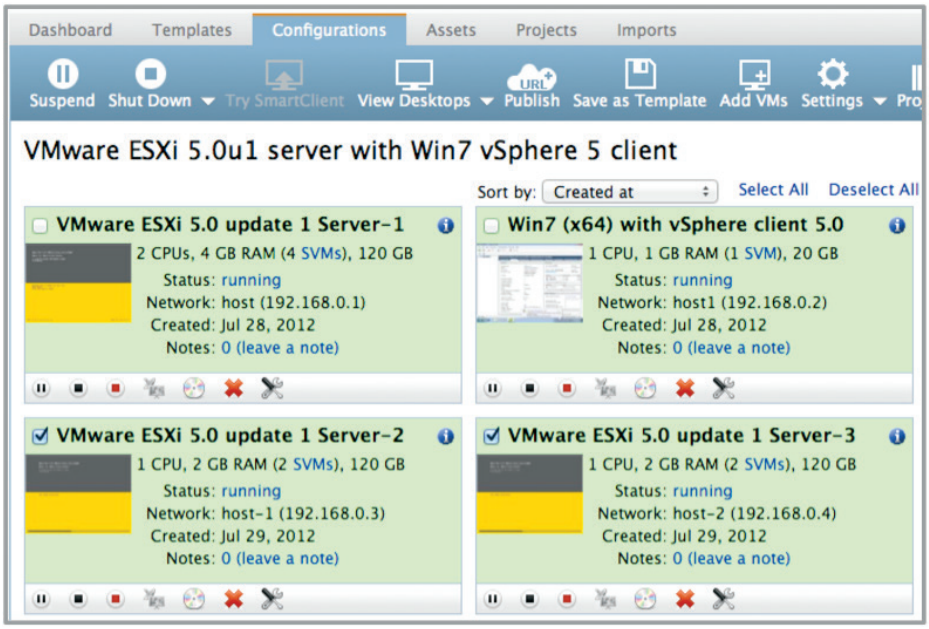

Fig. 12

2. Add Virtual Machines

Inside the virtual ESXi host that you deployed from the template, you'll find two virtual machines – one Ubuntu Linux and one Microsoft Windows. You can power these on, duplicate them, or import your own virtual machines. (Fig. 13)

Note: Today, the only limitation is that these virtual machines can only be powered on if they run 32-bit operating systems (but that may have already changed by the time you read this).

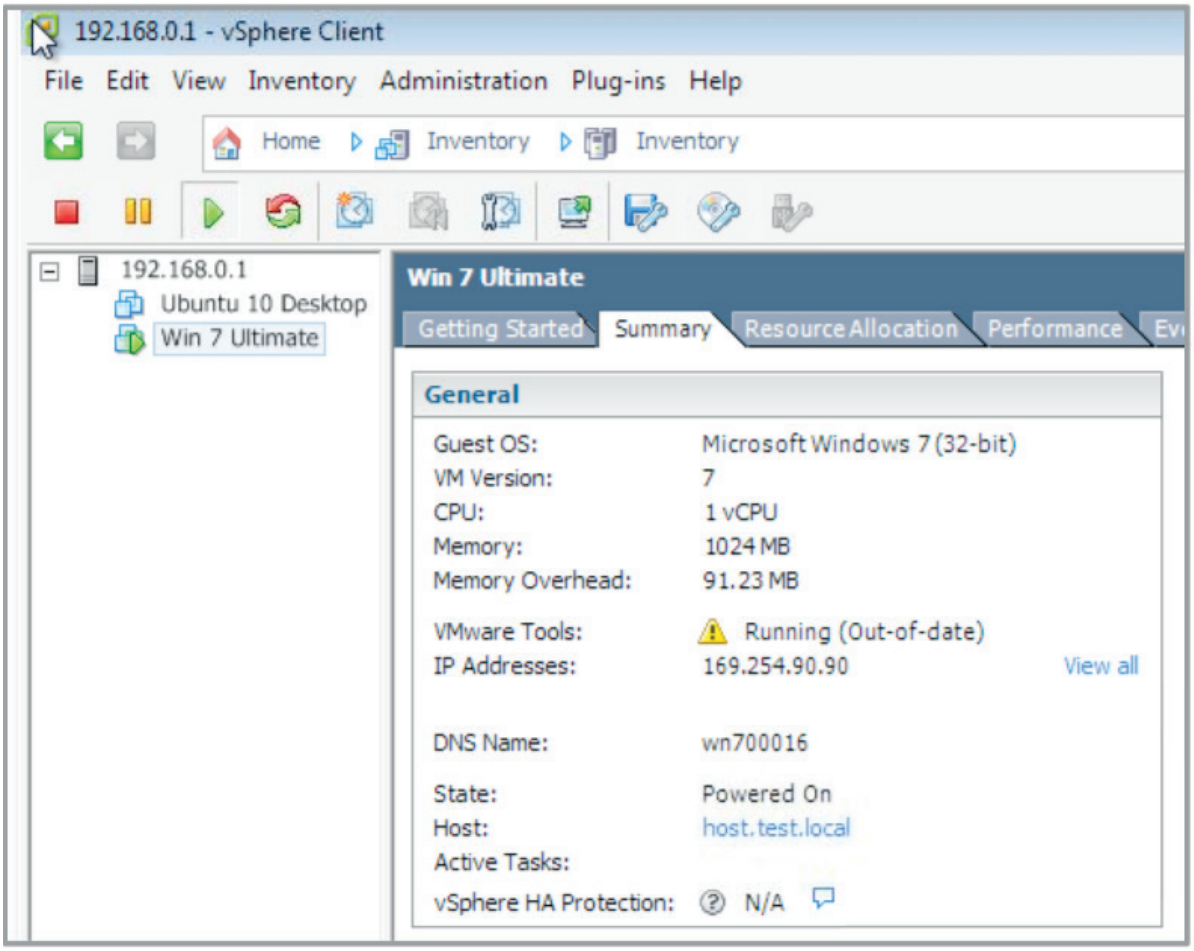

Fig. 13

3. Add Shared Storage

Shared storage is required in vSphere infrastructures to perform advanced features like vMotion, svMotion, HA, and DRS. You can add shared storage to your lab using things like NFS enabled in a Windows Server VM or by adding an **OpenFiler** VM.

4. Create a vCenter Server

vCenter is used for centralized administration of multiple ESXi hosts and is required to utilize advanced features of vSphere. Traditionally, vCenter runs on a Microsoft Windows Server 64-bit OS. You can easily deploy Microsoft Windows Server 2008 R2 64-bit from the Skytap templates library, download an evaluation of vCenter from the VMware evaluation site into that VM, install vCenter, then use it to administer your ESXi VMs.

5. Share Access to Your Lab

With the Skytap Publish URLs option, you can quickly and easily allow others to access your lab using any modern web browser. Perhaps you are working with another admin or developer on a project related to VMware ESXi. Once published, you will be provided a single URL that can be used to access all the virtual machines you have created in this configuration. (Fig. 14)

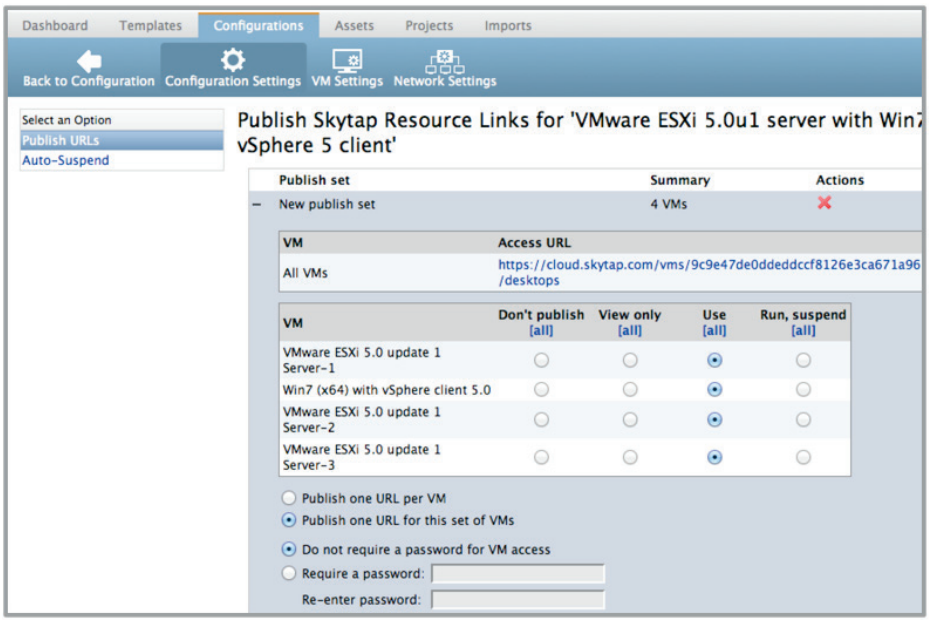

Fig. 14

Here's what it would look like (Fig. 15):

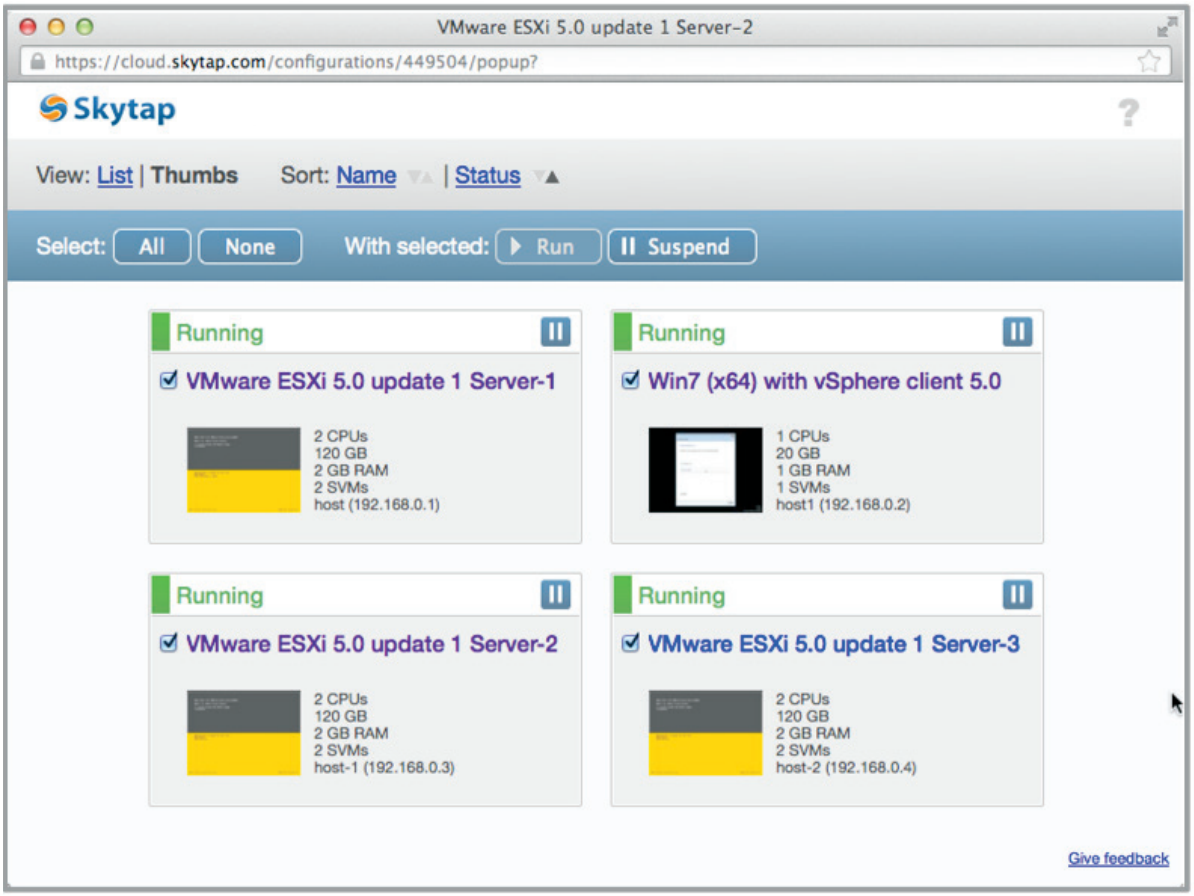

Fig. 13

Next Steps

In this white paper, we've learned about what VMware ESXi virtual lab in Skytap can do for you. Whether you want to use it to learn vSphere, to prepare for the VCP certification, to develop applications around ESXi, or to test upgrades and configuration changes.

If you'd like to sign up for a free trial of Skytap, visit **www.skytap.com/free-trial** to get started today.

David Davis is the author of the best-selling VMware vSphere video training library from TrainSignal. He has written hundreds of virtualization articles on the Web, is a vExpert, VCP, VCAP-DCA, and CCIE #9369 with more than 18 years of enterprise IT experience. His personal website is **VMwareVideos.com**.

About Skytap

Skytap provides Environments-as-a-Service to the enterprise. Our solution removes the inefficiencies and constraints that companies have within their software development and test lifecycles. As a result, our customers release better software faster.

Today's enterprise is challenged to continuously deliver new customer-facing applications, while overcoming increasing change and complexity in their IT infrastructures. Our customers use Skytap to manage, import, deploy and decommission on-demand environments that contain everything needed to accelerate the software lifecycle, without unnecessary costs and project delays due to manual configuration and dependencies.

Enterprise IT organizations maintain full visibility and cost control, while allowing dev and test teams to self-provision labs, and copy and share complex environments across global cloud regions with ease for a lasting boost in agility.

Customers can import existing virtualized applications or build new applications in the cloud. Skytap can be easily accessed through any modern web browser, REST-based API, Command Line Interface (CLI), or ALM tool (Jenkins, Visual Studio TFS, etc.).

Skytap customers have a choice of infrastructure. Customers can run complex computing environments on Skytap's native ESX-based infrastructure, or leverage our services atop leading cloud infrastructures such as AWS and Softlayer.

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