



Test/Dev Lab Virtualization

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Motivations

- Knowledge of VMware products (i.e. vSphere)
- Knowledge of a multi-system environment
- Testing of platform configurations other than primary system
- Curiosity about how something works or “what happens if?”



Tonight's Plan



Background

IP Addressing

- Private Address Ranges:
 - 10.0.0.0/8
 - 172.16.0.0/12
 - 192.168.0.0/16



IP Addressing

- Routing
- Network Address Translation

What is a Virtual Machine

- virtualization, not emulation
- virtual devices
- leaky abstractions



VMware Workstation



VMware Workstation

- Windows or Linux based host
- Fusion is the MacOS product



VMware Workstation

- host OS is responsible for dealing with physical hardware
- run as continuously or a ad hoc as you'd like



VM in VMware Workstation

- Let's Build a VM in VMware Workstation



VMware ESXi and vSphere

ESXi

- dedicated hypervisor, runs directly on the hardware
- as such your hardware must be “supported” by ESXi to use it
- assumes you have a functional network to access management
 - web based or API based



vSphere

- vSphere is largely the combination of ESXi and vCenter
- vCenter provides centralized management

General Notes

- Processor
- Memory
 - more memory = doing more concurrently
 - overcommitment – Edit > Preferences > Memory (workstation)
 - ESXi swap file
- Storage
 - storage matters – performance vs capacity
 - thin vs thick provisioning

Common Features

- snapshots – saved state of a virtual machine
- clones – full clones, linked clones

VMware Tools

- installed in Guest OS
- drivers and other packages to make the guest OS more usable
- expands management options
- provides time synchronization following key events
- provided as an freestanding executable installer, and iso image
- Linux guests: open-vm-tools package(s)

VMware Tools

- Check on Guest VM

Networking

- Bridged
- NAT
- Host-Only

Lab Architecture

- Build everything inside of VMware workstation, including an ESXi host
- Lowest barrier of entry
 - start with what you have
 - broader hardware support



Network Management within Workstation


- look at defaults for each network

Lab Design One

- two guests, start with NAT to complete install
- then place on host only network

Lab Design Two

- two guests in their own host only networks, place a “router” in-between



Routing Problems

ESXi Install

- installing ESXi – assuming you don't have hardware issues
- configuring management

vCenter Install

- Virtual appliance, deploys into a ESXi host or existing vSphere environment (VCSA)

Future Lab Additions

- DNS/DHCP/NTP
- Shared Storage
- Active Directory

DNS/NTP/DHCP

- essential network services

Shared Storage

- Shared storage

Directory Services

- Active Directory
- OpenLDAP

Pointers

- As you're getting started, don't get too invested in any one decision.
- Come up with a naming scheme for your "generic VMs" before you need them.



Pointers

- Decide what is important to you.
- Probably can't always follow "Best Practices" and production deployment techniques

Resource Pointers

- vBrownBag – “weekly” podcast/webinar
<https://vbrownbag.com>
- VMware Users Group (VMUG) – in-person & online community
<https://www.vmug.com>
- Communities – online, in-person
 - example: <http://blogtober.net/>

Resource Pointers

- VMTN Blog Beat – Aggregated Blog Feed
<https://blogs.vmware.com>
- VMware Technology Network (VMTN)
<https://communities.vmware.com>
- VMware Hands on Labs
<https://hol.vmware.com>
- VMware Product Trials
<https://www.vmware.com/try-vmware.html>

Resource Pointers

- Microsoft Evaluation Center
<https://www.microsoft.com/en-us/evalcenter/>
- Microsoft Virtual Machines
<https://developer.microsoft.com/en-us/microsoft-edge/tools/vms/>

Resource Pointers

- Safari Books Online via Tennessee Tech library
- Professional and Student members of ACM [not chapter membership] have access to the ACM Learning Center - includes full Safari Books Online

Resource Pointers

- Storage:
 - FreeNAS <http://www.freenas.org>
 - DellEMC UnityVSA <https://www.emc.com/products-solutions/trial-software-download/unity-vsa.htm>
- Routers:
 - VyOS <https://vyos.io/>, pfsense <https://www.pfsense.org/>



Conclusion/Door Prizes