

Virtual Computing and VMWare

Module 4

Module Objectives

1. Provide a brief history of virtual computing
2. Provide a survey of virtual computing environments
3. Describe the architecture of VMWare's virtual computing environment
4. Describe the functionality of VMWare
5. Describe the components of VMWare

Module Guidance

1. Video	Introduces the module and addresses module objectives 1 and 2.	Duration: 5 minutes
		Duration: 5 minutes
2. Activity 1		- 2 Minutes for completion - 3 minutes for review
3. Video	Address module objectives 3, 4, 5	Duration: 5 minutes
4. Activity 2		Duration: 5 minutes - 2 Minutes for completion 3 minutes for review
Total time: 20 minutes		

Supplemental Materials

Module 4 – Objectives and Key Instruction Points

Objectives:

Teaching students to be knowledgeable users of VMWare. This module will be somewhat abstract that provides a conceptual foundation for the next module. The next module will provide very practical information necessary for hands-on activities.

Video Segment 1 – Virtual Computing

- 1. History of Virtual Computing**
 - a. 1960s Mainframe concept – cost sharing, OS variety
 - b. Faded with trend for cheaper hardware
 - c. 2000s Concept returned to run on servers – less power, easier provisioning, more efficient use of hardware investments, OS variety, OS isolation
- 2. Types of Virtual Machine**
 - i. Process
 1. Multiprogramming
 2. Emulators
 3. High level language VM - portability
 - ii. System
 1. Hosted VMM
 2. “Native” VMM
 - iii. Popular examples
 1. VMWare Player/Workstation – Hosted VMM - Console
 2. VMWare Fusion – Hosted VMM for Mac - Console
 3. Parallels – Hosted VMM for Win & Mac - Console
 4. VMWare ESXi – Native VMM – Remote server
 5. Xen – Native VMM – Remote server

Video Segment 2 - VMWare

- 3. VMWare ESXi Architecture**
 - a. System Architecture
 - b. Broader Architecture
 - i. ESXi + vSphere client + vCLI
- 4. VMWare Functionality (ESX 4.0)**
 - a. Access to high speed large disk storage
 - b. Supports 64 CPU cores
 - c. Supports up to 1 TB or 1,000 GB of RAM
 - d. Single VM can use 8 CPUs simultaneously, if needed
 - e. VM power management
 - f. Virtual networking between VMs
 - g. Management of physical resources (CPU, Memory, Disk, Network)
 - h. Supports 10s of guest OS versions (ex. Windows 7, Linux, FreeBSD, Ubuntu)
 - i. VM Snapshot
- ~~5. Additional VMWare Elements~~**

Activities

Name	Objectives	Content ideas
Activity1	Reflect on history of virtualization, reflect on the OS's point of view of the machine, and OS level virtualization (native & hosted)	A Venn diagram worksheet that has students place the rationales for virtualization or lack of, for the three periods. On a worksheet provide a blank sketch of the logical computer system arch diagram with blanks in various blocks. Have students shade in the region of the diagram that the OS considers to be the "machine". Provide one of the two diagrams of OS level virtualization and ask students to identify it the type of virtualization, and have students list 1 advantage and disadvantage for that type of virtualization, and identify its common use case (i.e. desktop or server software)
Activity 2	Reflect on the ESXi architecture and how it relates to the general discussion in the previous segment. Reflect on how VMWare enable commonly expected functionality of a computer even though the computer doesn't have dedicated hardware and is located 100s of miles away.	On a worksheet have students map the terms of the general computer systems arch. to ESXi system architecture. The general architecture diagram should have numbers next to the functional element labels. Students then should place the appropriate number on the ESXi drawing thus being able to see how the two architectures align. Have students identify the top 3 things they do with a computer and using the operational architecture diagram explain how they would do those things on a VM shown in the drawing.
Activity 3	N/A	-

Handouts

Title:

Objectives:

Length: X pages

Notes: