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11-19-2008

Using Virtual Machines to Prototype Mapping Applications

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Using Virtual Machines to Prototype Mapping Applications

Larry Theller

GIS Day - 2008
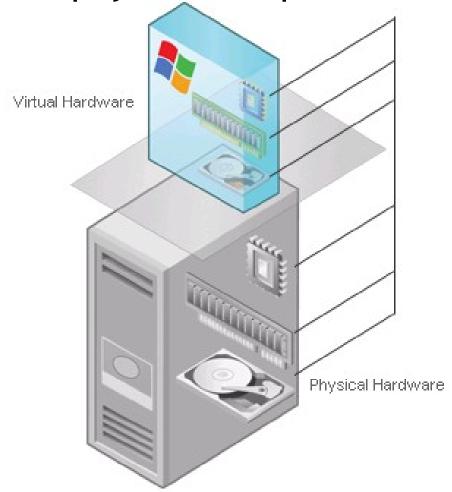
Virtual Machines
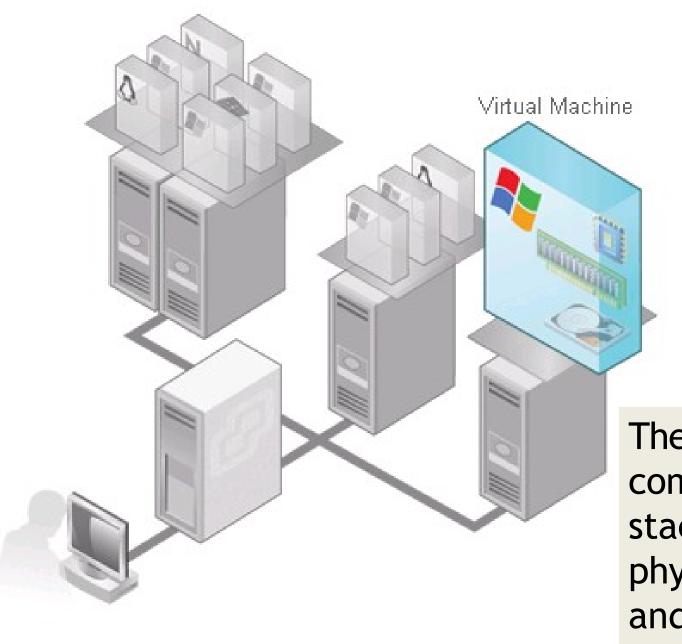
- What is this technology?
- Why would I use it?
- What does it look like?
- How would I use it?
- How do I get it?

Virtual Machines Benefits

In general, VMware virtual machines possess four key characteristics that benefit the user:

- **Compatibility**: Virtual machines are compatible with all standard x86 computers

- **Isolation**: Virtual machines are isolated from each other as if physically separated

- **Encapsulation**: Virtual machines encapsulate a complete computing environment

- **Hardware independence**: Virtual
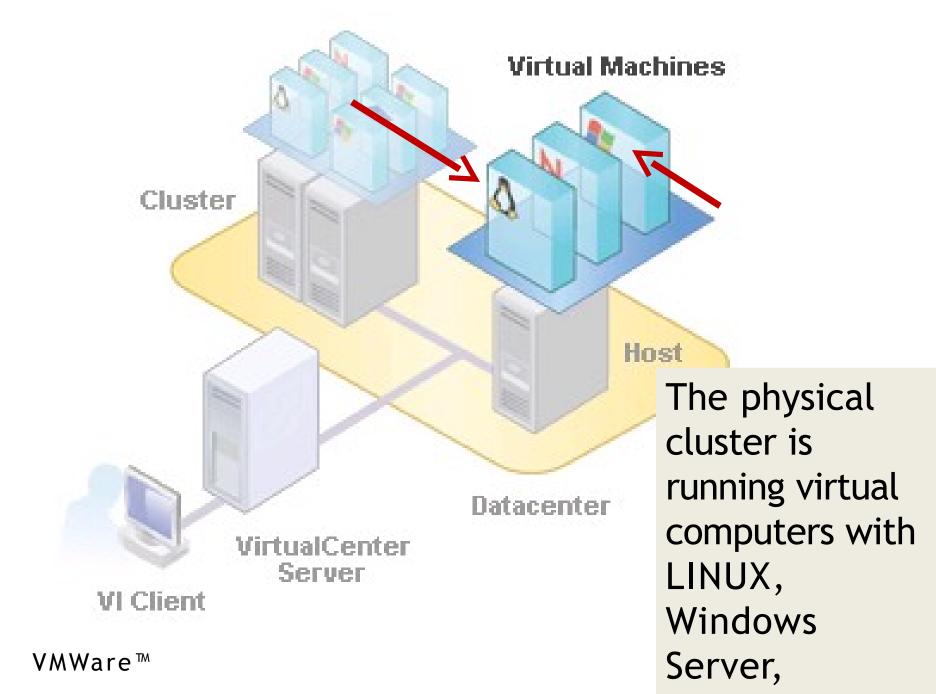
We create our own virtual computer that runs in a physical computer

Virtual Hardware

Physical Hardware

VMWare™

Virtual Machine
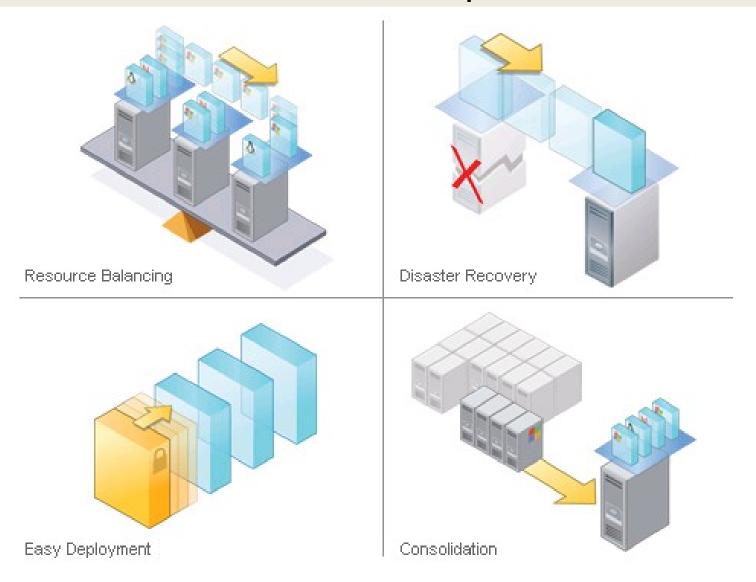
The virtual computer is stacked on a physical cluster and EACH has its own operating

VMWare™

Virtual Machines

Cluster

Host

Datacenter

VirtualCenter
Server

VI Client

VMWare™

The physical cluster is running virtual computers with LINUX, Windows Server,

Four reasons to use virtual computer environment.

Resource Balancing

Disaster Recovery

Easy Deployment

Consolidation

VMWare™

VMWare Workstation:

Pros:

- Rapid prototyping
- Easy to involve student programmers
- Bridged to internet for real testing
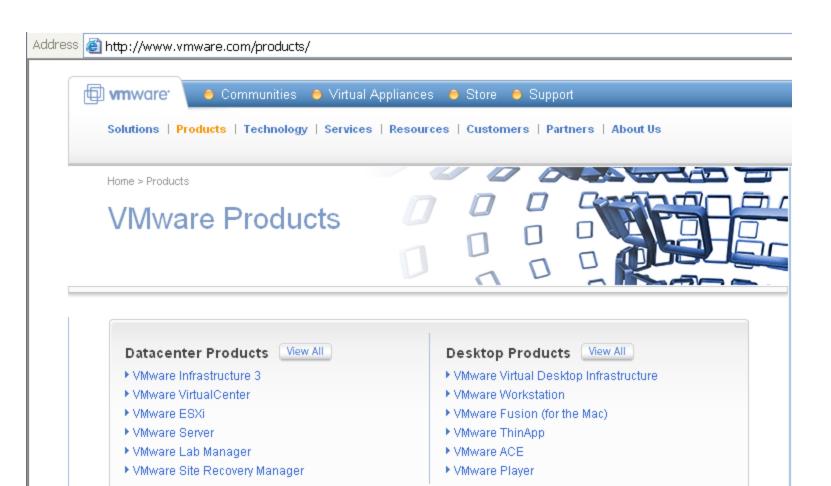
Cons:

- Slower
- limited file access (image size includes harddrive allocation)
        better for streaming data than for massive arrays of files.

VM Server (Offsite Cluster)

- Rapid installation
- Better resource utilization
- Back-up and Recovery
- Freedom from Hardware limitations
- Cheaper than hardware (for School of Agriculture units)
- Computational speed is slower

🔳 **vmware**   ● Communities   ● Virtual Appliances   ● Store   ● Support

Solutions | **Products** | **Technology** | **Services** | **Resources** | **Customers** | **Partners** | **About Us**

Home > Products

VMware Products

Datacenter Products [View All]

▶ VMware Infrastructure 3
▶ VMware VirtualCenter
▶ VMware ESXi
▶ VMware Server
▶ VMware Lab Manager
▶ VMware Site Recovery Manager

Desktop Products [View All]

▶ VMware Virtual Desktop Infrastructure
▶ VMware Workstation
▶ VMware Fusion (for the Mac)
▶ VMware ThinApp
▶ VMware ACE
▶ VMware Player

http://www.vmware.com/products/
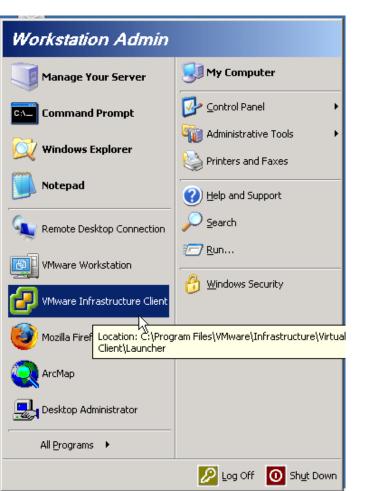
Products by Business Need
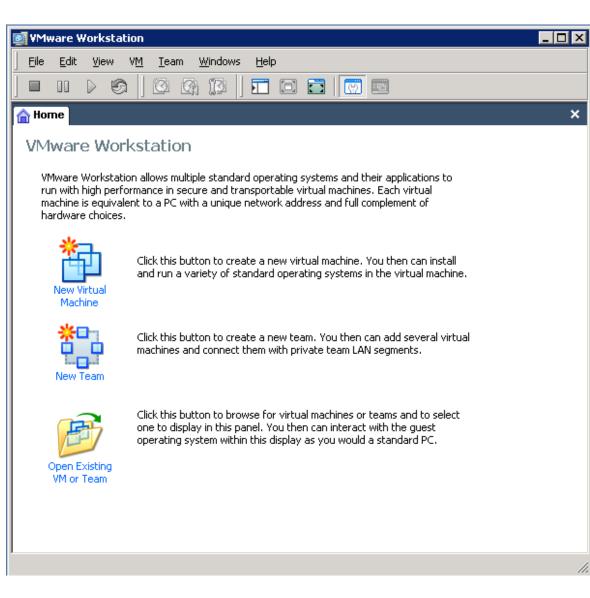
▶ Reduce Costs with Server Consolidation
▶ Business Continuity & Disaster Recovery
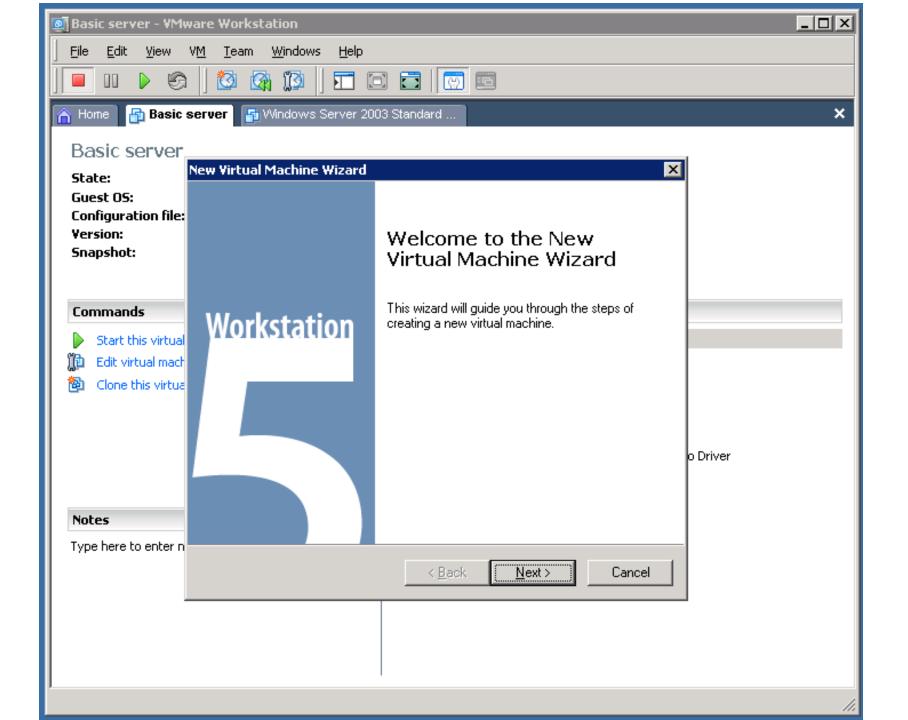
▶ Desktop Management & Control
▶ Virtual Lab Automation
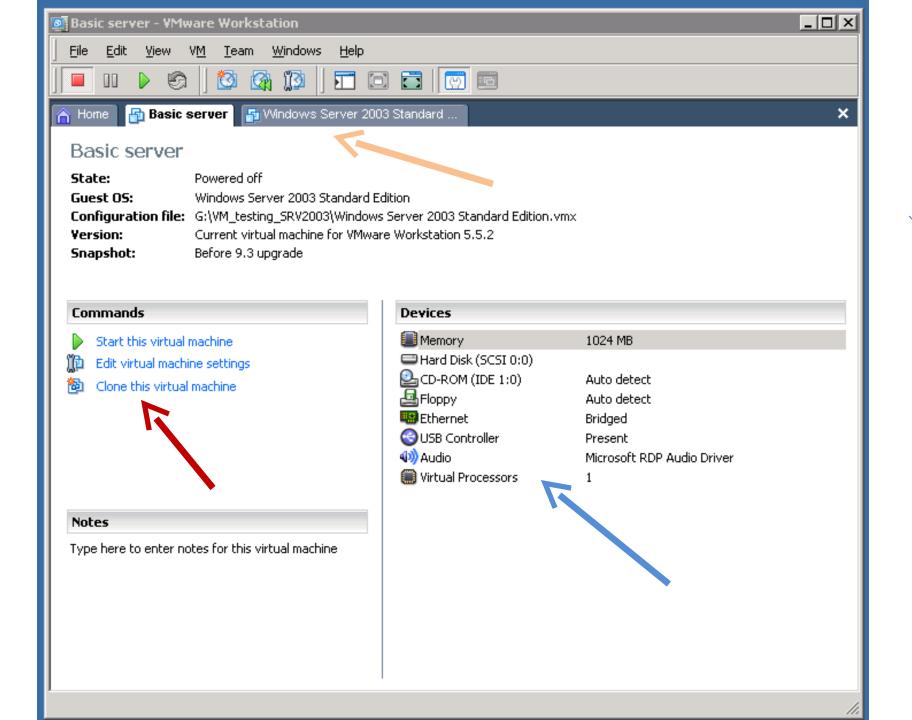
VMware Products: From the Desktop to the Datacenter
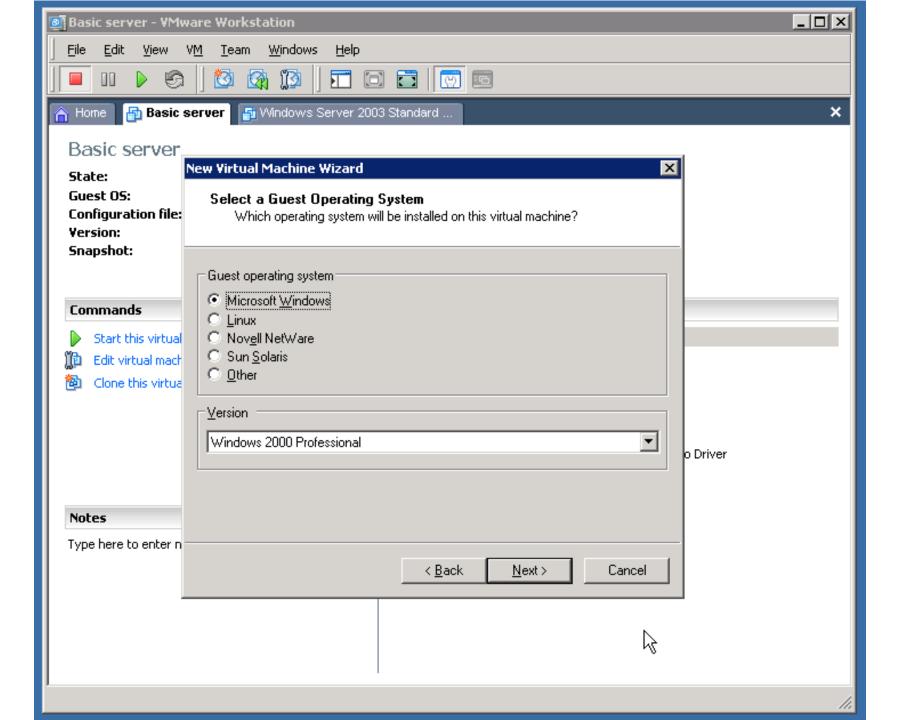
VMware is the recognized leader in virtualization technology solutions proven to increase the utilization of existing hardware and reduce capital and operational costs throughout the organization.

Workstation Admin

Manage Your Server

Command Prompt

Windows Explorer

Notepad

Remote Desktop Connection

VMware Workstation

VMware Infrastructure Client

Mozilla Firef... Location: C:\Program Files\VMware\Infrastructure\Virtual
Client\Launcher

ArcMap

Desktop Administrator

All Programs ▶

My Computer

Control Panel ▶

Administrative Tools ▶

Printers and Faxes

Help and Support

Search

Run...

Windows Security

Log Off   Shut Down

VMware Workstation

File   Edit   View   VM   Team   Windows   Help

Home

VMware Workstation

VMware Workstation allows multiple standard operating systems and their applications to run with high performance in secure and transportable virtual machines. Each virtual machine is equivalent to a PC with a unique network address and full complement of hardware choices.

New Virtual Machine — Click this button to create a new virtual machine. You then can install and run a variety of standard operating systems in the virtual machine.

New Team — Click this button to create a new team. You then can add several virtual machines and connect them with private team LAN segments.

Open Existing VM or Team — Click this button to browse for virtual machines or teams and to select one to display in this panel. You then can interact with the guest operating system within this display as you would a standard PC.

File   Edit   View   VM   Team   Windows   Help

Home   **Basic server**   Windows Server 2003 Standard ...   ✕

Basic server

State:
Guest OS:
Configuration file:
Version:
Snapshot:

Commands

▶ Start this virtual
🔧 Edit virtual mach
📋 Clone this virtua

Notes

Type here to enter n

New Virtual Machine Wizard   ✕

Welcome to the New Virtual Machine Wizard

This wizard will guide you through the steps of creating a new virtual machine.

Workstation 5

o Driver

< Back   Next >   Cancel

Basic server - VMware Workstation

File   Edit   View   VM   Team   Windows   Help

Home | Basic server | Windows Server 2003 Standard ... | ✕

Basic server

State:
Guest OS:
Configuration file:
Version:
Snapshot:

Commands

▶ Start this virtual
▐▌ Edit virtual mach
🗗 Clone this virtua

Notes

Type here to enter n

New Virtual Machine Wizard   ✕

Select a Guest Operating System
Which operating system will be installed on this virtual machine?

Guest operating system

- ● Microsoft Windows
- ○ Linux
- ○ Novell NetWare
- ○ Sun Solaris
- ○ Other

Version

| Windows 2000 Professional ▼ |

o Driver

< Back | Next > | Cancel

Basic server - VMware Workstation

File Edit View VM Team Windows Help

Home | Basic server | Windows Server 2003 Standard ...

Basic server

State:
Guest OS:
Configuration file:
Version:
Snapshot:

Commands

- Start this virtual
- Edit virtual mach
- Clone this virtua

Notes

Type here to enter n

New Virtual Machine Wizard

Name the Virtual Machine
What name would you like to use for this virtual machine?

Virtual machine name
```
Windows Web Server
```

Location
```
G:\VM_testing_SRV2003\
```
Browse...

Driver

< Back | Next > | Cancel

Basic server - VMware Workstation

File   Edit   View   VM   Team   Windows   Help

Basic server

State:
Guest OS:
Configuration file:
Version:
Snapshot:

Commands

▶ Start this virtual
🔧 Edit virtual mach
🔷 Clone this virtua

Notes

Type here to enter n

New Virtual Machine Wizard

Network Type
What type of network do you want to add?

Network connection

◉ Use bridged networking
Give the guest operating system direct access to an external Ethernet network.
The guest must have its own IP address on the external network.

○ Use network address translation (NAT)
Give the guest operating system access to the host computer's dial-up or
external Ethernet network connection using the host's IP address.

○ Use host-only networking
Connect the guest operating system to a private virtual network on the host
computer.

○ Do not use a network connection

[< Back]   [Next >]   [Cancel]

Basic server - VMware Workstation

File   Edit   View   VM   Team   Windows   Help

🏠 Home   🔲 **Basic server**   🔲 Windows Server 2003 Standard ...   ✕

Basic server

State:
Guest OS:
Configuration file:
Version:
Snapshot:

Commands

▶ Start this virtual
🖿 Edit virtual mach
🖿 Clone this virtua

Notes

Type here to enter n

New Virtual Machine Wizard   ✕

Specify Disk Capacity
How large do you want this disk to be?

Disk capacity
This virtual disk can never be larger than the maximum capacity that you set here.

Disk size (GB): [8.0]

☐ Allocate all disk space now.

By allocating the full capacity of the virtual disk, you enhance performance of
your virtual machine. However, the disk will take longer to create and there must
be enough space on the host's physical disk.

If you do not allocate disk space now, your virtual disk files will start small, then
become larger as you add applications, files, and data to your virtual machine.

☑ Split disk into 2 GB files

[< Back]   [Finish]   [Cancel]

Windows Web Server - VMware Workstation

File   Edit   View   VM   Team   Windows   Help

Home | Basic server | Windows Server 2003 Standard ... | **Windows Web Server**

Windo...

State:
Guest OS:
Configura
Version:

Comman

▶ Start t
Edit vi
Clone

Notes

Type here

Virtual Machine Settings

Hardware | Options

Device	Summary
🖥 Memory	256 MB
💾 Hard Disk (SCSI 0:0)	
💿 CD-ROM (IDE 1:0)	Auto detect
💾 Floppy	Using drive A:
🔳 Ethernet	Bridged
🔌 USB Controller	Present
🔊 Audio	Auto detect
🔲 Virtual Processors	1

Memory

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine:

`1160` MB

3600

△ Guest OS recommended minimum: 64MB
△ Recommended memory: 256MB
△ Maximum recommended memory: 1740MB
   (Memory swapping may occur beyond this size)

Add...   Remove

OK   Cancel   Help

Windows Web Server - VMware Workstation

File　Edit　View　VM　Team　Windows　Help

Home　Basic server　Windows Server 2003 Standard ...　Windows Web Server

Windows Web Server

State:　Powered off
Guest OS:　Windows 2000 Professional
Configuration file:　G:\VM_testing_SRV2003\New Folder\Windows 2000 Professional.vmx
Version:　Current virtual machine for VMware Workstation 5.5.2

Commands

▶ Start this virtual machine

▩ Edit virtual machine settings

▩ Clone this virtual machine

Notes

Type here to enter notes for this virtual machine

Devices

Memory	256 MB
Hard Disk (SCSI 0:0)	
CD-ROM (IDE 1:0)	Auto detect
Floppy	Using drive A:
Ethernet	Bridged
USB Controller	Present
Audio	Auto detect
Virtual Processors	1

Windows Server 2003 Standard Edition - VMware Workstation

File Edit View VM Team Windows Help

Power   ▶
Removable Devices   ▶

Home   Basic   Standar...   ✕

Snapshot   ▶
Install VMware Tools...
Upgrade Virtual Machine

Send Ctrl+Alt+Del
Grab Input   Ctrl+G

Capture Screen...
Capture Movie...

Clone...
Delete from Disk

Settings...   Ctrl+D

Welcome to Windows

Microsoft
Windows Server 2003
Standard Edition

Copyright © 1985-2003 Microsoft Corporation   *Microsoft*

Press Ctrl-Alt-Delete to begin.

Requiring this key combination at startup helps keep your
computer secure. For more information, click Help.

Help

Virtual server runing on a desktop - a

MS4W - MapServer 4 Windows - version 2.2.1

Introduction

Welcome to MS4W v2.2.1, the MapServer package for Windows. This package is intended to simplify your life if you are:

- a novice MapServer user with little knowledge (or time) to compile MapServer from scratch.
- interested in one of the MS4W addon packages and looking to avoid configuration issues.
- any MapServer user who needs a quick and dirty installation on Windows.

In any of these cases, and probably more, MS4W can help you. However, a few notes about this package:

- This is not a true installer, it will not modify any file or registry setting outside of the MS4W directory.
- Since it is not a true installer, it will not install to any location. It *** **MUST** *** be installed at the root of one of the drives on your system.
- The MS4W addon packages must be extracted at the same root as the base installer, and files must be overwritten.

Features

MS4W contains default installations of Apache, PHP, MapServ, MapScript (CSharp, Java, PHP, Python) and some sample applications. It is stru... a way as to facilitate upgrading individual components without messing up the rest of the install. The base installer package comes pre-configu... following software:

- Apache 2.2.3
- PHP 5.2.0

Permissions   Maps

close tab ☒

VMware Infrastructure Client

vmware

VMware Infrastructure Client

To directly manage a single host, enter the IP address or host name. To manage multiple hosts, enter the IP address or name of a VirtualCenter Server.

IP address / Name: 128.210.115.79

User name: onepurdue\theller

Password: *********

Login   Close   Help

Virtual Machines

Cluster

Host

Datacenter

VirtualCenter Server

VI Client

⏸ **Suspend the virtual machine**

🖋 **Edit virtual machine settings**

Explore Further

▤ **Learn more about virtual machines**

▤ **Learn how to install an operating system**

VMWare™

File   Edit   View   Inventory   Administration   Plugins   Help

Inventory | Scheduled Tasks | Events | Administration | Maps

Connect CD/DVD 1

- Hosts & Clusters
  - Core
    - Matrix
      - esx1.agriculture.pur
      - esx2.agriculture.pur
      - esx3.agriculture.pur
      - 114420082PUDC
      - 114420082PUDC2
      - 114420082PUForms
      - 114420082PURCA
      - 114420082PUSCA
      - 1144Deadpool
      - 1144Ginger
      - 1144GreenArrow
      - 1144Grimlock
      - 1144Magneto
      - 1144NewsRadio
      - 1144Phoenix
      - 1144Punisher
      - 1144Rogue
      - 1144Scooby
      - 1144Smallville
      - 1144Spawn
      - 1144Storm
      - 1144Urkel
      - 1144Witchblade
      - 1144Wolverine
      - 1146BeAware
      - 1158Extension
      - 1158Extension-Clone
      - 1158Printers
      - 1160-Nag
      - 1160-Riesling
      - 1160-Riesling-Clone
      - 1160TestVista0
    - esx4.agriculture.purdue
    - esx5.agriculture.purdue

1146BeAware

Getting Started | Summary | Performance | Tasks & Events | Alarms | Console | Permissions | Maps

close tab ☒

What is a Virtual Machine?

A virtual machine is a software computer that, like a physical computer, runs an operating system and applications. An operating system installed on a virtual machine is called a guest operating system.

Because every virtual machine is an isolated computing environment, you can use virtual machines as desktop or workstation environments, as testing environments, or to consolidate server applications.

In VirtualCenter Server, virtual machines run on hosts or clusters. The same host can run many virtual machines.

Virtual Machines

Cluster

Host

Datacenter

VirtualCenter Server

VI Client

Basic Tasks
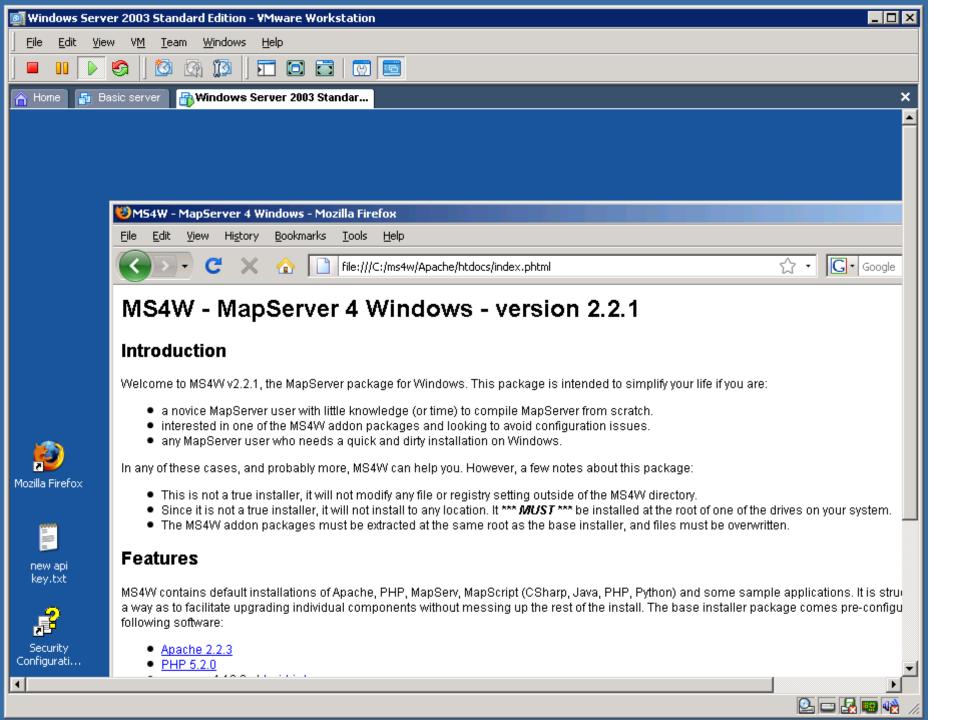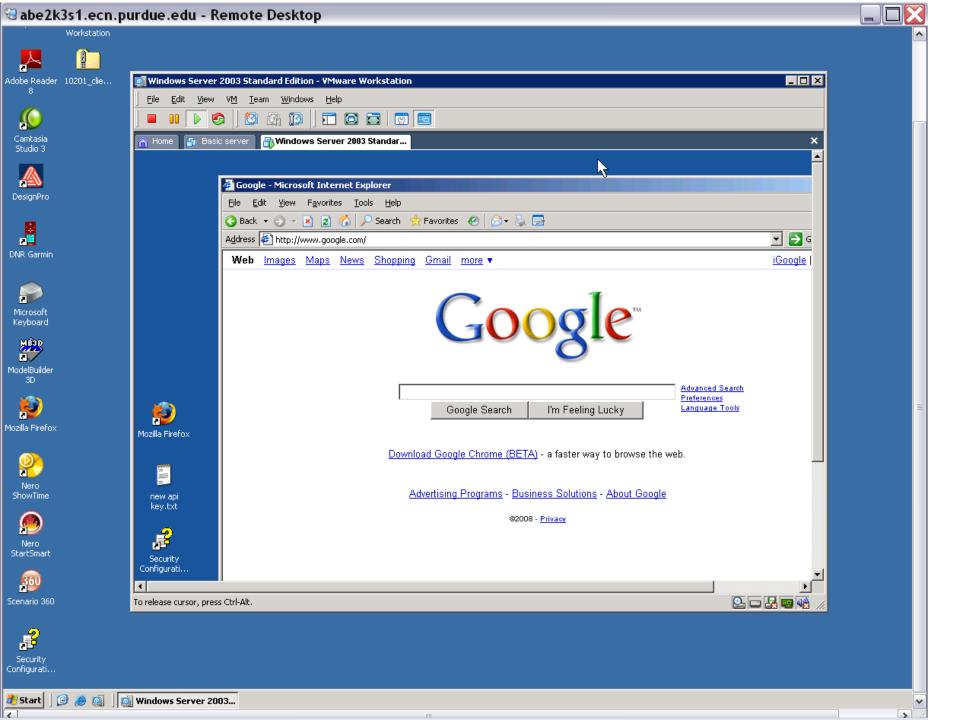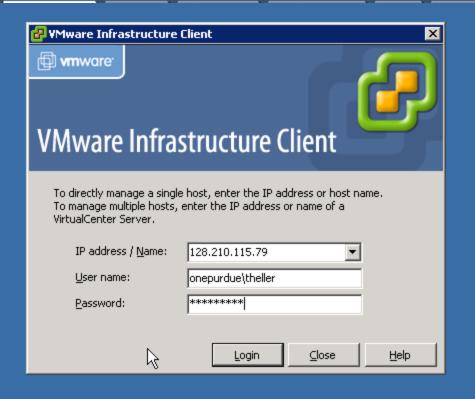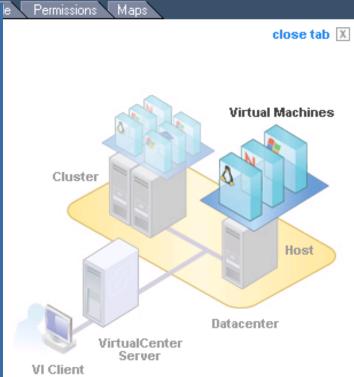
■ **Power off the virtual machine**

❚❚ **Suspend the virtual machine**

▱ **Edit virtual machine settings**

Explore Further

▤ **Learn more about virtual machines**

▤ **Learn how to install an operating system**

Recent Tasks

File   Edit   View   Inventory   Administration   Plugins   Help

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