WHITEPAPER

A logo for a company

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Creating a Virtual Windows Server environment using VMWare with additions of AD DS, FSRM, DHCP, DNS, and Client virtual machine.

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Executive Summary

This whitepaper gives a deep overview of creating a Windows server environment while using VMWare software. This paper explains the setup and how to integrate Active Directory Domain Services (AD DS), File Server Resource Manager (FSRM), Dynamic Host Configuration Protocol (DHCP), and Domain Name System (DNS) into the server. It also explains how to create and configure a Windows client server. This paper will give instructions on what requirements are needed, and how this will apply in real-world environments.

Introduction

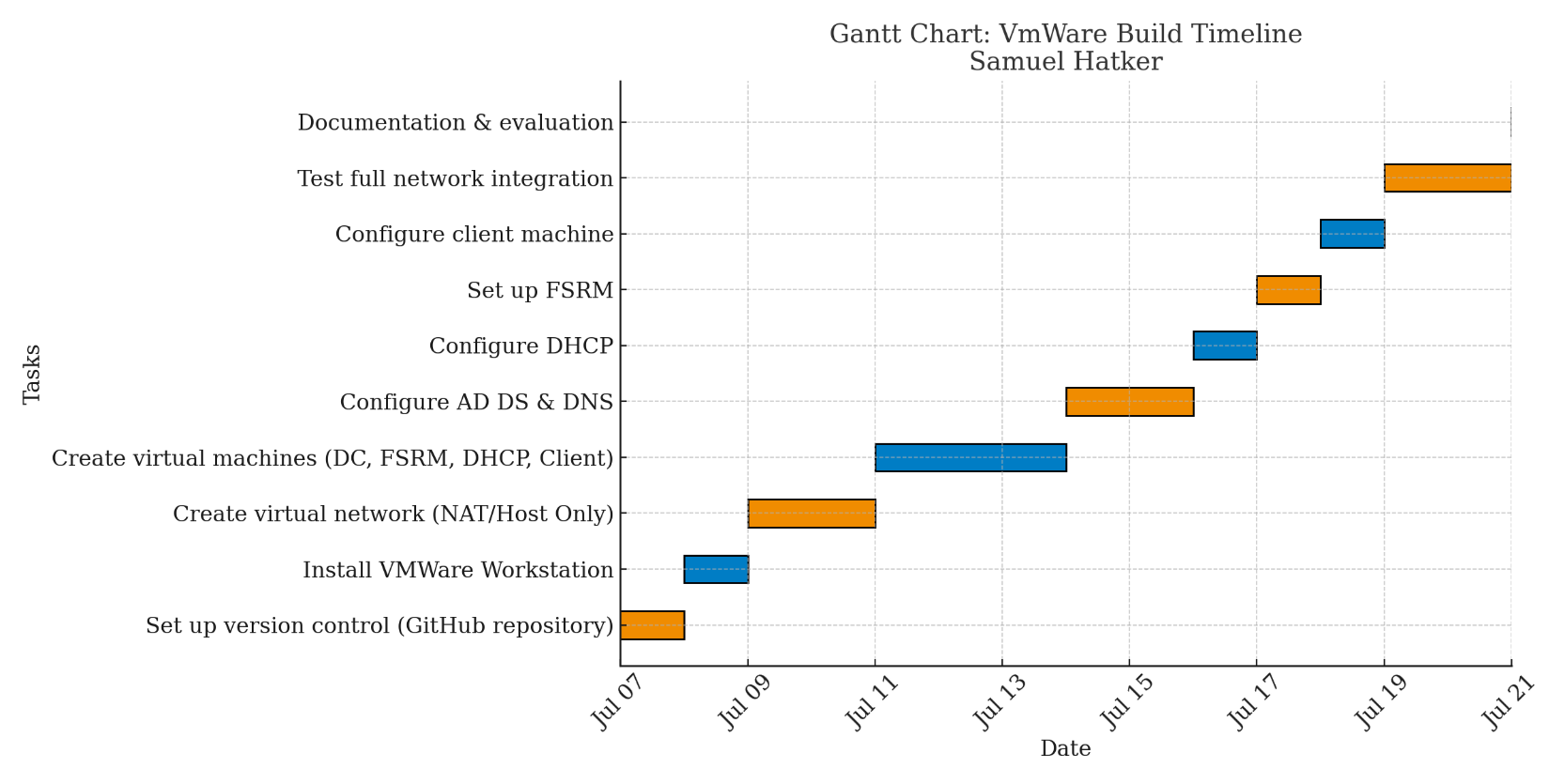
Being able to create a virtual environment has become a great strategy because of its scalability, low cost, and flexibility. IT Professional and students can use VMWare to simulate different full network environments using a virtual machine. This paper demonstrates how to make a Windows Server 2022 environment that meets technical requirements and customer expectations.

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Planning for Small Enterprise Example with Timeline

**Customer wants a virtualized network to replicate a small enterprise. This setup would need:**

1. Create separate virtual machines for each network
2. Assign IP addresses automatically
3. DNS resolution
4. Manage users and devices in the company in a centralized manner
5. File sharing is secured

System Requirements

**Hardware Requirements:**

1. 16 GB RAM minimum
2. 64-bit Processor
3. 500 GB HDD or SSD

**Software Requirements:**

1. VMWare Workstation Pro
2. Windows Server 2022 ISO
3. Windows 10 (or 11) ISO (For client machine)

**Version Control was demonstrated by using GitHub to track the progress of changes in the paper.**

Virtual Network Setup

1. **Install VMWare Workstation**
2. **Create the Virtual Machines:**
   * Domain Controller (ADDS, DNS) – Domc25
   * File Server (FSRM) – Fsrm25
   * DHCP Server – Dhcp25
   * Windows 10 Client – Winclient25

Configure Domain Controller (ADDS, DNS)

1. **Choose to Create a New Virtual Machine**
   * Make sure you choose custom, Next
   * Keep Hardware compatibility at Workstation 17.5 or later
   * Installer disc image file (iso):
     + Click Browse and choose your server ISO or you can install later
     + Next
   * Don’t add product key, Next
   * Name VM (Domc25)
   * Keep UEFI if using Windows Server 2016-2022, BIOS if installing Windows Server 2008 or older.
   * For processor configuration, switch the numbers (2,1 to 1,2) due to it being a test environment.
   * Keep Memory, Next.
   * Keep NAT for now, Next.
   * Next
   * Disk Type is SCSI not NVMe
   * Create New Disk
   * Next, Next
   * For Ready to Create VM, choose Finish.
2. **Install Windows Server 2022**

* Boot Domain Controller
* Press any key to boot from CD/DVD, Press any key.
* Windows Server installation wizard:
  + Select language/keyboard layout
  + Install
  + Skip product key
  + Select Windows Server edition (Desktop)
  + Choose where to install the VM disk
* After, Installation starts.
* Set Username and Password (SMALL is the domain name, small.net):
  + Username: SMALL\Administrator
  + Password: Password1

1. **Configure IP and DNS**
   * On desktop, right-click Start > Network Connections
   * Click Ethernet > Change adapter options
   * Right-click Ethernet > Properties
   * Double click Internet Protocol Version 4 (TCP/ IPv4)
   * Select the IP, Subnet Mask, Default Gateway
   * Add Preferred DNS server, leave alternate DNS blank
   * Click OK > OK > Close
   * TEST:
     + Open Command Prompt as administrator:
       - Ipconfig /all

ping (address here)

1. **Install the roles of AD DS on Domc25**
   * Open Server Manager (opens automatically)
   * Click Manage
   * Click “Add Roles and features”
   * Before you begin, select Next
   * Select Role-based or feature-based installation, Next
   * Choose server (hostname), Next
   * Scroll down and check Active Directory Domain Services:
     + Click Add Features: DNS Server

* Click Next
* Leave defaults on Select Features, Next
* Next
  + Complete installation
  + After installation, in Server Manager select Promote this server to a domain controller

1. **Promote to Domain Controller**
   * Select Add a new forest
   * Enter a domain name (small.net)
   * For Domain Controller Options, leave defaults checked
   * Set Directory Services Restore Mode (DSRM) password
   * DNS options, ignore warning
   * Confirm NetBIOS name (SMALL)
   * For paths, leave default, then Install
2. **Verify ADDS and DNS**
   * In Server Manager:
     + Tools > Active Directory Users and Computers
     + Domain should be there (small.net)

* Check DNS:
  + Tools > DNS

1. **Create Structure for Clients**
   * Create Organizational Units (OUs):
     + In Active Directory Users and Computers:
       - Right-click domain > New > OU

* Create OUs (Groups and Users)
* Add Users:
  + Right-click > New > User
  + Add name, last name, and username for User
  + Set password and uncheck User must change password at next login”

Configure DHCP

1. Install DHCP Role on Dhcp25
2. Authorize the DHCP server
3. Create the scope for DHCP (ex. 192.168.24.100- 192.168.24.200)

Configure File Server Resource Manager

1. Install FSRM Role on Fileserv25
   * Server Manager - Add Roles and Features - File and Storage Services - File Services - File Server Resource Manager
2. Make a shared folder for client machine(s)
   * Right click - Properties - Sharing tab - Advanced Sharing - Share as Users
   * Configure permissions and rules for users with access

Client Machine Configuration

1. Install Windows 10 or 11
2. Set the DNS server to Domc25 IP address
3. Join the set domain (ex. domain.net)
4. Login to the domain with set credentials

How it all works together

* AD DS manages computers, users and logins. It provides central authority when it comes to security.
* DNS resolves names into IP addresses in the domain which lets clients locate servers.
* DHCP assigns the IP addresses
* FSRM manages file storage which makes rules for files and space
* Windows Client uses all and needs all for their machine to work properly

Conclusion

Using VMWare is an important and efficient way to create an environment for testing, education, and just practicing your networking configuration skills. When you add AD DS, DNS, DHCP, and FSRM this can give the user gain experience with making good grade level environments for potential jobs or clients. This also gives students a great understanding for jobs that specialize in networking and support jobs.