

Lab 3: Enterprise Windows Server Administration

Lab 3: Enterprise Windows Server Administration

CNIT 242000 – Lab Section 001

Group 9

Naif Alamri

Ruiming Xu

Shashank Ramji

Submitted To: Phillip Rawles, Oscar Wong

Date Submitted: 07/06/2024

Submission Date Due: 07/06/2024

Table of Contents

| | |
|--|----|
| Executive Summary | 2 |
| Business Scenario | 3 |
| Procedures | 4 |
| Addressing VMs in Secondary Location | 5 |
| Deploy Windows Server VM from Template | 5 |
| Domain Controller 2 Virtual Machine Creation | 6 |
| Domain Controller 2 VM Domain Joining, Subnet & FSMO Roles Configuration | 7 |
| G09Backup Virtual Machine Creation, Disk Partitioning & Domain Joining | 7 |
| G09Backup Virtual Machine Microsoft Backup Server Installation | 8 |
| Duplex Queue Printing Setup | 9 |
| Internet Information Services (IIS) VM & Sites Creation | 10 |
| Internet Information Services (IIS) Firewall Rules Configuration | 12 |
| DFS Role Installation | 14 |
| DFS Namespace Creation | 14 |
| DFS Replication Config | 15 |
| User Profile Group Policy Object (GPO) and Path Reconfiguration | 16 |
| WSUS Virtual Machine Creation | 17 |
| WSUS Virtual Machine Networking, Naming and Storage Configuration | 17 |
| WSUS Virtual Machine Server Role Installation and AD Domain Joining | 18 |
| WSUS Group Policy Object (GPO) Creation | 19 |
| WSUS Deployment | 19 |
| VMware Thinapp Virtual Machine Creation, Domain Joining and Snapshot | 20 |
| VMware Thinapp & Microsoft Visio 7 Installation | 22 |
| Microsoft Powershell Remoting | 23 |
| Results | 26 |
| Logical Network Diagram | 17 |
| Physical Network Diagram | 18 |
| Conclusions and Recommendations | 28 |
| Recommendations | 29 |
| Bibliography | 30 |
| APPENDIX A: Problem Solving | 32 |
| Printer not Appearing in Certain VMs Issue | 32 |
| vCenter and VM Lag/Freezing Issue | 35 |
| Corrupted Visio 7 File in Thinapp Packaging Issue | 38 |

| | |
|---|----|
| Lab 3: Enterprise Windows Server Administration | 2 |
| APPENDIX B: Switch Configurations | 41 |
| IP Schema and Computer Names | 42 |
| APPENDIX C: IIS Site HTML | 46 |
| G09Public Site HTML Code | 46 |
| G09Private Site HTML Code | 47 |
| G09Protected Site HTML Code | 48 |

EXECUTIVE SUMMARY

Lab 3 enhances the Windows-based enterprise environment using VMware ESXi. This lab focused on network expansion, redundancy, and virtualization which was divided into 2 phases. Phase 1 of the lab focused on expanding the existing infrastructure, functionalities, and increasing redundancy. This involved adding a new VM port group to ESXi servers for a secondary enterprise location, a new DC at the additional location with a defined subnet and site, transferred FSMO rules, a new Windows 10 VM, a backup system using Microsoft Server Backup with a VM as backup target, two print queues, a print operator/administrator, an IIS server with three web sites with varying accessibility, and a DFS namespace with replication across the two DCs. Phase 2 of the lab extended the server management capabilities and redundancy by introducing WSUS on a new Windows Server instance with a second 80 GB Thin Provisioned hard drive to automatically store updates via GPO. PowerShell Remote commands were also utilized to manage services on remote machines efficiently. VMware Thinapp facilitated the packaging and deployment of Microsoft Visio 7 to physical machines.

Throughout the lab, some challenges faced included printers not appearing in certain VMs, high latency in VM and vCenter use, and corrupted Visio 7 applications in ThinApp packages. These issues are covered more in detail in Appendix A of this report. Appendix B goes over the vSwitch and IP Schemas, while Appendix C shows the HTML of IIS sites.

Following this executive summary, the business scenario will go over the reasoning, description and thought process of the business scenario created for the system. The process section will describe how each requirement of Lab 3 was achieved. The results section of this report will describe all of the components completed in Lab 3, and the conclusions and recommendation section will tie the work done in Lab 3 with the business scenario as well as explain what was learned from Lab 3.

BUSINESS SCENARIO

Westwood Local Hospital, due to its growing number of devices and increasing storage requirements, is focusing on enhancing its Windows-based enterprise infrastructure. To optimize network management, a second enterprise location needs to be configured, a second DC with increased functionality, increased redundancy, backup solutions, increased printer functionality, web services, DFS and its capabilities, domain-wide WSUS functionalities, PowerShell remote capabilities, and application packaging. To accomplish this, StudentVC, vCenter, 2 ESXi hosts, and their host clients were needed to host the operations of the various tasks of Lab 3. Various VMs with different OSes, such as Windows 10 and Windows Server 2019 were needed for various application uses as well. Among these applications, ThinApp, used for packaging applications, was obtained through the \\rtfm.cit.lcl network share with Purdue credentials, while other applications like Microsoft Server Backup, DFS Management, IIS Manager, Windows Firewall, and WSUS were obtained through role installation from the server manager or already within the system such as PowerShell. A secondary network and its IP configurations were provided by the IP configuration sheet to be used to establish the second enterprise location and further configurations were done on the ESXi host clients. Furthermore, printers and their drivers were established in previous labs. These applications were utilized to increase redundancy and expand environment capabilities.

The logical network of this project is as follows: the server and clients are connected to the internet via two different network locations (CNIT242G09A and B), while some also are connected to CNIT242iSCSI for iSCSI traffic. A diagram of this can be seen in Figure 1 in the Results section.

PROCEDURES

The procedures section is organized by tasks. Additionally, the formatting of this section is as follows: **buttons** are bold, *options* are italicized, text entered into the computer is in Courier New, menu navigation is by the pipe symbol and italic words: *Start | Programs | MS Office | Word*.

Second Port Group Addition to ESXi Servers

- 1.) Logged in to StudentVC
- 2.) Turned off the ESXi Server 1 by pressing **Power Off**
- 3.) Edited cnit242.ESXI.server1 and clicked **Add new device | Network adapter**
 - a.) Selected **CNIT242G09B**
- 4.) Turned on the ESXi Server by pressing **Power On**
- 5.) On a client VM, logged into the IP address of the ESXi Server
 - a.) For this specific instance, 44.100.9.28 was entered into the browser.
- 6.) Created a new virtual switch under networking tab
 - a.) Named it *Secondary-Switch*
- 7.) Created a new port group named *CNIT242-Secondary*
 - a.) Selected the **Secondary-Switch** from step 6a under the switch tab
- 8.) Created new vmkernel with step 7a's port group and entered in IP address and subnet mask as per IP Configuration sheet
 - a.) Selected **Static** under the IPv4 tab
- 9.) Repeated steps 1-8 for other ESXi Server (cnit242.ESXI.server2)

Addressing VMs in Secondary Location

1. Edited VMs that are desired to change networks and clicked **Add new device | Network adapter**
 - a.) Selected **CNIT242G09B**
- 10.) Delete the original Network Adapter 1
- 11.) Repeat step 10 for other desired VMs

Deploy Windows Server VM from Template

1. Log into vSphere Client with created credentials from Lab 2
2. Right-click on desired ESXi Server
 - a. Select **New Virtual Machine**
3. In the “New Virtual Machine” window that pops up in step 2, select *Deploy from template*
4. In the next tab of the “New Virtual Machine” window, the following was selected *Data Center | Group09.Datacenter | Discovered virtual machine | CNIT242000.Group09*
5. In the next tab of the “New Virtual Machine” window, enter the name
`cnit242.group09.windows10`
6. On the same tab of step 5, *Group09.Datacenter* was selected
7. In the next tab of the “New Virtual Machine” window, selected *44.100.9.29* for compute resource location
8. In the next tab of the “New Virtual Machine” window, selected *ESXi1-Datatore*
9. In the next tab of the “New Virtual Machine” window, selected *Customize this virtual machine's hardware*

10. In the next tab of the “New Virtual Machine” window, the “Customize hardware” tab’s Network adapter 1 tab, the following were selected *Browse | CNIT 242-Secondary | Connect at Power On* to join the secondary network on the new VM
11. On the “Customize hardware” tab’s CD/DVD drive 1 tab, the following were selected: *Datastore ISO File | datastore1 | vmimages | windows.iso | Connect at Power On*
12. In the next tab of the “New Virtual Machine” window, **Finish** was selected

Domain Controller 2 Virtual Machine Creation

1. Navigated to vSphere Client *G09VCENTER.GROUP09.C242.CIT.LCL*
2. Selected *Group09.Datacenter | VMs | VM Templates*
3. Right-clicked **Group09.24200 | New VM from This Template...**
4. Typed *cnit242.group09.dc2* for *Virtual Machine name*
5. Selected *Datastore*
6. Selected *44.100.9.28*
7. Selected *Customize this virtual machine’s hardware*
8. Selected *CNIT242-Secondary1* for Network Adapter 1
9. Clicked **OK**
10. Clicked *Windows Menu | Control Panel | Network and Internet | Network and Sharing Center | Ethernet0 | Properties | Internet Protocol Version 4 (TCP/IP) | Properties*
11. Entered the following IP addresses: *44.100.59.25, 255.255.255.0, 44.100.59.1* For DNS *44.100.9.33, 44.100.59.25*

Domain Controller 2 VM Domain Joining

1. Navigate to the Control Panel by typing *Control Panel* in the Windows search bar

2. The following selections were made in the Control Panel window: System and Security | Set the name of this computer | Computer name, domain, and workgroup settings | Change Settings | Computer Name | Change | Member of | Domain
3. In the text box for the domain name to be entered, the following was entered:
`group09.c242.cit.lcl`
4. **OK** was clicked on, and the domain was joined

Domain Controller 2 VM Subnet & Site Configuration

1. Navigated to Server Manager (automatically opened each login) and selected *Tools*
2. Within the Tools list, *Active Directory Sites and Services* was selected
3. Within the Active Directory Sites and Services, *Sites* was right clicked on and *New site* was selected within the dropdown menu
4. In the New site window, `Site2` was entered as site name and *DEFAULTIPSITELINK* was selected as the link name

Migrating Domain Controller 2 to Site2

1. Navigated to Server Manager (automatically opened each login) and selected *Tools*
2. Within the Tools list, *Active Directory Sites and Services* was selected
3. The following selections were made in the Active Directory Site and Services window: Default-Site-First-Name | Servers
4. Then, DC2 was right clicked on and *Move...* was selected

- a. Within the Move Server window that pops up from step 4, *Site2* was selected and **OK** was clicked on to complete the migration process

FSMO Role Migration

1. For RID Master, Infrastructure Master or PDC Emulator migration, the following steps were followed:
 - a. Logged in to DC2
 - b. Navigated to Server Manager (automatically opened each login) and selected *Tools*
 - c. Within the Tools list, *Active Directory Users and Computers* was selected
 - d. Right-clicked on the domain node and clicked on *Operations Masters*
 - e. Select RID, PDC, or Infrastructure tab based on desired FSMO role to move of the Operations Masters window
 - f. In the second text box, entered `dc2.group09.c242.cit.lcl` for the migration location
 - g. Clicked on **Change**
2. For Domain Naming Master, the following steps were followed:
 - a. Logged in to DC2
 - b. Navigated to Server Manager (automatically opened each login) and selected *Tools*
 - c. Within the Tools list, *Active Directory Domains and Trusts* was selected

- d. Right-clicked on the Active Directory Domains and Trusts node and chose *Operations Masters*
 - e. In the second text box of the Operations Masters window, entered `dc2.group09.c242.cit.lcl` for the migration location
 - f. Clicked on **Change**
3. For Schema Master, the following steps were followed:
- a. In the Windows search bar, right-clicked Command Prompt and selected *Run as Administrator*
 - b. The following was entered into the command prompt: `regsvr32 schmmgmt.dll`
 - c. In the Windows search bar, `run` was entered and selected, where `mmc.exe` was then entered
 - d. In `mmc.exe`, clicked on *File* and chose *Add/Remove Snap-In*
 - e. In the window that pops up after step 3d, the following were selected: Active Directory Schema | Add | OK
 - f. Right-clicked on *Active Directory Schema* and clicked on *Change Active Directory Domain Controller*
 - g. In the window that pops up after step 3f, the following were selected: This Domain Controller or AD LDS instance | `dc2.group09.c242.cit.lcl` | OK
 - h. Right-clicked on Active Directory Schema and selected *Operations Master*
 - i. In the second text box of the Operations Masters window, entered `dc2.group09.c242.cit.lcl` for the migration location
 - j. Clicked on **Change**

G09Backup Virtual Machine Creation, Disk Partitioning & Domain Joining

1. Navigated to vSphere Client *G09VCENTER.GROUP09.C242.CIT.LCL*
2. Selected *Group09.Datacenter* | **VMs** | **VM Templates**
3. Right-clicked **Group09.win10** | **New VM from This Template...**
4. Typed `cnit242.group09.backup` for *Virtual Machine name*
5. Selected *Datastore*
6. Selected *44.100.9.28*
7. Selected *Customize this virtual machine's hardware*
8. Clicked **Add New Device** | **Hard Disk**
9. Clicked **New Hard Disk**
10. Typed 400 for *GB*
11. Selected *Thin Provision* for Disk Provisioning
12. Clicked **Finish**
13. Clicked *Windows Menu* | *Settings* | *About* | **Rename this PC**
14. Typed Backup into *Name*
15. Clicked **Restart Now**
16. Clicked *Windows Menu* | *Control Panel* | *Network and Internet* | *Network and Sharing Center* | *Ethernet0* | **Properties** | *Internet Protocol Version 4 (TCP/IP)* | **Properties**
17. Entered the following IP addresses: 44.100.59.27, 255.255.255.0, 44.100.59.1 For DNS 44.100.9.33, 44.100.59.25
18. Clicked *Windows Menu* | Typed MMC
19. Clicked *File* | **Add/Remove snap-in**
20. Clicked *Disk Management* | **Add** | **Finish**
21. Double-clicked **Disk Management**

22. Right-clicked Disk 1 | **Online**
23. Right-clicked Disk 1 | **Initialize Disk**
24. Selected *GPT*
25. Right-clicked Disk 1 | **New Simple Volume**
26. Clicked **E:** for *letter* Drive
27. Clicked *Windows Menu* | **Control Panel** | *System and Security* | *System* | **Advanced System Settings** | *Computer Name* | **Change...**
28. Selected *Member of Domain*
29. Entered `group09.c242.cit.lcl` for Domain
30. Clicked **OK**
31. Entered `Group09\Administrator` credentials
32. Clicked **Restart Now**
33. Right-clicked **Windows Icon** | **File Explorer**
34. Navigated to *This PC*
35. Right-clicked **New Volume (E:)** | **New...** | **Folder**
36. Typed `Backup`
37. Right-clicked **Backup** | **Properties** | **Sharing** | **Share...**
38. Clicked **OK**

G09Backup Virtual Machine Microsoft Backup Server Installation

1. In Server Manager, clicked **Manage** | **Add Roles and Features**
2. Selected *Role-based or Feature-based installation*
3. Selected *G09SRV1.group09.c242.cit.lcl*
4. Checked *Windows Server Backup* | *Restart the destination server automatically if required*

5. Clicked **Yes** | **Install**
6. Clicked **Tools** | **Windows Server Backup** | **Local Backup**
7. Clicked **Backup Schedule**
8. Selected *Custom*
9. Clicked **Add Items**
10. Selected *C:\G09SRV1\SRV1Shared* | *C:\Windows\NTDS\NTDS.dit*
11. Selected *Once a day* | *1:00 AM* for *Select time of day* | *Back up to a shared network folder*
12. Typed \\Backup\backup for *Location*
13. Selected *Inherit* for Access Control
14. Entered Group09\Administrator credentials
15. Clicked **Finish**

Legal Sized Paper Queue Printing Setup

1. Navigated to *Server Manager* on DC1 | **Tools** | **Print Management**
2. Right-clicked **Printers** | **Add Printer...**
3. Selected *Add a new printer using an existing port* | **BULLZIP (Bullzip PDF Printer Port)**
4. Selected *Use an existing printer driver on the computer* | **Bullzip PDF Printer**
5. Typed Bullzip PDF Printer – Legal for *Printer Name*
6. Checked *Share this printer* | **Next**
7. Right-clicked **Bullzip PDF Printer – Legal** | **Properties...** | **Security**
8. Deselected *Everyone* | Selected *Administrator Group* | *Print* for Allow

Print Master Config

1. Navigated to *Server Manager* on DC1 | **Tools** | **Print Management**
2. Right-clicked on **Bullzip PDF Printer – Legal** | **Properties...** | **Security**
3. Clicked on **Add** and entered `Michael Scott`
4. After adding the user Michael Scott, who was designated Print Master, all available permissions were selected
5. Clicked on **Apply** and **OK**

Internet Information Services (IIS) VM & Sites Creation

1. Navigated *Group09.Datacenter* | *VMs* | *VM Templates* in vSphere *G09VCENTER.GROUP09.C242.CIT.LCL*
2. Right-clicked *CNIT24200.Group09* | **New VM from this template...**
3. Typed `cnit242.group09.IIS` into Virtual Machine name
4. Selected *44.100.9.29*
5. Selected *Datastore (1)*
6. Enabled *Customize this virtual machine's hardware*
7. Clicked **Next**
8. Selected *CNIT242-Secondary1* for Network Adapter 1
9. Clicked **OK**
10. Clicked *Windows Menu* | *Control Panel* | *Network and Internet* | *Network and Sharing Center* | *Ethernet0* | **Properties** | *Internet Protocol Version 4 (TCP/IP)* | **Properties**
11. Entered the following IP addresses: `44.100.59.150`, `255.255.255.0`, `44.100.59.1` For DNS `44.100.9.33`, `44.100.59.25`
12. Clicked *Windows Menu* | *Server Manager* | **Manage** | **Add Roles or Features...**
13. Selected *Role-based or feature-based installation* | *G09SRV1*
14. Selected *Web Server (IIS)* | *Restart destination server automatically if required*

15. Clicked **Install**
16. Clicked *Windows Icon* | Opened *Internet Information Services (IIS) Manager*
17. Right-clicked *G09SRV1 (G09SRV1\Administrator)* | *Sites* | **Add Website...**
18. Typed *G09Public* for *Site Name* | *C:\IISites\G09Public* for *Physical path* | *Port 1000*
19. Clicked *Windows Menu*
20. Typed *Notepad*
21. Typed an HTML code, refer to Appendix C for more information
22. Clicked **File** | **Save as...** | Navigated to *IISites\G09Public File*
23. Typed *Default.htm* for *Notepad name*
24. Clicked **Save**
25. Right-clicked *G09SRV1 (G09SRV1\Administrator)* | *Sites* | **Add Website...**
26. Typed *G09Protected* for *Site Name* | *C:\IISites\G09Protected* for *Physical path* | *Port 1001*
27. Clicked *Windows Menu*
28. Typed *Notepad*
29. Typed an HTML code, refer to Appendix C for more information
30. Clicked **File** | **Save as...** | Navigated to *IISites\G09Protected File*
31. Typed *Default.htm* for *Notepad name*
32. Clicked **Save**
33. Right-clicked *G09SRV1 (G09SRV1\Administrator)* | *Sites* | **Add Website...**
34. Typed *G09Private* for *Site Name* | *C:\IISites\G09Private* for *Physical path* | *Port 1002*
35. Clicked *Windows Menu*
36. Typed *Notepad*

37. Typed an HTML code, refer to Appendix C for more information
38. Clicked **File** | **Save as...** | Navigated to *\IISites\G09Private File*
39. Typed `Default.htm` for *Notepad name*
40. Clicked **Save**

Internet Information Services (IIS) Firewall Rules Configuration

1. Clicked *Windows Menu*
2. Typed *Run* | *Firewall.cpl*
3. Clicked **Advanced Settings** | **Inbound Rules** | **New Rule...**
4. Selected *Port* | *TCP*
5. Typed `1000`
6. Selected *Allow this connection*
7. Selected *Domain* | *Private* | *Public*
8. Typed `G09Public` for *Name*
9. Clicked **Finish**
10. Clicked **New Rule...**
11. Selected *Port* | *TCP*
12. Typed `1001` for *Specific local ports*
13. Selected *Allow this connection*
14. Selected *Domain* | *Private* | *Public*
15. Typed `G09Protected` for *Name*
16. Clicked **Finish**
17. Clicked **New Rule...**

18. Selected *Port* | *TCP*
19. Typed 1002 for *Specific local ports*
20. Selected *Allow this connection*
21. Selected *Domain* | *Private* | *Public*
22. Typed G09Private for *Name*
23. Right-clicked *G09Protected* | **Properties** | *Scope*
24. Selected *These IP Addresses for Local IP Addresses* and *These IP Addresses for Remote IP Addresses*
25. Clicked **Add...** for *local IP addresses*
26. Selected *This IP Address range*
27. Typed 44.100.59.1 for *From*
28. Typed 44.100.59.255 for *To*
29. Clicked **Add...** for *Remote IP Addresses*
30. Typed 44.100.59.1 for *From*
31. Typed 44.100.59.255 for *To*
32. Clicked **OK**
33. Right-clicked *G09Private* | **Properties** | *Scope*
34. Selected *These IP Addresses for Local IP Addresses* and *These IP Addresses for Remote IP Addresses*
35. Clicked **Add...** for *local IP addresses*
36. Selected *This IP Address range*
37. Typed 44.100.59.1 for *From*
38. Typed 44.100.59.255 for *To*

39. Clicked **Add...** for *local IP addresses*
40. Typed 44.100.9.1 for *From*
41. Typed 44.100.9.255 for *To*
42. Clicked **Add...** for Remote IP Addresses
43. Typed 44.100.59.1 for *From*
44. Typed 44.100.59.255 for *To*
45. Clicked **Add...** for Remote IP Addresses
46. Typed 44.100.9.1 for *From*
47. Typed 44.100.9.255 for *To*
48. Clicked **OK**

DFS Role Installation

1. In Server Manager on DC1 clicked **Manage | Add Roles and Features**
2. Selected *Role-based or feature-based installation*
3. Selected *Select a server from the server pool | G09SRV1.group09.c242.cit.lcl*
4. Expanded *File and Storage Services | File and ISCSI Services*
5. Selected *DFS Namespaces*
6. Clicked **Add Features**
7. Selected *DFS Replication*
8. Clicked **Add Features**
9. Enabled *Restart the destination server automatically if required*
10. Clicked **Install**

DFS Namespace Creation

1. Clicked *Tools* | **DFS Management**
2. Right-clicked *Namespaces* | **New Namespace...**
3. Entered G09SRV1 for Server
4. Entered newdfs for Name
5. Clicked **Edit Settings**
6. Set the *Local path of shared folder* to Default
7. Selected *Administrators have full access; other users have read and write permissions* | Clicked **OK**
8. Selected *Domain-based namespace*
9. Enabled *Enable Windows Server 2008 namespace*
10. Clicked **Create**
11. Right-clicked \\group09.c242.cit.lcl | **New Folder...**
12. Typed User Profiles\$ for Name
13. Clicked **Add...**
14. Entered \\G09SRV1\SRV1Shared\Profiles for *Path to folder target*
15. Clicked **OK**
16. Right-clicked \\group09.c242.cit.lcl | **New Folder...**
17. Typed Users for Name
18. Clicked **Add...**
19. Entered \\G09SRV1\SRV1Shared\Users for *Path to folder target*
20. Clicked **OK**

DFS Replication Config

1. Right-clicked *Replication* | **New Replication Group...**
2. Selected *Multipurpose replication group*
3. Typed `User Profiles$` for *Name of replication group*
4. Clicked **Add...**
5. Typed `G09SRV1; DC2` into Enter the object names to select
6. Selected *Full mesh*
7. Selected *Replicate continually using the specified bandwidth*
8. Selected *Full* for Bandwidth
9. Selected *G09SRV1* as Primary member
10. Clicked **Add...**
11. Typed `C:\G09SRV1\SRV1Shared\Profiles` for *Local path of folder to replicate*
12. Clicked **OK**
13. Clicked **Create**
14. Repeated steps 1-13 for Folder Redirection folder.

User Profile Group Policy Object (GPO) and Path Reconfiguration

1. In Server Manager, clicked *Tools* | **Group Policy Management**
2. Right-clicked *Roaming profiles* GPO | **Edit**
3. Navigated to *Computer Configuration* | *Policies* | *Administrative Templates* | *System* | *User Profiles* | Double-clicked **Set roaming profile path for all users logging on to this computer**
4. Entered `\\group09.c242.cit.lcl\newdfs\User Profiles$\%username%` for *Users logging onto this computer should use this roaming profile path*

5. Clicked **OK**
6. In Server Manager, clicked **Tools | Active Directory Users and Groups**
7. Clicked **InformationTechnology** group
8. Selected all members of this group
9. Right-clicked | Properties
10. Selected *Profile*
11. Entered `\\group09.c242.cit.lcl\newdfs\User Profiles$\%username%` for *Profile Path*

WSUS Virtual Machine Creation

1. Navigated *Group09.Datacenter | VMs | VM Templates* in vSphere *G09VCENTER.GROUP09.C242.CIT.LCL*
2. Right-clicked *CNIT24200.Group09* | **New VM from this template...**
3. Typed `cnit242.group09.wsus` into Virtual Machine name
4. Selected *44.100.9.29*
5. Selected *Datastore (1)*
6. Enabled *Customize this virtual machine's hardware*
7. Clicked **Next**
8. Clicked *Add new device | Hard Disk*
9. Entered 80 (GB) into *size*
10. Selected *Thin Provision* for Disk Provision
11. Clicked **Create**

WSUS Virtual Machine Networking, Naming and Storage Configuration

1. Clicked *Windows Menu* | *Settings* | *About* | **Rename this PC**
2. Typed WSUS into *Name*
3. Clicked **Restart Now**
4. Clicked *Windows Menu* | *Control Panel* | *Network and Internet* | *Network and Sharing Center* | *Ethernet0* | **Properties** | *Internet Protocol Version 4 (TCP/IP)* | **Properties**
5. Entered the following IP addresses: 44.100.59.52, 255.255.255.0, 44.100.59.1 For DNS 44.100.9.33, 44.100.59.25
6. Clicked *Windows Menu* | Typed MMC
7. Clicked *File* | **Add/Remove snap-in**
8. Clicked *Disk Management* | **Add** | **Finish**
9. Double-clicked **Disk Management**
10. Right-clicked Disk 1 | **Online**
11. Right-clicked Disk 1 | **Initialize Disk**
12. Selected *GPT*
13. Right-clicked Disk 1 | **New Simple Volume**
14. Clicked **E:** for *letter* Drive

WSUS Virtual Machine Server Role Installation and AD Domain Joining

1. In Server Manager | *Manage* | **Add Roles and Features**
2. Selected *Role-based or feature-based installation*
3. Selected *WSUS*
4. Selected *Windows Server Update Services* | **Add Features** | **Next**
5. Selected *WID Connectivity* and *WSUS Services* | **Next**

6. Typed `E:\WSUS-Store` into *Store updates in the following location* | **Next** | **Install**
7. Clicked *Windows Menu* | **Control Panel** | *System and Security* | *System* | **Advanced System Settings** | *Computer Name* | **Change...**
8. Selected *Member of Domain*
9. Entered `group09.c242.cit.lcl` for Domain
10. Clicked **OK**
11. Entered `Group09\Administrator` credentials
12. Clicked **Restart Now**

WSUS Group Policy Object (GPO) Creation

1. In Server Manager on DC1, clicked *Tools* | **Group Policy Management**
2. Right-clicked `group09.c242.cit.lcl` | **Create a new GPO in this domain, and Link it here...** | Typed `WSUSGPO`
3. Right-clicked `WSUSGPO` | **Edit**
4. Navigated to *Computer Configuration* | *Policies* | *Administrative Templates* | *Windows Components* | *Windows Update* | *Configure Automatic Updates*
5. Selected *Enabled*
6. Selected *3- Auto download and notify for install* | **OK**
7. Double-clicked *Specify intranet Microsoft service update location*
8. Selected *Enabled*
9. Typed <http://wsus.group09.c242.cit.lcl:8530> into both *Set the intranet update service for detecting updates* and *Set the intranet statistics server*
10. Enabled *Do not enforce TLS certificate pinning for Windows Update client for detecting updates*
11. Double-clicked *Automatic Updates detection frequency*

12. Selected *Enabled*

13. Entered 1 for *interval (hours)* | **OK**

WSUS Deployment

1. In Server Manager of WSUS Virtual Machine | *Tools* | **Windows Server Update Services**

2. Clicked **Next** | Unchecked the *Yes, I would like to join the Microsoft Update Improvement Program* check-box | **Next**

3. Selected *Synchronize from another Windows Server Update Services server*

4. Typed `wsus.cit.lcl` for Server Name

5. Clicked **Next**

6. Selected *Synchronize automatically*

7. Clicked **Next**

8. Selected *Being initial synchronization*

9. Clicked **Next**

10. Clicked **Finish**

11. In Windows Server Update Services, expanded *WSUS*

12. Navigated *Options*

13. Clicked **Computers**

14. Selected *Use the Update Services console*

15. Clicked **OK**

16. Navigated *Updates* | *All updates*

17. Selected *Any* under *Status*

18. Clicked **Refresh**

19. Selected four updates | Right-clicked *Approve...*

20. Right-clicked *All Computers* | **Approved for install**
21. Right-clicked *Unassigned Computers* | **Approved for install**
22. Clicked **OK**
23. Clicked **Close**

VMware Thinapp Virtual Machine Creation, Domain Joining and Snapshot

1. Navigated *Group09.Datacenter* | *VMs* | *VM Templates* in vSphere
G09VCENTER.GROUP09.C242.CIT.LCL
2. Right-clicked *cnit242.group09.thinapp.template* | **New VM from this template...**
3. Typed `cnit242.group09.thinapp3` into Virtual Machine name
4. Selected *44.100.9.29*
5. Selected *Datastore (1)*
6. Enabled *Customize this virtual machine's hardware*
7. Clicked **Next**
8. Selected *CNIT242-Secondary1* for Network Adapter 1
9. Clicked **OK**
10. Clicked *Windows Menu* | *Settings* | *About* | **Rename this PC**
11. Typed *Thinapp03* into *Name*
12. Clicked **Restart Now**
13. Clicked *Windows Menu* | **Control Panel** | *Network and Internet* | *Network and Sharing Center* | *Ethernet0* | **Properties** | *Internet Protocol Version 4 (TCP/IP)* | **Properties**
14. Entered the following IP addresses: `44.100.59.77`, `255.255.255.0`,
`44.100.59.1` For DNS `44.100.9.33`, `44.100.59.25`
15. Clicked *Windows Menu* | **Control Panel** | *System and Security* | *System* | **Advanced System Settings** | *Computer Name* | **Change...**

16. Selected *Member of Domain*
17. Entered `group09.c242.cit.lcl` for Domain
18. Clicked **OK**
19. Entered Group09\Administrator credentials
20. Clicked **Restart Now**
21. Navigated to vSphere Client
22. Selected *cnit242.group09.thinapp3*
23. Navigated to *Snapshots* | **Take Snapshot...** | **Create**

VMware Thinapp & Microsoft Visio 7 Installation

1. Opened *File Explorer*
2. Entered `\\rtfm.cit.lcl` as the *Path file*
3. Entered *CIT\Purdue Account Credentials*
4. Navigated to *ISO | VMware | Thinapp*
5. Double-clicked **VMware-ThinApp-Enterprise-2212.0.0-21059475**
6. Clicked **Next**
7. Entered License Key and Group09 as *Name*
8. Clicked **Install**
9. Opened *VMware Setup Capture*
10. Clicked **Next**
11. Clicked **Prescan**
12. Opened *File Explorer*
13. Navigated to `\\rtfm.cit.lcl\pub\cnit24200\Visio`
14. Double-clicked **Visio Professional 2007**

15. Double-clicked **en_office_visio_professional_2007_cd_x12-19212**
16. Clicked **Continue**
17. Checked the *I accept the terms of the agreement* check-box
18. Clicked **Continue**
19. Clicked **Install Now | Close**
20. Opened *VMware Setup Capture* tab
21. Clicked **Postscan | OK**
22. Clicked **Next**
23. Selected *Everyone* for *Groups authorized to run this package*
24. Clicked **Next**
25. Selected *File write access to non-system directories (Merged Isolation Mode)* under *File system isolation mode*
26. Clicked **Next**
27. Selected *Custom location or network drive*
28. Typed `\\g09srv1\thinapp`
29. Clicked **Next**
30. Clicked **Save**
31. Clicked **Build**
32. Clicked **Finish**
33. Navigated to vSphere Client *G09VCENTER.GROUP09.C242.CIT.LCL*
34. Selected *cnit242.group09.thinapp3* | **Actions** | *Power* | **Power Off** | **Snapshots** | Selected *VM Snapshot* | **Revert** | **Revert**
35. Navigated to *Summary* | **Launch Web Console**
36. Opened *File Explorer*
37. Typed `\\g09srv1\thinapp` as the file path

38. In the search bar of the folder, typed `Visio.exe`

39. Double-clicked **Visio** | **Run**

Microsoft Powershell Remoting

1. In Windows search bar, the following was entered: `Powershell`
 - a. Right clicked the Powershell option and selected *Run as Administrator*
2. In the command line, the following commands were entered:
 - a. For List Services: `get-serice -Name VMTools -ComputerName DC2`
 - b. For Start Service: `(Get-Service -Name "VMTools" -ComputerName "DC2").start()`
 - c. For Stop Service: `(Get-Service -Name "VMTools" -ComputerName "DC2").stop()`

RESULTS

Lab 3 successfully implemented the creation and configuration of an expanded environment that reflects a larger Windows-based enterprise and increased redundancy. To accomplish this, a new VM port group was created and connected to the two ESXi servers from Lab 2 to represent a second enterprise location. A new virtual switch, port group, and VMkernel NIC were created to direct traffic for the second network CNIT242G09B. To improve redundancy, a second domain controller was also created from a Windows Server VM template and added to the domain. With the new addition of a DC, a new subnet and site were also created in Active Directory, where the second DC 2 resides. Several FSMO roles, such as the PDC emulator, were also migrated to the second DC. Additionally, a Windows 10 VM was also created and configured to the secondary network using the CNIT242-Secondary1 port. To further increase redundancy and ensure files are backed up, Microsoft Backup was also implemented with Microsoft Server Backup on the cnit.242.group09.backup VM. Backups are done on user files and DCDB between 1:00-5:00 A.M. and are hosted on \\backup\backup.

To further increase the functionality of the Windows environment, a user, Michael Scott, was set as print master to control printing documents, queues, and printer properties when needed. Additionally, to support the need for different-sized paper, a second queue was made for the Bullzip PDF printer with legal-sized paper only for members of the administrators group. An IIS web server was also implemented on a new VM, cnit242.group09.IIS. Within the web server, a public web page, G09Public (44.100.59.150:1000) was created, where anyone could access the web page. G09Private (44.100.59.150:1001) was created where only domain members can access the web page. Lastly, G09Protected (44.100.59.150:1002) was created, in which only users on machines in the first VLAN can access the web page. Private and protected sites were configured through rules set through Windows Firewall.

Lab 3 further increases redundancy through the implementation of DFS across both DCs. A DFS namespace was created, and all references of home directories, desktops, etc. were changed to point to the DFS namespace, \\group09.c242.cit.lcl\newdfs through the creation of a new group policy. DFS replication was also implemented such that clients can access shares from the domain controller from their site. Windows Server Update Services was also implemented into a new VM, group09.c242.wsus with a second 80 GB virtual thin provisioned hard drive to store the downloaded updates. Listing, stopping, and starting services such as VMTools on a remote machine was also accomplished through PowerShell Remote with the following commands:

1. List Services: `get-service -Name VMTools -ComputerName DC2`
2. Start Service: `(Get-Service -Name "VMTools" -ComputerName "DC2").start()`
3. Stop Service: `(Get-Service -Name "VMTools" -ComputerName "DC2").stop()`

Lastly, VMware ThinApp was implemented in VMs in the domain, and Microsoft Visio 7 was packaged through ThinApp. It was made accessible to other physical machines using ThinApp through sharing the package on the network share \\G09SRV1.

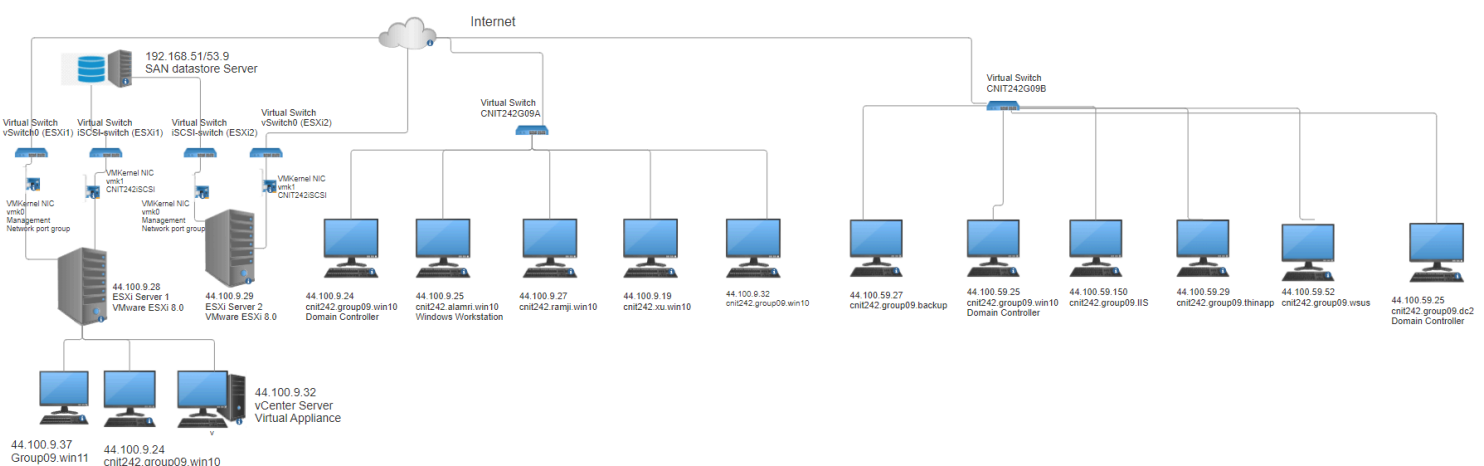


Figure 1: Logical Diagram of Lab 3



CONCLUSIONS AND RECOMMENDATIONS

Lab 3 fulfills Westwood Local Hospital's needs for a larger, more robust enterprise environment as well as redundancy within the system as files, storage, and usage increase across the network. To increase the enterprise environment, a second enterprise location needs to be configured. To improve redundancy within the system, a second DC with increased functionality with Several FSMO roles, a site, and a subnet was created along with a new Windows 10 VM. Additionally, a backup solution with Windows Server Backup was implemented to prevent file loss. Domain-wide WSUS functionalities were implemented within the two DCs as well for easier file access among users. The enterprise environment was also upgraded in functionality through the further configuration of printers to have two queues with different paper sizes and a print operator. Additionally, an IIS server with 3 web pages with varying accessibility was created for users, PowerShell Remote commands were familiarized to better manage VMs in a central location, and VMware ThinApp was implemented to package various applications such as Visio 7 for easier user experiences.

Through the implementation of these services, Lab 3 fulfills the business requirements Westwood Local Hospital needs for its expanding enterprise system.

Recommendations

The items listed under this section are recommendations for completing the procedures of Lab 3.

Recommendation 1: Create templates of various operating systems at the beginning for ease of use when new VMs are needed on vCenter throughout the project

Recommendation 2: To prevent bottlenecking and freezing, turn off unneeded VMs and ensure that no one ESXi Server has too many VMs

Recommendation 3: For items that need to be shared on the network share, such as DFS and ThinApp packages, create separate folders on the share to ensure that the share is well organized and each item is easily accessible to prevent confusion.

BIBLIOGRAPHY

Ahmed. (2022). How to Perform Backup and Restore in Windows Server 2019 [YouTube Video].

In *YouTube*.

https://www.youtube.com/watch?v=UMUGd23hvbK&ab_channel=DOIT%2Fmostafaahmed

Hoffman, C. (2017, July 20). *How to Run PowerShell Commands on Remote Computers*. How-to Geek; How-To Geek.

<https://www.howtogeek.com/117192/how-to-run-powershell-commands-on-remote-computers/>

Moran, D. (2022). How to setup DFS Replication (Distributed File System) [YouTube Video]. In *YouTube*. https://www.youtube.com/watch?v=mVzKOqZkfxU&ab_channel=DannyMoran

Moran, D. (2022). How to setup DFS Namespaces (Distributed File System) [YouTube Video]. In *YouTube*. https://www.youtube.com/watch?v=XGmxZNRTrgY&ab_channel=DannyMoran

MSFT WebCast. (2019). 10. Install and Configure DFS Namespaces in Windows Server 2019 [YouTube Video]. In *YouTube*.

https://www.youtube.com/watch?v=gt8iEZ2xnqM&ab_channel=MSFTWebCast

MSFT WebCast. (2019). 7 How to install and configure WSUS in Windows server 2019 [YouTube Video].

https://www.youtube.com/watch?v=Yv0qjxdX5yw&list=LL&index=2&t=790s&ab_channel=MSFTWebCast

sdwheeler. (2024, April). *Running Remote Commands - PowerShell*. Microsoft.com.

<https://learn.microsoft.com/en-us/powershell/scripting/security/remoting/running-remote-commands?view=powershell-7.4>

Tricknology. (2020). How to Setup or Configure IIS(Web Server) Server in Windows Server 2019

[YouTube Video].

https://www.youtube.com/watch?v=eeBm2H1Yuok&ab_channel=Tricknology

APPENDIX A: PROBLEM SOLVING

This section describes several issues faced throughout this project. Each problem is broken down by giving a *Problem Description*; listing *Possible Solutions*, each of which are generated through a brain-storming exercise, accompanied by the reasoning for it; *Solutions Attempted*, which simply list which options from the *Possible Solutions* list that were attempted; and finally, a detailed description of the *Final Solution* and why it solved the problem.

Printer not Appearing in Certain VMs Issue

Problem Description: A printer system was fully configured with two queues (which was made up of two of the same printer) for different sized paper as well as setting up a print master on the first DC. However, for many of the other VMs used, such as the print operator's VM or DC 2, the printer did not show up when printing a page. This issue only applied to some VMs and users, who were all part of the domain and had proper networking configurations at this point.

Possible Solutions:

1. Add the missing printer through Control Panel
 - a. The printer may be missing because it needed to be added to the VM just like how it was done for the initial DC VM through the Control Panel's "Add a new Printer" option. Adding the printer could be a potential solution.
2. Download the drivers of the missing printers in the network share
 - a. The drivers of the printer may not have been installed properly in the VMs with missing printers, causing the issue. This could be solved by installing the drivers through the network share.

Solutions Attempted:

1. Add the missing printer through Control Panel
 - a. An attempt to add the missing printer via the Control Panel was made through clicking the **Add a printer** button. The following steps were done to add the new printer:
 - i. In the Windows search bar, the following was entered and selected:
`Control Panel`
 - ii. In Control Panel, the following were selected: View devices and printers | Add a Printer
 - iii. In the “Add a Printer Window”, the following were selected to configure the missing printer: The printer that I want isn’t listed | Add a local printer or network printer with manual settings | Next | Use an existing port
 - iv. However, another issue was met after step iii, as the Bullzip port and driver did not appear in the window due to the fact that the configured Bullzip printers were not established in the VMs where the new configured printers were missing.
 - b. Because of the issue faced in step iv, this troubleshooting attempt failed, as a new printer was not able to be added due to the missing driver and port in the configuration window. However, this solution would not have solved the original issue, either, as this solution would have instead created another printer for a third queue to the Bullzip printer.
2. Download the drivers of the missing printers in the network share

- a. Downloading the drivers for the missing printers to the VMs in need from the network share was successful in correcting the issue. This solution's process and reason for success is detailed in the final solution section.

Final Solution: The final solution to this issue was downloading the drivers of the missing printers in the network share. The printers did not appear due to the fact that its drivers were not installed in the VMs where the printers were missing, as the printers could not run without them. This also solved the issue faced in solution #1 attempted in the **Solutions Attempted** section of this issue, as the printer and its driver became available to access for the Control Panel. For each VM that was missing the printers, the following were done:

1. In the Windows search bar, the following was entered and selected: `File Explorer`
2. In the File Explorer search bar, the following was entered: `\\G09SRV1`
3. Upon opening the network share, the two printers appear in the share. The two icons of the printers were both double-clicked, and their drivers installed immediately after.

Upon successfully installing the drivers of both printers, they appeared both in the Control Panel, where their queues and properties could be managed, as well as when CTRL + P was pressed to print pages, solving the issue.

vCenter and VM Lag/Freezing Issue

Problem Description: After setting up most of the additional VMs required for this lab, operating on VMs as well as vCenter became very slow, and often times the interfaces would freeze for several minutes. There were also several instances where vCenter could not be accessed, despite being configured correctly and running minutes ago. This severely impacted the progress of the lab, as VMs and vCenter became unresponsive.

Possible Solutions:

1. Migrate some VMs to the larger datastore (datastore1)
 - a. Due to the number of VMs on the iSCSI datastore, the datastore may not have enough space to process VM demands, causing it to lag and freeze at times. By migrating some VMs to datastore1, which had much more free space, the issue may be mitigated.
2. Migrate VMs to the second ESXi server and turn off unneeded VMs
 - a. With too many VMs all concurrently running, the CPU and memory of just one ESXi server may not be enough to sustain all of the VMs, causing the lag. By turning off unneeded VMs and migrating some to the second ESXi server, the CPU and memory usage of running VMs can be shared among both servers instead of just one and solve the issue of lagging.
3. Clear the cache of the web browser
 - a. vCenter being inaccessible and lagging may be due to browser issues, such as having too much cache and cookies, which can cause interactions with the browser that runs vCenter and VMs to be slow. Clearing the cache and cookies on

the browser could solve this issue through going to Google settings | Privacy and Security | Delete browsing data | Delete data

Solutions Attempted:

1. Migrate some VMs to the larger datastore (datastore1)
 - a. An attempt to migrate some VMs that were originally on the iSCSI datastore to datastore1, where over 300 GB was free for usage was made. The following steps were made for this attempt:
 - i. Logged into vCenter (44.100.9.32) with created credentials from Lab 2
 - ii. Right-clicking on *cnit242.group09.windows10* under the list of VMs on the left hand side of vCenter, *Migrate...* was selected
 - iii. In the “Migrate” tab that pops up after the selection made in step ii, the following were selected: Change storage only | Next | datastore1 | Next | Finish
 - iv. Repeat for other desired VMs
 - b. However, migrating the VM from one datastore to another took around 10 minutes each and vCenter was difficult to use due to the lag. Additionally, after several successful datastore migrations for several VMs, neither the lag when using VMs nor the lag when using vCenter lessened, causing the solution to fail.
2. Migrate VMs to the second ESXi server and turn off unneeded VMs
 - a. Migrating VMs to the second ESXi server and turning off unneeded VMs was successful in correcting the issue. This solution’s process and reason for success is detailed in the final solution section.

Final Solution: The final solution of this issue was to migrate some VMs to the second ESXi server and turn off VMs that were not in use. Upon looking at the summaries of the two

ESXi servers on the ESXi host client, it was found that the first ESXi server (44.100.9.28) was nearing 100% for both memory and CPU, which caused the extreme lag on both the VMs and vCenter. Several unneeded VMs were turned off on 44.100.9.28 through the following actions:

1. Logged in to 44.100.9.28 with login credentials created from Lab 2
2. On the left hand side of the ESXi host client, under the Virtual Machines tab, selected *cnit242.group09.windows10*
3. On the *cnit242.group09.windows10* summary window, the following were selected to power off the VM: Actions | Power | Power Off | Yes
4. Repeat for other desired VMs

After turning off several VMs, vCenter was able to run again and several VMs were migrated to the second ESXi server (44.100.9.29) from vCenter. The following steps were done to complete this:

1. Logged into vCenter (44.100.9.32) with created credentials from Lab 2
2. Right-clicking on *cnit242.group09.windows10* under the list of VMs on the left hand side of vCenter, *Migrate...* was selected
3. In the “Migrate” tab that pops up after the selection made in step ii, the following were selected: Change compute resource only | Next | 44.100.9.29 | Next | CNIT242-Secondary1 | Schedule vMotion with high priority (recommended) | Next | Finish
4. Repeat for other desired VMs

By turning off VMs that were not needed at the moment and migrating some VMs to the second ESXi server, VMs and vCenter ran much smoother, solving the issue.

Corrupted Visio 7 File in ThinApp Packaging Issue

Problem Description: A ThinApp package with Visio 7 in it was successfully created with ThinApp. However, upon putting the package into the network share and accessing it on another VM with its own ThinApp installed, Visio 7 could not be accessed through the bin folder, as double-clicking on it would result in an error message. The VM used to create the original ThinApp package was correctly set up, as it was a brand new VM and all instructions were followed for creating the ThinApp package.

Possible Solutions:

1. Copy the entire ThinApp folder from the ThinApp VM to the network share
 - a. In the initial attempt, only the “bin” folder where the packaged Visio 7 as well as the “build” file were copied to the file share. Visio 7 may have had an issue opening after the initial build due to the incomplete files in the share
2. Restart VM when downloading Visio 7 and creating the package
 - a. As mentioned in the ThinApp application, it recommends to restart the system after installing the desired applications to package if the applications require a restart. While Visio 7 did not show such window in the initial package creation, a restart may be necessary (upon a second attempt at ThinApp packaging, it was found that Visio 7 required a reboot to properly install) to properly install and be packaged by ThinApp.

Solutions Attempted:

1. Copy the entire ThinApp folder from the ThinApp VM to the network share

- a. An attempt to copy the entire ThinApp package was made, as an incomplete package in the network share may have been the issue for Visio 7 to not boot properly in a different VM. The following were done in this attempt:
 - i. On the ThinApp VM, File Explorer was opened by going into the Windows search bar and entering `File Explorer`
 - ii. Within File Explorer, the following was entered in its search bar:
`C:\Program Files\VMware\VMware ThinApp\Captures`
 - iii. Opening a new File Explorer, the following was entered in its search bar:
`\\G09SRV1` to access the network share
 - iv. Dragged the Microsoft Office Office 64-bit Components 2007 folder to the `\\G09SRV1` share
 - b. However, upon successfully copying the entire image folder to the network share and trying to boot up Visio 7, the same window appeared stating the error message, making it a failed solution.
2. Restart VM when downloading Visio 7 and creating the package
 - a. Restarting the VM after installing Visio 7 during the ThinApp packaging process was a successful solution. This solution's process and reason for success is detailed in the final solution section..

Final Solution: In the second attempt to package Visio 7, the application asked to restart the VM in order to properly install Visio 7. Upon restarting the VM, Visio 7 was properly installed and ThinApp restarted, allowing the packaging process to be finished by following the instructions given by ThinApp (refer to **Implementing ThinApp Package of Visio 7** for its process). After, the package was then copied to the network share (refer to #1 under **Solutions Attempted** for this process). When testing the package out on a

different VM through \\G09SRV1\thinapp\Captures\ Microsoft Office Office 64-bit Components 2007\bin and selecting *Microsoft Office Visio 2007*, the application successfully launched through ThinApp, resulting in a successful solution.

APPENDIX B: SWITCH CONFIGURATIONS AND IP SCHEMA**Switch 1 – 2**

Table 1: Secondary-Switch's Configurations

| | |
|-----------------|---|
| MTU | 1500 |
| Uplink 1 | <i>vmnic2 - UP, 10000 Mbps</i> |
| Link Discovery | Mode: <i>Listen</i> Protocol: <i>Cisco discovery protocol (CDP)</i> |
| Security | Promiscuous mode: <i>Reject</i> MAC address changes: <i>Reject</i> Forged transmits: <i>Reject</i> |
| Nic teaming | Load balancing: <i>Route based on originating port ID</i> Network failover detection: <i>Ling status only</i> Notify Switches: <i>Yes</i> Failback: <i>Yes</i> |
| Traffic shaping | Status: <i>Disabled</i> |

Table 2: Secondary-Switch-ESXi2's Configurations

| | |
|-----------------|---|
| MTU | 1500 |
| Uplink 1 | <i>vmnic2 - UP, 10000 Mbps</i> |
| Link Discovery | Mode: <i>Listen</i> Protocol: <i>Cisco discovery protocol (CDP)</i> |
| Security | Promiscuous mode: <i>Reject</i> MAC address changes: <i>Reject</i> Forged transmits: <i>Reject</i> |
| Nic teaming | Load balancing: <i>Route based on originating port ID</i> Network failover detection: <i>Ling status only</i> Notify Switches: <i>Yes</i> Failback: <i>Yes</i> |
| Traffic shaping | Status: <i>Disabled</i> |

IP Schema and Computer Names

Windows 10 Server (Cnit242.group09.win10.server):

Table 3: cnit242.group09.win10.server IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------|------------|-----------------------------|
| 255.255.255.0 | 44.100.9.33 | 44.2.2.44 | 44.100.9.1 | CNIT242G09A CNIT242iSCSI |

vCenter Server (cnit242.group09.vcenter1):

Table 4: cnit242.group09.vcenter IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------|------------|-----------------------------|
| 255.255.255.0 | 44.100.9.35 | 44.100.9.33 | 44.100.9.1 | CNIT242G09A CNIT242iSCSI |

Windows 11 Server (CNIT24200.Group09):

Table 5: CNIT24200.Group09 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|---------------------|------------|-----------------------------|
| 255.255.255.0 | 44.100.9.40 | 44.2.2.44,44.2.2.45 | 44.100.9.1 | CNIT242G09A CNIT242iSCSI |

Windows 11 Virtual Machine (Group09.win11):

Table 6: Group09.win11 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|--------------|---------------------------|------------|-----------------------------|
| 255.255.255.0 | 44.100.59.37 | 44.100.9.33, 44.2.2.44 | 44.100.9.1 | CNIT242G09B CNIT242iSCSI |

Windows 10 Client 2 (cnit242.ramji.win10):

Table 7: cnit242.ramji.win10 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------------------|------------|-----------------|
| 255.255.255.0 | 44.100.9.19 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09A |

Windows 10 Client 2 (cnit242.xu.win10):

Table 8: cnit242.xu.win10 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------------------|------------|-----------------|
| 255.255.255.0 | 44.100.9.20 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09A |

Windows 10 Client 3 (cnit242.alamri.win10):

Table 9: cnit242.alamri.win10 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------------------|------------|-----------------|
| 255.255.255.0 | 44.100.9.27 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09A |

Windows Server 2022 (cnit242.group09.win10.server):

Table 10: cnit242.group09.win10.server IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------------------|------------|-----------------------------|
| 255.255.255.0 | 44.100.9.24 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09A CNIT242iSCSI |

VMware Photon (cnit242.group09.vcenter1):

Table 11: cnit242.group09.win10.server IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------|------------|-----------------------------|
| 255.255.255.0 | 44.100.9.32 | 44.2.2.44 | 44.100.9.1 | CNIT242G09A CNIT242iSCSI |

Windows 10 Client 4 (cnit242.group09.win10):

Table 13: cnit242.group09.win10 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|--------------|-------------------------|------------|-----------------|
| 255.255.255.0 | 44.100.59.26 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09B |

Windows 10 Client 5 (cnit242.group09.thinapp):

Table 14: cnit242.group09.win10 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|--------------|-------------------------|------------|-----------------|
| 255.255.255.0 | 44.100.59.77 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09B |

Windows Server 2019 (cnit242.group09.wsus):

Table 15: cnit242.group09.wsus IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|--------------|-------------------------|------------|-----------------|
| 255.255.255.0 | 44.100.59.52 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09B |

VMware ESXi 8.0 (cnit242.ESXI.server1):

Table 16: cnit242.ESXI.server1 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------------------|------------|--|
| 255.255.255.0 | 44.100.9.28 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09A CNIT242G09B CNIT242iSCSI |

VMware ESXi 8.0 (cnit242.ESXI.server2):

Table 17: cnit242.ESXI.server2 IP Schema

| Subnet Mask | IP Address | DNS Servers | Gateway | Network Adapter |
|---------------|-------------|-------------------------|------------|--|
| 255.255.255.0 | 44.100.9.29 | 44.2.2.44, 44.2.2.45 | 44.100.0.1 | CNIT242G09A CNIT242G09B CNIT242iSCSI |

\

APPENDIX C: IIS SITE HTML**G09Public Site HTML Code**

```
<!DOCTYPE HTML>

<html>

    <head>

<title>Group 9 Public website!</title>

    </head>

    <body>

        <div align="center">

<h1>Welcome to Group 09's Public Site!</h1>

        </div>

    </body>

</html>
```

G09Private Site HTML Code

```
<!DOCTYPE HTML>

<html>

    <head>

<title>Group 9 Private website!</title>

    </head>

    <body>

        <div align="center">

<h1>Welcome to Group 09's Private Site!</h1>

        </div>

    </body>

</html>
```

G09Protected Site HTML Code

```
<!DOCTYPE HTML>

<html>

    <head>

<title>Group 9 Protected website!</title>

    </head>

    <body>

        <div align="center">

<h1>Welcome to Group 09's Protected Site!</h1>

        </div>

    </body>

</html>
```