Batch: A-4 **Roll No.:** 16010122151
Experiment No. 03
Grade: AA / AB / BB / BC / CC / CD /DD
Signature of the Staff In-charge with date

Title: Virtual Lab on VMware Hands on Lab

Objective: Explore VMware hands on labs

Expected Outcome of Experiment:

CO	Outcome
2	**Investigate the system virtualization and outline its role in enabling the cloud computing System model**

Books/ Journals/ Websites referred:
https://www.vmware.com/resources/hands-on-labs

https://labs.hol.vmware.com/HOL/catalog

Abstract:-

Virtualization is a fundamental technology that enables cloud computing by abstracting physical hardware and creating multiple virtual environments. VMware Hands-on Labs (HOL) provides an interactive platform to explore virtualization concepts without the need for dedicated infrastructure. This experiment aims to investigate system virtualization using VMware HOL, allowing learners to understand how virtualization supports cloud computing models. Through practical exposure, users gain hands-on experience with VMware products, configuring and managing virtualized environments, and exploring key functionalities such as virtual networking, storage, and resource management.

Related Theory: -

Virtualization is the process of creating a software-based (or virtual) version of computing resources, such as servers, storage, and networks. VMware, a leader in virtualization technology, provides a suite of tools that allow users to create and manage virtual machines (VMs), optimize workloads, and improve system scalability.

Key Concepts of Virtualization:

1. **Hypervisor:** A software layer that enables multiple virtual machines to run on a single physical machine. VMware uses Type-1 (bare-metal) and Type-2 (hosted) hypervisors for different use cases.
2. **Virtual Machines (VMs):** Software-defined computers that operate independently but share underlying hardware resources.
3. **Virtual Networking:** Network virtualization enables multiple virtualized environments to communicate efficiently within a cloud infrastructure.
4. **Storage Virtualization:** Abstracts physical storage devices and presents them as a unified storage resource.
5. **Resource Allocation & Management:** VMware provides tools to allocate CPU, memory, and storage dynamically to optimize system performance.

Related Theory (contd...): -

VMware Hands-on Labs (HOL) offers a cloud-based sandbox where users can experiment with VMware solutions without the need for local installations. The labs cover:

- **VMware vSphere** – Virtual machine management and deployment.
- **NSX** – Software-defined networking for secure connectivity.
- **vSAN** – Virtualized storage solutions.
- **VMware Cloud Foundation** – Integrated cloud infrastructure management.

By exploring VMware HOL, users develop a deeper understanding of how virtualization contributes to modern cloud computing architectures, including Infrastructure as a Service (IaaS) and Platform as a Service (PaaS).

Implementation Details:

1. **Enlist all the Steps followed and various options explored**

Step 1:
Accessing VMware Hands-on Lab (HOL)
Navigated to VMware Hands-on Labs.
Logged in using VMware credentials (or created an account if new).
Explored available labs and selected "VMware vSphere – Virtualization Basics" to begin.
Step 2:
Deploying a Virtual Machine (VM) on vSphere
Launched the vSphere Web Client in the HOL environment.
Navigated to “Hosts and Clusters” and selected "Create a New Virtual Machine."
Configured VM settings:
Guest OS: Windows/Linux
CPU & RAM Allocation: Assigned based on requirements.
Storage: Assigned virtual disk space.
Networking: Configured virtual NICs and network settings.
Step 3:
Exploring Hypervisor Features
Tested live VM migration using vMotion.
Explored Snapshot Management to create and restore VM states.
Configured Resource Allocation Policies to optimize performance.
Step 4:
Virtual Networking Configuration (NSX)
Explored Software-Defined Networking (SDN) using VMware NSX.

Configured virtual switches and segmented networks for enhanced security.
Tested firewall rules and micro-segmentation features.

Step 5:

Storage Virtualization (vSAN)
Created a vSAN Datastore and attached it to virtual machines.
Explored storage policies for replication and fault tolerance.

Step 6:

Cloud Integration (VMware Cloud Foundation)
Explored how VMware integrates with cloud platforms (AWS, Azure, Google Cloud).
Tested Hybrid Cloud Deployment for multi-cloud scalability.

2. **Explain your program logic, classes and methods used.**

While HOL is a pre-configured lab environment with GUI-based interactions, the core VMware technologies function through APIs and automation scripts. In practical deployments, users interact with VMware via PowerCLI (PowerShell), Python SDKs, or vSphere APIs.

Classes and Methods Used in vSphere API Approach:

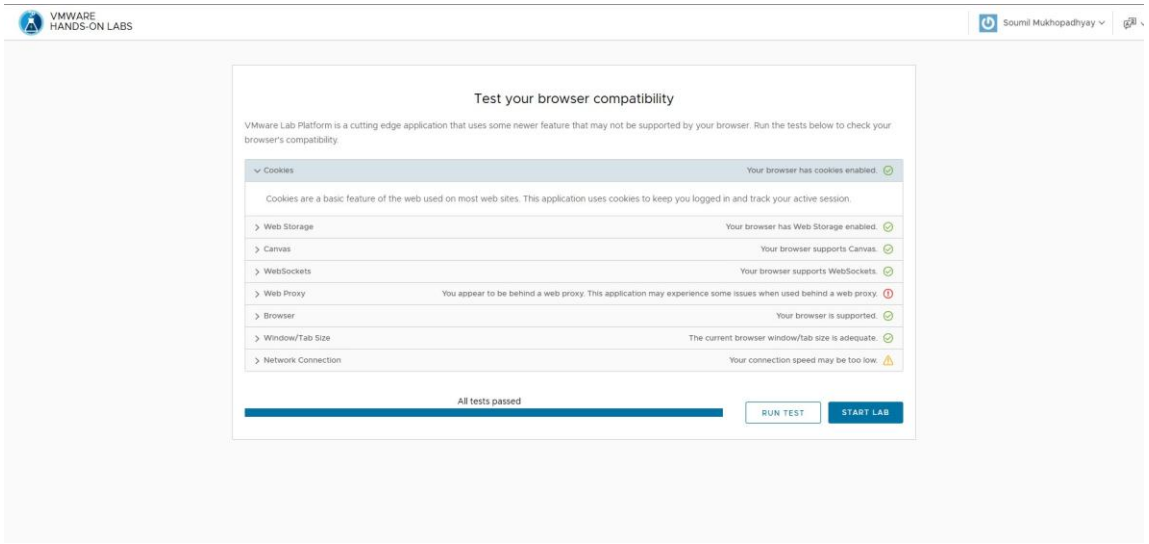
- **VMware.Vim.VirtualMachine** → Represents a virtual machine instance.
- **CreateVM_Task()** → Creates a VM with specified parameters.
- **PowerOnVM_Task()** → Boots up the virtual machine.
- **ReconfigureVM_Task()** → Modifies VM settings dynamically.

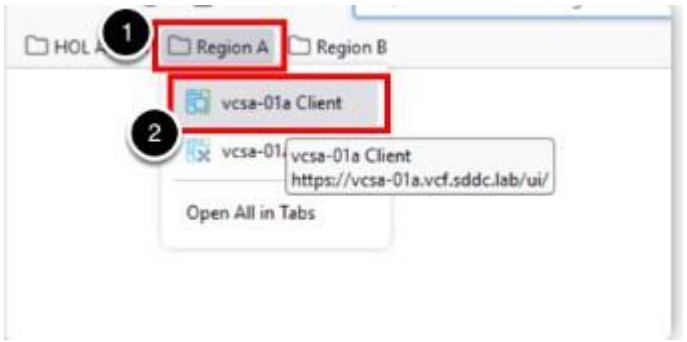
3. Explain the Importance of the approach followed by you

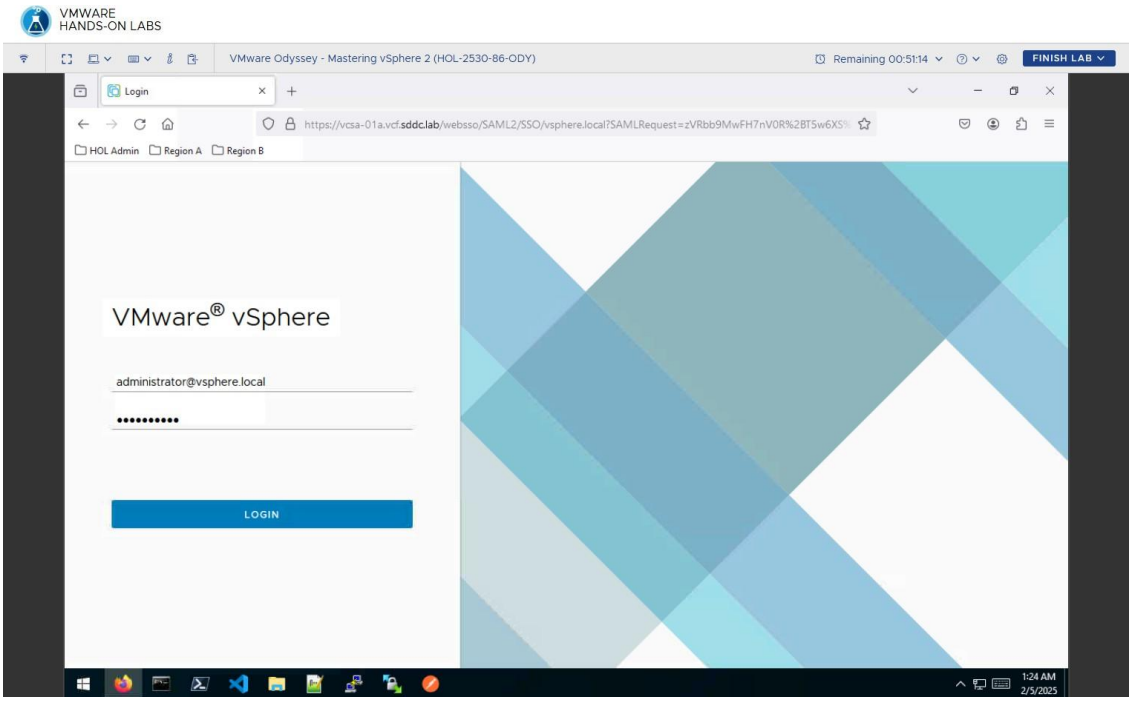
- **Hands-on Learning:** VMware HOL provides **real-world experience** without requiring dedicated infrastructure.
- **Cloud-Centric Implementation:** Emphasizes **hybrid and multi-cloud** integrations, preparing users for enterprise cloud solutions.
- **Performance Optimization:** Exploring **resource allocation** ensures effective virtualization management.
- **Security & Networking:** VMware NSX allows users to implement **firewall rules, micro-segmentation**, and **secure networking.**
- **Automation Readiness:** Understanding PowerCLI and APIs prepares users for **automated deployments and DevOps integration.**

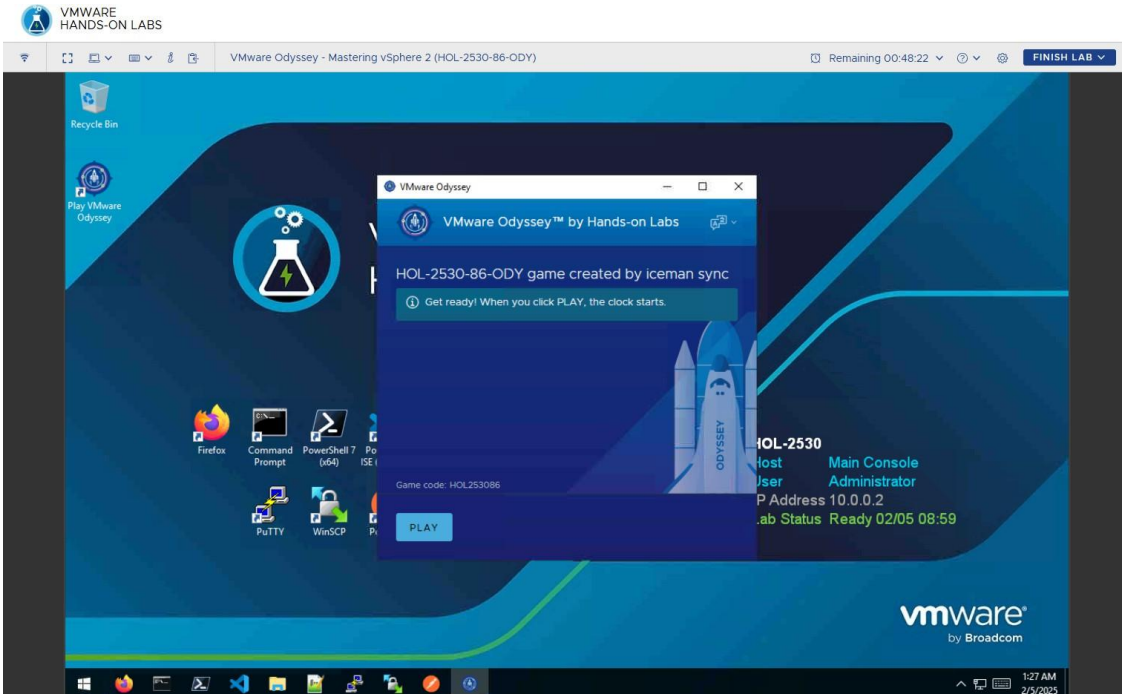
SCREENSHOTS:


VMWARE
HANDS-ON LABS
VMWARE
HANDS-ON LABS
HOL-2530
Host Main Console
User Administrator
IP Address 10.0.0.2
Lab Status Ready 02/05 08:59
HOL-2530-86-ODY - VMWARE ODYSSEY - MASTERING VSPHERE
Are you ready to showcase your skills? Welcome to VMware Odyssey, you will have thirty minutes to complete a variety of vSphere Odyssey tasks related to Data Center Virtualization. The faster you complete the tasks the higher your score. If you exceed the 30 minute timeframe, you can still continue and earn points for completing the tasks.
If you are new to Data Center Virtualization and would like to get familiar with the product before taking the VMware Odyssey lab, make sure to try the following labs to prepare:
VMware vSphere 8 - What is New (HOL-2530-01-VCF-L)
VMware vSphere - Advanced Topics (HOL-2530-02-VCF-L)
VMware vSphere - Security - Getting Started (HOL-2530-03-VCF-L)
VMware vSphere Automation - PowerCLI (HOL-2530-04-VCF-L)
Captains:
Chris Halverson, Client Solutions Architect
Bernard Smith, Senior Consultant
Step 1: Check the Lab Status
HOL-2111

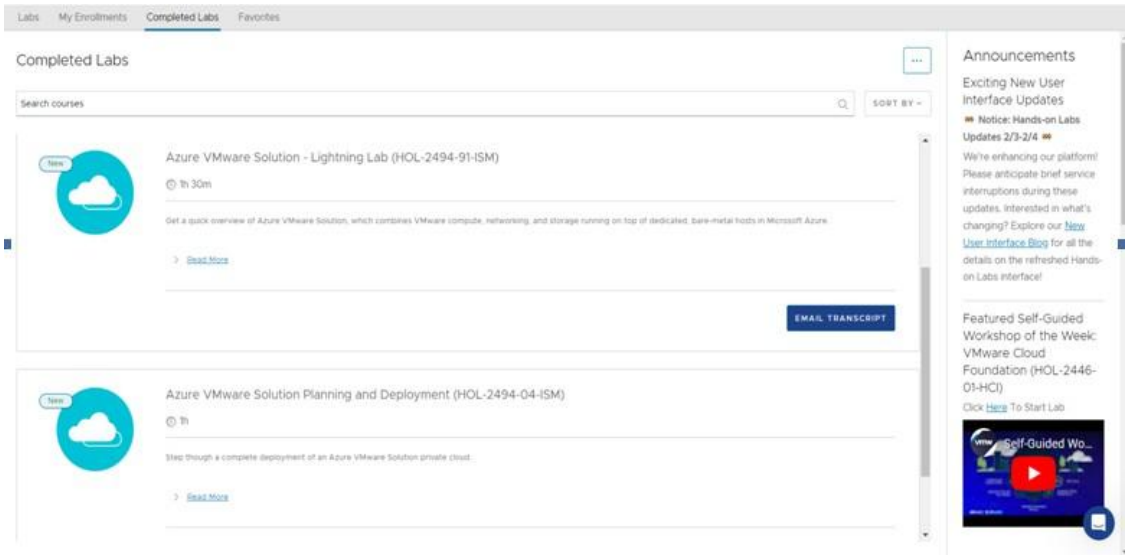

VMWARE
HANDS-ON LABS
Soumil Mukhopadhyay
Test your browser compatibility
VMware Lab Platform is a cutting edge application that uses some newer feature that may not be supported by your browser. Run the tests below to check your browser's compatibility.
Cookies
Your browser has cookies enabled.
Cookies are a basic feature of the web used on most web sites. This application uses cookies to keep you logged in and track your active session.
Web Storage
Your browser has Web Storage enabled.
Canvas
Your browser supports Canvas.
WebSockets
Your browser supports WebSockets.
Web Proxy
You appear to be behind a web proxy. This application may experience some issues when used behind a web proxy.
Browser
Your browser is supported.
Window/Tab Size
The current browser window/tab size is adequate.
Network Connection
Your connection speed may be too low.
All tests passed
RUN TEST
START LAB

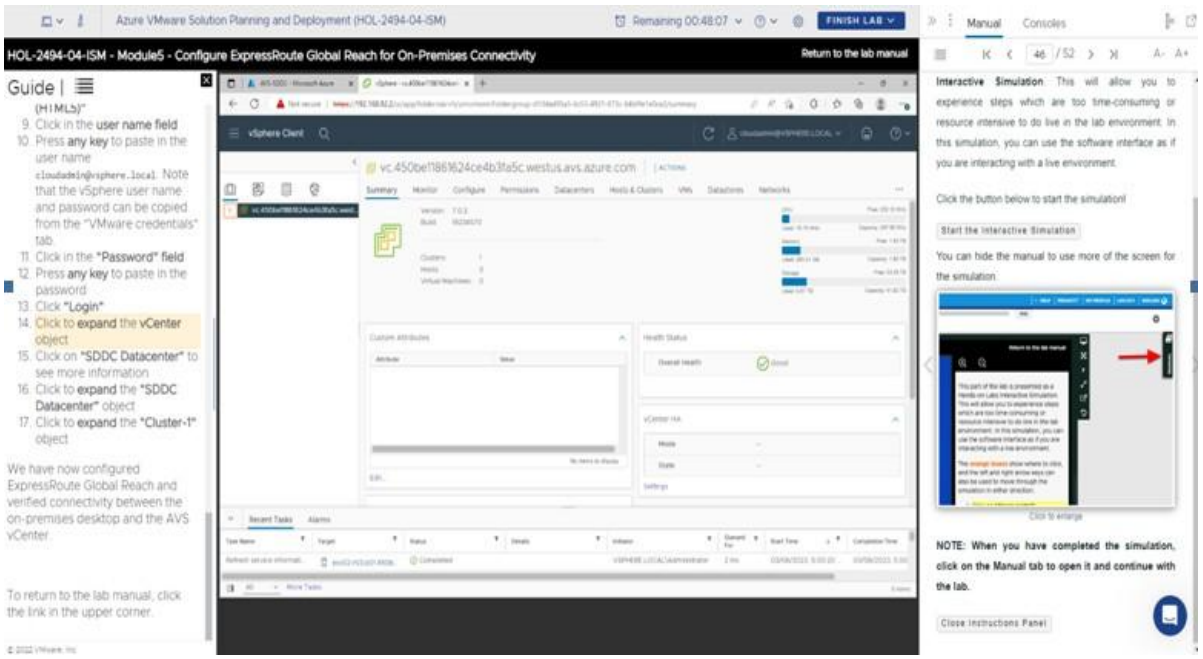

1
Region A
Region B
vcsa-01a Client
2
vcsa-01a Client
https://vcsa-01a.vcf.sddc.lab/ui/
Open All in Tabs

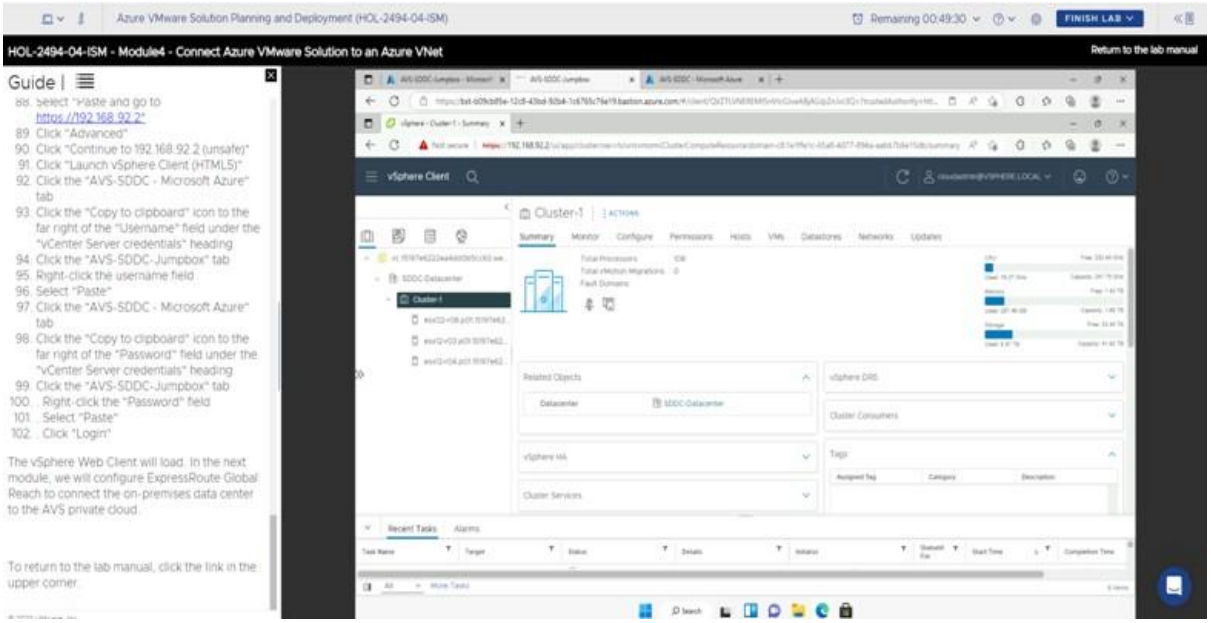

VMWARE
HANDS-ON LABS
VMware Odyssey - Mastering vSphere 2 (HOL-2530-86-ODY)
Remaining 00:51:14
FINISH LAB
Login
HOL Admin
Region A
Region B
VMware® vSphere
administrator@vsphere.local
LOGIN
1:24 AM
2/5/2025

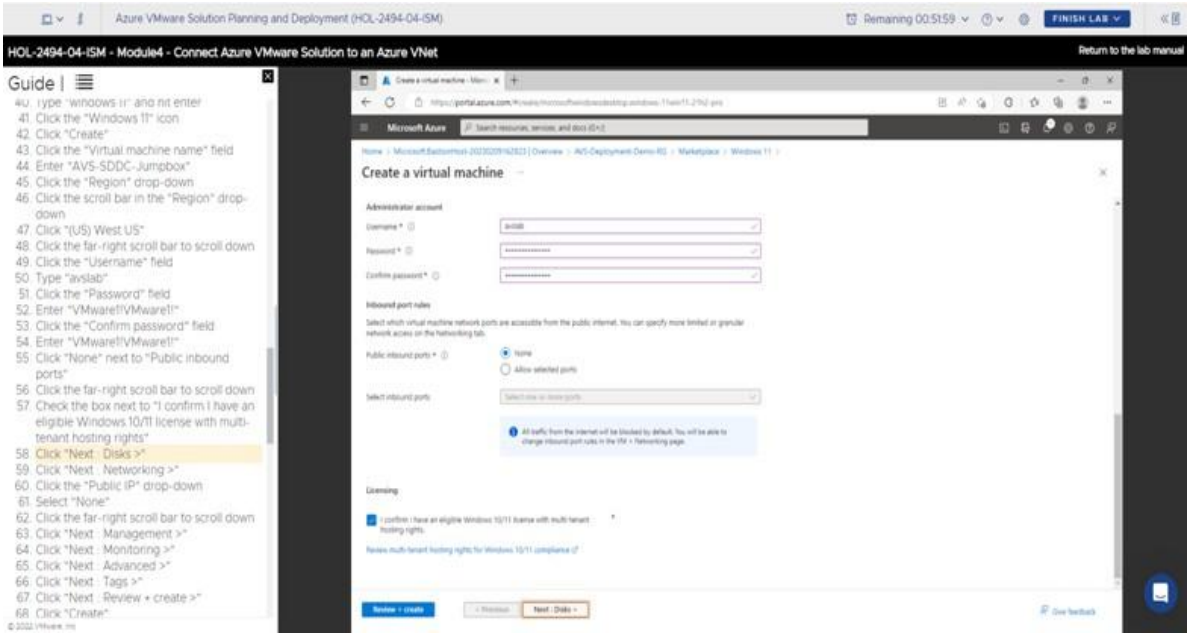

VMWARE
HANDS-ON LABS
VMware Odyssey - Mastering vSphere 2 (HOL-2530-86-ODY)
Remaining 00:48:22
FINISH LAB
Recycle Bin
Play VMware Odyssey
VMware Odyssey
VMware Odyssey™ by Hands-on Labs
HOL-2530-86-ODY game created by iceman sync
Get ready! When you click PLAY, the clock starts.
Game code: HOL253086
PLAY
Firefox
Command Prompt
PowerShell 7 (x64)
PuTTY
WinSCP
Main Console
Administrator
P Address 10.0.0.2
Ready 02/05 08:59
vmware
by Broadcom
1:27 AM
2/5/2025

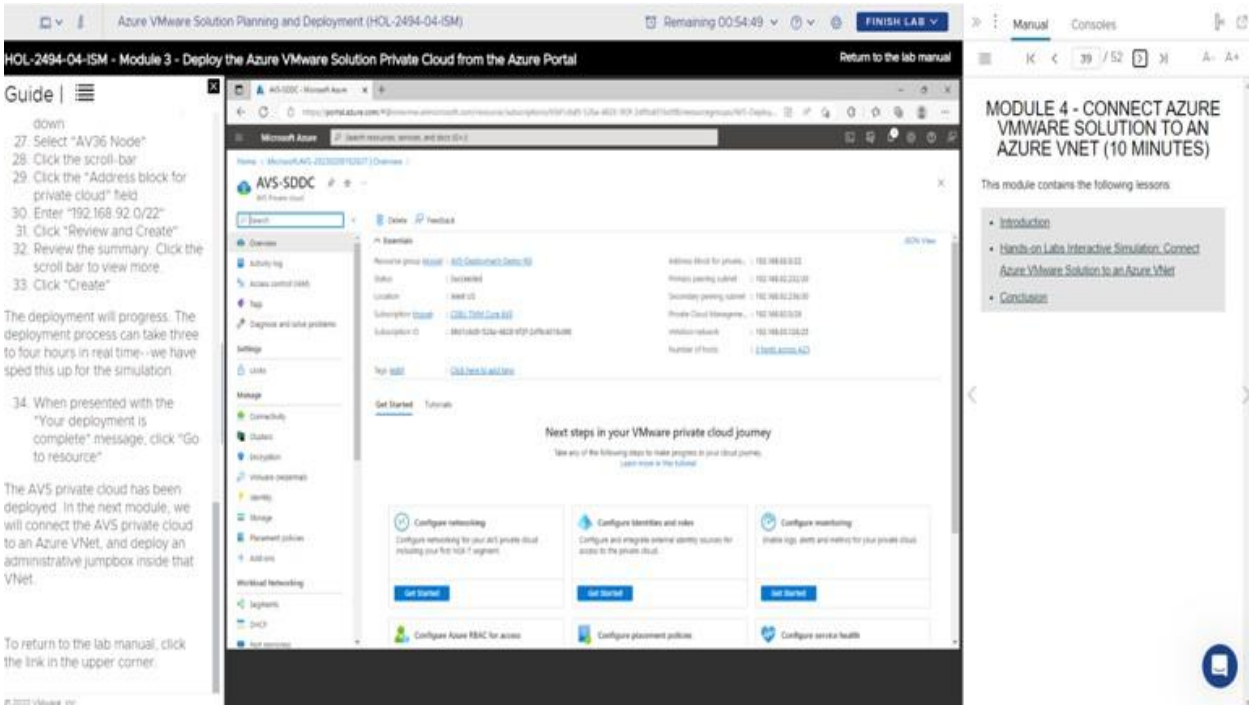
SERVICE-1:

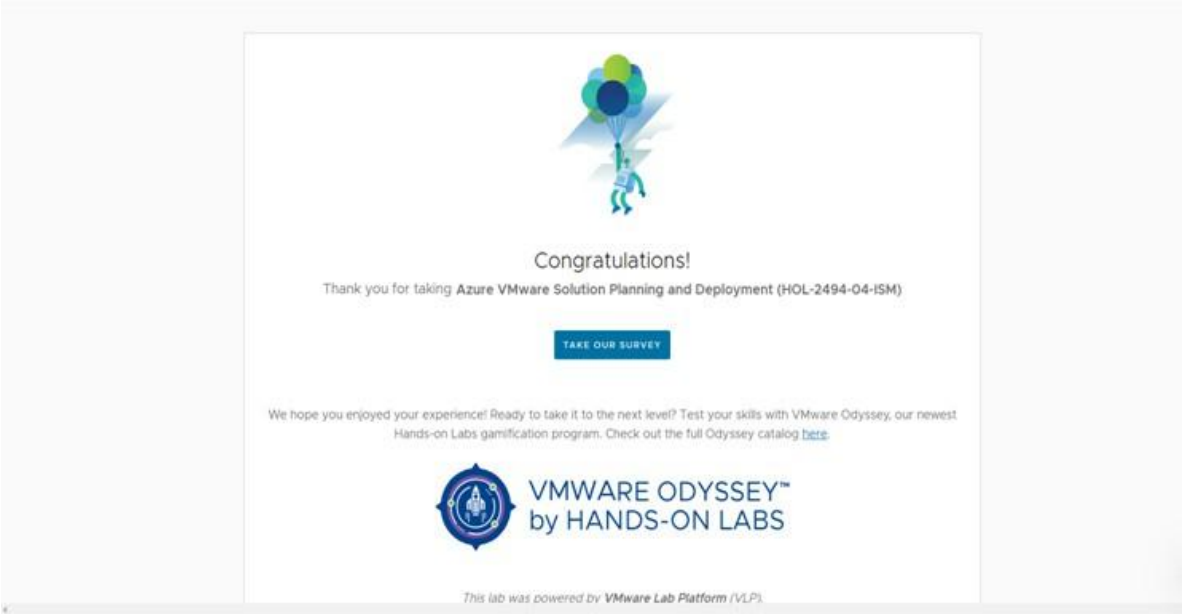

Labs
My Enrollments
Completed Labs
Favorites
Completed Labs
Search courses
SORT BY
Azure VMware Solution - Lightning Lab (HOL-2494-91-ISM)
1h 30m
Read More
EMAIL TRANSCRIPT
Azure VMware Solution Planning and Deployment (HOL-2494-04-ISM)
1h
Read More
Announcements
Exciting New User Interface Updates
Notice: Hands-on Labs Updates 2/3-2/4
We're enhancing our platform! Please anticipate brief service interruptions during these updates. Interested in what's changing? Explore our New User Interface Blog for all the details on the refreshed Hands-on Labs interface!
Featured Self-Guided Workshop of the Week: VMware Cloud Foundation (HOL-2446-01-HCI)
Click Here To Start Lab


Azure VMware Solution Planning and Deployment (HOL-2494-04-ISM)
Remaining 00:48:07
FINISH LAB
HOL-2494-04-ISM - Module5 - Configure ExpressRoute Global Reach for On-Premises Connectivity
Return to the lab manual
Guide
(HTML5)
9. Click in the user name field
10. Press any key to paste in the user name
cloudadmin@vsphere.local. Note that the vSphere user name and password can be copied from the "VMware credentials" tab
11. Click in the "Password" field
12. Press any key to paste in the password
13. Click "Login"
14. Click to expand the vCenter object
15. Click on "SDDC Datacenter" to see more information
16. Click to expand the "SDDC Datacenter" object
17. Click to expand the "Cluster-1" object
We have now configured ExpressRoute Global Reach and verified connectivity between the on-premises desktop and the AVS vCenter.
To return to the lab manual, click the link in the upper corner.
vSphere Client
vc.450be1186f624ce4b3fa5c.westus.avs.azure.com
Manual
Consoles
Interactive Simulation: This will allow you to experience steps which are too time-consuming or resource intensive to do live in the lab environment. In this simulation, you can use the software interface as if you are interacting with a live environment.
Click the button below to start the simulation!
Start the Interactive Simulation
You can hide the manual to use more of the screen for the simulation
NOTE: When you have completed the simulation, click on the Manual tab to open it and continue with the lab.
Close Instructions Panel

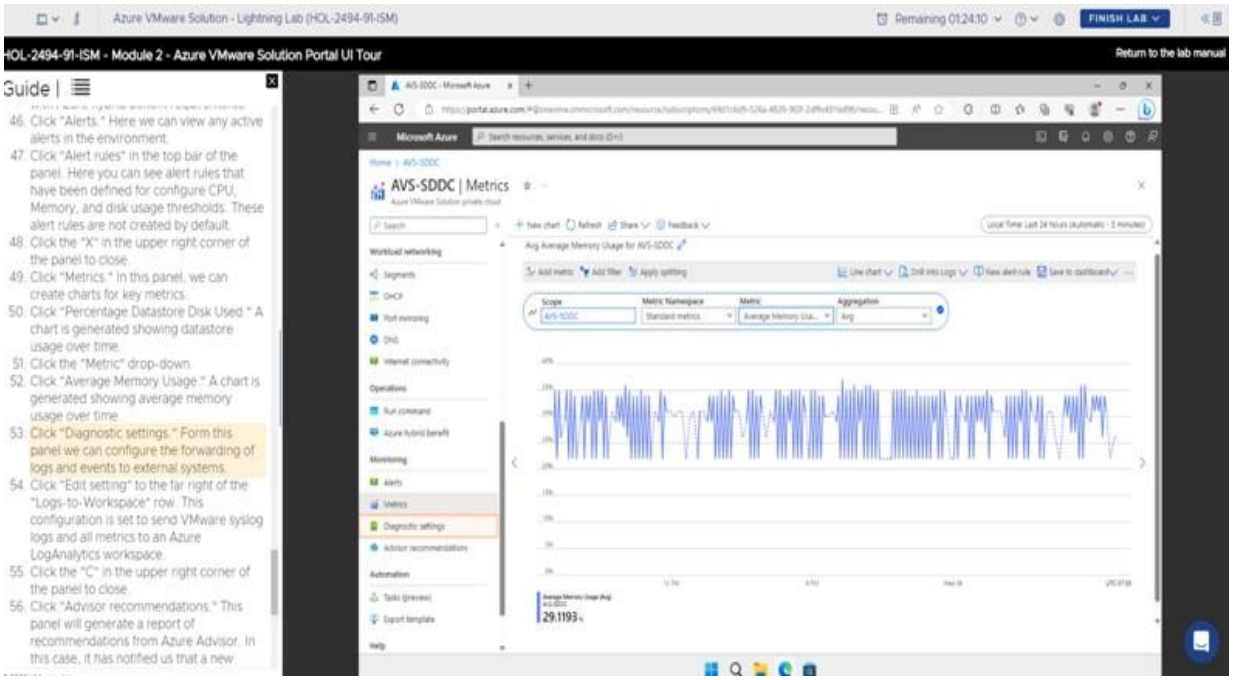

Azure VMware Solution Planning and Deployment (HOL-2494-04-ISM)
Remaining 00:49:30
FINISH LAB
HOL-2494-04-ISM - Module4 - Connect Azure VMware Solution to an Azure VNet
Return to the lab manual
Guide
88. Select "Paste and go to https://192.168.92.2"
89. Click "Advanced"
90. Click "Continue to 192.168.92.2 (unsafe)"
91. Click "Launch vSphere Client (HTML5)"
92. Click the "AVS-SDDC - Microsoft Azure" tab
93. Click the "Copy to clipboard" icon to the far right of the "Username" field under the "vCenter Server credentials" heading
94. Click the "AVS-SDDC-Jumpbox" tab
95. Right-click the username field
96. Select "Paste"
97. Click the "AVS-SDDC - Microsoft Azure" tab
98. Click the "Copy to clipboard" icon to the far right of the "Password" field under the "vCenter Server credentials" heading
99. Click the "AVS-SDDC-Jumpbox" tab
100. Right-click the "Password" field
101. Select "Paste"
102. Click "Login"
The vSphere Web Client will load. In the next module, we will configure ExpressRoute Global Reach to connect the on-premises data center to the AVS private cloud.
To return to the lab manual, click the link in the upper corner.
vSphere Client
Cluster-1

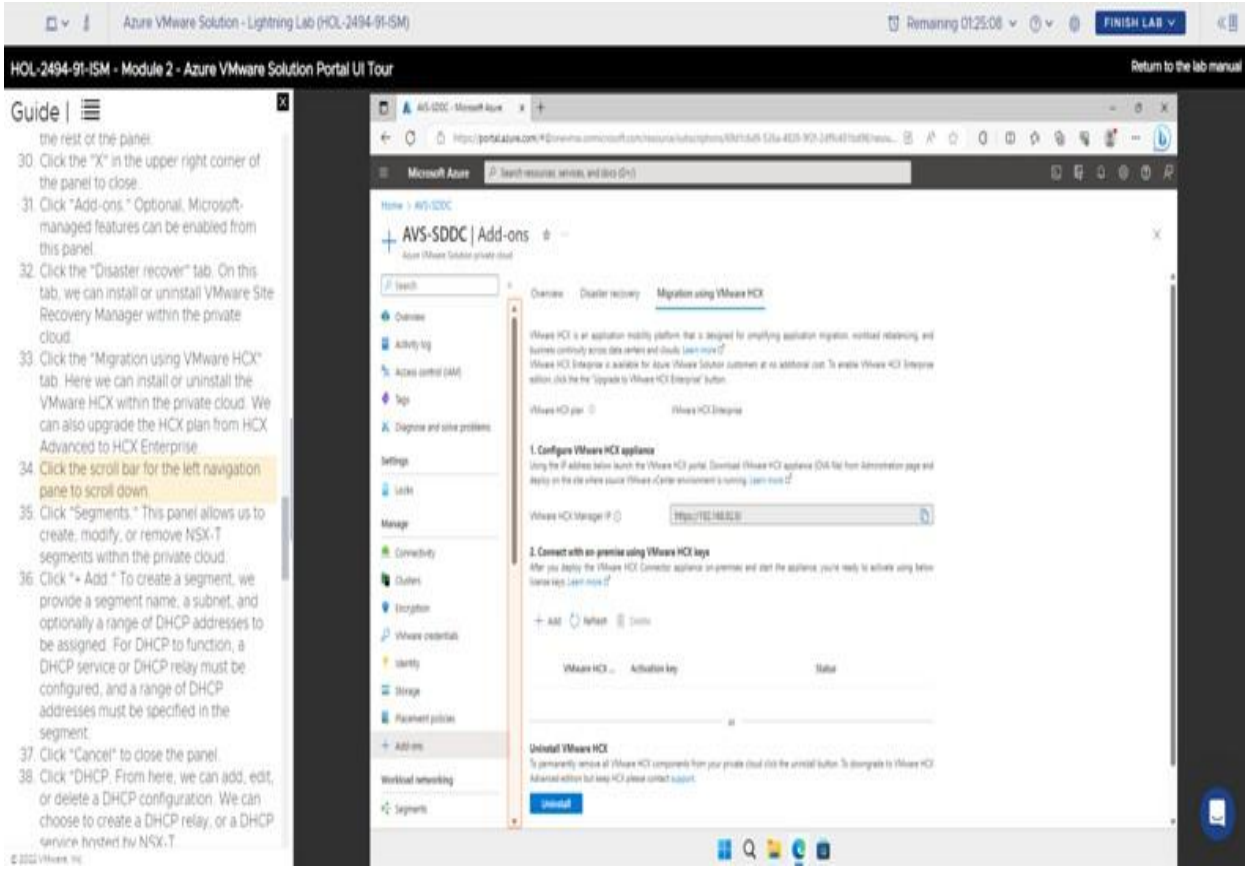

Azure VMware Solution Planning and Deployment (HOL-2494-04-ISM)
Remaining 00:51:59
FINISH LAB
HOL-2494-04-ISM - Module4 - Connect Azure VMware Solution to an Azure VNet
Return to the lab manual
Guide
41. Click the "Windows 11" icon
42. Click "Create"
43. Click the "Virtual machine name" field
44. Enter "AVS-SDDC-Jumpbox"
45. Click the "Region" drop-down
46. Click the scroll bar in the "Region" drop-down
47. Click "(US) West US"
48. Click the far-right scroll bar to scroll down
49. Click the "Username" field
50. Type "avslab"
51. Click the "Password" field
52. Enter "VMware!!VMware!!"
53. Click the "Confirm password" field
54. Enter "VMware!!VMware!!"
55. Click "None" next to "Public inbound ports"
56. Click the far-right scroll bar to scroll down
57. Check the box next to "I confirm I have an eligible Windows 10/11 license with multi-tenant hosting rights"
58. Click "Next : Disks >"
59. Click "Next : Networking >"
60. Click the "Public IP" drop-down
61. Select "None"
62. Click the far-right scroll bar to scroll down
63. Click "Next : Management >"
64. Click "Next : Monitoring >"
65. Click "Next : Advanced >"
66. Click "Next : Tags >"
67. Click "Next : Review + create >"
68. Click "Create"
Microsoft Azure
Create a virtual machine

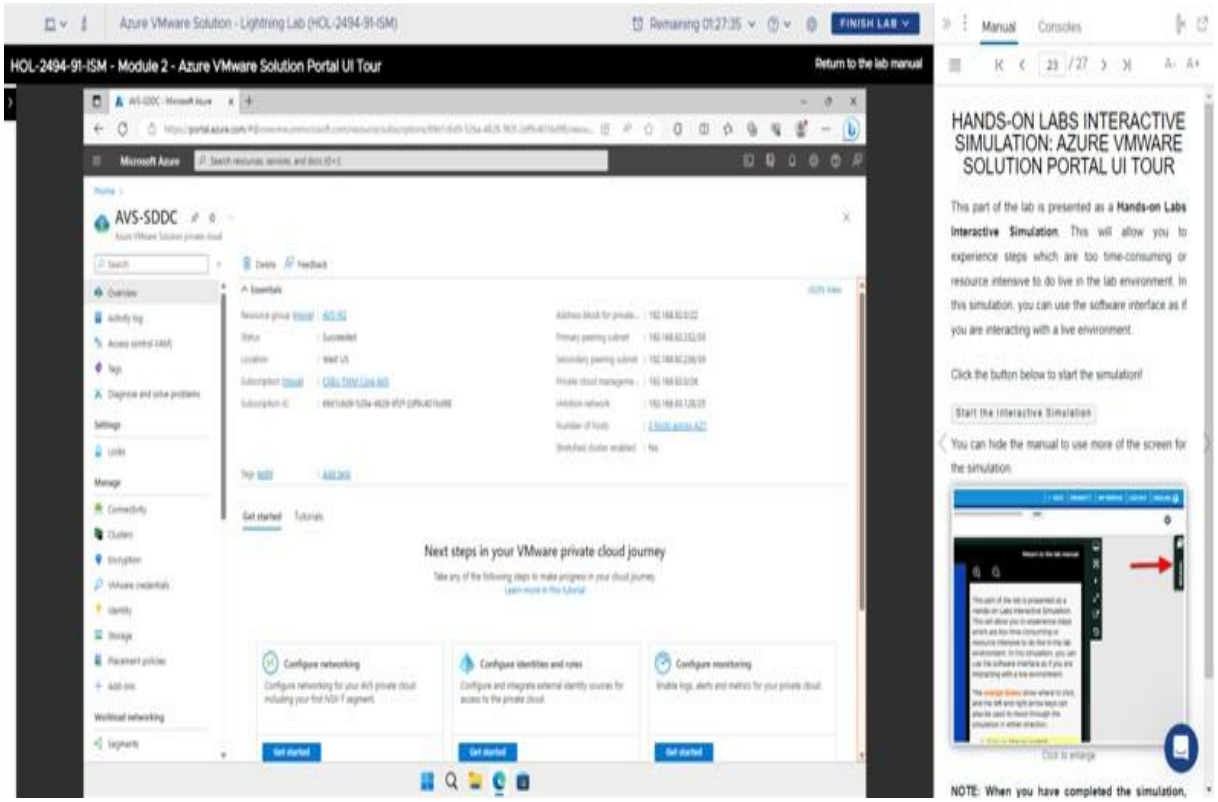

Azure VMware Solution Planning and Deployment (HOL-2494-04-ISM)
Remaining 00:54:49
FINISH LAB
HOL-2494-04-ISM - Module 3 - Deploy the Azure VMware Solution Private Cloud from the Azure Portal
Return to the lab manual
Guide
down
27. Select "AV36 Node"
28. Click the scroll-bar
29. Click the "Address block for private cloud" field
30. Enter "192.168.92.0/22"
31. Click "Review and Create"
32. Review the summary. Click the scroll bar to view more
33. Click "Create"
The deployment will progress. The deployment process can take three to four hours in real time--we have sped this up for the simulation.
34. When presented with the "Your deployment is complete" message, click "Go to resource"
The AVS private cloud has been deployed. In the next module, we will connect the AVS private cloud to an Azure VNet, and deploy an administrative jumpbox inside that VNet.
To return to the lab manual, click the link in the upper corner.
AVS-SDDC
Next steps in your VMware private cloud journey
Manual
Consoles
MODULE 4 - CONNECT AZURE VMWARE SOLUTION TO AN AZURE VNET (10 MINUTES)
This module contains the following lessons
Introduction
Hands-on Labs Interactive Simulation: Connect Azure VMware Solution to an Azure VNet
Conclusion


Congratulations!
Thank you for taking Azure VMware Solution Planning and Deployment (HOL-2494-04-ISM)
TAKE OUR SURVEY
We hope you enjoyed your experience! Ready to take it to the next level? Test your skills with VMware Odyssey, our newest Hands-on Labs gamification program. Check out the full Odyssey catalog here.
VMWARE ODYSSEY™ by HANDS-ON LABS
This lab was powered by VMware Lab Platform (VLP).

SERVICE-2:


Azure VMware Solution - Lightning Lab (HOL-2494-91-ISM)
Remaining 01:24:10
FINISH LAB
HOL-2494-91-ISM - Module 2 - Azure VMware Solution Portal UI Tour
Return to the lab manual
Guide |
46. Click "Alerts." Here we can view any active alerts in the environment.
47. Click "Alert rules" in the top bar of the panel. Here you can see alert rules that have been defined for configure CPU, Memory, and disk usage thresholds. These alert rules are not created by default.
48. Click the "X" in the upper right corner of the panel to close.
49. Click "Metrics." In this panel, we can create charts for key metrics.
50. Click "Percentage Datastore Disk Used." A chart is generated showing datastore usage over time.
51. Click the "Metric" drop-down.
52. Click "Average Memory Usage." A chart is generated showing average memory usage over time.
53. Click "Diagnostic settings." Form this panel we can configure the forwarding of logs and events to external systems.
54. Click "Edit setting" to the far right of the "Logs-to-Workspace" row. This configuration is set to send VMware syslog logs and all metrics to an Azure LogAnalytics workspace.
55. Click the "C" in the upper right corner of the panel to close.
56. Click "Advisor recommendations." This panel will generate a report of recommendations from Azure Advisor. In this case, it has notified us that a new
AVS-SDDC | Metrics
29.1193


Azure VMware Solution - Lightning Lab (HOL-2494-91-ISM)
Remaining 01:25:08
FINISH LAB
HOL-2494-91-ISM - Module 2 - Azure VMware Solution Portal UI Tour
Return to the lab manual
Guide |
the rest of the panel.
30. Click the "X" in the upper right corner of the panel to close.
31. Click "Add-ons." Optional, Microsoft-managed features can be enabled from this panel.
32. Click the "Disaster recover" tab. On this tab, we can install or uninstall VMware Site Recovery Manager within the private cloud.
33. Click the "Migration using VMware HCX" tab. Here we can install or uninstall the VMware HCX within the private cloud. We can also upgrade the HCX plan from HCX Advanced to HCX Enterprise.
34. Click the scroll bar for the left navigation pane to scroll down.
35. Click "Segments." This panel allows us to create, modify, or remove NSX-T segments within the private cloud.
36. Click "+ Add." To create a segment, we provide a segment name, a subnet, and optionally a range of DHCP addresses to be assigned. For DHCP to function, a DHCP service or DHCP relay must be configured, and a range of DHCP addresses must be specified in the segment.
37. Click "Cancel" to close the panel.
38. Click "DHCP. From here, we can add, edit, or delete a DHCP configuration. We can choose to create a DHCP relay, or a DHCP
AVS-SDDC | Add-ons
Overview
Disaster recovery
Migration using VMware HCX
1. Configure VMware HCX appliance
2. Connect with on-premise using VMware HCX keys
Uninstall VMware HCX
Uninstall



Conclusion:- Thus, in this experiment, we delved into a few hands-on activities and labs through the VMWare virtual platform, performed them and obtained successful results, thus completing the experiment lab activity.