Ethical Hacking v2

Installation and Configuration Guide
For PROXMOX VE

Document Version: 2025-6-13

NDG Ethical Hacking v2 on *PROXMOX VE* requires **NETLAB+ VE 25.0.0** or greater.

Contents

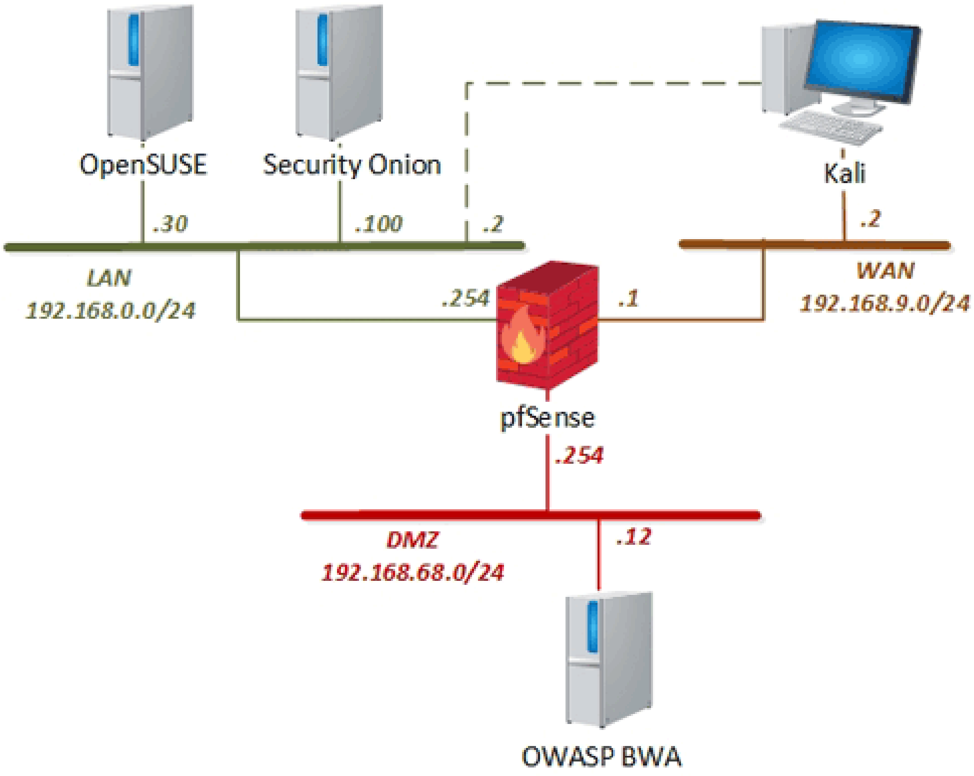
1 Introduction

This document provides detailed guidance on performing the installation and configuration of the *Ethical Hacking v2* pod on the *NETLAB+ VE* system.

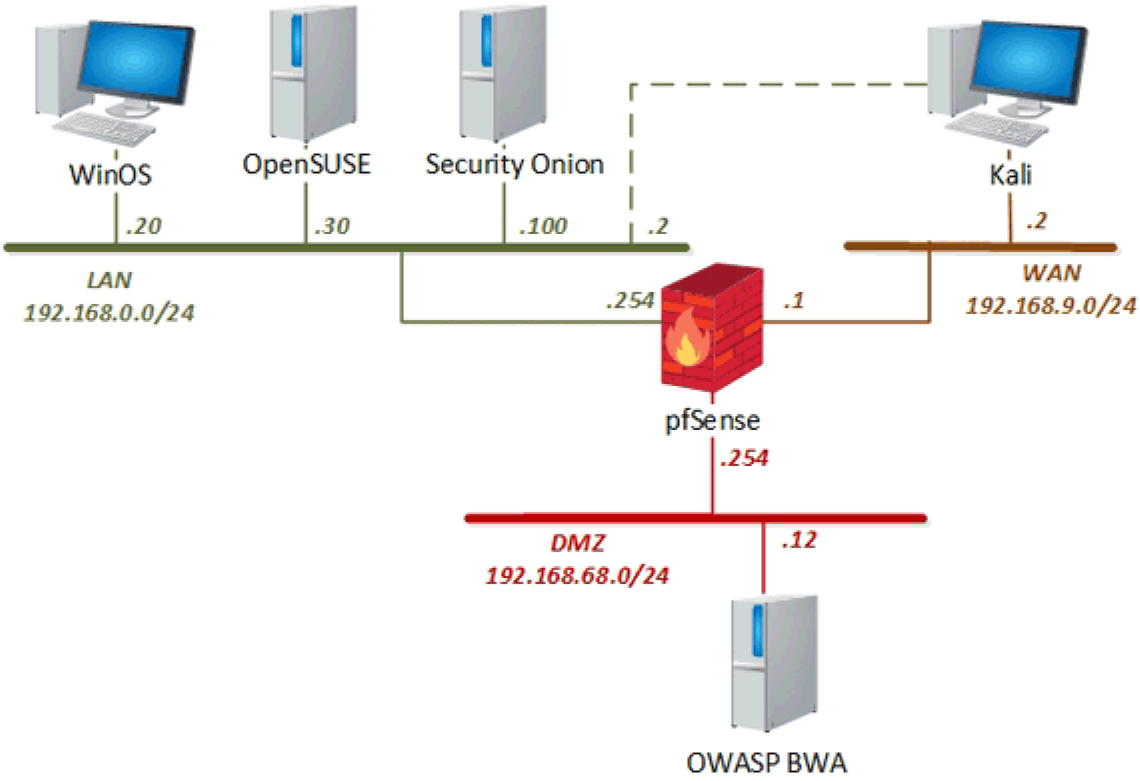
1.1 Introducing the Ethical Hacking v2 Pod

The *Ethical Hacking v2* pod is a 100% virtual machine pod consisting of six virtual machines. Linked together through virtual networking, these six virtual machines provide the environment for a student or a team to perform the *Ethical Hacking v2* labs for both *Series-1* and *Series-2* lab libraries.

Series-1 Topology



Series-2 Topology



2 Planning

This guide provides specific information pertinent to delivering the *Ethical Hacking v2* pod. The *NETLAB+ Virtual Machine Infrastructure* provides the prerequisite guidance for setting up your Proxmox VE infrastructure, including:

- An introduction to virtualization using *NETLAB+*
- Detailed setup instructions for standing up *Proxmox VE*
- Virtual machine and virtual pod management concepts using *NETLAB+*

This document assumes that you have set up virtual machine infrastructure in accordance with the *NETLAB+ Virtual Machine Infrastructure*.

2.1 Pod Creation Workflow

The following list is an overview of the pod setup process.

1. Restore virtual machine images required from the NDG VM Distribution System.
2. Make necessary adjustments to each virtual machine in the environment.
    a. Insert/Verify manual **MAC** addresses.
    b. Change the default network to **SAFETY_NET**.
    c. Any other configuration changes mentioned in this guide.
3. Import the deployed virtual machines to the *NETLAB+* **Virtual Machine Inventory**.
4. Create a master pod from the master virtual machines.
5. Activate or license the required software on each virtual machine when prompted.
6. Take a snapshot of each virtual machine deployed labeled **GOLDEN** after all configurations and licensing have taken effect. The *GOLDEN* snapshot is used to clone virtual machine images for host templates.
7. Use the *NETLAB+* **Pod Cloning** feature to create template pod on each host used in the *NETLAB+* environment.
8. Use the *NETLAB+* **Pod Cloning** feature to create student pods from the template pod.

2.2 Pod Resource Requirements

The *Ethical Hacking v2* course will consume 83.9 GB of storage per template pod instance. If you only choose to teach *Series-1* labs, then the course will consume 53.7 GB of storage per each template pod instance due to the removal of the *WinOS* virtual machine.

The following table provides details of the storage requirements for each of the virtual machines in the pod.

Virtual Machine	Deployed VM (Thin Provisioned)	Maximum Allocated Memory
Kali	17.9 GB	2 GB
OpenSUSE	8.6 GB	2 GB
OWASP-BWA	6.9 GB	1 GB
pfSense	1.3 GB	512 MB
Security Onion	19 GB	2 GB
WinOS	30.2 GB	8 GB
Total	**83.9 GB**	**15.5 GB**

2.3 Proxmox VE Host Server Requirements

Please refer to the *NDG* website for specific *Proxmox VE* host requirements to support virtual machine delivery: https://www.netdevgroup.com/products/requirements/

The deployment of the *Ethical Hacking v2* requires *Proxmox VE* version of **8.4** or greater.

Please Note

The number of **active** pods that can be used simultaneously depends on the *NETLAB+* product license and the number of *Proxmox VE* host servers meeting the hardware requirements specifications.

2.4 NETLAB+ Requirements

Installation of *Ethical Hacking v2* pods, as described in this guide, requires that you are running *NETLAB+ VE* **25.0.0 or greater**.

Previous versions of *NETLAB+* do not support requirements for the *Ethical Hacking v2* course on the physical host servers.

Please refer to the *NETLAB+ Virtual Machine Infrastructure*.

2.5 NETLAB+ Virtual Machine Infrastructure Setup

The *NETLAB+ Virtual Machine Infrastructure* setup is described in the following sections of the *NETLAB+ Virtual Machine Infrastructure:*

- *Registering a Virtual Datacenter in NETLAB+*
- *Adding hosts in NETLAB+*
- *Proactive Resource Awareness*

It is important to configure *Proactive Resource Awareness* to maximize the number of active pods per physical *Proxmox VE* host.

2.6 Software Requirements

For the purpose of software licensing, each virtual machine is treated as an individual machine, PC, or server. Please refer to the specific vendor license agreements (and educational discount programs, if applicable) to determine licensing requirements for your virtual machines' software, operating system, and applications.

The minimum virtual infrastructure software required for standing up this pod is in the following table.

Virtual Infrastructure Requirements

Software	Version
Proxmox VE	8.4

Please refer to the *Software and Licenses* section regarding the software requirements for virtual machines in the pod.

2.7 Networking Requirements

To accommodate the movement of large *VMs* and *ISO* disk images from one host to another, gigabit Ethernet or better connectivity is recommended to interconnect your *NETLAB+* and *Proxmox VE* host systems.

The two standard networking models recommended to interconnect your servers are described in detail in the *Networking Models* section of the *NETLAB+ Virtual Machine Infrastructure*.

3 Software and Licenses

3.1 Obtaining Windows Software Licenses

The following table lists the software that is required for the virtual machines inside the *Ethical Hacking v2* pod, but only if you plan on teaching the *Series-2* lab series, which requires the use of a single Windows-based virtual machine. Your organization needs to be a member of the vendor programs listed in the *Source* column to obtain and use the licenses. To subscribe to the *Microsoft Azure Dev Tools for Teaching* program, visit: https://azureforeducation.microsoft.com/en-us/Institutions.

Pod Software Requirements

Software	Version	Source
Windows Server	2019 Standard (64-bit)	Azure Dev Tools for Teaching

To enable all features of the *Windows*-based virtual machines, licensing will be required, followed through with activations for the master virtual machines only. This needs to be done before cloning.

For more information regarding the *Microsoft Azure Dev Tools for Teaching* program, you may visit their FAQ page: https://azure.microsoft.com/en-us/education/institutions/dev-tools-for-teaching-faq/.

It is recommended to acquire the *Multiple Activation Key* (*MAK*) lab key license for a specified *Windows* product. This type of key enables you to activate multiple installations of a product with the same key.

Please note that activating licenses is only required on master pods. Doing a *Link Clone* of the master pod will preserve the activation on the cloned VMs in the user pods. It is important to note that when activating *Windows*, the VMs have temporary Internet access so that they can contact *Microsoft Licensing Servers*.

3.2 Setup NDG VM Distribution System

The virtual machines are made available from the NDG VM Distribution System. Please follow the guide at *NDG VM Distribution System*.

This pod requires you are connected to the **vmdist.ndg_genit** and **vmdist.ndg_genit.windows** storage.

To request access to the preconfigured virtual machine templates from *CSSIA* and *NDG*:

1. Go to *the CSSIA VM Image Sharing Agreement* page: CSSIA VM Image Sharing Agreement
2. Complete and submit your access request by following the instructions on the request form.
3. *CSSIA* will confirm your access and notify *NDG Support*.
4. NDG Support will authorize your access to the NDG VM Distribution System.
5. Contact NDG Support if you need your username and password credentials.

4 Master Pod Configuration

A master pod is setup on the management server. This master pod will contain the VMs deployed from the NDG VM Distribution System. This will later be cloned to template pods on each host.

4.1 Associated NDG VM Distribution System Storage Connections

These storage connections should be set up and configured on your management server. Refer to *Section 3.2*.

vmdist.ndg_genit

VM Name	VM OS	VM ID	Virtual Machine Name
Kali	Linux	4201001	NDG-EHv2.Kali *(build)*
OWASP-BWA	Linux	4201002	NDG-EHv2.OWASP-BWA *(build)*
OpenSUSE	Linux	4201003	NDG-EHv2.OpenSUSE *(build)*
Security Onion	Linux	4201004	NDG-EHv2.Security-Onion *(build)*
pfSense	FreeBSD	4201006	NDG-EHv2.pfSense *(build)*

vmdist.ndg_genit.windows

VM Name	VM OS	VM ID	Virtual Machine OVA Name
WinOS	Windows Server 2019 Standard (x64)	4201005	NDG-EHv2.WinOS *(build)*

Please Note

The *WinOS* VM should only be deployed if you plan on teaching the *Ethical Hacking v2 (Series-2)* labs.

4.2 Deploying from NDG VM Distribution System

Deploy on your management server the pod virtual machine files from the NDG VM Distribution System.

1. Navigate to your **Proxmox VE Management Server** using your management workstation in a web browser.
2. Using your navigation panels, in the **Resource Tree**, navigate to **Datacenter** > *your_management_server* > **vmdist.ndg_genit.**
3. In the **Content Panel**, select **Backups**.
4. In the Notes column, select the name **NDG-EHv2.Kali** *(build).*

> Please Note
>
> These build numbers may vary. Please refer to the Release Notes of the content to determine the latest version.

5. Click the **Restore** button.
6. In the **Restore: VM** popup window, select your **Storage** (generally NETLAB1).
7. Set the **VM** field to *4201001.*
8. Click the **Restore** button.
9. *Proxmox VE* will begin deploying the virtual machine. This may take some time, depending on the speed of your connection, HDDs, etc. Repeat the previous steps for each remaining virtual machine in the pod. Note the WinOS machine requires a different storage connection.

4.2.1 Modify Virtual Machines

Once the virtual machines are imported onto the management host, verify the configurations. The following steps will guide you through the process.

1. Navigate to your **Proxmox VE cluster** using your management workstation, and login.
2. Using your navigation panels, in the *Resource Tree*, navigate to *Datacenter*, your management server and expand its view to see the virtual machines deployed in *Section 4.2*.
3. Locate the **Kali** virtual machine. In the *Content Panel*, select **Hardware**.
4. Select *Network Device (net0)* and click the **Edit** button.
5. Confirm the *MAC address* field matches the table below.

Virtual Machine	NIC	MAC
Kali	0	00:50:56:99:25:09
	1	00:50:56:99:d5:96
OpenSUSE	0	00:50:56:9a:de:74
OWASP-BWA	0	00:50:56:9a:c0:10
pfSense	0	00:50:56:9a:47:6a
	1	00:50:56:9a:dc:58
	2	00:50:56:9a:63:ac
Security Onion	0	00:50:56:9a:ab:d3
	1	00:50:56:9a:7a:4e
WinOS	0	00:50:56:99:98:d7

6. Repeat the previous steps for each network adapter of the remaining virtual machines you deployed.

4.2.2 Create a Snapshot on the Virtual Machines

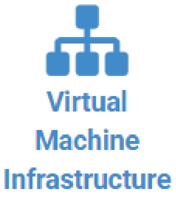
1. Locate the **NDG-EHv2.Kali** virtual machine. In the *Content Panel*, select **Snapshots**.
2. Click the **Take Snapshot** button.
3. In the *Create Snapshot* window, type **GOLDEN** or whatever prior snapshot name the virtual machine had. Click **Take Snapshot** to take a snapshot.
4. Repeat these steps for each virtual machine.

4.3 NETLAB+ Virtual Machine Inventory Setup

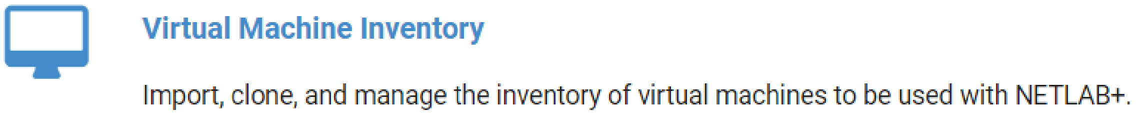
This section will guide you in adding your master virtual machines to the *Virtual Machine Inventory* of your *NETLAB+ VE* system.

1. Log in to your *NETLAB+ VE* system using the administrator account.

2. Select the **Virtual Machine Infrastructure** icon.

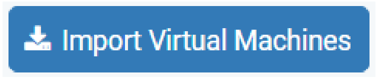


3. Click the **Virtual Machine Inventory** icon.

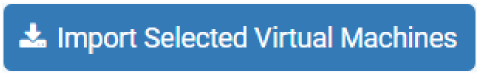


Import, clone, and manage the inventory of virtual machines to be used with NETLAB+.

4. Click the **Import Virtual Machines** button located at the bottom of the list.



5. Select the appropriate datacenter from the list where your VMs reside.
6. Select the checkbox next to the virtual machines you have just deployed and click **Import Selected Virtual Machines**.



7. When the *Configure VMs* window loads, you can set your virtual machine parameters.

   a. Check the dropdown box for the correct operating system for each imported virtual machine.
   b. Change *Role* to **Master** for each VM.
   c. Add any comments for each virtual machine in the last column.

> It is advised to leave the *Version* and *Build* numbers for reference when requesting *NDG* support.

d. Verify your settings and click **Import (X) Virtual Machines** (notice the number in parenthesis is dynamic, depending on the amount of VMs selected).

e. Verify all *Import Statuses* report back with *OK* and then click on the **Dismiss** button.

f. Verify that your virtual machines show up in the inventory.

For additional information, please refer to the *NETLAB+ VE Administrator Guide*.

4.4 Building the Master Ethical Hacking v2 Pod

This section will assist you in adding the *Ethical Hacking v2* pod to your *NETLAB+* system.

4.4.1 Enabling Labs in Course Manager

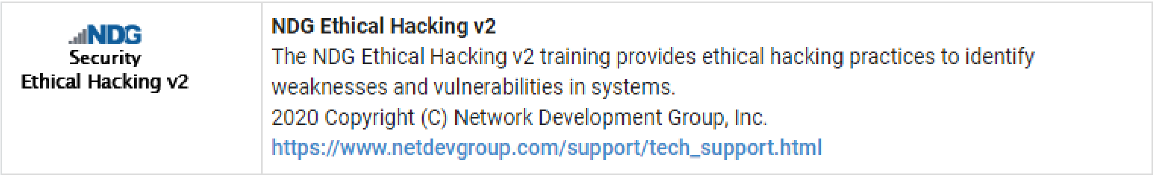
Please refer to the *Course Manager* section *of the NETLAB+ VE Administrator Guide* on how to enable content. Please install the **NDG Ethical Hacking - v2** course.

4.4.2 Create the Master Pod

1. Log into **NETLAB+ VE** with the *administrator* account.
2. Select the **Pods** icon.

3. Create a new pod by scrolling to the bottom and clicking the **Create New Pod** button.

4. Then, click on the **NDG Ethical Hacking v2** pod entry from the list of installed pod types.



NDG Security Ethical Hacking v2	NDG Ethical Hacking v2 The NDG Ethical Hacking v2 training provides ethical hacking practices to identify weaknesses and vulnerabilities in systems. 2020 Copyright (C) Network Development Group, Inc. https://www.netdevgroup.com/support/tech_support.html

5. On the *New Pod* window, input a value into the **Pod ID** and **Pod Name** fields. Click **Next**.

> The ***Pod ID*** determines the order in which the pods will appear in the scheduler. It is best practice to use a block of sequential ID numbers for the *Pod Id* that allows for the number of pods you are going to install.
>
> The ***Pod Name*** identifies the pod and is unique per pod. Here we used the name of the lab set or course in a shortened form.

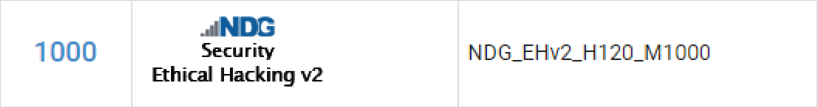
6. To finalize the wizard, click **OK**.

For additional information, please refer to the *NETLAB+ VE Administrator Guide*.

4.4.3 Attach Virtual Machines to the Master Pod

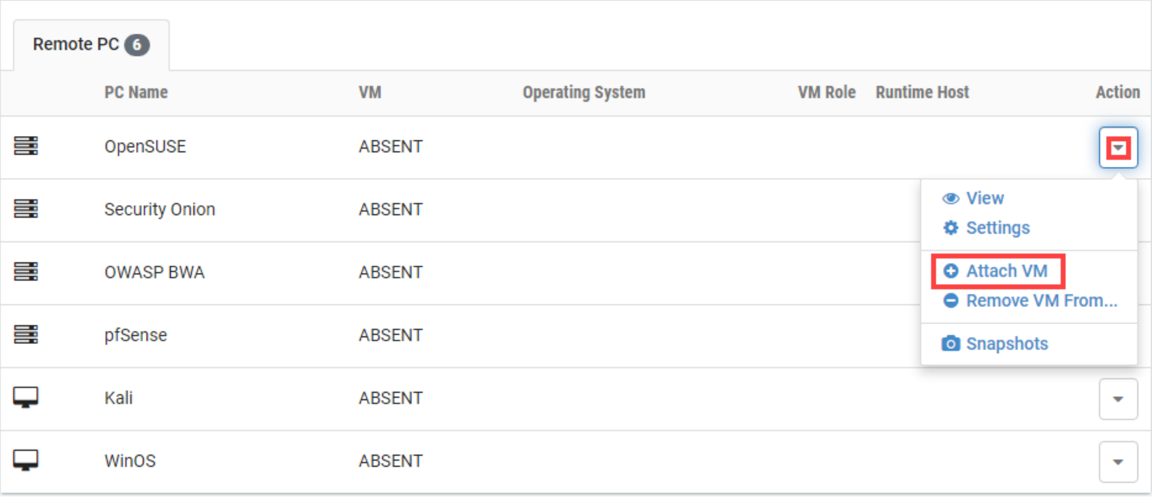
Update the master pod to associate the virtual machines with the newly created pod.

1. Select the **NDG Ethical Hacking v2** master pod from the pod list.



1000	NDG Security Ethical Hacking v2	NDG_EHv2_H120_M1000

2. Click on the **Action** dropdown next to the virtual machine you are about to assign and select **Attach VM**.



Remote PC 6

	PC Name	VM	Operating System	VM Role	Runtime Host	Action
	OpenSUSE	ABSENT				
	Security Onion	ABSENT				
	OWASP BWA	ABSENT				
	pfSense	ABSENT				
	Kali	ABSENT				
	WinOS	ABSENT				

3. Select the corresponding virtual machine from the inventory list.

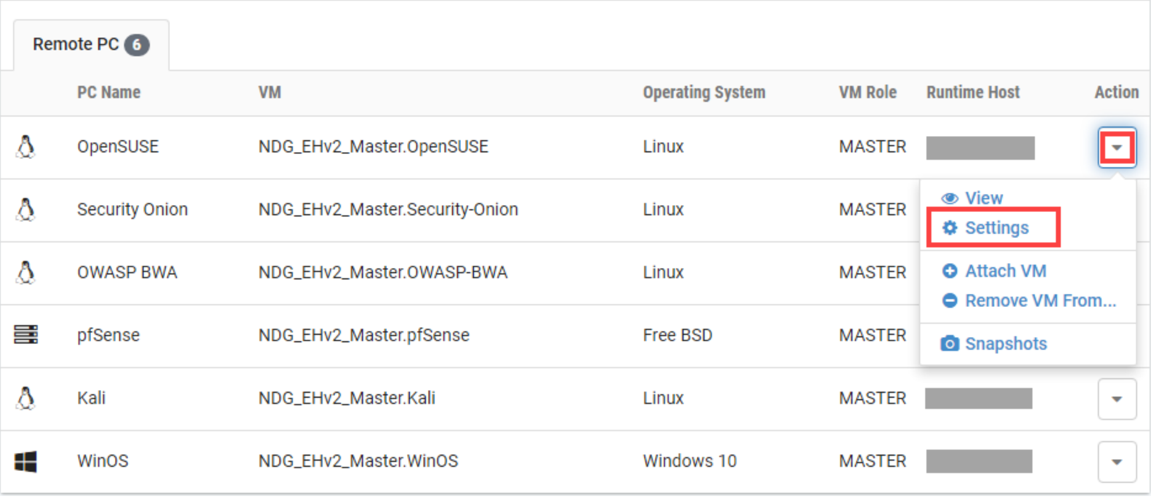
4. Click **OK** to confirm the VM attachment and repeat the previous steps for the remaining virtual machines.

Please Note

If you do not plan on teaching the *Ethical Hacking (Series-2)* labs, then leave the *WinOS* slot to **ABSENT** since this VM is not used in the *Series-1* labs.

4.4.4 Set the Revert to Snapshot

1. Make sure to view the **Ethical Hacking v2** master pod you just created snapshots for. In the pod view, click on the dropdown menu option underneath the *Action* column and select **Settings**.



Remote PC 6

	PC Name	VM	Operating System	VM Role	Runtime Host	Action
	OpenSUSE	NDG_EHv2_Master.OpenSUSE	Linux	MASTER	[redacted]	▾
	Security Onion	NDG_EHv2_Master.Security-Onion	Linux	MASTER		
	OWASP BWA	NDG_EHv2_Master.OWASP-BWA	Linux	MASTER		
	pfSense	NDG_EHv2_Master.pfSense	Free BSD	MASTER		
	Kali	NDG_EHv2_Master.Kali	Linux	MASTER	[redacted]	▾
	WinOS	NDG_EHv2_Master.WinOS	Windows 10	MASTER	[redacted]	▾

2. In the virtual machine's *Settings* window, click on the *Revert to Snapshot* dropdown and select **GOLDEN** and then click the **Submit** button.

> This sets the snapshot on the virtual machine that will get reverted to each time the pod is scheduled.

3. Click **OK** to confirm.
4. Return to the pod view page and repeat the previous steps for the remaining virtual machines.

4.5 Make changes to the Master Pod

Some pods have software that needs to be altered on the host machine before it can be used properly. This normally happens when software requires licenses to function.

If there are changes that need to be made to the master pod prior to template cloning, you will need to follow this set of instructions to ready your master pod.

For the Ethical Hacking v2 master pod, you will need to license all the *Microsoft Windows* machines, but only if you plan on teaching the *Ethical Hacking v2 (Series-2)* labs. This process consists of:

- Scheduling the master pod
- Providing temporary internet access to the *WinOS* VM
- Licensing/Activating the *WinOS* VM
- Shutting down the *WinOS* VM
- If necessary, resetting the network interface cards to *SAFETY_NET*
- Taking a new *GOLDEN* snapshot for the *WinOS* VM
- Ending the reservation

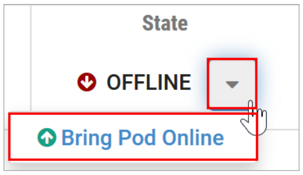
4.5.1 Virtual Machine Credentials

For your reference, the following table provides a list of the credentials for the systems in the pod:

Machine	User name	Password
Kali	root	toor
OpenSUSE	osboxes	osboxes.org
OWASP-BWA	root	owaspbwa
pfSense	admin	pfsense
Security Onion	ndg	password123
WinOS	Administrator	Train1ng$

4.5.2 Bring the Master Pod online

1. In the pod view, click the drop arrow under *State* and select **Online**.



4.5.3 Create Class and Schedule the Master Pod

Create a class as identified in the *Add Classes* section of the *NETLAB+ VE Instructor Guide* then schedule the *Master Pod* to license the *WinOS* virtual machine (choose the *Series-2* lab design and then select "*No Lab: Launch Cyber Range*" from the list of labs as this selection will boot up all VMs available in the pod).

> ⚠ When scheduling the *Master Pod*, it is important to schedule the pod for enough time to complete the following steps. Failure to complete the steps prior to taking the final snapshot could mean redeploying necessary virtual machines.

4.5.4 Provide Temporary Internet Access to WinOS

1. Navigate to your **Proxmox VE cluster** using your management workstation, and login.
2. Using your navigation panels, in the *Resource Tree*, navigate to *Datacenter*, your management server and expand its view to see the virtual machines deployed in *Section 5.2*.
3. Locate the **NDG-EHv2.WinOS** virtual machine. In the *Content Panel*, select **Hardware**.
4. Select *Network Device (net0)* and click the **Edit** button.
5. In the *Edit: Network Device* window, set the *Bridge* field to an internet-accessible bridge.

> Alternatively, you can add a new *Network Device* to the VM and use it to link to a virtual machine port group that is linked to an internet accessible physical adapter.

6. Click **OK** to confirm the changes.

4.5.5 License and Activate WinOS

1. Log on to the **WinOS** virtual machine in the pod. If necessary, click the dropdown arrow for the VM's tab and select **Send CTRL+ALT+DEL**.
2. Log in as `Administrator` with `Train1ng$` as the password.
3. Once logged in, make sure the TCP/IP settings are temporarily configured correctly so that the internet is reachable. This can vary depending on how your environment is set up.

> If you added a new temporary *vNIC* from the previous section, make sure to configure the *TCP/IP* settings for the newly added network adapter and use it to connect out to the internet.

4. Right-click on the **Start** icon in the lower-left and select **System**.
5. Scroll down and click **Change product key or upgrade your edition of Windows** in the *Windows activation* section.
6. Click **Change product key** in the *Activate Windows* now section.
7. Enter the product key and follow the on-screen instructions.
8. Windows should now be activated. If you received an error, make sure that the key entered is valid and click the **Troubleshoot** link from the *Activation Settings* to troubleshoot the problem.

4.5.6 Shut Down WinOS

1. While on the **NDG-EHv2.WinOS** machine, click the **Start** menu followed by clicking the **Shut Down** button.

4.5.7 Reset the NIC to SAFETY_NET

1. Navigate to your **Proxmox VE cluster** using your management workstation, and login.
2. Using your navigation panels, in the *Resource Tree*, navigate to *Datacenter*, your management server and expand its view to see the virtual machines you previously deployed.
3. Locate the **NDG-EHv2.WinOS** virtual machine. In the *Content Panel*, select **Hardware**.
4. Select *Network Device (net0)* and click the **Edit** button.
5. In the *Edit: Network Device* window, set the *Bridge* field to **SAFETY_NET**.

> If you added a new temporary *Network Device* from the previous section, make sure to remove the *Network Device*.

10. Click **OK** to confirm settings.

4.5.8 Take New Snapshots for the Changed Master Virtual Machines

1. Locate the **NDG-EHv2.WinOS** virtual machine. In the *Content Panel*, select **Snapshots**.
2. Select the current **GOLDEN** snapshot and click **Remove**. Remember the name of this snapshot, as the new snapshot will need to have the exact same name.
3. Click **Yes** on the *Confirm* window.
4. Click the **Take Snapshot** button.
5. In the *Create Snapshot* window, type **GOLDEN** or whatever prior snapshot name the virtual machine had. Click **Take Snapshot** to take a snapshot.
6. Repeat these steps for each virtual machine.

4.5.9 End Reservation

You may now end the reservation of the master pod.

5 Pod Cloning

This section will help you create multiple student pods. The following sections describe the *NETLAB+* pod cloning feature used to create student pods on one or two host systems.

5.1 Pod Categories

NETLAB+ has three pod categories:

A **master** pod refers to the main staging pod on the *management server*. This pod consists of the master virtual machines that were deployed from the NDG VM Distribution System. This is where you would license any software in the pod and configure any virtual machines as indicated in this guide.

A **template** pod refers to a pod on a *host server* that is a *full clone* copy of a master pod with virtual machines that are set to templates. This pod and virtual machines cannot be modified. This pod category can also not be turned online as templates cannot be powered on. There should be a template pod on each host server you plan to run user pods on.

A **user (student)** pod refers to a pod on a *host server* that is a *link clone* copy of the template pod with virtual machines ready for student reservations.

5.2 Linked Clones vs Full Clones Virtual Machines

NETLAB+ can create *linked clones* or *full clones*.

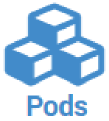
A **linked clone** (or linked virtual machine) is a virtual machine that shares virtual disks with the parent (or master) virtual machine in an ongoing manner. This conserves disk space and allows multiple virtual machines to use the same software installation. Linked clones can be created very quickly because most of the disk is shared with the parent VM.

A **full clone** is an independent copy of a virtual machine that shares nothing with the parent virtual machine after the cloning operation. The ongoing operation of a full clone is entirely separate from the parent virtual machine.

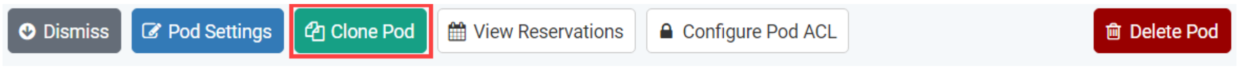
5.3 Create Full Clone Templates on Host Server

The following section describes how to create template pods on the *Proxmox VE Host* server, not the management server. In this scenario, we will create full template virtual machines using the *NETLAB+* pod cloning utility.

1. Log in to **NETLAB+ VE** with the *administrator* account.
2. Select the **Pods** icon.



3. Click on your master pod.
4. Make sure the pod is offline by selecting **Take Pod Offline**.
5. Click the **Clone Pod** button to create a new pod, based on the settings and snapshots of this pod.

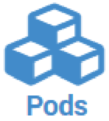


6. Input a new ID value into the **New Pod ID** field. It is advised to keep the pods in numerical order. If the pod IDs are not in numerical order, they will not show up in the scheduler in numerical order. Click **Next**.

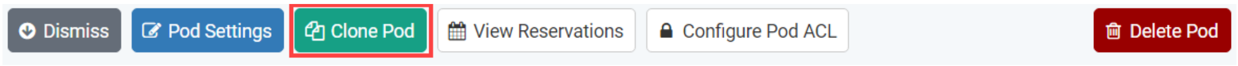
5.4 Creating Template Pods

The following section describes how to create user pods on the same *Proxmox VE Host* system that holds your master pod's virtual machines. In this scenario, we will create linked virtual machines using the *NETLAB+* pod cloning utility.

7. Log in to **NETLAB+ VE** with the *administrator* account.
8. Select the **Pods** icon.



9. Click on your master pod.
10. Make sure the pod is offline by selecting **Take Pod Offline**.
11. Click the **Clone Pod** button to create a new pod, based on the settings and snapshots of this pod.



12. Input a new ID value into the **New Pod ID** field. It is advised to keep the pods in numerical order. If the pod IDs are not in numerical order, they will not show up in the scheduler in numerical order. Click **Next**.
13. Enter a name for the cloned pod into the **New Pod Name** field. For example, **NDG_EHv2_H120_T1001**. Click **Next**.

> The ***Pod Name*** identifies the pod and is unique per pod. Here we used the name of the lab set or course in a shortened form along with a host identifier (H120), the type and number of the pod (T1001).

14. When the action has finished processing, you are presented with a settings screen. Notice each VM has its own tab. Go through each tab and verify the following:

    Source Virtual Machine:

    a. *From Snapshot* should be set to the **GOLDEN** snapshot you created previously.

    Target Virtual Machine:

    a. For *Type*, verify that **Full** is selected.
    b. For *Role*, verify that the **Template** role is selected.
    c. For Datastore, verify you selected the correct one. **NETLAB1** by default.
    d. For *Take Snapshot*, verify that **GOLDEN** is inputted.
    e. For *Copy BIOS UUID,* only choose this option if you wish to preserve the sources VM's BIOS UUID for the targeted clone VM (when this option is checked, it can help with keeping licensing intact such as *Microsoft Windows Licensing/Activation*).

15. When you are done changing settings, click **Clone Pod**. This should complete within a minute as we are creating linked virtual machines.

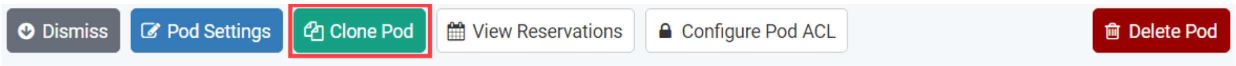
16. When the pod clone process is finished, click **OK**.
17. If you want to dedicate this pod to a particular class, team, or student, use the *Pod ACLs* feature. For details, see the *NETLAB+ VE Instructor Guide*.
18. Repeat these steps for each host server you will have user pods on.

5.5 Creating User Pods

The following section describes how to create user pods on the same *Proxmox VE Host* system that holds your master pod's virtual machines. In this scenario, we will create linked virtual machines using the *NETLAB+* pod cloning utility.

1. Log in to **NETLAB+ VE** with the *administrator* account.
2. Select the **Pods** icon.

3. Click on your template pod.
4. Click the **Clone Pod** button to create a new pod, based on the settings and snapshots of this pod.



5. Input a new ID value into the **New Pod ID** field. It is advised to keep the pods in numerical order. If the pod IDs are not in numerical order, they will not show up in the scheduler in numerical order. Click **Next**.
6. Enter a name for the cloned pod into the **New Pod Name** field. For example, **NDG_EHv2_H120_S1001**. Click **Next**.

> The ***Pod Name*** identifies the pod and is unique per pod. Here we used the name of the lab set or course in a shortened form along with a host identifier (H120), the type and number of the pod (S1001).

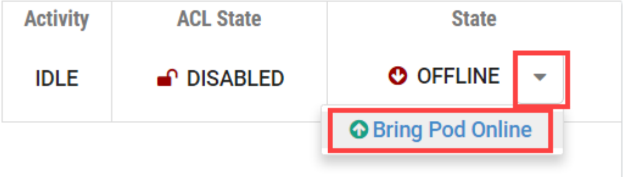
7. When the action has finished processing, you are presented with a settings screen. Notice each VM has its own tab. Go through each tab and verify the following:

   Target Virtual Machine:

   f. For *Type*, verify that **Linked** is selected.
   g. For *Role*, verify that the **Normal** role is selected.
   h. For *Take Snapshot*, verify that **GOLDEN** is inputted.
   i. For *Copy BIOS UUID,* only choose this option if you wish to preserve the sources VM's BIOS UUID for the targeted clone VM (when this option is checked, it can help with keeping licensing intact such as *Microsoft Windows Licensing/Activation*).

8. When you are done changing settings, click **Clone Pod**. This should complete within a minute as we are creating linked virtual machines.

9. When the pod clone process is finished, click **OK**.
10. If you want to dedicate this pod to a particular class, team, or student, use the *Pod ACLs* feature. For details, see the [*NETLAB+ VE Instructor Guide*](#).
11. Click the **Online** Button on the *Pod Management* page to make the pod available.



Activity	ACL State	State
IDLE	DISABLED	OFFLINE

The user pod can now be reserved. When the reservation becomes active, *NETLAB+* will automatically configure virtual machines and virtual networking for your new pod.

The *GOLDEN* snapshot is the starting point for all pods. We recommend that you reserve the 1st pod and conduct some labs to make sure the snapshot images work correctly. If there are defects, make corrections to the images to the master pod, create new template pods, and create new user pods.

5.6 Assigning Pods to Students, Teams, or Classes

Please refer to the [*NETLAB+ VE Instructor Guide*](#) for details on using the *Pod ACLs* feature.