Contents

1 Introduction ........................................................................................................................................... 3
  1.1 Introducing the Red Hat System Administration II (RH134-RHEL8) Pod ..................... 3

2 Planning.................................................................................................................................................. 4
  2.1 Pod Creation Workflow ..................................................................................................................... 4
  2.2 Pod Resource Requirements ............................................................................................................. 5
  2.3 ESXi Host Server Requirements ....................................................................................................... 5
  2.4 NETLAB+ Requirements .................................................................................................................. 5
  2.5 NETLAB+ Virtual Machine Infrastructure Setup ............................................................................. 6
  2.6 Software Requirements ..................................................................................................................... 6
  2.7 Networking Requirements ................................................................................................................ 6

3 Obtaining Software and Licenses .......................................................................................................... 7
  3.1 Downloading OVF Files ..................................................................................................................... 7

4 Master Pod Configuration ...................................................................................................................... 8
  4.1 Deploying Virtual Machine OVF/OVA Files ..................................................................................... 8
  4.2 Modify Virtual Machines ................................................................................................................... 9
    4.2.1 VM Credentials ........................................................................................................................... 10
  4.3 NETLAB+ Virtual Machine Inventory Setup ..................................................................................... 10
  4.4 Building the Master Red Hat System Administration II (RH134-RHEL8) Pod ........... 11
    4.4.1 Enabling the Labs in Course Manager ......................................................................................... 11
    4.4.2 Create the Master Pod ............................................................................................................... 11
    4.4.3 Attach Virtual Machines to the Master Pod .............................................................................. 13
    4.4.4 Create Snapshots for the Master Virtual Machines ................................................................. 13
    4.4.5 Set the Revert to Snapshot ......................................................................................................... 16

5 Pod Cloning .......................................................................................................................................... 17
  5.1 Linked Clones and Full Clones ......................................................................................................... 17
  5.2 Creating User Pods ........................................................................................................................... 17
  5.3 Cloning Your Master Pod to a Second Host .................................................................................... 19
  5.4 Creating User Pods on the Second Host .......................................................................................... 21
  5.5 Assigning Pods to Students, Teams, or Classes .............................................................................. 21
1 Introduction

This document provides detailed guidance on performing the installation and configuration of the Red Hat System Administration II (RH134-RHEL8) pod on the NETLAB+ VE system.

1.1 Introducing the Red Hat System Administration II (RH134-RHEL8) Pod

The Red Hat System Administration II (RH134-RHEL8) pod is a 100% virtual machine pod consisting of 1 virtual machine. Linked together through virtual networking, the 1 virtual machine provides the environment for a student or a team to perform the Red Hat System Administration II (RH134-RHEL8) labs.
2 Planning

This guide provides specific information pertinent to delivering the Red Hat System Administration II (RH134-RHEL8) pod. The NETLAB+ Remote PC Guide Series provides the prerequisite guidance for setting up your VMware infrastructure, including:

- An introduction to virtualization using NETLAB+.
- Detailed setup instructions for standing up VMware vCenter and VMware ESXi.
- 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+ Remote PC Guide Series. The planning information below refers to specific sections in the Remote PC Guide when applicable.

2.1 Pod Creation Workflow

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

1. Obtain the master virtual machine images required for the master pod.
2. Deploy the master virtual machine images to your VMware vCenter Appliance.
   a. Deploy virtual machines using Thin Provisioning to reduce storage consumption.
   b. Make necessary adjustments to each virtual machine in the environment.
      i. Insert/Verify manual MAC addresses.
      ii. Change the default network to SAFETY NET.
      iii. Any other configuration changes mentioned in this guide.
3. Import the deployed virtual machines to the NETLAB+ Virtual Machine Inventory.
4. Activate or license the required software on each virtual machine when prompted.
5. Take a snapshot of each virtual machine in the master pod labeled GOLDEN_MASTER after all configurations and licensing have taken effect. The GOLDEN_MASTER snapshot is used to clone virtual machine images for the user pods.
6. Use the NETLAB+ Pod Cloning feature to create student pods from the master pod.
7. If multiple hosts are used in the NETLAB+ environment, make a Full Clone of the master pod on the initial host (Host A) to the subsequent host (Host B) and so on using the NETLAB+ Pod Cloning feature.
2.2 Pod Resource Requirements

The *Red Hat System Administration II (RH134-RHEL8)* course will consume 22.6 GB of storage per each master pod instance.

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

<table>
<thead>
<tr>
<th>Virtual Machine</th>
<th>OVF/OVA</th>
<th>Initial Master Pod (Thin Provisioning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation0</td>
<td>18.9</td>
<td>22.6</td>
</tr>
<tr>
<td>Total</td>
<td>18.9 GB</td>
<td>22.6 GB</td>
</tr>
</tbody>
</table>

2.3 ESXi Host Server Requirements

Please refer to the *NDG* website for specific *ESXi* host requirements to support virtual machine delivery: [http://www.netdevgroup.com/content/vmita/requirements/](http://www.netdevgroup.com/content/vmita/requirements/)

The deployment of the *RH134* VM from the *Red Hat System Administration II (RH134-RHEL8)* pod requires a *VMware vSphere Version* of 6.0 or greater for the infrastructure due to the *Hardware Version* of select *RH134 VM (version 11)* in the pod.

The number of active pods that can be used simultaneously depends on the *NETLAB+* product edition, appliance version and the number of *VMware ESXi* host servers meeting the hardware requirements specifications.

For current *ESXi* server requirements and active pod count, refer to the following URL: [http://www.netdevgroup.com/support/remote_pc.html#vm_host_server_specifications](http://www.netdevgroup.com/support/remote_pc.html#vm_host_server_specifications).

2.4 NETLAB+ Requirements

Installation of *Red Hat System Administration II (RH134-RHEL8)* pods, as described in this guide, requires that you are running *NETLAB+ VE*.

Previous versions of *NETLAB+* do not support requirements for the *Red Hat System Administration II (RH134-RHEL8)* course on the physical host servers.

Please refer to the *NETLAB+ Remote PC Guide Series*. 
2.5 NETLAB+ Virtual Machine Infrastructure Setup

The NETLAB+ Virtual Machine Infrastructure setup is described in the following sections of the NETLAB+ Remote PC Guide Series:

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

It is important to configure Proactive Resource Awareness to maximize the number of active pods per physical ESXi 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.

<table>
<thead>
<tr>
<th>Virtual Infrastructure Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software</strong></td>
</tr>
<tr>
<td>vSphere ESXi</td>
</tr>
<tr>
<td>vCenter Server</td>
</tr>
</tbody>
</table>

2.7 Networking Requirements

To accommodate the movement of large VMs, OVF/OVAs, and ISO disk images from one host to another, gigabit Ethernet or better connectivity is recommended to interconnect your NETLAB+, vCenter Server system and ESXi host systems.

The two standard networking models recommended to interconnect your servers are described in detail in the Networking Models section of the Remote PC Guide Series, Volume 1 - Introduction and Planning.
3 Obtaining Software and Licenses

3.1 Downloading OVF Files

The virtual machines are made available as Open Virtualization Format (OVF) or Open Virtualization Archive (OVA) files. These files are available for download from CSSIA.

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

1. Go to the CSSIA Resources page: https://www.cssia.org/cssiaresources/
2. Select CSSIA VM Image Sharing Agreement.
3. Complete and submit your access request by following the instructions on the request form.
4. CSSIA will provide, via email, password-protected download links. Access to the download links is provided only to customers who are current with their NETLAB+ support contract and are participants in the appropriate partner programs (i.e., Cisco Networking Academy, VMware IT Academy, Red Hat Academy, and/or Palo Alto Networks).
5. Once all virtual machines have been downloaded, they can be deployed following the steps in the appropriate pod installation guide. Each virtual machine is deployed individually.
4 Master Pod Configuration

4.1 Deploying Virtual Machine OVF/OVA Files

Deploy the OVF/OVA files you have downloaded to your host server.

1. Navigate to your **vSphere Client** using your management workstation, ensure that your downloaded OVA/OVF files are accessible on this machine, and then connect to your **vCenter Server**.
2. From the vSphere Client interface, navigate to **Hosts and Clusters**.
3. Right-click on the target **ESXi Host Server** and select **Deploy OVF Template**.
4. In the **Deploy OVF Template** window, on the **Select source** step, select the **Local File** radio button and click **Browse**.
5. Locate and select one of the VMs for the pod, click **Open**.

```
Only one VM can be selected using this wizard. The process will have to be repeated for the remaining VMs.
```

6. Verify that the VM file path and name appear next to the **Browse** button and click **Next**.
7. In the **Review details** section, make sure to fill the checkbox for **Accept extra configuration options (if present)** and click **Next**.
8. In the **Select name and folder** section, change the name of the virtual machine to something that is easy to manage. You can use the names provided in the list below as names for the virtual machines if you do not have a set naming convention. Select the appropriate datastore and click **Next**.

<table>
<thead>
<tr>
<th>Virtual Machine Topology Name</th>
<th>Virtual Machine Deployment Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation0</td>
<td>RH134_RHEL8_Master.Foundation0</td>
</tr>
</tbody>
</table>

9. On the **Select Storage** step, choose the appropriate storage device and make sure that **Thin Provision** is selected. Click **Next**.
10. In the **Setup networks** section, select **SAFETY NET** as the destination and click **Next**.

```
If SAFETY NET is not available, refer to the Create a Safe Staging Network section in the Remote PC Guide Series – Volume 2.
```

11. In the **Ready to complete** section, make sure **Power on after deployment** is **unchecked** and confirm the settings. Click **Finish**.
12. vCenter will begin deploying the virtual machine. This may take some time depending on the speed of your connection, HDDs, etc.
4.2 Modify Virtual Machines

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

1. In the vSphere Client interface, right-click on the imported virtual machine and select Edit Settings.
2. For all of the virtual machines, manually assign the MAC addresses for each NIC. The table below identifies the MAC addresses per NIC.

<table>
<thead>
<tr>
<th>Virtual Machine</th>
<th>NIC</th>
<th>MAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation0</td>
<td>1</td>
<td>00:50:56:99:d4:1a</td>
</tr>
</tbody>
</table>

![Edit Settings interface for RH134_RHEL8_Master.Foundation0]
4.2.1 VM Credentials

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

<table>
<thead>
<tr>
<th>Machine</th>
<th>User name</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation0</td>
<td>kiosk</td>
<td>redhat</td>
</tr>
</tbody>
</table>

4.3 NETLAB+ Virtual Machine Inventory Setup

This section will guide you in adding your templates to the Virtual Machine Inventory of your NETLAB+ system.

1. Log in to your NETLAB+ VE system using the administrator account.
2. Click on the Virtual Machine Infrastructure icon.
3. Click the Virtual Machine Inventory icon.
4. Click the Import Virtual Machines button located at the bottom of the list.
5. Select the appropriate datacenter from the list where your master VMs reside.
6. Select the checkbox next to the virtual machine you had just deployed and click Import Selected Virtual Machines.
7. When the Configure VMs page loads, you can set your virtual machine parameters.
   a. Check the drop-down 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.

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 Red Hat System Administration II (RH134-RHEL8) Pod

This section will assist you in adding the Red Hat System Administration II (RH134-RHEL8) pod to your NETLAB+ system.

4.4.1 Enabling the 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 Red Hat Academy System Administration II (RH134) - v8.0 course.

4.4.2 Create the Master Pod

This section will assist you in adding the Red Hat System Administration II (RH134-RHEL8) pod to your NETLAB+ system.

1. Log into NETLAB+ VE with the administrator account.
2. Click on the Pods icon.
3. Create a new pod by scrolling to the bottom and clicking the Create New Pod button.

5. Then, click on the Red Hat SysAdmin II – RH134 pod entry from the list of installed pod types.

6. 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 along with a host identifier (H120), the type and number of the pod (M1000).

7. 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. Click on the Red Hat System Administration II (RH134-RHEL8) master pod from the pod list.

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

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

4. Click OK to confirm the VM attachment.

4.4.4 Create Snapshots for the Master Virtual Machines

In order to proceed with pod cloning, snapshots must be created on each of the pod’s virtual machines.

Verify that all VMs are still powered off before taking snapshots.

1. Make sure to view the Red Hat System Administration II (RH134-RHEL8) master pod you just assigned machines to. In the pod view, click on the drop-down
menu option underneath the *Action* column for a specific VM and select *Snapshots*.

2. In the *Snapshot Manager* window, click on **Take**. This will take a snapshot of the current state of the virtual machine.

![Snapshot Manager](image)

Any changes made after this will require a new snapshot or those changes will not reflect in the reset state of the pod or its clones.
3. In the *Take Snapshot* window, type **GOLDEN_MASTER** into the *Name* text field, or you may choose another naming convention as long as it is consistent for easy management. Click **OK**.

![Take Snapshot window]

It is recommended to use **GOLDEN_MASTER** as the snapshot name when working with normalized pod types.

4. In the *Snapshot Manager* window, notice the snapshot is created. Click the **Dismiss** button.

![Snapshot Manager window]

At this point it is good to verify that you have only one snapshot on the virtual machine. Multiple snapshots increase the likelihood of having problems, especially if the snapshots are named the same. Also, the more snapshots a virtual machine has, the slower the performance and the more drive space is used.
### 4.4.5 Set the Revert to Snapshot

1. Make sure to view the Red Hat System Administration II (RH134-RHEL8) master pod you just created snapshots for. In the pod view, click on the drop-down menu option underneath the Action column and select Settings.

![Settings Menu](image)

2. In the virtual machine’s Settings window, click on the Revert to Snapshot drop-down and select GOLDEN_MASTER and then click the Submit button.

   ![Revert to Snapshot](image)

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

3. Click OK to confirm.
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 Linked Clones and Full Clones

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. Ongoing operation of a full clone is entirely separate from the parent virtual machine.

5.2 Creating User Pods

The following section describes how to create user pods on the same VMware 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.

Make sure the pod status is Offline prior to continuing. The cloning process requires the pod be offline. Since this is a master pod, which is used for cloning other pods, we will keep it offline to create the instructor and student pods from.

1. Login into NETLAB+ VE with the administrator account.
2. Select the Pods icon.
3. Click on the 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**.

7. Enter a name for the cloned pod into the **New Pod Name** text field. For example, **RH134_RHEL8_H120_S1001**. Click **Next**.

![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).](image)

8. When the action has finished processing, you are presented with a **Clone Pod** configuration wizard. Verify the following:

**Source Virtual Machine:**
- **From Snapshot** should be set to the **GOLDEN_MASTER** snapshot you created previously.

**Target Virtual Machine:**
- For **Type**, verify that **Linked** is selected.
- For **Role**, verify that the **Normal** role is selected.
- For **Take Snapshot**, verify that **GOLDEN_MASTER** is input.
9. When you are done changing settings, click **Clone Pod**. This should complete within a minute as we are creating linked virtual machines.

![Clone Pod]

10. When the pod clone process is finished, click **OK**.
11. 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](#).
12. Click the **Online** button on the **Pod Management** page to activate the pod.

![Online button]

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

5.3 **Cloning Your Master Pod to a Second Host**

For this task, we will use the pod cloning utility to copy our master pod to a second host.

1. Login into **NETLAB+ VE** with the **administrator** account.
2. Click on the **Pods** icon.

![Pods]

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

![Clone Pod]

The **GOLDEN_MASTER** 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 and retake the **GOLDEN_MASTER** snapshot before creating additional pods.
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**.

7. Enter a name for the cloned pod into the **New Pod Name** field. For example, **RH134_RHEL8_H130_M1000**. 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 (H130), the type and number of the pod (M1000).

8. When the action has finished processing, you are presented with a **Clone Pod** configuration wizard. 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_MASTER** snapshot you created previously.

   **Target Virtual Machine:**
   a. For *Type*, verify that **Full** is selected.
   b. For *Role*, verify that the **Master** role is selected.
   c. For *Take Snapshot*, verify that **GOLDEN_MASTER** is input.
   d. For *Runtime Host*, select the second host system (which should be different than the system you are cloning from).

9. When you are done changing settings, click **Clone Pod**. This may take up to 30 minutes as full copies are being made. You may navigate away from the cloning progress screen, and then later return to the pod to check progress.

10. When the pod clone process is finished, click **OK**.
5.4 Creating User Pods on the Second Host

To create user pods on the second host, repeat the steps to create user pods on the first host (see Creating User Pods), substituting the second master pod (created in the previous section) as the cloning source.

5.5 Assigning Pods to Students, Teams, or Classes

Please refer to the NETLAB+ VE Instructor Guide for details on using the Pod ACLs feature.