

SmartNode[™] **Virtual SmartNode (vSN)**

User Manual



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Warranty Information

For license and warranty information, refer to [Appendix B, "End User License Agreement"](#) on page 50.

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About This Guide

This guide describes the Virtual SmartNode (vSN) virtualization software, installation, and basic configuration.

Audience

This guide is intended for the following users:

- Operators
- Installers

Structure

This guide contains the following chapters and appendices:

- [Chapter 1](#) on page 8 provides information about vSN features and capabilities.
- [Chapter 2](#) on page 11 provides information about installing and configuring the vSN.
- [Chapter 3](#) on page 41 describes how to update vSN software and firmware.
- [Chapter 4](#) on page 47 describes how to contact Patton for assistance
- [Appendix A](#) on page 46 provides specifications for the vSN
- [Appendix B](#) on page 50 provides license information that describes acceptable usage of the software provided with the Virtual SmartNode.

For best results, read the contents of this guide *before* you install the Virtual SmartNode.

Chapter 1 **General information**

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Overview

Congratulations on becoming the owner of Virtual SmartNode (vSN) virtualization software. Identical to Patton's Trinity Operating System (OS) firmware that runs on all recent Patton devices (including the Enterprise Session Border Controller (eSBC) SN5300, and SN55XX) vSN makes Trinity OS available for virtualized environments.

The Virtual SmartNode enables enterprises and service providers to secure their VoIP network by using their existing virtualization infrastructure without installing additional hardware. The vSN runs on common virtualization infrastructure including VMware, KVM, Hyper-V and VirtualBox.

This user manual describes how to install and operate the vSN. If questions or problems arise during installation or use of this product, contact Patton Electronics Technical Support at +1 301 975 1007.

Features

The Virtual SmartNode combines highly flexible SIP routing and manipulation features with powerful quality of service (QoS) IP routing functions to build professional and reliable VoIP and data networks

Features include:

- **VoIP Security**—Network separation with SIP Back 2 Back UA, intrusion protection, DoS prevention, trust peer, Signaling encryption (SIP-TLS), Stateful Firewall
- **Session Control**—Dynamic SIP Session allocation for a high number of calls. SessionRouter allows flexible call routing and numbering plan adaptations, CLIP/CLIR, hold, transfer, and much more.
- **SIP Normalization**—SIP-to-SIP Interworking - Normalizing different, vendor specific SIP implementations or *dialects*. Demarcation point, separation between networks
- **Network Monitoring & Assessment**—Network monitoring probe* for QoS measurements and proactive alerting to minimize problems. SLA assurance at demarcation point
- **Load Balancing**—Call load distribution across multiple network links.
- **IP Routing & Networking**—IPv4 & IPv6 Routing Protocol support; GRE, VRRP, RIP, L2TP, etc.
- **High Availability**—Stateful call failover incl. proactive dead call detection. SBC redundancy and failover to secondary, virtual instances
- **Proprietary Software**—vSN uses proprietary Patton's Trinity OS™ software for added security

System Requirements

Virtual SmartNode requires the following system resources per virtual machine (VM) instance:

- **CPU**—64-bit x86 architecture (single core or more)
- **RAM**—A minimum of 1 GB
- **HDD**—1 GB
- **Network**—At least one (virtual) Ethernet adapter

Functional Principle

The Virtual SmartNode uses a floating license model through the Patton Cloud, to enable the features required for each specific use-case.

The Patton Cloud automatically distributes the obtained licenses (see [figure 1](#)) to where they are needed (vSN and other Patton devices). This enables you to easily scale up/down SBC services on Virtual SmartNode devices but also on regular SmartNode devices.

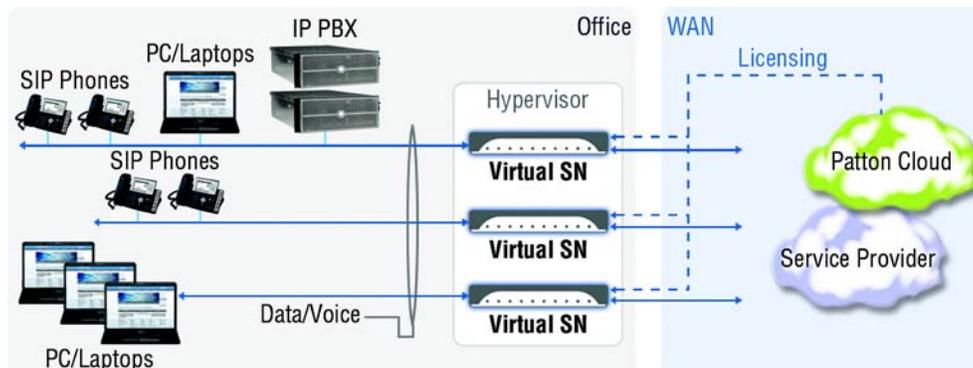


Figure 1. vSN licensing

Software Images

Patton delivers different types of virtual SmartNode images: a set of pre-installed images for the different hypervisors and a generic upgrade image, that is the same for all hypervisors.

The image deliveries can be distinguished by their file extensions:

- **Pre-Installed images**—You can mount the delivered pre-installed image as bootable virtual HDD and start vSN immediately. Patton ships the pre-installed image in different formats, suitable for different hypervisors:
 - / **VHD**—VirtualBox virtual disk image (e.g. vSN_3.15.3.vhd)
 - / **VDI**—VirtualBox virtual disk image (e.g. vSN_3.15.3.vdi)
 - / **VMDK**—VMware virtual disk image (e.g. vSN_3.15.3.vmdk)
 - / **QCOW**—QCOW2: QEMU Copy-On-Write disk image (e.g. vSN_3.15.3.qcow2)
 - / **RAW**—Raw image format (e.g. vSN_3.15.3.raw)
- **Upgrade Image (tar)**—Once the virtual SmartNode is up and running you don't want to re-install it for each software upgrade, because this will drop your persistent configuration files. Instead you can use the same upgrade procedures as for physical devices, i.e., download the upgrade image from a TFTP or web server, manually, with auto-provisioning (Example delivery: *vSN_3.15.4.tar*) or through the Patton Cloud (min. Cloud Service plan Advanced required).

Chapter 2 Installation

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Introduction

This chapter describes installing Virtual SmartNode (vSN) software on the following virtual machines:

- “Installing the vSN on VMware ESX” on page 12
- “Installing vSN on VirtualBox” on page 21
- “Installing the vSN on KVM” on page 25
- “Installing the vSN on Hyper-V” on page 29

Installing the vSN on VMware ESX

Installation consists of the following:

- Copying the pre-installed vSN image into the datastore (see section “Copying the pre-installed vSN image into the datastore” on page 12)
- Running the virtual machine and doing the initial configuration (see section “Running VM and Initial Configuration” on page 19)

Copying the pre-installed vSN image into the datastore

For a VMware VM to directly boot from Patton's pre-installed vSN image (VMDK) you have to add the image into one of VMware's data stores

1. Run the *vSphere Client* application (see [figure 2](#)).
2. Select an ESX server farm in the inventory and open the *Summary* tab (see [figure 2](#)).

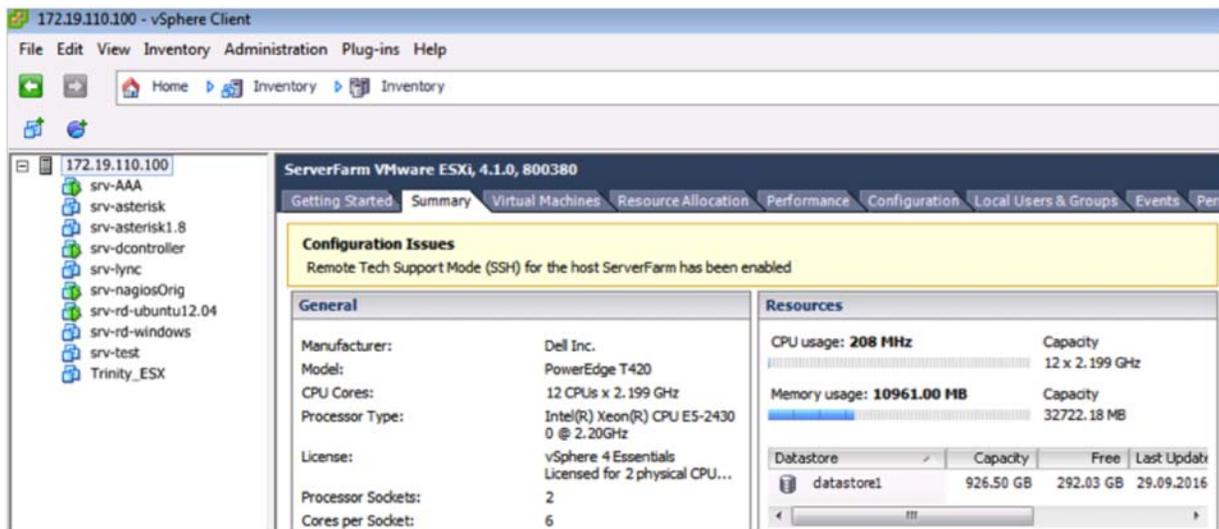


Figure 2. vSphere Client window

3. Right-click on one of the data stores on the right and select *Browse Datastore...*
4. Create a new folder for the new VM (see [figure 3](#)).

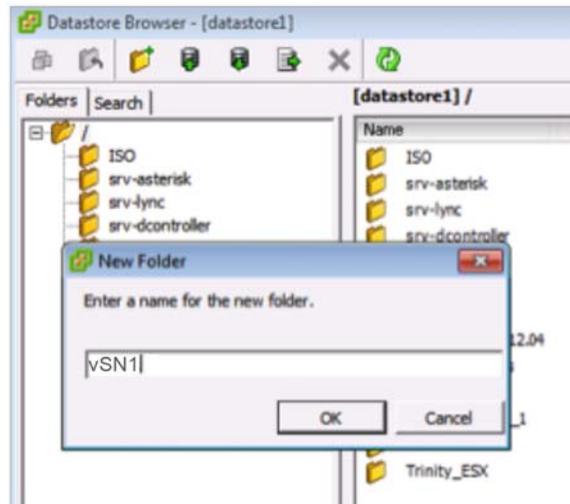


Figure 3. Datastore Browser window

5. Select the created folder and upload the provided pre-installed vSN image (VMDK). (see [figure 4](#))

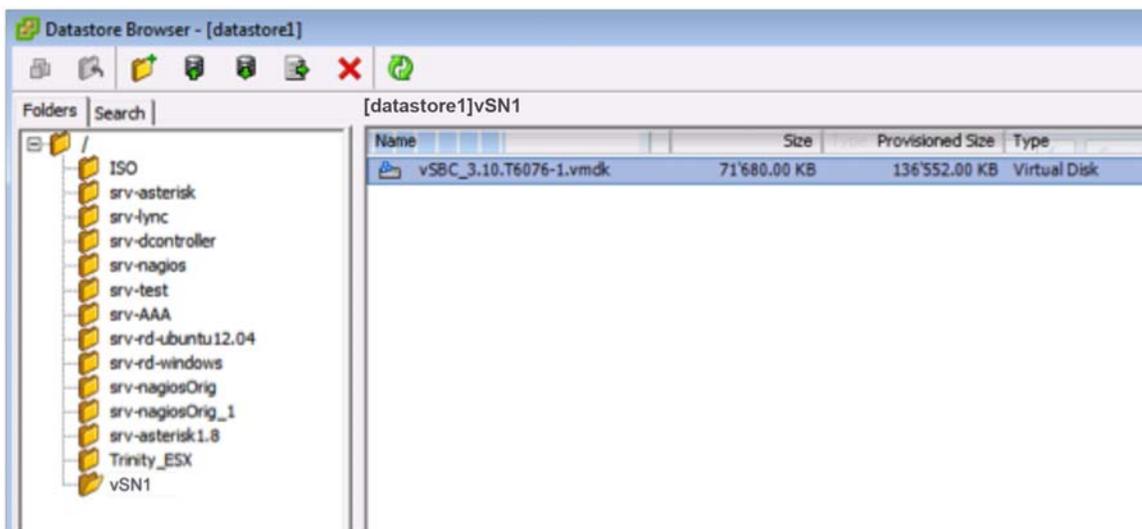


Figure 4. Datastore Browser [datastore1] window

Creating a new VM

1. Run the *vSphere Client* application (see [figure 5](#) on page 14).
2. Select an ESX server farm in the inventory

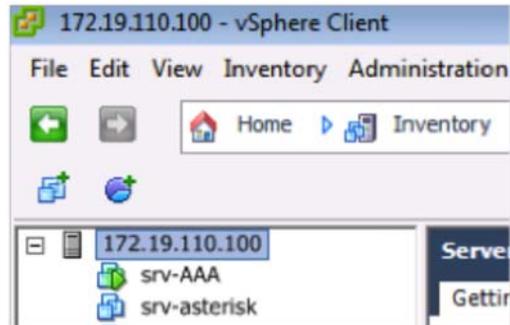


Figure 5. Run vSphere Client application

3. Click the *File* menu and select *New > Virtual Machine* or press *ctrl + N* to start the machine-setup wizard.
4. On the *Configuration* panel click the *Custom* button (see [figure 6](#)).

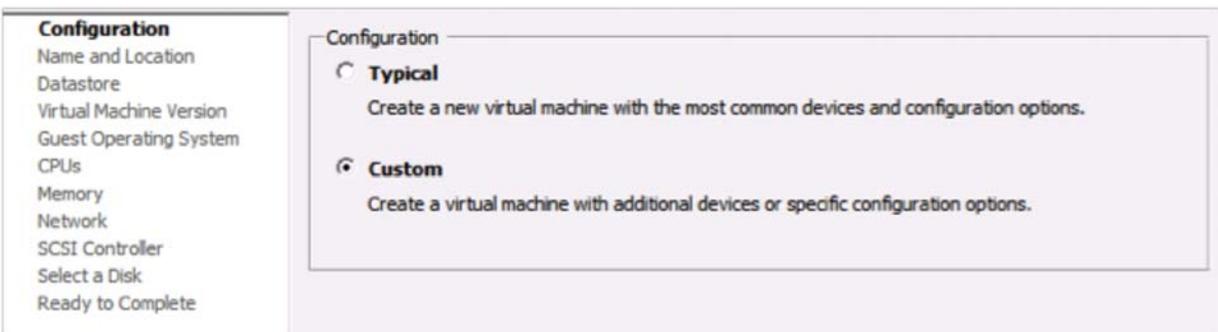


Figure 6. Wizard Configuration panel

5. Click the *Next* button.
6. On the *Name and Location* panel, enter a VM name (see [figure 7](#)).

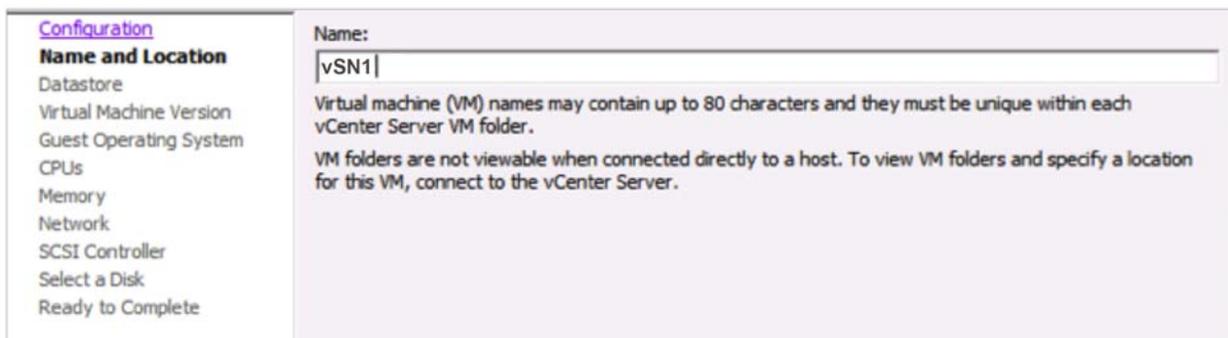


Figure 7. Wizard Name and Location panel

7. Click the *Next* button.
8. On the *Datastore* panel, select a datastore where you have uploaded the pre-installed vSN image (VMDK) (see [figure 9](#) on page 15).

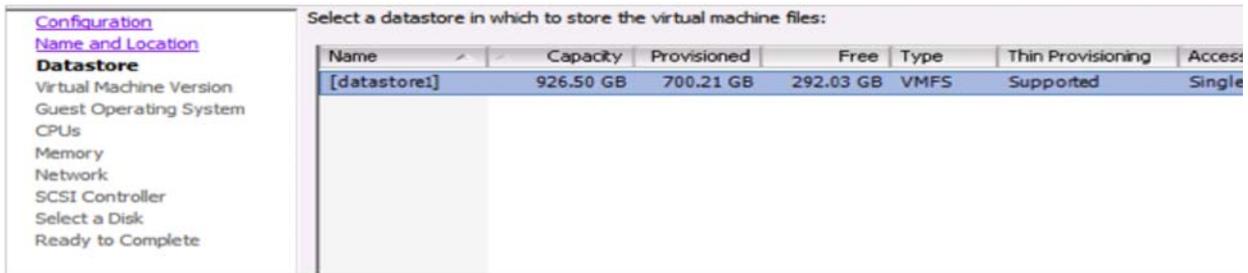


Figure 8. Wizard Datastore panel

9. Click the *Next* button.
10. On the *Virtual Machine Version* panel, select the latest version (see [figure 9](#)).



Figure 9. Wizard Virtual Machine Version panel

11. Click the *Next* button.
12. On the *Guest Operating System* panel, click the *Linux* button to make it the guest operating system (see [figure 10](#)).

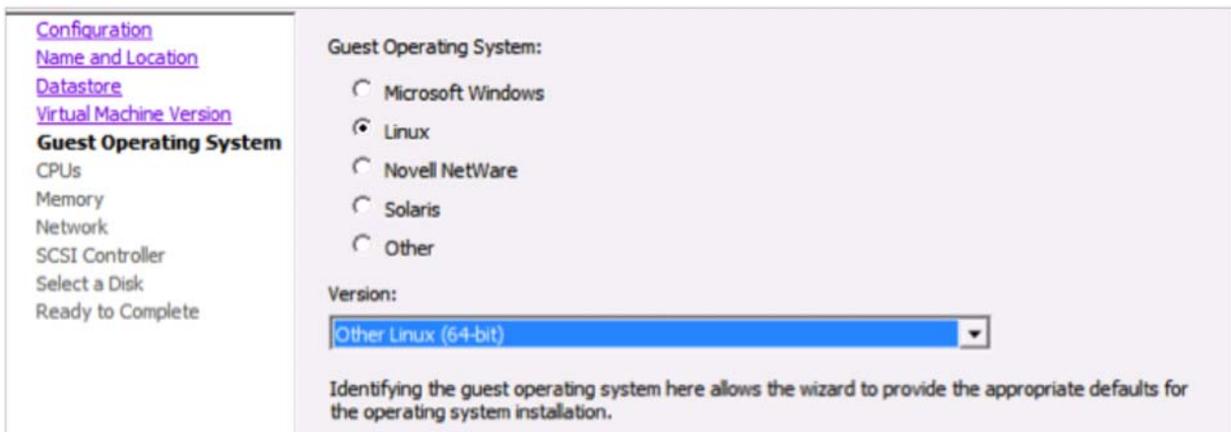


Figure 10. Wizard Guest Operating System panel

13. Click the Version menu and select *Other Linux (64-bit)*.
14. Click the *Next* button.
15. On the *CPUs* panel, select at least 1 CPU (see [figure 11](#)).

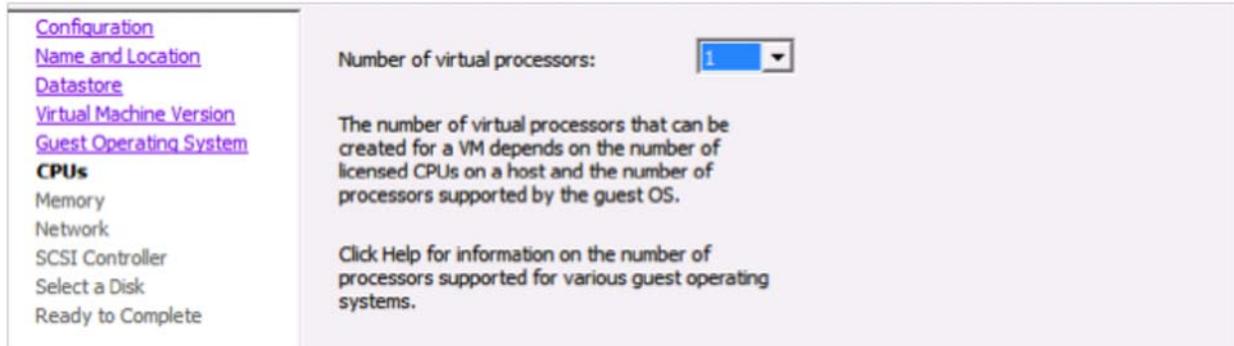


Figure 11. Wizard CPUs panel

16. Click the *Next* button.
17. On the *Memory* panel, reserve at least 1 GB of RAM (see [figure 12](#)).

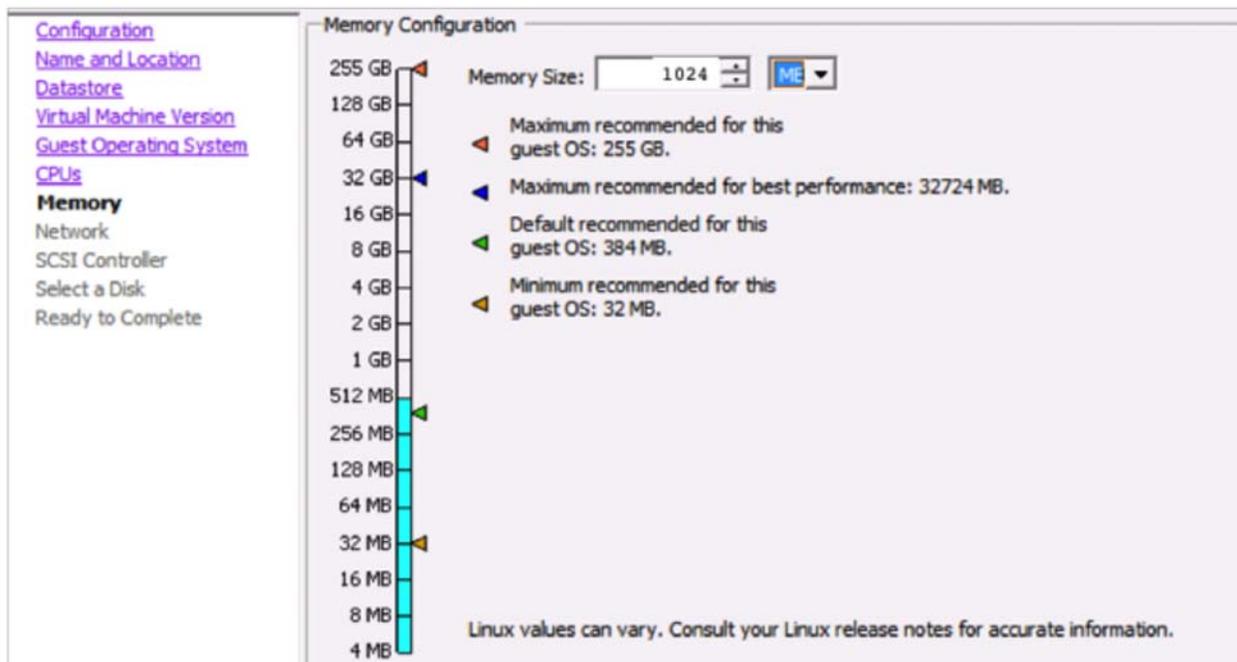


Figure 12. Wizard Memory panel

18. Click the *Next* button.

19. On the *Network* panel, set up the networking environment for the VM, for example one virtual network interface as shown in [figure 13](#) on page 17 (network and adapter names may be different on your server farm).

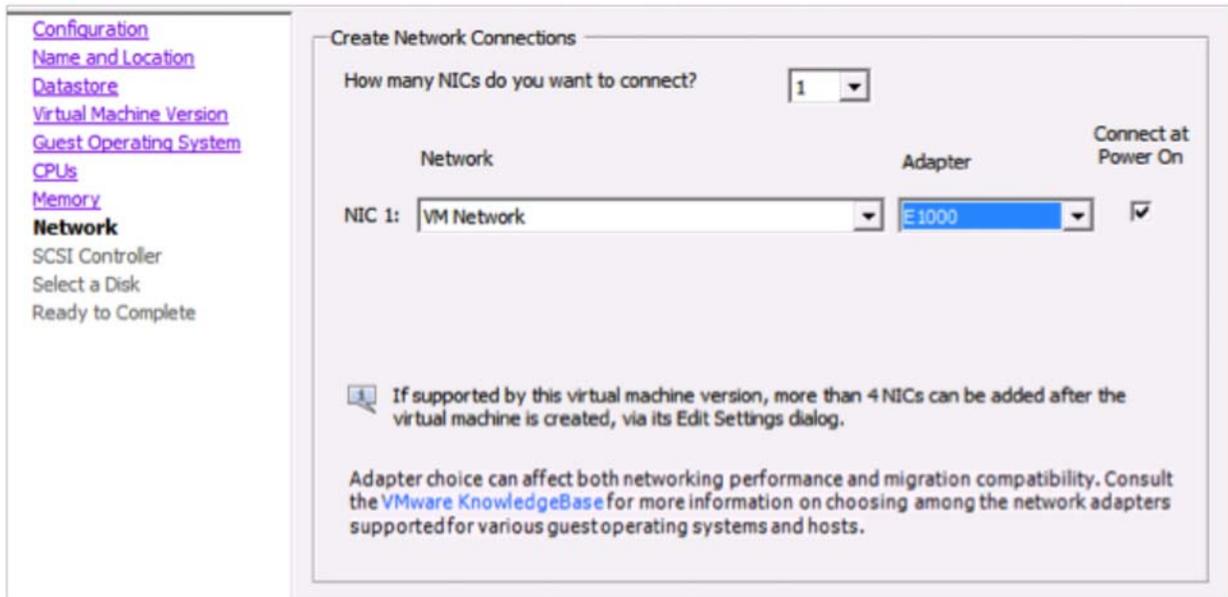


Figure 13. Wizard Network panel

20. Click the *Next* button.
21. On the *SCSI Controller* panel, click the *LSI Logic Parallel* button to make it the SCSI controller (see [figure 14](#)).

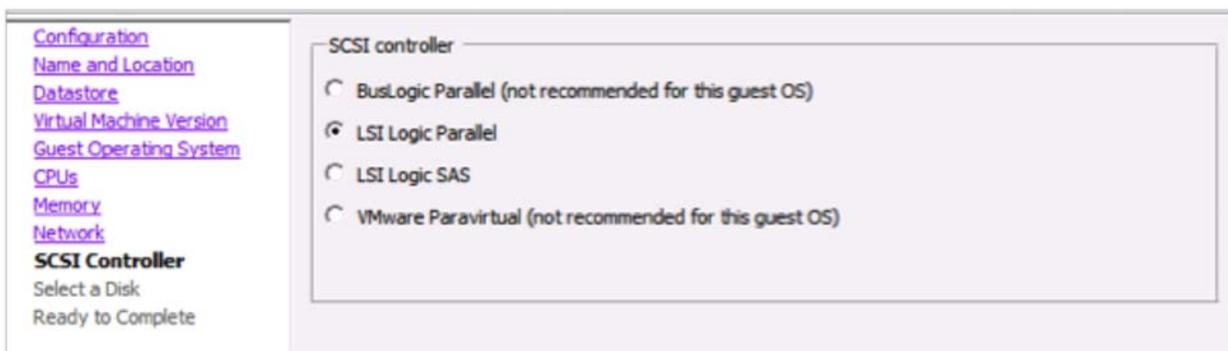


Figure 14. Wizard SCSI Controller panel

22. Click the *Next* button.
23. On the *Select a Disk* panel, click the *Use an existing virtual disk* button to make it the type of disk the vSN will use (see [figure 15](#) on page 18).

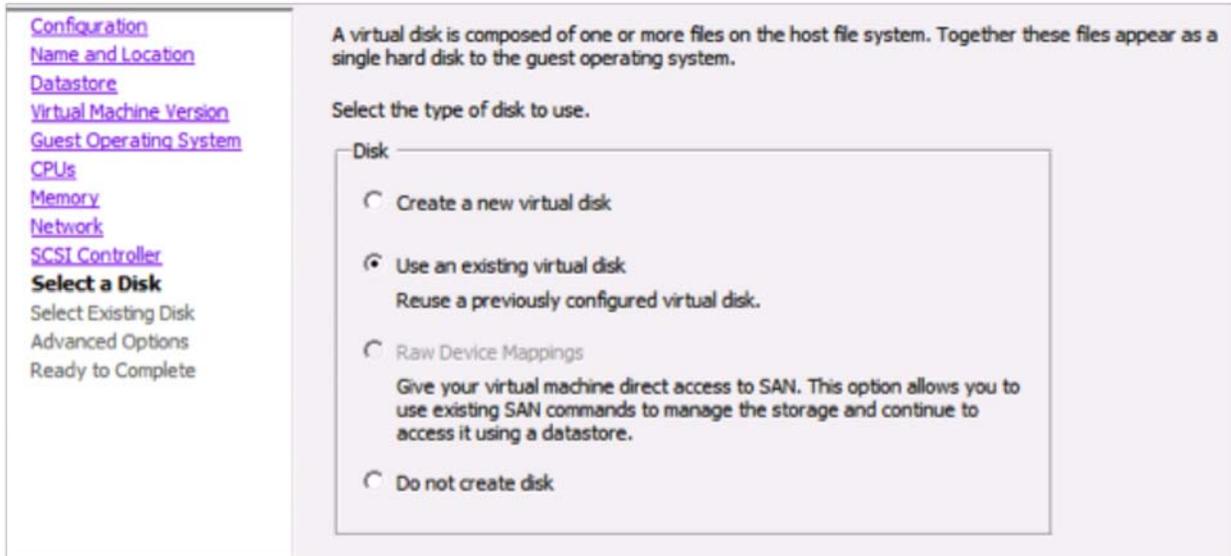


Figure 15. Wizard Select a Disk panel

24. Click the *Next* button.
25. On the *Select Existing Disk* panel, browse for the uploaded pre-installed vSN image (VMDK) in the datastore (see figure 16).



Figure 16. Wizard Select Existing Disk panel

26. Click the *Next* button.
27. On the *Advanced Options* panel, change the *Virtual Device Node* type to *IDE*. Leave the *Mode* options at the default settings (see figure 17 on page 19).

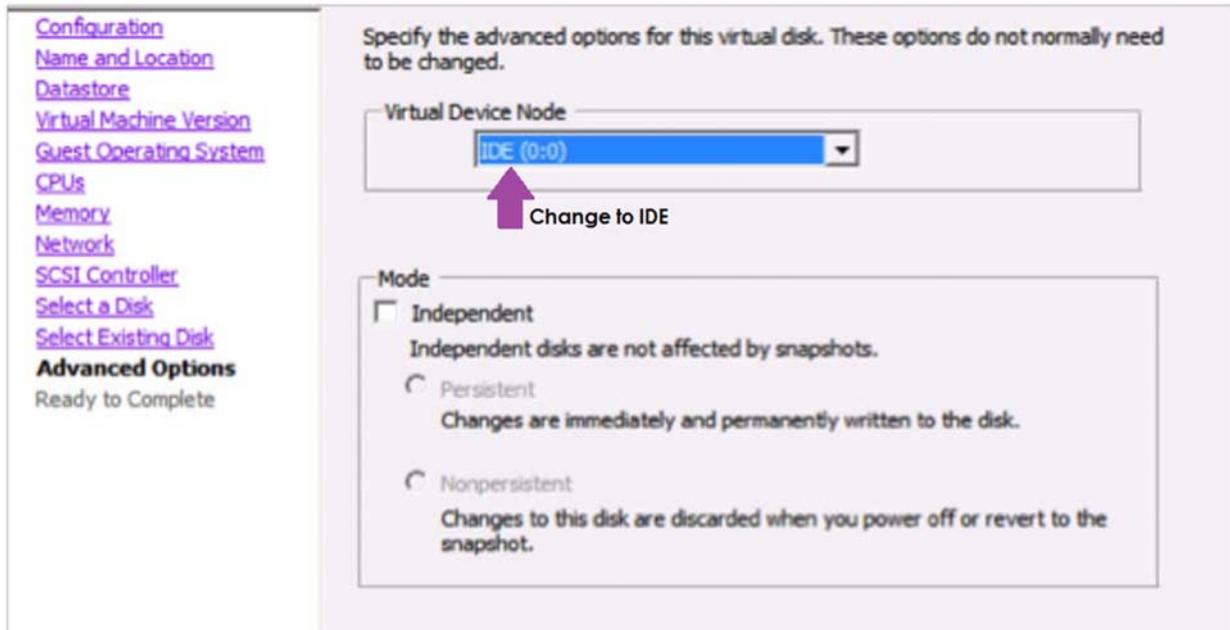


Figure 17. Wizard Advanced Options panel

28. On the *Ready to Complete* panel, review the settings for the virtual machine (see [figure 18](#)).

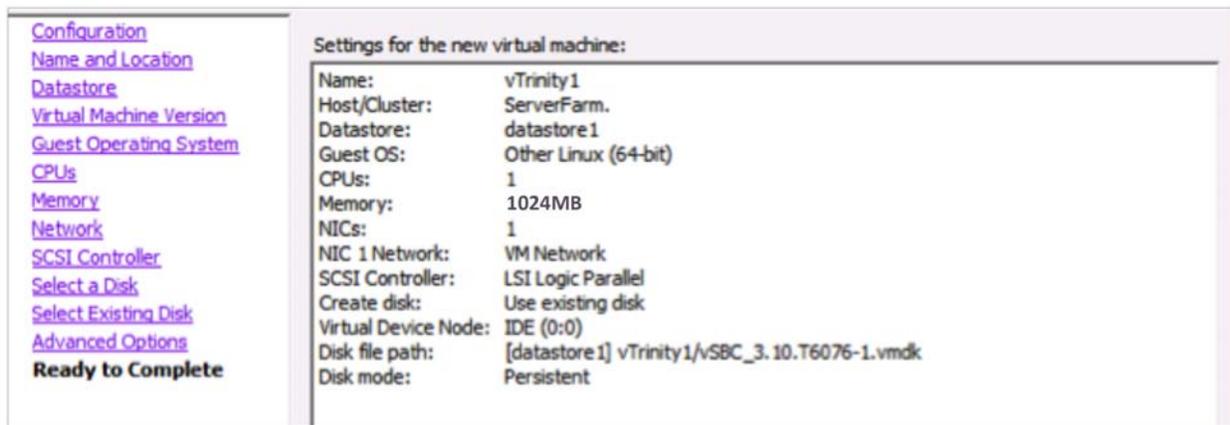


Figure 18. Wizard Ready to Complete panel

29. Click the *Next* button.

Running VM and Initial Configuration

Once you have installed the vSN VM, you run it by doing the following:

1. sRun the *vSphere Client* application.
2. Select the vSN VM in the inventory.
3. Click on the *Power On* button (see [figure 19](#)).

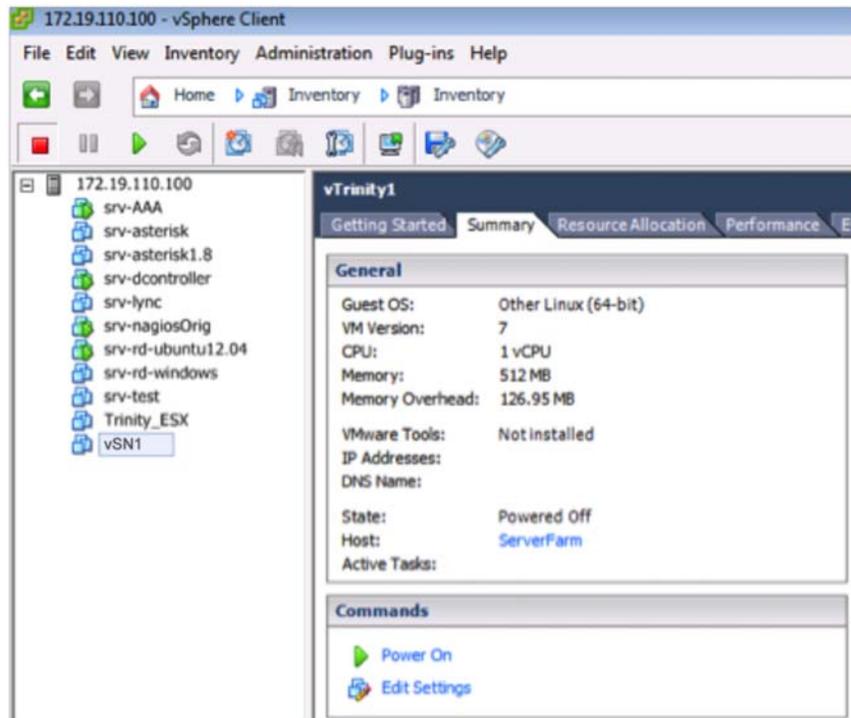


Figure 19. Running the VM

4. Switch to the *Console* tab. After a short delay, the login prompt displays.

We recommend you login and perform some initial configuration for the new VM such as changing the administrator password and enabling ssh management access as follows:

5. **Login** with the default administrator account: username *admin*, no password.
6. Create a **new administrator** account (and invalidate the default account) by entering the following commands:

```
node> enable
node# configure
node(cfg)# administrator <username> password <password>
node(cfg)#
```

7. Optionally, **change the IP address**. By default, the vSN instance tries to lease an IP address over DHCP. To display the assigned address, enter the *show ip interface* command. If you want to replace it by a static address, enter the following commands.

```
node(cfg)# context ip
node(ctx-ip) [ROUTER]# interface IF1
node(if-ip) [LAN]# no ipaddress DHCP
node(if-ip) [LAN]# ipaddress IF1 <a.b.c.d/m>
node(ip-if) [LAN]# end
node#
```

8. Persistently **store the configuration** changes:

```
# copy running-config startup-config
```

To reload the vSN instance, enter the *reload* command. To shut off the VM, type *poweroff*.

Note The Virtual SmartNode is installed. For information on operating vSN software, refer to the *User Manuals & Configuration Guides* section of the [Virtual SmartNode](#) product page to download the most recent release of the *Trinity Command Line Reference Guide*.

Go to section “Connecting to Patton Cloud” on page 38 to lease needed licenses from Patton Cloud.

Installing vSN on VirtualBox

Installation consists of the following:

- Creating a new VM (see section “Creating a new VM”)
- Running the virtual machine and doing the initial configuration (see section “Running VM and Initial Configuration” on page 23)

Creating a new VM

1. Run the *Oracle VM VirtualBox Manager* application.
2. Run the *Machine / New...* menu to start the machine-setup wizard.
3. On the *Name and operating system* panel, enter a VM *Name* (see [figure 20](#)).

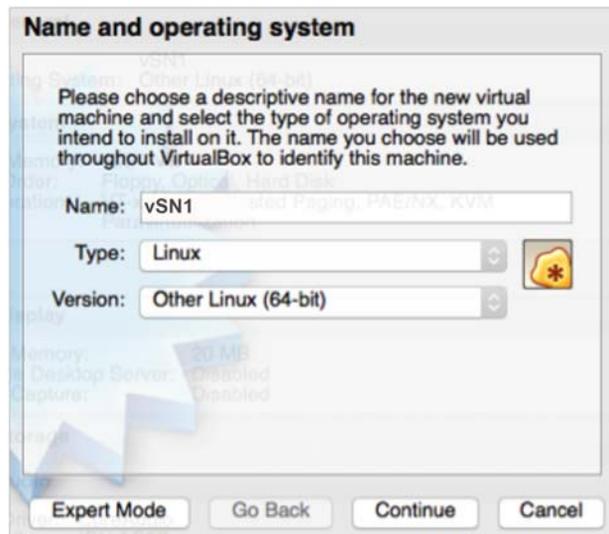


Figure 20. Wizard Name and operating system panel

4. Click on the *Type:* menu and select *Linux*.
5. Click on the *Version:* menu and select *Other Linux (64-bit)*

- Click the *Continue* button.
- On the *Memory size* panel, reserve at least 1 GB of RAM (see [figure 21](#)).

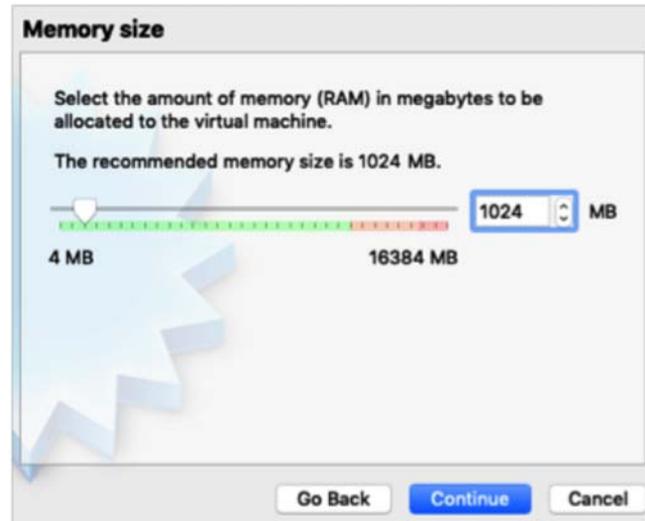


Figure 21. Wizard Memory size panel

- Click the *Continue* button.
- On the *Hard disk* panel, click the *Use an existing virtual hard disk file* button to select the hard disk (see [figure 22](#)).
- Select the VDI file from the set of delivered pre-installed images



Figure 22. Wizard Hard disk panel

11. Click the *Create* button.

Optionally, change the network settings of the created VM. By default, the VM is created with one Ethernet interface in a private NAT-ed network. If you want to reach vSN from outside the host OS, you have to change the interface to bridged mode as follows:

1. Right-click the vSN1 VM and select the *Settings...* menu
2. Click the *Network* tab (see [figure 23](#)).
3. Click the *Attached to:* dropdown menu and select *Bridged Adapter*.
4. Select the physical network interface over which vSN shall be reachable.
5. Click the *OK* button.

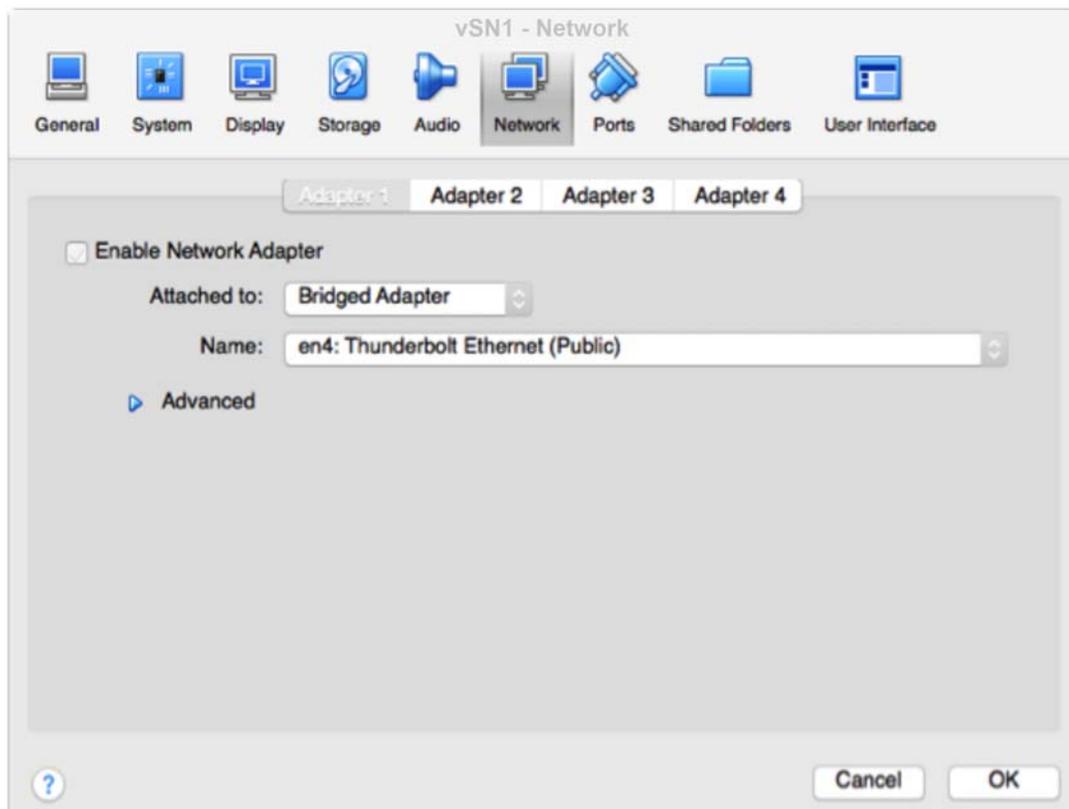


Figure 23. Network Settings window

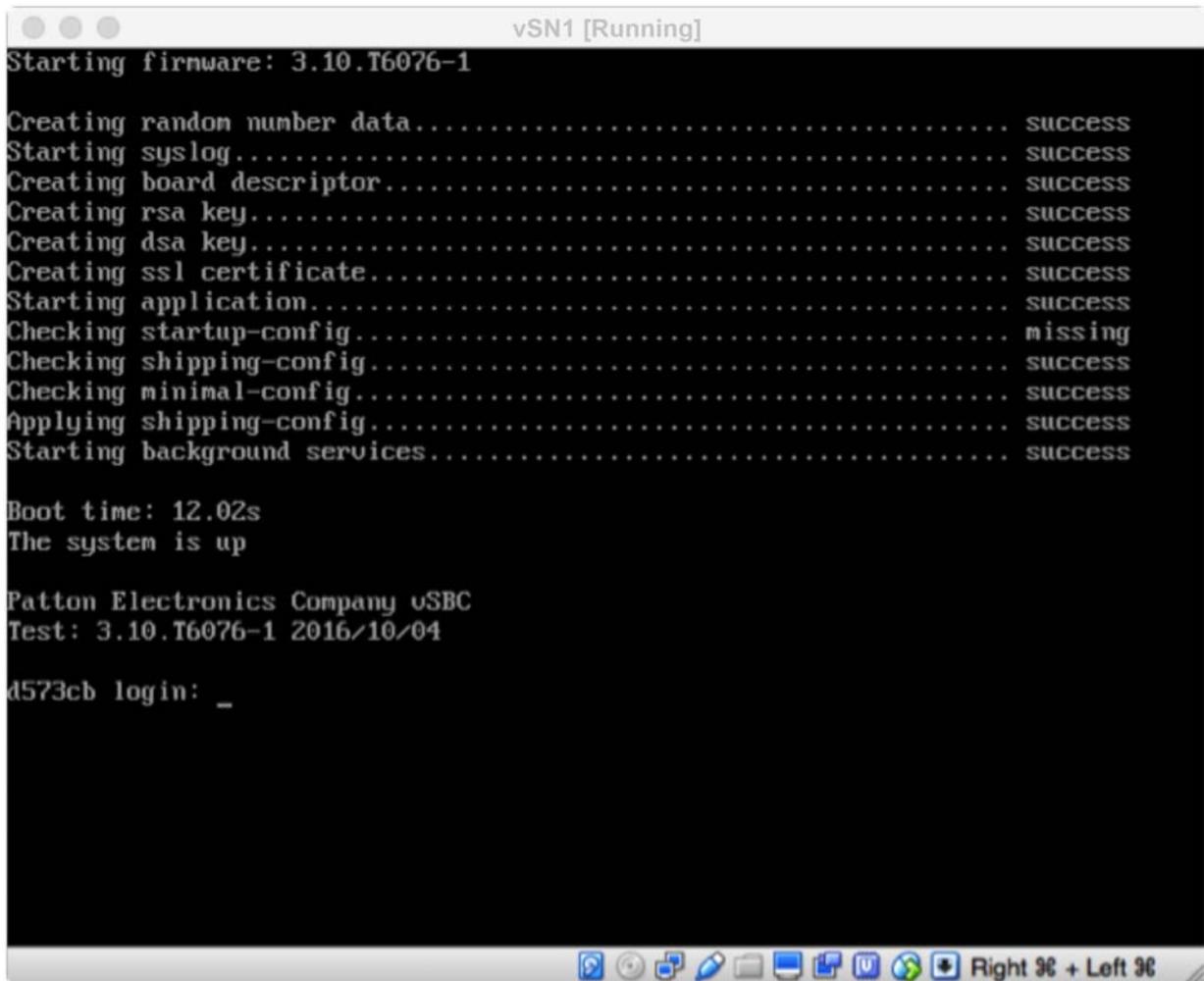
Running VM and Initial Configuration

Once you have installed the vSN VM you run it by following the procedure below:

1. Run the *Oracle VM VirtualBox Manager* application.
2. Right-click the created vSN1 VM and select the *Start/Normal Start* menu. Alternatively, you can start the VM from the command line by entering the following command:

```
VirtualBox --startvm vSN1
```

A new window with the console output of the vSN instance displays (see [figure 24](#)).



```
vSN1 [Running]
Starting firmware: 3.10.T6076-1

Creating random number data..... success
Starting syslog..... success
Creating board descriptor..... success
Creating rsa key..... success
Creating dsa key..... success
Creating ssl certificate..... success
Starting application..... success
Checking startup-config..... missing
Checking shipping-config..... success
Checking minimal-config..... success
Applying shipping-config..... success
Starting background services..... success

Boot time: 12.02s
The system is up

Patton Electronics Company vSBC
Test: 3.10.T6076-1 2016/10/04

d573cb login: _
```

Figure 24. Console window

We recommend you login and perform some initial configuration for the new VM such as changing the administrator password and enabling ssh management access as follows:

3. **Login** with the default administrator account: username *admin*, no password.
4. Create a **new administrator** account (and invalidate the default account) by entering the following commands:

```
node> enable
node# configure
node(cfg)# administrator <username> password <password>
node(cfg)#
```

- Optionally, **change the IP address**. By default, the vSN instance tries to lease an IP address over DHCP. To display the assigned address, enter the *show ip interface* command. If you want to replace it by a static address, enter the following commands.

```
node(cfg)# context ip
node(ctx-ip) [ROUTER]# interface IF1
node(if-ip) [LAN]# no ipaddress DHCP
node(if-ip) [LAN]# ipaddress IF1 <a.b.c.d/m>
node(ip-if) [LAN]# end
node#
```

- Persistently **store the configuration** changes:

```
# copy running-config startup-config
```

To reload the vSN instance, enter the *reload* command. To shut off the VM, type *poweroff*.

Note The Virtual SmartNode is installed. For information on operating vSN software, refer to the *User Manuals & Configuration Guides* section of the [Virtual SmartNode](#) product page to download the most recent release of the *Trinity Command Line Reference Guide*.

Go to section “[Connecting to Patton Cloud](#)” on page 38 to lease needed licenses from Patton Cloud.

Installing the vSN on KVM

Installation consists of the following:

- Creating a Virtual SmartNode disk (see section “[Creation of a Virtual SmartNode disk](#)”)
- Set up a virtual machine on KVM Virtual Manager (see section “[Virtual Machine Setup](#)”)
- Run the virtual machine and do the initial configuration (see section “[Running VM and Initial Configuration](#)” on page 23)

Creation of a Virtual SmartNode disk

1. Connect on the kvm-server via ssh -X

```
ssh -X administrator@srv-kvm.testlab.intranet
```

2. Start Virtual Machine Manager

```
virt-manager &
```

3. Download the desired disk images for the VM

```
cd /var/lib/libvirt/images
sudo wget https://www.patton.com/support/upgrades/license.asp?model=vsn&path=qcow2
```

Virtual Machine Setup

The KVM Virtual Manager (see [figure 25](#) on page 26) is a graphical desktop application from which new Virtual Machines, such as the Virtual SmartNode, can be set up.

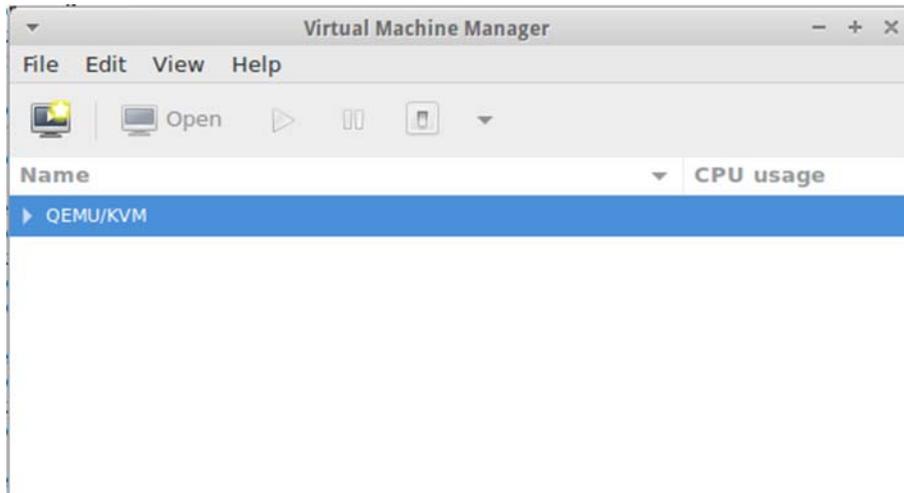


Figure 25. KVM virt-manager window

Creation of a new virtual machine

1. Navigate to the New Virtual Machine Create button, and follow the description as shown in [figure 26](#).



Figure 26. New Virtual Machine Wizard window

2. Select “Generic” for OS Type and Version and specify the image previously downloaded (see [figure 27](#) on page 27).

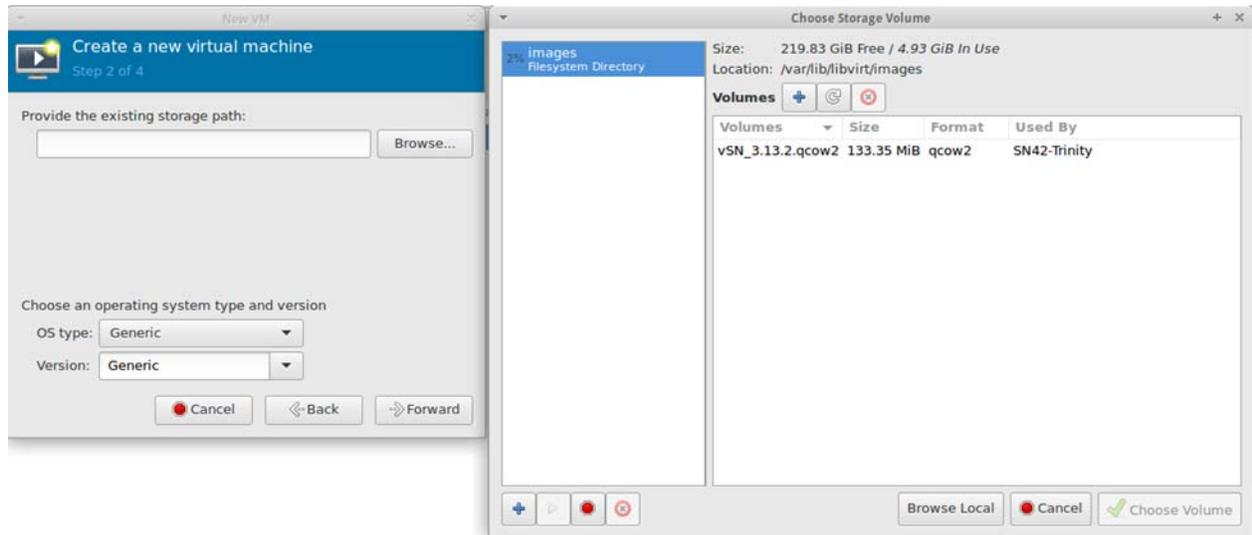


Figure 27. Selection of Virtual SmartNode Disk

3. Specify the CPU and Memory to be assigned to the Virtual SmartNode (see [figure 28](#)). The minimum requirements are:
 - CPU: 1
 - RAM: 1024MB
 - Disk: 1024MB

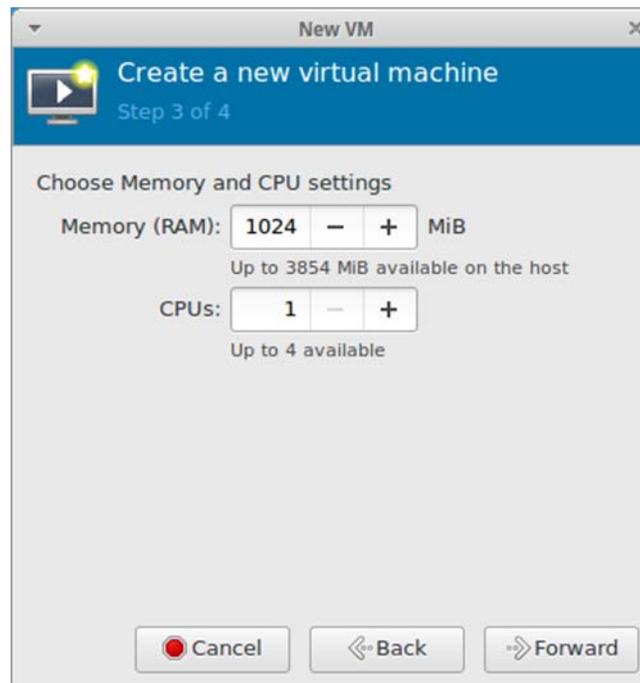


Figure 28. Memory and CPU Settings

4. For the last step setting up the virtual machine, define a Name for the Virtual SmartNode and review your settings, before clicking *Finish* (see figure 29).

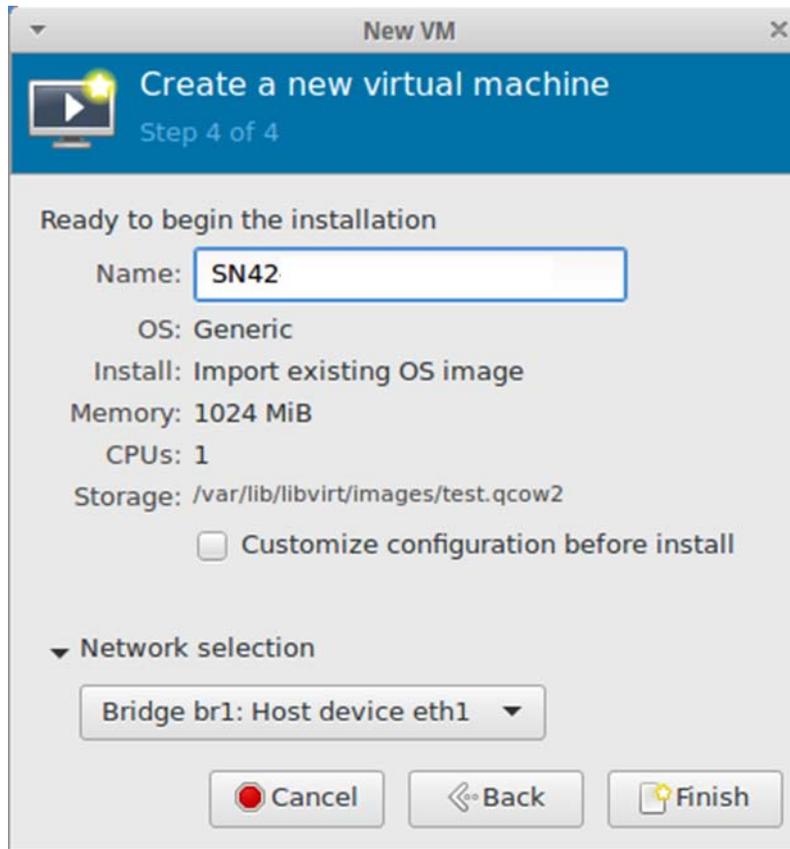


Figure 29. Finalize VSN Setup

Virtual SmartNode Initial Configuration

We recommend you login and perform some initial configuration for the new VM such as changing the administrator password and enabling ssh management access as follows:

1. **Login** with the default administrator account: username admin, no password.
2. Create a **new administrator** account (and invalidate the default account) by entering the following commands:

```
node> enable
node# configure
node(cfg)# administrator <username> password <password>
node(cfg)#
```

3. Optionally, **change the IP address**. By default, the vSN instance tries to lease an IP address over DHCP. To display the assigned address, enter the show ip interface command. If you want to replace it by a static address, enter the following commands:

```
node(cfg)# context ip
node(ctx-ip) [ROUTER]# interface IF1
```

```
node(if-ip) [LAN]# no ipaddress DHCP
node(if-ip) [LAN]# ipaddress IF1 <a.b.c.d/m>
node(ip-if) [LAN]# end
node#
```

4. Persistently **store the configuration** changes:

```
# copy running-config startup-config
```

Go to section “[Connecting to Patton Cloud](#)” on page 38 to lease needed licenses from Patton Cloud.

Installing the vSN on Hyper-V

Installation consists of the following:

- Download a Virtual SmartNode image (see section “[Download a vSN Virtual Image Disk](#)” on page 29)
- Set up a virtual machine on HyperV (see section “[Installing the vSN on Hyper-V](#)” on page 29)
- Run the virtual machine and do the initial configuration (see section “[Virtual SmartNode Initial Configuration](#)” on page 37)

Download a vSN Virtual Image Disk

1. Navigate to the [virtual SmartNode Product webpage](#) on patton.com and select the Hyper-V image for download and store it on your server (see [figure 30](#) on page 30).

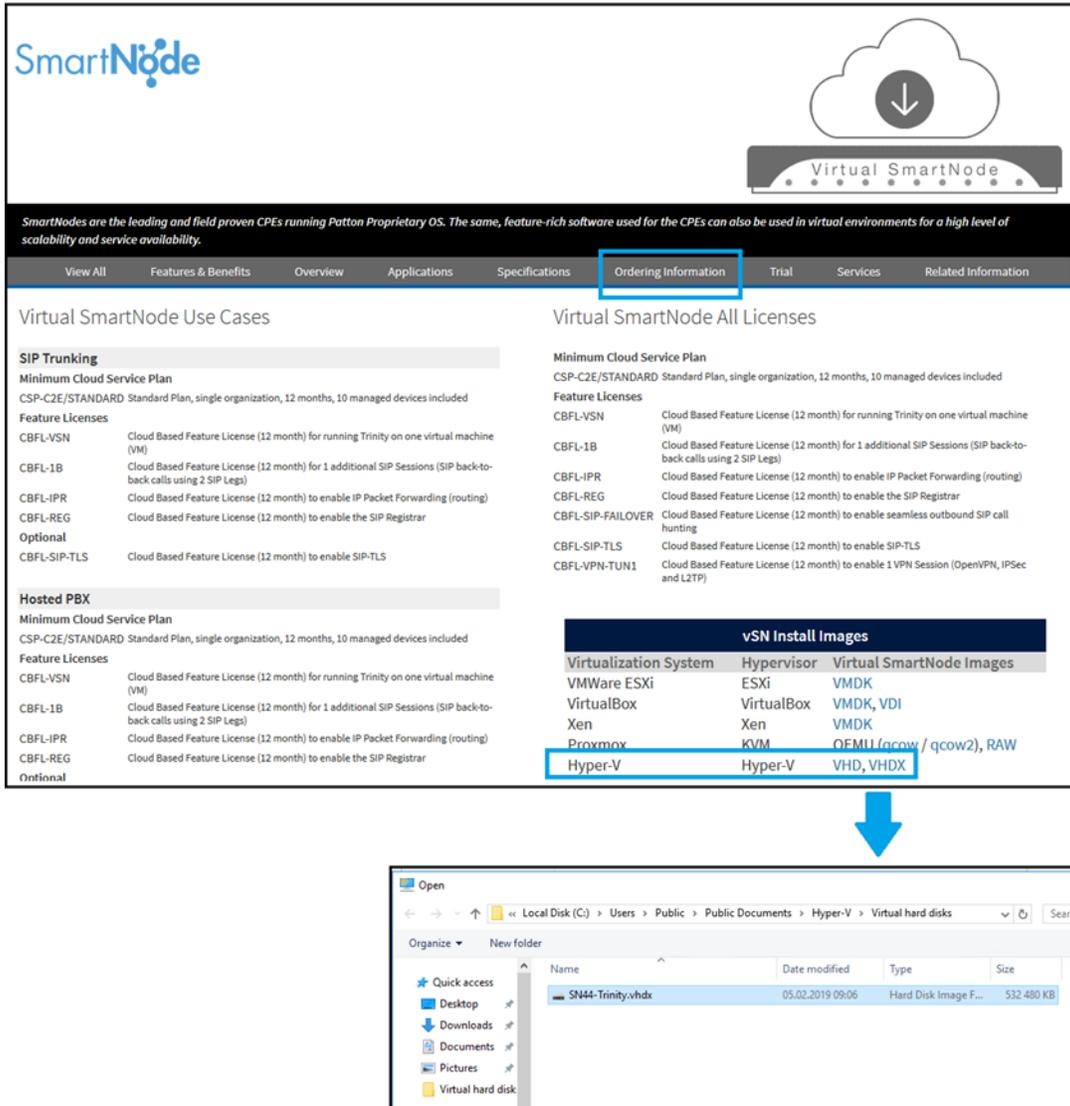


Figure 30. vSN Product Page For Image Download

Virtual Machine Setup

1. The first step consists of preparing the Network for the Virtual SmartNode to be used. This is done using the Virtual Switch Manager (see figure 31 on page 31).

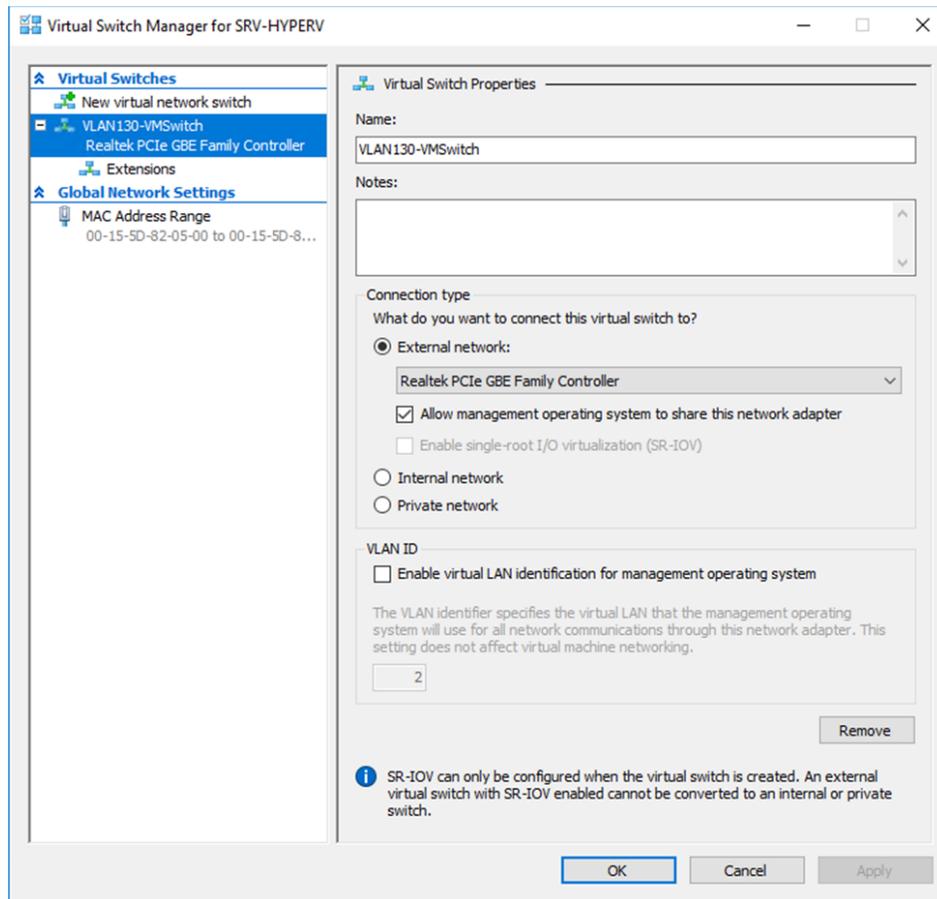


Figure 31. Network Setup

2. Set up a new Virtual Matching using the Wizard. Specify a name for your Virtual SmartNode (e.g. vSN44) (see [figure 32](#) on page 32).

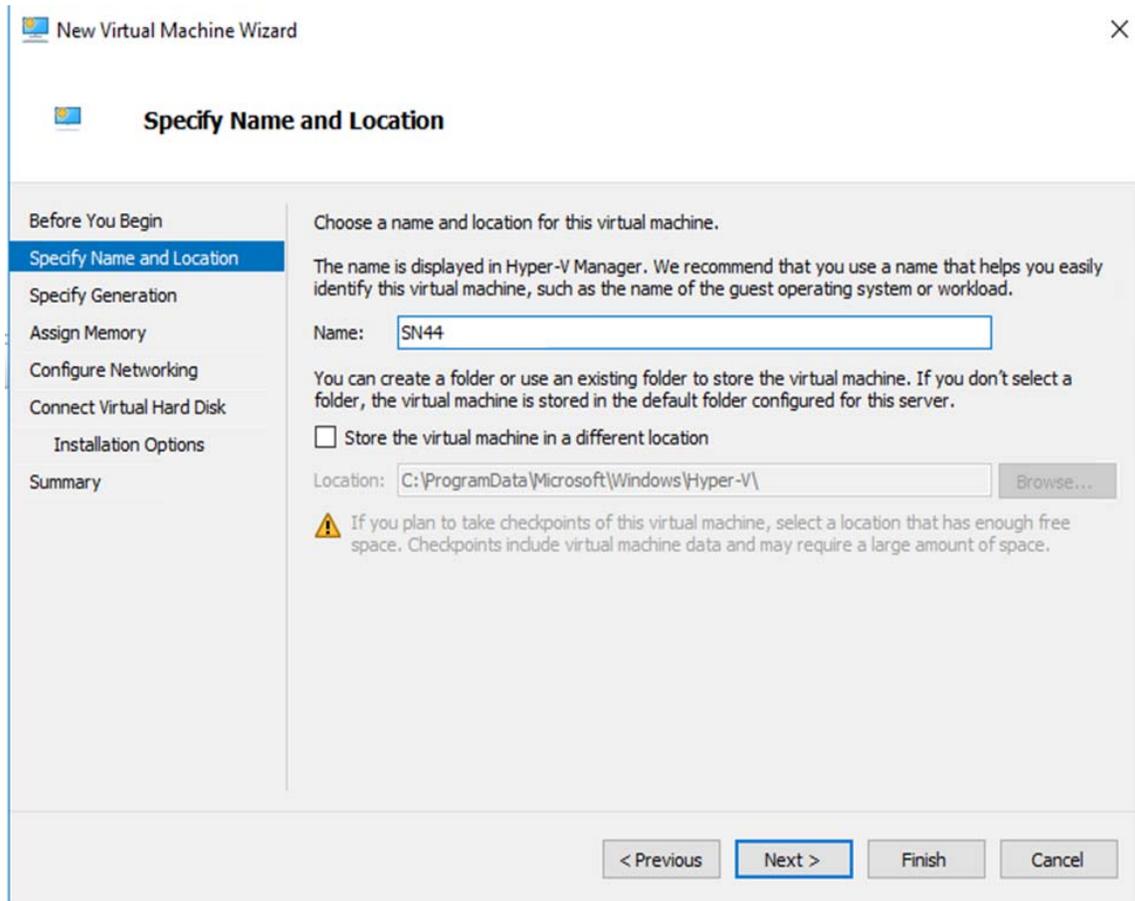


Figure 32. Setup of a New Virtual SmartNode Instance

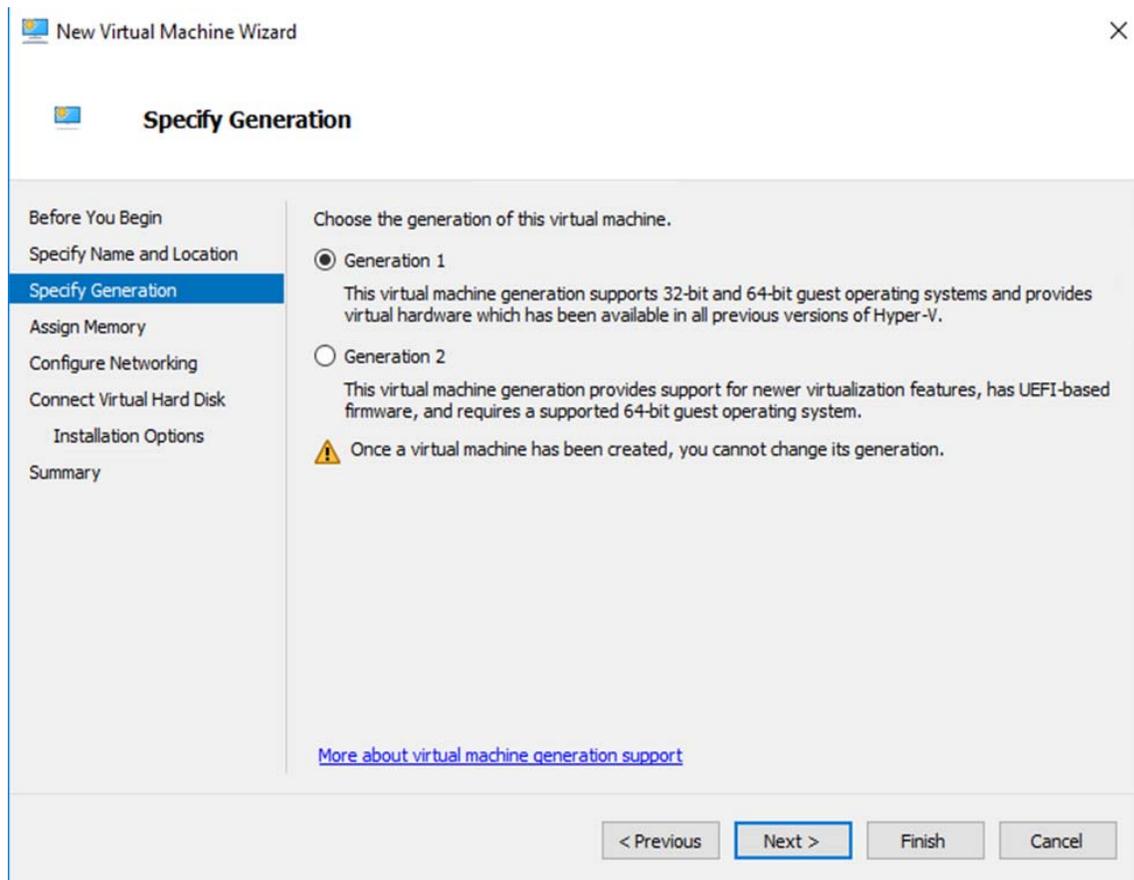


Figure 33. Select Generation 1

3. Specify the CPU and Memory to be assigned to the Virtual SmartNode (see [figure 34](#) on page 34). The minimum requirements are:
 - CPU: 1
 - RAM: 1024MB
 - Disk: 1024MB

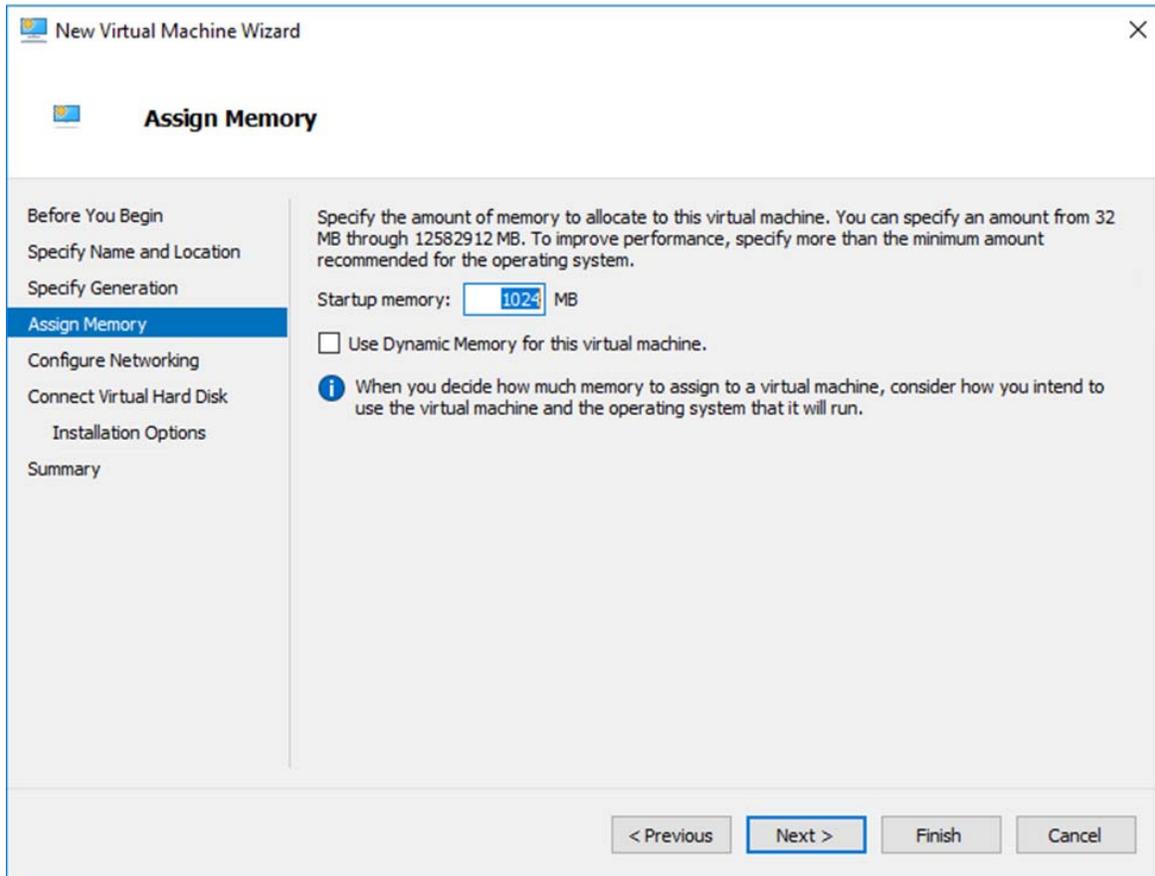


Figure 34. Memory Specification - Min. 1024MB

4. Select the IP Network to be used by the Virtual SmartNode (see [figure 35](#) on page 35).

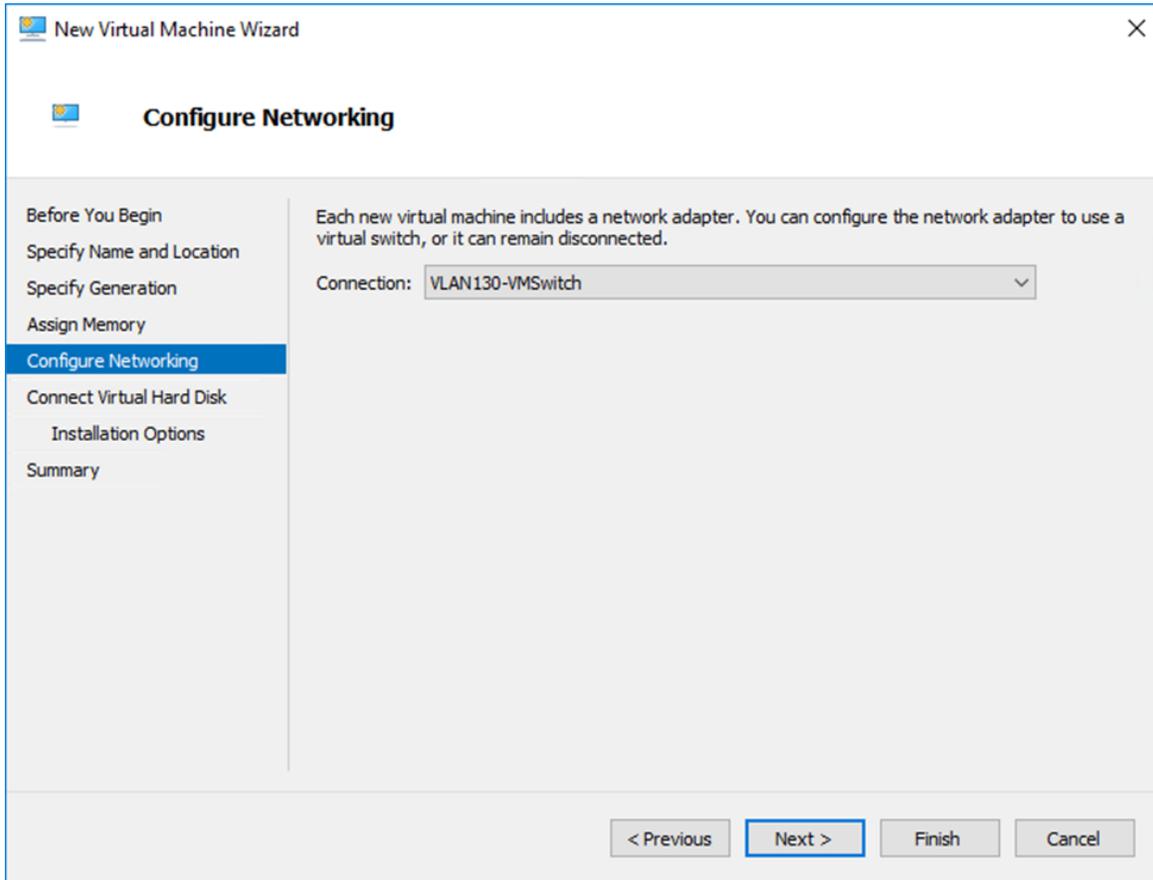


Figure 35. Select the Previously Set Up Network

5. Select the Hyper-V virtual disk, which was previously created through downloaded image from the [Patton Product Page](#) (see figure 36 on page 36).

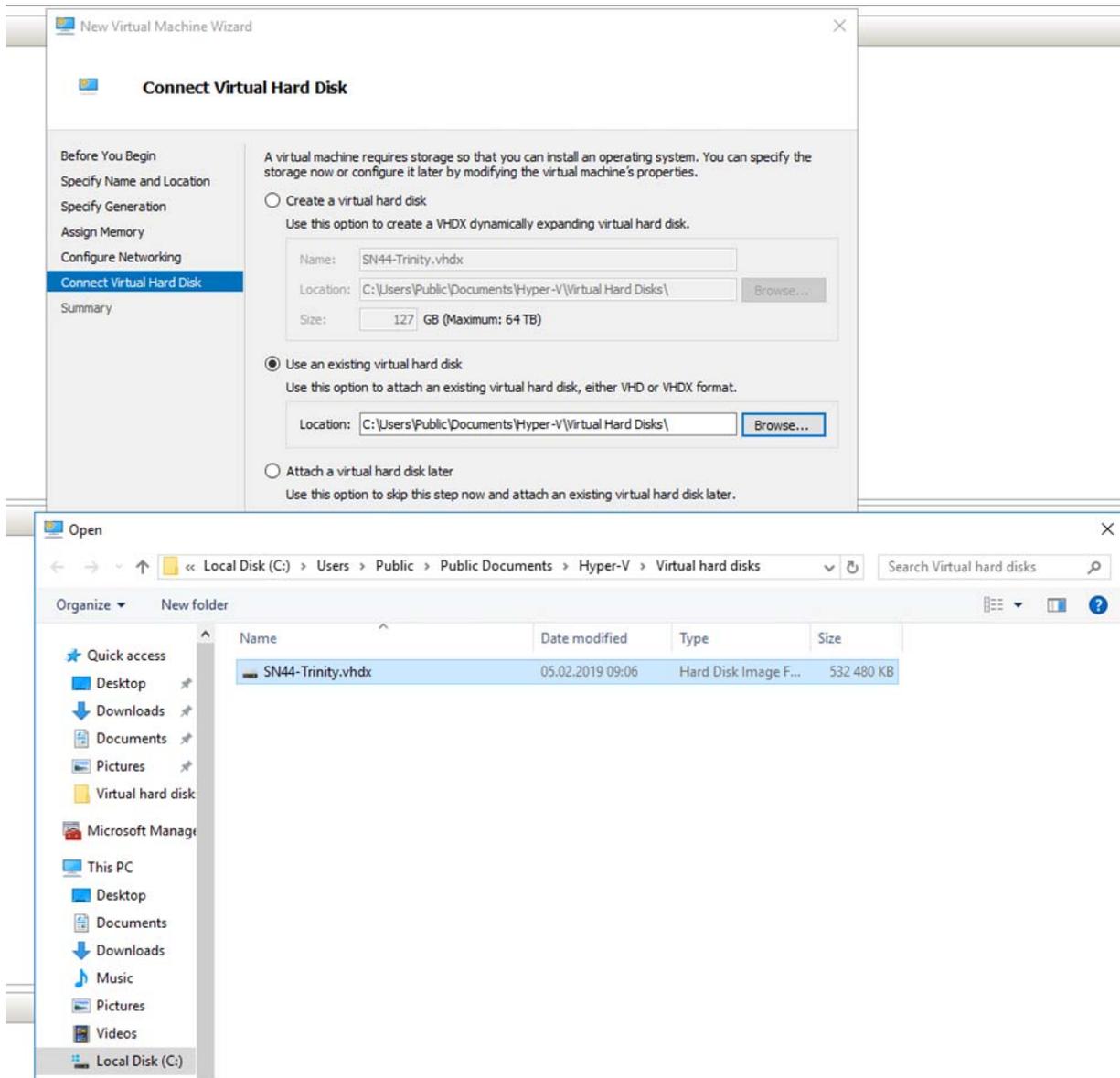


Figure 36. Connect to Virtual Disk

- Click *Finish* (see [figure 37](#) on page 37) to complete virtual machine setup, and begin configuring the Virtual SmartNode.

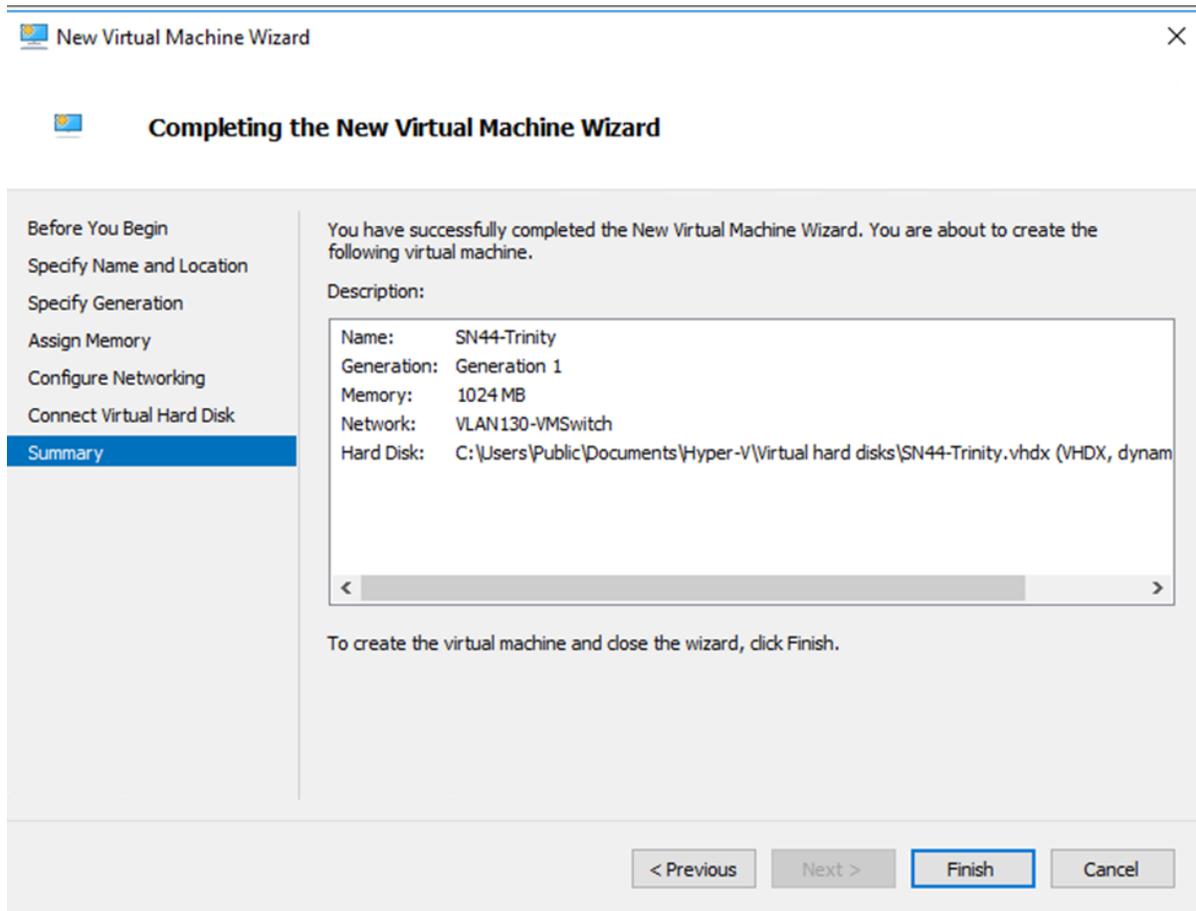


Figure 37. Finalizing New Virtual Machine Setup

Virtual SmartNode Initial Configuration

We recommend you login and perform some initial configuration for the new VM such as changing the administrator password and enabling ssh management access as follows:

1. **Login** with the default administrator account: username admin, no password.
2. Create a **new administrator** account (and invalidate the default account) by entering the following commands:

```
node> enable
node# configure
node(cfg)# administrator <username> password <password>
node(cfg)#
```

3. Optionally, **change the IP address**. By default, the vSN instance tries to lease an IP address over DHCP. To display the assigned address, enter the show ip interface command. If you want to replace it by a static address, enter the following commands:

```
node(cfg)# context ip
```

```

node(ctx-ip) [ROUTER]# interface IF1
node(if-ip) [LAN]# no ipaddress DHCP
node(if-ip) [LAN]# ipaddress IF1 <a.b.c.d/m>
node(ip-if) [LAN]# end
node#

```

4. Persistently **store the configuration** changes:

```
# copy running-config startup-config
```

Go to section “[Connecting to Patton Cloud](#)” on page 38 to lease needed licenses from Patton Cloud.

Connecting to Patton Cloud

A virtual machine running vSN has to lease licenses from a Patton Cloud in order to provide access to the functional features. The following features require a license:

- Virtual SmartNode instance (required to operate a vSN)
- IP packet routing (NAT/NAPT, VRRP, GRE, BGP, RIPv1/v2)
- SIP session (one license per parallel session),
- SIP registrar
- SIP security (TLS)
- SIP Failover (Seamless outbound SIP call hunting)
- VPN Tunnel (OpenVPN, IPsec, L2TP)

All but the *sip-sessions* and VPN license are so called *feature licenses*, which means that each VM needs exactly one license to unlock the corresponding feature. The *sip-sessions* and VPN license are *quantitative licenses*: a VM needs one license to complete one SIP session. The Cloud can be configured to statically assign *sip-sessions* to VMs or to automatically lease them to those VMs that need them. [Figure 38](#) on page 38 illustrates the operating principle of the Cloud

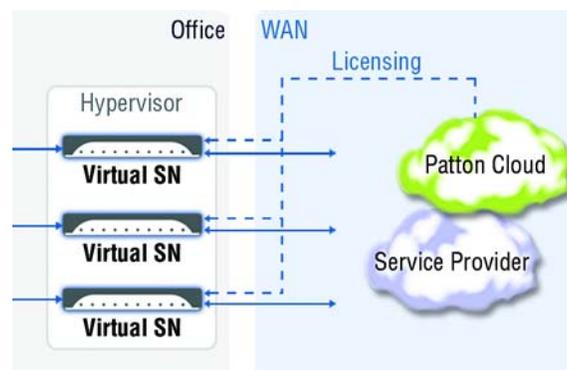
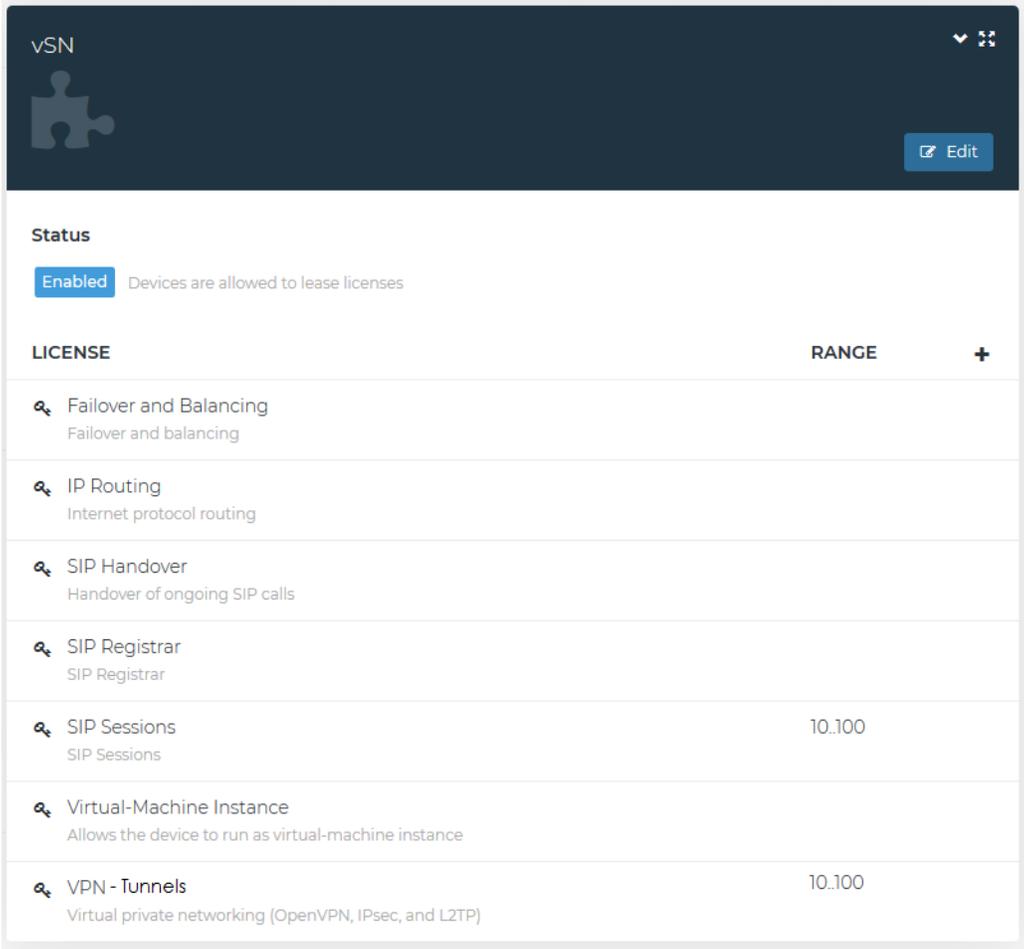


Figure 38. Operating principle of a Patton Cloud: leases floating licenses temporarily to Patton devices including vSN instances

In addition to the licenses required to unlock Trinity features, each VM also has to lease a *virtual-instance* license from the Cloud. Hence, on the Cloud, you need at least the same number of *virtual-instance* licenses than the number of vSN instances you want to launch in parallel.

Cloud Configuration Example

Figure 39 and figure 40 on page 40 illustrate a possible configuration option for the Cloud.



The screenshot shows the vSN configuration interface. At the top, there is a dark header with the 'vSN' logo and an 'Edit' button. Below the header, the 'Status' section shows a blue 'Enabled' button and the text 'Devices are allowed to lease licenses'. The main area is a table with columns for 'LICENSE', 'RANGE', and a '+' icon. The table lists several licenses with their descriptions and ranges.

LICENSE	RANGE	+
Failover and Balancing Failover and balancing		
IP Routing Internet protocol routing		
SIP Handover Handover of ongoing SIP calls		
SIP Registrar SIP Registrar		
SIP Sessions SIP Sessions	10..100	
Virtual-Machine Instance Allows the device to run as virtual-machine instance		
VPN - Tunnels Virtual private networking (OpenVPN, IPsec, and L2TP)	10..100	

Figure 39. Example vSN device license profile

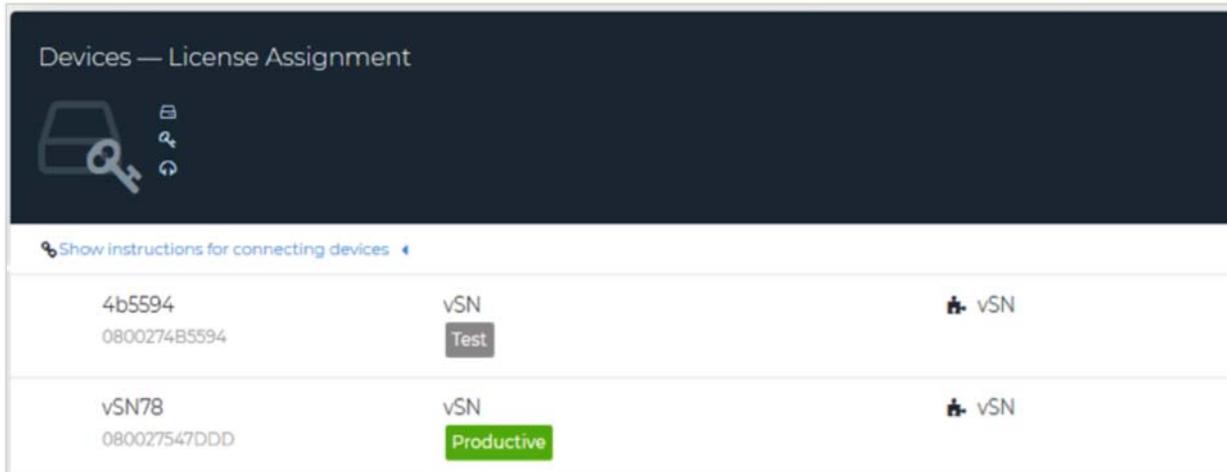


Figure 40. Profile assignment

This configuration sets up a device profile that applies to each connected vSN connecting to the Patton Cloud, from where the licenses are being managed.

Configuration Example to Attach a vSN Instance to the Cloud

By default, the *nodems-client* connects to the cloud at <https://nodems.patton.io>.

Configure your Organization Key, in order for the virtual SmartNode to show up in your Patton Cloud Organization.

The following configuration snippet shows a possible example of how to connect a vSN instance to the Cloud.

```
nodems-client
  organization-key *****
  resource any
  no shutdown
```

Chapter 3 **Software Upgrade**

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Introduction

To upgrade vSN running in a VM, you don't have to boot-strap the machine again using the new pre-installed image. Instead, you instruct the VM to upgrade itself with the TAR file provided separately (e.g. *vSN_3.15.2.tar*).

There are different methods for performing a self-upgrade. These methods are identical to those available for physical Patton devices:

- **Patton Cloud:** With minimum Cloud Service Plan Standard, software upgrades can be done easily, with 2 clicks.

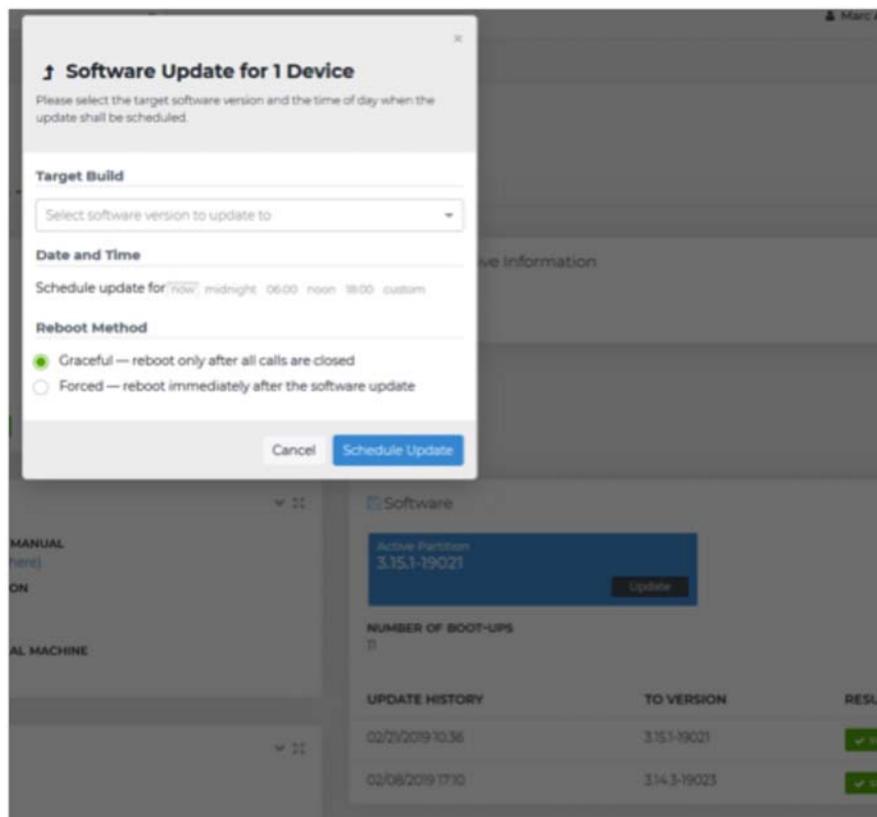


Figure 41. Software Updates dialog

- **TFTP via CLI:** Store the new software (TAR file) to a TFTP server and use the following CLI command to perform the upgrade:


```
copy tftp://<tftp-server-ip>/<path-to-tar> flash:
```
- **HTTP via CLI:** Store the new software (TAR file) to a web server and use the following CLI command to perform the upgrade:


```
copy http://<web-server-ip>/<path-to-tar> flash:
```
- **Web GUI:** Log into the VM's web GUI, execute the *System / Firmware Upgrade menu*, click the *Upgrade* button, select the TAR file on your local disk and click *Start*.

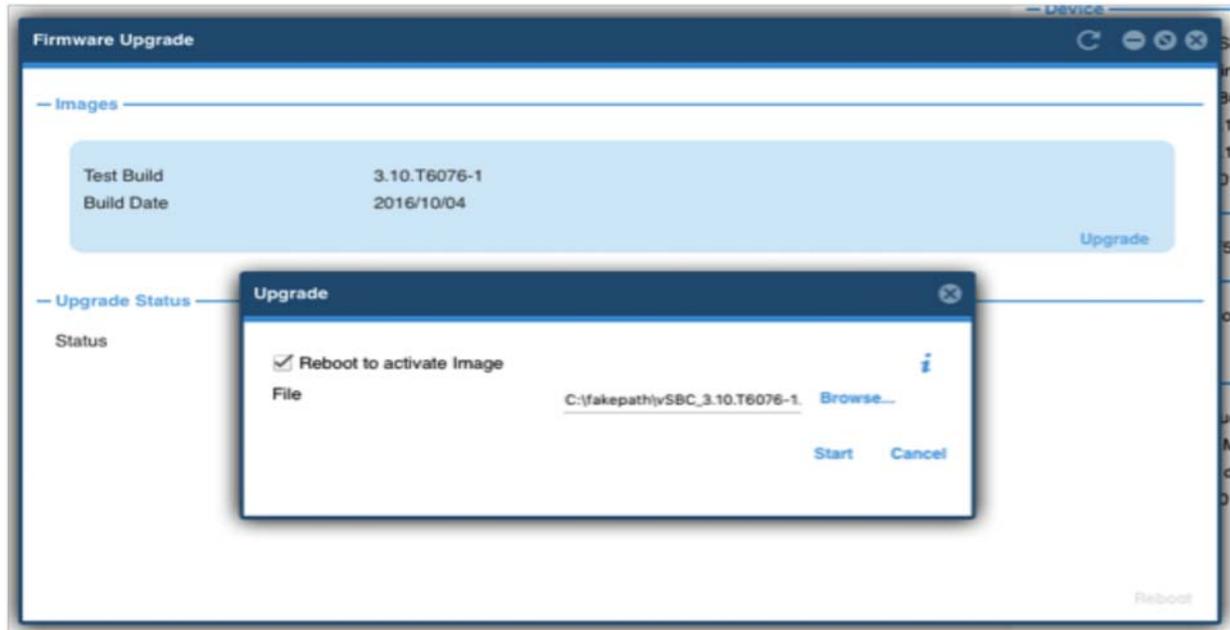


Figure 42. Firmware Upgrade dialog

- **Auto-Provisioning:** Configure the vSN instance to automatically check for a newer software on a TFTP or web server. Refer to the *Trinity Command Line Reference Guide* (Chapter 13, "Auto Provisioning of Firmware and Configuration" on page 194) for more information.

Chapter 4 **Contacting Patton for assistance**

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Contact information

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

Refer to the following for information on contacting Patton Technical Services for Free Support:

REGION	North America	Western Europe	Central & Eastern Europe
Location	Maryland, USA	Bern, Switzerland	Budapest, Hungary
Time Zone	EST/EDT UTC/GMT - 4/5 hours	CET/CEDT UTC/GMT + 1/2 hours	CET/CEDT UTC/GMT + 1/2 hours
Business Hours	Monday-Friday 8:00am to 5:00pm	Monday-Friday 09:00 to 12:00 13:30 to 17:30	Monday-Friday 8:30 to 17:00
Email	support@patton.com	support@patton.com	support@patton.com
Phone	+ 1 301 975 1007	+41 31 985 25 55	+36 439 3835
Fax	+1 301 869 9293	+41 31 985 2526	

Appendix A **Specifications**

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Voice Signaling

- G.711 A-Law/-Law (64 kbps)
- G.722 (64 kbps)
- G.726 (ADPCM 16,24,32,40 kbps)
- G.723.1 (5.3 or 6.3 kbps)
- G.729ab (8kbps)
- Transparent ISDN data
- ilbc-13.33k (SIP-SIP only)
- AMR-NB (4.75, 5.15, 5.9, 6.7, 7.4, 7.95, 10.2, 12.2 kbps)

Call Routing & Services

- Regular expression number matching
- Regular expression number manipulation
- Least Cost Routing
- Call load distribution
- Number blocking
- Short-Dialing
- Digit collection
- Distribution-Groups and Hunt-Groups
- Seamless call failover
- Detection of RTP loss
- SIP Back-to-Back User Agent
- SIP Registrar

Security

- Network separation
- SIP back to back UA*
- TLS*
- Open VPN* / IPsec* / L2TP*
- DoS detection & prevention
- Intelligent ACL
- Trusted peer

IP Networking*

- IPv4 & IPv6 Dual Stack
- Routing Protocol support GRE, VRRP, BGP, RIPv1&v2
- Policy, Packet and packet length Based Routing
- IP Multi-Netting, VLAN, Secondary IP
- Network Address and Port translation (NAT/NAPT)
- IPv4 & IPv6 DHCP Client & Server

Quality of Service

- PacketSmart™ Network Assessment & Monitoring*
- Voice priority, DownStreamQoS™
- Traffic Management, shaping policing
- IEEE 802.1p, IEEE 802.1Q, 4096 VLANs (Tag insertion/deletion), TOS, DiffServ Labeling

Management

- Patton Cloud Managed
- Dynamic resource licensing model (leased / floated)
- Changeable MAC address
- Web/HTTPs, CLI with Telnet and SSH access
- Web Wizard
- Fully Documented CLI
- Telnet and HTTPs access
- TR-069, TFTP, HTTP, HTTPS configuration up- and download
- TR-069, TFTP, HTTP, HTTPS firmware upgrade
- SNMPv1-3 agent
- Radius, Tacacs+
- Separate config domain (LAN side config and WAN side config)
- MIB II and private MIB
- Built-in diagnostic tools
- Secure Auto-Provisioning with built in root CA

Licensing

- Each vSN instance requires 1 license (e.g. CBFL-VSN)
- Software feature licenses can be obtained from Patton Cloud

- See patton.io for more details

Performance Requirement

- 500 MHz per 250 calls

Virtualized Machine System Requirements

- CPU: 64bit x86 architecture (single core or more)
- Hypervisor (KVM, VMware, VirtualBox, Hyper-V)
- RAM: a minimum of 1024 MB
- HDD: min. 1024 MB
- Network: at least 1 Ethernet adapter (virtual)

Appendix B **End User License Agreement**

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End User License Agreement

By opening this package, operating the Designated Equipment or downloading the Program(s) electronically, the End User agrees to the following conditions:

1. Definitions

- A) “Effective Date” shall mean the earliest date of purchase or download of a product containing the Patton Electronics Company Program(s) or the Program(s) themselves.
- B) “Program(s)” shall mean all software, software documentation, source code, object code, or executable code.
- C) “End User” shall mean the person or organization which has valid title to the Designated Equipment.
- D) “Designated Equipment” shall mean the hardware on which the Program(s) have been designed and provided to operate by the End User.

2. Title

Title to the Program(s), all copies of the Program(s), all patent rights, copyrights, trade secrets and proprietary information in the Program(s), worldwide, remains with Patton Electronics Company or its licensors.

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3. Term

The term of this Agreement is from the Effective Date until title of the Designated Equipment is transferred by End User or unless the license is terminated earlier as defined in section “6. Termination” on page 52.

4. Grant of License

- A) During the term of this Agreement, Patton Electronics Company grants a personal, non-transferable, non-assignable and non-exclusive license to the End User to use the Program(s) only with the Designated Equipment at a site owned or leased by the End User.
- B) The End User may copy licensed Program(s) as necessary for backup purposes only for use with the Designated Equipment that was first purchased or used or its temporary or permanent replacement.
- C) The End User is prohibited from disassembling; decompiling, reverse-engineering or otherwise attempting to discover or disclose the Program(s), source code, methods or concepts embodied in the Program(s) or having the same done by another party.
- D) Should End User transfer title of the Designated Equipment to a third party after entering into this license agreement, End User is obligated to inform the third party in writing that a separate End User License Agreement from Patton Electronics Company is required to operate the Designated Equipment.

5. Warranty

The Program(s) are provided “as is” without warranty of any kind. Patton Electronics Company and its licensors disclaim all warranties, either express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose or non-infringement. In no event shall Patton Electronics Company or its licensors be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or inability to use the Program(s), even if Patton Electronics Company has been advised of the possibility of such damages. Because some states do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

If the Program(s) are acquired by or on behalf of a unit or agency of the United States Government, the Government agrees that such Program(s) are “commercial computer software” or “computer software documentation” and that, absent a written agreement to the contrary, the Government’s rights with respect to such Program(s) are limited by the terms of this Agreement, pursuant to Federal Acquisition Regulations 12.212(a) and/or DEARS 227.7202-1(a) and/or sub-paragraphs (a) through (d) of the “Commercial Computer Software—Restricted Rights” clause at 48 C.F.R. 52.227-19 of the Federal Acquisition Regulations as applicable.

6. Termination

- A) The End User may terminate this agreement by returning the Designated Equipment and destroying all copies of the licensed Program(s).
- B) Patton Electronics Company may terminate this Agreement should End User violate any of the provisions of section “4. Grant of License” on page 51.
- C) Upon termination for A or B above or the end of the Term, End User is required to destroy all copies of the licensed Program(s)

7. Notices

Patton devices may log, collect and report data related to installed software, licenses, feature utilization, product performance, device management, service quality and other parameters which is used for quality control, product improvement, license management, service level management and technical support. Collected data may be reported to Patton or a service provider delivering its services connected to the device.

Patton may use this information for other business purposes, such as to alerting you to updated products or services, securing access to software updates, and assisting in order processing.

Any and all information collected by Patton or its assigns will be kept strictly confidential and will not be sold, rented, loaned, or otherwise disclosed to any third party except as required by law.

8. Other Licenses

The Program may be subject to licenses extended by third parties. Accordingly, Patton Electronics Company licenses the Programs subject to the terms and conditions dictated by third parties. Third party software identified to the Programs includes:

- The LGPL (Lesser General Public License) open source license distributed to you pursuant to the LGPL license terms (<http://www.gnu.org/licenses/lgpl.html>).
- RedBoot (Red Hat Embedded Debug and Bootstrap) embedded system debug/bootstrap environment from Red Hat distributed to you pursuant to the eCos license terms (ecos.sourceware.org/license-overview.html) and GNU General Public License (GPL) terms (www.gnu.org/copyleft/gpl.html). Source code is available upon request.

9. Unenforceable Provisions

If any part of these terms and conditions are found to be invalid or unenforceable under applicable law, such part will be ineffective to the extent of such invalid or unenforceable part only, without in any way affecting the remaining parts of these terms and conditions.

10. Governing Law

The rights and obligations of the parties pursuant to these terms and conditions are governed by, and shall be construed in accordance with, the laws of the State of Maryland, USA.

User may be subject to other local, provincial or state and national laws. User hereby irrevocably submits to the exclusive jurisdiction of the courts of the State of Maryland, USA for any dispute arising under or relating to this agreement and waives user's right to institute legal proceedings in any other jurisdiction. Patton shall be entitled to institute legal proceedings in connection with any matter arising under this agreement in any jurisdiction where User resides, does business, or has assets.

11. Waiver

No waiver of any of the provisions of these terms and conditions will be deemed to constitute a waiver of any other provision nor shall such a waiver constitute a continuing waiver unless otherwise expressly provided in writing duly executed by the party to be bound thereby. Any other terms and conditions of sale, to the extent not inconsistent herein, regarding a Patton device, program, license or service remain in full force and effect.