

pfSense VM Build

The presentation builds a pfSense router with a NAT interface, internal01 interface (VM LAN segment) and internal02 interface (VM LAN segment).

Preuss
3/7/2020

WAN Interface - em0

NAT

192.168.117.x/24

internal01 - em1

192.168.100.50/24






2001:db8:abba:100::50/64

internal02 - em2

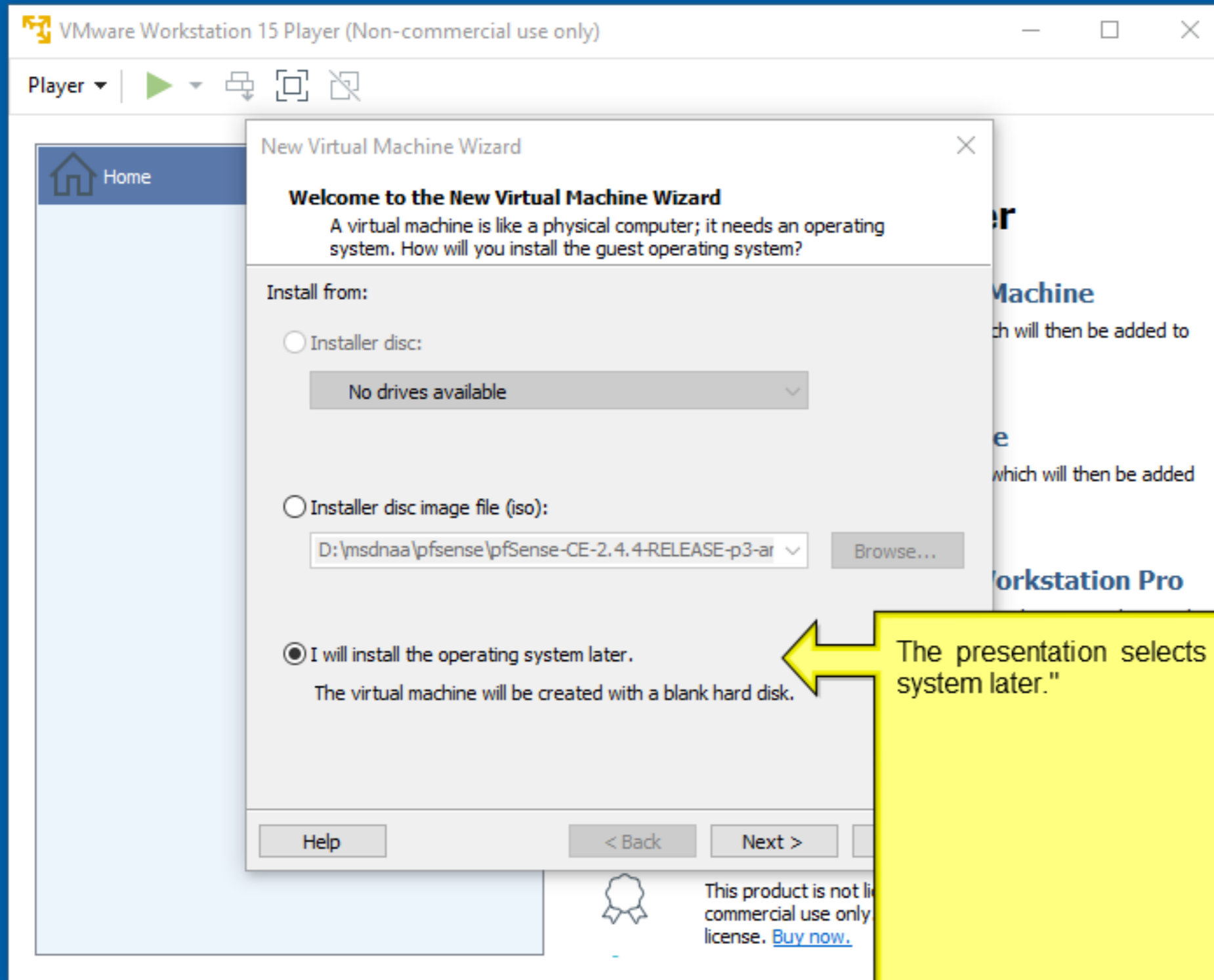
172.16.200.60/24

2001:db8:abba:200::60/64

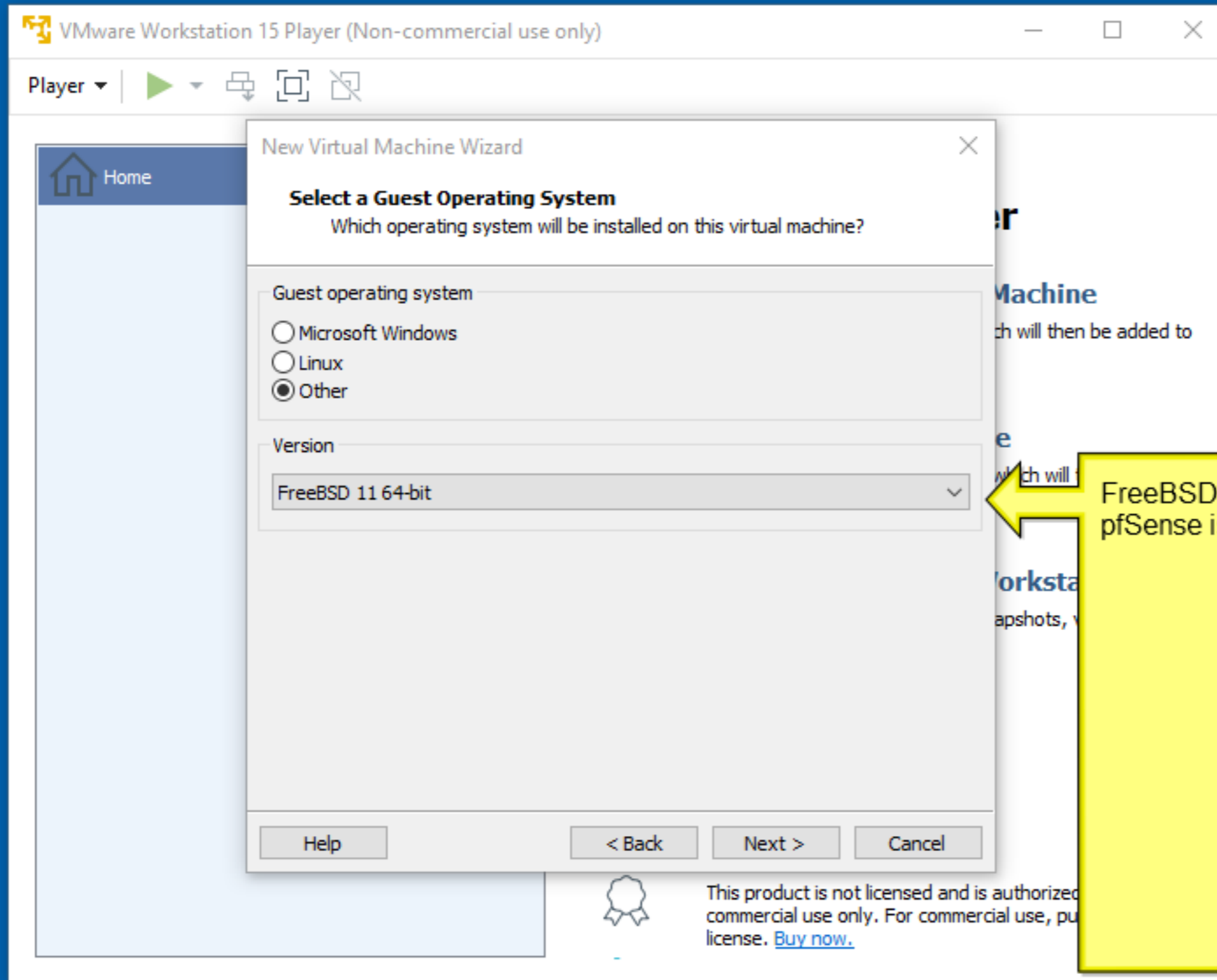
Welcome to VMware Workstation 15 Player

-  **Create a New Virtual Machine**
Create a new virtual machine, which will then be added to the top of your library.
-  **Open a Virtual Machine**
Open an existing virtual machine, which will then be added to the top of your library.
-  **Upgrade to VMware Workstation Pro**
Get advanced features such as snapshots, virtual network management, and more.
-  **Help**
View online help.
-  This product is not licensed and is authorized for non-commercial use only. For commercial use, purchase a license. [Buy now.](#)

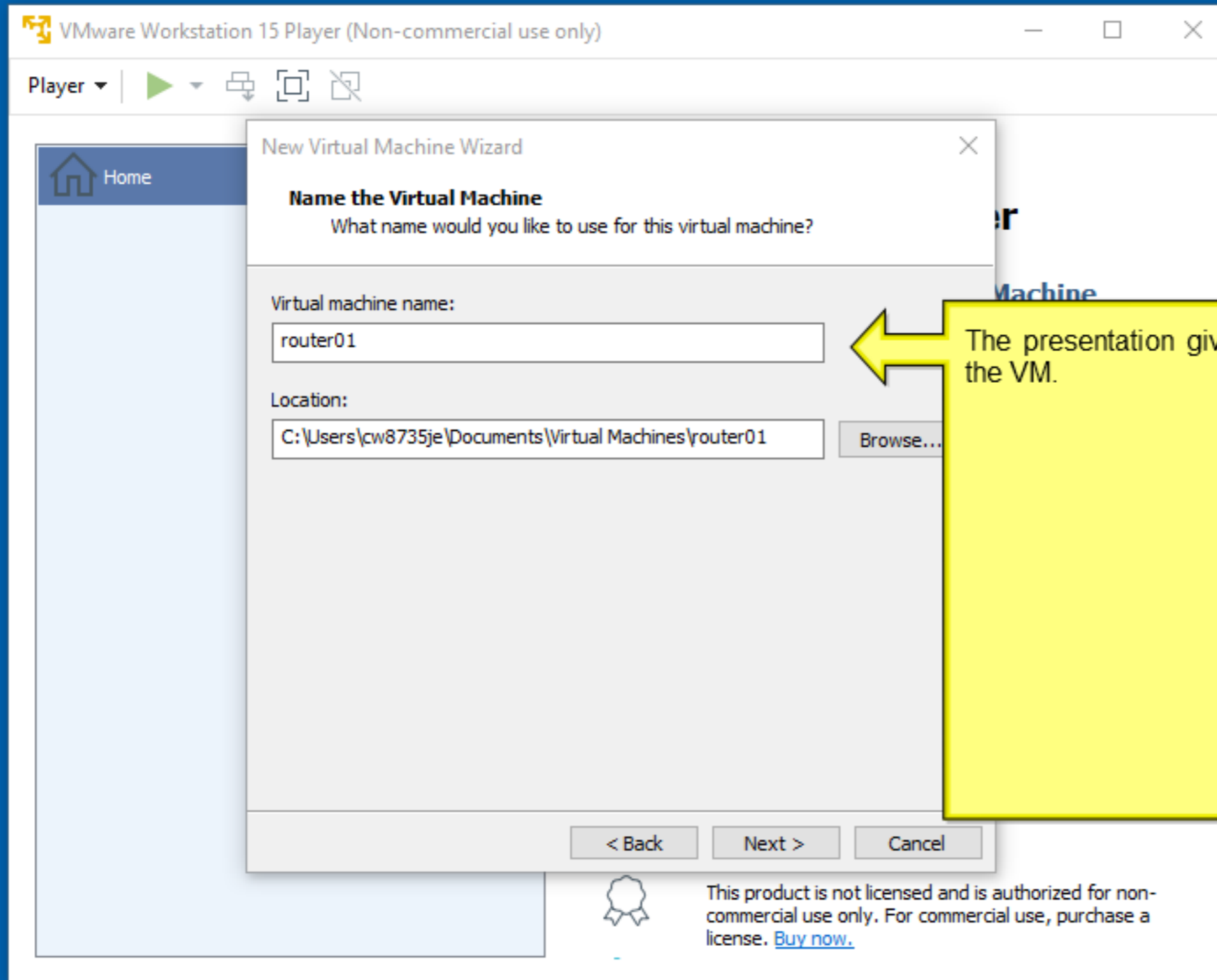
The presentation selects "Create a New Virtual Machine".



The presentation selects "I will install the operating system later."



FreeBSD is under the "other" category. This version of pfSense is at least FreeBSD 11.



VMware Workstation 15 Player (Non-commercial use only)

Player ▾ | ▶ ▾ | 🖨️ | 🖼️ | ✂️

Home

New Virtual Machine Wizard

Specify Disk Capacity

How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB):

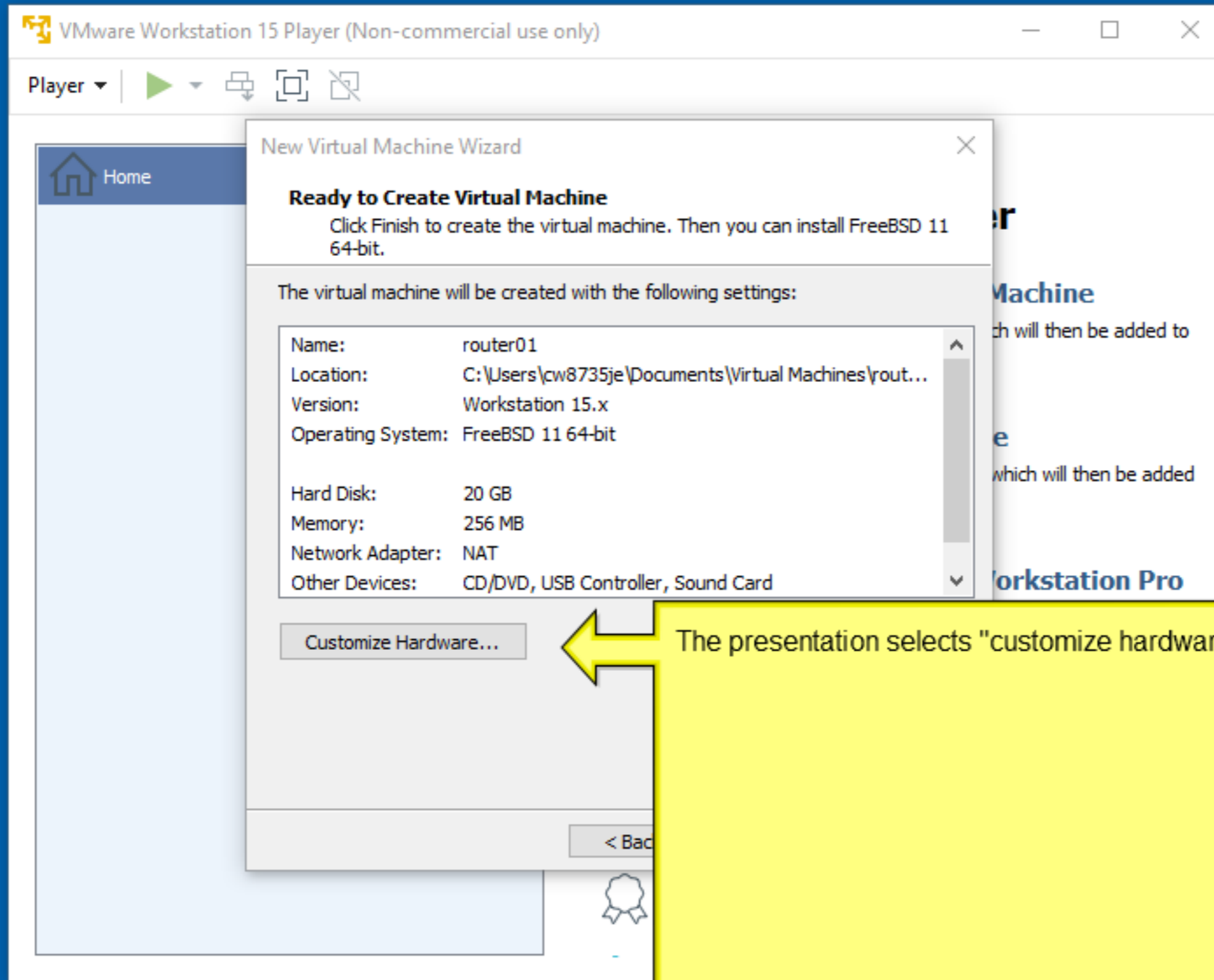
Recommended size for FreeBSD 11 64-bit: 20 GB

Store virtual disk as a single file
 Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine files, but may reduce performance with very large disks.

Help < Back

20 GB is enough space for class experiments. Storing the virtual disk as a single file makes moving the vm easier.



Device	Summary
Memory	1 GB
Processors	1
New CD/DVD (IDE)	Auto detect
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Add... Remove

Memory

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine: MB

64 GB -
32 GB -
16 GB -
8 GB -
4 GB -
2 GB -
1 GB -
512 MB -
256 MB -
128 MB -
64 MB -
32 MB -
16 MB -
8 MB -
4 MB -

- Maximum recommended memory (Memory swapping may occur beyond this size.) 27.7 GB
- Recommended memory 256 MB
- Guest OS recommended minimum 32 MB

The presentation sets the vm RAM to 1024 MB.

Close Help

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Auto detect
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Add... Remove

Processors

Number of processor cores:

Virtualization engine

- Virtualize Intel VT-x/EPT or AMD-V/RVI
- Virtualize CPU performance counters
- Virtualize IOMMU (IO memory management unit)

Close Help

The presentation sets the number of CPU cores to 2.

Hardware

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Auto detect
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Device status

Connected

Connect at power on

Connection

Use physical drive:

Auto detect

Use ISO image file:

D:\msdnaa\pfsense\pfSense-CE-2.4.4-REL

The presentation selects the installation iso for pfSense.

Hardware

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Device status

Connected

Connect at power on

Network connection

Bridged: Connected directly to the physical network

Replicate physical network connection state

NAT: Used to share the host's IP address

Host-only: A private network shared with the host

Custom: Specific virtual network

VMnet0

LAN segment:

LAN Segments...

Add... Remove

Close Help

The presentation sets the first nic to "NAT".

Hardware

Device	Summary	Connections
Memory	1 GB	USB compatibility: USB 2.0
Processors	2	<input type="checkbox"/> Show all USB input devices
New CD/DVD (IDE)	Using file D:\media\... Using file D:\media\...	<input type="checkbox"/> Show all USB input devices
Network Adapter		
USB Controller		
Sound Card		
Display		

Add Hardware Wizard

Hardware Type
What type of hardware do you want to install?

Hardware types:	Explanation
<input checked="" type="radio"/> CD/DVD Drive	Add a network adapter.
<input type="radio"/> Floppy Drive	
<input checked="" type="radio"/> Network Adapter	
<input type="radio"/> USB Controller	
<input type="radio"/> Sound Card	
<input type="radio"/> Parallel Port	
<input type="radio"/> Serial Port	
<input type="radio"/> Printer	
<input type="radio"/> Generic SCSI Device	

Add... Remove

Close Help

The presentation adds another network adapter.

Hardware

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	NAT
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Device status

Connected

Connect at power on

Network connection

Bridged: Connected directly to the physical network

Replicate physical network connection state

[Configure Adapters](#)

NAT: Used to share the host's IP address

Host-only: A private network shared with the host

Custom: Specific virtual network

VMnet0

LAN segment:

LAN Segments...

Add... Remove

Close Help

The presentation selects "LAN segment" for the "Network Adapter 2" connection.

The presentation selects "LAN Segments" to continue.

Hardware

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdhaa\pfsens...
Network Adapter 2	NAT
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto d

Device status

Connected

Connect at power on

Network connection

Bridged: Connected directly to the physical network

Replicate physical network connection state

Configure Adapters

Global LAN Segments

Global LAN Segments:

Add

OK

Add...

Remove

LAN Segments...

Advanced...

The presentation selects "Add" to add another LAN.

Hardware

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	NAT
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto d

Device status

Connected

Connect at power on

Network connection

Bridged: Connected directly to the physical network

Replicate physical network connection state

Configure Adapters

Global LAN Segments

Global LAN Segments:

internal01

Add

Add... Remove

Close Help

The presentation creates a new LAN named "internal01"

Hardware

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	NAT
Network Adapter	NAT
Network Adapter 3	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Device status

Connected

Connect at power on

Network connection

Bridged: Connected directly to the physical network

Replicate physical network connection state

[Configure Adapters](#)

NAT: Used to share the host's IP address

Host-only: A private network shared with the host

Custom: Specific virtual network

VMnet0

LAN segment:

internal01

[LAN Segments...](#) [Advanced...](#)

[Add...](#) [Remove](#)

[Close](#) [Help](#)

Network Adapter 2 network is ready.

Hardware

Device	Summary	Device status
Memory	1 GB	<input type="checkbox"/> Connected
Processors	2	<input checked="" type="checkbox"/> Connect at power on
New CD/DVD (IDE)	Using file D:\media\...\	
Network Adapter		
Network Adapter		
USB Controller		
Sound Card		
Display		

Add Hardware Wizard

Hardware Type
What type of hardware do you want to install?

Hardware types:	Explanation
<input checked="" type="checkbox"/> CD/DVD Drive	Add a network adapter.
<input type="checkbox"/> Floppy Drive	
<input checked="" type="checkbox"/> Network Adapter	
<input type="checkbox"/> USB Controller	
<input type="checkbox"/> Sound Card	
<input type="checkbox"/> Parallel Port	
<input type="checkbox"/> Serial Port	
<input type="checkbox"/> Printer	
<input type="checkbox"/> Generic SCSI Device	

Close Help

Add... Remove

The presentation adds another network adapter.

Hardware

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	LAN Segment
Network Adapter	NAT
Network Adapter 3	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Device status

Connected

Connect at power on

Network connection

Bridged: Connected directly to the physical network

Replicate physical network connection state

[Configure Adapters](#)

NAT: Used to share the host's IP address

Host-only: A private network shared with the host

Custom: Specific virtual network

VMnet0

LAN segment:

LAN Segments...

Add... Remove

Close Help

The presentation selects "LAN segment" for the "Network Adapter 3" connection.

The presentation selects "LAN Segments" to continue.

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	LAN Segment
Network Adapter	NAT
Network Adapter 3	NAT
USB Controller	Present
Sound Card	Auto d
Display	Auto d

Device status

Connected

Connect at power on

Network connection

Bridged: Connected directly to the physical network

Replicate physical network connection state

Configure Adapters

Global LAN Segments

Global LAN Segments:

- internal01
- internal02

Add

Add... Remove

Close Help

The presentation creates an new LAN named "internal02"

Hardware

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	LAN Segment
Network Adapter	NAT
Network Adapter 3	LAN Segment
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Device status

Connected

Connect at power on

Network connection

Bridged: Connected directly to the physical network

Replicate physical network connection state

[Configure Adapters](#)

NAT: Used to share the host's IP address

Host-only: A private network shared with the host

Custom: Specific virtual network

VMnet0

LAN segment:

internal02

[LAN Segments...](#) [Advanced...](#)

[Add...](#) [Remove](#)

[Close](#) [Help](#)

Network Adapter 3 network is ready.

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	LAN Segment
Network Adapter	NAT
Network Adapter 3	LAN Segment
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Connections

USB compatibility: USB 2.0 ▾

Show all USB input devices

Share Bluetooth devices with the virtual machine

Add... Remove

Close Help

The presentation did not change this item.

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	LAN Segment
Network Adapter	NAT
Network Adapter 3	LAN Segment
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Device status

Connected

Connect at power on

Connection

Use default host sound card

Specify host sound card:

The presentation did not change this item.

Add... Remove

Close Help

Device	Summary
Memory	1 GB
Processors	2
New CD/DVD (IDE)	Using file D:\msdnaa\pfsens...
Network Adapter 2	LAN Segment
Network Adapter	NAT
Network Adapter 3	LAN Segment
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

3D graphics

Accelerate 3D graphics

Monitors

Use host setting for monitors

Specify monitor settings:

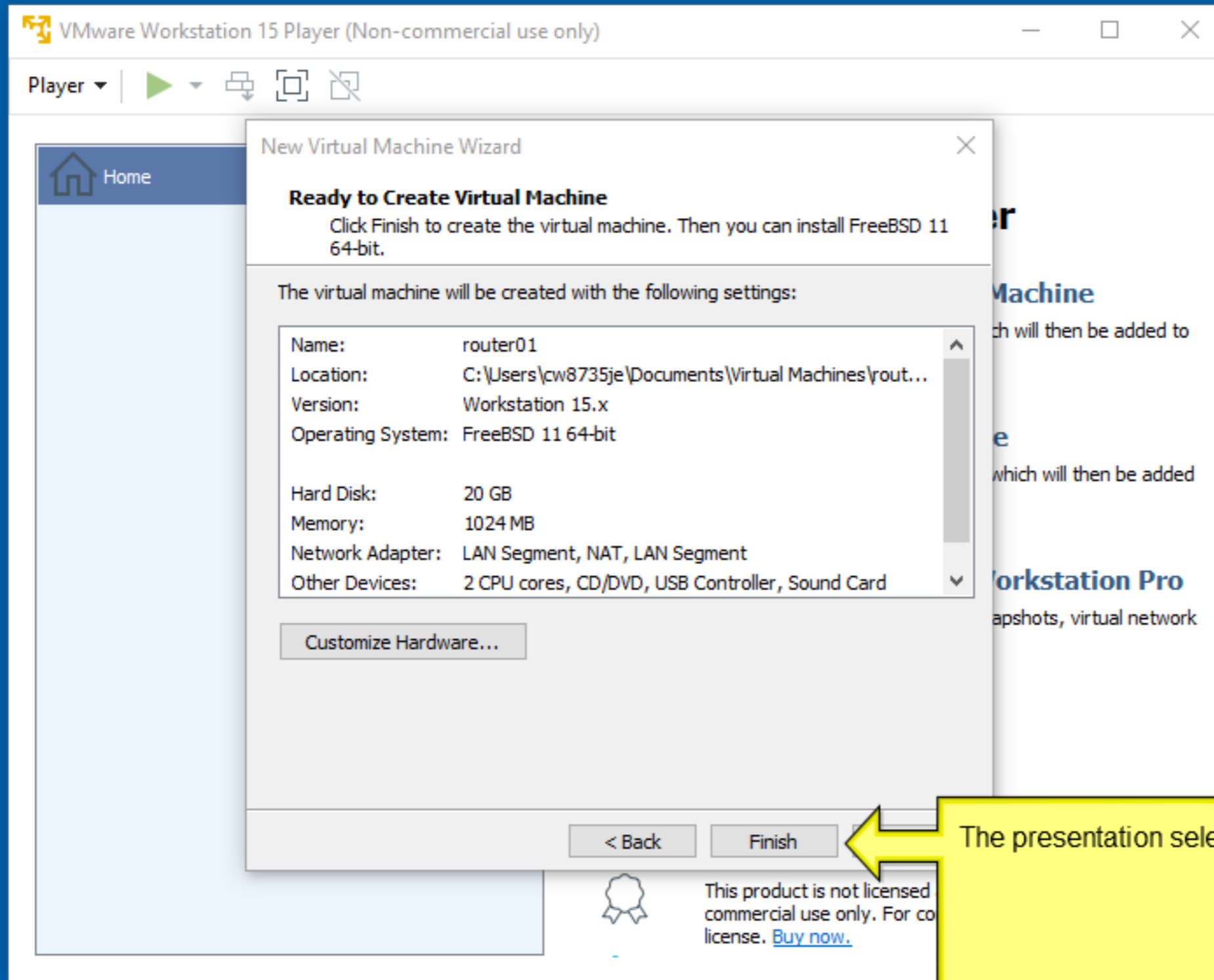
Number of monitors:

1

The presentation did not change this item.

Add... Remove

Close Help



The presentation selected "Finish".

VMware Workstation 15 Player (Non-commercial use only)

Player ▾ | ▶ ▾ | 🖨️ | 🖼️ | ✂️

Home

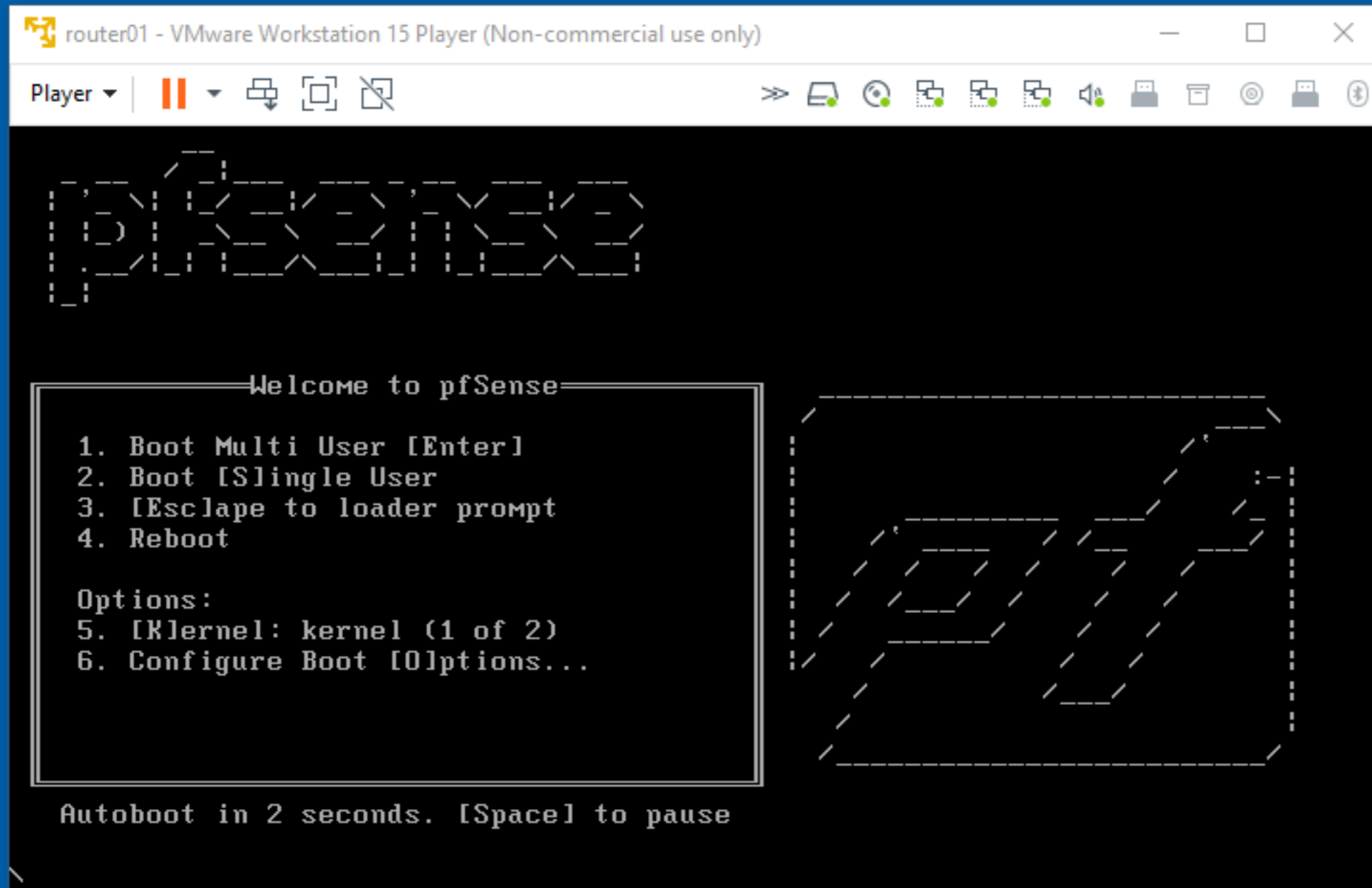
router01

router01

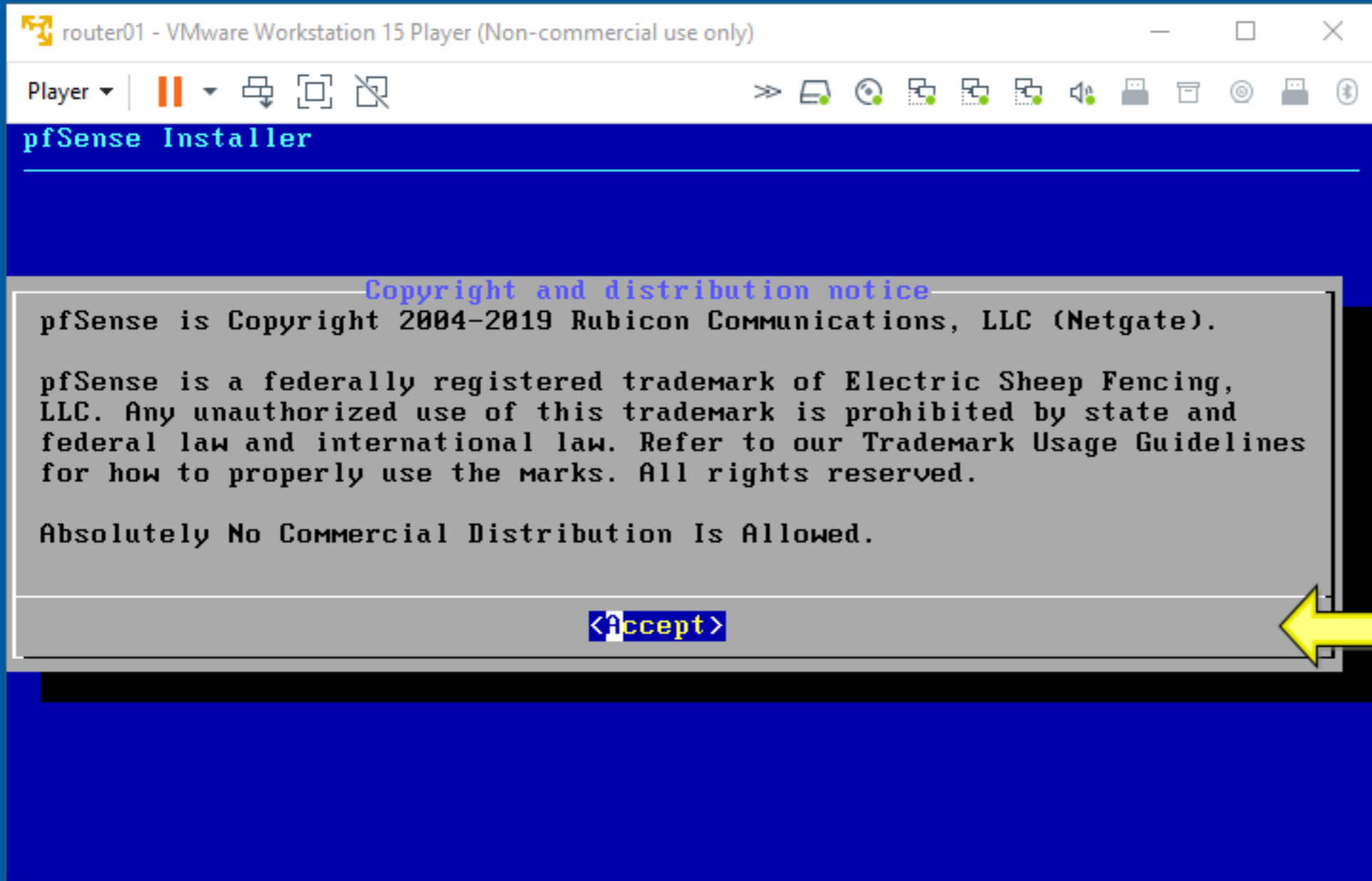
State: Powered Off
OS: FreeBSD 11 64-bit
Version: Workstation 15.x virtual machine
RAM: 1 GB

▶ Play virtual machine
🔧 Edit virtual machine settings

The presentation selected "Play virtual machine".



The presentation watched the screens display.



The presentation selected "Accept".

pfSense Installer

Welcome

Welcome to pfSense!

Install	Install pfSense
Rescue Shell	Launch a shell for rescue operations
Recover config.xml	Recover config.xml from a previous install

< **OK** >

The presentation selected "OK" to "Install".

pfSense Installer

Keymap Selection

The system console driver for pfSense defaults to standard "US" keyboard map. Other keymaps can be chosen below.

```
>>> Continue with default keymap
->- Test default keymap
( ) Armenian phonetic layout
( ) Belarusian
( ) Belgian
( ) Belgian (accent keys)
( ) Brazilian (accent keys)
( ) Brazilian (without accent keys)
( ) Bulgarian (BDS)
( ) Bulgarian (Phonetic)
( ) Canadian Bilingual
( ) Central European
  (+)

13%
```

<Select>
[Press arrows, TAB]

The presentation selected "Select" to "Continue with default keymap".

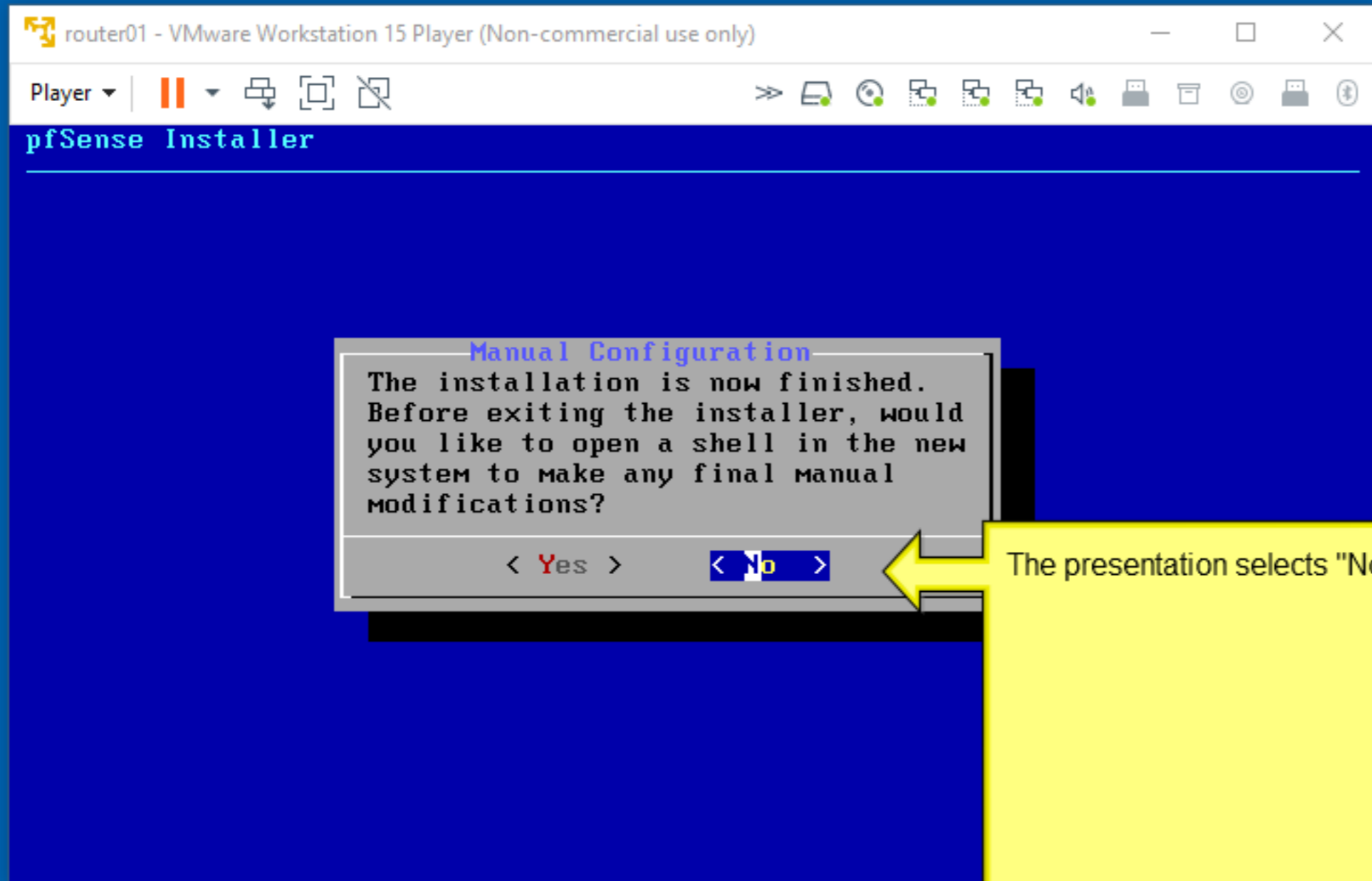
pfSense Installer

Partitioning
How would you like to partition your disk?

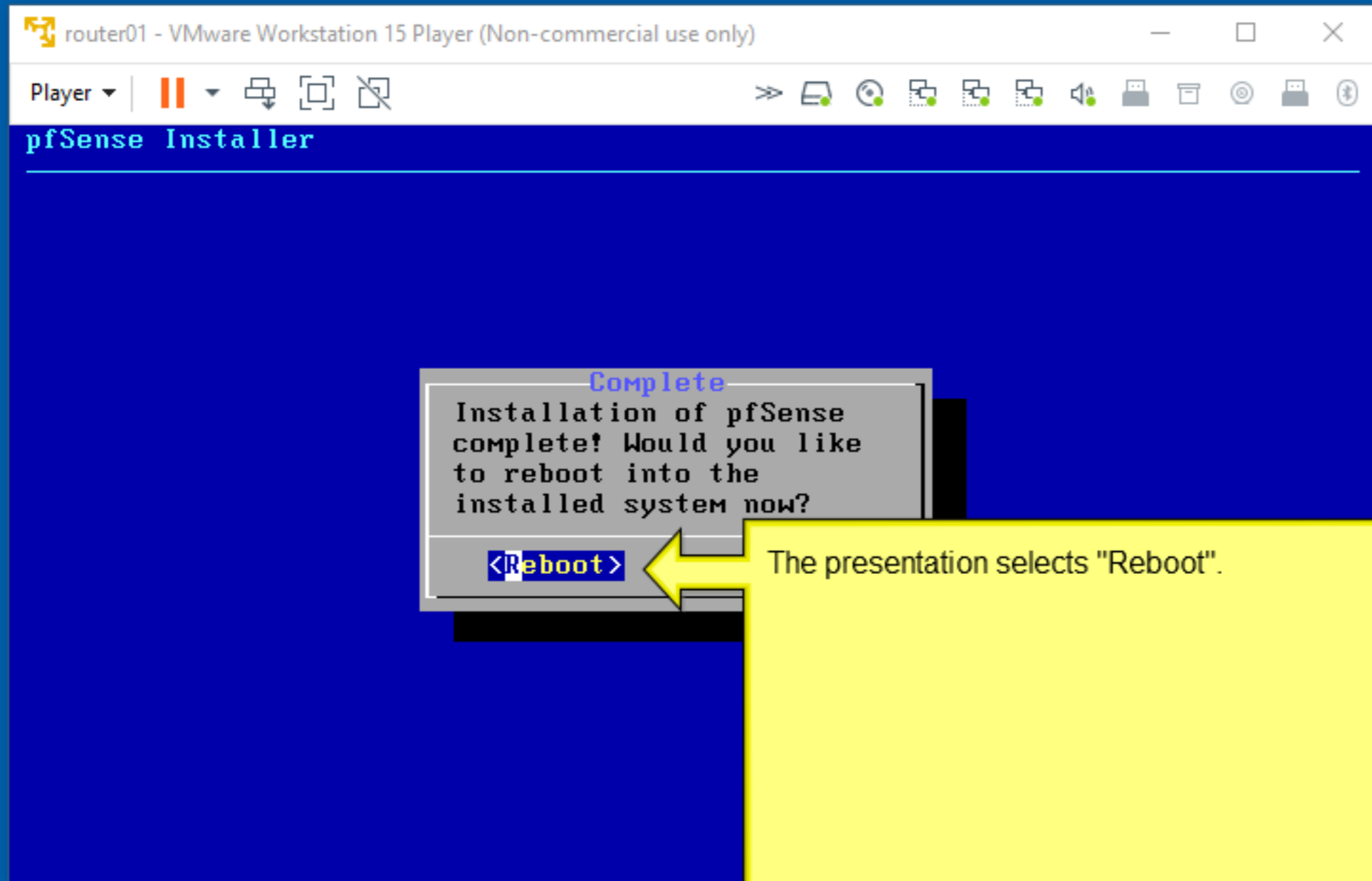
Auto (UFS)	Guided Disk Setup
Manual	Manual Disk Setup (experts)
Shell	Open a shell and partition by hand
Auto (ZFS)	Guided Root-on-ZFS

< **OK** >

The presentation selects "OK" to "Auto (UFS)".



The presentation selects "No".



Complete
Installation of pfSense
complete! Would you like
to reboot into the
installed system now?
<Reboot>

The presentation selects "Reboot".


```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Pause] [Full Screen] [Close] [Refresh] [Power] [Reset] [Screenshot] [Clipboard] [Help]
-----
Welcome to pfSense
1. Boot Multi User [Enter]
2. Boot [S]ingle User
3. [E]scape to loader prompt
4. Reboot

Options:
5. [K]ernel: kernel (1 of 2)
6. Configure Boot [O]ptions...

/boot/kernel/kernel text=0x17c1930 data=0xb93d38+0x557b28 syms=[0x8+0x197400+0x8
+0x197f72]
/boot/entropy size=0x1000
Booting...
_
```

The presentation watches the reboot process.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Starting syslog...done.
Starting CRON... done.
pfSense 2.4.4-RELEASE (Patch 3) amd64 Wed May 15 18:53:44 EDT 2019
Bootup complete

FreeBSD/amd64 (pfSense.localdomain) (ttyv0)

VMware Virtual Machine - Netgate Device ID: 7039027b1f5f0489dd7a

*** Welcome to pfSense 2.4.4-RELEASE-p3 (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 192.168.117.163/24
LAN (lan)      -> em1      -> v4: 192.168.1.1/24

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults    13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                15) Restore recent configuration
7) Ping host                  16) Restart PHP-FPM
8) Shell

Enter an option: 1
```

The presentation selects option "1".

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
0) Logout (SSH only)          9) pfTop
1) Assign Interfaces         10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults 13) Update from console
5) Reboot system            14) Enable Secure Shell (sshd)
6) Halt system              15) Restore recent configuration
7) Ping host                16) Restart PHP-FPM
8) Shell

Enter an option: 1

Valid interfaces are:

em0      00:0c:29:e4:48:ea   (up) Intel(R) PRO/1000 Legacy Network Connection 1.
em1      00:0c:29:e4:48:f4   (up) Intel(R) PRO/1000 Legacy Network Connection 1.
em2      00:0c:29:e4:48:fe (down) Intel(R) PRO/1000 Legacy Network Connection 1.

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.
Should VLANs be set up now [y:n]? n
```

The presentation answers "n" to vlans.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
6) Halt system          15) Restore recent configuration
7) Ping host           16) Restart PHP-FPM
8) Shell

Enter an option: 1

Valid interfaces are:

em0      00:0c:29:e4:48:ea  (up) Intel(R) PRO/1000 Legacy Network Connection 1.
em1      00:0c:29:e4:48:f4  (up) Intel(R) PRO/1000 Legacy Network Connection 1.
em2      00:0c:29:e4:48:fe (down) Intel(R) PRO/1000 Legacy Network Connection 1.

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y:n]? n

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for
(em0 em1 em2 or a): em0
```

The presentation sets em0 as the WAN interface or the NAT connection.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Enter an option: 1

Valid interfaces are:

em0      00:0c:29:e4:48:ea   (up) Intel(R) PRO/1000 Legacy Network Connection 1.
em1      00:0c:29:e4:48:f4   (up) Intel(R) PRO/1000 Legacy Network Connection 1.
em2      00:0c:29:e4:48:fe (down) Intel(R) PRO/1000 Legacy Network Connection 1.

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y;n]? n

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(em0 em1 em2 or a): em0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(em1 em2 a or nothing if finished): em1
```

The presentation sets "em1" as the "LAN" or "internal01" connection.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Valid interfaces are:
em0      00:0c:29:e4:48:ea   (up) Intel(R) PRO/1000 Legacy Network Connection 1.
em1      00:0c:29:e4:48:f4   (up) Intel(R) PRO/1000 Legacy Network Connection 1.
em2      00:0c:29:e4:48:fe (down) Intel(R) PRO/1000 Legacy Network Connection 1.

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y;n]? n

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(em0 em1 em2 or a): em0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(em1 em2 a or nothing if finished): em1

Enter the Optional 1 interface name or 'a' for auto-detection
(em2 a or nothing if finished): em2
```

The presentation sets "em2" as "OPT1" or "internal02" connection.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
say no here and use the webConfigurator to configure VLANs later, if required.
Should VLANs be set up now [y:n]? n
If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.
Enter the WAN interface name or 'a' for auto-detection
(em0 em1 em2 or a): em0
Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(em1 em2 a or nothing if finished): em1
Enter the Optional 1 interface name or 'a' for auto-detection
(em2 a or nothing if finished): em2
The interfaces will be assigned as follows:
WAN -> em0
LAN -> em1
OPT1 -> em2
Do you want to proceed [y:n]? y
```

The presentation answers "y".

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
OPT1 -> em2
Do you want to proceed [y!n]? y
Writing configuration...done.
One moment while the settings are reloading... done!
VMware Virtual Machine - Netgate Device ID: 7039027b1f5f0489dd7a
*** Welcome to pfSense 2.4.4-RELEASE-p3 (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 192.168.117.163/24
LAN (lan)      -> em1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> em2      ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults    13) Update from console
5) Reboot system               14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 2
```

The presentation answers "2".


```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
*** Welcome to pfSense 2.4.4-RELEASE-p3 (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 192.168.117.163/24
LAN (lan)      -> em1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> em2      ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults  13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 2
```

The presentation answers "2" or the "LAN" interface.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
LAN (lan) -> em1 -> v4: 192.168.1.1/24
OPT1 (opt1) -> em2 ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults    13) Update from console
5) Reboot system               14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 2

Enter the new LAN IPv4 address.
> 192.168.100.50
```

The presentation provides the "LAN" interface IPv4 address.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
5) Reboot system          14) Enable Secure Shell (sshd)
6) Halt system           15) Restore recent configuration
7) Ping host             16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 2

Enter the new LAN IPv4 address. Press <ENTER> for none:
> 192.168.100.50

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0    = 8

Enter the new LAN IPv4 subnet mask:
> 24
```

The presentation provides the "LAN" interface subnet mask.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Enter an option: 2
Available interfaces:
1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static)
3 - OPT1 (em2)
Enter the number of the interface you wish to configure: 2
Enter the new LAN IPv4 address. Press <ENTER> for none:
> 192.168.100.50
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0    = 8
Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24
For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
> |
```

The presentation presses "enter" to continue without entering any values.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Pause] [Copy] [Paste] [Fullscreen] [Refresh] [Close]
Available interfaces:
1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 2

Enter the new LAN IPv4 address. Press <ENTER> for none:
> 192.168.100.50

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0    = 8

Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24

For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new LAN IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:100::50
```

The presentation enters the "LAN" interface IPv6 address.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0    = 8
Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24
For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>
Enter the new LAN IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:100::50
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0      = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0         = 80
     ffff:ffff:ffff:ffff:0:0:0:0           = 64
Enter the new LAN IPv6 subnet bit count
> 64
```

The presentation enters the "LAN" interface subnet mask.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
255.0.0.0 = 8
Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24
For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>
Enter the new LAN IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:100::50
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64
Enter the new LAN IPv6 subnet bit count (1 to 127):
> 64
For a WAN, enter the new LAN IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
> |
```

The presentation presses "enter" to continue without entering any values.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24

For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new LAN IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:100::50

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64

Enter the new LAN IPv6 subnet bit count (1 to 127):
> 64

For a WAN, enter the new LAN IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Do you want to enable the DHCP server on LAN? (y/n) n
```

The presentation answers "n".


```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new LAN IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:100::50

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64

Enter the new LAN IPv6 subnet bit count (1 to 127):
> 64

For a WAN, enter the new LAN IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Do you want to enable the DHCP server on LAN? (y/n) n
Disabling IPv4 DHCPD...
Do you want to enable the DHCP6 server on LAN? (y/n) n
```

The presentation answers "n".

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
For a LAN, press <ENTER> for none:
>
Enter the new LAN IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:100::50
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64
Enter the new LAN IPv6 subnet bit count (1 to 127):
> 64
For a WAN, enter the new LAN IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
>
Do you want to enable the DHCP server on LAN? (y/n) n
Disabling IPv4 DHCPD...
Do you want to enable the DHCP6 server on LAN? (y/n) n
Disabling IPv6 DHCPD...
Do you want to revert to HTTP as the webConfigurator protocol? (y/n) n
```

The presentation answers "n".

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
For a WAN, enter the new LAN IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Do you want to enable the DHCP server on LAN? (y/n) n
Disabling IPv4 DHCPD...
Do you want to enable the DHCP6 server on LAN? (y/n) n
Disabling IPv6 DHCPD...
Do you want to revert to HTTP as the webConfigurator protocol? (y/n) n

Please wait while the changes are saved to LAN...
Reloading filter...
Reloading routing configuration...
DHCPD...

The IPv4 LAN address has been set to 192.168.100.50/24

The IPv6 LAN address has been set to 2001:db8:abba:100::50/64
You can now access the webConfigurator by opening the following URL in your web
browser:
    https://192.168.100.50/
    https://[2001:db8:abba:100::50]/

Press <ENTER> to continue. █
```

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
browser:
    https://192.168.100.50/
    https://[2001:db8:abba:100::50]/
Press <ENTER> to continue.
VMware Virtual Machine - Netgate Device ID: 7039027b1f5f0489dd7a
*** Welcome to pfSense 2.4.4-RELEASE-p3 (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 192.168.117.163/24
LAN (lan)      -> em1      -> v4: 192.168.100.50/24
               v6: 2001:db8:abba:100::50/64
OPT1 (opt1)    -> em2      ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults    13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                15) Restore recent configuration
7) Ping host                  16) Restart PHP-FPM
8) Shell

Enter an option: 2
```

The presentation answers "2".

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
WAN (wan)    -> em0    -> v4/DHCP4: 192.168.117.163/24
LAN (lan)    -> em1    -> v4: 192.168.100.50/24
              v6: 2001:db8:abba:100::50/64
OPT1 (opt1)  -> em2    ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults    13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                15) Restore recent configuration
7) Ping host                  16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static, staticv6)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 3
```

The presentation answers "3" or the "OPT1" interface.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
v6: 2001:db8:abba:100::50/64
OPT1 (opt1) -> em2 ->
0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults  13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                15) Restore recent configuration
7) Ping host                  16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static, staticv6)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 3

Enter the new OPT1 IPv4 address.
> 172.16.200.60
```

The presentation provides the "OPT1" interface IPv4 address.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
5) Reboot system          14) Enable Secure Shell (sshd)
6) Halt system           15) Restore recent configuration
7) Ping host             16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static, staticv6)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 3

Enter the new OPT1 IPv4 address. Press <ENTER> for none:
> 172.16.200.60

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0    = 8

Enter the new OPT1 IPv4 subnet mask:
> 24
```

The presentation provides the "OPT1" interface subnet mask.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Enter an option: 2
Available interfaces:
1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static, staticv6)
3 - OPT1 (em2)
Enter the number of the interface you wish to configure: 3
Enter the new OPT1 IPv4 address. Press <ENTER> for none:
> 172.16.200.60
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0     = 8
Enter the new OPT1 IPv4 subnet bit count (1 to 31):
> 24
For a WAN, enter the new OPT1 IPv4 upstream
For a LAN, press <ENTER> for none:
> |
```

The presentation presses "enter" to continue without entering any values.


```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Pause] [Copy] [Paste] [Fullscreen] [Refresh] [Close]
Available interfaces:
1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static, staticv6)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 3

Enter the new OPT1 IPv4 address. Press <ENTER> for none:
> 172.16.200.60

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0    = 8

Enter the new OPT1 IPv4 subnet bit count (1 to 31):
> 24

For a WAN, enter the new OPT1 IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new OPT1 IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:200::60
```

The presentation enters the "OPT1" interface IPv6 address.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0    = 8
Enter the new OPT1 IPv4 subnet bit count (1 to 31):
> 24
For a WAN, enter the new OPT1 IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>
Enter the new OPT1 IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:200::60
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64
Enter the new OPT1 IPv6 subnet bit count
> 64
```

The presentation enters the "OPT1" interface subnet mask.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
255.0.0.0 = 8
Enter the new OPT1 IPv4 subnet bit count (1 to 31):
> 24
For a WAN, enter the new OPT1 IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>
Enter the new OPT1 IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:200::60
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64
Enter the new OPT1 IPv6 subnet bit count (1 to 127):
> 64
For a WAN, enter the new OPT1 IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
> |
```

The presentation presses "enter" to continue without entering any values.

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
Enter the new OPT1 IPv4 subnet bit count (1 to 31):
> 24

For a WAN, enter the new OPT1 IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new OPT1 IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:200::60

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64

Enter the new OPT1 IPv6 subnet bit count (1 to 127):
> 64

For a WAN, enter the new OPT1 IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Do you want to enable the DHCP server on OPT1? (y/n) n
```

The presentation answers "n".

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Pause] [Full Screen] [Close]
>
For a WAN, enter the new OPT1 IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new OPT1 IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:200::60

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64

Enter the new OPT1 IPv6 subnet bit count (1 to 127):
> 64

For a WAN, enter the new OPT1 IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Do you want to enable the DHCP server on OPT1? (y/n) n
Do you want to enable the DHCP6 server on OPT1? (y/n) n
```

The presentation answers "n".

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
For a LAN, press <ENTER> for none:
>
Enter the new OPT1 IPv6 address. Press <ENTER> for none:
> 2001:db8:abba:200::60
Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. ffff:ffff:ffff:ffff:ffff:ffff:ffff:ff00 = 120
     ffff:ffff:ffff:ffff:ffff:ffff:ffff:0   = 112
     ffff:ffff:ffff:ffff:ffff:ffff:0:0     = 96
     ffff:ffff:ffff:ffff:ffff:0:0:0       = 80
     ffff:ffff:ffff:ffff:0:0:0:0         = 64
Enter the new OPT1 IPv6 subnet bit count (1 to 127):
> 64
For a WAN, enter the new OPT1 IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
>
Do you want to enable the DHCP server on OPT1? (y/n) n
Do you want to enable the DHCP6 server on OPT1? (y/n) n
Do you want to revert to HTTP as the webConfigurator protocol? (y/n) n
```

The presentation answers "n".

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Pause] [Full Screen] [Close]
>> [Network] [Power] [Refresh] [Save] [Print] [Help] [VM] [Host] [Tools]

Enter the new OPT1 IPv6 subnet bit count (1 to 127):
> 64

For a WAN, enter the new OPT1 IPv6 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Do you want to enable the DHCP server on OPT1? (y/n) n
Do you want to enable the DHCP6 server on OPT1? (y/n) n
Do you want to revert to HTTP as the webConfigurator protocol? (y/n) n

Please wait while the changes are saved to OPT1...
Reloading filter...
Reloading routing configuration...
DHCPD...

The IPv4 OPT1 address has been set to 172.16.200.60/24

The IPv6 OPT1 address has been set to 2001:db8:abba:200::60/64

Press <ENTER> to continue. █
```

```
router01 - VMware Workstation 15 Player (Non-commercial use only)
Player | [Icons]
The IPv6 OPT1 address has been set to 2001:db8:abba:200::60/64
Press <ENTER> to continue.
VMware Virtual Machine - Netgate Device ID: 7039027b1f5f0489dd7a
*** Welcome to pfSense 2.4.4-RELEASE-p3 (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 192.168.117.163/24
LAN (lan)      -> em1      -> v4: 192.168.100.50/24
               v6: 2001:db8:abba:100::50/64
OPT1 (opt1)    -> em2      -> v4: 172.16.200.60/24
               v6: 2001:db8:abba:200::60/64

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces         10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults  13) Update from console
5) Reboot system             14) Enable Secure Shell (sshd)
6) Halt system               15) Restore recent configuration
7) Ping host                 16) Restart PHP-FPM
8) Shell

Enter an option: █
```

The pfSense vm is ready for use.