

RouterOS in mediu virtual

MikroTik
ROUTING THE WORLD

Despre mine

- ing. Emil Oltean
- prima lucrare ISP: retea de cartier in Brasov – 1999-2001
- primele teste WISP: vara anului 2005
- primul Mikrotik RouterBoard: RB133 - dec. 2006
- primul RouterOS: 2.9.38
- primul HotSpot cu RB133C - 2007
- primul link la distanta mare cu RB333 , 8 km in 2.4 - 2007
- primul link in 5GHz cu R5H – 21Km – 802.11a – 17Mbps – viteza maxima in 802.11a este 21Mbps - 2009
- prima implementare SXT din Romania – dec. 2011
- prima implementare DynaDysh din Romania – oct. 2015

Avantajele RouterOS ca VM

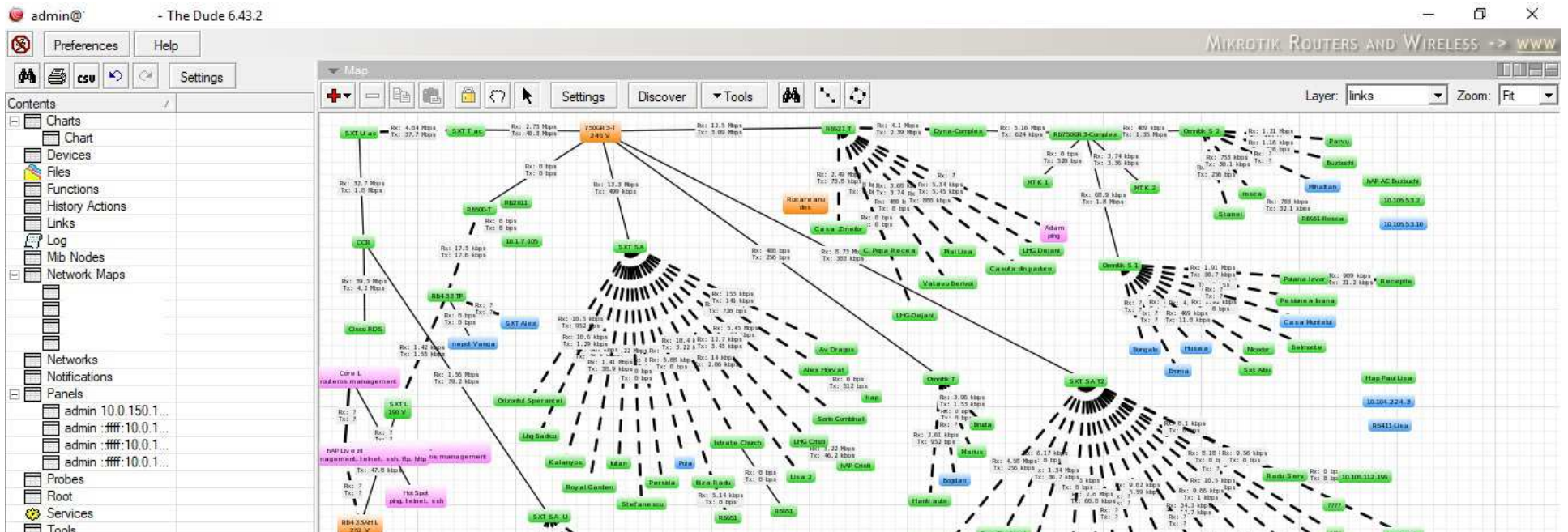
- viteza de implementare
- toate capabilitatile RouterOS fara sa cumperi un router
- posibilitatea creeri unui sistem de monitorizare The Dude
- putem folosi RouterOS VM cu rolul de concentrator PPPoE
- RouterOS VM cu rolul de UserManager
- RouterOS CHR NAT

Viteza implementarii

- descarcam RouterOS CHR din sectiunea Cloud Hosted Router mikrotik.com/download
- alegem imaginea vmdk,vdi,vhdx, sau ova in functie de hipervisorul in care vrem sa instalam
- importam imaginea in hipervizor si avem routerul dorit
- Atentie: creati masina virtuala cu minim doua interfete de retea !

RouterOS CHR - The Dude

- in imaginea RouterOS CHR pe care o importati exista deja instalat pachetul Dude
- este un sistem de monitorizare a retelei foarte performant oferit gratuit de Mikrotik



RouterOS – concentrator PPPoE

- este recomandat ca intr-o retea ISP sa exista mai multe concentratoare PPPoE
- se pot aloca mai multe procesoare si memorie RAM necesara conexiunilor PPPoE
- si daca deja avem mai multe concentratoare PPPoE masini virtuale de ce nu:
- RouterOS UserManager – sistem de management al utilizatorilor pentru servicii PPP, HotSpot – este un server RADIUS

RouterOS CHR in XenServer

- descarcam imaginea cu extensia vmdk
- importam cu ajutorul utilitarului XenCenter imaginea
- Important: setati adresa IP fixa in timpul importului !
- adaugati mai multe interfete de retea
- configurati : Parola, adrese ip si gateway
- `ip address add address=... / ..
interface=etherX`
- `ip route add gateway=...`

RouterOS CHR in XenServer

The screenshot shows the 'Import Disk Image' wizard in XenServer, specifically the 'Define Virtual Machine' step. The window title is 'Import Disk Image'. The left sidebar contains a list of steps: 'Import Source', 'VM Definition' (highlighted), 'Location', 'Storage', 'Networking', 'OS Fixup Settings', 'Transfer VM Settings', and 'Finish'. The main area contains the following fields and instructions:

Enter a name that will help you identify the virtual machine later and specify the number of virtual CPUs and the amount of memory that will be initially allocated to the new virtual machine.

VM Name RouterOS CHR

Number of CPUs 1

Memory 256 MB

The Citrix logo is visible in the bottom left corner. At the bottom right, there are three buttons: '< Previous', 'Next >', and 'Cancel'.

RouterOS CHR in XenServer

Import Disk Image

Select the location where the imported VM will be placed

Import Source
VM Definition
Location
Storage
Networking
OS Fixup Settings
Transfer VM Settings
Finish

Choose the pool or standalone server where you want to place the VM(s). If required, you can also specify a Home Server within the selected pool for each imported VM.

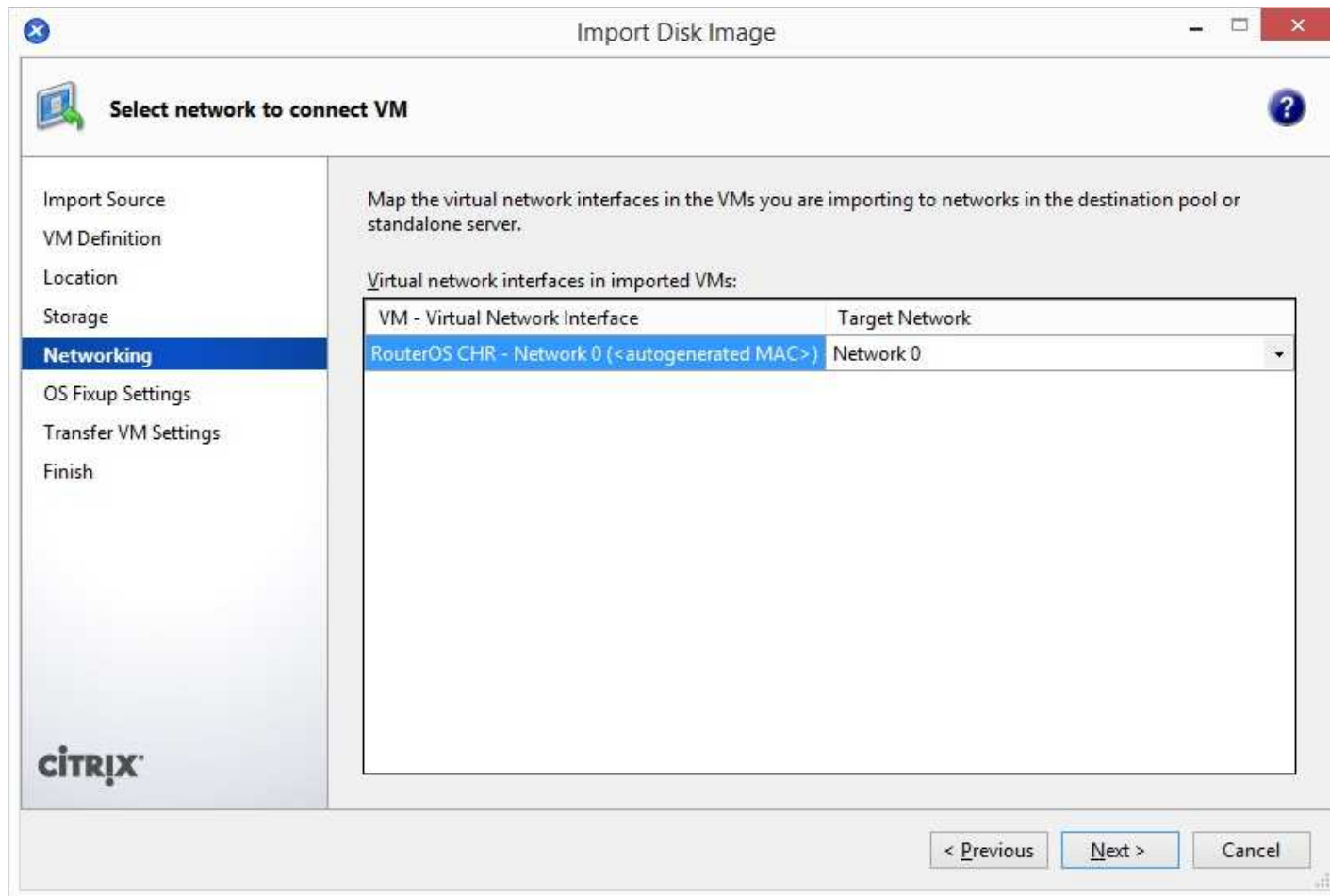
Import VM(s) to: server pool

Assign imported VM(s) to a home server:

VM	Home Server
RouterOS CHR	Don't assign a home server

< Previous Next > Cancel

RouterOS CHR in XenServer



RouterOS CHR in XenServer

The screenshot shows the 'Import Disk Image' wizard in Citrix XenServer. The current step is 'Transfer VM Settings', which is highlighted in the left-hand navigation pane. The main area of the wizard is titled 'Configure networking options for the Transfer VM'. It contains the following elements:

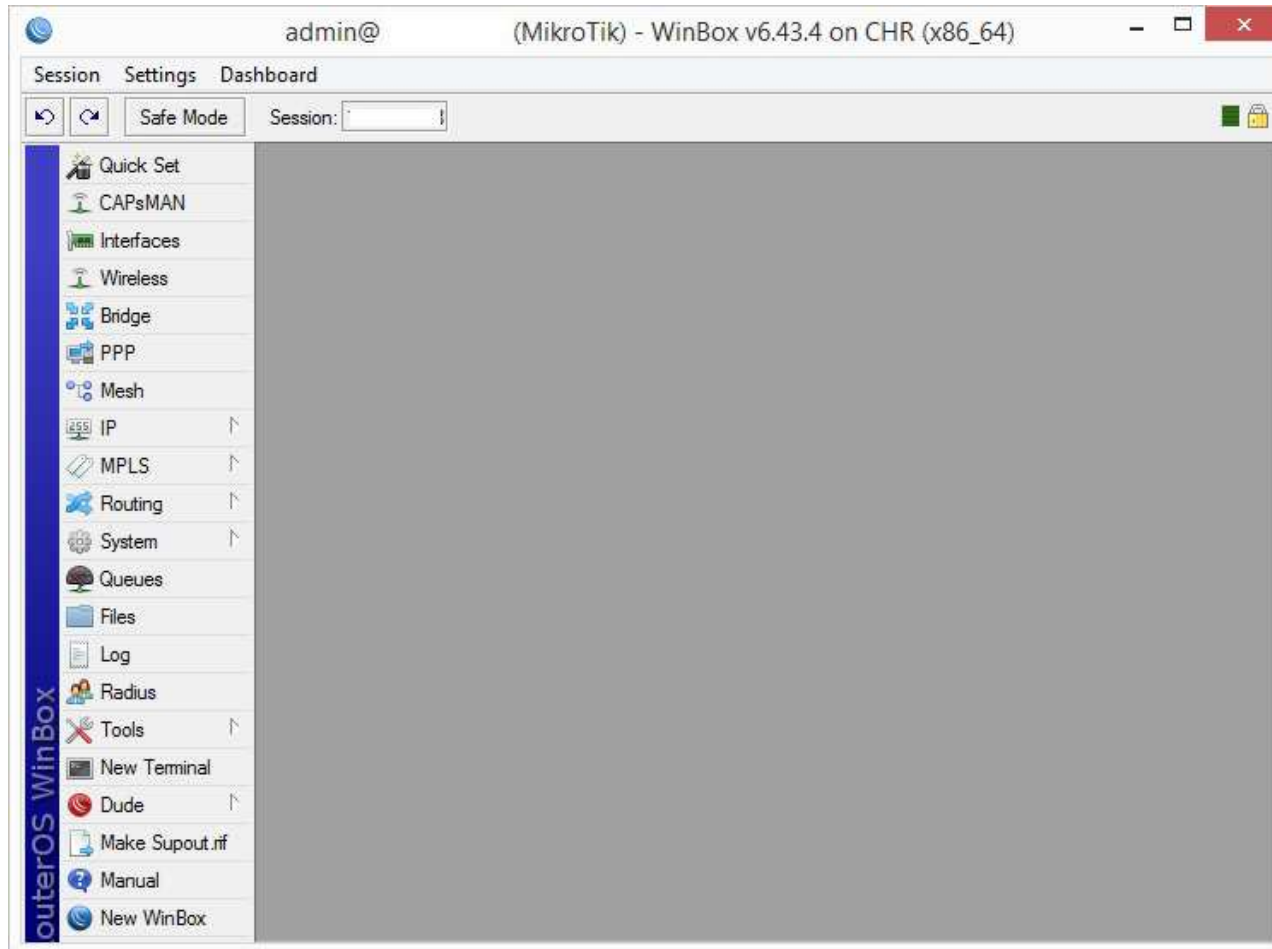
- Import Source**
- VM Definition**
- Location**
- Storage**
- Networking**
- OS Fixup Settings**
- Transfer VM Settings** (Current step)
- Finish**

The main configuration area includes:

- A heading: "Select the network on which the temporary VM (Transfer VM) used to perform the import operation will run."
- A dropdown menu labeled "Network:" with the selected value "Network 0 (management)".
- A section titled "Network Settings" with two radio button options:
 - Automatically obtain network settings using DHCP
 - Use these network settings:
- Three input fields for manual network configuration:
 - IP address: [Empty text box]
 - Subnet mask: [Empty text box]
 - Gateway: [Empty text box]

At the bottom of the wizard, there are three buttons: "< Previous", "Next >", and "Cancel". The Citrix logo is visible in the bottom-left corner of the window.

RouterOS CHR in XenServer



RouterOS CHR in XenServer

- pana acum am discutat despre beneficiile implementarii in XenServer
- exista si lipsuri:
 - nu este exista un template de RouterOS in Xenserver
 - este posibil ca in anumite versiuni de XenServer interfetele de retea sa nu aiba viteze mai mari de 100Mbps
 - masina virtuala nu migreaza perfect de pe un nod pe altul

RouterOS CHR in Hyper-V

- este cea mai simpla metoda de a testa RouterOS CHR
- din meniul “Turn Windows features on or off”
- cu utilitarul Hyper-V Manager importam imaginea de disk cu formatul .vhdx
- nu uitati sa adaugati mai multe interfete de retea
- configurati adresa de retea , gateway, adaugati o parola, verificati serviciile de retea

RouterOS CHR in Hyper-V

The image shows a screenshot of the 'New Virtual Machine Wizard' dialog box in Windows, specifically the 'Specify Name and Location' step. The dialog box has a title bar with the text 'New Virtual Machine Wizard' and a close button (X) in the top right corner. Below the title bar, there is a sub-header 'Specify Name and Location' with a small icon to its left. On the left side of the dialog, there is a vertical list of steps: 'Before You Begin', 'Specify Name and Location' (which is highlighted with a blue bar), 'Specify Generation', 'Assign Memory', 'Configure Networking', 'Connect Virtual Hard Disk', 'Installation Options', and 'Summary'. The main area of the dialog contains the following text: 'Choose a name and location for this virtual machine.' followed by 'The name is displayed in Hyper-V Manager. We recommend that you use a name that helps you easily identify this virtual machine, such as the name of the guest operating system or workload.' Below this, there is a text input field labeled 'Name:' containing the text 'Router OS CHR'. The next line of text says 'You can create a folder or use an existing folder to store the virtual machine. If you don't select a folder, the virtual machine is stored in the default folder configured for this server.' Below this is a checkbox labeled 'Store the virtual machine in a different location' which is currently unchecked. Underneath the checkbox is a text input field labeled 'Location:' containing the path 'C:\ProgramData\Microsoft\Windows\Hyper-V\' and a 'Browse...' button to its right. At the bottom of the main area, there is a warning icon (a yellow triangle with an exclamation mark) followed by the text: 'If you plan to take checkpoints of this virtual machine, select a location that has enough free space. Checkpoints include virtual machine data and may require a large amount of space.' At the bottom of the dialog box, there are four buttons: '< Previous', 'Next >' (which is highlighted with a blue border), 'Finish', and 'Cancel'.

New Virtual Machine Wizard

Specify Name and Location

Before You Begin

Specify Name and Location

Specify Generation

Assign Memory

Configure Networking

Connect Virtual Hard Disk

Installation Options

Summary

Choose a name and location for this virtual machine.

The name is displayed in Hyper-V Manager. We recommend that you use a name that helps you easily identify this virtual machine, such as the name of the guest operating system or workload.

Name: Router OS CHR

You can create a folder or use an existing folder to store the virtual machine. If you don't select a folder, the virtual machine is stored in the default folder configured for this server.

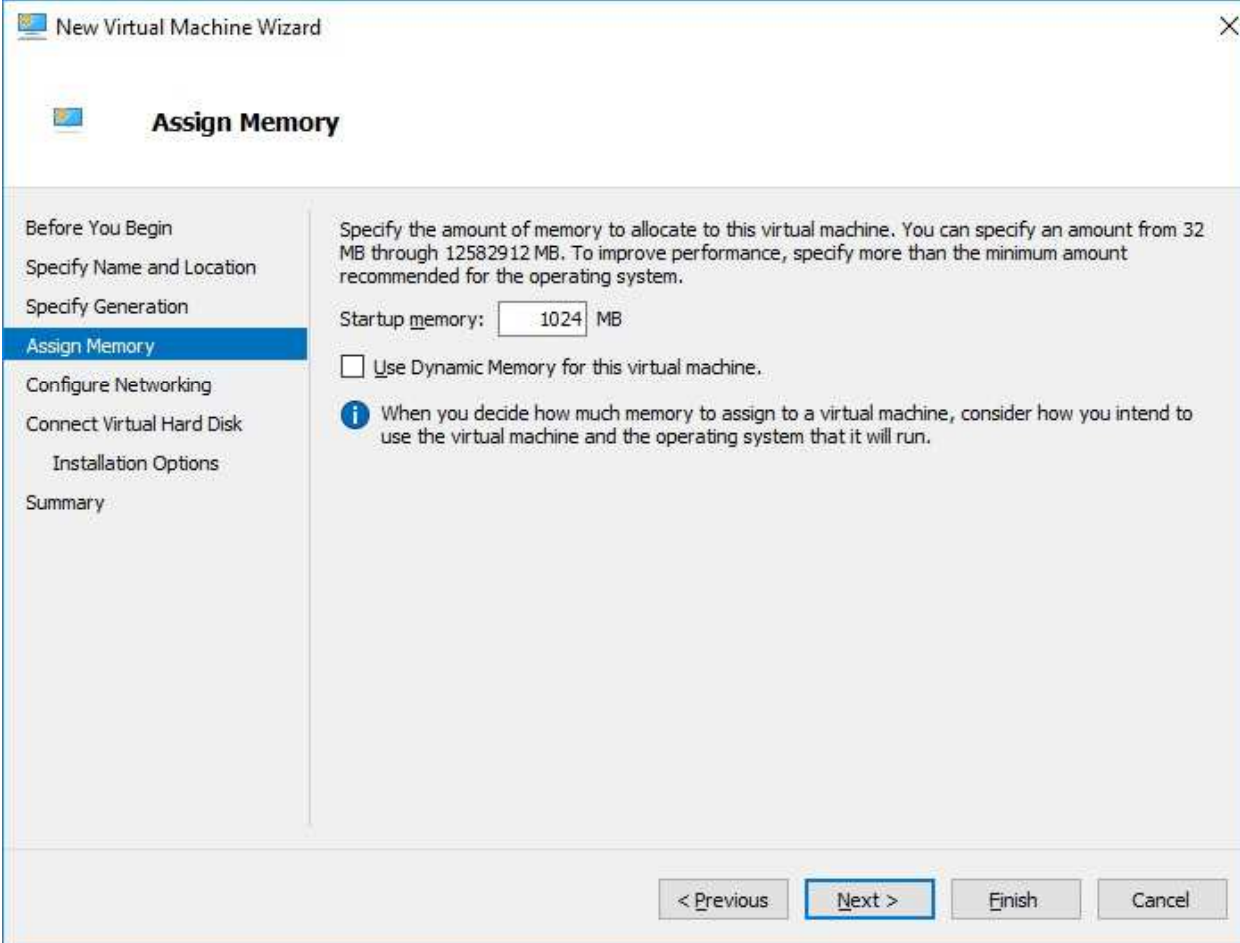
Store the virtual machine in a different location

Location: C:\ProgramData\Microsoft\Windows\Hyper-V\ Browse...

If you plan to take checkpoints of this virtual machine, select a location that has enough free space. Checkpoints include virtual machine data and may require a large amount of space.

< Previous Next > Finish Cancel

RouterOS CHR in Hyper-V



The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Assign Memory' step. The window title is 'New Virtual Machine Wizard' and it has a close button (X) in the top right corner. The main title of the step is 'Assign Memory'. On the left side, there is a navigation pane with the following steps: 'Before You Begin', 'Specify Name and Location', 'Specify Generation', 'Assign Memory' (which is highlighted in blue), 'Configure Networking', 'Connect Virtual Hard Disk', 'Installation Options', and 'Summary'. The main area contains the following text: 'Specify the amount of memory to allocate to this virtual machine. You can specify an amount from 32 MB through 12582912 MB. To improve performance, specify more than the minimum amount recommended for the operating system.' Below this text, there is a 'Startup memory:' label followed by a text box containing '1024' and 'MB'. There is also an unchecked checkbox labeled 'Use Dynamic Memory for this virtual machine.' Below the checkbox, there is an information icon (i) followed by the text: 'When you decide how much memory to assign to a virtual machine, consider how you intend to use the virtual machine and the operating system that it will run.' At the bottom of the window, there are four buttons: '< Previous', 'Next >' (which is highlighted with a blue border), 'Finish', and 'Cancel'.

New Virtual Machine Wizard

Assign Memory

Before You Begin
Specify Name and Location
Specify Generation
Assign Memory
Configure Networking
Connect Virtual Hard Disk
Installation Options
Summary

Specify the amount of memory to allocate to this virtual machine. You can specify an amount from 32 MB through 12582912 MB. To improve performance, specify more than the minimum amount recommended for the operating system.

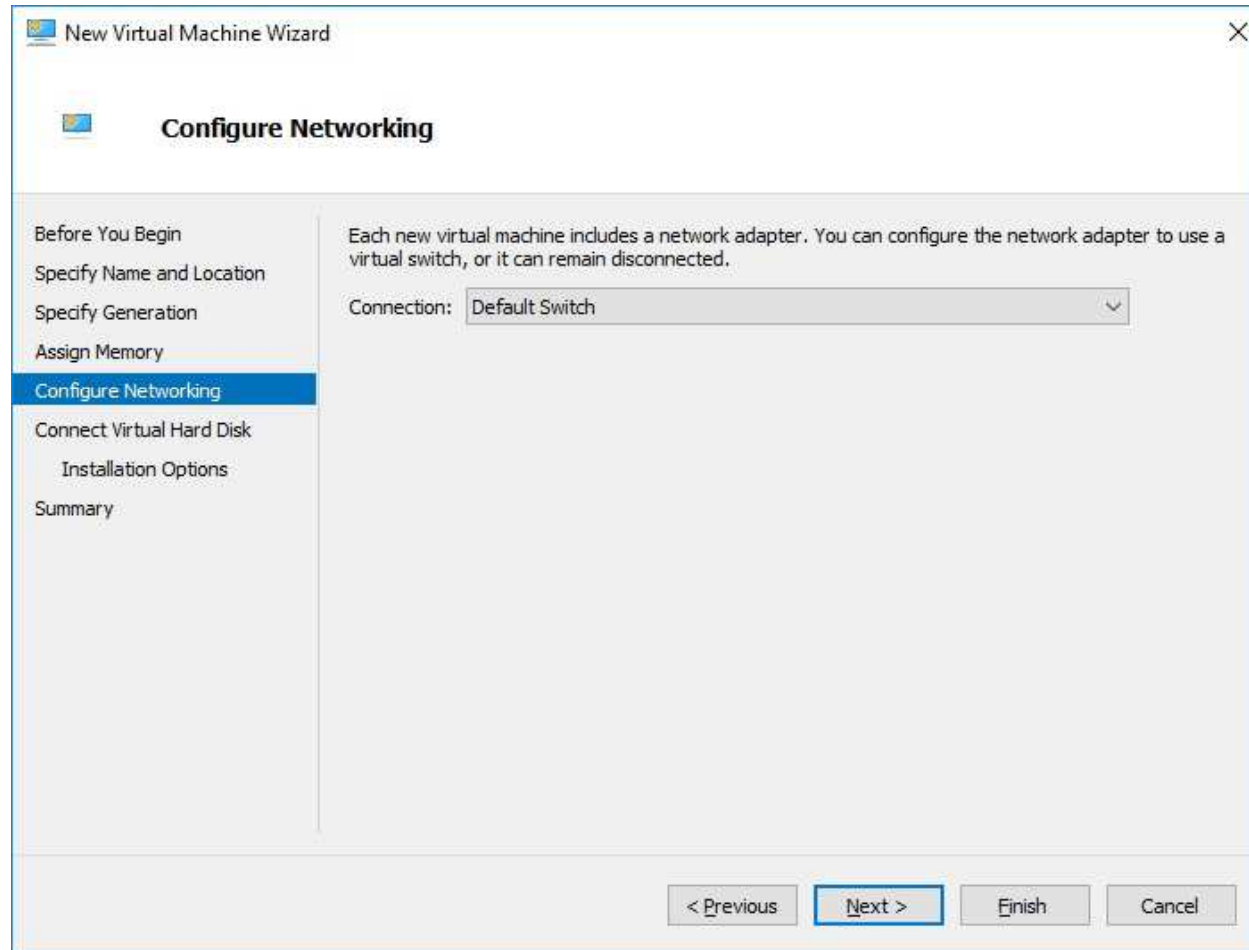
Startup memory: MB

Use Dynamic Memory for this virtual machine.

i When you decide how much memory to assign to a virtual machine, consider how you intend to use the virtual machine and the operating system that it will run.

< Previous **Next >** Finish Cancel

RouterOS CHR in Hyper-V



RouterOS CHR in Hyper-V

The screenshot shows the 'New Virtual Machine Wizard' dialog box, specifically the 'Connect Virtual Hard Disk' step. The window title is 'New Virtual Machine Wizard' and it has a close button in the top right corner. The main title of the step is 'Connect Virtual Hard Disk'. On the left side, there is a navigation pane with the following steps: 'Before You Begin', 'Specify Name and Location', 'Specify Generation', 'Assign Memory', 'Configure Networking', 'Connect Virtual Hard Disk' (which is currently selected and highlighted in blue), and 'Summary'. The main area contains the following text: 'A virtual machine requires storage so that you can install an operating system. You can specify the storage now or configure it later by modifying the virtual machine's properties.' There are three radio button options: 1. 'Create a virtual hard disk' (unselected): 'Use this option to create a VHDX dynamically expanding virtual hard disk.' Below this is a form with 'Name:' set to 'Router OS CHR.vhdx', 'Location:' set to 'C:\Users\Public\Documents\Hyper-V\Virtual Hard Disks\', and 'Size:' set to '1 GB (Maximum: 64 TB)'. There is a 'Browse...' button next to the location field. 2. 'Use an existing virtual hard disk' (selected): 'Use this option to attach an existing virtual hard disk, either VHD or VHDX format.' Below this is a form with 'Location:' set to 'C:\Users\Public\Documents\Hyper-V\Virtual Hard Disks\' and a 'Browse...' button. 3. 'Attach a virtual hard disk later' (unselected): 'Use this option to skip this step now and attach an existing virtual hard disk later.' At the bottom of the dialog, there are four buttons: '< Previous', 'Next >', 'Finish', and 'Cancel'.

New Virtual Machine Wizard

Connect Virtual Hard Disk

Before You Begin
Specify Name and Location
Specify Generation
Assign Memory
Configure Networking
Connect Virtual Hard Disk
Summary

A virtual machine requires storage so that you can install an operating system. You can specify the storage now or configure it later by modifying the virtual machine's properties.

Create a virtual hard disk
Use this option to create a VHDX dynamically expanding virtual hard disk.

Name: Router OS CHR.vhdx
Location: C:\Users\Public\Documents\Hyper-V\Virtual Hard Disks\ Browse...
Size: 1 GB (Maximum: 64 TB)

Use an existing virtual hard disk
Use this option to attach an existing virtual hard disk, either VHD or VHDX format.

Location: C:\Users\Public\Documents\Hyper-V\Virtual Hard Disks\ Browse...

Attach a virtual hard disk later
Use this option to skip this step now and attach an existing virtual hard disk later.

< Previous Next > Finish Cancel

RouterOS CHR in Hyper-V

The screenshot displays the WinBox interface for RouterOS CHR. The window title is "admin@192.168.54.101 (MikroTik) - WinBox v6.43.4 on CHR (x86_64)". The interface includes a navigation menu on the left with options like Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, Dude, Make Supout.rif, Manual, and New WinBox. The main area shows the "Resources" window with the following data:

Resource	Value
Uptime	00:02:28
Free Memory	943.1 MiB
Total Memory	976.0 MiB
CPU	Intel(R)
CPU Count	1
CPU Frequency	2593 MHz
CPU Load	0 %
Free HDD Space	69.3 MiB
Total HDD Size	95.3 MiB
Sector Writes Since Reboot	464
Total Sector Writes	465
Architecture Name	x86_64
Board Name	CHR
Version	6.43.4 (stable)
Build Time	Oct/17/2018 06:37:48

Navigation buttons on the right include OK, PCI, USB, CPU, IRQ, RPS, and Hardware.

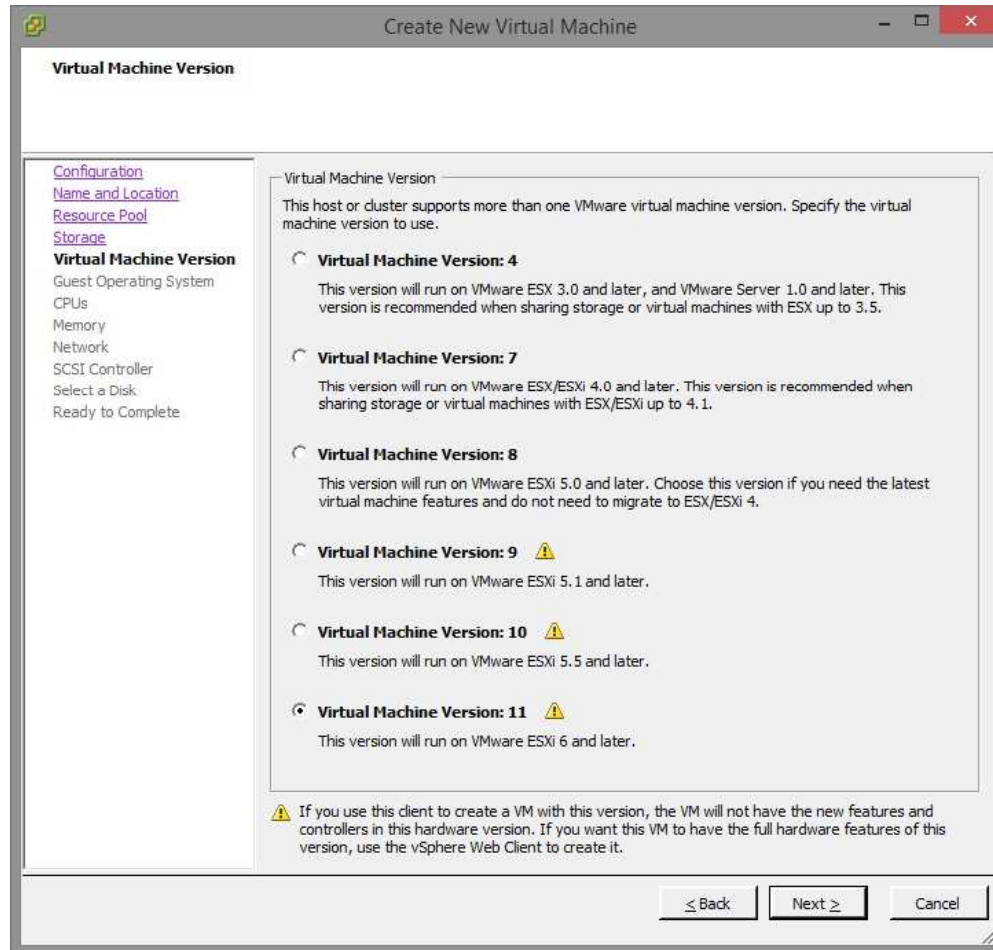
RouterOS CHR in Hyper-V

- Hyper-V avantaje:
 - nu necesita componente hardware dedicate
 - viteza VM RouterOS CHR
 - poate migra intre host-uri
- Hyper-V dezavantaje:
 - trebuie sa ai o licenta pentru Windows
 - uneori virtual switch-urile din Hyper-V

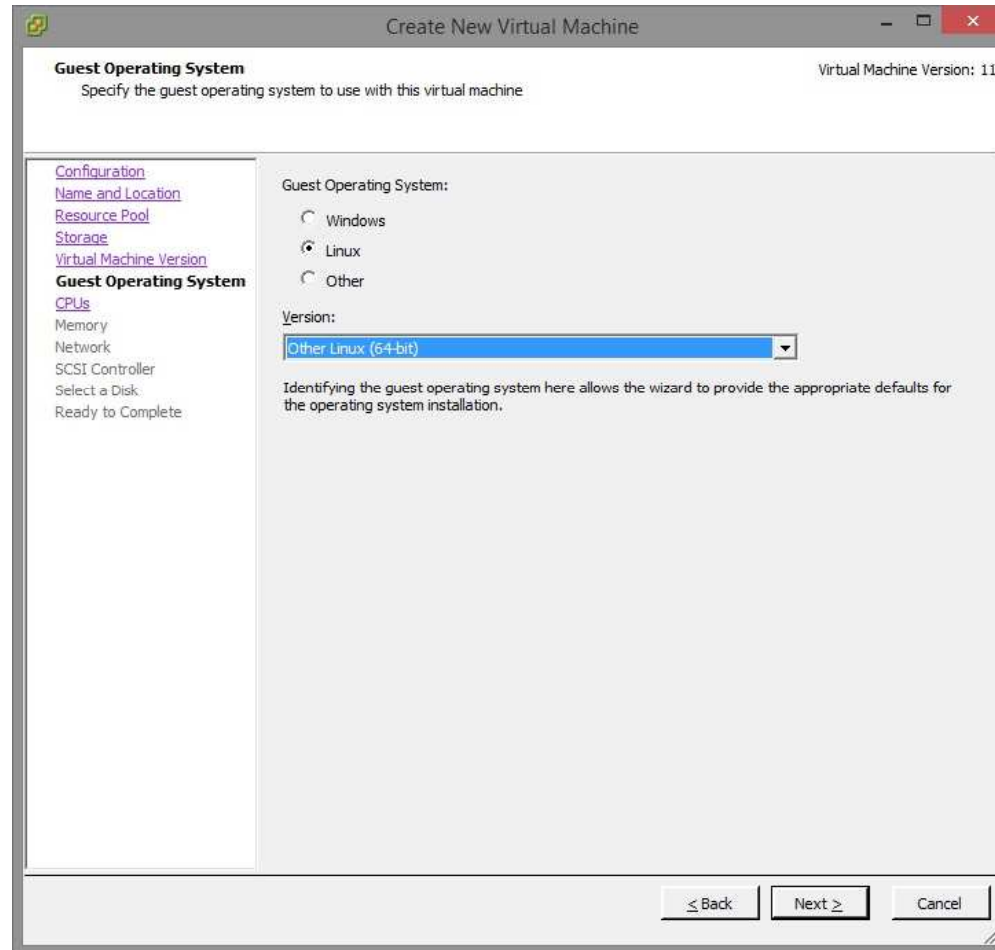
RouterOS CHR in VMware

- folosim imagine .vmdk
- pe care o incarcam in datastore
- adaugam interfete de retea (minim 2)
- configurati : Parola, adrese ip si gateway
- `ip address add address=... / . .
interface=etherX`
- `ip route add gateway=...`

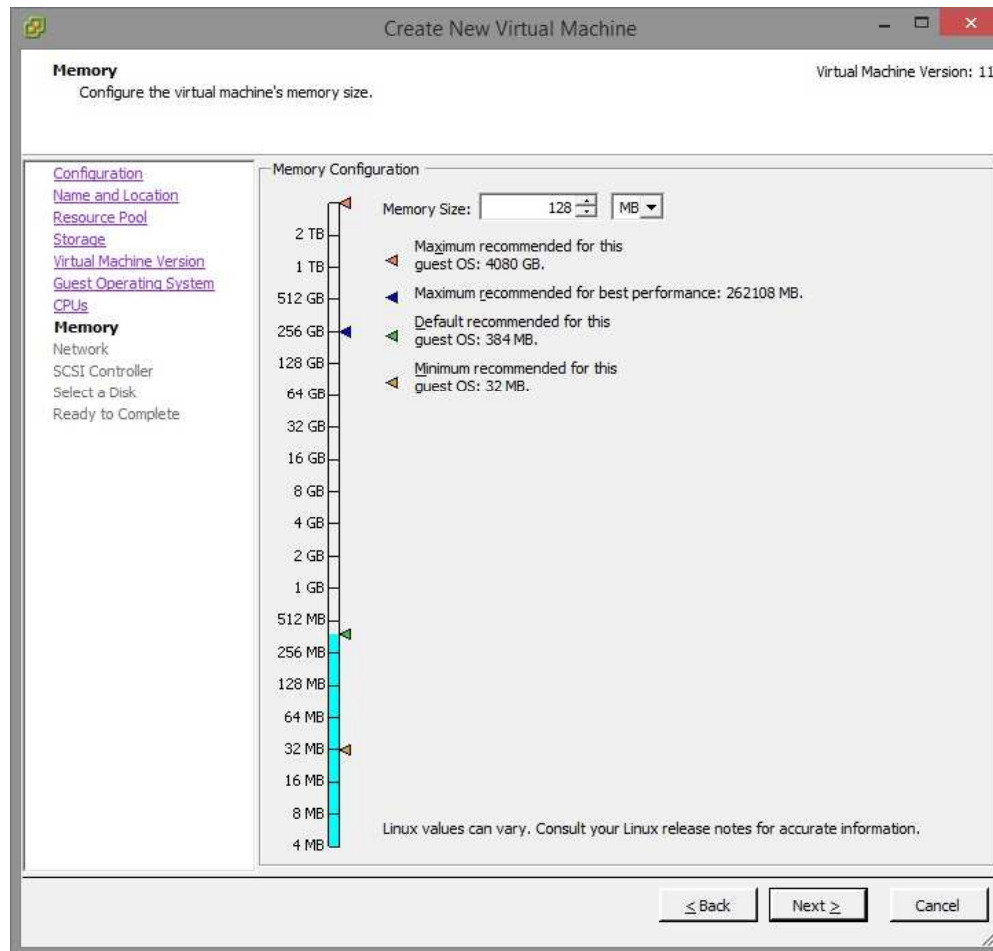
RouterOS CHR in VMware



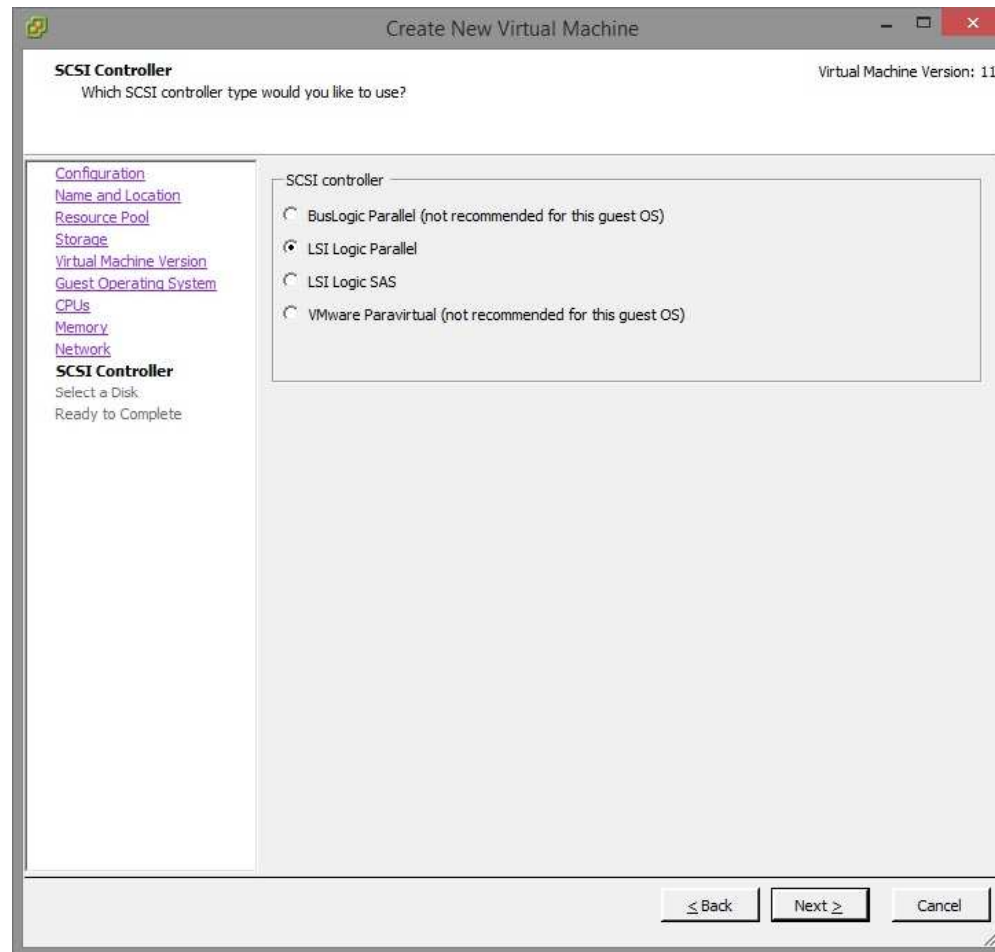
RouterOS CHR in VMware



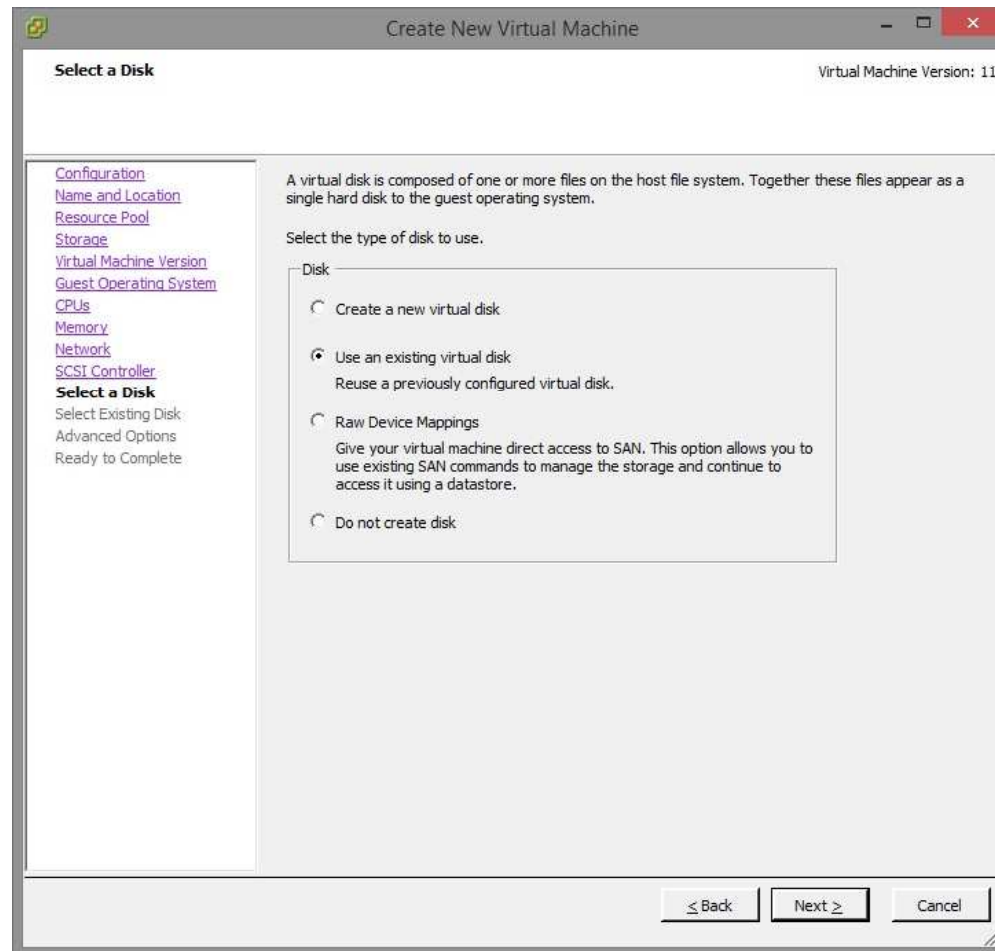
RouterOS CHR in VMware



RouterOS CHR in VMware



RouterOS CHR in VMware



RouterOS CHR in VMware

- VMware avantaje:
 - cea mai consacrată soluție de virtualizare
 - hipervizorul cu cea mai bună stabilitate
 - un standard în industrie
 - soluție storage tip hiperconvergent vSan – VxRail
- VMware dezavantaje:
 - preț mare pentru licențiere
 - nu este cea mai rapidă soluție de virtualizare

RouterOS CHR in Proxmox VE

- trebuie sa copiem imaginea .vmdk in hipervizor
- cream din linie de comanda vm:
– `qm create 100 --net0 virtio --net1 virtio`
- importam imaginea de disk in vm:
– `qm importdisk 100 chr-6.43.4.vmdk local-lvm`
- Ca si pana acum: parola , adrese, gateway

RouterOS CHR in Proxmox VE

The screenshot displays the Proxmox VE web interface. At the top, the logo 'PROXMOX' is followed by 'Virtual Environment 5.2-1' and a search bar. The main content area is titled 'Virtual Machine 100 (RouterOS) on node 'pve''. On the left, a sidebar shows a tree view with 'Datacenter' expanded to 'pve', where '100 (VM 100)' is selected. Below this, 'local (pve)' and 'local-lvm (pve)' are listed. The central panel has a menu on the left with 'Hardware' selected. To the right of the menu are buttons: 'Add', 'Remove', 'Edit', 'Resize disk', 'Move disk', and 'Revert'. The main configuration area shows a table of hardware components:

Component	Value
Keyboard Layout	Default
Memory	512.00 MiB
Processors	1 (1 sockets, 1 cores)
Display	Default
Network Device (net0)	virtio=76:E7:7E:29:46:F4
Network Device (net1)	virtio=66:4D:66:F0:D1:0E
Unused Disk 0	local-lvm:vm-100-disk-1

RouterOS CHR in Proxmox VE

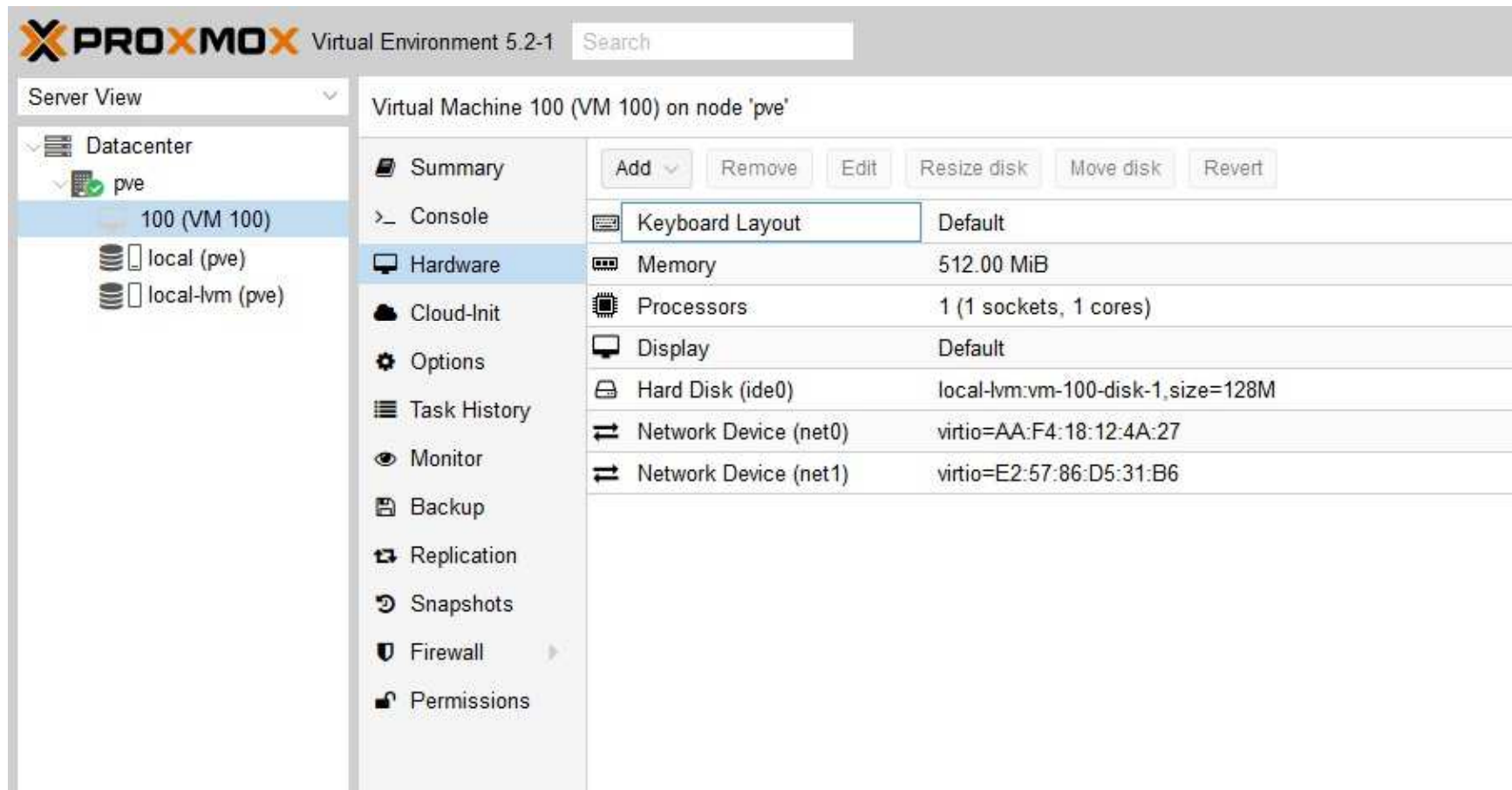
- adaugam diskul importat la vm



The screenshot shows a dialog box titled "Add: Unused Disk" with a close button in the top right corner. The dialog contains the following fields and controls:

- Bus/Device:** A dropdown menu set to "IDE" and a numeric input field set to "0".
- Cache:** A dropdown menu set to "Default (No cache)".
- Disk image:** A dropdown menu set to "local-lvm:vm-100-disk-1".
- Help:** A button with a question mark icon and the text "Help".
- Advanced:** A checkbox labeled "Advanced" which is currently unchecked.
- Add:** A blue button labeled "Add".

RouterOS CHR in Proxmox VE

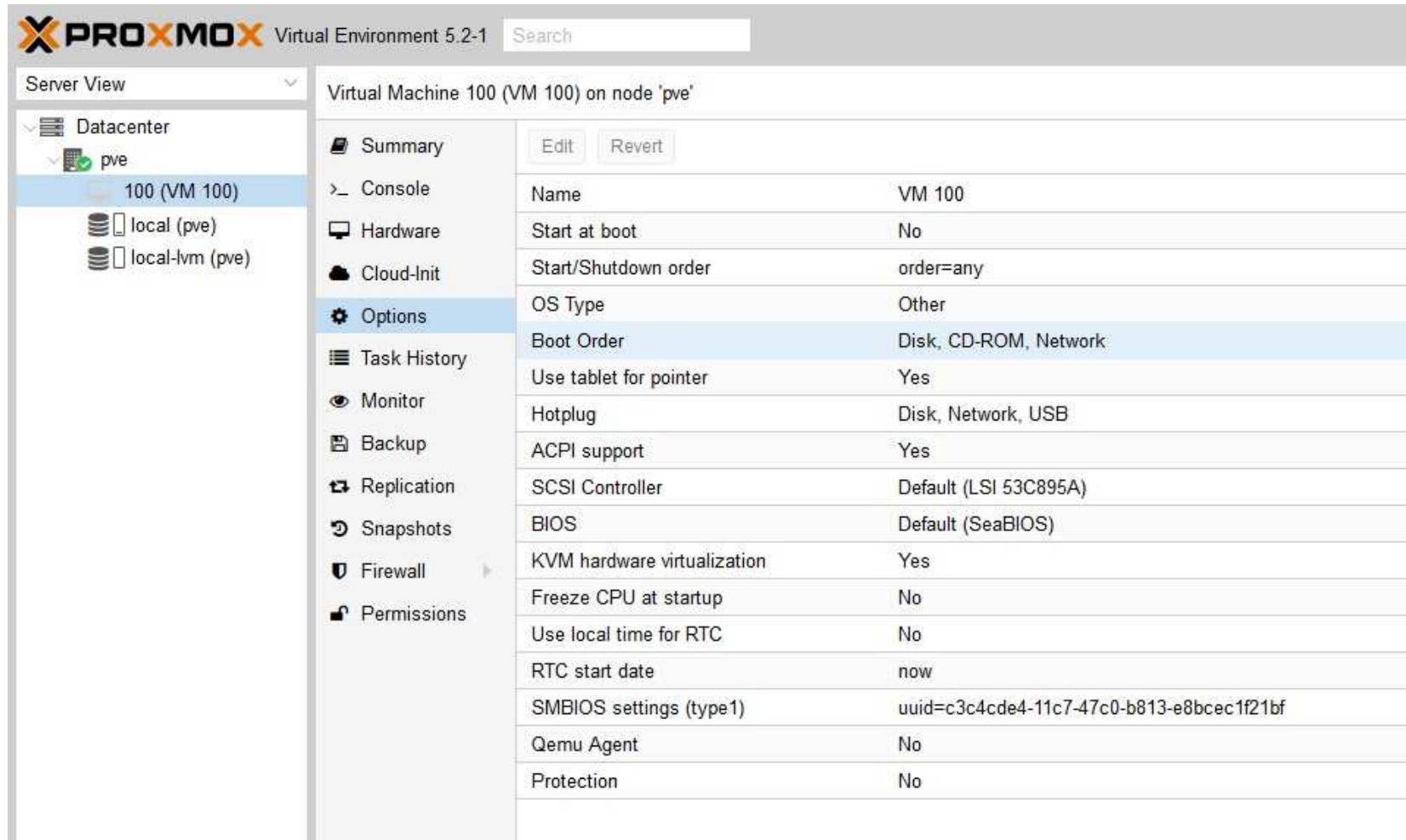


The screenshot displays the Proxmox VE interface for configuring a Virtual Machine (VM 100) on node 'pve'. The interface is divided into several sections:

- Header:** Proxmox Virtual Environment 5.2-1 with a search bar.
- Left Sidebar (Server View):** Shows a tree structure with 'Datacenter' expanded to 'pve', where '100 (VM 100)' is selected. Below it are 'local (pve)' and 'local-lvm (pve)' storage options.
- VM Configuration Panel:** Titled 'Virtual Machine 100 (VM 100) on node 'pve'', it includes a 'Summary' tab and a list of actions: Add, Remove, Edit, Resize disk, Move disk, and Revert.
- Hardware Configuration Table:** A table listing VM hardware components and their settings.

Component	Value
Keyboard Layout	Default
Memory	512.00 MiB
Processors	1 (1 sockets, 1 cores)
Display	Default
Hard Disk (ide0)	local-lvm:vm-100-disk-1,size=128M
Network Device (net0)	virtio=AA:F4:18:12:4A:27
Network Device (net1)	virtio=E2:57:86:D5:31:B6

RouterOS CHR in Proxmox VE



The screenshot displays the Proxmox VE web interface. The top header shows the Proxmox logo and version 5.2-1. The left sidebar shows a tree view of the datacenter with a node named 'pve' containing VM 100 and two local storage volumes. The main panel shows the configuration for VM 100, with the 'Options' tab selected. The configuration table lists various settings for the VM.

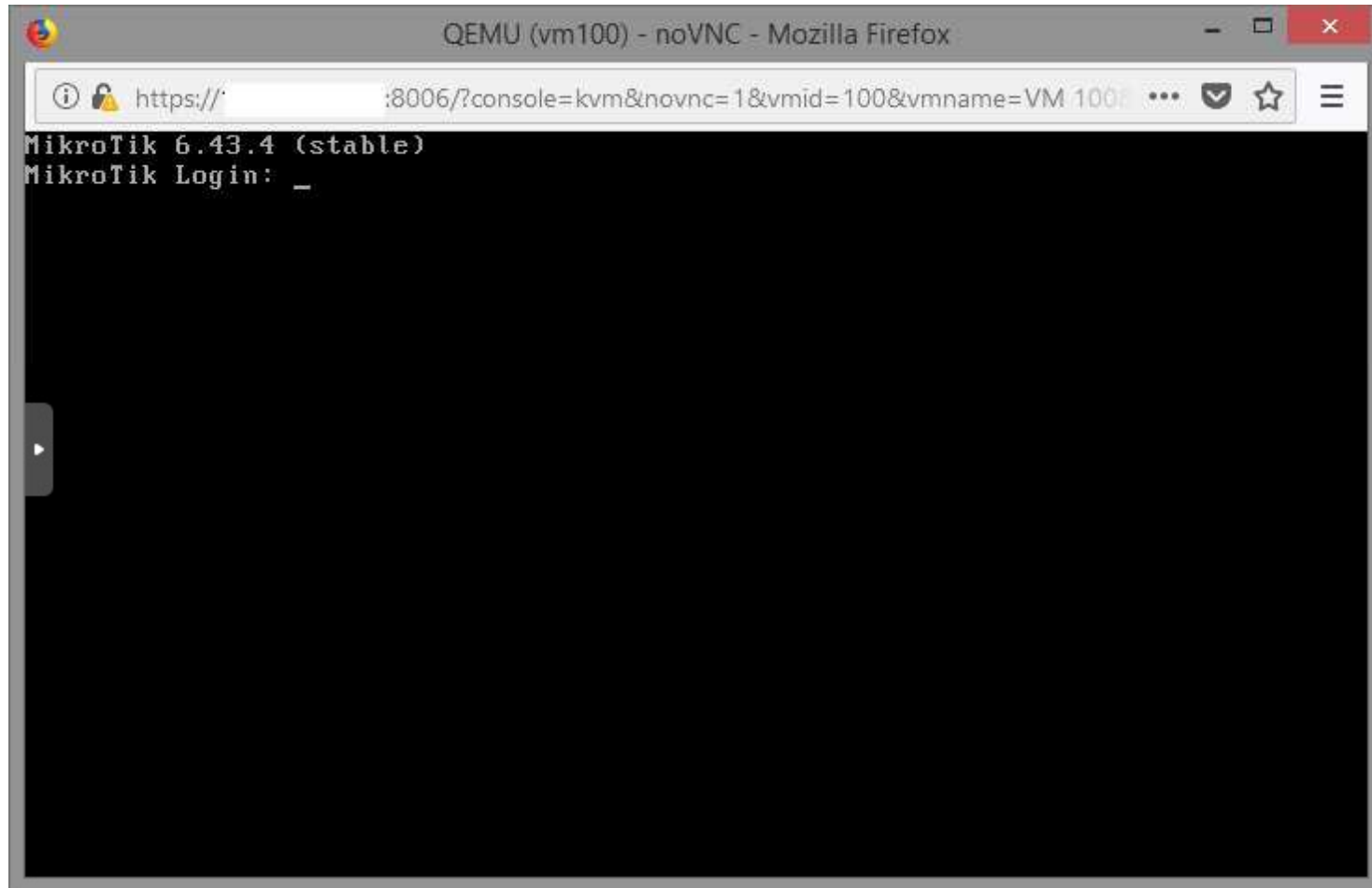
Setting	Value
Name	VM 100
Start at boot	No
Start/Shutdown order	order=any
OS Type	Other
Boot Order	Disk, CD-ROM, Network
Use tablet for pointer	Yes
Hotplug	Disk, Network, USB
ACPI support	Yes
SCSI Controller	Default (LSI 53C895A)
BIOS	Default (SeaBIOS)
KVM hardware virtualization	Yes
Freeze CPU at startup	No
Use local time for RTC	No
RTC start date	now
SMBIOS settings (type1)	uuid=c3c4cde4-11c7-47c0-b813-e8bcec1f21bf
Qemu Agent	No
Protection	No

RouterOS CHR in Proxmox VE

- modificam disk boot order



RouterOS CHR in Proxmox VE



RouterOS CHR in Proxmox VE

- avantaje Proxmox:
 - solutie open-source cu hiperconvergenta
 - cu 3 PC-uri cu 2 eth si 2 hdd avem redundanta completa
 - fiecare nod poate fi utilizat pentru administrare
- dezavantaje Proxmox:
 - imaginea se copiaza , se importa relativ greu
 - nu exista foarte multe implementari cu Proxmox

Tabel comparativ

Hipervizor	SO	Licenta	Virtual SAN	Management
XenServer	Linux	GNU GPLv2+	Nu nativ	Aplicatie
VMware	Linux	Proprietara	vSAN	Aplicatie /web
Proxmox	Linux	AGPLv3	Ceph	Web
Hyper-V	Windows	Proprietara	SDS	Aplicatie

Intrebari?