

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

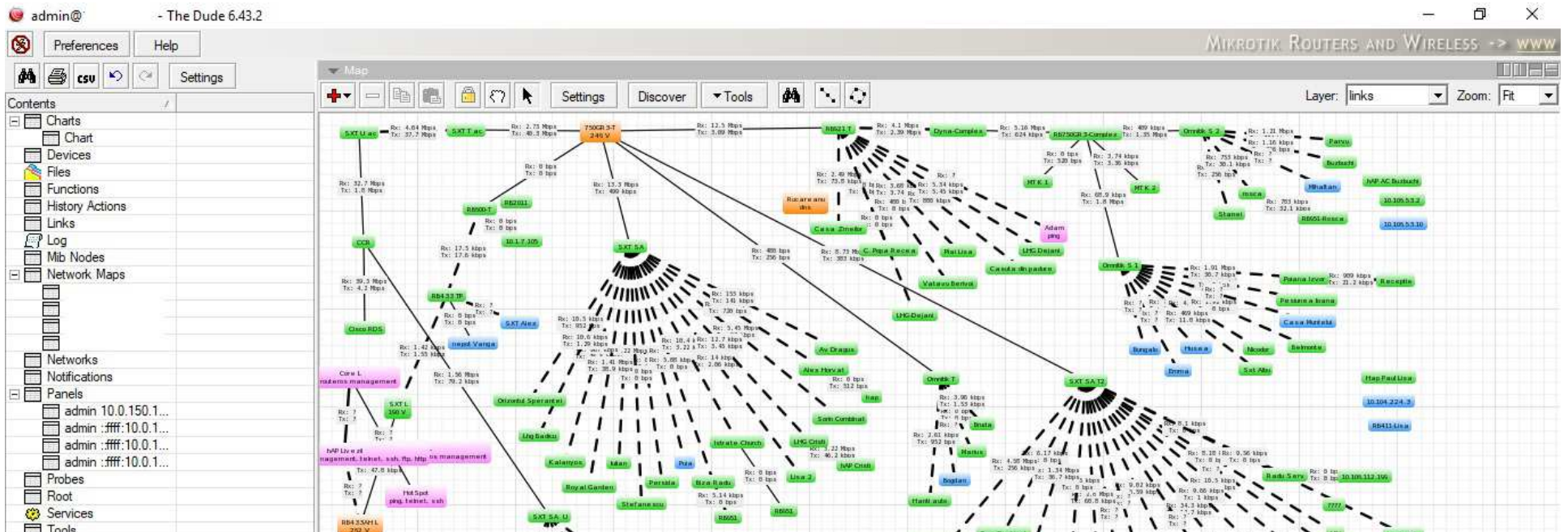
- viteza de implementare
- toate capabilitatile RouterOS fara sa cumperi un router
- posibilitatea creeri unui sistem de monitorizare The Dude
- putem folosi RouterOS VM cu rolul de concentrator PPPoE
- RouterOS VM cu rolul de UserManager
- RouterOS CHR NAT

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



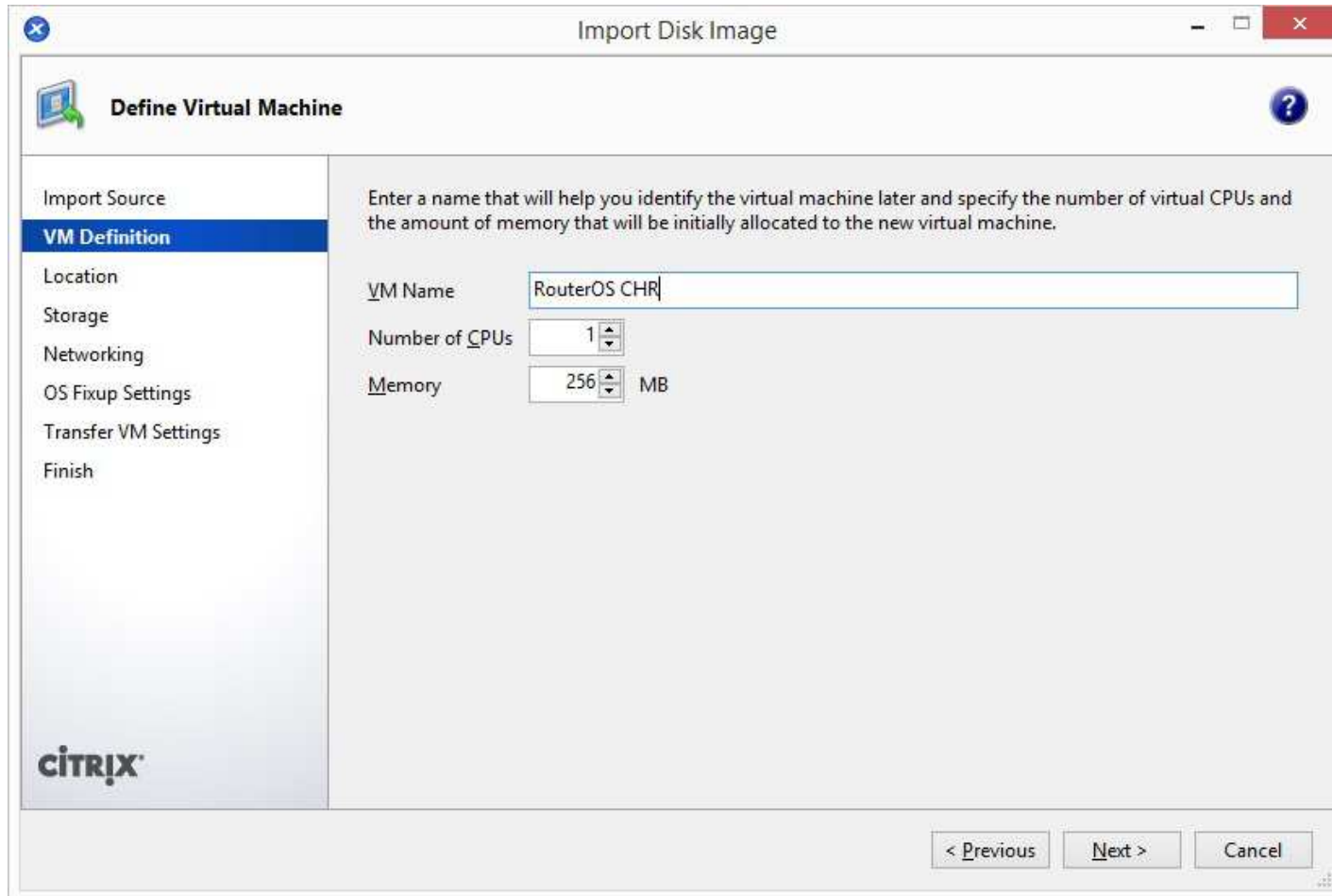
RouterOS – concentrator PPPoE

- 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' window in XenServer. The 'Define Virtual Machine' step is active, showing a list of configuration options on the left and a description on the right. The 'VM Name' is set to 'RouterOS CHR', 'Number of CPUs' is 1, and 'Memory' is 256 MB. The Citrix logo is visible in the bottom left corner of the window.

Import Disk Image

Define Virtual Machine

Import Source

VM Definition

Location

Storage

Networking

OS Fixup Settings

Transfer VM Settings

Finish

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

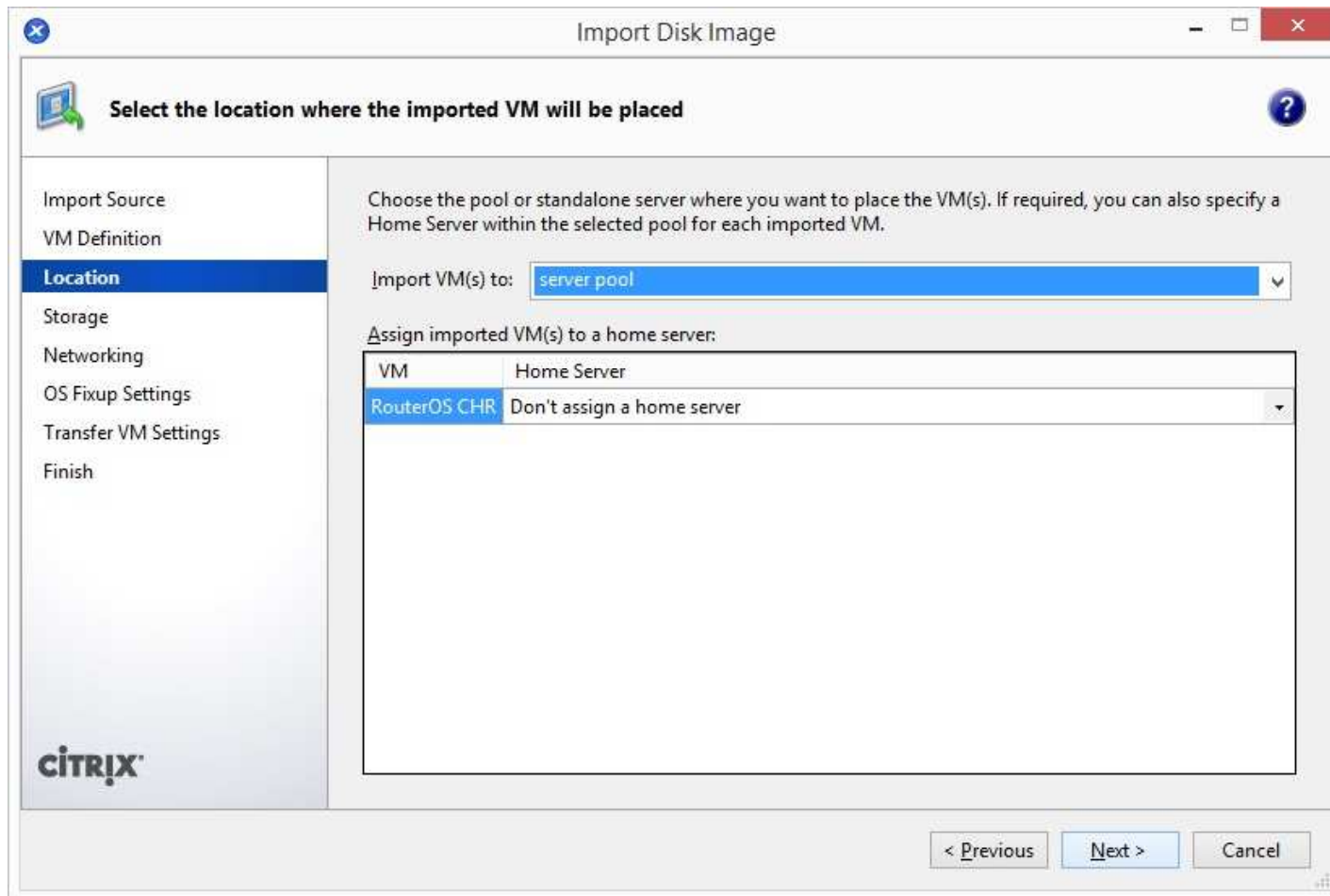
Number of CPUs 1

Memory 256 MB

CITRIX

< Previous Next > Cancel

RouterOS CHR in XenServer



The screenshot shows the 'Import Disk Image' wizard in Citrix XenServer. The 'Location' step is selected in the left-hand navigation pane. The main area displays instructions for choosing a pool or standalone server. The 'Import VM(s) to:' dropdown is set to 'server pool'. Below, the 'Assign imported VM(s) to a home server:' section contains a table with two rows: 'VM' and 'Home Server'. The first row is 'RouterOS CHR' and the second row is 'Don't assign a home server'. The Citrix logo is visible in the bottom left corner of the wizard. Navigation buttons at the bottom right include '< Previous', 'Next >', and 'Cancel'.

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

Import Disk Image

Select network to connect VM

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

Map the virtual network interfaces in the VMs you are importing to networks in the destination pool or standalone server.

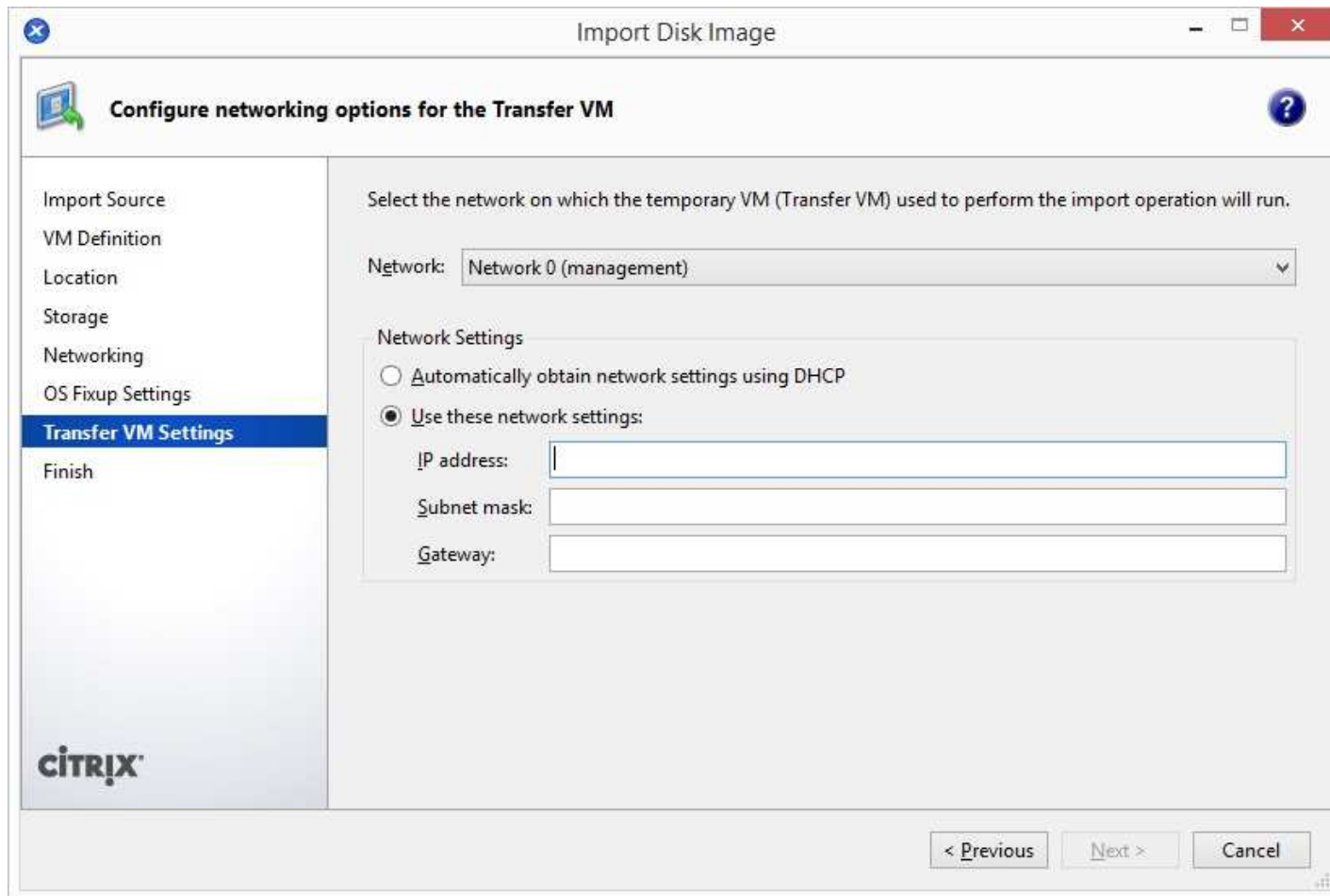
Virtual network interfaces in imported VMs:

VM - Virtual Network Interface	Target Network
RouterOS CHR - Network 0 (<autogenerated MAC>)	Network 0

CITRIX

< Previous Next > Cancel

RouterOS CHR in XenServer



The screenshot shows the 'Import Disk Image' window in Citrix XenServer. The left sidebar contains a list of steps: Import Source, VM Definition, Location, Storage, Networking, OS Fixup Settings, **Transfer VM Settings** (highlighted), and Finish. The main area is titled 'Configure networking options for the Transfer VM'. It includes a dropdown menu for 'Network' set to 'Network 0 (management)'. Under 'Network Settings', the radio button for 'Use these network settings:' is selected, with input fields for IP address, Subnet mask, and Gateway. The Citrix logo is in the bottom left, and navigation buttons (< Previous, Next >, Cancel) are in the bottom right.

Import Disk Image

Configure networking options for the Transfer VM

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

Select the network on which the temporary VM (Transfer VM) used to perform the import operation will run.

Network: Network 0 (management)

Network Settings

☐ Automatically obtain network settings using DHCP

☒ Use these network settings:

IP address:

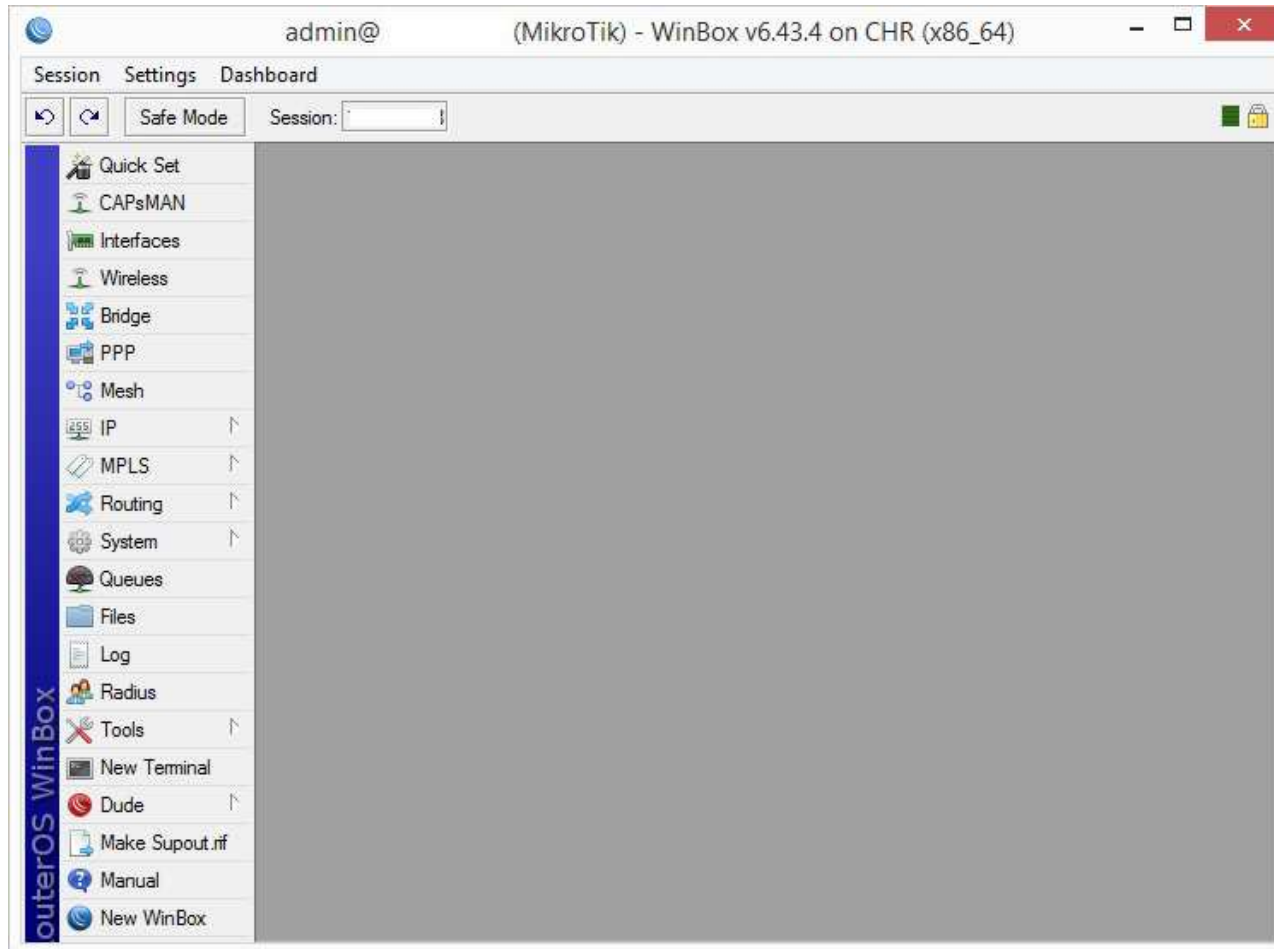
Subnet mask:

Gateway:

CITRIX

< Previous Next > Cancel

RouterOS CHR in XenServer



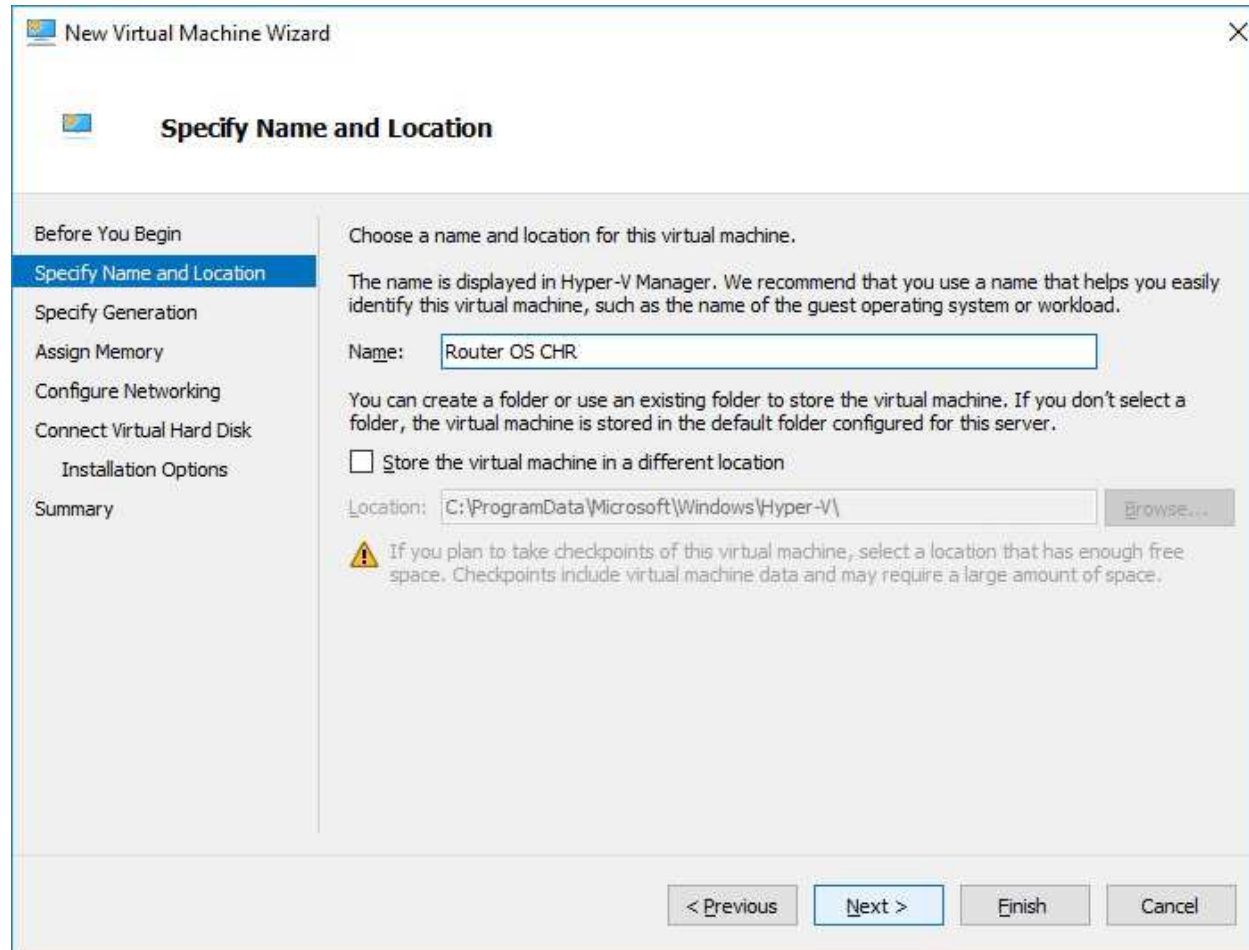
RouterOS CHR in XenServer

- 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 screenshot shows the 'New Virtual Machine Wizard' window with the 'Specify Name and Location' step selected. The left sidebar lists the steps: 'Before You Begin', 'Specify Name and Location' (highlighted), 'Specify Generation', 'Assign Memory', 'Configure Networking', 'Connect Virtual Hard Disk', 'Installation Options', and 'Summary'. The main area contains instructions for naming and locating the VM. The 'Name' field is set to 'Router OS CHR'. The 'Location' field is set to 'C:\ProgramData\Microsoft\Windows\Hyper-V\'. A warning icon and text advise selecting a location with enough free space for checkpoints. Navigation buttons at the bottom include '< Previous', 'Next >', '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.

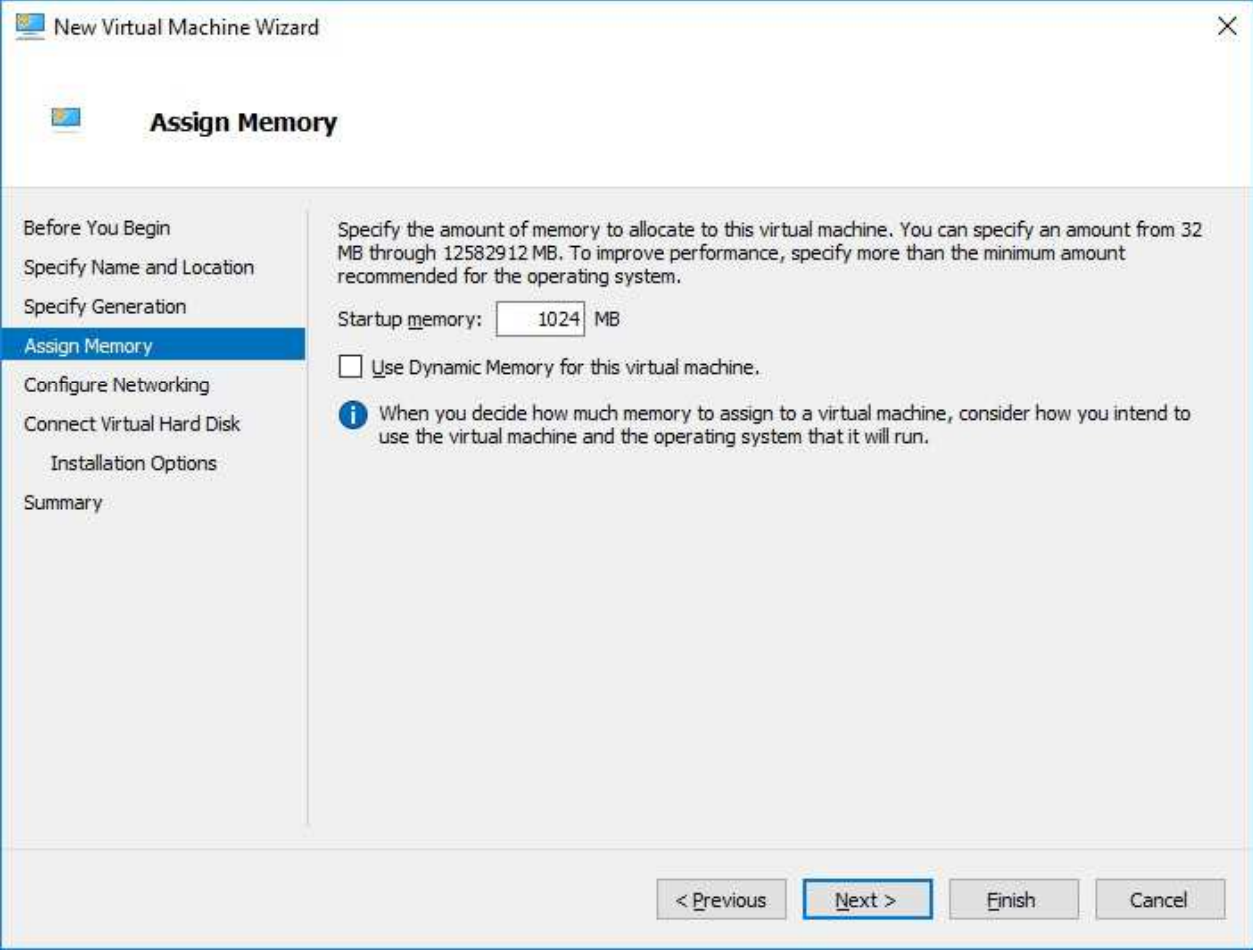
☐ Store the virtual machine in a different location

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



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

New Virtual Machine Wizard

Configure Networking

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

Each new virtual machine includes a network adapter. You can configure the network adapter to use a virtual switch, or it can remain disconnected.

Connection: Default Switch

< Previous **Next >** Finish Cancel

RouterOS CHR in Hyper-V

The screenshot shows the 'New Virtual Machine Wizard' window in Hyper-V. The title bar reads 'New Virtual Machine Wizard'. The main heading is 'Connect Virtual Hard Disk'. On the left, a sidebar lists the steps: 'Before You Begin', 'Specify Name and Location', 'Specify Generation', 'Assign Memory', 'Configure Networking', 'Connect Virtual Hard Disk' (which is highlighted in blue), and 'Summary'. The main area contains instructions and three radio button options. The first option, 'Create a virtual hard disk', is unselected. The second option, 'Use an existing virtual hard disk', is selected. The third option, 'Attach a virtual hard disk later', is unselected. At the bottom, 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)

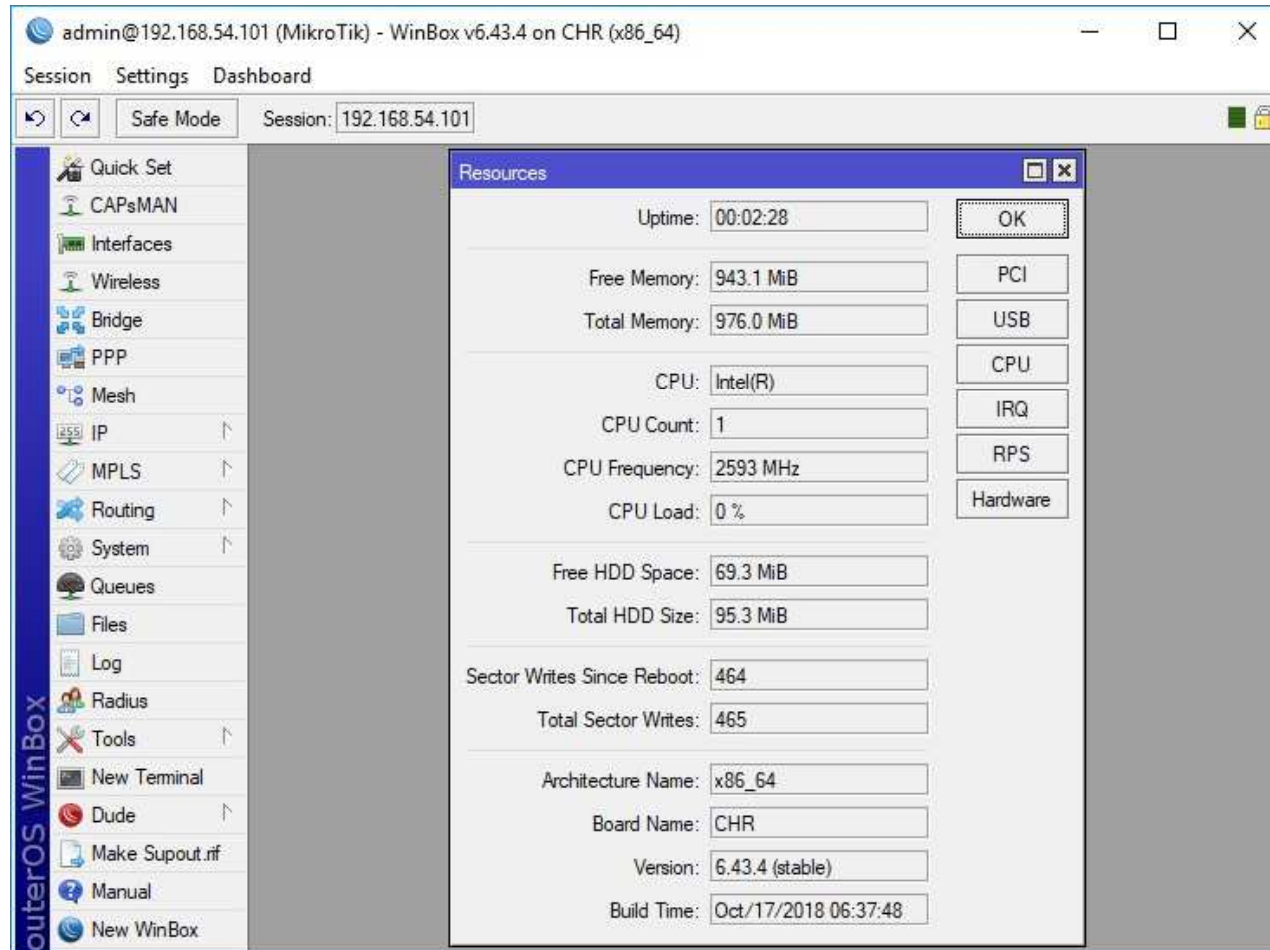
☒ Use an existing virtual hard disk
Use this option to attach an existing virtual hard disk, either VHD or VHDX format.

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



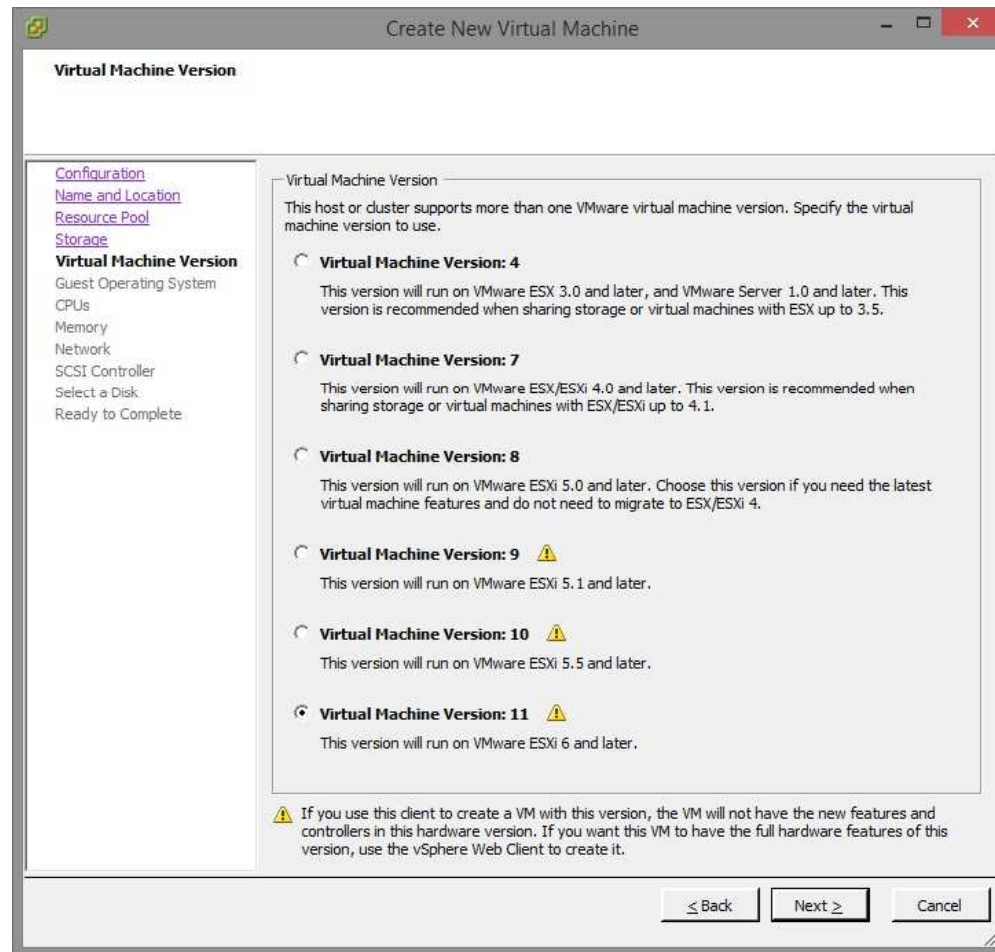
RouterOS CHR in Hyper-V

- 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

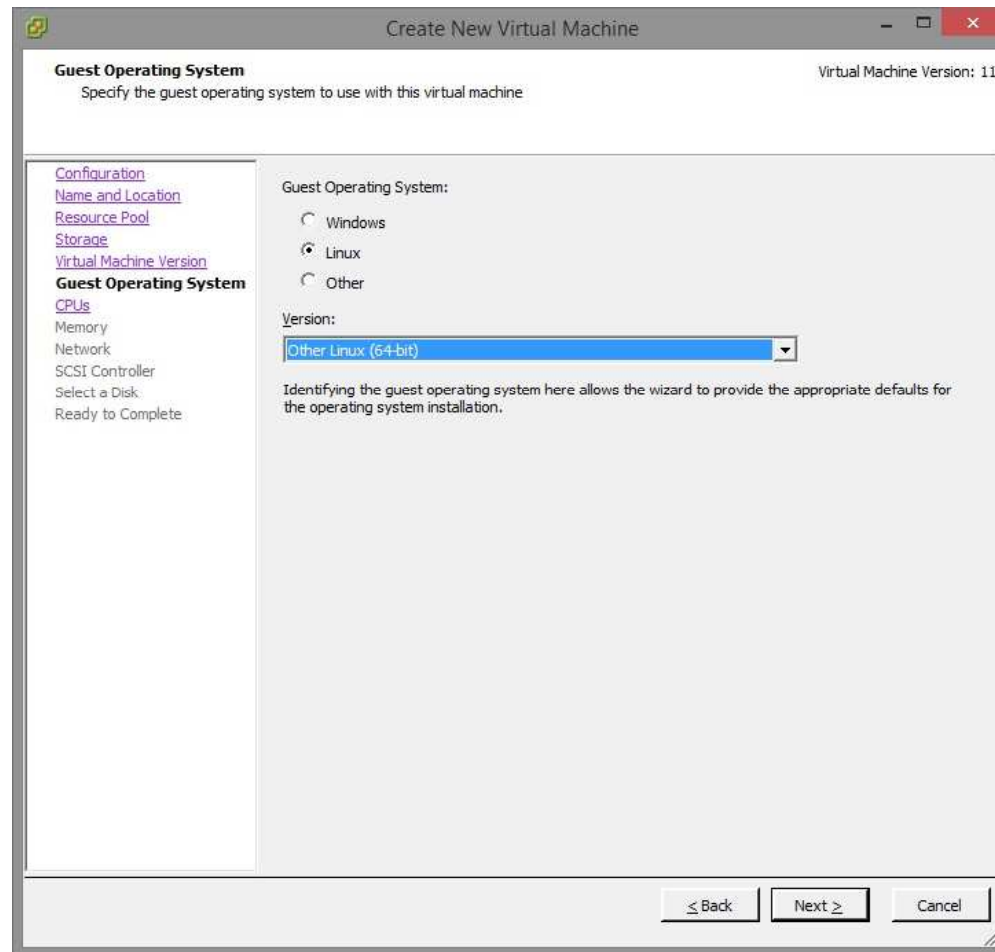
RouterOS CHR in VMware

- 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=...`

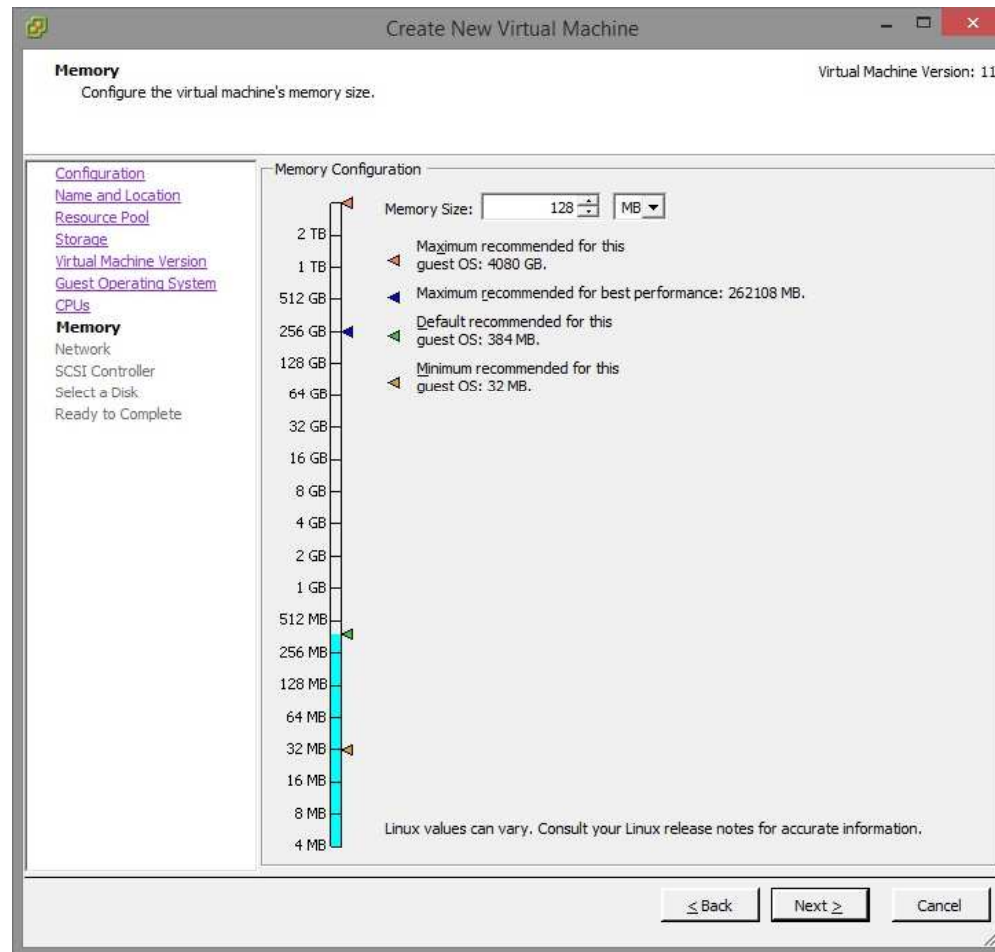
RouterOS CHR in VMware



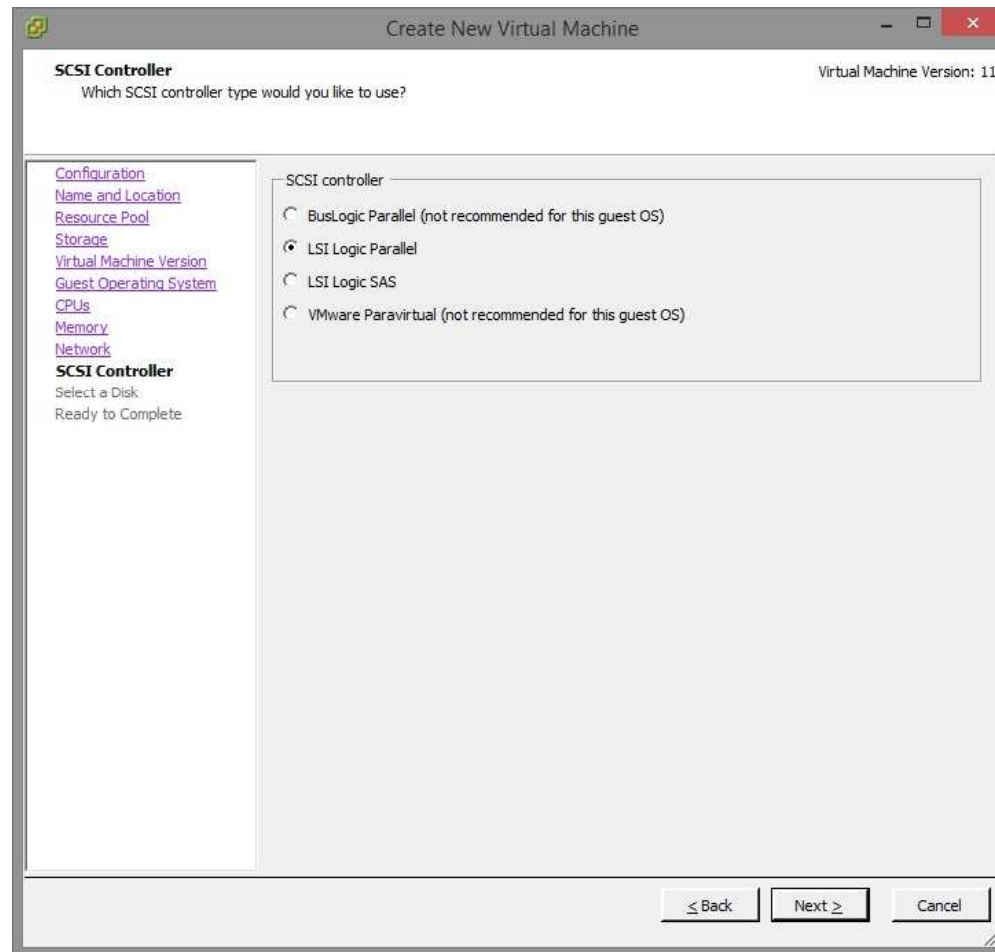
RouterOS CHR in VMware



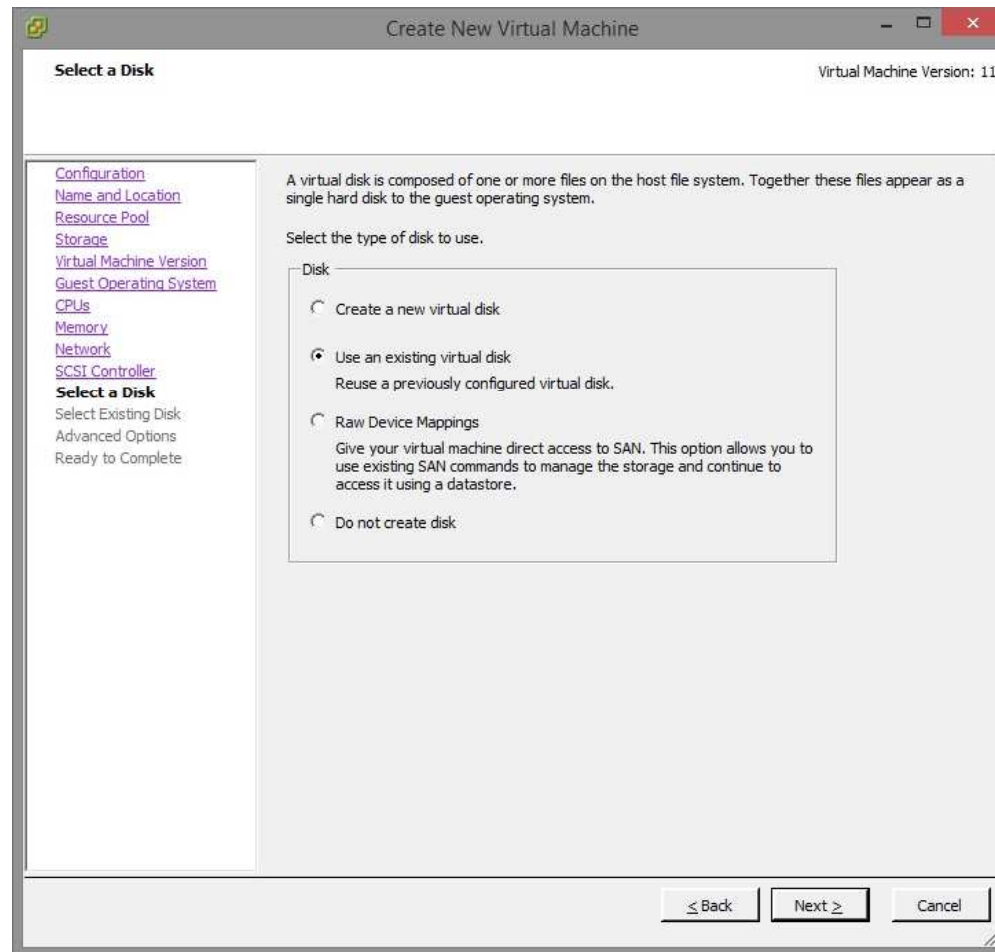
RouterOS CHR in VMware



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:
 - prețul 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

PROXMOX Virtual Environment 5.2-1

Server View

Datacenter

- pve
 - 100 (VM 100)
 - local (pve)
 - local-lvm (pve)

Virtual Machine 100 (RouterOS) on node 'pve'

Summary

Console

Hardware

Cloud-Init

Options

Task History

Monitor

Backup

Replication

Snapshots

Firewall

Permissions

Add Remove Edit Resize disk Move disk Revert

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

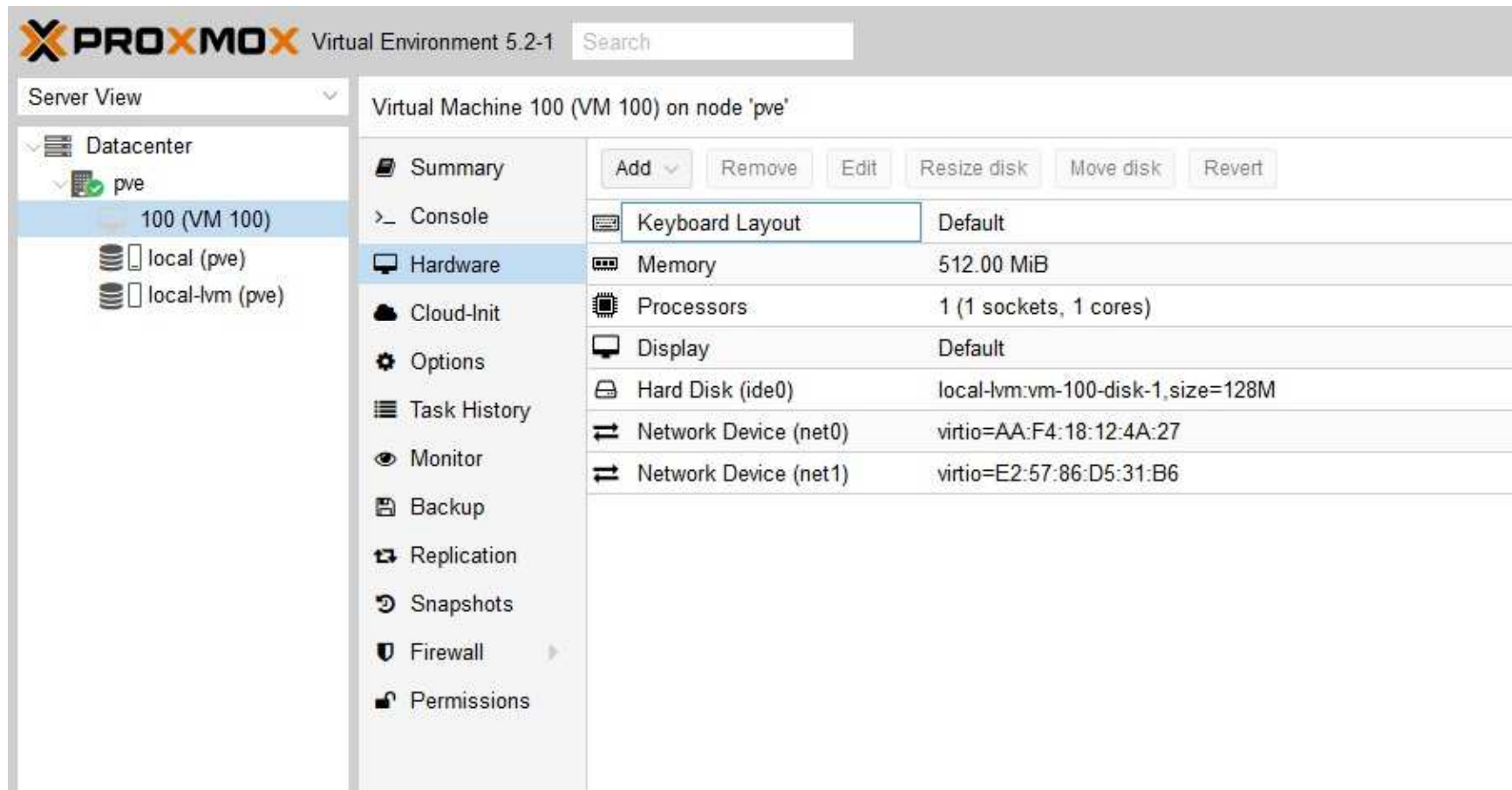


The screenshot shows a dialog box titled "Add: Unused Disk" with a close button in the top right corner. The dialog contains the following fields:

- 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".

At the bottom of the dialog, there is a "Help" button with a question mark icon, an "Advanced" checkbox which is currently unchecked, and a blue "Add" button.

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 the 'Server View' with a tree structure: 'Datacenter' > 'pve' > '100 (VM 100)'. Below '100 (VM 100)' are 'local (pve)' and 'local-lvm (pve)'. The main content area is titled 'Virtual Machine 100 (VM 100) on node 'pve''. It features a left-hand menu with options: Summary, Console, Hardware (selected), Cloud-Init, Options, Task History, Monitor, Backup, Replication, Snapshots, Firewall, and Permissions. To the right of the menu is a table of hardware components. Above the table are buttons: 'Add', 'Remove', 'Edit', 'Resize disk', 'Move disk', and 'Revert'. The table lists the following components:

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

PROXMOX Virtual Environment 5.2-1

Server View

- Datcenter
 - pve
 - 100 (VM 100)
 - local (pve)
 - local-lvm (pve)

Virtual Machine 100 (VM 100) on node 'pve'

Summary

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

Options

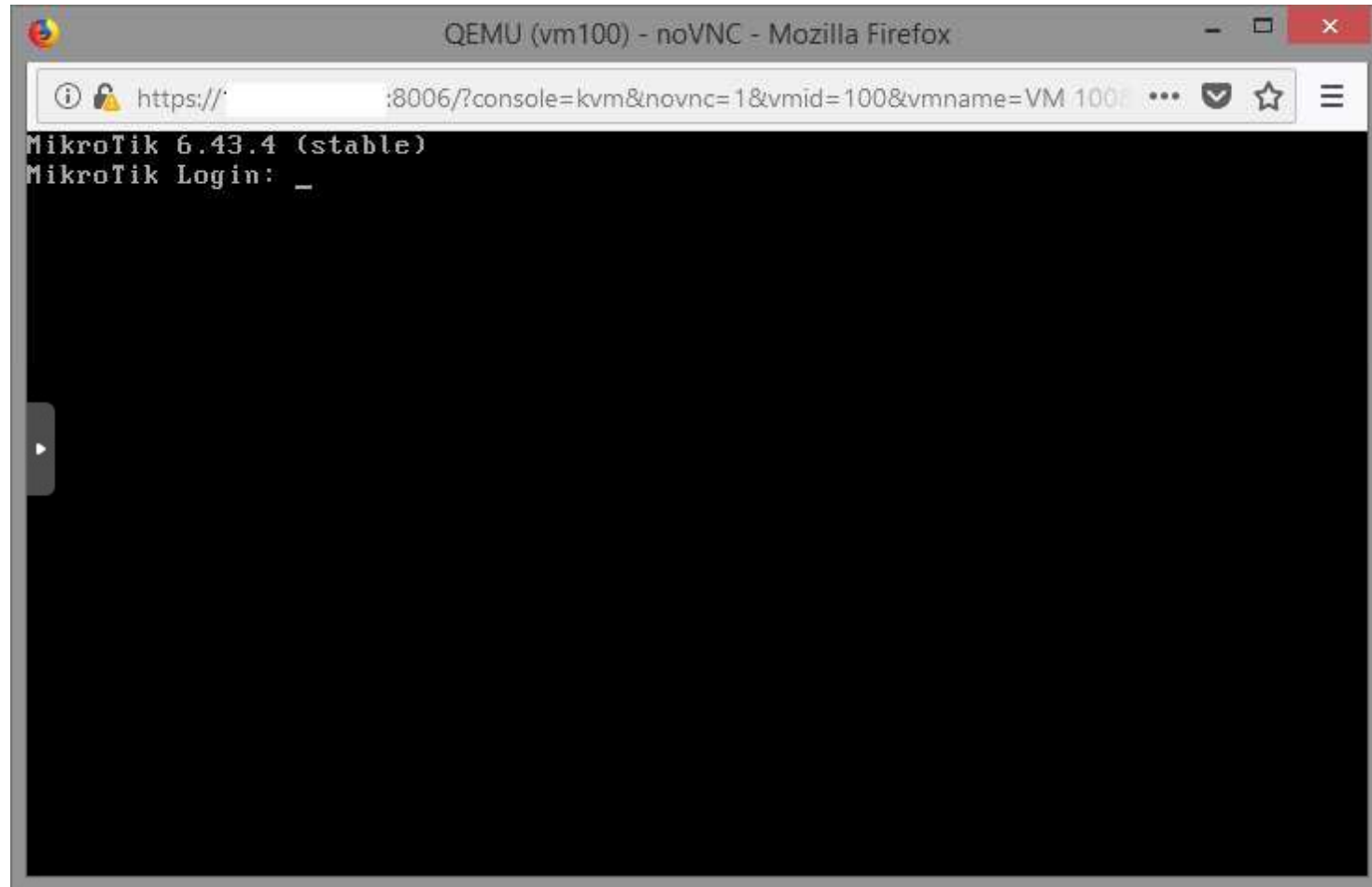
- Console
- Hardware
- Cloud-Init
- Task History
- Monitor
- Backup
- Replication
- Snapshots
- Firewall
- Permissions

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?