



# MikroTik CHR on Proxmox

Complex labbing without need for EVE-NG or GNS3

# AGENDA

01

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## Introduction

Meet Marc Perea

02

---

## Problem

Why do it this way?

03

---

## Solution

Proxmox + VLANs

04

---

## Example Walk-through

How-to and Screenshots

# MARC PEREA – ADMIRAL



**2006**

**Discovered  
MikroTik vs  
Cisco & Brocade**

**2015**

**MikroTik  
Certified Trainer  
& Managed WiFi**

**2024**

**Centralized  
Management &  
Automation**

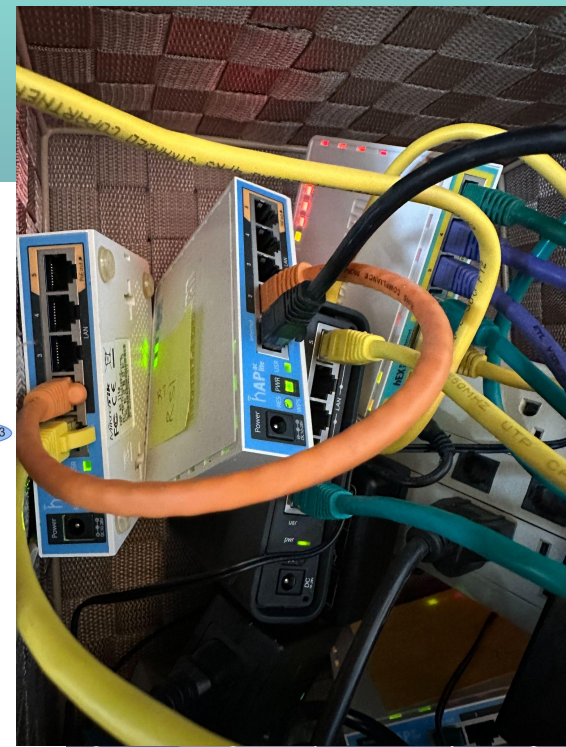
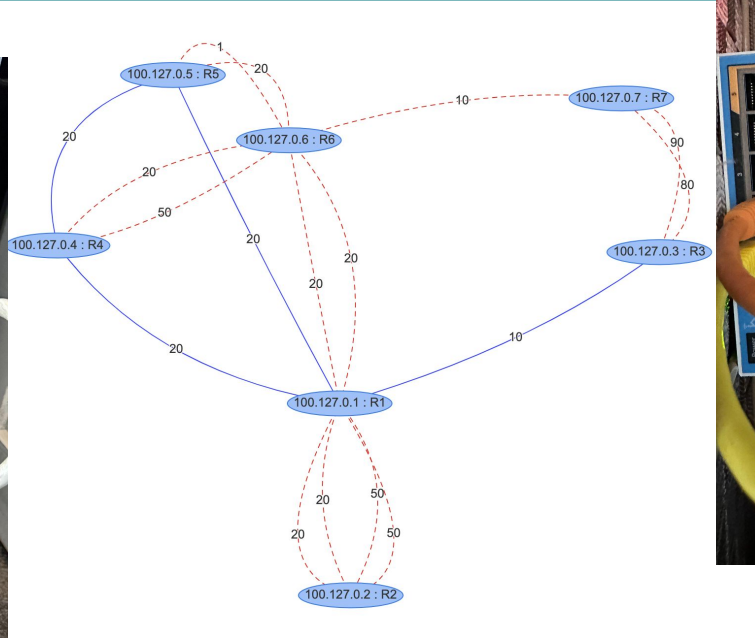


A decorative graphic on the left side of the slide, consisting of a grid of hexagons. Some hexagons are solid light blue, while others are white outlines. Small cyan dots are placed at the vertices of the hexagons, and thin white lines connect some of them, creating a network-like structure.

# 02

## THE PROBLEM

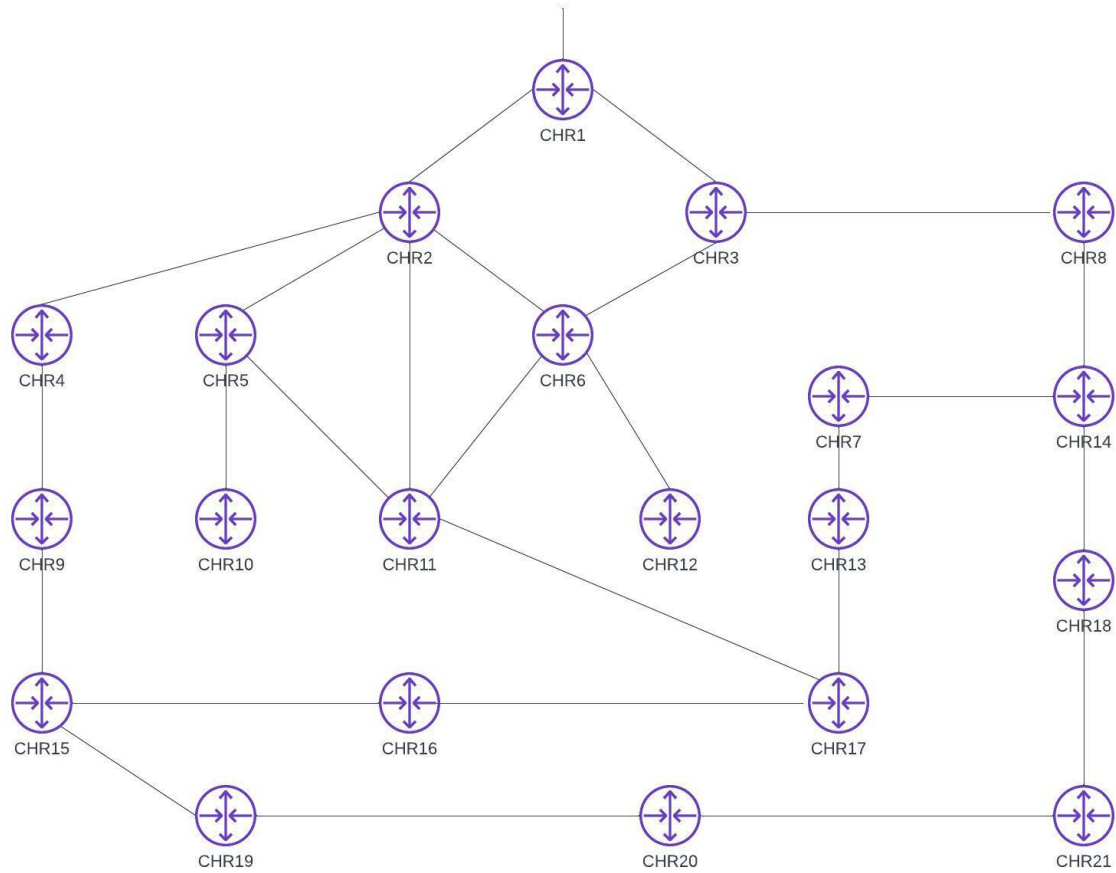
Building a complex lab with hardware is messy!



7 nodes - already ugly!



INTERNET





# 03

## THE SOLUTION

PROXMOX + CHR

# Requirements

**A**

**LOW COST!**

I'd like to spend little \$

**B**

**EASY TO USE**

I want it to be easy to use and maintain

**C**

**SIMPLE**

I want to invest minimal time and effort

**D**

**CLEAN**

Wife aggro!





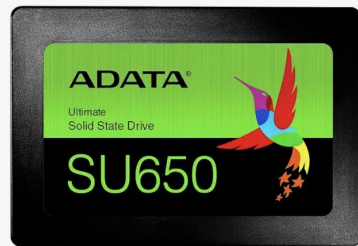


# A

## LOW COST

### \$40 USD Used PC

About \$100 - less than cost of 3 HAP AC Lites



**ADATA**  
SSD 120GB 2.5 SATA SU650

★★★★☆ ~ 5,355

**\$17<sup>91</sup>**

FREE delivery **Mar 6 - 11**  
Or fastest delivery **Tue**

Add to cart

More Buying Choices  
\$14.25 (5 new offers)



**GREAT PRICE**

**A-Tech 8GB PC3-12800 Desktop DDR3 1600 MHz Non ECC 240-Pin DIMM Memory  
RAM 1x 8G**

USA Seller + Lifetime Warranty + Free Technical Support  
Brand New

★★★★☆ [80 product ratings](#)

**\$13.99**

Buy It Now

**Free 4 day shipping**

Free returns

**2,522 sold**



Top Rated Plus

atechcomponents (109,802) 99.5%

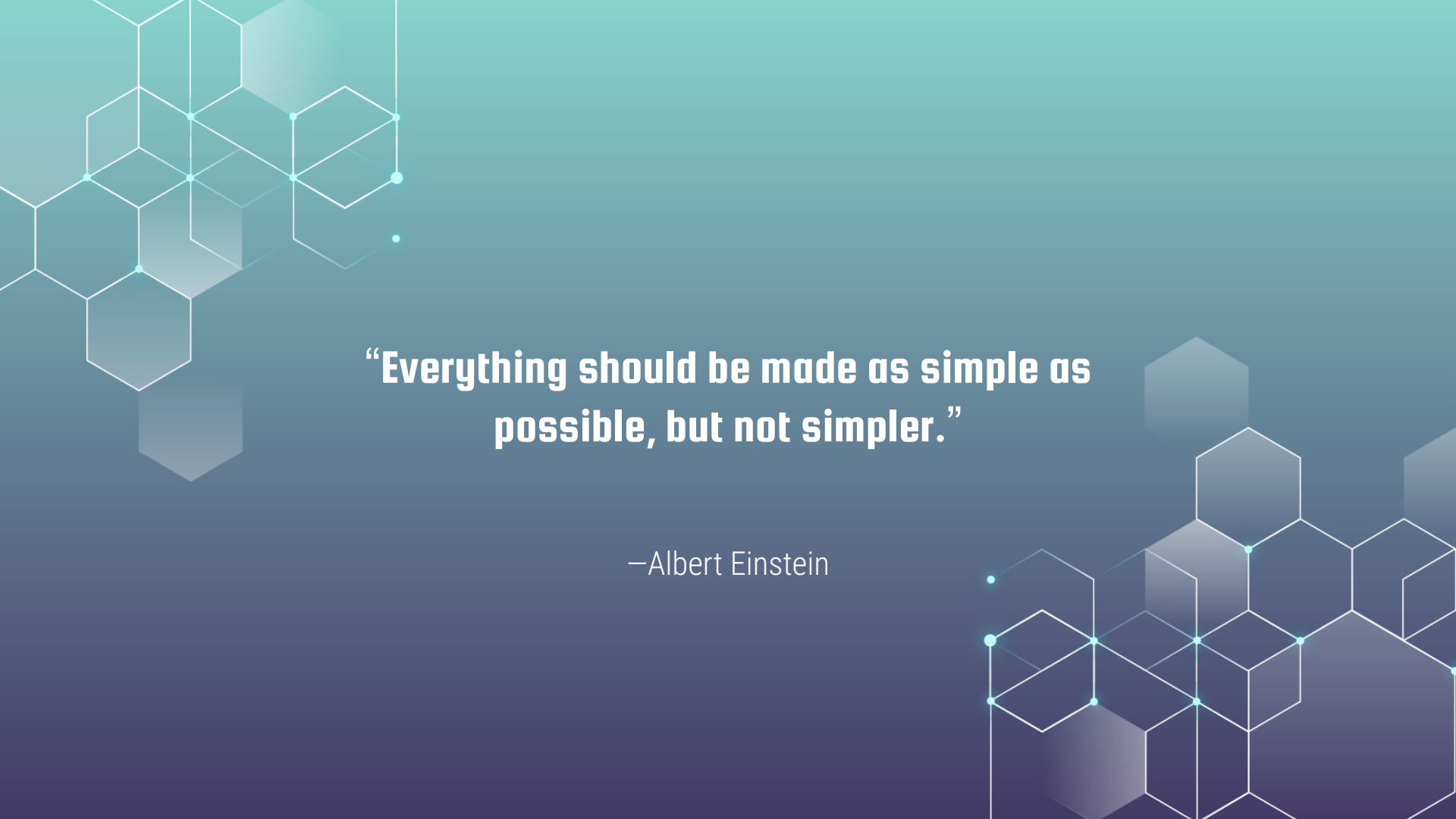


**B**

## **EASY OPERATION**

Just use VLANs and bridges!

**Cloning and updating Hardware is EASY!**



**“Everything should be made as simple as possible, but not simpler.”**

—Albert Einstein



C

# SIMPLICITY

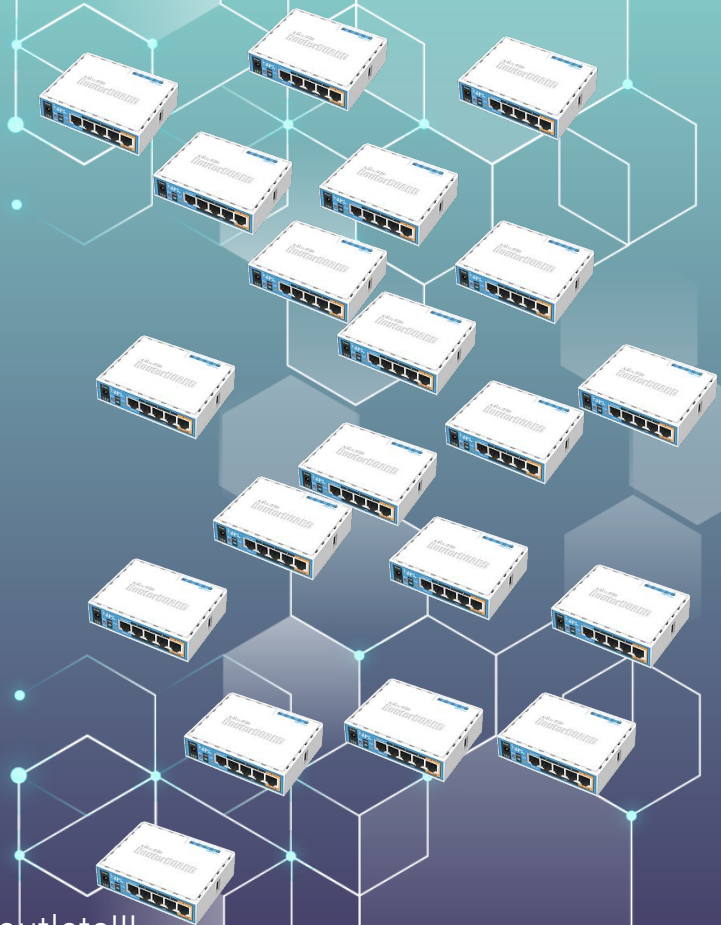
Proxmox VS GNS3 / EVE-NG





# D CLEAN

- 1 ethernet port
- 1 power cable
- 1 spot on a shelf
- 1 AC power outlet
- vs
- 21 routers
- 24 patch cables
- 21 power cables and outlets!!!





# 04

## HOW-TO GUIDE

Just use VLANs and bridges!

# NOT SPEAKING ABOUT

1



**NETWORK  
ENGINEERING**

2



**PROXMOX  
INSTALLATION OR  
TUNING**

3



**OSPF  
CONFIGURATION  
OR TUNING**

## First – CHR on PROXMOX

Search for how to setup proxmox and follow a guide

then

Visit [https://admiralplatform.com/  
how-to-setup-a-mikrotik-chr-on-proxmox/](https://admiralplatform.com/how-to-setup-a-mikrotik-chr-on-proxmox/)

or on YouTube

<https://www.youtube.com/watch?v=F2cPJspkbY>



# Prepare PROXMOX

Click on Open SHELL on the main menu

- `wget https://download.mikrotik.com/routeros/6.48.6/chr-6.48.6.img.zip`
- `apt-get update`
- `apt-get upgrade`
- `apt-get install unzip`
- `unzip chr-6.48.6.img.zip`
- `qemu-img convert -f raw -O qcow2 /root/chr-6.48.6.img /chr-6.48.6.qcow2`

## CREATE NEW VM - NAME AND ID

### Create: Virtual Machine

General

OS

System

Disks

CPU

Memory

Node: pve-lab2

VM ID: 201

Name: CHR1

Start at boot:

## CREATE NEW VM - NO MEDIA

### Create: Virtual Machine

General

OS

System

Disks

CPU

Use CD/DVD disc image file (iso)

Storage: local

ISO image:

Use physical CD/DVD Drive

Do not use any media

# CREATE NEW VM - NEXT

Create: Virtual Machine ⊗

General OS **System** Disks CPU Memory Network Confirm

Graphic card:  ▼ SCSI Controller:  ▼

Machine:  ▼ Qemu Agent:

Firmware

BIOS:  ▼ Add TPM:

? Help Advanced  Back Next

# CREATE NEW VM - DISK 1

## Create: Virtual Machine

General OS System **Disks** CPU Memory Network

scsi1



Disk

Bandwidth

Bus/Device: SCSI

SCSI Controller: VirtIO SCSI single

Storage: local-lvm

Disk size (GiB):

Format: Raw disk image (raw)

# CREATE NEW VM – CPU

## Create: Virtual Machine

General OS System Disks **CPU** Memory Network Confirm

Sockets:  Type:

Cores:  Total cores: **1**

VCPUs:  CPU units:

CPU limit:  Enable NUMA:

CPU Affinity:

### Extra CPU Flags:

Default	- <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> +	md-clear	Required to let the guest OS know if MDS is mitigated correctly
Default	- <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> +	pcid	Meltdown fix cost reduction on Westmere, Sandy-, and IvyBridge Intel CPUs
Default	- <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> +	spec-ctrl	Allows improved Spectre mitigation with Intel CPUs
Default	- <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> +	ssbd	Protection for "Speculative Store Bypass" for Intel models
Default	- <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> +	ibpb	Allows improved Spectre mitigation with AMD CPUs

Help

Advanced

Back

Next

## CREATE NEW VM – RAM

### Create: Virtual Machine

General

OS

System

Disks

CPU

Memory

Memory (MiB):

128

Minimum memory (MiB):

128

Shares:

Default (1000)

Ballooning Device:



# CREATE NEW VM - NET - more later...

Create: Virtual Machine ⊗

General OS System Disks CPU Memory **Network** Confirm

No network device

Bridge:  Model:

VLAN Tag:  MAC address:

Firewall:

---

Disconnect:  Rate limit (MB/s):

MTU:  Multiqueue:

? Help Advanced  Back Next



# FINISH - FOR NOW...

## Create: Virtual Machine

General OS System Disks CPU Memory Network **Confirm**

Key ↑	Value
cores	1
ide2	none,media=cdrom
memory	128
name	CHR1
net0	virtio,bridge=vibr0,firewall=1
nodename	pve-lab2
numa	0
onboot	1
ostype	l26
scsi1	local-lvm:1,iotread=on
scsihw	virtio-scsi-single
sockets	1
vmid	201

**NO!!!**

Start after created

Advanced

Back

Finish

# CREATE NEW BRIDGE

The screenshot displays the Proxmox VE 7.4-17 interface. The top left shows the Proxmox logo and the text "Virtual Environment 7.4-17". A search bar is located to the right of the logo. Below the search bar, the "Server View" is selected, and the "Node 'pve-lab2'" is highlighted. In the left sidebar, the "Datacenter (Admiral-homelab)" is expanded, showing "offsite1" and "pve-lab2". The "pve-lab2" node is selected, and its sub-items are listed: "201 (CHR1)", "local (pve-lab2)", and "local-lvm (pve-lab2)". The "Network" tab is selected in the bottom navigation bar. The "Create" dropdown menu is open, showing options: "Linux Bridge", "Linux Bond", "Linux VLAN", "OVS Bridge", "OVS Bond", and "OVS IntPort". Red arrows indicate the path from the "pve-lab2" node to the "Network" tab and then to the "Linux Bridge" option in the "Create" menu.

PROXMOX Virtual Environment 7.4-17 Search

Server View

Node 'pve-lab2'

Datacenter (Admiral-homelab)

- offsite1
- pve-lab2
  - 201 (CHR1)
  - local (pve-lab2)
  - local-lvm (pve-lab2)

201 (CHR1)

local (pve-lab2)

local-lvm (pve-lab2)

Search

Summary

Notes

Shell

System

Network

Create

Revert

Linux Bridge

Linux Bond

Linux VLAN

OVS Bridge

OVS Bond

OVS IntPort

# CREATE NEW BRIDGE

## Create: Linux Bridge

Name:

vmbr1

Autostart:



IPv4/CIDR:

VLAN aware:



Gateway (IPv4):

Bridge ports:

IPv6/CIDR:

Comment:

VLAN BRIDGE

Gateway (IPv6):

MTU:

1500



? Help

Advanced

Create

# MAKE DISK USABLE WITH VM-ID

PROXMOX Virtual Environment 7.4-17 Search Documentation

Server View Node 'pve-lab2' Reboot Shutdown

Datacenter (Admiral-homelab)

- offsite1
- pve-lab2**
- 201 (CHR1)
- local (pve-lab2)
- local-vm (pve-lab2)

Search

Summary

Notes

**\_ Shell**

System

Network

Certificates

DNS

Hosts

Options

Time

Syslog

Updates

Repositories

Firewall

Disks

LVM

LVM-Thin

```
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Mar 3 22:13:15 EST 2024 from 192.168.87.11 on pts/0
root@pve-lab2:~# qm importdisk 201 /chr-6.48.6.qcow2 local-lvm
importing disk '/chr-6.48.6.qcow2' to VM 201 ...
Logical volume "vm-201-disk-1" created.
transferred 0.0 B of 64.0 MiB (0.00%)
transferred 4.3 MiB of 64.0 MiB (6.78%)
transferred 8.1 MiB of 64.0 MiB (12.64%)
transferred 11.8 MiB of 64.0 MiB (18.50%)
transferred 15.6 MiB of 64.0 MiB (24.36%)
transferred 19.3 MiB of 64.0 MiB (30.22%)
transferred 23.1 MiB of 64.0 MiB (36.08%)
transferred 26.8 MiB of 64.0 MiB (41.94%)
transferred 30.6 MiB of 64.0 MiB (47.80%)
transferred 34.3 MiB of 64.0 MiB (53.66%)
transferred 37.0 MiB of 64.0 MiB (57.88%)
transferred 40.8 MiB of 64.0 MiB (63.74%)
transferred 44.5 MiB of 64.0 MiB (69.60%)
transferred 48.3 MiB of 64.0 MiB (75.46%)
transferred 52.0 MiB of 64.0 MiB (81.32%)
transferred 55.8 MiB of 64.0 MiB (87.18%)
transferred 56.6 MiB of 64.0 MiB (88.46%)
transferred 59.5 MiB of 64.0 MiB (93.04%)
transferred 62.5 MiB of 64.0 MiB (97.62%)
transferred 63.5 MiB of 64.0 MiB (99.27%)
transferred 64.0 MiB of 64.0 MiB (100.00%)
transferred 64.0 MiB of 64.0 MiB (100.00%)
Successfully imported disk as 'unused0:local-lvm:vm-201-disk-1'
root@pve-lab2:~#
```

# ADJUST HARDWARE

4-17 Search

Virtual Machine 201 (CHR1) on node

- Summary
- Console
- Hardware**
- Cloud-Init
- Options
- Task History
- Monitor
- Backup
- Replication
- Snapshots

Memory

Processor

BIOS

Display

Machine

SCSI Controller

CD/DVD

Hard Disk

Network Device (net0)

**Unused Disk 0**

virtio=8A:7D:1F:B6:65:18;bridge=vmbrio;firewall=1

local-lvm:vm-201-disk-1

### Add: Unused Disk

**Disk** Bandwidth

Bus/Device: SCSI 0 Cache: Default (No cache)

SCSI Controller: VirtIO SCSI single Discard:

Disk image: local-lvm:vm-201-disk-1 IO thread:

---


SSD emulation:  Backup:


Read-only:  Skip replication:

Async IO: Default (io\_uring)


Help Advanced **Add**


# ADJUST HARDWARE


Virtual Machine 201 (CHR1) on node 'pve-lab2' No Tags  ▶ Start


 Summary Add ▾ **Detach** Edit Disk Action ▾ Revert


>\_ Console


 **Hardware**


 Cloud-Init


 Options


 Task History











 Monitor

 Backup


 Replication


 Snapshots

 Firewall ▶


 Memory	128.00 MiB
 Processors	2 (1 sockets, 2 cores)
 BIOS	Default (SeaBIOS)
 Display	Default
 Machine	Default (i440fx)
 SCSI Controller	VirtIO SCSI single
 CD/DVD Drive (ide2)	none,media=cdrom
 Hard Disk (scsi0)	local-lvm:vm-201-disk-1,iotread=1,size=64M
 <b>Hard Disk (scsi1)</b>	local-lvm:vm-201-disk-0,iotread=1,size=1G
 Network Device (net0)	virtio=8A:7D:1F:B6:65:F8,bridge=vibr0,firewall=1


# ADJUST HARDWARE


Virtual Machine 201 (CHR1) on node 'pve-lab2' No Tags  ▶ Start


 Summary Add Remove Edit Disk Action Revert


>\_ Console


 Hardware


 Cloud-Init


 Options











 Task History

 Monitor

 Backup

 Replication

 Snapshots

 Memory	128.00 MiB
 Processors	2 (1 sockets, 2 cores)
 BIOS	Default (SeaBIOS)
 Display	Default
 Machine	Default (i440fx)
 SCSI Controller	VirtIO SCSI single
 CD/DVD Drive (ide2)	none,media=cdrom
 Hard Disk (scsi0)	local-lvm:vm-201-disk-1,iosthread=1,size=64M
 Network Device (net0)	virtio=8A:7D:1F:B6:65:F8,bridge=vmbr0,firewall=1
 Unused Disk 0	local-lvm:vm-201-disk-0

# USE THE DISK TO BOOT

Virtual Machine 201 (CHR1) on node 'pve-lab2' No Tags ▶ Start 🔌 S

Summary Edit Revert

> Console

Hardware

Cloud-Init

**Options**

Task History

Monitor

Backup

Replication

Snapshot

Firewall

Permissions

Name	CHR1
Start at boot	Yes
Start/Shutdown order	order=any
OS Type	Linux 6.x - 2.6 Kernel
Boot Order	ide2, net0

**Edit: Boot Order** ✕

#	Enabled	Device	Description
<b>1</b>	<input checked="" type="checkbox"/>	scsi0	local-lvm:vm-201-disk-1,iotread=1,size=64M
2	<input checked="" type="checkbox"/>	ide2	none,media=cdrom
3	<input checked="" type="checkbox"/>	net0	virtio=8A:7D:1F:B6:65:F8,bridge=vmbr0,firewall=1
4	<input type="checkbox"/>	net1	virtio=46:81:89:09:98:B5,bridge=vmbr1,firewall=1,tag=2...
5	<input type="checkbox"/>	net2	virtio=C2:49:DD:B2:40:A2,bridge=vmbr1,firewall=1,tag=...

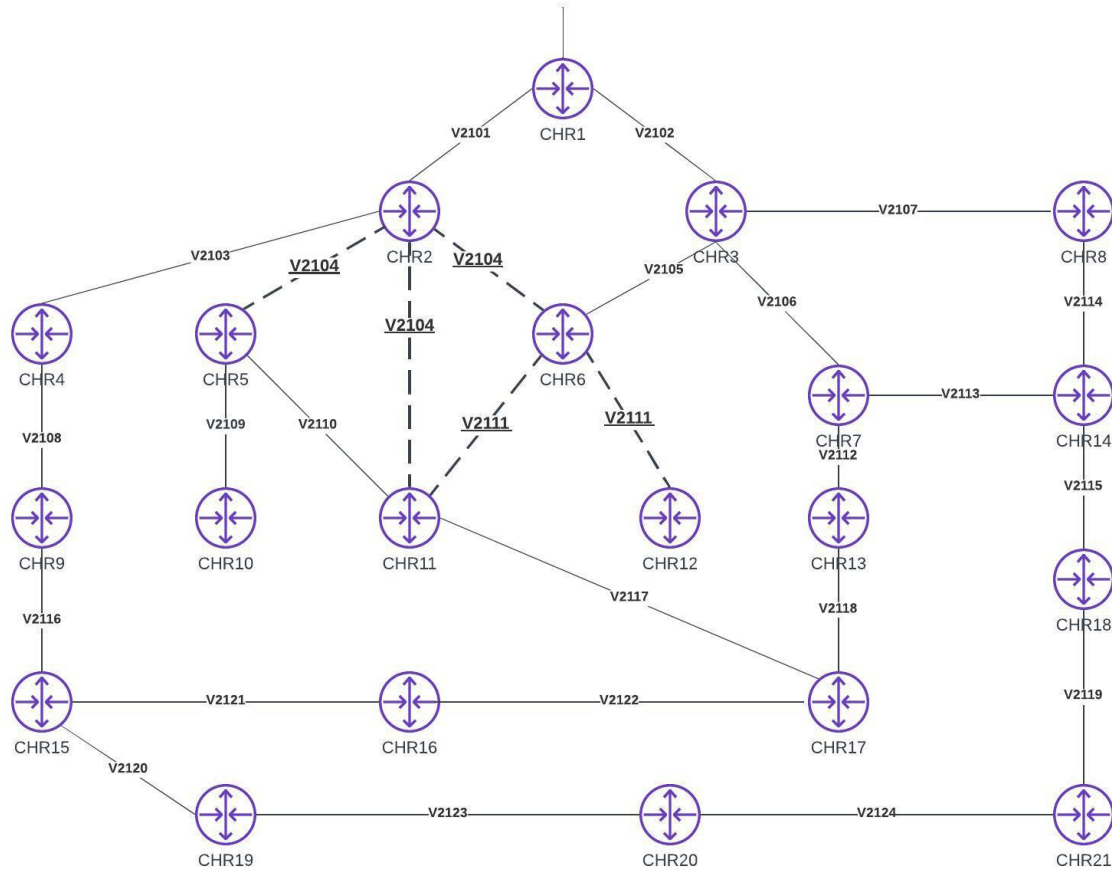
Drag and drop to reorder

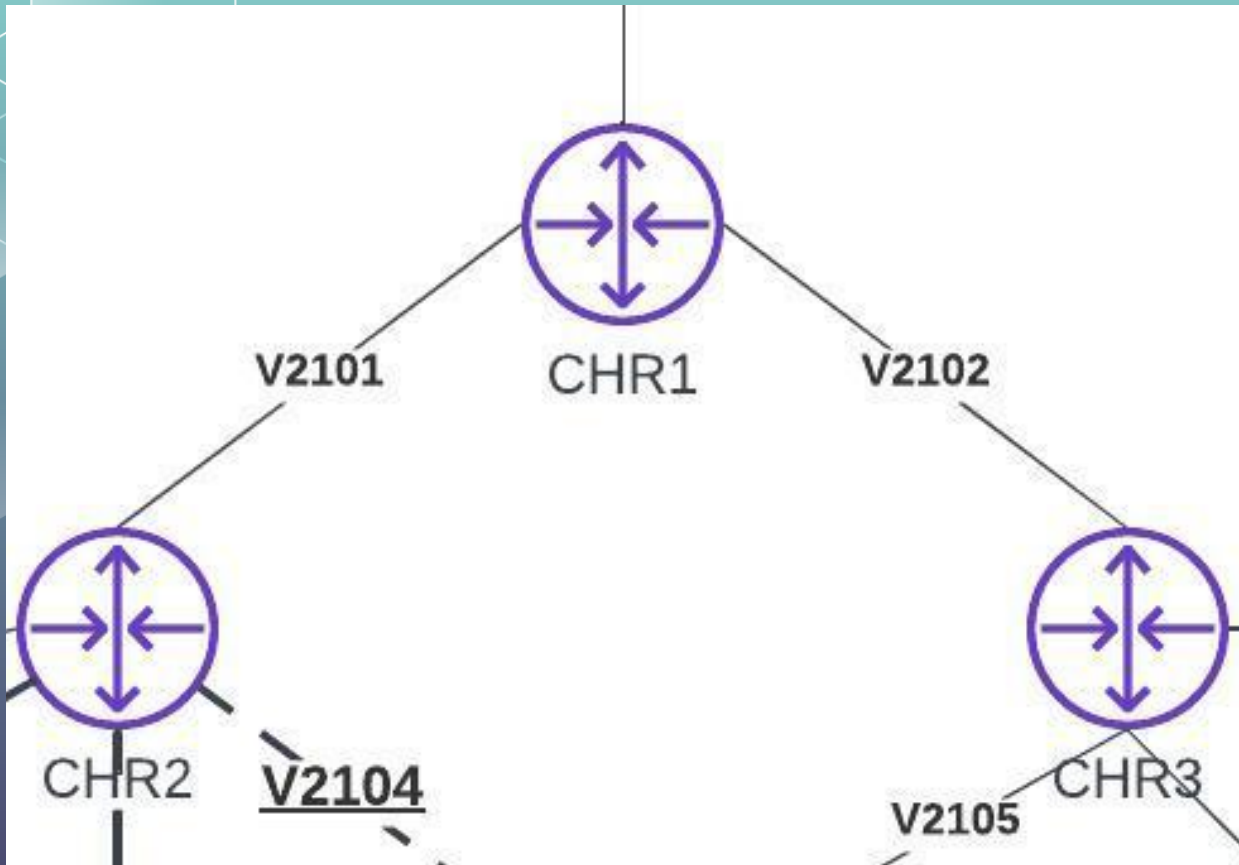
? Help OK Reset





INTERNET





## ADD A NIC to CHR2

Virtual Machine 201 (CHR1) on node 'pve-lab2'

Summary

Console

Hardware

Cloud-Init

Options

Add

Remove

Ed

Hard Disk

CD/DVD Drive

Network Device

EFI Disk

TPM State

## ADD A NIC to CHR2

### Add: Network Device

Bridge:

VLAN Tag:

Firewall:

Model:


MAC address:

Disconnect:

Rate limit (MB/s):

MTU:

Multiqueue:

 Help

Advanced

Add

## ADD A NIC to CHR3

### Add: Network Device

Bridge:

VLAN Tag:

Firewall:

Model:


MAC address:

Disconnect:

Rate limit (MB/s):

MTU:

Multiqueue:

 Help

Advanced

Add

# FINAL NETWORK

↔ Network Device (net0)	virtio=8A:7D:1F:B6:65:F8,bridge=vmbr0,firewall=1	<b>INTERNET</b>
↔ Network Device (net1)	virtio=46:81:89:09:98:B5,bridge=vmbr1,firewall=1,tag=2101	<b>To CHR2</b>
↔ Network Device (net2)	virtio=C2:49:DD:B2:40:A2,bridge=vmbr1,firewall=1,tag=2102	<b>To CHR3</b>

# NOW YOU CAN START THE CHR VM!

The screenshot displays the Proxmox VE 7.4-17 interface. The top navigation bar includes the Proxmox logo, a search field, and buttons for Documentation, Create VM, Create CT, and a user profile for root@. The main content area is titled 'Virtual Machine 201 (CHR1) on node 'pve-lab2'' and features a sidebar with a tree view of the datacenter (Admiral-homelab) containing 'offsite1', 'pve-lab2', and '201 (CHR1)'. The console window shows the MikroTik RouterOS login prompt, followed by a ASCII art logo and the version information: 'MikroTik RouterOS 6.48.6 (c) 1999-2021' and 'http://www.mikrotik.com/'. The prompt 'Do you want to see the software license? [Y/n]: \_' is visible at the bottom.

PROXMOX Virtual Environment 7.4-17 Search

Documentation Create VM Create CT root@

Server View Virtual Machine 201 (CHR1) on node 'pve-lab2' No Tags

Start Shutdown Migrate Console More

Datacenter (Admiral-homelab)  
offsite1  
pve-lab2  
201 (CHR1)  
local (pve-lab2)  
local-lvm (pve-lab2)

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

```
MikroTik 6.48.6 (long-term)
RouterOS Login: admin
Password:

MMM      MMM      KKK      TTTTTTTTTT      KKK
MMMM     MMMM     KKK      TTTTTTTTTT      KKK
MMM MMMM  MMM  III  KKK  KKK  RRRRRR      000000      TTT      III  KKK  KKK
MMM  MM  MMM  III  KKKKK  RRR  RRR  000  000      TTT      III  KKKKK
MMM      MMM  III  KKK  KKK  RRRRRR      000  000      TTT      III  KKK  KKK
MMM      MMM  III  KKK  KKK  RRR  RRR      000000      TTT      III  KKK  KKK


MikroTik RouterOS 6.48.6 (c) 1999-2021      http://www.mikrotik.com/


Do you want to see the software license? [Y/n]: _
```

## 3 NICs – Internet, CHR2, CHR3

Virtual Machine 201 (CHR1) on node 'pve-lab2'

No Tags 

 Start

 Shutdown

 Summary

>\_ Console

 Hardware

 Cloud-Init

 Options

```
[admin@RouterOS] > interface print
Flags: D - dynamic, X - disabled, R - running, S -
#    NAME    TYPE
0    R ether1   ether
1    R ether2   ether
2    R ether3   ether
```



# Configure the network

PROXMOX Virtual Environment 7.4-17 Search Documentation Create VM Create CT root@pam

Server View Virtual Machine 201 (CHR1) on node 'pve-lab2' No Tags Start Shutdown Migrate Console More Help

- Datacenter (Admiral-homelab)
  - offsite1
  - pve-lab2
    - 201 (CHR1)
    - 202 (CHR2)
    - 203 (CHR3)
    - local (pve-lab2)
    - local-lvm (pve-lab2)

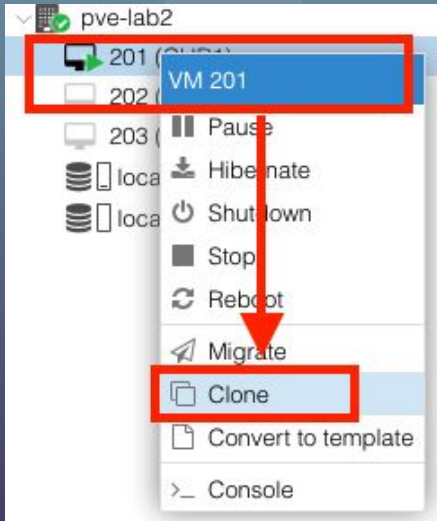
- Summary
- Console
- Hardware
- Cloud-Init
- Options
- Task History
- Monitor
- Backup
- Replication
- Snapshots
- Firewall
- Permissions

```
[admin@RouterOS] >
[admin@RouterOS] > interface bridge add name=loopback
[admin@RouterOS] > ip address add address=100.127.0.1 interface=loopback
[admin@RouterOS] > ip add add address=100.126.0.1/29 int=ether2 comment=CHR2
[admin@RouterOS] > ip add add address=100.126.0.9/29 int=ether3 comment=CHR3
[admin@RouterOS] > routing ospf
area                instance  nbma-neighbor  route                export
area-border-router interface neighbor        sham-link
as-border-router   lsa        network        virtual-link
[admin@RouterOS] > routing ospf instance set 0 router-id=100.127.0.1
[admin@RouterOS] > routing ospf interface add passive=yes interface=loopback
[admin@RouterOS] > routing ospf interface add network-type=point-to-point use-bf
d=yes interface=ether2
[admin@RouterOS] > routing ospf interface add network-type=point-to-point use-bf
d=yes interface=ether3
[admin@RouterOS] > ip address print
Flags: X - disabled, I - invalid, D - dynamic
#  ADDRESS                NETWORK                INTERFACE
0  D  192.168.87.220/24      192.168.87.0          ether1
1  100.127.0.1/32         100.127.0.1          loopback
2  ::: CHR2
   100.126.0.1/29        100.126.0.0          ether2
3  ::: CHR3
   100.126.0.9/29       100.126.0.8          ether3
```

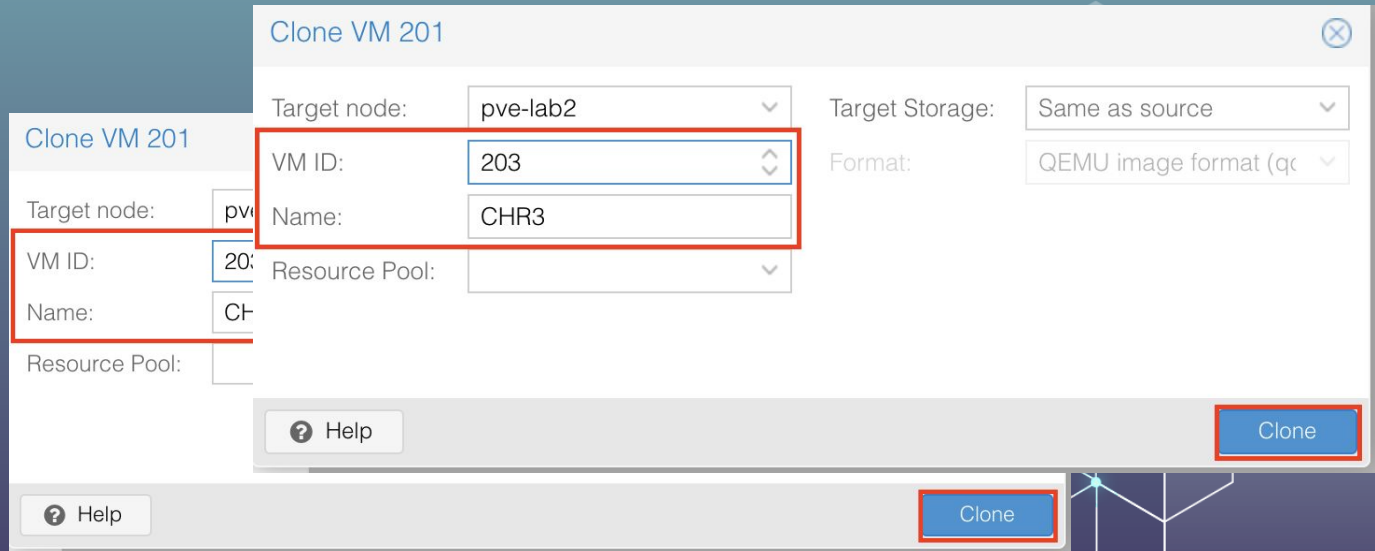
# CHRI Configuration

```
/interface bridge add name=loopback
/routing ospf instance set 0 distribute-default=if-installed-as-type-1 router-id=100.127.0.1
/ip address add address=100.127.0.1 interface=loopback
/ip address add address=100.126.0.1/29 comment=CHR2 interface=ether2
/ip address add address=100.126.0.9/29 comment=CHR3 interface=ether3
/ip dhcp-client add disabled=no interface=ether1
/routing ospf interface add interface=loopback passive=yes
/routing ospf interface add interface=ether2 network-type=point-to-point use-bfd=yes
/routing ospf interface add interface=ether3 network-type=point-to-point use-bfd=yes
/routing ospf network add area=backbone network=100.127.0.1/32
/routing ospf network add area=backbone network=100.126.0.0/29
/routing ospf network add area=backbone network=100.126.0.8/29
/system identity set name=CHR1
```

# NOW MAKE CHR2 and CHR3 using CLONE!



A screenshot of the Proxmox VE interface showing a list of VMs under the 'pve-lab2' host. VM 201 is selected, and its context menu is open. The 'Clone' option is highlighted with a red box. A red arrow points from the 'Clone' option in the menu to the 'Clone VM 201' dialog box shown in the next image.



A screenshot of the 'Clone VM 201' dialog box. The dialog is titled 'Clone VM 201' and has a close button in the top right corner. The fields are as follows:

- Target node: pve-lab2
- Target Storage: Same as source
- Format: QEMU image format (qcow2)
- VM ID: 203
- Name: CHR3
- Resource Pool: (empty)

The 'Clone' button is located at the bottom right of the dialog. A red box highlights the 'Clone' button in the bottom right corner of the dialog. Another red box highlights the 'VM ID' and 'Name' fields. A third red box highlights the 'Target node' field. A fourth red box highlights the 'Clone' button in the bottom right corner of the overall image.



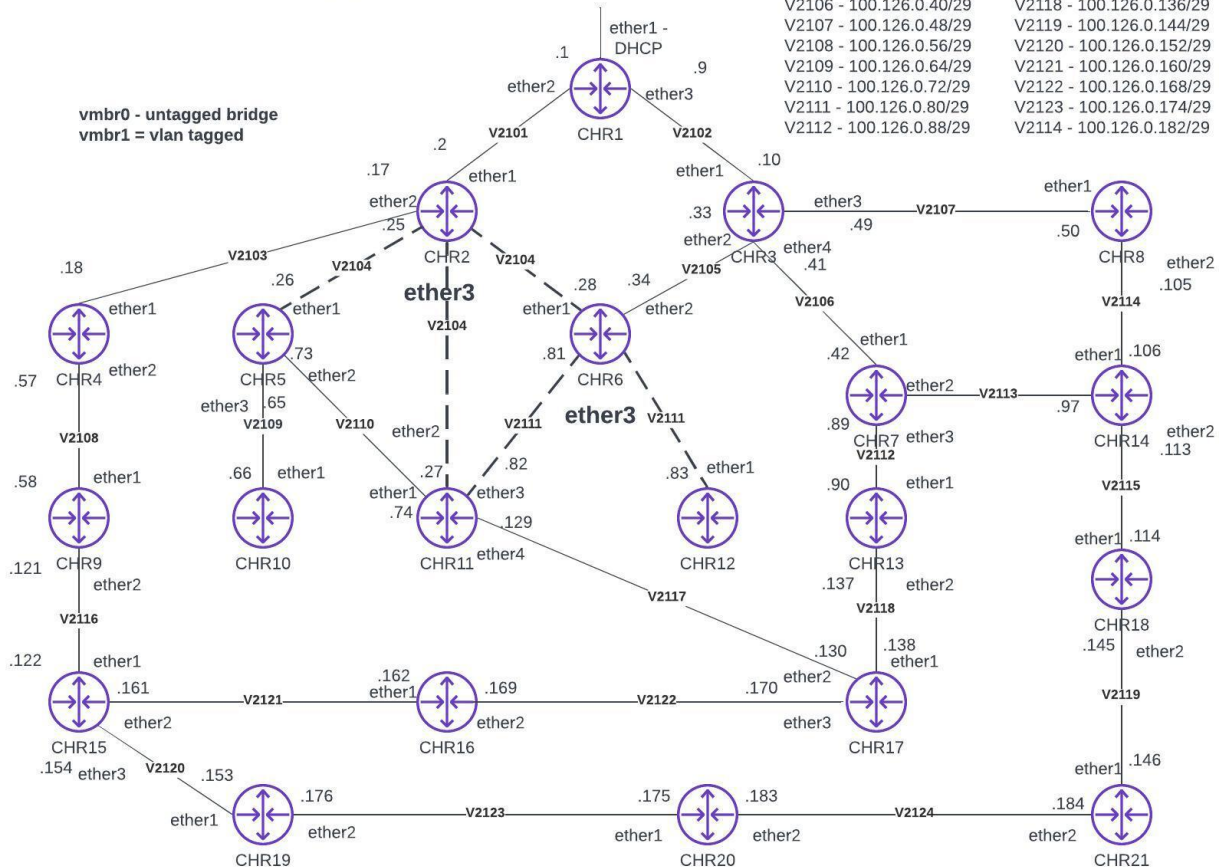
INTERNET



- V2101 - 100.126.0.0/29
- V2102 - 100.126.0.8/29
- V2103 - 100.126.0.16/29
- V2104 - 100.126.0.24/29
- V2105 - 100.126.0.32/29
- V2106 - 100.126.0.40/29
- V2107 - 100.126.0.48/29
- V2108 - 100.126.0.56/29
- V2109 - 100.126.0.64/29
- V2110 - 100.126.0.72/29
- V2111 - 100.126.0.80/29
- V2112 - 100.126.0.88/29

- V2113 - 100.126.0.96/29
- V2114 - 100.126.0.104/29
- V2115 - 100.126.0.112/29
- V2116 - 100.126.0.120/29
- V2117 - 100.126.0.128/29
- V2118 - 100.126.0.136/29
- V2119 - 100.126.0.144/29
- V2120 - 100.126.0.152/29
- V2121 - 100.126.0.160/29
- V2122 - 100.126.0.168/29
- V2123 - 100.126.0.174/29
- V2124 - 100.126.0.182/29

vibr0 - untagged bridge  
vibr1 = vlan tagged

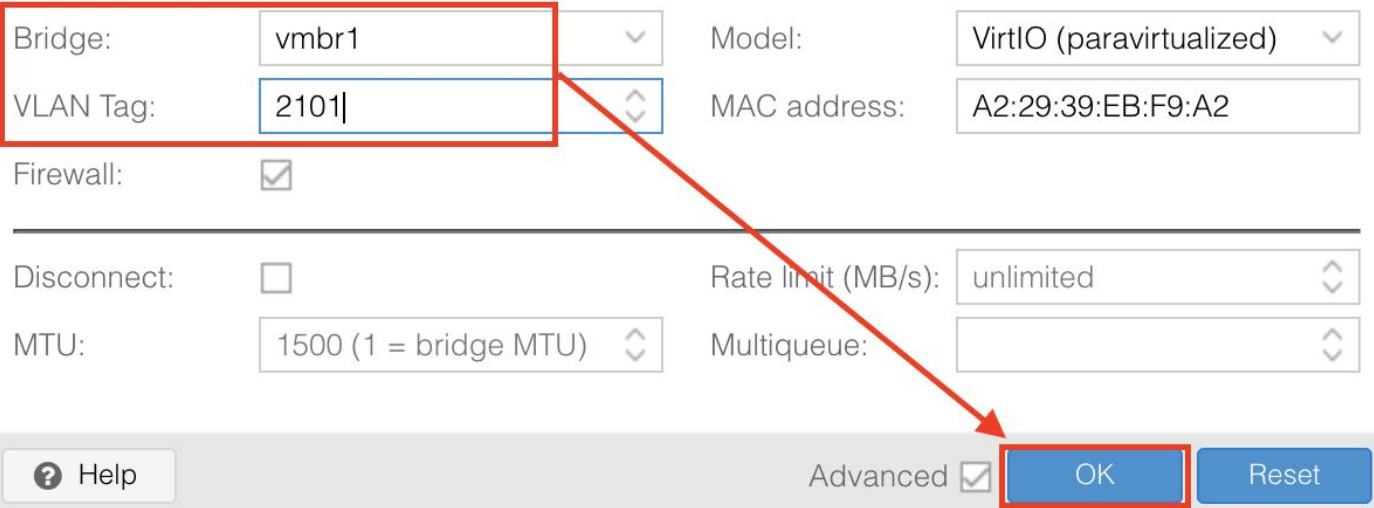


## CHR2 - NIC 1 to CHR1

Edit: Network Device ✕

Bridge:	vmbr1	Model:	VirtIO (paravirtualized)
VLAN Tag:	2101	MAC address:	A2:29:39:EB:F9:A2
Firewall:	<input checked="" type="checkbox"/>		
<hr/>			
Disconnect:	<input type="checkbox"/>	Rate limit (MB/s):	unlimited
MTU:	1500 (1 = bridge MTU)	Multiqueue:	

? Help Advanced  OK Reset

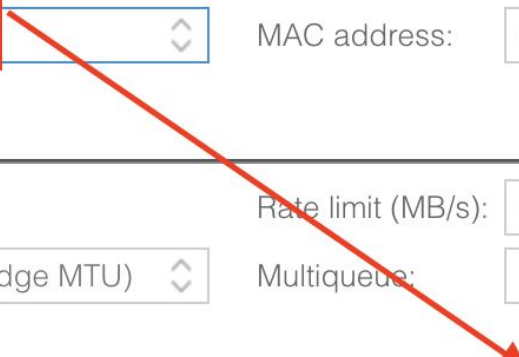


# CHR2 - NIC 2 to CHR4

Edit: Network Device ✕

Bridge:	vmbr1	Model:	VirtIO (paravirtualized)
VLAN Tag:	2103	MAC address:	02:6F:9F:0A:40:FC
Firewall:	<input checked="" type="checkbox"/>		
<hr/>			
Disconnect:	<input type="checkbox"/>	Rate limit (MB/s):	unlimited
MTU:	1500 (1 = bridge MTU)	Multiqueue:	

? Help Advanced  OK Reset



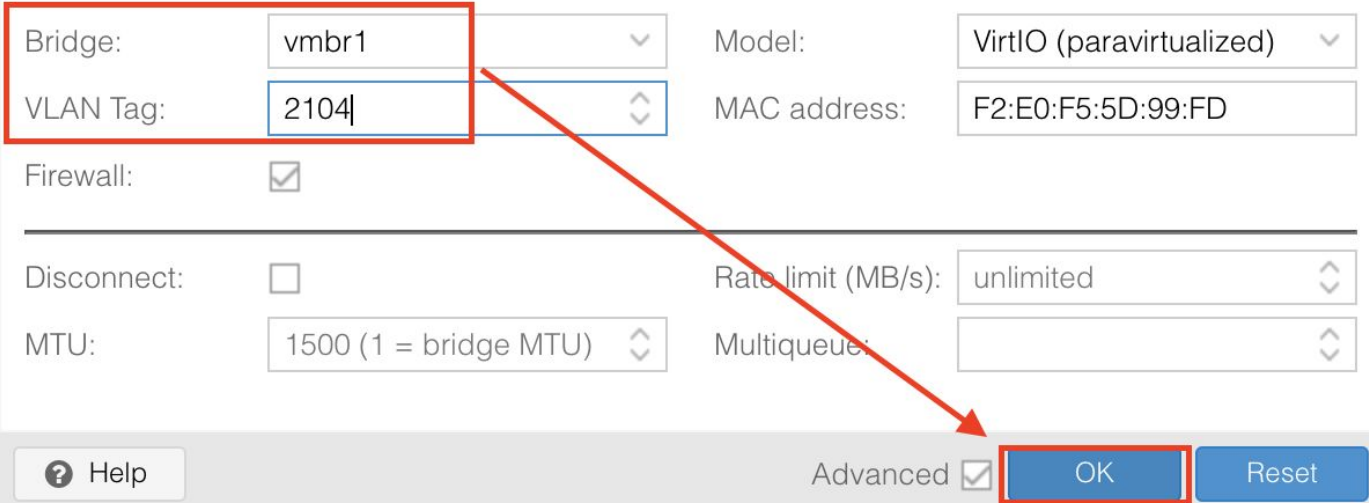
# CHR2 - NIC 3 emulated switch!

## to CHR5 + CHR11 + CHR6

Edit: Network Device ⊗

Bridge:	vmbr1	Model:	VirtIO (paravirtualized)
VLAN Tag:	2104	MAC address:	F2:E0:F5:5D:99:FD
Firewall:	<input checked="" type="checkbox"/>		
Disconnect:	<input type="checkbox"/>	Rate limit (MB/s):	unlimited
MTU:	1500 (1 = bridge MTU)	Multiqueues:	

? Help Advanced  OK Reset



# CHR2 Configuration

```
/interface bridge add name=loopback
/routing ospf instance set [ find default=yes ] router-id=100.127.0.2
/ip address add address=100.126.0.2/29 comment=CHR1 interface=ether1
/ip address add address=100.127.0.2 interface=loopback
/ip address add address=100.126.0.17/29 comment=CHR4 interface=ether2
/ip address add address=100.126.0.25/29 comment=CHR5,11,6 interface=ether3
/routing ospf interface add interface=loopback passive=yes
/routing ospf interface add interface=ether1 network-type=point-to-point use-bfd=yes
/routing ospf interface add interface=ether2 network-type=point-to-point use-bfd=yes
/routing ospf interface add interface=ether3
/routing ospf network add area=backbone network=100.127.0.2/32
/routing ospf network add area=backbone network=100.126.0.16/29
/routing ospf network add area=backbone network=100.126.0.24/29
/routing ospf network add area=backbone network=100.126.0.0/29
/system identity set name=CHR2
/tool romon set enabled=yes
```



📄 Summary

&gt;\_ Console

🖥️ Hardware

☁️ Cloud-Init

⚙️ Options

📅 Task History

👁️ Monitor

📁 Backup

🔄 Replication

🕒 Snapshots

🛡️ Firewall

🔒 Permissions

```
[admin@CHR2] > routing ospf network add area=backbone network=100.126.0.0/29
```

```
[admin@CHR2] > system logging export
```

```
# mar/04/2024 14:03:06 by RouterOS 6.48.6
```

```
# software id =
```

```
#
```

```
#
```

```
#
```

```
#
```

```
[admin@CHR2] > ping count=1 100.126.0.2
```

```
SEQ HOST
```

```
SIZE TTL TIME STATUS
```

```
0 100.126.0.2
```

```
56 64 0ms
```

```
sent=1 received=1 packet-loss=0% min-rtt=0ms avg-rtt=0ms max-rtt=0ms
```

```
[admin@CHR2] > ip route print
```

```
Flags: X - disabled, A - active, D - dynamic,
```

```
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
```

```
B - blackhole, U - unreachable, P - prohibit
```

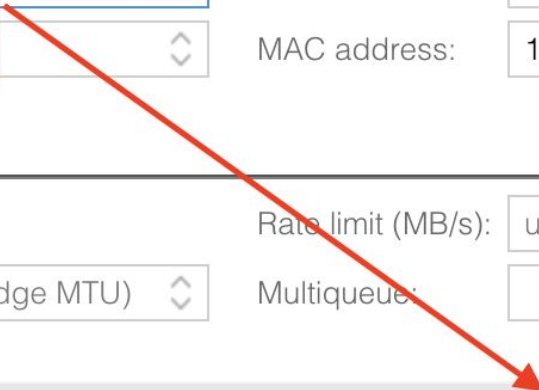
#	DST-ADDRESS	PREF-SRC	GATEWAY	DISTANCE
0	ADo 0.0.0.0/0		100.126.0.1	110
1	ADC 100.126.0.0/29	100.126.0.2	ether1	0
2	ADo 100.126.0.8/29		100.126.0.1	110
3	ADC 100.126.0.16/29	100.126.0.17	ether2	0
4	ADC 100.126.0.24/29	100.126.0.25	ether3	0
5	ADo 100.127.0.1/32		100.126.0.1	110
6	ADC 100.127.0.2/32	100.127.0.2	loopback	0

# CHR3 - NIC 1 to CHRI

Edit: Network Device ⊗

Bridge:	vmbr1	Model:	VirtIO (paravirtualized)
VLAN Tag:	2102	MAC address:	12:EC:45:E8:A8:77
Firewall:	<input checked="" type="checkbox"/>		
Disconnect:	<input type="checkbox"/>	Rate limit (MB/s):	unlimited
MTU:	1500 (1 = bridge MTU)	Multiqueue:	

? Help Advanced  OK Reset

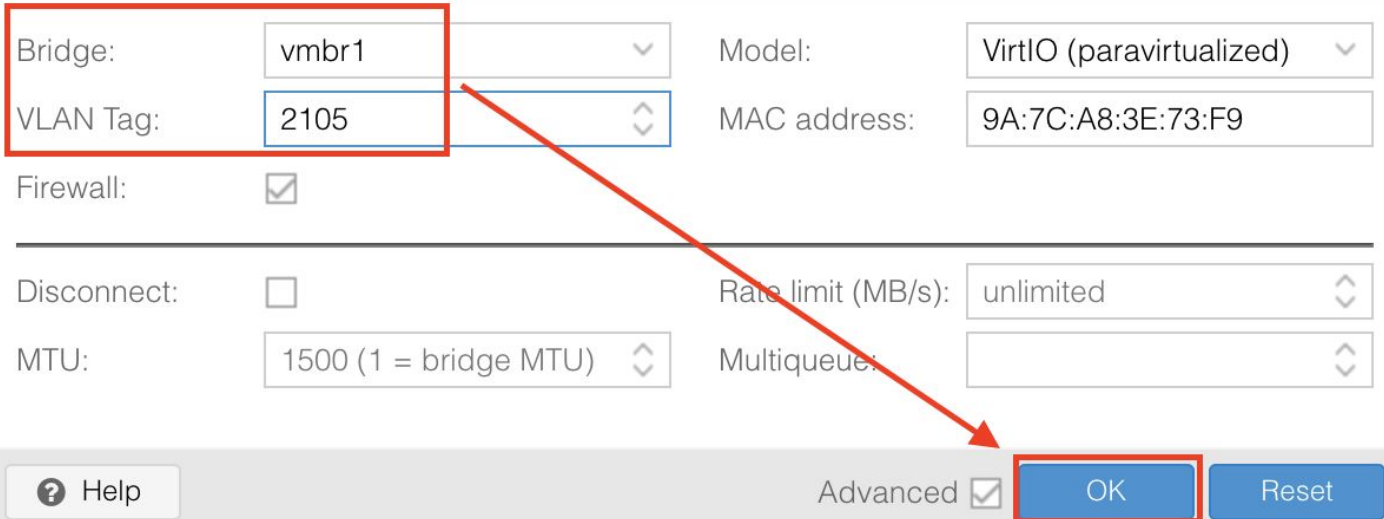


## CHR3 - NIC 2 to CHR6

Edit: Network Device ⓧ

Bridge:	vmbr1	Model:	VirtIO (paravirtualized)
VLAN Tag:	2105	MAC address:	9A:7C:A8:3E:73:F9
Firewall:	<input checked="" type="checkbox"/>		
<hr/>			
Disconnect:	<input type="checkbox"/>	Rate limit (MB/s):	unlimited
MTU:	1500 (1 = bridge MTU)	Multiqueues:	

? Help Advanced  OK Reset



## CHR3 - NIC 3 to CHR8

### Edit: Network Device

Bridge: vubr1

VLAN Tag: 2107

Firewall:

Model: VirtIO (paravirtualized)

MAC address: 7E:B0:8C:80:EA:A7

Disconnect:

Rate limit (MB/s): unlimited

MTU: 1500 (1 = bridge MTU)

Multiqueue:

Help

Advanced

OK

Reset

# CHR3 - ADD NIC 4 to CHR7

Virtual Machine 203 (CHR3) on node 'pve-lab2'

Summary

Console

Hardware

Cloud-Init

Options

Add

Remove

- Hard Disk
- CD/DVD Drive
- Network Device
- EFI Disk

Add: Network Device

Bridge:	vmbr1	Model:	VirtIO (paravirtualized)
VLAN Tag:	2106	MAC address:	auto
Firewall:	<input checked="" type="checkbox"/>		
Disconnect:	<input type="checkbox"/>	Rate limit (MB/s):	unlimited
MTU:	1500 (1 = bridge MTU)	Multiqueue:	

Help

Advanced

Add

# CHR3 Configuration

```
/interface bridge add name=loopback
/routing ospf instance set [ find default=yes ] router-id=100.127.0.3
/ip address add address=100.126.0.10/29 comment=CHR1 interface=ether1
/ip address add address=100.127.0.3 interface=loopback
/ip address add address=100.126.0.33/29 comment=CHR6 interface=ether2
/ip address add address=100.126.0.49/29 comment=CHR8 interface=ether3
/ip address add address=100.126.0.41/29 comment=CHR7 interface=ether4
/routing ospf interface add interface=loopback passive=yes
/routing ospf interface add interface=ether1 network-type=point-to-point use-bfd=yes
/routing ospf interface add interface=ether2 network-type=point-to-point use-bfd=yes
/routing ospf interface add interface=ether3 network-type=point-to-point use-bfd=yes
/routing ospf interface add interface=ether4 network-type=point-to-point use-bfd=yes
/routing ospf network add area=backbone network=100.127.0.3/32
/routing ospf network add area=backbone network=100.126.0.8/29
/routing ospf network add area=backbone network=100.126.0.32/29
/routing ospf network add area=backbone network=100.126.0.40/29
/routing ospf network add area=backbone network=100.126.0.48/29
/system identity set name=CHR3
/tool romon set enabled=yes
```

Summary

Console

Hardware

Cloud-Init

Options

Task History

Monitor

Backup

Replication

Snapshots

Firewall

Permissions

```
[admin@RouterOS] > system identity set name=CHR3
```

```
[admin@CHR3] > tool romon set enabled=yes
```

```
[admin@CHR3] > ip route print
```

```
Flags: X - disabled, A - active, D - dynamic,
```

```
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
```

```
B - blackhole, U - unreachable, P - prohibit
```

#		DST-ADDRESS	PREF-SRC	GATEWAY	DISTANCE
0	ADo	0.0.0.0/0		100.126.0.9	110
1	ADo	100.126.0.0/29		100.126.0.9	110
2	ADC	100.126.0.8/29	100.126.0.10	ether1	0
3	ADo	100.126.0.16/29		100.126.0.9	110
4	ADo	100.126.0.24/29		100.126.0.9	110
5	ADC	100.126.0.32/29	100.126.0.33	ether2	0
6	ADC	100.126.0.40/29	100.126.0.41	ether4	0
7	ADC	100.126.0.48/29	100.126.0.49	ether3	0
8	ADo	100.127.0.1/32		100.126.0.9	110
9	ADo	100.127.0.2/32		100.126.0.9	110
0	ADC	100.127.0.3/32	100.127.0.3	loopback	0

```
[admin@CHR3] > ping count=1 100.127.0.2
```

```
SEQ HOST
```

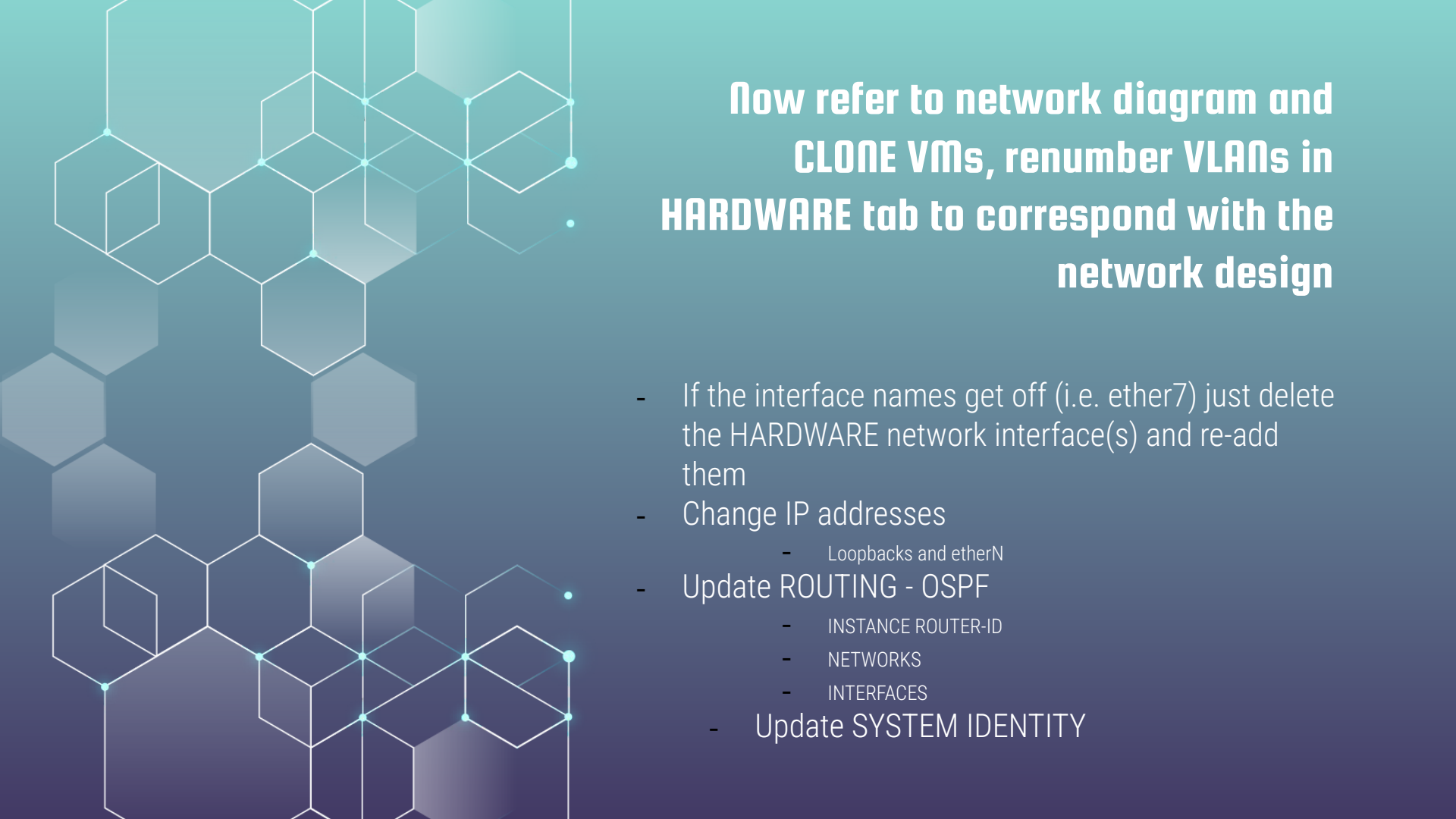
```
0 100.127.0.2
```

```
SIZE TTL TIME STATUS
```

```
56 63 0ms
```

```
sent=1 received=1 packet-loss=0% min-rtt=0ms avg-rtt=0ms max-rtt=0ms
```





**Now refer to network diagram and  
CLONE VMs, renumber VLANs in  
HARDWARE tab to correspond with the  
network design**

- If the interface names get off (i.e. ether7) just delete the HARDWARE network interface(s) and re-add them
- Change IP addresses
  - Loopbacks and etherN
- Update ROUTING - OSPF
  - INSTANCE ROUTER-ID
  - NETWORKS
  - INTERFACES
- Update SYSTEM IDENTITY



# TRICKS!

You can use Proxmox to do the VLAN  
You can use MikroTik CHR to tag the VLAN!!!

Virtual Machine 210 (CHR10) on node 'pve-lab2'

No Tags

Start

Shutdown

Migrate

Console

More

Help

Summary

Console

Hardware

Cloud-Init

Options

Task History

Monitor

Backup

Replication

Snapshots

Firewall

Permissions

```
##
/interface bridge
add name=loopback
/interface ethernet
set [ find default-name=ether1 ] disable-running-check=no
/interface vlan
add comment=CHR10-to-CHR5 interface=ether1 name=V2109 vlan-id=2109
interface wireless security profiles
set [ find default=yes ] supplicant-identity=MikroTik
routing ospf instance
set [ find default=yes ] router-id=100.127.0.10
/ip address
add address=100.126.0.66/29 comment=CHR5 interface=V2109 network=100.126.0.64
add address=100.127.0.10 interface=loopback network=100.127.0.10
/routing ospf interface
add interface=loopback passive=yes
add interface=V2109 network-type=point-to-point use-bfd=yes
/routing ospf network
add area=backbone network=100.127.0.10/32
add area=backbone network=100.126.0.64/29
/system identity
set name=CHR10
/tool romon
set enabled=yes
```

# TRICKS!

Use BRIDGING to combine VLAN + broadcast

Virtual Machine 212 (CHR12) on node 'pve-lab2'

No Tags

Start

Shutdown

Migrate

Console

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

```
/interface bridge
add name=loopback
/interface ethernet
set [ find default-name=ether1 ] disable-running-check=no
/interface vlan
add comment=CHR12-to-CHR6+11 interface=ether1 name=V2111 vlan-id=2111
/interface wireless security-profiles
set [ find default=yes ] supplicant-identity=MikroTik
/routing ospf instance
set [ find default=yes ] router-id=100.127.0.12
ip address
add address=100.126.0.83/29 comment=CHR6+11 interface=V2111 network=\
100.126.0.80
add address=100.127.0.12 interface=loopback network=100.127.0.12
/routing ospf interface
add interface=loopback passive=yes
add interface=V2111
/routing ospf network
add area=backbone network=100.126.0.0/24 interface=V2111
add area=backbone network=100.127.0.0/24 interface=loopback
/system identity
set name=CHR12
/tool romon
set enabled=yes
[admin@CHR12] > _
```

```
[admin@CHR12] > routing ospf neighbor print
0 instance=default router-id=100.127.0.6 address=100.126.0.81 interface=V2111
priority=1 dr-address=100.126.0.81 backup-dr-address=100.126.0.82
state="Full" state-changes=5 ls-retransmits=0 ls-requests=0 db-summaries=0
adjacency=5m4s

1 instance=default router-id=100.127.0.11 address=100.126.0.82 interface=V2111
priority=1 dr-address=100.126.0.81 backup-dr-address=100.126.0.82
state="Full" state-changes=5 ls-retransmits=0 ls-requests=0 db-summaries=0
adjacency=5m4s
[admin@CHR12] >
```

# LOW POWER USE!!!

The screenshot displays the Proxmox VE 7.4-17 interface. On the left, a tree view shows a datacenter named 'Admiral-homelab' containing an 'offsite1' node with a sub-node 'pve-lab2'. The 'pve-lab2' node is highlighted with a red box and contains a list of 21 virtual machines (CHR1 to CHR21). The main panel shows the 'Summary' page for the 'pve-lab2' node, which has been up for 07:13:51. Key system metrics are displayed:

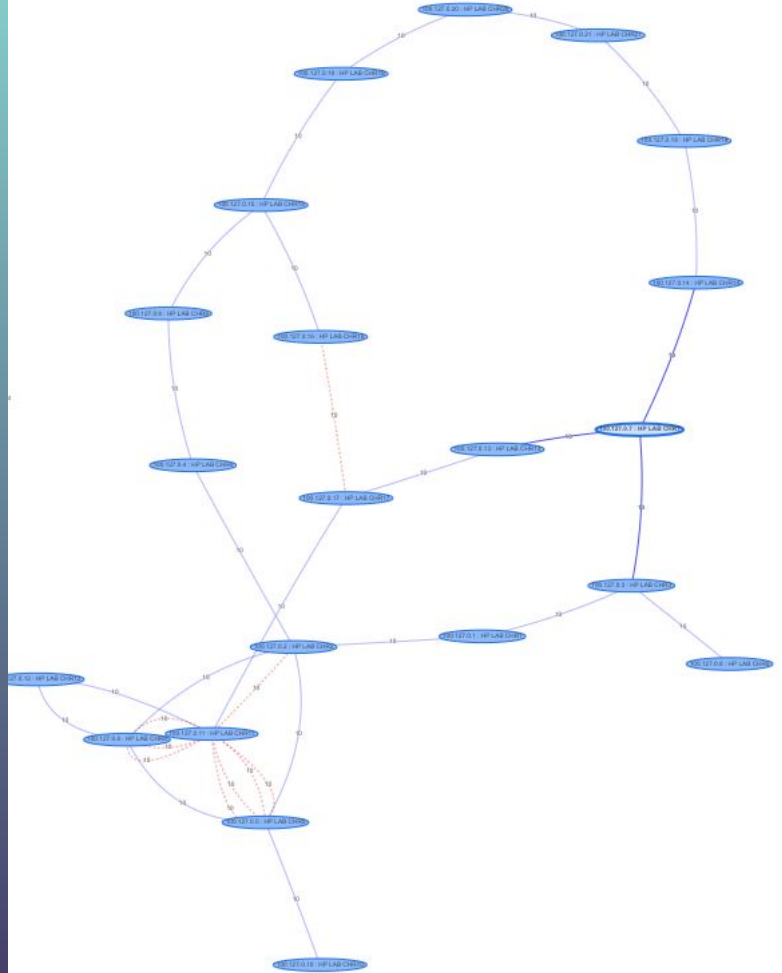
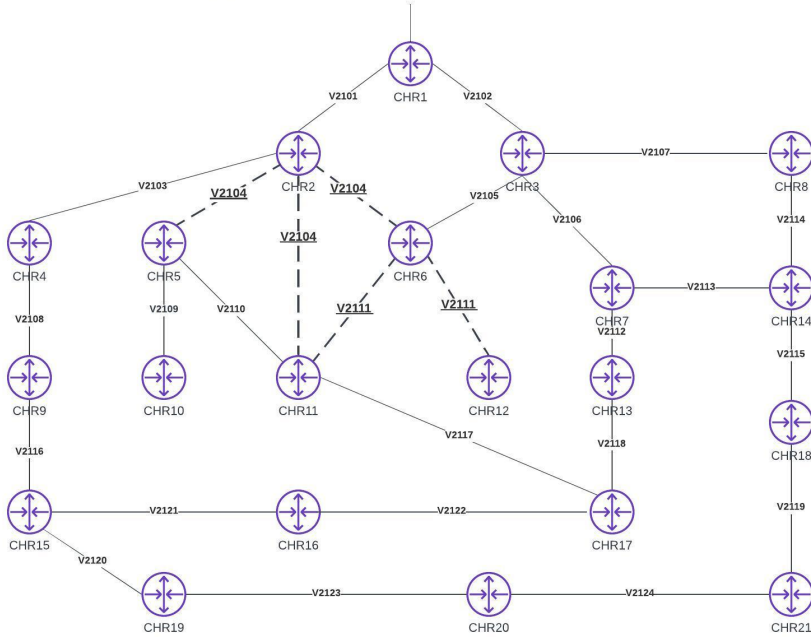
- CPU usage:** 10.88% of 8 CPU(s). A red arrow points from this metric to the CPU usage graph below.
- Load average:** 0.60, 0.90, 1.10
- RAM usage:** 12.65% (3.95 GiB of 31.25 GiB). A red arrow points from this metric to the RAM usage graph below.
- IO delay:** 0.00%
- SWAP usage:** 0.00% (0 B of 8.00 GiB)
- HD space:** 3.41% (3.21 GiB of 93.93 GiB)

System information includes: 8 x Intel(R) Core(TM) i7-2600 CPU @ 3.40GHz (1 Socket), Linux 5.13.19-6-pve #1 SMP PVE 5.13.19-15 (Tue, 29 Mar 2022 15:59:50 +0200), PVE Manager Version pve-manager/7.4-17/513c62be, and Repository Status: Proxmox VE updates (checked) and Non production-ready repository enabled! (warning).

At the bottom, a 'CPU usage' graph shows a green area chart representing CPU usage over time, with a legend indicating CPU usage (green) and IO delay (blue). The y-axis represents percentage from 6% to 14%.



PROXMOX



Auto Generated Network Map by Admiral  
My mission was successful!

# THANK YOU!

Do you have any questions?  
marc@admiralplatform.com

Admiral Centralized MikroTik  
Management and Automation

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