

A woman with dark hair, wearing a light-colored blouse and blue jeans, stands in a server room. She is holding a tablet and looking upwards. The server racks are filled with blue and black equipment. The background is slightly blurred, showing more server racks and overhead lighting.

Juniper Open Learning presents:

FREE 90-min webcast on

Create your own lab using

**EVE-NG**

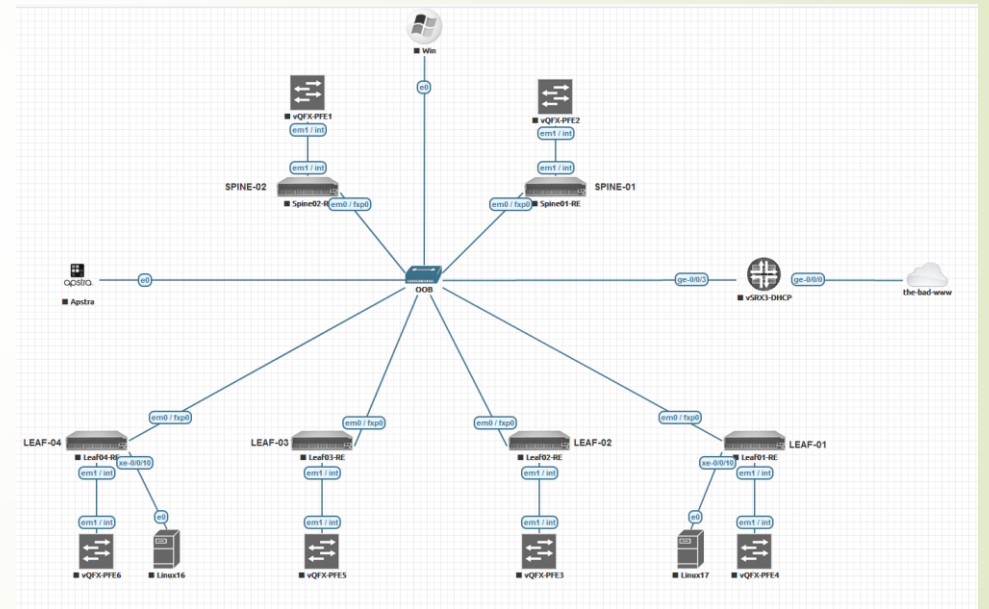
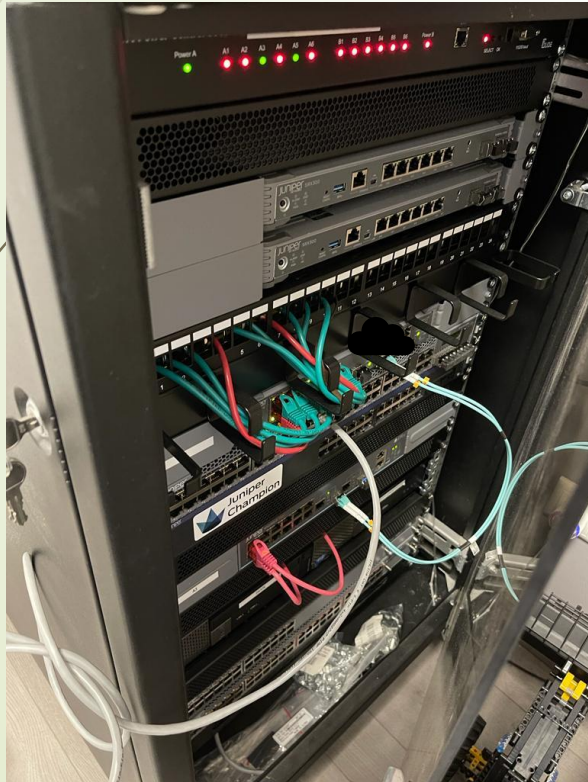
Jan 21<sup>st</sup>, 2025, 2:30 PM PST

JUNIPER  
NETWORKS

Education Services

# Why Virtual Labs

Save Power / Rackspace / Hardware Costs



# What is EVE-NG?



Emulated Virtual Environment  
Next Generation



# Why EVE-NG | Why Virtual Labs

- ▶ Quickly Lab / Test a new Design
- ▶ No additional Hardware Costs for Equipment
- ▶ GREAT for Certification → Combine with vLabs and AATP
- ▶ Get started for free with the Community Edition
- ▶ Vendor-Neutral! Great for Migrations / Interop Tests
- ▶ Extremely Flexible (Bare-Metal, VM | On-Prem | Colocation | Cloud)

# EVE-NG Flavors

- Bare-Metal (best performance)  
**Needed for some vDevices**
- VMware (best flexibility)
- Cloud (best „power-boost“ option)



# EVE-NG Installation, Setup and more

- 3-Part Video Series (will be renewed in 2025)
- [https://learningportal.juniper.net/juniper/user\\_activity\\_info.aspx?id=EDU-JUN-WBT-JOL-EVENG](https://learningportal.juniper.net/juniper/user_activity_info.aspx?id=EDU-JUN-WBT-JOL-EVENG)

### Course Modules ▲

#	Module	Duration	Lab	Required	Status
1	<a href="#">Module 01: Building a Juniper EVE-NG Lab Environment for Daily Usage Part 1: EVE-NG Overview</a>	52m		<input type="radio"/>	Not Started
2	<a href="#">Module 02: Building a Juniper EVE-NG Lab Environment for Daily Usage Part 2: Overview of vMX, vSRX, and vQFX</a>	59m		<input type="radio"/>	Not Started
3	<a href="#">Module 03: Building a Juniper EVE-NG Lab Environment for Daily Usage Part 3: Overview of Clustering</a>	50m		<input type="radio"/>	Not Started

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### Course Details ▲

Juniper Ambassador Christian Scholtz teams up with the Juniper Open Learning to teach you how to build virtual lab environments to help with your preparation for Juniper Networks certification. The video starts with an overview of EVE-NG. It then details how to perform the initial setup of EVE-NG with a demonstration. Basic and advanced lab actions are then covered. If you plan to pursue Juniper certification, this video will help you build a virtual lab for practice.

**Difficulty:** Foundational  
**Last Updated:** Wednesday, October 26, 2022

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[Copy Shortcut](#)

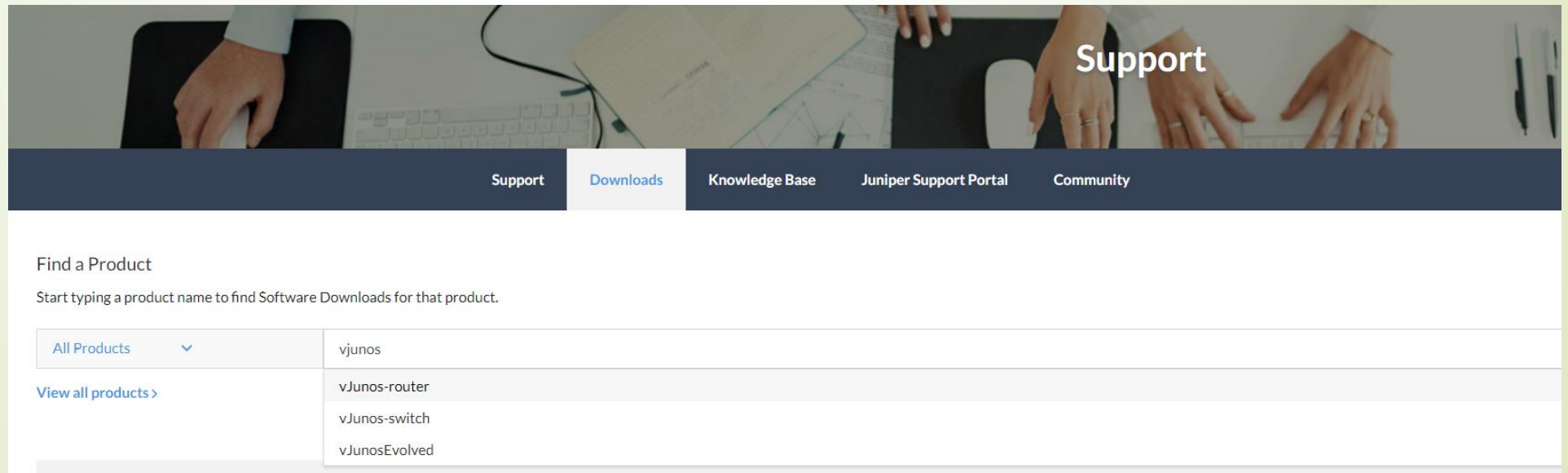


# Lab Environment Considerations

- DHCP needed?
- DNS needed?
- AD? Management-PC's? Clients? Test-Servers? (commit Feature in EVE-NG)
- Outside Network? Test-Lab (Hardware) needed? Interface-Cards in Server?
- Firewalls / NAT?
- VPN / MIST-Edge into your Lab?
- Traffic-Generators? Tip: <https://ostinato.org/>
- Your own „Chaos-Monkey“ / „Break-Fix-Tools“?
- One Big Topology VS multiple smaller ones?

# Fetching images

- ▶ 3 „base“ v-Images (<https://www.juniper.net/us/en/dm/vjunos-labs.html>):
- ▶ vJunOS-Switch (virtual EX9214)
- ▶ vJunOS-Router (virtual MX304)
- ▶ vJunOS-Evolved (based on JunOS Evo)



The screenshot shows the Juniper Support website interface. At the top, there is a navigation bar with the word "Support" in large white text on a dark background. Below this, a dark blue navigation menu contains the following links: "Support", "Downloads", "Knowledge Base", "Juniper Support Portal", and "Community". The main content area features a search bar titled "Find a Product" with the instruction "Start typing a product name to find Software Downloads for that product." Below the search bar, there is a dropdown menu labeled "All Products" with a downward arrow. To the right of the dropdown, a list of search results is displayed: "vjunos", "vJunos-router", "vJunos-switch", and "vJunosEvolved". A link "View all products >" is located to the left of the search results.

Product Name
vjunos
vJunos-router
vJunos-switch
vJunosEvolved





# Fetching images

- ▶ „Specialized“ images:
- ▶ 128T:  
Reach out to your Juniper SE
- ▶ APSTRA + APSTRA-ZTP + APSTRA-Flow (4.2.1):  
<https://support.juniper.net/support/downloads/?p=apstra>
- ▶ JSA:  
<https://support.juniper.net/support/downloads/?p=juniper-secure-analytics>
- ▶ vRR:  
<https://support.juniper.net/support/downloads/?p=virtual-route-reflector>

# Adding Devices to MIST

- Add config to vjunos-switch

```
vjunos-Switch
[edit]
root# load set terminal
[Type ^D at a new line to end input]
set system services ssh protocol-version v2
set system authentication-order password
set system login user mist class super-user
set system login user mist authentication encrypted-password $6$1fLlvz78BsafUvc3$I/qwr3G5PIOQn1Cxe2G
N.K880boqffh1RIKqE0nNctxstsf02Re6581xnTLqJkdbJMdB/bxZzgNCjkFWDHLaq0
set system login user mist authentication ssh-rsa "ssh-rsa AAAAB3NzaClyc2EAAAADAQABAAQOC2"
set system services outbound-ssh client mist device-id 93771c6d-62af-4697-all4-8b29eeab8c52
set system services outbound-ssh client mist secret 7a3de7543c298134057a86d7a4a4a42006d303b11922c2bf
ea42195c5ab5ad131e9536065d9d0287cb8ac4ff5f0ff2cdc251845b60cafce0caal5f311fbae6a5
set system services outbound-ssh client mist services netconf keep-alive retry 12 timeout 5
set system services outbound-ssh client mist oc-term.eu.mist.com port 2200 timeout 60 retry 1000
delete system phone-home
terminal:10: (14) syntax error: phone-home
load complete

[edit]
root# commit and-quit
commit complete
Exiting configuration mode
root>
```

- Depending on DHCP you need to add a static route and a nameserver and NAT!

```
root> configure
Entering configuration mode

[edit]
root# set routing-options static route 0/0 next-hop 10.10.100.1

[edit]
root# set system name-server 1.1.1.1

[edit]
root# commit
commit complete

[edit]
root#
```

# Allow Lab-Devices to reach the Internet

- ▶ Sampel SRX config for Source-NAT in the Lab

## Configure Source NAT using interface IP

In this example, all traffic from the trust zone to the untrust zone is translated to the egress interface, ge-0/0/2 interface IP address.

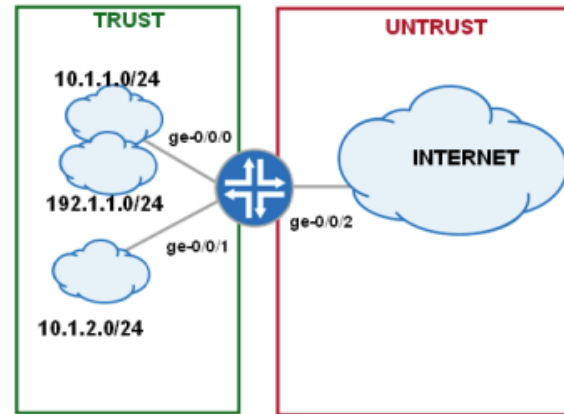


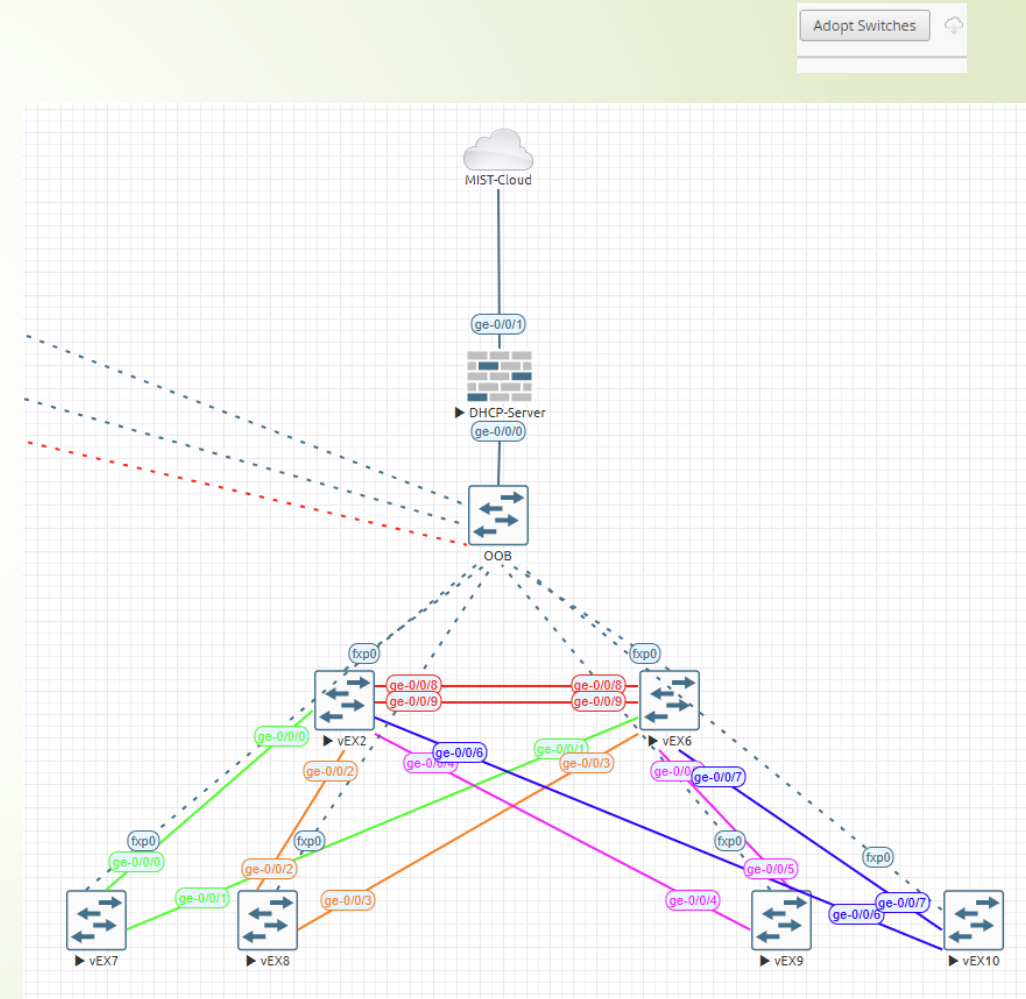
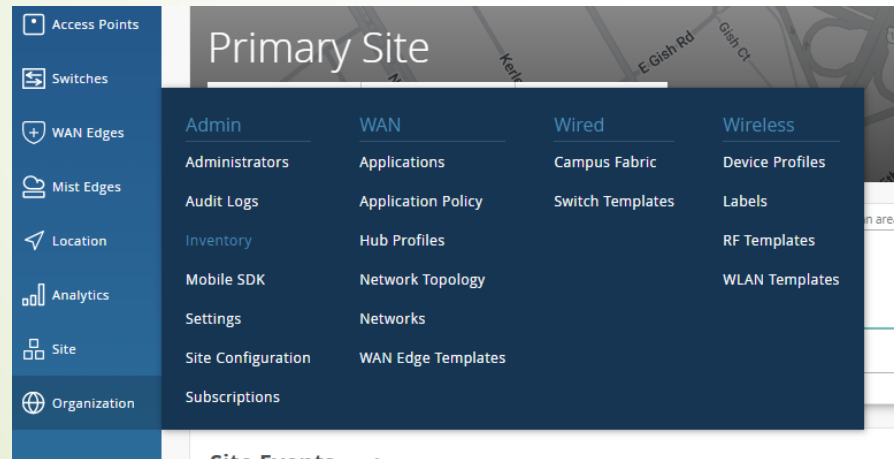
Fig1: source NAT using interface IP

```
[edit security nat source]
set rule-set rs1 from zone trust
set rule-set rs1 to zone untrust
set rule-set rs1 rule r1 match source-address 0.0.0.0/0
set rule-set rs1 rule r1 match destination-address 0.0.0.0/0
set rule-set rs1 rule r1 then source-nat interface

[edit security policies from-zone trust to-zone untrust]
set policy internet-access match source-address any destination-address any application
any
set policy internet-access then permit
```

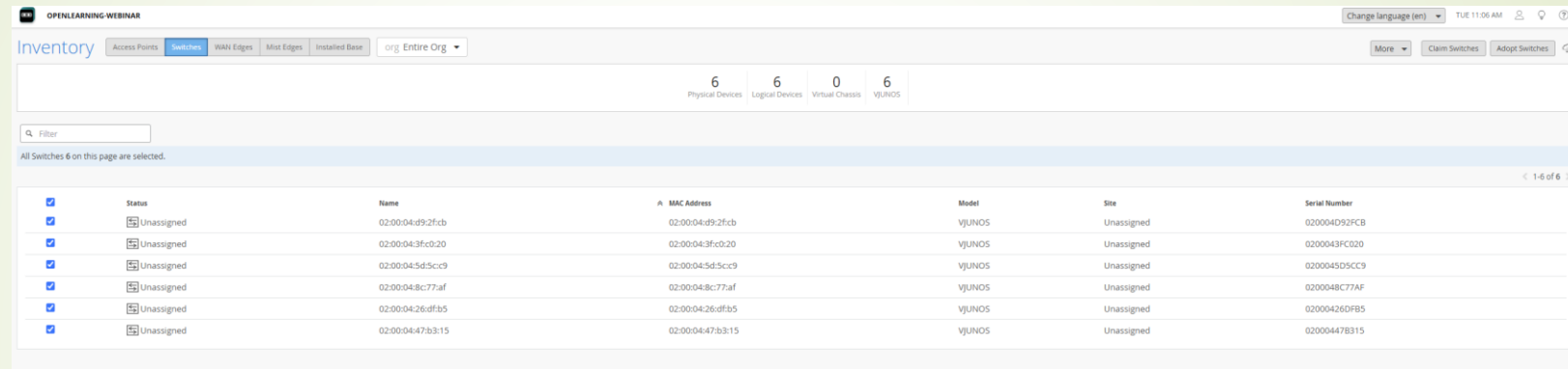
# Our Lab Topology

- vJunos-Switch for Spine / Leaf and Acces
- Connected via OOB-Port towards OOB-Switch
- OOB-Switch connected to DHCP-Server for Phone-Home
- DHCP-Server connected to Uplink (Mist-Cloud)
- Onboarded in MIST to save time:



# Our Lab Topology

➔ Wait for MIST to show the Device



The screenshot shows the MIST Inventory page for 'Entire Org'. It displays a summary of 6 Physical Devices, 6 Logical Devices, 0 Virtual Chassis, and 6 VJUNOS. Below this, a table lists 6 unassigned switches with their MAC addresses, models (VJUNOS), and serial numbers.

Status	Name	MAC Address	Model	Site	Serial Number
Unassigned	02:00:04:d9:2f:cb	02:00:04:d9:2f:cb	VJUNOS	Unassigned	020004D92FCB
Unassigned	02:00:04:3f:c0:20	02:00:04:3f:c0:20	VJUNOS	Unassigned	0200043FC020
Unassigned	02:00:04:5d:5c:c9	02:00:04:5d:5c:c9	VJUNOS	Unassigned	0200045D5CC9
Unassigned	02:00:04:8c:77:af	02:00:04:8c:77:af	VJUNOS	Unassigned	0200048C77AF
Unassigned	02:00:04:26:df:b5	02:00:04:26:df:b5	VJUNOS	Unassigned	02000426DFB5
Unassigned	02:00:04:47:b3:15	02:00:04:47:b3:15	VJUNOS	Unassigned	02000447B315

➔ Assign Device to a site WITHOUT using the „manage config via MIST“ checkbox!



The 'Assign Switches' dialog box shows 6 selected switches being assigned to the 'Primary Site'. The 'Manage Configuration' section has the checkbox 'Manage configuration with MIST' unchecked.

Status	Name	IP Address	Model
Connected	02:00:04:3f:c0:20	10.10.100.103	VJUNOS
Connected	02:00:04:5d:5c:c9	10.10.100.100	VJUNOS
Connected	02:00:04:8c:77:af	10.10.100.104	VJUNOS
Connected	02:00:04:26:df:b5	10.10.100.105	VJUNOS
Connected	02:00:04:47:b3:15	10.10.100.102	VJUNOS
Connected	02:00:04:d9:2f:cb	10.10.100.101	VJUNOS

➔ Wait for the Device to come online (roughly between 1 min and 5min)

Status	Name	IP Address	Model
Connected	02:00:04:3f:c0:20	10.10.100.103	VJUNOS
Connected	02:00:04:5d:5c:c9	10.10.100.100	VJUNOS
Connected	02:00:04:8c:77:af	10.10.100.104	VJUNOS
Connected	02:00:04:26:df:b5	10.10.100.105	VJUNOS
Connected	02:00:04:47:b3:15	10.10.100.102	VJUNOS
Connected	02:00:04:d9:2f:cb	10.10.100.101	VJUNOS

# Our Lab Topology

- Device is shown in MIST AND INTERFACES FINALLY SHOW UP!!!!!! 😊😊😊

The screenshot displays the Mist Cloud interface for a device named 'vjunos-switch'. The interface is divided into several sections:

- Front Panel / Port List:** Shows a grid of 20 SFP ports (0-19) arranged in two rows of ten. Port 0 is highlighted with a green icon.
- METRICS:** Displays various performance metrics with progress bars:
  - Switch-AP Affinity: --
  - PoE Compliance: --
  - VLANs: --
  - Version Compliance: 100%
  - Switch Uptime: 100%
  - Config Success: 100%
- PROPERTIES:** A table listing device details:

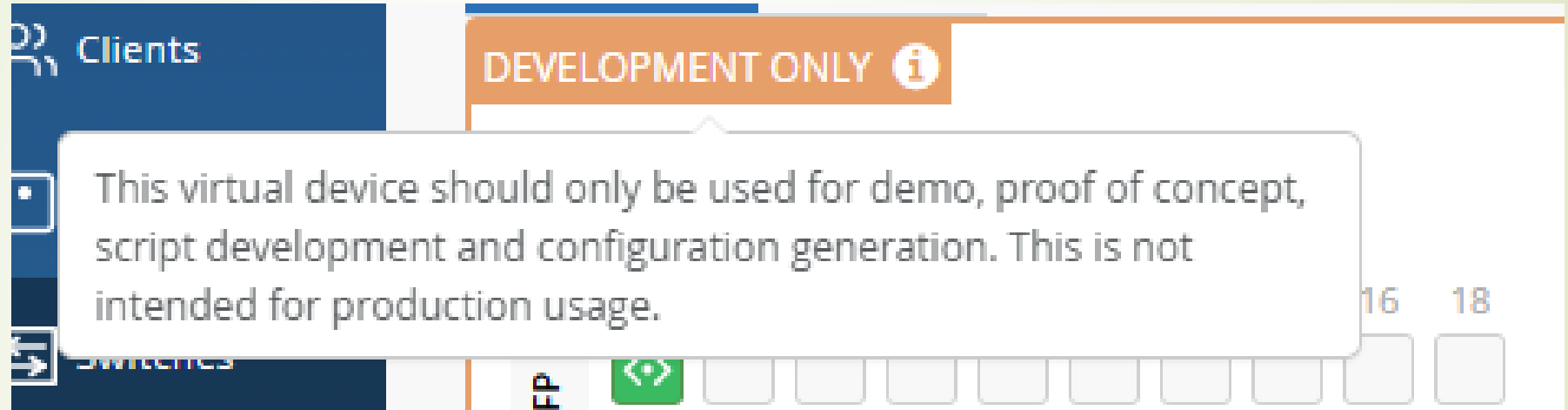
PROPERTY	VALUE
INSIGHTS	<a href="#">Switch Insights</a>
MAC ADDRESS	2c:6b:f5:46:54:c0
DEVICE ID	0200045d5cc9
MODEL	VJUNOS
VERSION	23.2R1.14
TEMPLATE	<a href="#">None (Configure)</a>
- STATISTICS:** A table showing operational status:

STATISTIC	VALUE
STATUS	Connected
IP ADDRESS	● 10.10.100.100 (fxp0.0)
UPTIME	22m
LAST SEEN	Jan 21, 2025 11:08:33 AM
LAST CONFIG	--

At the bottom, a banner indicates "Configuration is Not Managed by Mist" with a button to "Enable Configuration Management".

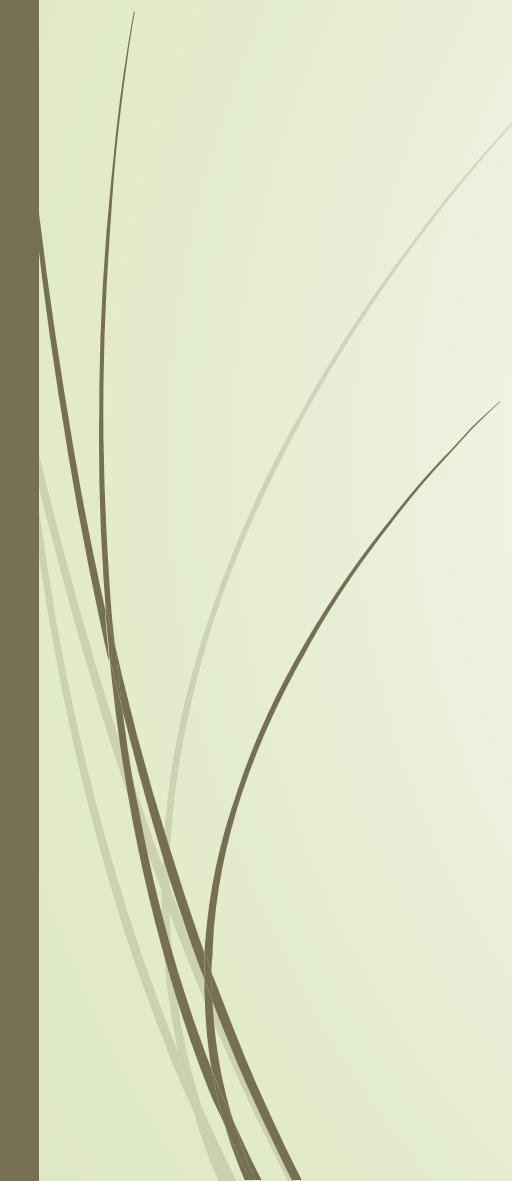
# Our Lab Topology

- Only for Lab usage!





# Our Lab Topology

- ▶ Live-Demo Time =)
- 

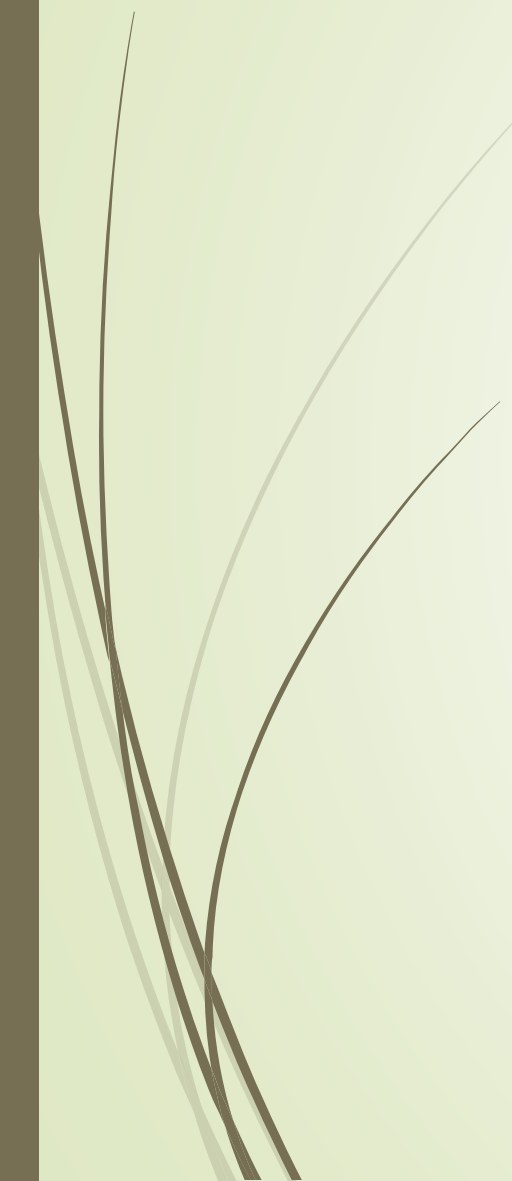


What to do in case something goes wrong?





# Pitfall: not enough resources (CPU / RAM)

- ▶ Symptom:
    - ▶ Multiple unexplainable errors / strange behavior in multiple ways
  - ▶ Cause:
    - ▶ Device has not enough CPU / RAM to perform basic tasks
  - ▶ Solution:
    - ▶ NEVER go below the recommendation from the template
- 

# Pitfall: booting up everything at once

- Symptom:
- Lab takes literally forever to start
- Cause:
- Device takes WAY more resources during bootup and CPU is overwhelmed
- Solution:
- Use the „delay“-option to start the devices one after another



<b>Startup configuration</b>	<b>Satellite</b>
None ▾	master ▾
<b>Delay (s)</b>	
0	

# Pitfall: eve-ception

- Symptom:
- Running EVE-NG on your Laptop in vmware Workstation and starting a lab is not working

➤ Cause:



- Solution:
- Don't use EVE-NG on your Laptop  
Use a proper Server (Vmware, Cloud or Bare-Metal)  
and access it via your Webbrowser  
Usually cheap to fetch on eBay



## More Infos

- ▶ YouTube Video Series covering EVE-NG and Juniper:  
<https://www.youtube.com/netchron>
- ▶ EVE-NG YouTube Channel:  
<https://www.youtube.com/@eve-ng-emulatedvirtualenvi9759>
- ▶ EVE-NG Website:  
<https://www.eve-ng.net/>
- ▶ EVE-NG Forum:  
<https://www.eve-ng.net/forum/>
- ▶ EVE-NG Helpdesk (Live-Chat):  
<https://www.eve-ng.net/index.php/live-helpdesk/>

# KAHOOT Time!



# Q&A



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