

# “Lab as Code” con Containerlab

Víctor Serrano  
24/10/2024



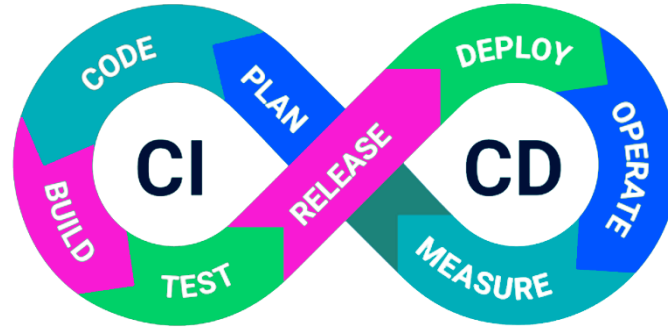
NOKIA

# Why virtual labs?

A right, not a privilege



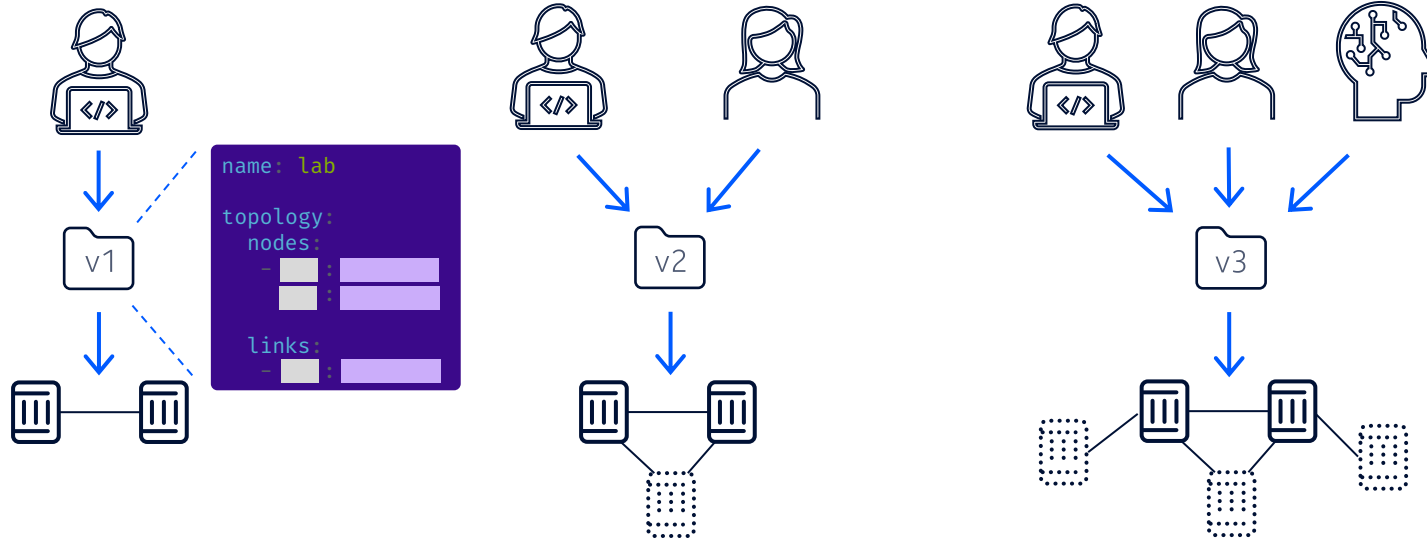
Education  
and learning



Change management  
and validation

# Virtual labs “Okay”, but why “as Code”?

## Versioning and Collaboration



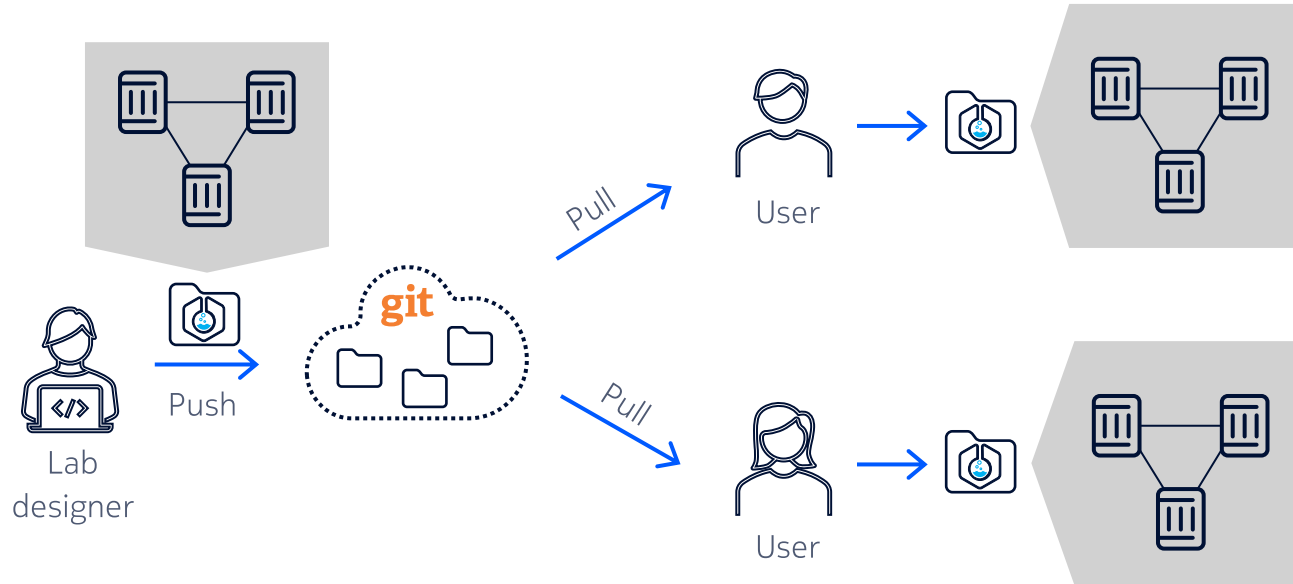
Initial  
Version

Design  
Evolution

New Inputs &  
Collaborators

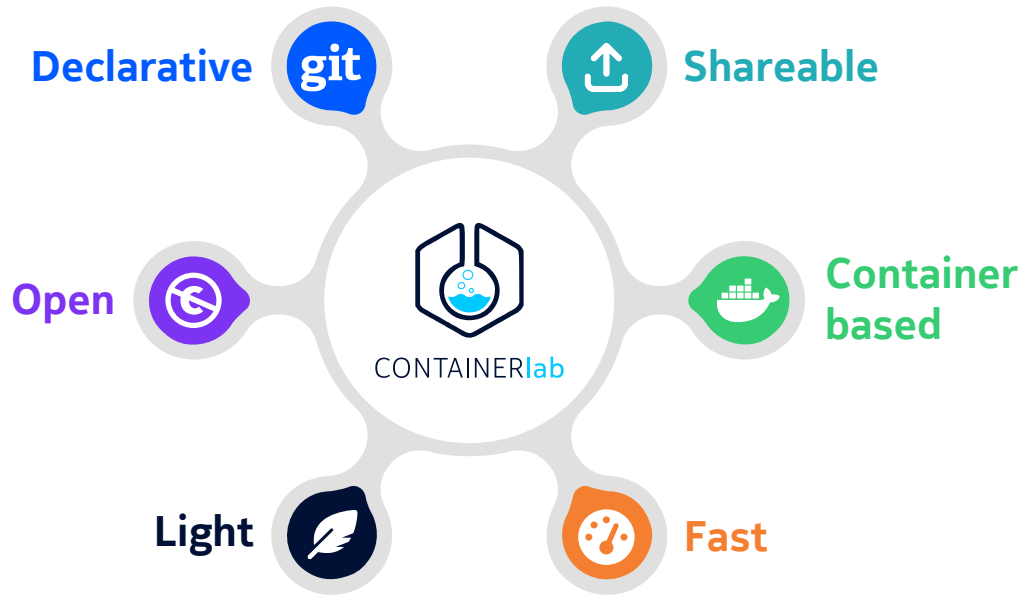
# Virtual labs “Okay”, but why “as Code”?

## Sharing



# Containerlab

“A” way to define, run and share networking labs



Docker-compose for your virtual labs



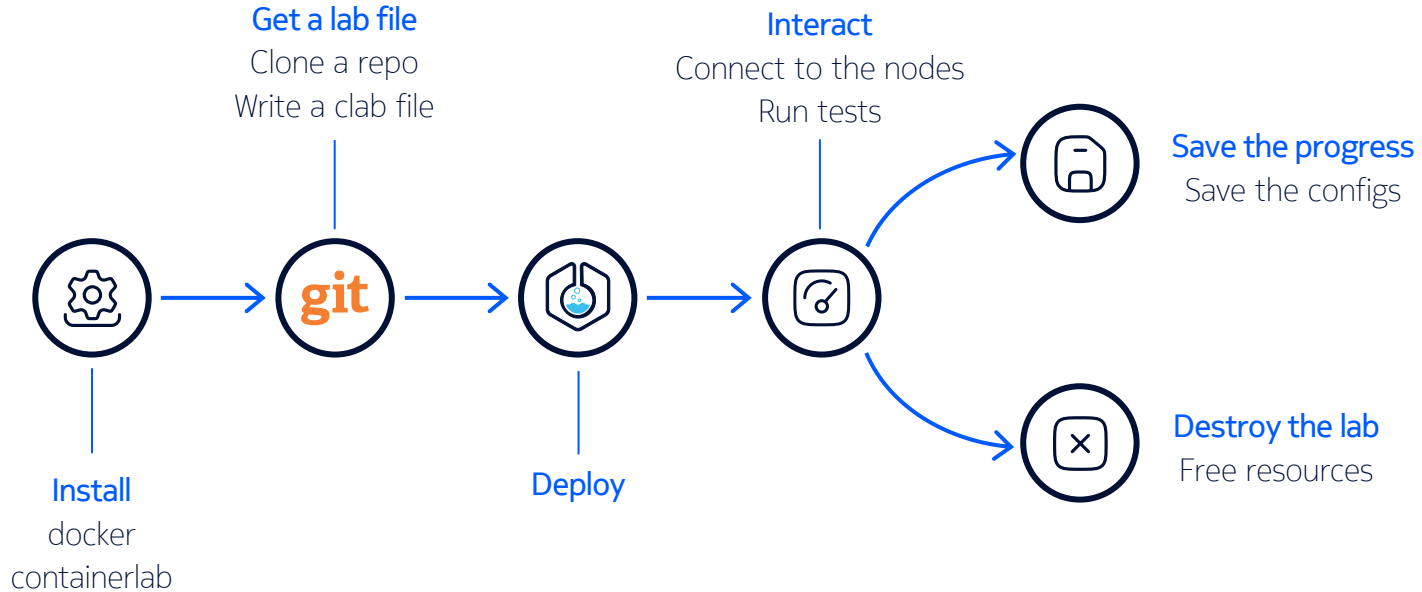
Infrastructure-agnostic & CI friendly



A common lab interface for Software and Network engineers

# Containerlab

## The Workflow



# Containerlab node types

## Containerized Network OSes

- Sourced by the vendor.
- Fast to spin up.
- Small footprint.
- Shareability and versioning.

Current trend is to **move away from VM** packaging towards containers **for new NOSes**

**NOKIA**  
SR Linux

**JUNIPER**  
NETWORKS  
cRPD

**ARISTA**  
cEOS

**CISCO**  
XRd

  
**NVIDIA**  
cVX

  
**KEYSIGHT**  
TECHNOLOGIES  
IXIA-c

and others...

**NOKIA**

# Containerlab node types

## Regular container images

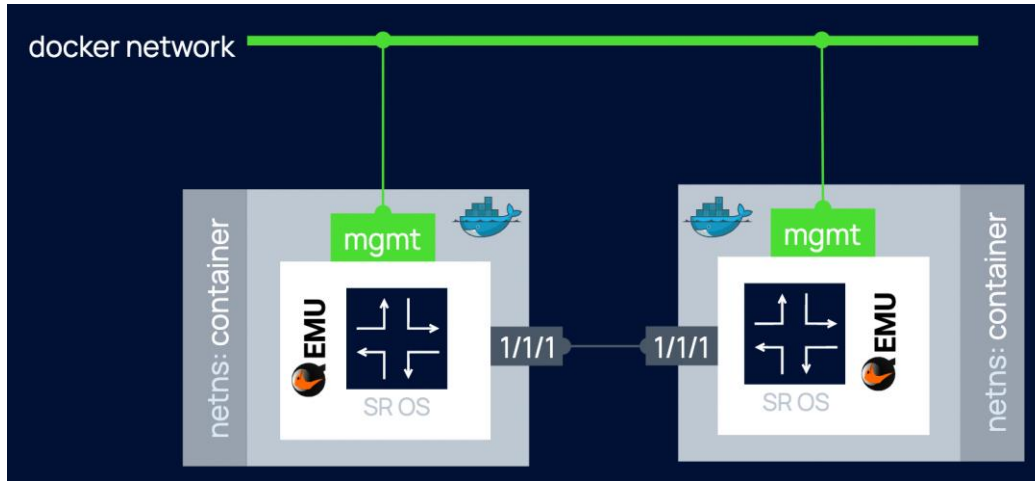
- Other available regular container images.
- Emulating clients.
- Hundreds of network-focused software:
  - Telemetry & Logging stacks.
  - Peering software.
  - Flow collectors.
  - etc.





# Containerlab node types

## Virtual Machines in a container package



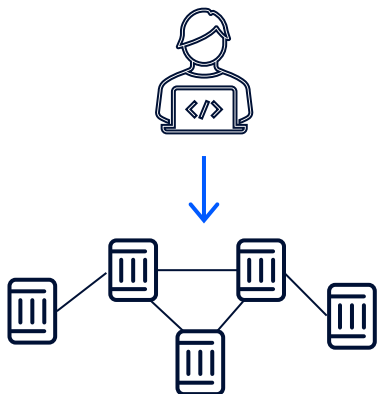
- Traditional NOSes packaged as a VM.
- Integrated with containerlab through [vrnetlab](#) open-source project.
- Onboard existing VM-based NOSes in a container package.



CONTAINERlab

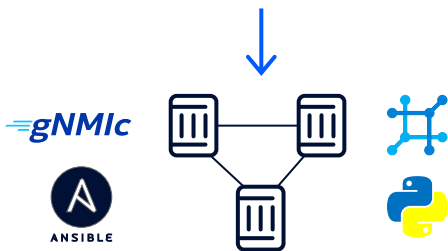
# Main use cases

For automation



Eats YAML for breakfast  
Looking for reproducibility and versioning for labs

Mostly deals with small-scaled labs



Uses applications that span beyond pure Networking use cases



Code-first approach



Git-native



Quick lab lifecycle management



Short, sweet, and familiar file layout



Welcomes containers and VMs



First-class support for the whole container ecosystem



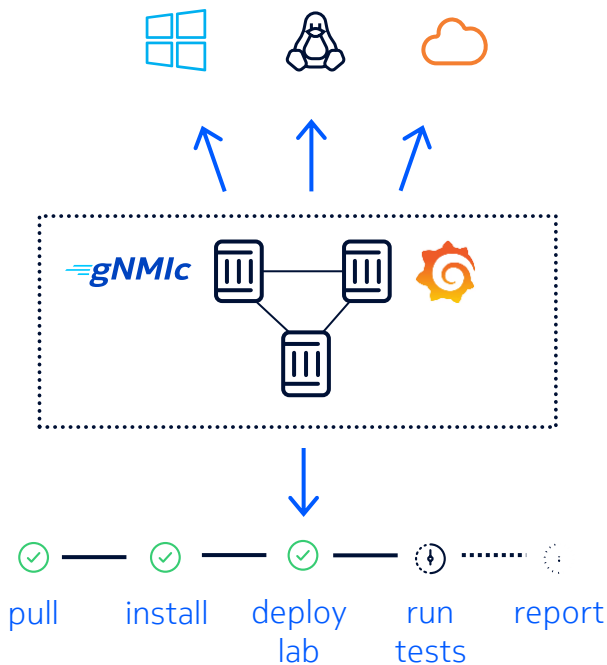
Direct connectivity for your automation stack



CONTAINERlab

# Main use cases

For automation



Infrastructure agnostic

VM and Container friendly

CI-friendly



Run ~anywhere  
Linux/WSL compute



Single binary  
statically compiled



Native container and VM support  
VM-integration via vrnetlab



Light  
It is just a CLI



Easy and fast installation  
Native to CI runners

# Main use cases

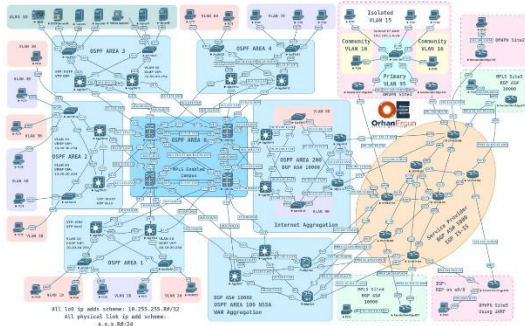
## For massive labs



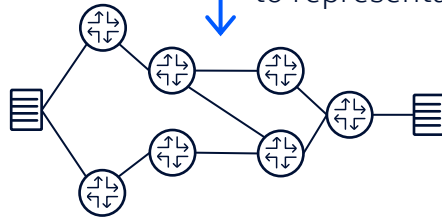
+



CONTAINERlab



Decompose large network  
to representative domains



The whole lab is a deployment unit  
single-node start/stops



Adding new nodes/link is a  
redeployment



Single host limits



# Demo Time

# Who uses Containerlab



# Community

Check them out!



[Discord server](#)



[Lab examples](#)



CONTAINER**lab**



[vrnetlab project](#)



[Clabernetes](#)



CONTAINERlab

<https://containerlab.dev>



# Copyright and confidentiality

The contents of this document are proprietary and confidential property of Nokia. This document is provided subject to confidentiality obligations of the applicable agreement(s).

This document is intended for use by Nokia's customers and collaborators only for the purpose for which this document is submitted by Nokia. No part of this document may be reproduced or made available to the public or to any third party in any form or means without the prior written permission of Nokia. This document is to be used by properly trained professional personnel. Any use of the contents in this document is limited strictly to the use(s) specifically created in the applicable agreement(s) under which the document is submitted. The user of this document may voluntarily provide suggestions, comments or other feedback to Nokia in respect of the contents of this document ("Feedback").

Such Feedback may be used in Nokia products and related specifications or other documentation. Accordingly, if the user of this document gives Nokia Feedback on the contents of this document, Nokia may freely use, disclose, reproduce, license, distribute and otherwise commercialize the feedback in any Nokia product, technology, service, specification or other documentation.

Nokia operates a policy of ongoing development. Nokia reserves the right to make changes and improvements to any of the products and/or services described in this document or withdraw this document at any time without prior notice.

The contents of this document are provided "as is". Except as required by applicable law, no warranties of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular

purpose, are made in relation to the accuracy, reliability or contents of this document. NOKIA SHALL NOT BE RESPONSIBLE IN ANY EVENT FOR ERRORS IN THIS DOCUMENT or for any loss of data or income or any special, incidental, consequential, indirect or direct damages howsoever caused, that might arise from the use of this document or any contents of this document.

This document and the product(s) it describes are protected by copyright according to the applicable laws.

Nokia is a registered trademark of Nokia Corporation. Other product and company names mentioned herein may be trademarks or trade names of their respective owners.