

Modern Network Labbing

Embracing “Lab as Code” with Containerlab

Speaker: Andy Whitaker

Problems with Labbing

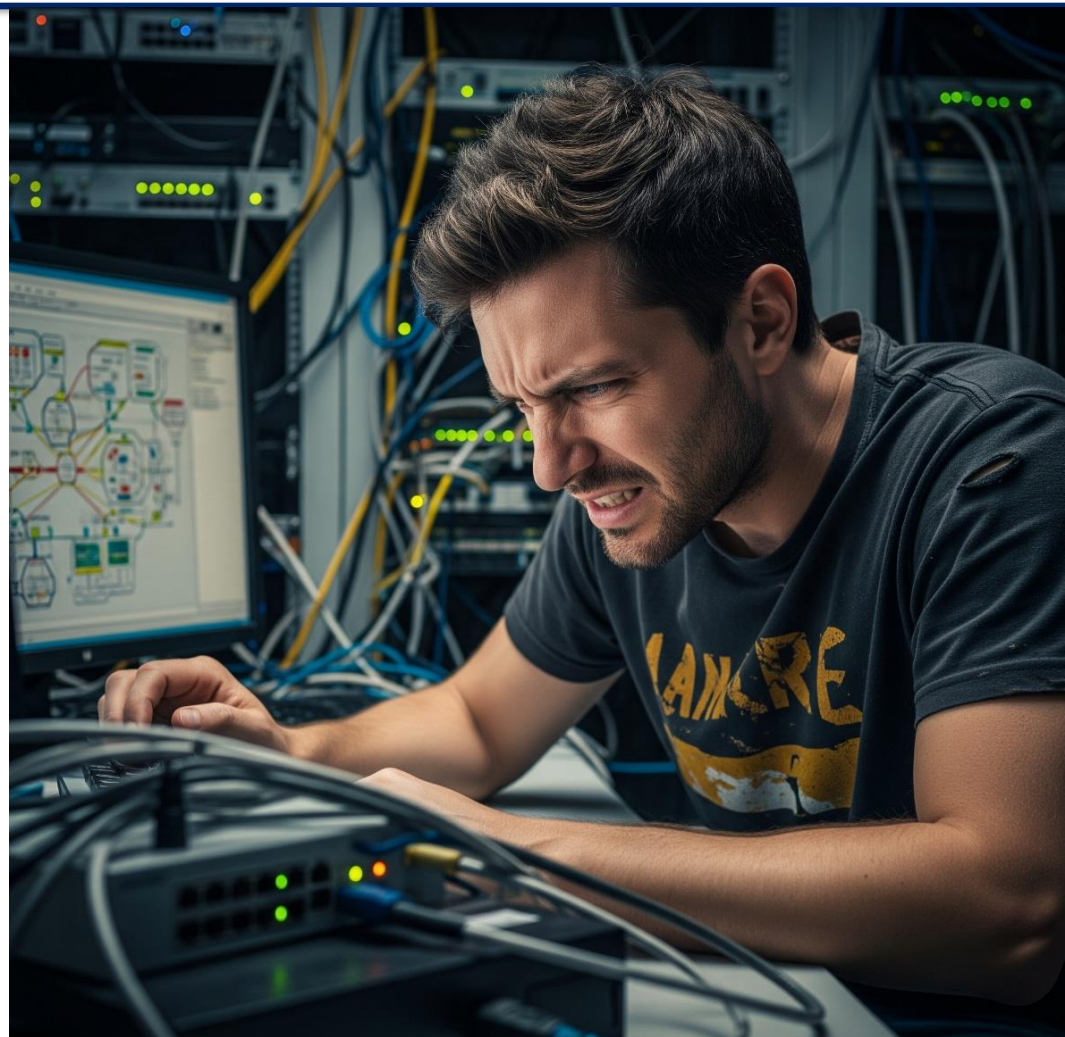
Issues with the status quo

Hardware:

- Expensive / Difficult to procure
- Keeping up with trends
- Incredibly difficult to share

VM Lab Solutions:

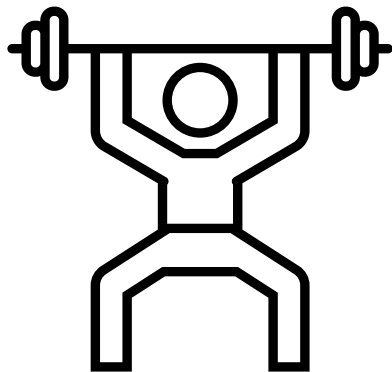
- VM solutions are often difficult to set up
- Lab software can be expensive for commercial use
- Sharing labs is better but still difficult
- Enforced Limitations
- Proprietary ecosystems (integration challenges)
- Resource utilization / portability



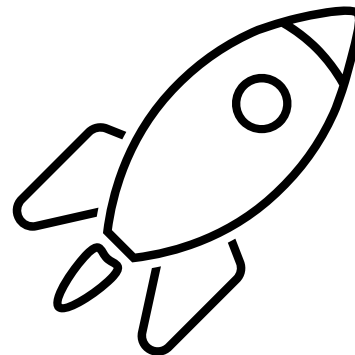
Importance of Two Labs

Lab for play and lab for pay

Personal Lab



Professional Lab



Containerlab

Facts

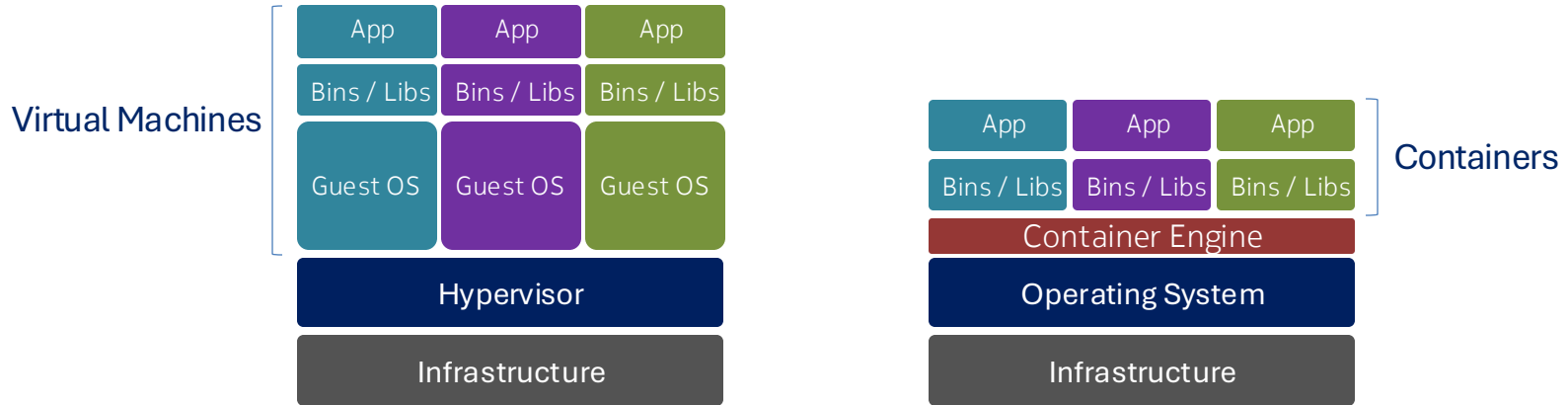
- Container-based
- Open Source
- Single binary file
- 280,000+ Installations
- 120+ Contributors
- 30+ Releases in 12 months
- 40+ Network OSes / Images Supported
- Used by major network vendors and enterprises
- Thriving community on Discord



CONTAINERlab

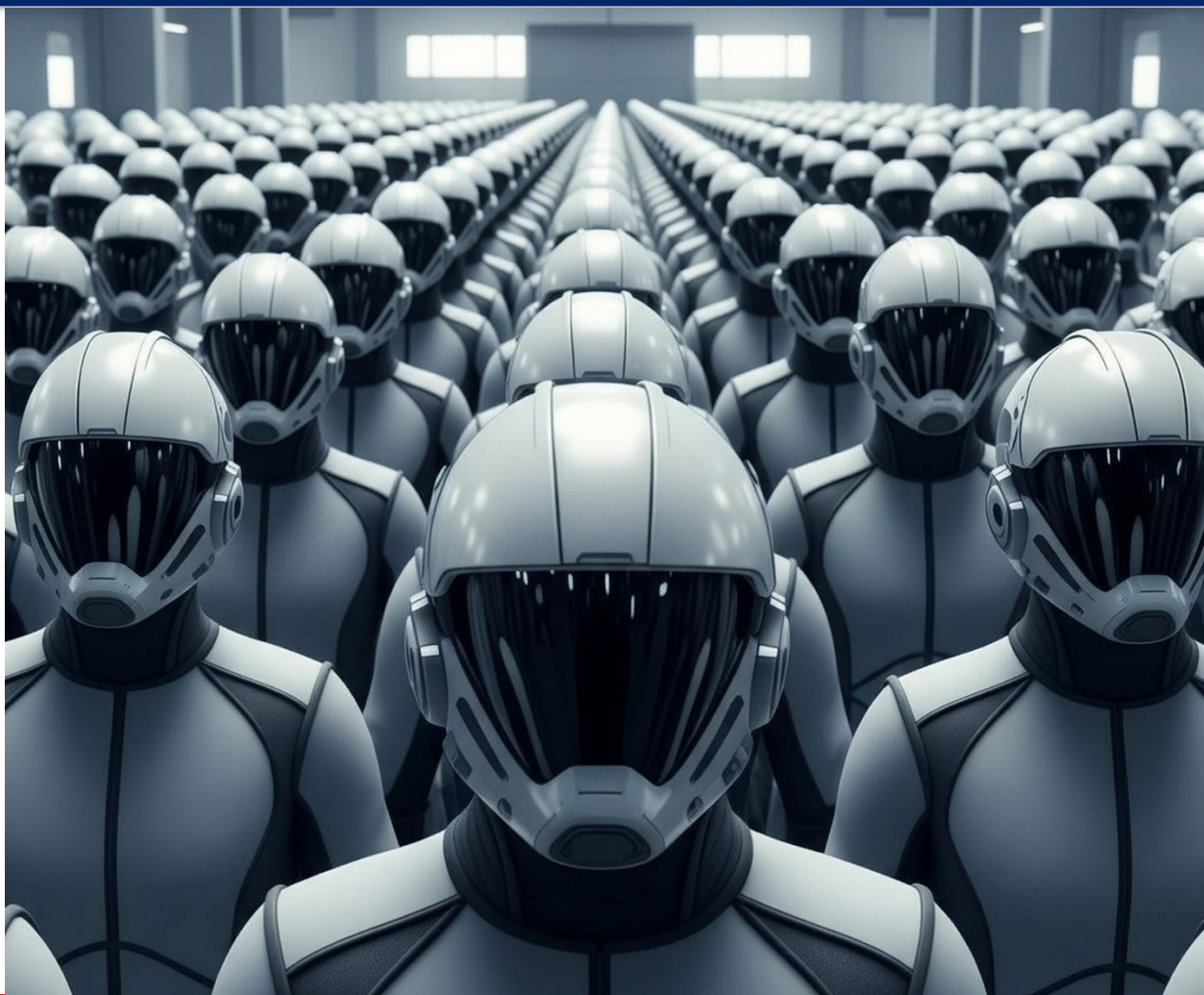
Advantages of Containers

Containers are lightweight



Reproducibility

Containers were developed at the same time the industry was solving several problems with software at scale. The result is an initiative to also create tools that focused on reproducibility.



Imperative vs Declarative

Imperative

Describe how to achieve the outcome in a step-by-step fashion.



Declarative

Describe the outcome you want and allow the underlying system to achieve it.



Containerlab Topology

Simple declarative lab definition

```
name: mylab

topology:
  nodes:
    spine:
      kind: nokia_srlinux
      image: ghcr.io/nokia/srlinux
    leaf:
      kind: nokia_srlinux
      image: ghcr.io/nokia/srlinux

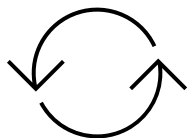
  links:
    - endpoints: ["spine:e1-1", "leaf:e1-1"]
```

Lab as Code

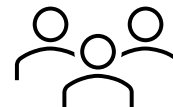
Why do we want to use “Lab as Code”?



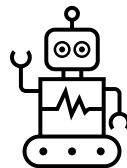
Version Control



Repeatability



Share



Automate

Demo

GitHub CodeSpaces

Free compute resources to run your labs!

- 120 cpu clock hours **FREE** per month
- Free for individual use
- Monthly usage reset
- Protections from going over and running a bill (will auto shut down if you do not define a billing method and budget)
- Containerlab documentation and images provided to ease CodeSpaces use



Honorable Mentions

Projects to improve your quality of life!

- Netlab – An orchestration tool which will generate your clab topologies AND provision common boilerplate for you such as adding IPs to your links, OSPF areas, BGP peerings, EVPN, etc...
- FRR – Free and open source lightweight routing control plane (used in SONiC and by many organizations)
- OrbStack – Fast alternative to run Docker containers and lightweight Linux VMs on MacOS (free for personal use)
- DevPod – Launch and manage devcontainers locally or on remote hosts with a friendly GUI interface
- Lima – Lightweight Linux VMs on MacOS and Linux with automatic filesharing and port forwarding (similar to WSL2)
- Multipass – Similar to Lima but Ubuntu machines only
- Edgeshark – Wireshark capture your containers

