Network lab with Vagrant and Ansible

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Network lab for Learning & Development

- practical excercises for **face to face training courses**
- two servers hosted inhouse, capacity 2 × 16 seats
- Cisco routers running in **an emulator** or in a KVM-based **virtual machine**
- accessible **over the Web** using HTTPS and Javascript-based terminal
- memory hungry, hard to scale

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Problem: labs for e-learning

- accessible for **everybody** from **anywhere**, ideally at **any time**
- **high peaks** of concurrent users expected
- should be cost-effective – (*close to*) free for participants
- should be **reasonably user-friendly**

This look like a job for *cloud computing*.

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There is NO CLOUD, just other people's computers

Author: Markus Meier, FSFE, CC-BY-SA 4.0

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Proposed solution: run labs on users' computers

- very diverse set of environments: *Windows, macOS, Linux, ChromeOS, Android, iOS, x86, amd64, arm, aarch64*
- *ideal:* run **everything inside web browser**
  - theoretically possible with today's browsers' technologies
  - bad effort/effect ratio
- *less ideal:* provide a VirtualBox image
  - VirtualBox provides similar experience on Windows, macOS, Linux
  - CPU architecture have to be fixed
  - dealing with virtual machines is often unpleasant (keyboard layout, screen resolution, font size...)
- *finally:* provide a headless VirtualBox image with web-based interface

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Prototype BGP lab

- automatically deployed using *Vagrant* and *Ansible*
- no hard dependency on *Vagrant*, can be deployed manually as well
- deploys **LXD containers** with *Alpine Linux* and *FRRouting* (cca. 70 MiB)
- router consoles exposed using `ttyd`
- static HTML content build using *Jekyll*

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https://github.com/oskar456/vagrant-netlab-bgp
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Thank you!

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The slides are already published on my website.