VyOS Networks

HOCHSCHULE ESSLINGEN

VYOS SUCCESS STORY

From Theory to Practice: How Hochschule Esslingen Leverages VyOS in Education

JULY 2025

Customer Overview

Hochschule Esslingen – University of Applied Sciences is one of Germany's leading technical universities, with a strong focus on engineering and applied sciences. In its Department of Computer Science and Engineering, students are introduced to the fundamentals of computer networks through hands-on learning — and since 2020, VyOS has been at the heart of that training.

The Challenge

The university needed a practical, scalable, and cost-effective way to teach networking concepts such as Ethernet, IP, routing, NAT, and firewalling. Traditional hardware-based labs — while effective — posed significant challenges:

- **Hardware management doesn't scale well** for large student groups
- **Cabling, resets, and maintenance** are time-consuming and error-prone
- **Cost of commercial routers** (e.g. Cisco) adds up quickly in large lab environments

The team sought a solution that could combine real-world relevance with flexibility and ease of use — without compromising on depth.

Exploring Alternatives

While considering options, the team explored both **hardware appliances** and other **open-source platforms** like OPNsense and OpenWRT. However, most of these alternatives lacked a modern CLI, scalability for virtualization, or the advanced routing features needed for effective curriculum delivery.

With VyOS, and particularly the **VyOS for Good** program, the university found a solution that checked every box: an enterprise-grade router OS that could be easily deployed in virtual environments, with extensive documentation and support for core networking protocols.

The VyOS Solution

Since 2020, **hundreds of undergraduate IT students** at Hochschule Esslingen have used VyOS to build practical networking skills as part of their core curriculum.

The university leverages **Oracle VirtualBox** to run virtual testbeds. Each student works with two VyOS virtual machines:

- **One pre-configured router (with DHCP, NAT, etc.)**
- **One clean VyOS instance that the student must configure from scratch**

Through this setup, students learn how to build:

- **DHCP services**
- **Stateful firewalls**
- **Port forwarding**
- **Tunnels and routing between multiple networks**

The **VyOS CLI** makes the learning curve approachable, while the **comprehensive documentation and examples** help guide students through increasingly advanced tasks.

Results

VyOS has proven to be a **stable, accessible**, and **powerful platform** for teaching computer networking at Hochschule Esslingen. With VyOS, the university is able to:

- **Scale practical labs** to large cohorts with minimal overhead
- Offer **real-world, hands-on training** with professional-grade tools
- **Avoid the cost and complexity** of hardware-based labs

Feedback from students has been consistently positive — most are able to configure and manage VyOS within a short time, preparing them for future roles in networking and systems engineering.

Why VyOS?

- **CLI simplicity:** Ideal for education, yet powerful enough for advanced tasks
- **Flexible virtualization:** Runs smoothly in student environments via VirtualBox
- **Robust documentation:** Supports self-guided learning and experimentation
- **Community & support:** The VyOS for Good program made adoption seamless

Looking Ahead

The team at Hochschule Esslingen continues to use VyOS as a **core part of its curriculum**, and recommends it to other institutions aiming to provide accessible and practical networking education.

> *VyOS is an excellent solution for teaching computer networks. It's easy to learn, robust, and powerful — and we strongly recommend it to other universities.*
>
> — Lecturer, Hochschule Esslingen