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Empowering ICT Education: How Computer Learning Center Leveraged VyOS for Advanced Lab Environments

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Customer Overview

Computer Learning Center (CLC | <https://www.clc-africa.com/>) is a premier ICT and business training institution based in East and Central Africa, with a presence extending to Dubai and Egypt. A subsidiary of Mart Networks, CLC has spent over 27 years bridging the gap between academic theory and industry practice, offering certifications from global ICT leaders including Cisco, Fortinet, VMware, and Palo Alto Networks.

Challenge

As CLC expanded its training programs, the institution needed to host hundreds of virtual lab environments to support hands-on learning. Key challenges included:

- **High Costs of Hosted Labs:** Commercial virtual routers with per-student licensing were financially unsustainable for short-lived, non-production lab environments.
- **Performance Limitations:** Trial licenses often came with bandwidth caps (e.g., 1 Mbps), rendering them impractical for lab use.
- **Lack of Flexibility:** The need to support multi-vendor, advanced features like BGP, VRF, and VXLAN, while running on diverse hypervisors (VMware Workstation, ESXi, KVM) demanded a robust yet lightweight solution.



Why VyOS?

VyOS emerged as the ideal platform after thorough evaluation of several open-source and commercial alternatives. CLC found VyOS to be:

- **Feature-Rich & Lightweight:** Support for advanced protocols such as MP-BGP, VRF, MPLS, VXLAN, WireGuard, and IPv6—without demanding high system resources.
- **Easy to Automate:** VyOS VMs were rapidly deployed across lab sandboxes using templates and automation tools.
- **Vendor-Neutral & CLI-Friendly:** Instructors could replicate CLI environments from other vendors, making it ideal for vendor-agnostic training.
- **Well-Documented:** A robust library of official resources and community tutorials (e.g., Level Zero Networking) helped streamline deployment and exploration of new use cases.



Implementation

CLC integrated VyOS into its custom-built Data Center hosting environment, where each student lab required internet access and advanced routing capabilities. VyOS powered connectivity across hundreds of sandboxed environments, with key technical advantages:

- **Commit/Confirm Configuration System:** Enabling safe experimentation by students and structured review by instructors.
- **Container Support:** VyOS containers powered services like AdGuard Home for content filtering and Tailscale for secure remote access.
- **Resource Efficiency:** VyOS ran smoothly on hardware as modest as 2GB RAM and 2GB flash storage.

Educational Impact

VyOS became a powerful teaching tool across CLC's curriculum. In Network+ and vendor-neutral courses, instructors demonstrated protocols like BGP and OSPF using VyOS VMs, giving students hands-on exposure to real-world networking.

Beyond the Classroom

VyOS also proved invaluable in home labs. Bernard Omuony, Senior Network Engineer at CLC, adopted VyOS to manage secure remote access to his NAS, run containers for content filtering, and enable smart home automation—all without relying on a public IP address.

Support from VyOS for Good

Through the **VyOS for Good** initiative, CLC received institutional access to the LTS version of VyOS. The onboarding and support experience reaffirmed VyOS' commitment to accessible education and community-driven innovation.

Results

- **Lowered Infrastructure Costs:** VyOS eliminated the need for costly router licenses while supporting dynamic, scalable lab environments.
- **Enhanced Learning:** CLC improved student experience with fast, customizable, and realistic lab simulations.
- **Improved Operational Efficiency:** Automation tools (Terraform, Ansible, Napalm, Netmiko) enabled quick deployment and reset of lab environments.



Looking Ahead

CLC continues to explore deeper integrations—such as deploying open-source IPS/NGFW tools like Snort and Zenarmor—on top of VyOS to further enrich lab capabilities.

Conclusion

VyOS has become an integral part of CLC's training and infrastructure strategy. Its flexibility, performance, and strong community support make it an ideal platform for educational institutions looking to deliver practical, future-ready ICT skills.



"VyOS is a perfect example of software for the good of humanity. It empowers us to deliver enterprise-grade training without the enterprise-grade price tag."

— Bernard Omuony, Senior Network Engineer and Instructor at CLC

