

# CML – Simulation-based software: an effective educational tool for distance learning

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## ABSTRACT

Information Technology (IT) education is disrupted by distance learning since it is primarily reliant on hands-on labs and practical experience. In the era of rapid technological change and innovation, the quality of the IT courses offered in higher education is crucial to developing the next generation of IT specialists. In this context, simulation-based software solutions must be adopted immediately to enhance the IT education learning process significantly.

## CCS CONCEPTS

• Applied Computing • Networks

## KEYWORDS

CML, Virtual tool, NetDevOps, IT Education, Distance learning

## 1 Introduction

Providing opportunities for students to work with current technology to validate their theoretical knowledge is one of the key challenges of teaching IT network-related topics. Virtual software tools are the most cost-effective alternative to expensive physical labs. They provide students, even remotely, with an environment for exploring and experimenting with evolving networking technologies.

## 2 CML Tool in IT Networking Education

As the IT sector evolves towards programmability, applications, and integrations, NetDevOps, is one of the most promising directions. It integrates DevOps into networking to ensure

network scalability and a replicable process [1]. Cisco Modelling Lab Enterprise (CML) is a proprietary network simulation tool that can enable the transition to the age of network automation and power the NetDevOps transformation. CML can be deployed to simulate Cisco and non-Cisco networks by creating a lab environment with real Cisco IOS images and a simple drag-and-drop interface. This network modeling application is a multiuser shared lab platform that enables your whole team to collaborate, design and monitor their labs. The most significant expected outcome of the implementation of CML will be the delivery of findings faster, more efficiently, and at a lower cost than in traditional laboratories since CML allows us to design, test, and troubleshoot on virtual equipment. Such a platform will include all the required tools for laboratory and practical work, including the solution to sophisticated telecommunication networking tasks. Besides, it offers an effective platform for acquiring core skills in software development, NetDevOps, network programmability, automation, and security.

## 3 Conclusion

Network virtualization technology was developed to reduce the high cost of dedicated network education labs. The CML tool facilitates the development and deployment of network modifications in a continuous integration environment.

## REFERENCES

- [1] Jay Ashok Shah and Dushyant Dubaria. NetDevOps: A New Era Towards Networking & DevOps. In Proceedings of the 2019 IEEE 10th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON), New York, NY, USA, 2019, 0775-0779, DOI: <https://doi.org/10.1109/UEMCON47517.2019.8992969>.