BUILDING A CYBER-EDUCATION LAB

COSTS, CONSIDERATIONS AND ALTERNATIVES

ON-PREMISE COST FACTORS: CAPEX IS JUST THE TIP OF THE ICEBERG

More people than ever are considering a career in cybersecurity. Cybersecurity professionals are in demand, command competitive salaries, and have great job security. As such, cyber education is increasingly important. However, traditional textbook teaching methods are not sufficient to effectively train students to become practitioners. Real world training in live infrastructure is paramount to providing a world class education, yet most educational institutions do not have a physical lab to deliver the necessary curriculum or training required for students to conduct experiments, analyze results, and repeat processes.

Any cybersecurity lab must have, at minimum, the following components:

1. **COMPUTE**: The compute infrastructure for virtual machines. This means physical servers. At least 3 servers are required for a cluster.
2. **STORAGE**: A redundant, highspeed, networked storage solution. This means at least two servers configured as a NAS or a SAN.
3. **VIRTUALIZATION SOFTWARE**: 1 VMware vSphere Enterprise Plus license for per CPU.
4. **LEARNING MANAGEMENT SYSTEM**: for the administration, documentation, tracking, reporting, automation and delivery of educational courses, training programs, or learning and development programs.

SETTING UP AND SCALING THE ENVIRONMENT

If there is no available classroom space outfitted with the proper cooling, electricity, and other requirements, you might need to build an adequate facility which requires available real estate. Real estate costs can vary considerably as the following will need to be taken into consideration:

- Number of enrolled cyber students
- Space for on-premises servers
- Redundant 240v Power
- Seating and computers for students
- Required hardware cooling and ventilation systems
- Security systems

COST FACTORS

Take into consideration the physical hardware and power required to build out a cyber-security lab. For the following example, ~100 students will have access to the lab. Note: real estate and constructions costs are intentionally not included as they will vary significantly by locale.

HARDWARE (CAPEX every 3 years)	ON-PREMISE LAB	HYPERQUBE
3 Servers (32 cores, 1TB of RAM ea.)	💵💵💵	
Redundant Network Storage	💵💵💵	
Hi-Speed and Redundant Networking (multiple 10g or 25g switches)	💵	
Hardware Support Contract	💵	
		NO CAPEX COSTS
SOFTWARE (Annual subscription)		
Virtualization: VMware, vSphere Enterprise+	💵	
VMware, vSphere Enterprise+ Annual Support	💵	
Cyber LMS (GUI for students to access content)	💵💵💵	**ALL INCLUSIVE ANNUAL SUBSCRIPTION**
SPECIALIZED LAB SUPPORT		
VMware Engineer	💵💵💵	
Datacenter/Storage Engineer	💵💵💵	
Administrative Staff/Security	💵💵	
Instructional Designer (build cybersecurity content)	💵💵💵	

CYBER RANGE AS A SERVICE: A COST EFFECTIVE ALTERNATIVE

A Cyber Range is a platform providing an isolated virtual environment which enables educators to build risk free, on demand live infrastructure where they can deliver realistic, hands-on/experiential cybersecurity exercises to their students virtually. Students can utilize a Cyber Range to understand a concept and put that concept into practice, develop real-world cyber skills, work as teams to solve cyber problems, conduct experiments, analyze results as well as prepare for cyber credentialing exams.

Cyber Ranges are self-managed, therefore do not require a physical lab, have no reliance on engineering or specialized employees as well as no associated data center or hardware costs. Important features to look for in a Cyber Range include:

Customizable and scalable: tools-agnostic, nothing pre-packaged, completely customizable allowing users to address specific organizational and training needs

Easy to setup and deploy: a no code/drag and drop solution that can be deployed efficiently, without requiring additional staff or extensive training
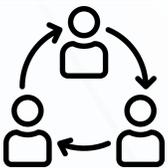
Collaborative: invite one or many users into environments for real-time collaboration, regardless of physical location

Reusable: build safe and immersive environments that are reusable for simulating real-world threats and their analyses

Easily accessible: access from anywhere via a browser, providing flexibility in an ever changing environment.

FAREWELL TO THE PHYSICAL LAB

Physical Labs, which were once an absolute necessity, are now seemingly obsolete as agile, customizable, scalable, flexible, reconfigurable and infrastructure expense eliminating cyber ranges have proven to be an invaluable and irreplaceable solution. Immediate ROI of a cyber range include:

- Real-time performance-based learning and assessment
- A virtual environment where individuals can collaborate to improve their skills and teamwork in solving cyber problems
- A risk-free environment where new ideas can be tested

Not all Cyber Ranges are created equal, so it's good to have a plan to evaluate the features and benefit differences between providers before settling on one. Testing the usability on a small scale (perhaps a POC) before you buy can help illuminate its substantive value based on your needs as well as provide clarity around ROI.

It's no secret there is currently a gap in cybersecurity skills. Cybercriminals are becoming more and more adept at navigating security systems and breaching them, as if they're upgrading their skills at a faster pace than cybersecurity teams can master how to respond to those attacks. The threat landscape will continue to evolve, and a cyber range will be pivotal in providing future cyber professionals with continual practice and education that reflects real-world scenarios and threats so they are wholly prepared to begin the journey toward a cybersecurity career.

About HyperQube
We are the "Copy and Paste for Infrastructure" company. The HyperQube Cyber Range is a no code, drag and drop solution where you can build risk free, on demand live infrastructure. With no reliance on engineering, no data center and no hardware investment you can create exact replicas of your connected and configured network in as little as 30 seconds that feel and operate like your production network. For more information, contact us or visit us at hyperqube.io.

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