Dynamic Pentest Lab Generator

Building a standardized Azure Pentest Deployment Framework

Graduate

Janosch Bühler

Samuel Maissen

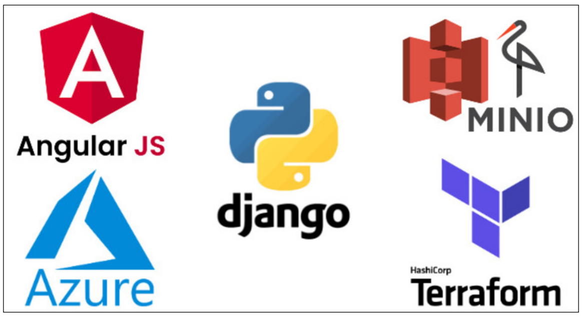
Dante Suwanda

Initial Situation: Hacking-Lab is a platform that provides ethical hacking for educational purposes. The overall goal is to promote awareness in the field of hacking and security. The corresponding challenges are developed in the format of a capture the flag scenario. As it stands, Hacking-Lab leverages Terraform deployments to establish pentest labs in Azure. Each lab, consists of a static Terraform deployment, which is manually developed to suit a specific use-case. This approach, involves a time-intensive process that necessitates manual interventions and several procedures. It also calls for time dedicated to debugging the Terraform deployment. Additionally, it expects the lab creator to possess knowledge of cloud deployments.

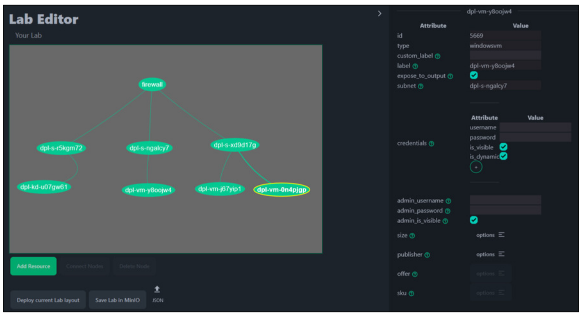
Objective: The objective of this bachelor's thesis is to develop a web application that automates the deployment and configuration of custom pentest lab environments, integrating it into the existing Hacking-Lab infrastructure. The project aims to implement a Visio-like tool that defines the basic infrastructure of a corporate IT network, generating configurations for deployment via Terraform. The solution should simplify the creation of network setups with multiple subnets, deployment of virtual machines and container services. It should include VPN access for students, the possibility to manage communication between resources like a firewall, and DNS resolution for these resources. The tool should offer the ability to use existing Hacking-Lab Docker images and allow virtual machines to be customized. It should also provide options for distributing dynamic flags and setting static or dynamic passwords, enhancing the uniqueness of the labs.

Result: The project successfully established a solid framework for generating pentest labs. This was achieved using Django for backend operations and Angular for the frontend, ensuring a scalable and maintainable solution. For the deployment part Terraform was used, which dynamically configures and deploys the necessary resources based on the configuration applied in the frontend. The framework integrates seamlessly with Hacking-Lab using SSO authentication.

Core Technologies
Microsoft, Angular, Django, HashiCorp, MinIO



Dynamic Pentest Generator Frontend
Own presentment



dpl-vm-y8oojw4

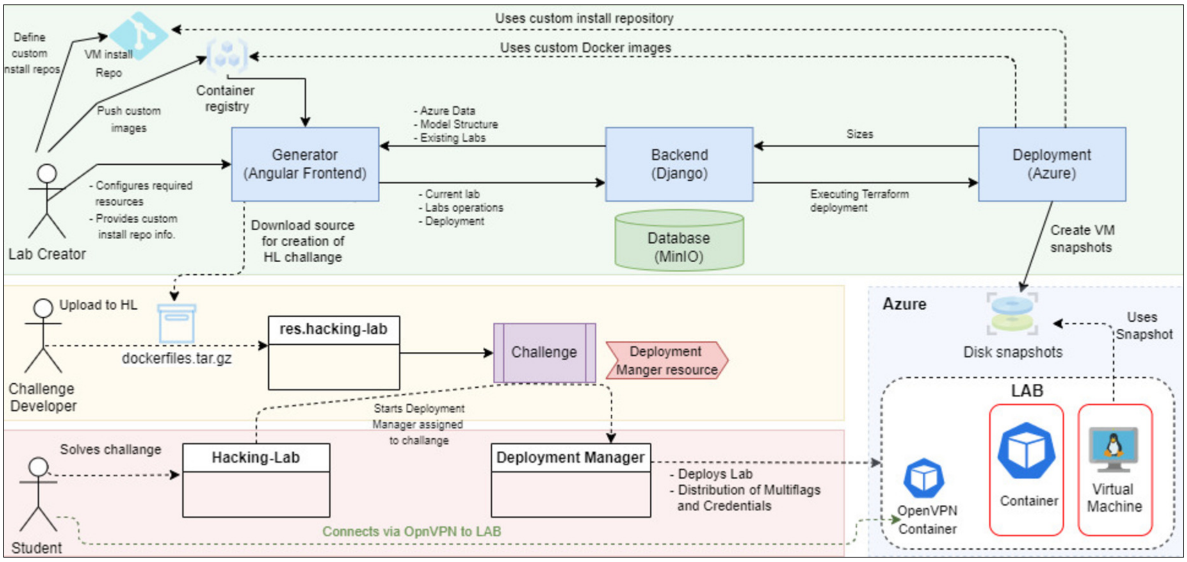
Attribute	Value
id	5669
type	windowsvm
custom_label	
label	dpl-vm-y8oojw4
expose_to_output	✓
subnet	dpl-s-ngalcy7

credentials

Attribute	Value
username	
password	
is_visible	✓
is_dynamic	✓

admin_username	
admin_password	
admin_is_visible	✓
size	options
publisher	options
offer	options
sku	options

Dynamic Pentest Generator System-context
Own presentment



Advisor
Ivan Bütler

Co-Examiner
Daniel Frei, Swiss Reinsurance Company Ltd, Zürich, ZH

Subject Area
Security, Networks, Security & Cloud Infrastructure, Software

Project Partner
Hacking-Lab AG, Jona, SG