Case Study – Test Plan

“Only Flights”

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Project Members & Student Numbers:

* Kaloyan Andreev (4408020)
* Francisco Marcó (4467752)
* Sava Vasilev (4663438)

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Case Study - Group 10

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# Preface

This document will detail the goals, definition and implementation of the Testing process that will undergo the Case Study Project. Alongside this document, will follow in the future a Test Report where the steps to be detailed here will be followed to determine the performance and functioning of our Project. In the following chapters, it will be outlined our goals, process, and further comments to complement the Test Report.

## Goal of the Test Plan

The main objective of this document is to determine how functional is our Project, by applying a series of tests. These tests will be selected with the intention of conforming to our functional and non-functional requirements (outlined in the URS document of this Project) and to ensure that major issues are identified and fixed before delivering the project.

## Way of working

After devising this document, our team will perform the tests outlined here and will devise a Test Report, where our findings will be discussed and we will make a conclusion as to whether or not our Project is working as intended. Before this period, we will update this document with any feedback given to us by our Tutor.

## Scope of the testing

These tests will be analyzing three core aspects of the project: Application, Infrastructure and Security. We believe these to be the foundations of the project and as such we must ensure that their functioning is up to expectations and conforms with our requirements. In each chapter, we will go in-depth about our goals with the test and the components that must be tested.

## Objective List

Below is a list of the rough objectives we hope to fulfill by performing the Tests.

* **Infrastructure is cloud-based and will reduce costs as opposed to an onsite one and will also provide more worldwide coverage**
* **Web-application is delivered on a dedicated webserver**
* **Database server securely stores application data, user data, and logs**
* **Application delivers cloud infrastructure automation**
* **Ensure all core-concepts from the Course are implemented**
* **The provided infrastructure can hold an initial 100 users per day with an option to extend the current infrastructure in response to a scaling user flow.**

# Applications testing

## Testing Goals

The goal of testing the Applications of our project is to conform with our deliverables and ensure that critical main components of our Project are functioning. We will focus on testing of the “TrExecutor” application and “OnlyFlights” website application.

Firstly, the infrastructure automation application “TrExecutor” will be tested. The objective is to ensure that the application is functional, meaning that it delivers in its task, while also ensuring other aspects such as security, ease-of-use, etc.

Followed that, we will analyze the “OnlyFlights” website, where the objective is to ensure all website functionalities interact properly and that it is ready for deployment. Additionally, its security will be tested as well as if it could operation with high number of requests.

If necessary, the team will consider developing an UML + Use Case diagram to have a clearer look at the website application’s design.

## In-scope

The following items are inside of the testing scope for our applications. These are the priorities during the testing and accomplishing these means that our Project is working as intended.

* **Website is accessible through the internet**
* **Log-in page is mandatory for users to access**
* **Sign-up page is accessible for new users**
* **Log-in authenticates users by storing their credentials in the Database**
* **Passwords are hashed for security**
* **User can book flights in the homepage**
* **Flight list shows real-time information by pulling data from an API**
* **User can access them**
* **Testing how much stress the application can handle**
* **Checking code syntax**
* **TrExecutor successfully runs code (connecting to AWS account + executing scripts)**

## Out of scope

The following items are outside of the testing scope for our applications. These are not relevant during the testing and no consideration is taken into whether they are accomplished or not.

* **Analyzing traffic flows**
* **Non-technical design flaws (e.g: bad UI or UX)**
* **Code (e.g.: no Code evaluation to check for inconsistencies, making it more efficient, etc.)**

## Observations

N/A

# Infrastructure testing

## Testing Goals

The goal of testing the infrastructure of our project is to conform with our deliverables and ensure that critical main components of our Project are functioning. We will focus on testing the resources created and managed in AWS: which namely include EC2 instances, ECR and ECS, Lambda Functions, Networking, etc.

Firstly, the Computing resources of our infrastructure (i.e: EC2 instances) will be tested. We will mainly corroborate if they are working as intended in a secure manner, by running a trail production run and making use of as many of them as possible. If necessary, we will connect to the machines to run any troubleshooting or modifications needed.

Followed that, we will analyze the Networking resources of our infrastructure (i.e.: VPC, Subnets, etc.). The goal of this test is to determine if all necessary network connections were successfully developed, as well as establishing the degree of security we employed when creating and handling these resources.

Finally, we will look at the IaC resources used and created for the project. These include namely the Terraform scripts, Ansible scripts, Shell scripts and Lambda functions, which will be run in a testing environment to see that everything is working accordingly.

Automate, ansible. Ping commands, ssh, AWS API.

## In-scope

The following items are inside of the testing scope for our Infrastructure. These are the priorities during the testing and accomplishing these means that our Project is working as intended.

* **EC2 instances are connected to the internet and assigned to their proper respective VPCs and Subnets**
* **ECR and ECS interaction is working as intended, and it is possible to push Docker images in the ECR to deploy new versions of the application**
* **Each EC2 instance fulfills its role and doesn’t provide any difficulties to the rest of the project. Every resource is relevant and there should not be any idle or unused instance.**
* **Load Balancer is functioning and manages traffic according to expectations.**
* **S3 storage interacts successfully with target resources and data is stored in a safely manner.**
* **RDS instances interact successfully with target resources and data is stored in a safely manner. Costs are taken into account after the incident.**
* **VPCs were created in an efficient manner, dividing and isolating resources by their role. Subnets are also implemented to allow HA and enforce security.**
* **Terraform code successfully creates resources in AWS and configures them properly**
* **Ansible playbooks successfully creates resources in AWS and configures them properly**
* **Shell scripts successfully creates resources in AWS and configures them properly**
* **Lambda functions are integrated and fulfill their intended purpose without affecting the infrastructure**
* **Route53 correctly uses and manages the indicated domain**
* **Monitoring is carried on relevant resources**

## Out of scope

The following items are outside of the testing scope for our Infrastructure. These are not relevant during the testing and no consideration is taken into whether they are accomplished or not.

* **Code evaluation (i.e.: revising Terraform scripts to check for Coding improvements)**
* **EC2 instance’s volume testing (storage)**
* **Specific networking configuration (i.e.: checking for improvements in logic or management, if it works in a secure way it works.)**

## Observations

N/A

# Security testing

## Testing Goals

The goal of testing the infrastructure of our project is to conform with our deliverables and ensure that critical main components of our Project are functioning. We will focus on testing the security measures taken for the whole project, which include things like secrets & keys management, Networking configuration, HTTPS Certificates, and others.

Firstly, we will focus and seeing how we stored and manage our Secrets & Keys used for the project. We will see if they are stored and upkept properly, which means that the proper measures were taken and followed (i.e.: checking if the Keys have the proper permissions, are stored safely, etc.)

Followed that, we will analyze the Networking configuration of our Project. While there is some overlap with the Infrastructure Testing here, we will ensure that the configuration applied to our network is sensible and allows for a secure way of working, ensuring nothing is compromised and its safe environment.

Finally, we will look at other Security components, such as IAM roles and permissions, backups, data storage, and more. These items will mainly be checked for security flaws, such as unintended unauthorized access.

Pentest, secrets management, key pair management, passwd hashing, etc

## In-scope

The following items are inside of the testing scope for our Security. These are the priorities during the testing and accomplishing these means that our Project is working as intended.

* **Keys are stored safely and are accessible, each key is ideally not reused and has the proper permissions assigned to ensure SSH authentication.**
* **Relevant Secrets are confidentially stored and encrypted in some form**
* **VPC configuration ensures that the resources are grouped and managed in a way the ensures no risk for the project (i.e: Route Tables or VPN ensure a secure connection)**
* **Security groups properly manage each instance according to their needs only (i.e: not giving unnecessary permissions that could prove a security risk)**
* **VPN ensures a safe, private tunnel to access the infrastructure.**
* **Off-site backups are provided for relevant data**
* **IAM roles, users and policies don’t imply a security risk (i.e: unnecessary permissions, try to follow CIA triangle)**
* **HTTPS certificates work as intended**

## Out of scope

The following items are outside of the testing scope for our security. These are not relevant during the testing and no consideration is taken into whether they are accomplished or not.

* **Pen-testing**
* **Application security (i.e: website security flaws)**

## Observations

N/A