

End of Internship Presentation Summer 2023

Mark Rubin
Technology Summer Intern

8/9/2023

About Me

- Personal
 - Name: Mark Rubin
 - Princeton University Class of 2026
 - Major: Computer Science – School of Engineering
 - Hometown: Highland Park, NJ
- Professional
 - Title: Technology Summer Intern
 - Manager: Damian Murberg
 - Team: Cloud Platform Operations
 - Portfolio: Application Operations
 - Business Unit: Payments
 - Prior Experience: Primarily a data science background, specifically in sports analytics working for various NFL teams and an NBA agent





Internship Overview

Internship Focuses

Cloud Infrastructure



Developed understanding of cloud infrastructure and Microsoft Azure, learning about Kubernetes and how to build a virtual machine

Automation Scripting



Composed seven automation scripts to minimize time spent on various tasks ranging from cybersecurity installations to ServiceNow request fulfillment

Shadowing & Development



Leveraged employee network to meet with several developers, a member of QA and a BSA to gain a better understanding of the SDLC



Focus 1: Cloud Infrastructure

Cloud Related Projects

Creating an Azure
Virtual Machine

Developed Comfort with Cloud Infrastructure
and Microsoft Azure

Gained Hands-On Experience with
Azure RedHat OpenShift, YAML,
Terraform and Azure DevOps
Pipelines

Redacted Resource
Creation



Focus 2: Automation

Automation Projects Overview

OpenShift Audit
Script for User
Removal

Python, ADO Pipelines

Redacted Installation

Bash

Service Principal
Renewal and
Rotation

**Bash, PowerShell, ADO
Pipelines**

Namespace
Creation
Automation

YAML, Bash, ADO Pipelines

ServiceNow Ticket
Response System

**Python, JavaScript,
Microsoft Power Automate,
ADO Pipelines**

Thread and Heap
Dump Automation

Python, ADO Pipelines

OpenShift Audit Script for Removal of Inactive Users

Problem: People request access to ARO clusters but never enter the system.

This appears as a cybersecurity risk in quarterly audits since unnecessary users should not be provided access.

Goal: Develop a Python script to cleanup OpenShift clusters by removing users who have never logged in to ARO from the groups they are in.

Actions:

1. Create project proposal outlining the project
2. Utilize sandbox environment to determine regular expressions and OC CLI commands
3. Combine aspects of practice file to create a functioning program

Result: The program successfully removes all unnecessary ARO users from their respective groups.

Business Value:

- Saved Time
- Decrease vulnerability to cyber attacks

Redacted

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Automate Redacted Installation

Situation and Task

- Develop a Bash script that would automate the installation of the Redacted client software on over 40 virtual machines, fulfilling a cybersecurity mandate efficiently

Actions

- Learning
- Planning
- Programming
- Debugging
- Deployment

Challenges

- Designing appropriate regular expressions
- Moving between virtual machines
- Kickstarting software on each machine
- Improve run-time efficiency

Lessons

- Bash Programming
- Interacting with Linux VM's through the CLI
- Draw on internet tutorials and other people's knowledge to accomplish a goal

Automate Redacted Installation

Results and Business Value

- Successfully installed the Redacted software on our virtual machines, fulfilling the cybersecurity mandate in time
- Saved my team time that would have otherwise been dedicated to accomplishing this task manually
- Protected our VMs from potential cyber attacks

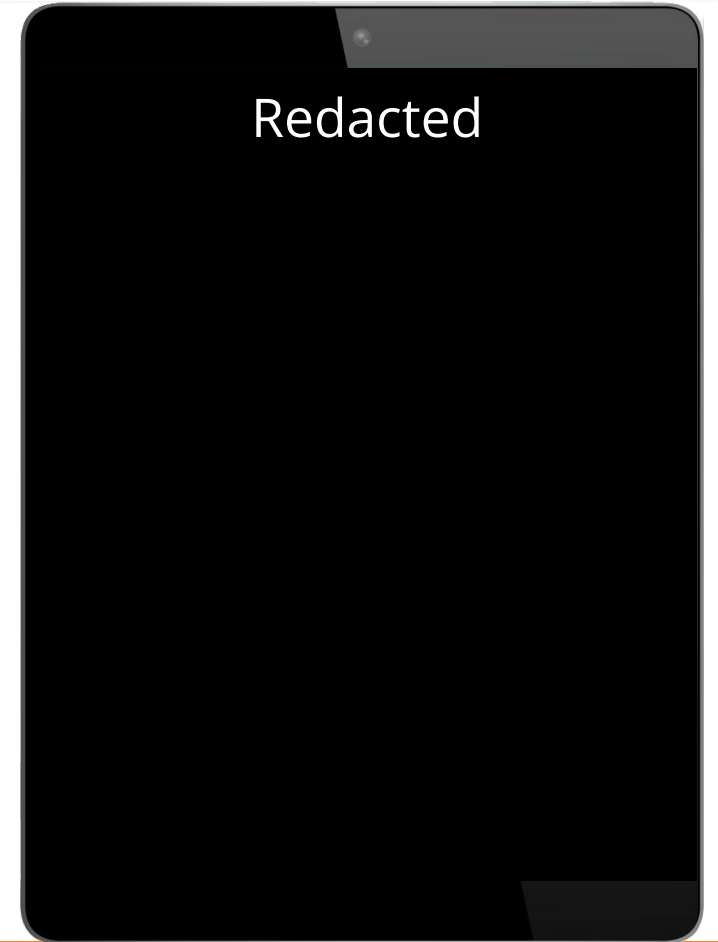
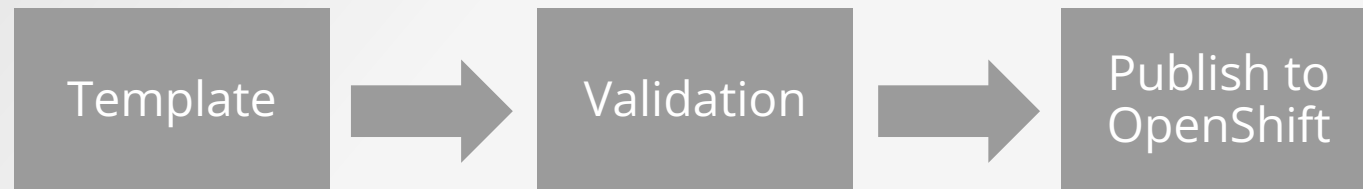


Service Principal Renewal and Rotation

Purpose	Azure Service Principles must be rotated every six months and this is a highly manual process to replace the secrets in over 200 projects
Getting the New Secret from Azure	Wrote a PowerShell script, leveraging the Azure CLI to get the identification of the service principal and extract the new secret
Replacing the Secret in OpenShift Clusters	Used the text file produced in the PowerShell script as input for a Bash script that replaced the secrets in all relevant OpenShift projects

Namespace/Project Creation Template

- Developed a streamlined automation process for creating new projects in OpenShift, parameterizing the unique aspects of each project
- Decreases odds of human error and lessens time to develop each project from about an hour to under 5 minutes



ServiceNow Ticket Response System

Eliminate need to
manually add users to
ARO groups

Utilize Microsoft Power
Automate for flow
control

Leverage Python,
JavaScript and OC CLI
to parse information
and fulfill task

Reduce work time
from hours weekly to
under ten minutes

Ticket Response System Demo

Redacted

Ticket Response System Demo Continued

Redacted

Thread and Heap Dumps

Situation and Task

- Need to develop an easier way to take thread and heap dumps to get an overview of what is occurring in our OpenShift applications
- Create Python scripts and place them in a pipeline to make it easier to take thread and heap dumps

Challenges and Results

- The challenge of this program was to be able to utilize Azure CLI commands to download the thread dump to a local computer
- Luckily, the challenge was overcome and both scripts exist as pipelines
- This will make it easier for our team to provide this information and will help developers debug their applications

Automation Project Thank You's

OpenShift Audit
Script for User
Removal

Elina Swain

Redacted Installation

Dwain Hargrave, Niraj Shah

Service Principal
Renewal and
Rotation

MohanRaj Natraj

Namespace
Creation
Automation

MohanRaj Natraj

ServiceNow Ticket
Response System

**Damian Murberg, Chris
Brennan**

Thread and Heap
Dump Automation

Elina Swain



Focus 3: Shadowing

Thank You to Those I Shadowed

Mentor	Role	Team/Project	Skill/Lesson
Elijah Apyapong	Developer	Redacted	Spring Boot, Databases, API Development
Arpit Patel	Developer	API Team	Backend, API development and Developer Tools
Rapheal Ojo-Kadiri	BSA	API Team	JIRA and Agile Methodology
Chandra Kakaraparthi	QA	Redacted	QA Testing
Navatha Reddy Devarapalli	Developer		React, CSS and Front End Development
Mounika Mendu	Developer		Redacted and project insight and Front End Development
Attkula Jitendra Reddy	Application Owner		Transition from developer to application owner
Eric Rehe	Product Owner	Issuer Processing	Product Management and Career Insight

Special thank you to Amy Kaden, Damian Murberg and Ashish Patel for coordinating these opportunities!



Takeaways

Technical Skills Learned

- Python
- Bash
- JavaScript
- Spring Boot
- React
- Azure DevOps/Pipelines
- Terraform
- Microsoft Power Automate
- Microsoft Azure
- Kubernetes/Azure RedHat OpenShift
- Cloud Infrastructure Concepts
- Interacting with Linux, OC and AZ CLI
- Power BI

Takeaways, Lessons Learned, and Future

- Beyond the technical skills, the biggest things I learned
 - Always ask questions!
 - Prioritize learning and use your network to learn new skills
 - Actively look for projects and work to do to get the most out of the experience

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Thank You Cloud Platform Operations!

- Damian Murberg
- Niraj Shah
- Aashvi Patel
- Nadeesha Perera Meringage
- Ibrahim Alshahidi
- MohanRaj Natraj
- Elina Swain
- Dwain Hargrave
- Ruban Ronald
- Satyam Tiwari

Q&A



Thank You!