Project 1 - Identity and Access Management

-You are a Cloud Engineer Consultant, working with StartupCo, a fast-growing tech startup that recently launched their first product - a fitness tracking application.
-They've been using AWS for three months, initially setting up their infrastructure quickly to meet launch deadlines.
-Now that their product is live, they need to address their cloud security fundamentals. The company has 10 employees who all currently share the AWS root account credentials to access and manage their cloud resources.
-This practice started when they were moving quickly to launch, but now their CTO recognizes the security risks this poses..

Current Setup:

- Everyone uses the root account
- No separate permissions for different teams
- No MFA or password policies
- AWS credentials shared via team chat

Current Infrastructure:

- EC2 instances running their application
- S3 buckets storing user data and application assets
- RDS database for user information
- CloudWatch for monitoring
- Several development and production environments

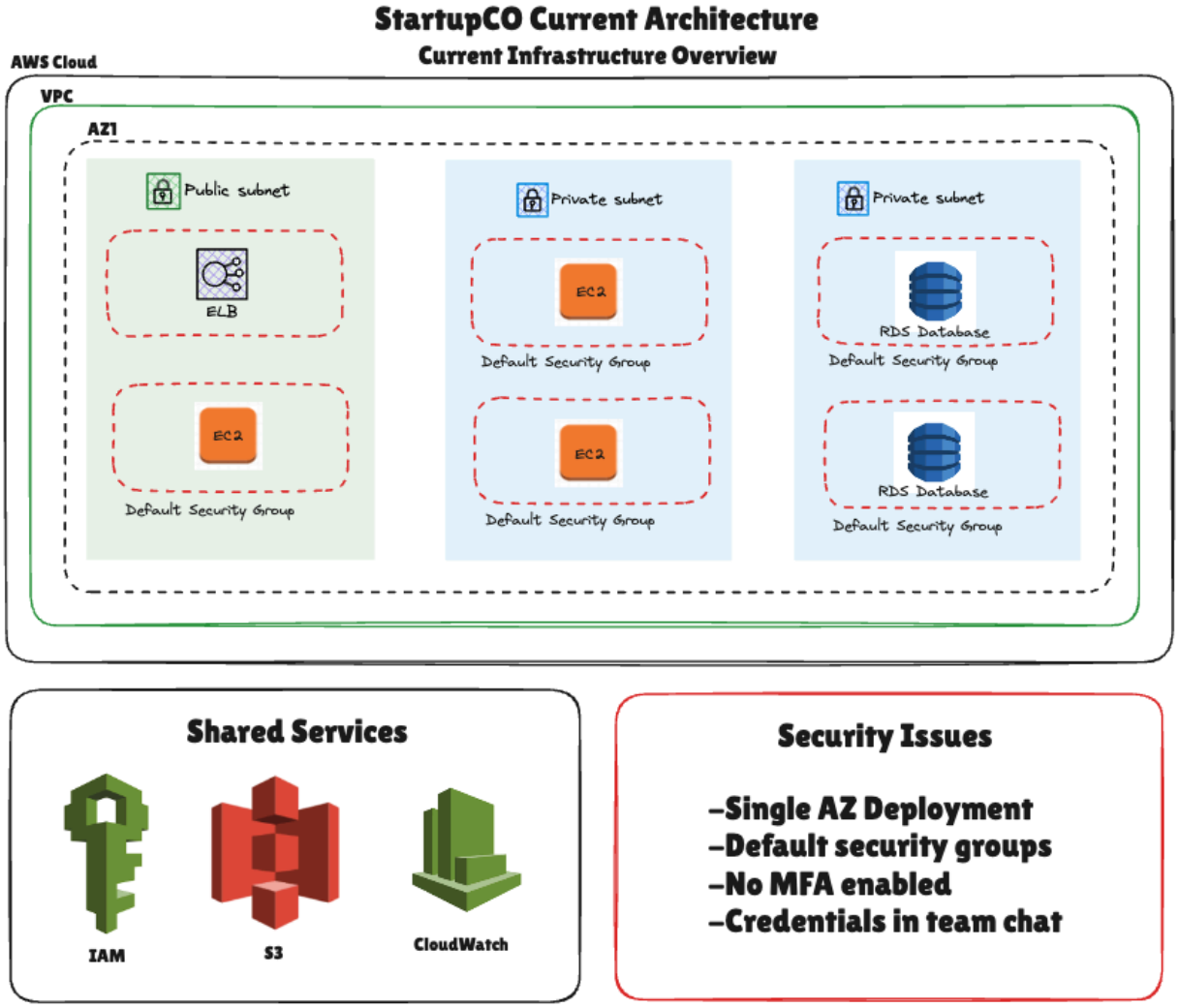
Team Structure & Access Needs:

- 4 Developers (need EC2 and S3 access)
- 2 Operations (need full infrastructure access)
- 1 Finance Manager (needs cost management access)
- 3 Data Analysts (need read-only access to data resources)

--------- Your Task ---------

1 - Create their Architecture

- Create an architecture diagram showcasing their current infrastructure



-My draft of their current infrastructure shows us that they have a VPC in AWS that houses 1 public subnet and 2 private subnets. The public subnet contains an ELB and EC2 instance. The private subnets are separated with 1 having microservices and the other RDS databases. There are several default security groups placed in each subnet. The startup is utilizing AWS IAM, S3, and CloudWatch for their shared services. However, located in the red box are the issues they are currently facing.

2 - Secure the Root Account

- Enable MFA
- Stop using it for daily operations
- Store credentials securely

-By securing the Root Account. I have to look into what accounts they have created in AWS so far. If the startup only has the main account aka the management account, then I need to create a Root User Account under that management account.
-To do this: login to the Root Account and go to IAM. You will see that the MFA is disabled. Just like I did in the beginning of bootcamp, you want to follow those steps to create MFA for the Root User account.
-Keep in mind that the Root User is not intended for infrastructure work. For that I would create an admin user and give it the proper permissions such as view billing access, administrator access, etc. This Admin account is actually the management account! However, this account is not what you should intend to build infrastructure with either!
-Once I secured a Root User and Admin User in the Root Account, I would logout of the Root Account and log in to the Admin User.

3 - Create IAM Users and Groups

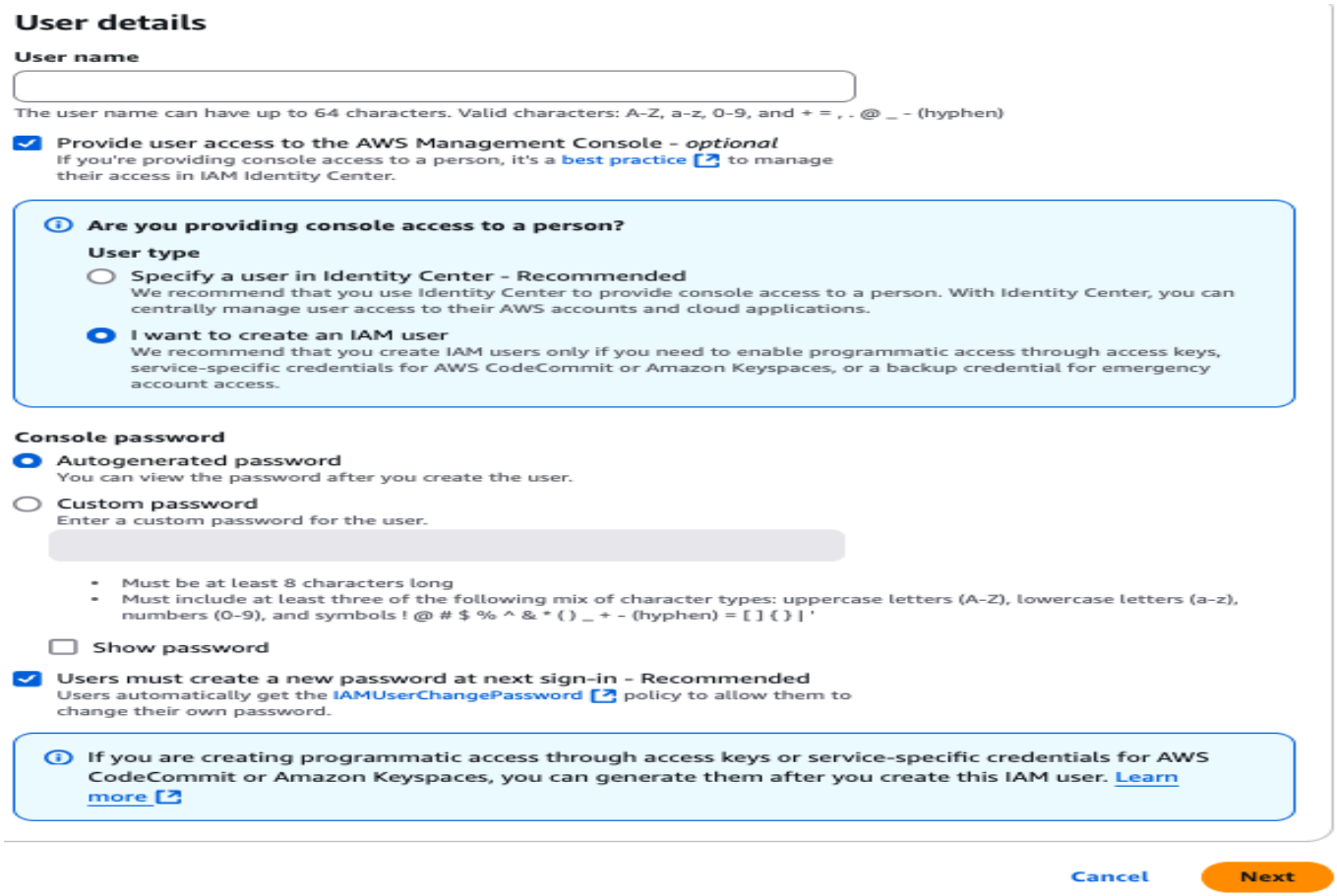
- Developer group & users
- Operations group & users
- Finance group & user
- Analyst group & users

-Login to the management account and check all accounts with AWS Organizations.
-If you look at it, it only shows 1 account created, that is displayed as the management account. This is because although you created an Admin Account, it is still under the Root User Account.
-The management account should only be used for adding and managing different accounts inside your AWS Organization and/or looking at the billings.
-To start working on infrastructures, I would create another account for it.
-Once I get my infrastructure user account set up, only then can I start creating IAM Users and Groups for the 4 developers for EC2 and S3 access, 2 operations with full infrastructure access, 1 finance manager for cost management access, and 3 data analysts for read-only access to data resources.
-In order to create these users with respective access, it requires their email addresses and names.

4 - Set Up Security Requirements

- Enable MFA for all users
- Create a strong password policy
- Ensure users can only access what they need

-To create a user go to IAM>Users>create user.
-Create a name for the user and IAM user then click nex



-I can add permissions later so click next again>create user.
-Now I want to create a group so go to User groups>create group.
-I want this group for the 4 developers so name it developer_group and then attach that new_user to this group.

5 - Implement These Permissions

Developers:

- EC2 management
- S3 access for application files
- CloudWatch logs viewing

Operations:

- Full EC2, CloudWatch access
- Systems Manager access
- RDS management

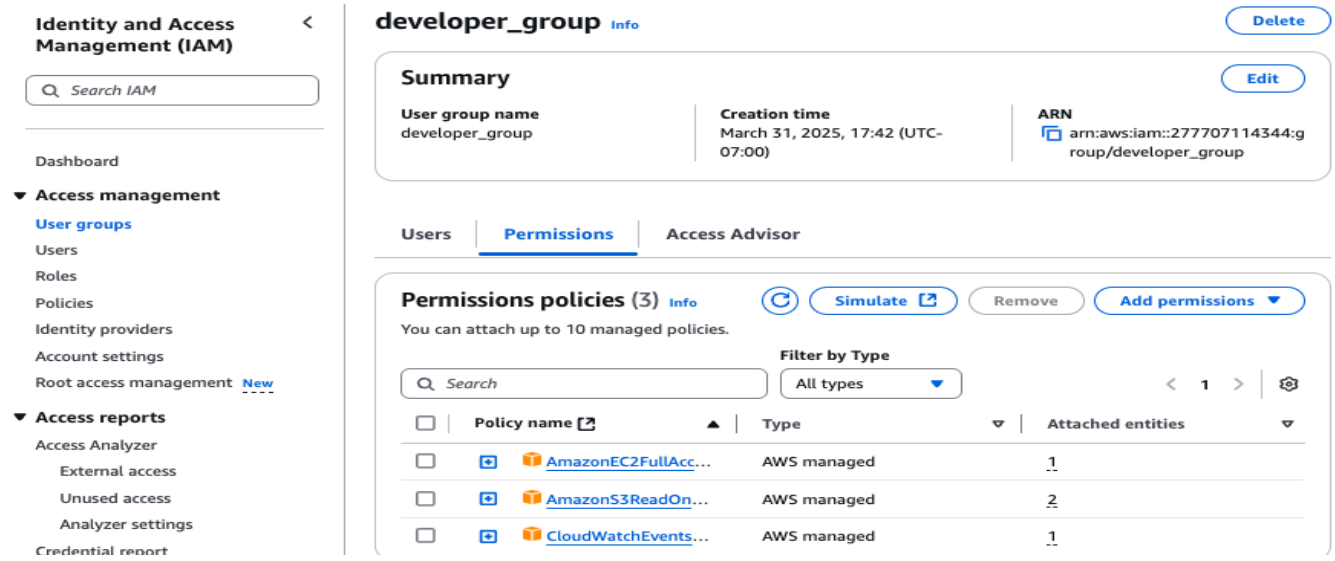
Finance:

- Cost Explorer
- AWS Budgets
- Read-only resource access

Analysts:

- Read-only S3 access
- Read-only database access

-I can now attach the permissions to this developer group so search for EC2, S3, and cloudwatch access. Enter EC2 in the search bar and many will pop up but you want developers to have full access for EC2 and CloudWatch. However for S3 make sure which specific access you want to give them by asking your developers or their managers.
-When I'm done, click the create user group. You can click on the developer group and click the permissions tab to see it all there.
-Follow this process for creating new users and which group to add them to while attaching the correct permissions based on lowest access needs for their respective work.



--------- What to Submit ---------

Documentation and Screenshots

1. Clear Documentation explaining the problem you faced, what you did to overcome it, with the Architecture you created
2. In the documentation include screenshots showing:
    1. Your IAM groups and users structure
    2. MFA and password policies
    3. Example permissions for each group
    4. How you structure the permissions
    5. Why you made certain security choices

---------Advanced Bonus Challenge --------

Once you've implemented everything via Console, try to recreate your solution using:

- Terraform
- AWS CloudFormation
- AWS CDK

This will help you understand both approaches.