DEVOPS FINAL REPORT

Applying CI/CD for Software Development

Decentralized Application Front-End

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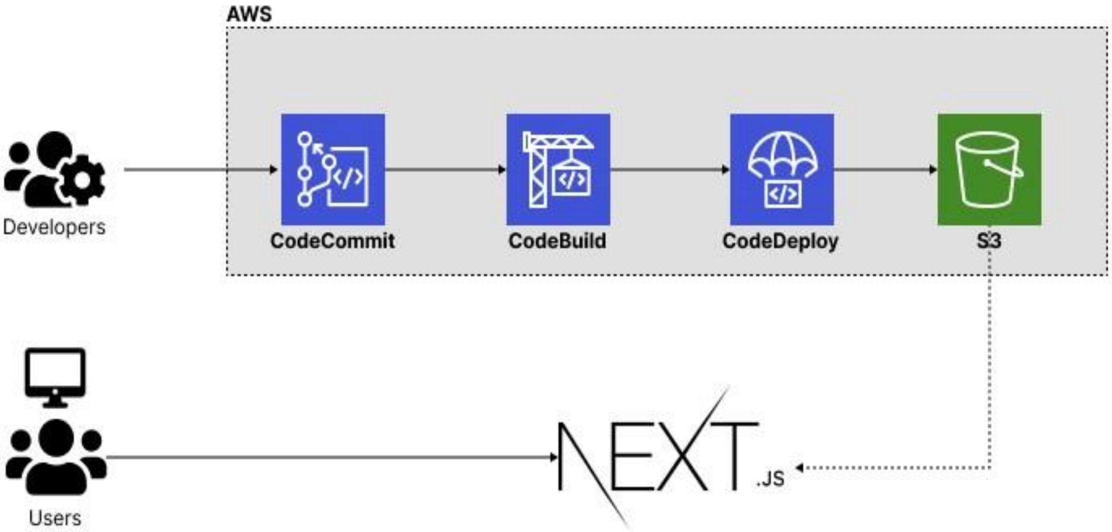
1. Problem Definition

This project aims to solve some common problems that have been happening while developing our front-end:

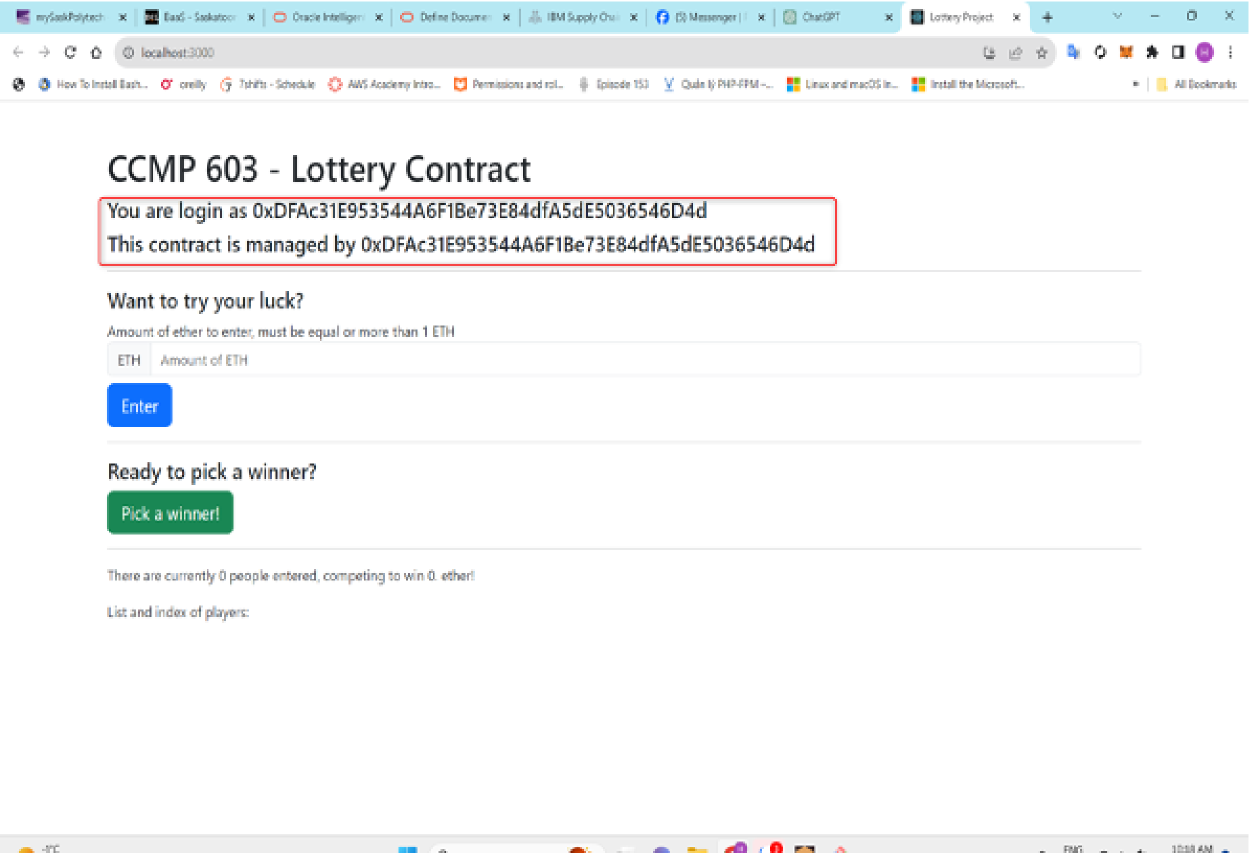
- **Versioning control**: it's difficult to manage changes across teammates without a versioning control system. This thing will be a barrier for collaboration within our team in code discussion and development which needs to be centralized. In consequence, this can lead to conflicts, code override and difficult to track changes.
- **Build and deployment process**: Development cycles can be slowed down by build and deployment procedures that are manual or inefficient. By using different compilers can created different deployment packages leading to inconsistencies.
- **Deployment environment:** using different configuration and installing manually to create environment for deployment, testing or production can lead to unexpected errors and failure deployment.

2. Design and Architecture:

Our application will use modern technologies like Amazon Web Services (AWS) or DevOps, NextJS for the front-end. To buid it, the team will use AWS CodePipeline, CodeCommit, CodeBuild, and CodeDeploy to manage Continuous Integration and Continuous Delivery (CI/CD). This process is dedicated to the front-end application, which will be deployed to AWS Simple Storage Services (S3) and hosted as a static website.



The front-end will be developed in NextJS which use ReactJS as the core library, combining with CSS Tailwind Framework, the simple of it look like the images below:



CCMP 603 - Lottery Contract

You are login as 0xDFAc31E953544A6F1Be73E84dfA5dE5036546D4d

This contract is managed by 0xDFAc31E953544A6F1Be73E84dfA5dE5036546D4d

Want to try your luck?

Amount of ether to enter, must be equal or more than 1 ETH

ETH Amount of ETH

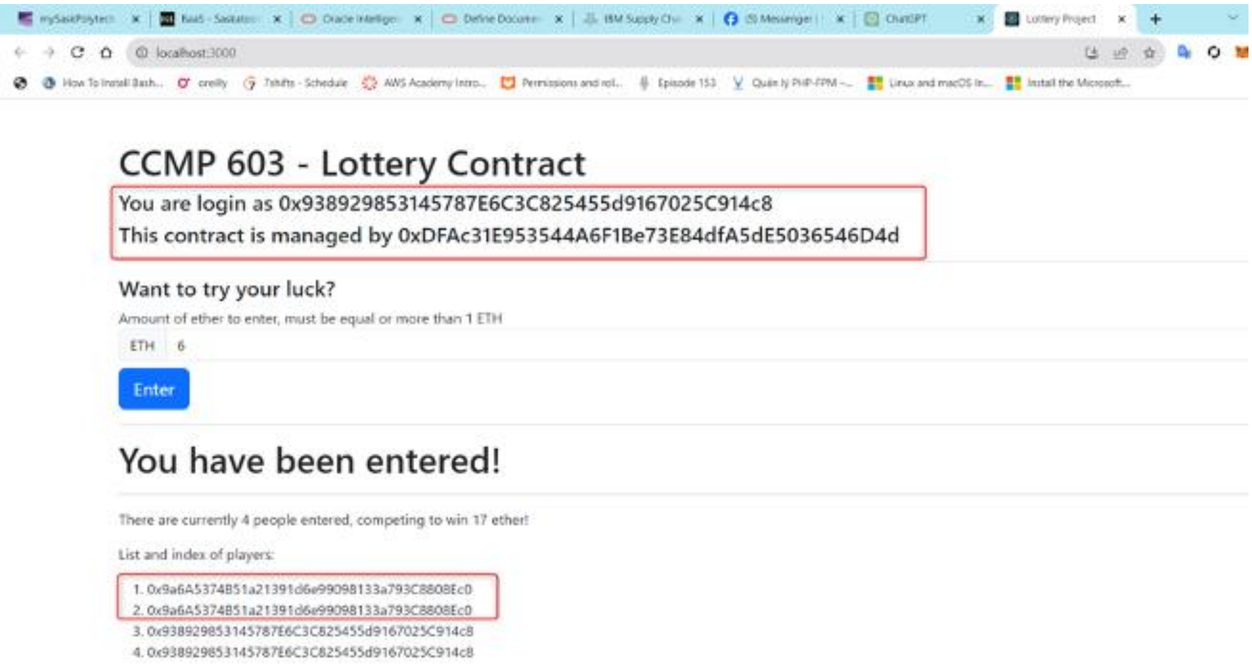
Enter

Ready to pick a winner?

Pick a winner!

There are currently 0 people entered, competing to win 0 ether!

List and index of players:



CCMP 603 - Lottery Contract

You are login as 0x938929853145787E6C3C825455d9167025C914c8

This contract is managed by 0xDFAc31E953544A6F1Be73E84dfA5dE5036546D4d

Want to try your luck?

Amount of ether to enter, must be equal or more than 1 ETH

ETH 6

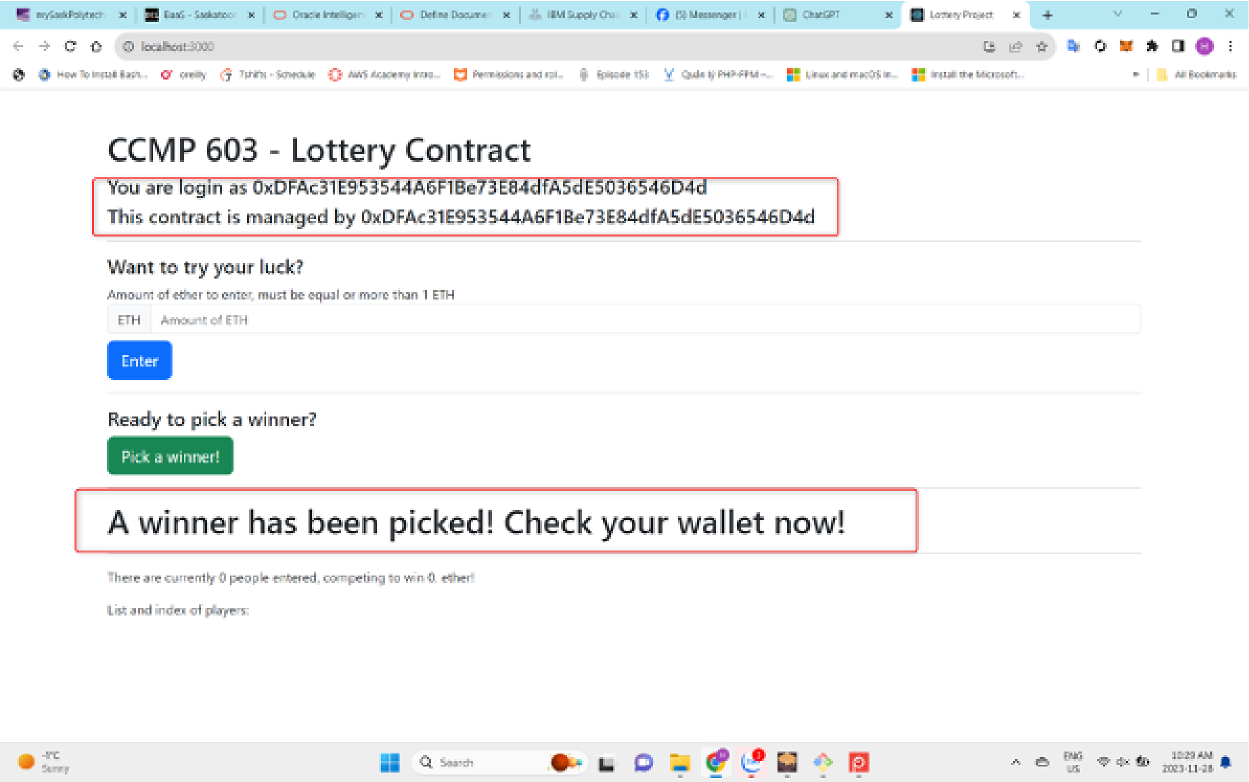
Enter

You have been entered!

There are currently 4 people entered, competing to win 17 ether!

List and index of players:

1. 0x9a6A5374B51a21391d6e99098133a793C8808Ec0
2. 0x9a6A5374B51a21391d6e99098133a793C8808Ec0
3. 0x938929853145787E6C3C825455d9167025C914c8
4. 0x938929853145787E6C3C825455d9167025C914c8



CCMP 603 - Lottery Contract

You are login as 0xDFAc31E953544A6F1Be73E84dfA5dE5036546D4d

This contract is managed by 0xDFAc31E953544A6F1Be73E84dfA5dE5036546D4d

Want to try your luck?

Amount of ether to enter, must be equal or more than 1 ETH

ETH Amount of ETH

Enter

Ready to pick a winner?

Pick a winner!

A winner has been picked! Check your wallet now!

There are currently 0 people entered, competing to win 0. ether!

List and index of players:

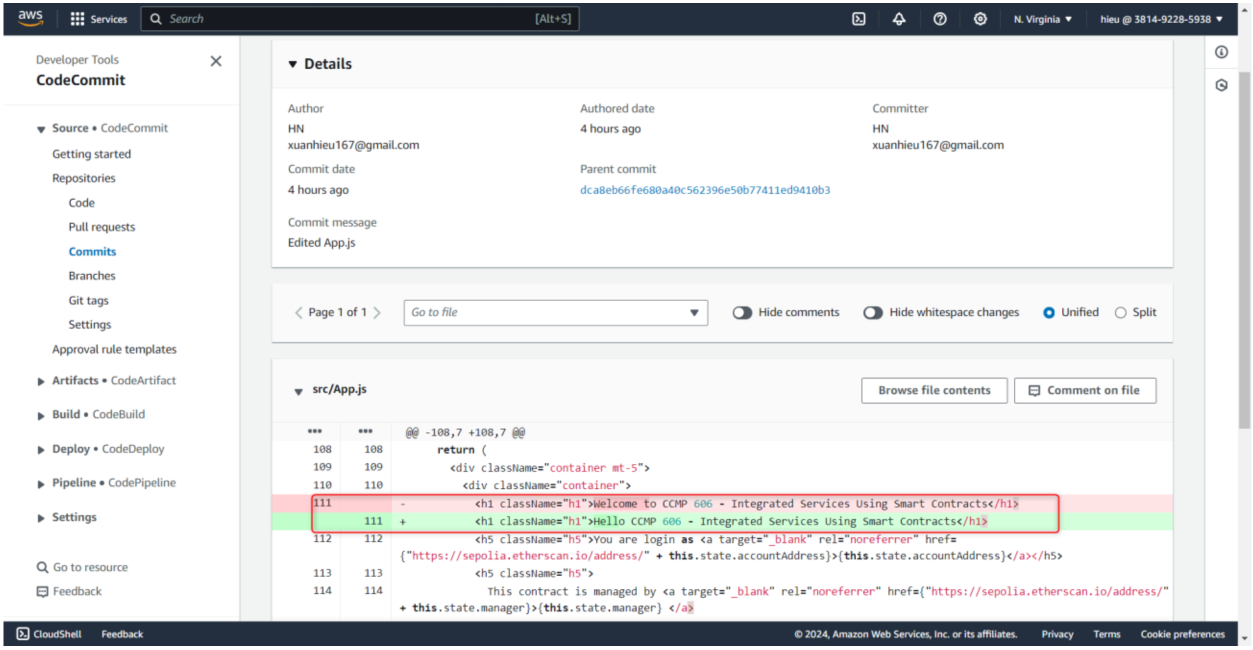
3. Implementation Stages

The implementation stages include several key steps. First, we create a strong foundation for our code by setting up a reliable CodeCommit repository. Then, we make things smoother by setting up continuous integration using CodeBuild. Next, we automate the deployment of our applications using CodeDeploy. We also take care of managing our project files using S3, a secure storage system. Finally, we consolidated all stages in a pipeline by using CodePipeline. These steps work together to make our development and operations run more smoothly. They help us automate tasks and create more efficient DevOps processes.

- Setting Up Version Control with AWS CodeCommit
    - Create a new AWS CodeCommit repository for the project.
    - Set up access controls and permissions for team members.
    - Migrate existing code repositories
- Building and Testing with AWS CodeBuild
    - Configure AWS CodeBuild to trigger builds automatically upon code changes.
    - Define build specifications and scripts.
- Deployment Automation with AWS CodeDeploy
    - Set up deployment groups and deployment configurations in AWS CodeDeploy.
    - Define deployment scripts and configurations.
    - Integrate CodeDeploy with CodeBuild for continuous deployment.
- Configuring AWS S3 Bucket for Storage
    - Set up an S3 bucket for storing application.
    - Configure access policies and permissions for secure storage.
    - Integrate CodeBuild and CodeDeploy with the S3 bucket for retrieval during deployment.
- Manage process with CodePipeline
    - Add build project, deployments and repositories into a pipeline.
    - Describe process in buildspec.yml.

4. Testing

Firstly, we made a change in repository and committed to the main branch.



▼ Details

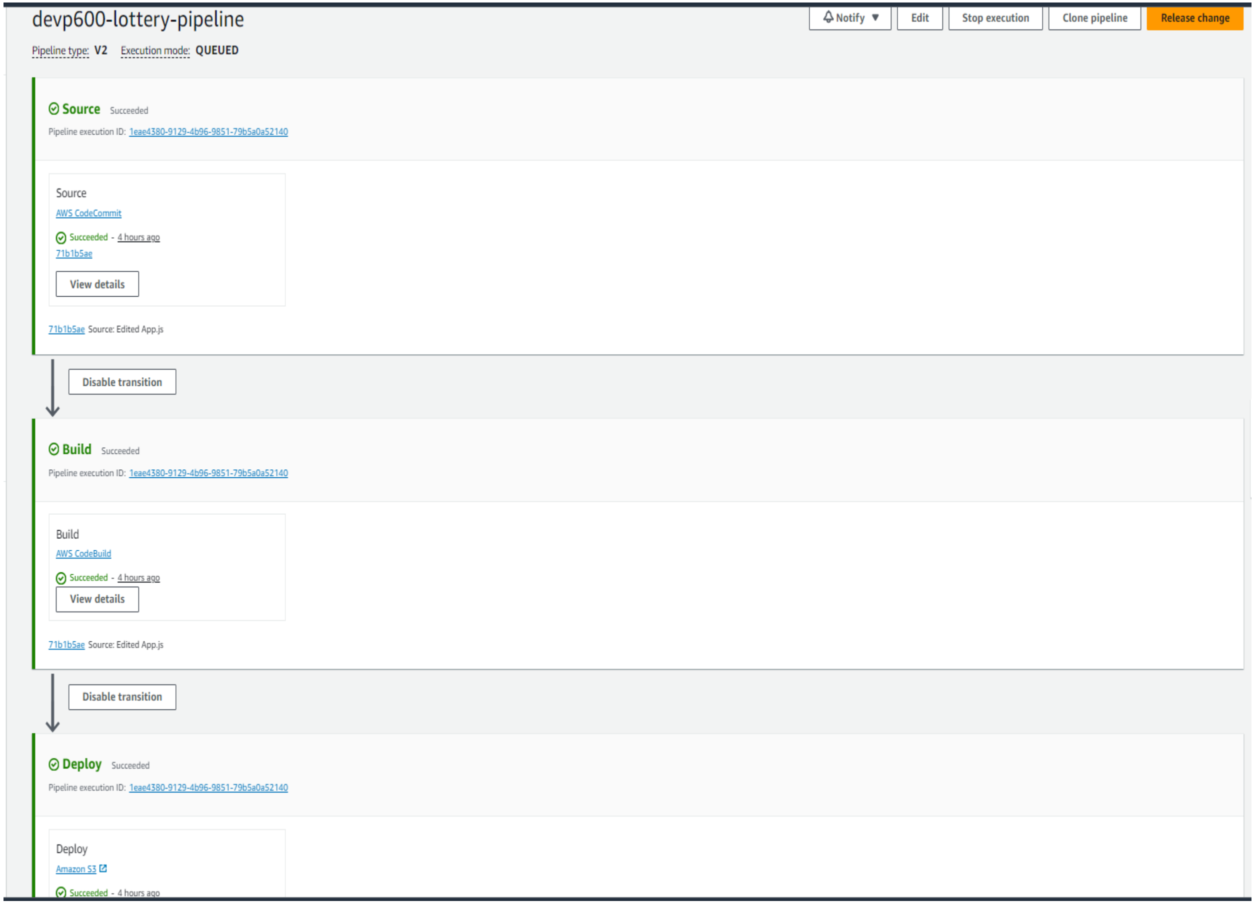
Author	Authored date	Committer
HN xuanhieu167@gmail.com	4 hours ago	HN xuanhieu167@gmail.com

Commit date	Parent commit
4 hours ago	dca8eb66fe680a40c562396e50b77411ed9410b3

Commit message
Edited App.js

```
@@ -108,7 +108,7 @@
      return (
        <div className="container mt-5">
          <div className="container">
-           <h1 className="h1">Welcome to CCMP 606 - Integrated Services Using Smart Contracts</h1>
+           <h1 className="h1">Hello CCMP 606 - Integrated Services Using Smart Contracts</h1>
            <h5 className="h5">You are login as <a target="_blank" rel="noreferrer" href=
{"https://sepolia.etherscan.io/address/" + this.state.accountAddress}>{this.state.accountAddress}</a></h5>
            <h5 className="h5">
              This contract is managed by <a target="_blank" rel="noreferrer" href={"https://sepolia.etherscan.io/address/"
+ this.state.manager}>{this.state.manager} </a>
```

Secondly, Pipeline triggered the changes and run pipeline automatically.



devp600-lottery-pipeline

Pipeline type: V2 Execution mode: QUEUED

Source Succeeded
Pipeline execution ID: 1eae4380-9129-4b96-9851-79b5a0a52140

Source
AWS CodeCommit
Succeeded - 4 hours ago
71b1b5ae

71b1b5ae Source: Edited App.js

Build Succeeded
Pipeline execution ID: 1eae4380-9129-4b96-9851-79b5a0a52140

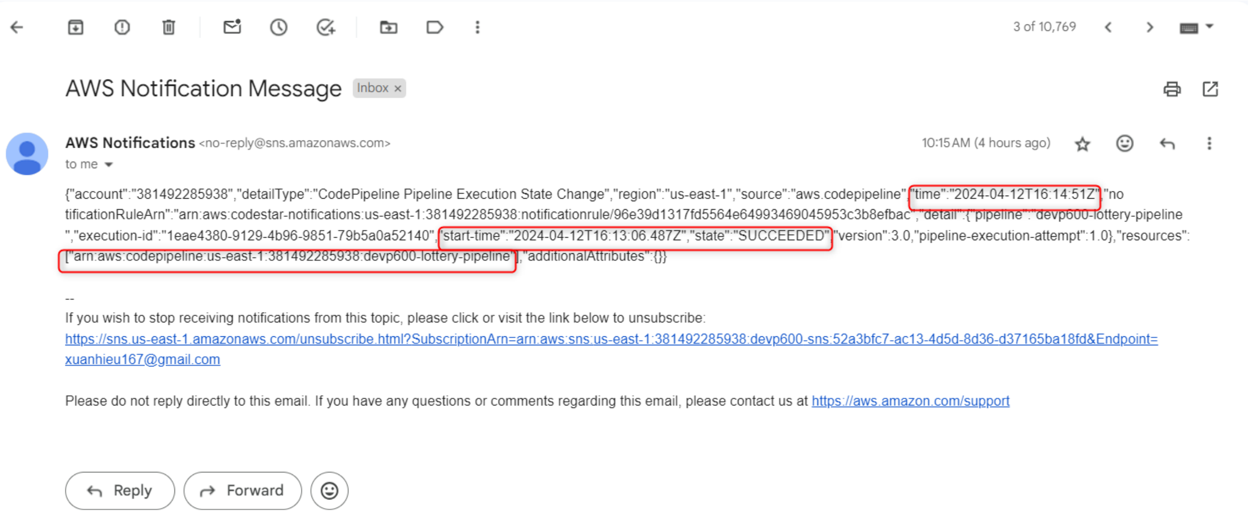
Build
AWS CodeBuild
Succeeded - 4 hours ago

71b1b5ae Source: Edited App.js

Deploy Succeeded
Pipeline execution ID: 1eae4380-9129-4b96-9851-79b5a0a52140

Deploy
Amazon S3
Succeeded - 4 hours ago

Thirdly, after completing, SNS sent notification email to my mailbox for pipeline’s status.



AWS Notification Message

AWS Notifications <no-reply@sns.amazonaws.com>
to me

10:15 AM (4 hours ago)

{"account":"381492285938","detailType":"CodePipeline Pipeline Execution State Change","region":"us-east-1","source":"aws.codepipeline","time":"2024-04-12T16:14:51Z","notificationRuleArn":"arn:aws:codestar-notifications:us-east-1:381492285938:notificationrule/96e39d1317fd5564e64993469045953c3b8efbac","detail":{"pipeline":"devp600-lottery-pipeline","execution-id":"1eae4380-9129-4b96-9851-79b5a0a52140","start-time":"2024-04-12T16:13:06.487Z","state":"SUCCEEDED","version":3.0,"pipeline-execution-attempt":1.0},"resources":["arn:aws:codepipeline:us-east-1:381492285938:devp600-lottery-pipeline"],"additionalAttributes":{}}

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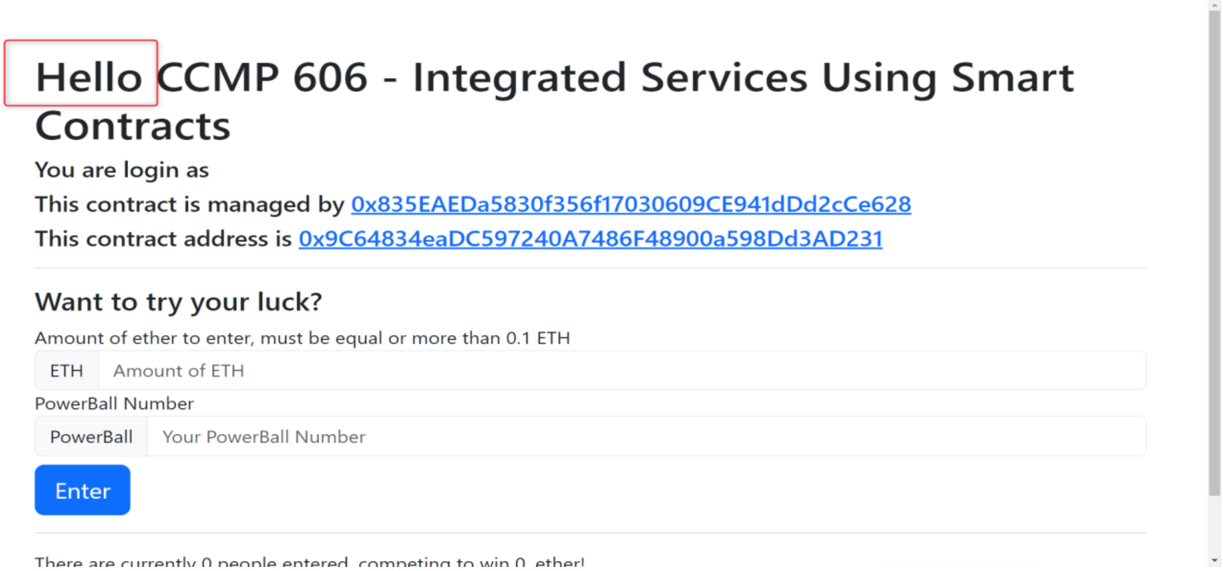
https://sns.us-east-1.amazonaws.com/unsubscribe.html?SubscriptionArn=arn:aws:sns:us-east-1:381492285938:devp600-sns:52a3bfc7-ac13-4d5d-8d36-d37165ba18fd&Endpoint=xuanhieu167@gmail.com

Please do not reply directly to this email. If you have any questions or comments regarding this email, please contact us at https://aws.amazon.com/support

Code changes were deployed successfully from S3.



Hello CCMP 606 - Integrated Services Using Smart Contracts

You are login as

This contract is managed by 0x835EAEDa5830f356f17030609CE941dDd2cCe628

This contract address is 0x9C64834eaDC597240A7486F48900a598Dd3AD231

Want to try your luck?

Amount of ether to enter, must be equal or more than 0.1 ETH

PowerBall Number

There are currently 0 people entered, competing to win 0 ether!

5. Conclusion

In summary, applying Continuous Integration and Continuous Deployment (CI/CD) in software deployment can reduce human mistakes, inconsistencies, and unexpected failures. CI/CD offers speed, efficiency, and high-quality delivery by automating tasks like code validation and deployment. It assures consistency and reliability in deployment environments, enabling collaboration among team members. For this reason, organizations can concentrate on business goals to reach customer satisfaction.