Summer Internship Report

Name: Dharvi Patel(17IT067)

AWS Continuous Compliance

IT compliance they think of spreadsheets, documents, audits, and generally, how “compliance” slows down the velocity of delivering value to end users. With AWS, however, everything is accessible via an API, and as a result, compliance can be treated as a code asset just like any other part of the software system. You can version, test, codify, monitor, and run compliance continuously. By doing this, you can ensure that all of your AWS infrastructure is always compliant with the control directives that ensure adherence to compliance regimes and good engineering practices.

learn how to use AWS services that provide the ability to define compliance as code, including AWS Config Rules, AWS Lambda, Amazon CloudWatch, AWS cloudTrail, Security Hub, etc.

AWS services :

AWS Config:

AWS Config is a service that enables you to assess, audit, and evaluate the configurations of your AWS resources. Config continuously monitors and records your AWS resource configurations and allows you to automate the evaluation of recorded configurations against desired configurations. With Config, you can review changes in configurations and relationships between AWS resources, dive into detailed resource configuration histories, and determine your overall compliance against the configurations specified in your internal guidelines. This enables you to simplify compliance auditing, security analysis, change management, and operational troubleshooting.

CloudTrail:

AWS CloudTrail is a service that enables governance, compliance, operational auditing, and risk auditing of your AWS account. With CloudTrail, you can log, continuously monitor, and retain

account activity related to actions across your AWS infrastructure. CloudTrail provides event history of your AWS account activity, including actions taken through the AWS Management Console, AWS SDKs, command line tools, and other AWS services. This event history simplifies security analysis, resource change tracking, and troubleshooting. In addition, you can use CloudTrail to detect unusual activity in your AWS accounts. These capabilities help simplify operational analysis and troubleshooting.

Security Hub:

AWS Security Hub gives you a comprehensive view of your high-priority security alerts and security posture across your AWS accounts. There are a range of powerful security tools at your disposal, from firewalls and endpoint protection to vulnerability and compliance scanners. But oftentimes this leaves your team switching back-and-forth between these tools to deal with hundreds, and sometimes thousands, of security alerts every day. With Security Hub, you now have a single place that aggregates, organizes, and prioritizes your security alerts, or findings, from multiple AWS services, such as Amazon GuardDuty, Amazon Inspector, Amazon Macie, AWS Identity and Access Management (IAM) Access Analyzer, and AWS Firewall Manager, as well as from AWS Partner solutions. AWS Security Hub continuously monitors your environment using automated security checks based on the AWS best practices and industry standards that your organization follows. You can also take action on these security findings by investigating them in Amazon Detective or by using Amazon CloudWatch Event rules to send the findings to ticketing, chat, Security Information and Event Management (SIEM), Security Orchestration Automation and Response (SOAR), and incident management tools or to custom remediation playbooks. AWS Security Hub in just a few clicks in the Management Console and once enabled, Security Hub will begin aggregating and prioritizing findings and conducting security checks.

AWS Lambda:

AWS Lambda lets you run code without provisioning or managing servers. You pay only for the compute time you consume.

With Lambda, you can run code for virtually any type of application or backend service - all with zero administration. Just upload your code and Lambda takes care of everything required to run and scale your code with high availability. You can set up your code to automatically trigger from other AWS services or call it directly from any web or mobile app.

Study RDK and check AWS Config

First of all install the rdk using pip command. Than you enter through command access key and secret access key and region to access the create rule from AWS.

```
C:\Users\hp>rdk -k AKIAICHWARSG3KWVE4IA -s mpIGA/SmX3v25OWjxCO/nfzRQTTH0shQQqbntd6p -r us-east-1 init
Running init!
Found Bucket: config-bucket-520477949117
Creating IAM role config-role
Waiting for IAM role to propagate
Creating delivery channel to bucket config-bucket-520477949117
Config Service is ON
Config setup complete.
Creating Code bucket config-rule-code-bucket-520477949117-us-east-1
```

In this step you create the rule locally this rule is store in your directory.

```
C:\Users\hp>rdk create MyRule --runtime python3.6 --resource-types AWS::EC2::Instance
Running create!
Local Rule files created.
```

In this step test the rule locally and debug the rule and get the how many numbers of error in the rule.

```
C:\Users\hp>rdk test-local MyRule
Running local test!
Testing MyRule
Looking for tests in C:\Users\hp\MyRule
MyRule_test.py
Debug!
<unittest.suite.TestSuite tests=[<unittest.suite.TestSuite tests=[<MyRule_test.ComplianceTest testMethod=tes
 <unittest.suite.TestSuite tests=[<MyRule_test.TestStsErrors testMethod=test_sts_access_denied>, <MyRule_tes
ors testMethod=test_sts_unknown_error>]>]>
test_sample (MyRule_test.ComplianceTest) ... ok
test_sts_access_denied (MyRule_test.TestStsErrors) ... ok
test_sts_unknown_error (MyRule_test.TestStsErrors) ... ok
```

In this step modify the rule locally and then you can deploy the rule into AWS.

```
C:\Users\hp>rdk modify MyRule --runtime python2.7 --maximum-frequency TwentyFour_Hours
Running modify!
Modified Rule 'MyRule'.  Use the `deploy` command to push your changes to AWS.

C:\Users\hp>
```

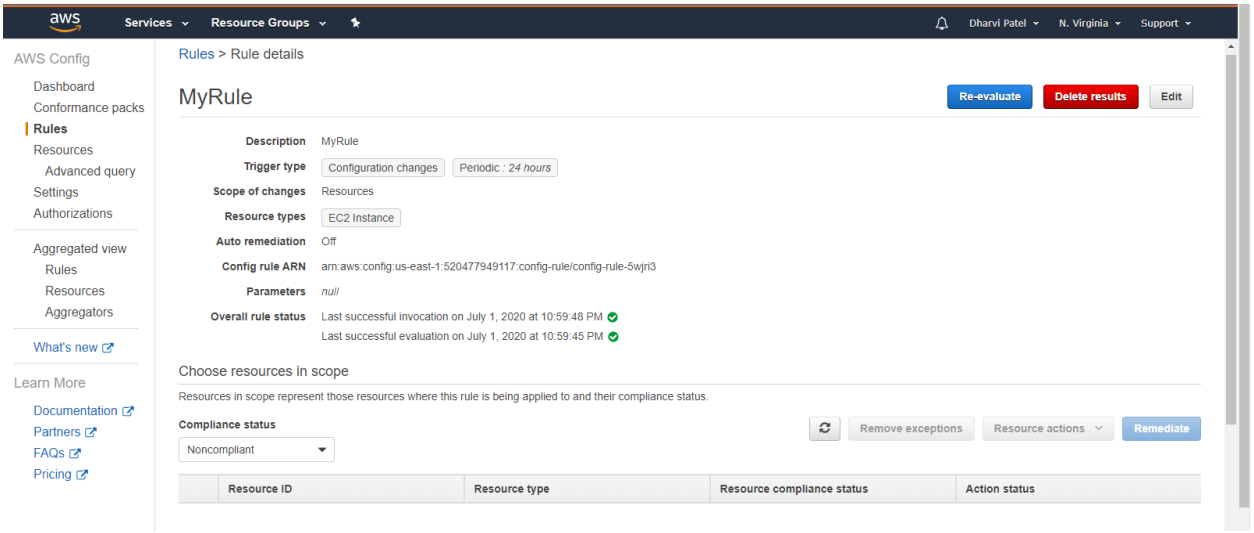
In this step you can deploy the rule use bellow command.

```
C:\Users\hp>rdk deploy MyRule
Running deploy!
Found Custom Rule.
Zipping MyRule
Uploading MyRule
Upload complete.
Creating CloudFormation Stack for MyRule
Waiting for CloudFormation stack operation to complete...
Waiting for CloudFormation stack operation to complete...
Waiting for CloudFormation stack operation to complete...
Waiting for CloudFormation stack operation to complete...
Waiting for CloudFormation stack operation to complete...
CloudFormation stack operation complete.
Config deploy complete.
```

After deploy the rule you can check the log files.

```
C:\Users\hp>rdk logs MyRule -n 5
'stty' is not recognized as an internal or external command,
operable program or batch file.
Using default terminal rows and columns.
2020-07-01 22:48:45 - END RequestId: b5b300ab-0316-4069-9275-b140271c91f8
'stty' is not recognized as an internal or external command,
operable program or batch file.
Using default terminal rows and columns.
2020-07-01 22:48:45 - REPORT RequestId: b5b300ab-0316-4069-9275-b140271c91f8
                     Duration: 1165.38 ms    Billed Duration: 1200 ms    Memory
                      Size: 256 MB    Max Memory Used: 68 MB    Init Duration:
                     178.79 ms
'stty' is not recognized as an internal or external command,
operable program or batch file.
Using default terminal rows and columns.
```

See below, This is the AWS console which is rule which I have create the above and deploy the AWS. This rule is deploy in us-east-1 so make sure you open the console in us-east-1. This console is config console.



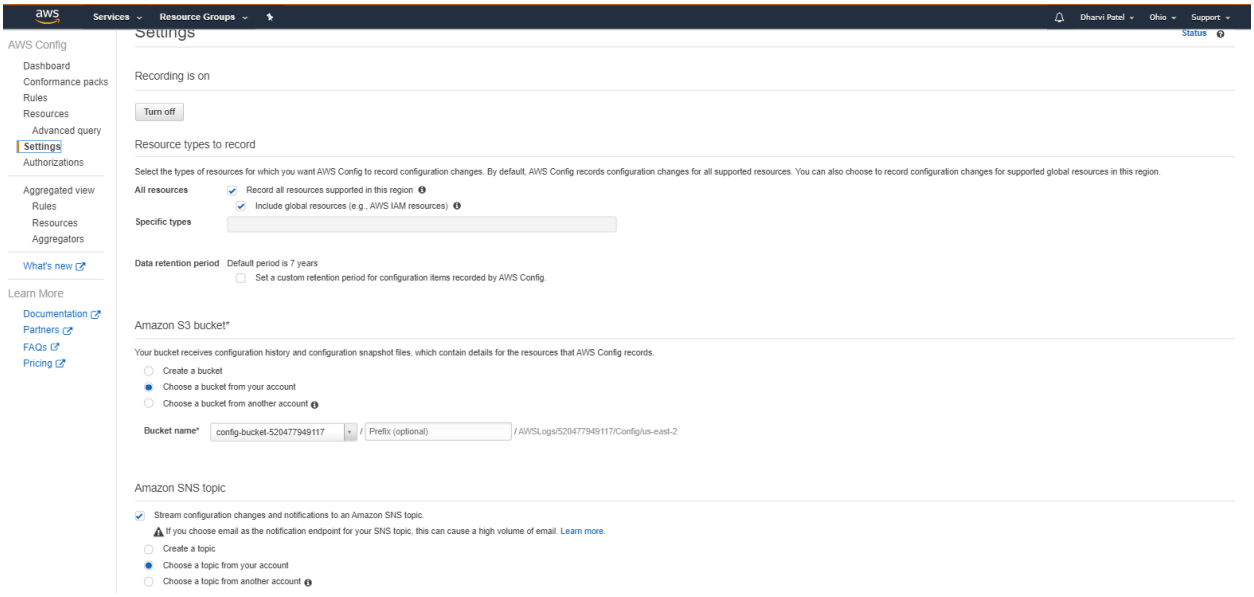
If you create the rule template so bellow command you have to perform.

```
C:\Users\hp>rdk create-rule-template -o remote-rule-template.json MyRule
Generating CloudFormation template!
CloudFormation template written to remote-rule-template.json
```

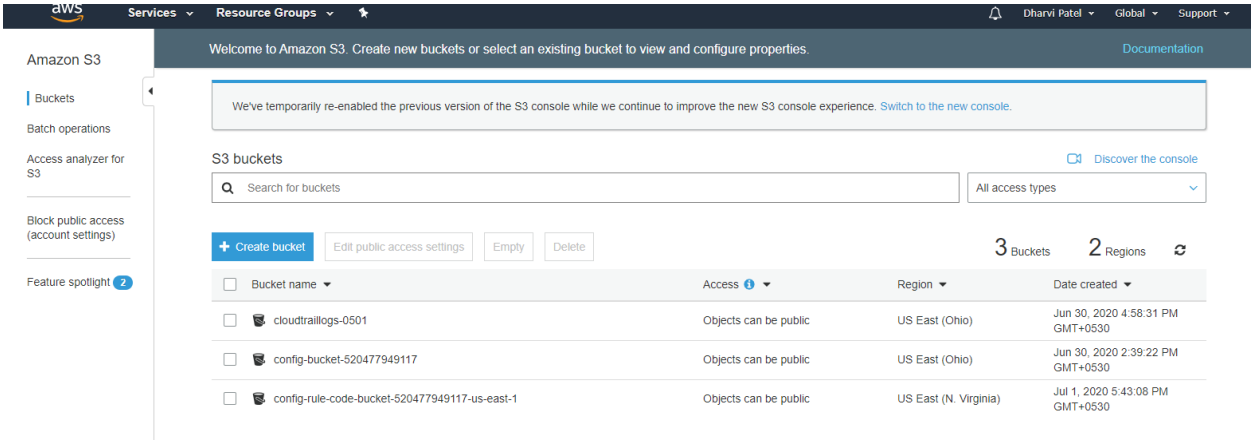
```
C:\Users\hp>rdk sample-ci AWS::EC2::Instance
{
    "version": "1.2",
    "accountId": "681361479661",
    "configurationItemCaptureTime": "2017-04-05T22:23:11.677Z",
    "configurationItemStatus": "ResourceDiscovered",
    "configurationStateId": "1491430991677",
    "configurationItemMD5Hash": "7d83283adb8b966945d43cee39c7419c",
    "arn": "arn:aws:ec2:us-east-1:681361479661:instance/i-03402838daac1d611",
    "resourceType": "AWS::EC2::Instance",
    "resourceId": "i-03402838daac1d611",
    "awsRegion": "us-east-1",
    "availabilityZone": "us-east-1b",
    "resourceCreationTime": "2017-04-05T22:15:53.000Z",
    "tags": {},
    "relatedEvents": [
        "d3d87c29-bde3-4380-a7de-810f379246cc"
    ],
    "relationships": [
        {
            "resourceType": "AWS::EC2::NetworkInterface",
            "resourceId": "eni-d055cfc4",
            "relationshipName": "Contains NetworkInterface"
        },
        {
            "resourceType": "AWS::EC2::SecurityGroup",
            "resourceId": "sg-fd215482",
            "relationshipName": "Is associated with SecurityGroup"
        },
        {
            "resourceType": "AWS::EC2::Subnet",
            "resourceId": "subnet-1aaccc7f",
            "relationshipName": "Is contained in Subnet"
        },
        {
            "resourceType": "AWS::EC2::Volume",
            "resourceId": "vol-0c24aa343c564eda8",
            "relationshipName": "Is attached to Volume"
        },
        {
            "resourceType": "AWS::EC2::VPC",
            "resourceId": "vpc-79b3ea1e",
            "relationshipName": "Is contained in Vpc"
        }
    ],
    "configuration": {
        "instanceId": "i-03402838daac1d611",
        "imageId": "ami-22ce4934",
        "state": {
            "code": 16,
            "name": "running"
        },
        "privateDnsName": "ip-172-31-74-239.ec2.internal",
        "publicDnsName": "ec2-34-205-29-138.compute-1.amazonaws.com",
        "stateTransitionReason": "",
        "keyName": "ssm-key",
        "amiLaunchIndex": 0,
```

Manually create rule and check compliance

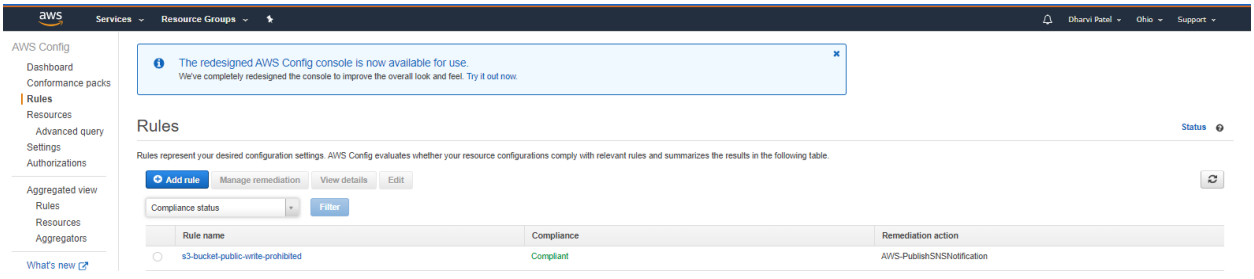
Here bellow settings is rule setting. This rule is related to s3 bucket which is for s3 bucket is not public if public so it is non complaint.



This is s3 bucket list which is not a public.



This is rule which is we created and this is complaint because all buckets are in non public mode.



Below is the recover the our non compliant resources using cloudWatch and Lambda function. cloudWatch is used for trigger the log file where is error and which time this error will ocuur. You can use cloud Trail to use the recording the event which is performed in AWS acoount. Lambda function is connected to the cloud Watch and is triggered the non compliant resource to compliant.