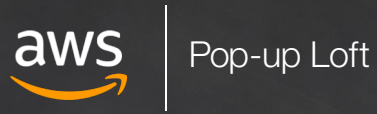
Identity Round Robin Workshop

Serverless Round – Static Hosted Website

Jesse Fuchs
Security Solutions Architect
Amazon Web Services



What to expect from this round

- AWS IAM Primer
- Using Cognito for Application User Management
- WildRydes Serverless Application
- Group Exercise – Build Phase
- Group Exercise – Verify Phase
- Review and Discussion

Considerations for layers of principals

Applications

- Identities: Application Users, Application Administrators

Operating Systems

- Identities: Developers, and/or Systems Engineers

Amazon Web Services

- Identities: Developers, Solutions Architects, Testers, Software/Platform
- Interaction of AWS Identities:
  - Provisioning/deprovisioning EC2 instances and EBS storage.
  - Configuring Elastic Load Balancers.
  - Accessing S3 Objects or data in DynamoDB.
  - Accessing data in DynamoDB.
  - Interacting with SQS queues.
  - Sending SNS notifications.

aws

Considerations for layers of principals

Applications

- Identities: Application Users, Application Administrators

Operating Systems

- Identities: Developers, and/or Systems Engineers

Amazon Web Services

- Identities: Developers, Solutions Architects, Testers, Software/Platform
- Interaction of AWS Identities:
  - Provisioning/deprovisioning EC2 instances and EBS storage.
  - Configuring Elastic Load Balancers.
  - Accessing S3 Objects or data in DynamoDB.
  - Accessing data in DynamoDB.
  - Interacting with SQS queues.
  - Sending SNS notifications.

aws

AWS Principals

Account Owner ID (Root Account)

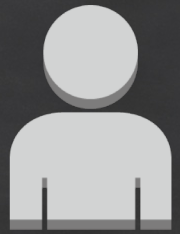
- Access to all subscribed services.
- Access to billing.
- Access to console and APIs.
- Access to Customer Support.

AWS Identity and Access Management (IAM)

- Access to specific services.
- Access to console and/or APIs.
- Access to Customer Support (Business and Enterprise).

AWS Identity and Access Management (IAM)

*Enables **you** to **control** who can do what in your AWS account*



IAM Users

IAM Groups

IAM Roles

Policies

aws

AWS IAM Policy Types

Identity-based policies

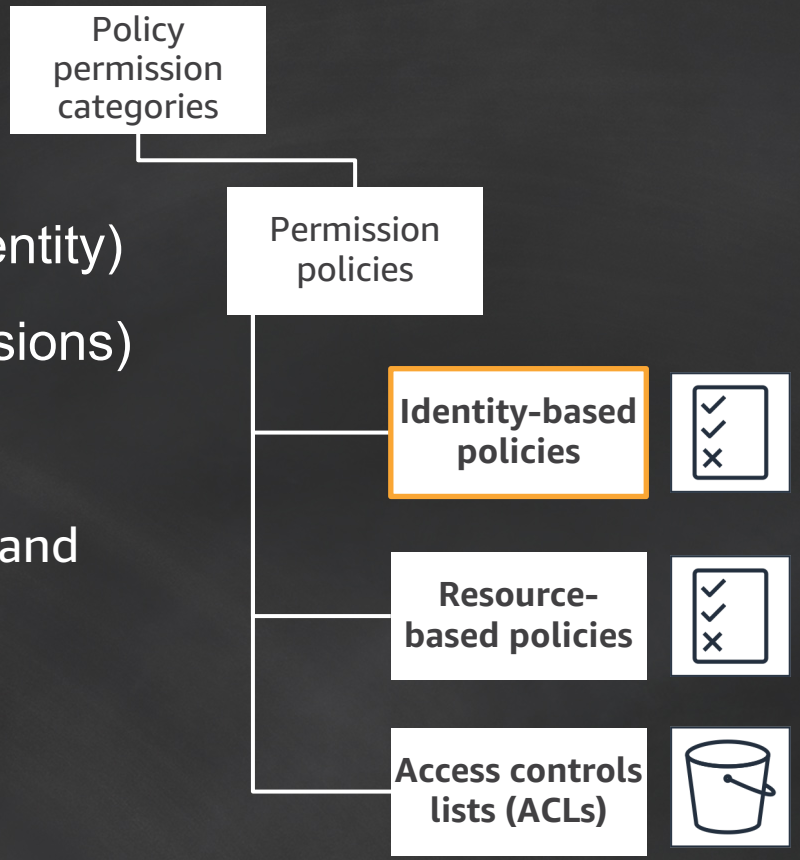
Resource-based policies

Access Control Lists

AWS IAM Policy Types

- JSON-formatted documents
- Attached to a **principal** (or identity)
- Contains a statement (permissions) that specifies:
  - what actions that identity can perform, on which resources, and under what conditions.

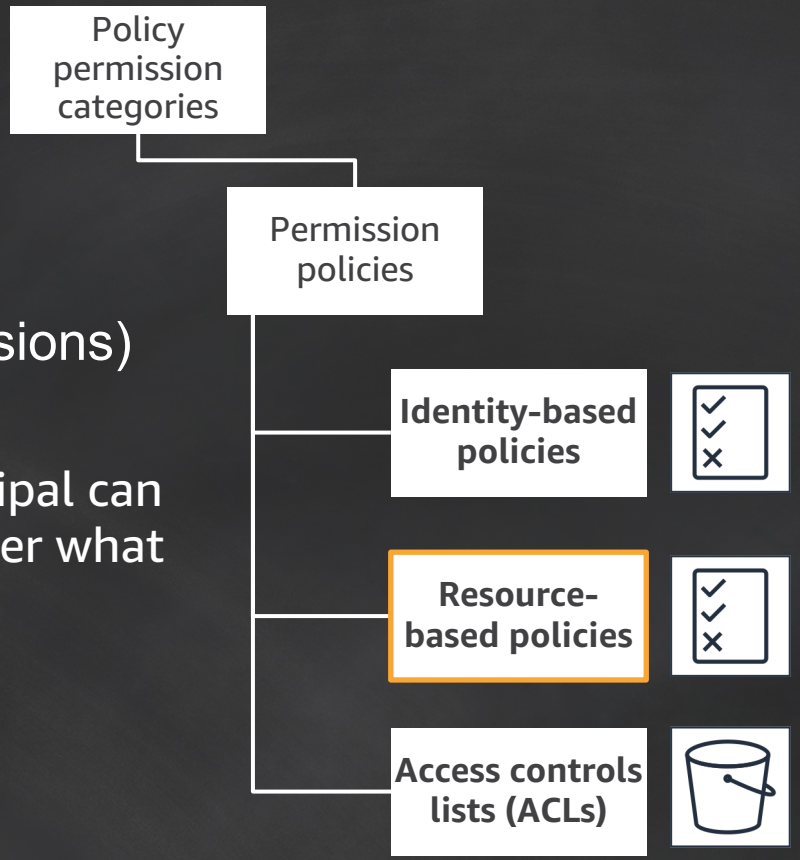
Principal (implicit)
Action
Resource
Condition



AWS IAM Policy Types

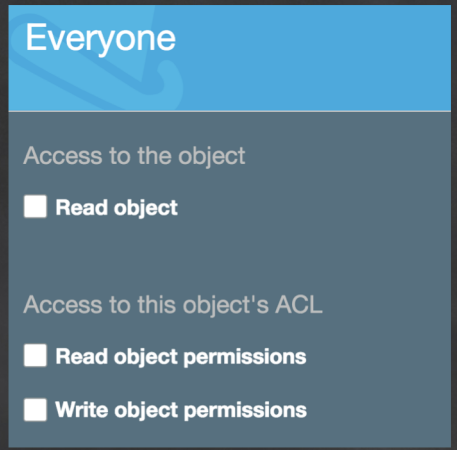
- JSON-formatted documents
- Attached to a **resource**
- Contains a statement (permissions) that specifies:
  - what actions a specified principal can perform on that resource under what conditions.

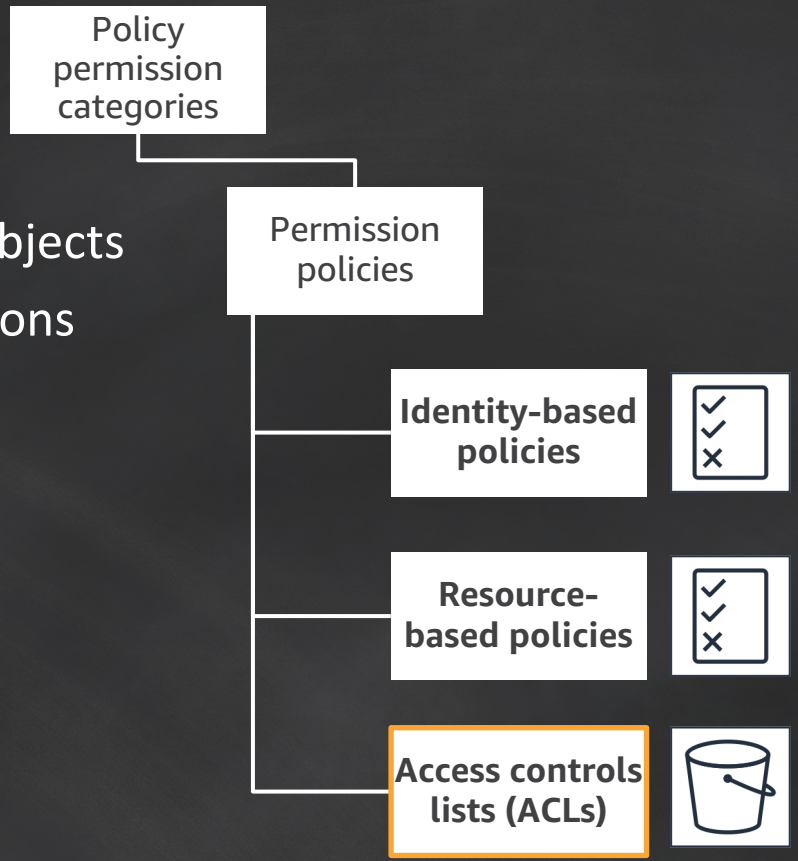
Principal
Action
Resource
Condition



AWS IAM Policy Types

- Manage access to buckets and objects
- Contains a Grantee and Permissions





AWS IAM Identity-Based Policy Example

AWS IAM User
(Alice)

AWS IAM
Identity-Based
Policy

```
"Version": "2012-10-17"
"Statement": [
   {
     "Effect": "Allow",
     "Action": "s3:GetObject",
     "Resource": "arn:aws:s3:::examplebucket/*"
    }
 ]
```


aws

AWS IAM Identity-Based Policy Example

AWS IAM User
(Alice)

AWS IAM
Identity-Based
Policy

```
"Version": "2012-10-17"
"Statement": [
   {
     "Effect": "Allow",
     "Action": "s3:GetObject",
     "Resource": "arn:aws:s3:::examplebucket/*”,
     "Condition": {
       "StringEquals": {
         "s3:ExistingObjectTag/classification": ”sensitive"
       }
     }
   ]
```


aws

AWS IAM Resource-Based Policy Example

Amazon S3 Bucket

AWS IAM
Resource-Based
Policy

```
"Version": "2012-10-17"
"Statement": [
   {
     "Effect": "Allow",
     ”Principal": {
       "AWS" : "*"
     },
     "Action": "s3:GetObject",
     "Resource": "arn:aws:s3:::examplebucket/*”
   }
 ]
```

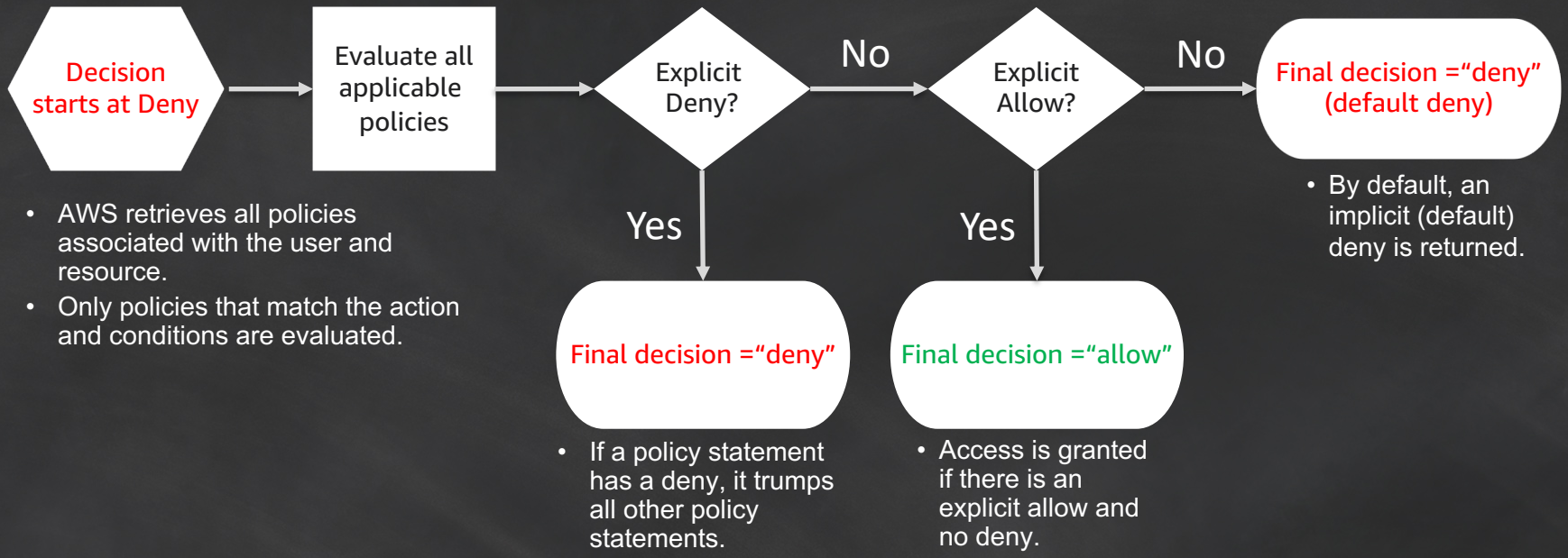
AWS IAM Resource-Based Policy Example

Amazon S3 Bucket

AWS IAM Resource-Based Policy

```
"Version": "2012-10-17"
"Statement": [
   {
     "Effect": "Allow",
     ”Principal": {
       "AWS" : "*"
     },
     "Action": "s3:GetObject",
     "Resource": "arn:aws:s3:::examplebucket/*”,
     "Condition" : {
       "IpAddress" : {
         "aws:SourceIp": "192.168.143.0/24"
       },
     }
    }
  ]
```

AWS IAM Policy Evaluation Logic



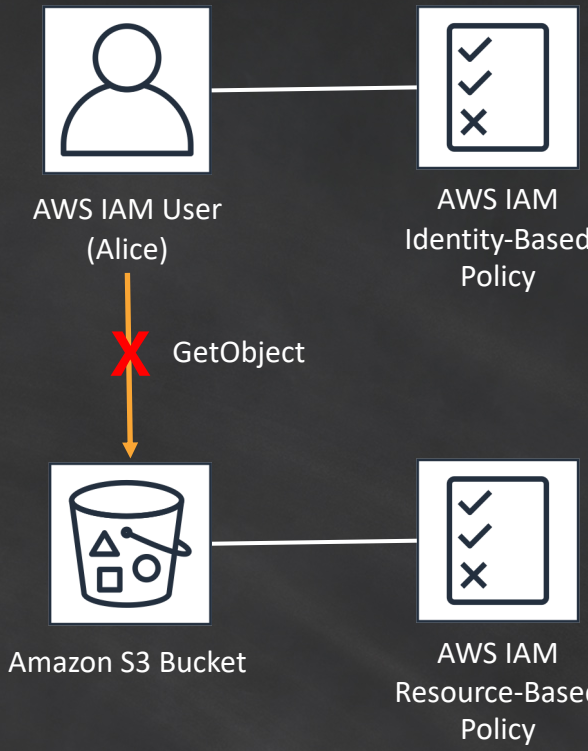
- AWS retrieves all policies associated with the user and resource.
- Only policies that match the action and conditions are evaluated.

- If a policy statement has a deny, it trumps all other policy statements.

- Access is granted if there is an explicit allow and no deny.

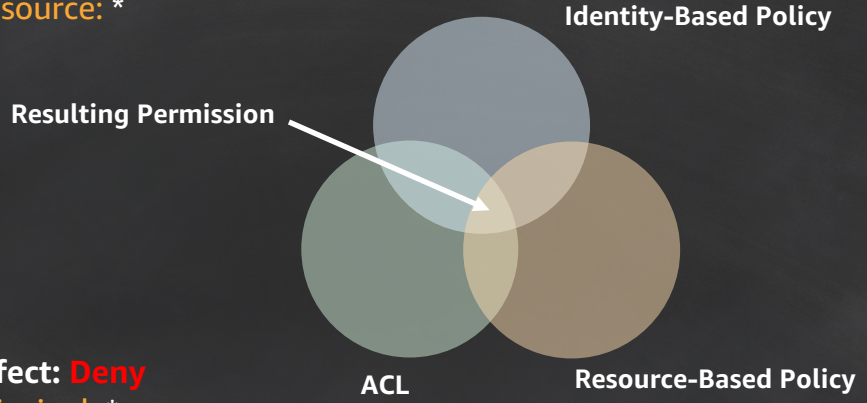
- By default, an implicit (default) deny is returned.

AWS IAM Policy Evaluation Logic



Effect: Allow
Action: s3:GetObject
Resource: *

Effect: Deny
Principal: *
Action: s3:GetObject
Resource: *



Considerations for layers of principals

Applications

- Identities: Application Users, Application Administrators

Operating Systems

- Identities: Developers, and/or Systems Engineers

Amazon Web Services

- Identities: Developers, Solutions Architects, Testers, Software/Platform
- Interaction of AWS Identities:
  - Provisioning/deprovisioning EC2 instances and EBS storage.
  - Configuring Elastic Load Balancers.
  - Accessing S3 Objects or data in DynamoDB.
  - Accessing data in DynamoDB.
  - Interacting with SQS queues.
  - Sending SNS notifications.

aws

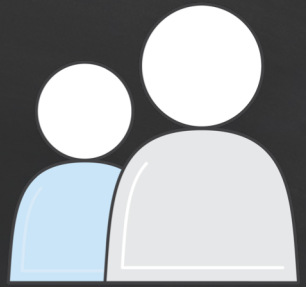
Amazon Cognito

Identity for your web and mobile apps

Security & Access

User Ownership

Experience

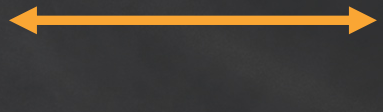


Customer Relationships

aws

Amazon Cognito

Web and Mobile Apps



Amazon Cognito

Cognito User Pools →

Cognito Identity Pools →

- Managed User Directory
- AWS Credentials
- Federation (SAML)
- Hosted-UI
- Standard Tokens (OAuth 2)

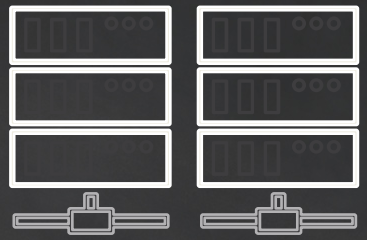
Developers focus on what is special about their app

Cognito handles auth and identity

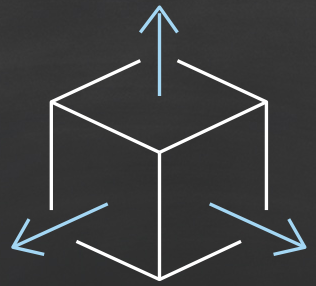
aws

WildRydes Serverless Application

What does serverless mean?



No Server Management



Flexible Scaling

High Availability

No Idle Capacity

aws

WildRydes Serverless Application

Building blocks for serverless applications

Compute


AWS Lambda


AWS Lambda@Edge

Storage


Amazon S3

Database


Amazon DynamoDB

API Proxy and GraphQL


Amazon API Gateway


AWS AppSync

Messaging and Queues


Amazon SQS


Amazon SNS

Analytics


Amazon Kinesis


Amazon Athena

Orchestration and State Management


AWS Step Functions

Monitoring and Debugging


AWS X-Ray

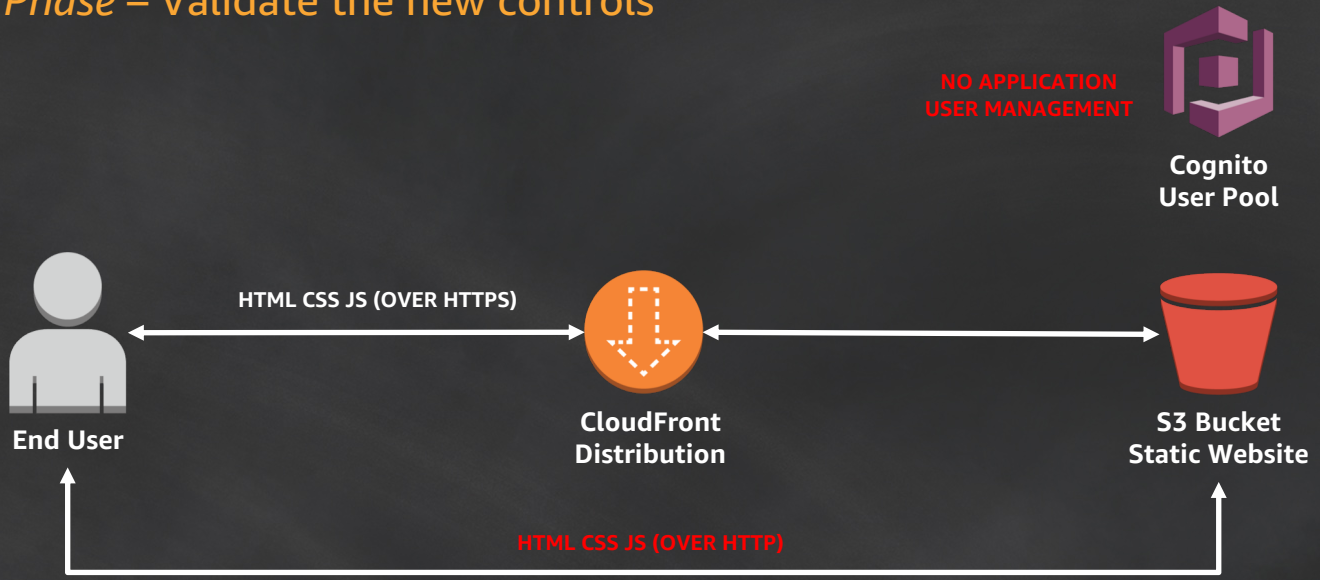
User Management and IdP


Amazon Cognito

aws

WildRydes Serverless Application

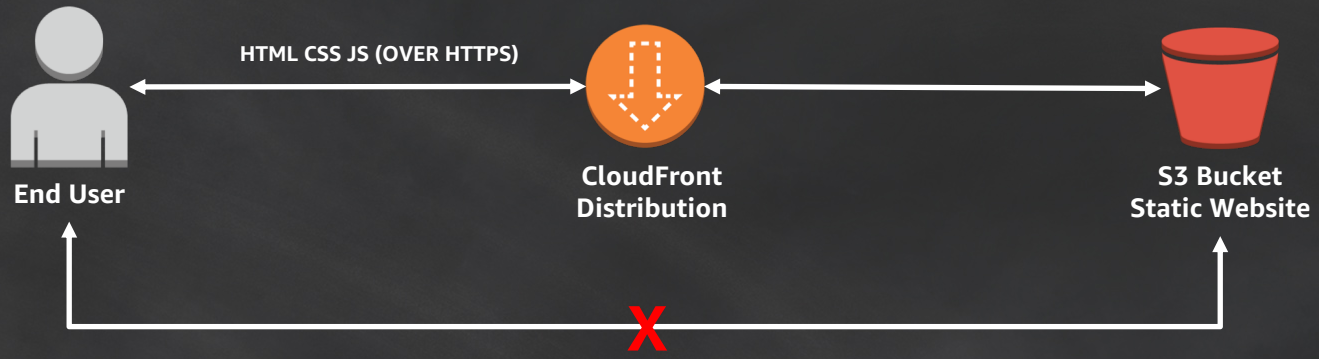
- *Build Phase* – Complete the access controls
- *Verify Phase* – Validate the new controls



WildRydes Serverless Application

Build Phase - Task 1

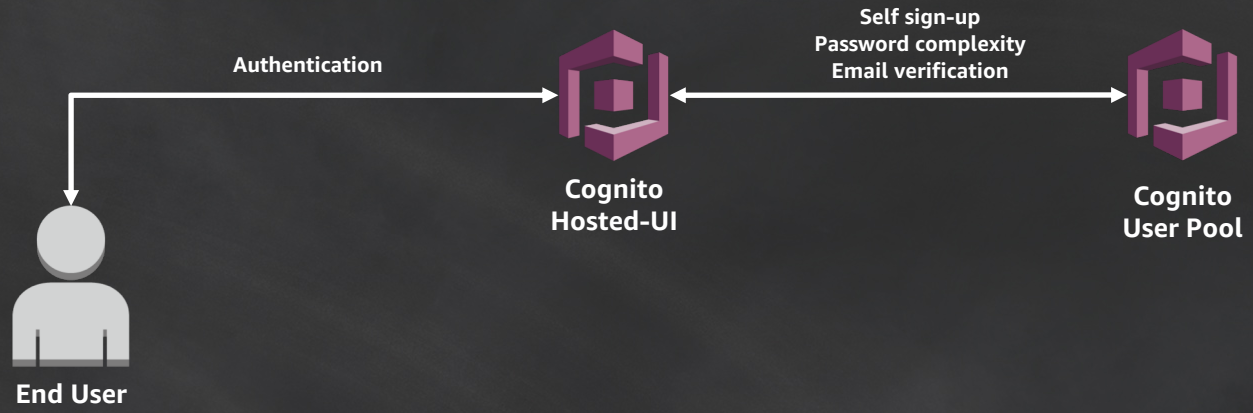
Reduce the attack surface of your origin



WildRydes Serverless Application

Build Phase - Task 2

Setup application user management



WildRydes Serverless Application

Build Phase (1 hour)

https://awssecworkshops.com

1. Click on *Level 300*
2. Click on *Identity Round-Robin Workshop*
3. Click on *Serverless Round*

WildRydes Serverless Application

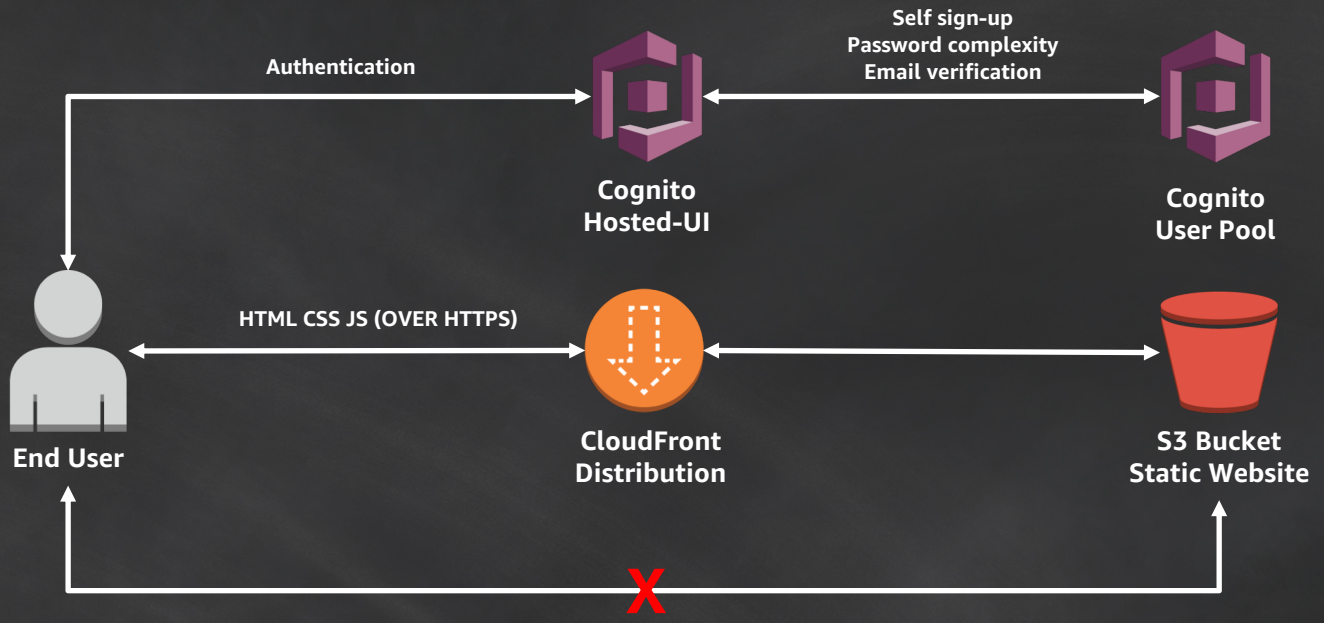
Verify Phase (15 Minutes)

https://awssecworkshops.com

1. Click on *Verify Phase* at the bottom left

WildRydes Serverless Application

Architecture



Review and Discussion

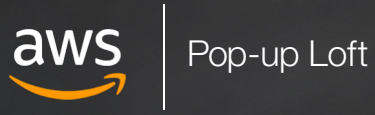
How did you restrict access to the S3 Bucket?

Review and Discussion

What response type did you put in your Hosted-UI URL?

Review and Discussion

Where are your JWT Tokens stored?



Thank You!