



PROJECT  
**Cloud Computing**

POST-SECONDARY

## 1 INTRODUCTION

In recent years, Cloud Computing has become a necessity for businesses across all sectors and verticals. To keep a competitive edge, businesses leverage the cloud to develop solutions that can handle the demands of their customers and give them a positive customer experience given any load or fault scenario. There are key aspects to successfully building a cloud-based solution. These include system design, deployment, network design, high availability, scalability, automation, security, cost, and monitoring.

This test project will comprise of two separate challenges. An “AWS GameDay” challenge that is designed to assess Competitors based on their ability to effectively and securely deploy, maintain, troubleshoot and scale a web application. The second challenge will be an “AWS Jam” challenge. This challenge is designed to assess competitors troubleshooting abilities across a wide variety of AWS services.

## 2 DESCRIPTION OF PROJECT AND TASKS

This document describes the operational theory and practice for the production system powering the Unicorn Rentals website. The primary audience is the Unicorn Rentals DevOps team running the site. This team is responsible for deploying code, scaling the site in response to load, maintaining published SLAs (including response time and uptime), disaster recovery, troubleshooting activities, and any monitoring and alerting activities

### Tasks

- Log into Gameday with your assigned hash (Provided on the day)
- Set your team/competitor name on the Dashboard – (Format: NAME SURNAME)
- Read the documentation thoroughly (Outlined below)
- Log into the AWS console (link provided from the Dashboard)
- Examine existing configurations in EC2 (Elastic Cloud Computer server)
- Examine existing configurations in VPC (Virtual Private Cloud, Network Segment)

- Configure application to auto scale to handle increasing load (Auto Scaling Groups, with Launch Configuration)
- Create/update the user data configuration correctly, including download locations of server binary and server configuration file Update the user data configuration to include any required local dependencies
- Configure any server dependencies as outlined in the technical details
- Configure necessary application monitoring, metrics and alarms in CloudWatch
- Ensure security of the entire infrastructure at all times
- Monitor performance of the application servers in the “Score Events and Scoreboard” and through the AWS Console with CloudWatch
- Serve client requests to gain points, reference the “Score Events and Scoreboard” to ensure you are scoring positively by serving the requests.
- Monitor costs and do not scale up the infrastructure excessively to minimize penalties

## 2.1 Day 1: GameDay Experience

### 2.1.1 Initial States

At the start of the day, the minimal infrastructure needed to provide the public client API will be operational within the account. This infrastructure is neither scalable nor highly available. It does however provide a reference point for a functional deployment. Please reference the TeamRole your account IAM console for any permissions based questions.

## Summary

Delete role

**Role ARN** `arn:aws:iam::117671164446:role/TeamRole` [🔗](#)

**Role description** [Edit](#)

**Instance Profile ARNs** `arn:aws:iam::117671164446:instance-profile/TeamRoleInstanceProfile` [🔗](#)

**Path** /

**Creation time** 2019-08-21 03:17 CDT

**Maximum CLI/API session duration** 12 hours [Edit](#)

**Give this link to users who can switch roles in the console** <https://signin.aws.amazon.com/switchrole?roleName=TeamRole&account=117671164446> [🔗](#)

Permissions Trust relationships Tags Access Advisor Revoke sessions

▼ Permissions policies (3 policies applied)

Attach policies

➕ Add inline policy

Policy name ▼	Policy type ▼	
▶ restrict-policy	Managed policy	✕
▶ ws-loadgen-aus-day2-policy	Managed policy	✕

Show 1 more

▶ Permissions boundary (not set)

### 2.1.2 Infrastructure Costs

Scaling the infrastructure horizontally brings an increase in the number of Amazon EC2 instances used. Each instance is associated with a cost. If there are more instances deployed than necessary to meet the demand of the load, Competitors will be penalized in points. Make sure to deploy the necessary number of instances to meet the demand (which changes throughout the day).

### 2.1.3 Personal Event Dashboard

The personal event dashboard and scoreboard is provided to give Competitors some visibility into how their application is performing based on web traffic served. This dashboard, however, does not include the Marks that are given based on Systems Design and Deployment, Systems Design and Deployment, Network Design and Deployment, Infrastructure Automation, Infrastructure Security, Infrastructure Active and Passive Monitoring. Each Criteria will provide marks that will be added up to meet the total amount. The sole purpose of the Personal event dashboard and Scoreboard for Competitors to have visibility into viability and how they are serving traffic and is not how the Competitors are performing in relation to other based on all the Criteria's where Marks can be accorded.

The dashboard has a few key components that you will interact with throughout the competition. The top bar of the dashboard has a series of buttons that allow you to:

- Access your score events. These are individual entries of activity helpful in determining the availability of your application.

- Access your AWS account. Click on this button in order to get access to your AWS account. You are provided with an AWS account to use for this competition. On completion of each day, the account will be closed and unable to be accessed again.

- Input for your infrastructure address. Your web infrastructure will require a public hostname to access. Just as every website requires a name in a web browser, users of this web application you are deploying require an address to use in order to access the site. You can use an IP address for this address but will get more points for a hostname address.

### 2.1.4 Scoreboard and Scoring Events

To get a deeper view your performance, you can click on the "Score Events" button on the player dashboard to access your point-by-point breakdown.

Points	Total	Source	Reason
-1	531.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLTcwMzI%3D: dial tcp 52.72.237.43:80: i/o timeout
-1	532.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLTEzNTI%3D: dial tcp 52.72.237.43:80: i/o timeout
-1	533.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLT15ODc%3D: dial tcp 52.72.237.43:80: i/o timeout
-1	534.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLTyxNQ%3D%3D: dial tcp 52.72.237.43:80: i/o timeout
-1	535.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLTgxNjU%3D: dial tcp 52.72.237.43:80: i/o timeout
-1	536.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLTyMTg%3D: dial tcp 52.72.237.43:80: i/o timeout
-1	537.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLTM0Mg%3D%3D: dial tcp 52.72.237.43:80: i/o timeout
-1	538.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLTc0MQ%3D%3D: dial tcp 52.72.237.43:80: i/o timeout
-1	539.22	Order Processor	Request error: Get http://52.72.237.43/calc?input=SUNhbkhheIVuaWNvcm4%2FLTgxNDY%3D: dial tcp 52.72.237.43:80: i/o timeout

This page has two sections to note:

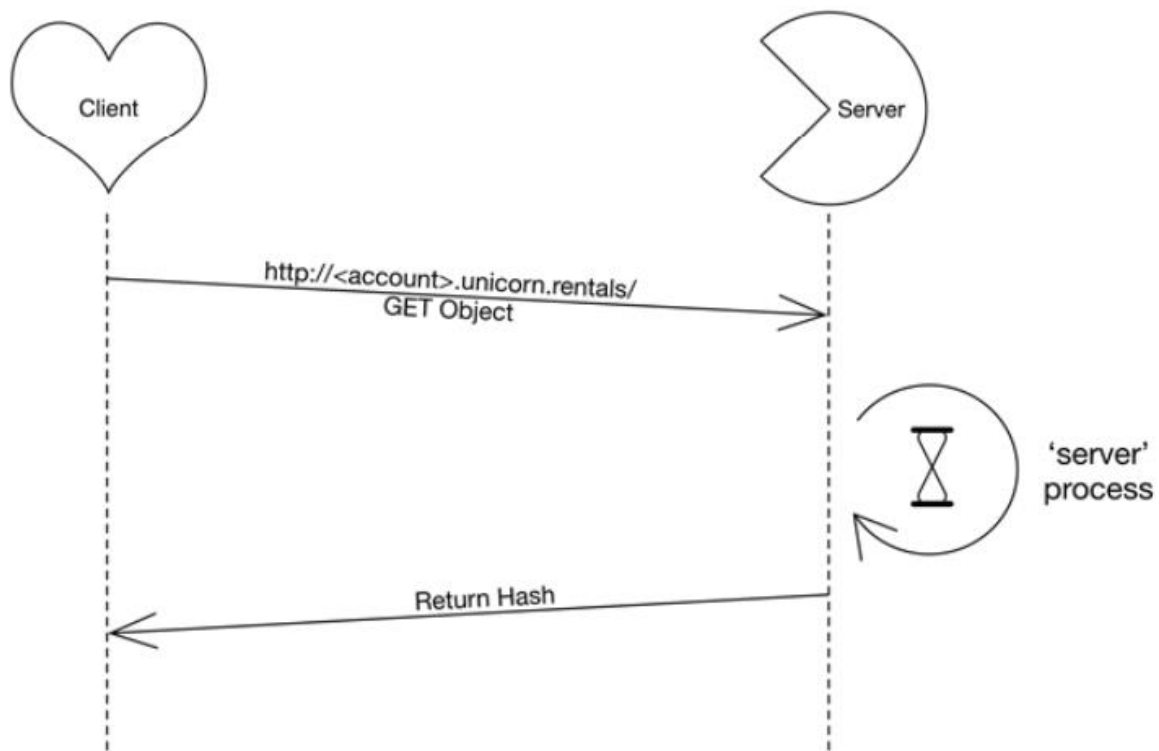
- Each row lists every score event that you have generated. The "Source" column tells you where the point awards or deductions came from. The "Points" column will tell you how many points you have received or lost.
- The "Reason" column will tell you the reason you received the points or lost the points. Pay very close attention to this column when you are losing points in order to understand what is going on and how to fix the problems

### 2.1.5 AWS Service Restrictions

When working with AWS, you have access to most services. If you get an error such as "Permission Denied", check to make sure that you are operating in the correct AWS Region and using appropriate resources sizes (e.g. "t2" instance sizes).

### 2.1.6 Application Architecture

The client below is making requests to the server that you are running. The address the client tries to connect on is defined by the address that you set in the dashboard.



### 2.1.7 Additional Operations

You can find additional application information on options by using the "-h" flag when running the server binary: `./server -h` • Create a new Launch Configuration based on the existing Launch Configuration that can be found in the account provided:

- (<http://docs.aws.amazon.com/AutoScaling/latest/DeveloperGuide/WorkingWithLaunchConfig.html>)
  - Utilize a 'User Data' script
  - Associate this new launch configuration with the Auto Scaling group.
  - Scale-up new group / scale-in old group.
  - Make sure instances are associated with the proper network resources.

### 2.1.8 Add an SSH key to the instance and Auto Scaling Groups

Add an SSH Key to the instance and Auto Scaling Groups

- Create an ssh-keypair  
(<http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-key-pairs.html>)
- Update the Launch Configuration (Same procedure as 'Update Application').
- Yes, this means you must relaunch the instances.

• Connect from Windows:

<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html>

• Configure an Auto Scaling Policy:

[http://docs.aws.amazon.com/AutoScaling/latest/DeveloperGuide/scaling\\_typesof.html](http://docs.aws.amazon.com/AutoScaling/latest/DeveloperGuide/scaling_typesof.html)



## 2.1.9 Troubleshooting Procedures

[http://docs.aws.amazon.com/AutoScaling/latest/DeveloperGuide/policy\\_creating.html](http://docs.aws.amazon.com/AutoScaling/latest/DeveloperGuide/policy_creating.html)

<http://docs.aws.amazon.com/ElasticLoadBalancing/latest/DeveloperGuide/elbcloudwatch-metrics.html>

## 2.2 Day 2 : AWS Jams

### 2.2.1 The Jam Platform

The first day of competition will be mainly focused on your ability to create new scalable architectures. In addition to testing your creativity and technical ability in creating architectures, you will also be tested on specific skills that are necessary as a cloud computing expert. For this part of the competition, we will be using a module-based platform for testing specific skills.

### 2.2.2 Registering on the Jam Platform

If you haven't already just click the register button. Fill in the following fields:

Email: Your Email Display

Name: [Name]-[Province]

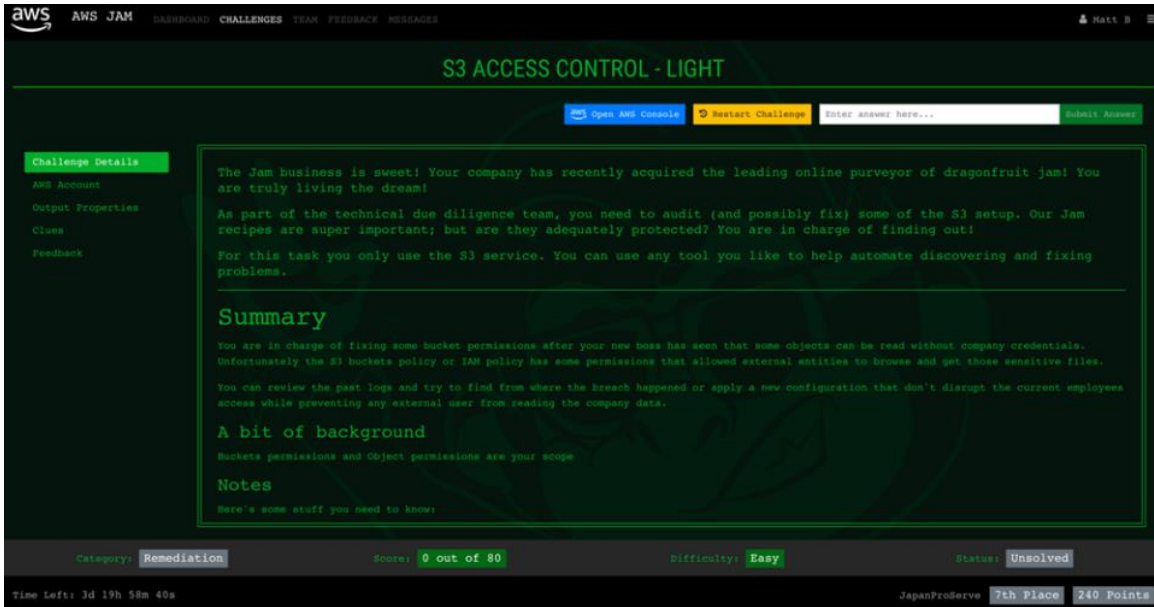
Password: A password of your choosing. Never share this with another person

You can choose whether or not to give consent to distribute your email. For this event it will not matter. Complete the Captcha

### 2.2.3 Using the Jam Platform

You will be using the jam platform for Day 2 of the competition. Once the jam event opens, you'll be able to complete the challenges in any order that you wish. Once we are ready to start the jam event, you will all be given an event password. This will unlock your tasks for that day. The default view of the jam platform is a map. This is just a fun layout, but is not important for this event. You can complete any challenge in any order.

Once you select a challenge you will see a screen like this:



**S3 ACCESS CONTROL - LIGHT**

Open AWS Console Restart Challenge Enter answer here... Submit Answer

**Challenge Details**

AWS Account  
Output Properties  
Clues  
Feedback

The Jam business is sweet! Your company has recently acquired the leading online purveyor of dragonfruit jam! You are truly living the dream!

As part of the technical due diligence team, you need to audit (and possibly fix) some of the S3 setup. Our Jam recipes are super important; but are they adequately protected? You are in charge of finding out!

For this task you only use the S3 service. You can use any tool you like to help automate discovering and fixing problems.

**Summary**

You are in charge of fixing some bucket permissions after your new boss has seen that some objects can be read without company credentials. Unfortunately the S3 buckets policy or IAM policy has some permissions that allowed external entities to browse and get those sensitive files. You can review the past logs and try to find from where the breach happened or apply a new configuration that don't disrupt the current employees access while preventing any external user from reading the company data.

**A bit of background**

Buckets permissions and Object permissions are your scope

**Notes**

Here's some stuff you need to know!

Category: Remediation Score: 0 out of 80 Difficulty: Easy Status: Unsolved

Time Left: 3d 19h 58m 49s JapanProberve 7th Place 240 Points

This will give you the instructions for the task, access to your account, and the ability to restart the challenge if you believe you've broken something and cannot repair it yourself. Any time to restart a Jam is time used; you will not receive this time back.

The jam modules can be very difficult, but all can and have been solved using only the instructions given to you. However, you do have the option of revealing clues. Clues are designed to help you make progress toward the final solution but it is important to remember that you will not receive full points for the module if you use a clue. Determine your own strategy, and be mindful of the consequences of using a clue. You **will** be penalized for the use of clues.



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