TEAM LEAD

Mentoring

CLARUSWAY©
WAY TO REINVENT YOURSELF

Class Schedule

- Agile, SDLC, Scrum, Jira
- Python
- Linux
- AWS
- Git
- DevOps
- Networking
- SQL

Teamwork Schedule

Ice-breaking 10 minutes

- Personal Questions (Stay at home & Corona, Study Environment, Kids etc.)
- Any challenges (Classes, Coding, AWS, studying, etc.)
- Ask how they're studying, give personal advice.
- Remind that practice makes perfect.

Team work 10 minutes

- Ask what exactly each student does for the team, if they know each other, if they care for each other, if they follow and talk with each other etc.

Ask Questions 20 minutes

What can developers now do with AWS CloudFormation that they could not before?

AWS CloudFormation automates and simplifies the task of repeatedly and predictably creating groups of related resources that power your applications. Creating and interconnecting all resources your application needs to run is now as simple as creating a single EC2 or RDS instance.

How does AWS CloudFormation choose actual resource names?

You can assign logical names to AWS resources in a template. When a stack is created, AWS CloudFormation binds the logical name to the name of the corresponding actual AWS resource. Actual resource names are a combination of the stack and logical resource name. This allows multiple stacks to be created from a template without fear of name collisions between AWS resources.

Can you name all your resources in CloudFormation Template file?

Although AWS CloudFormation allows you to name some resources (such as Amazon S3 buckets), CloudFormation doesn't allow this for all resources. Naming resources restricts the reusability of templates and results in naming conflicts when an update causes a resource to be replaced. To minimize these issues, CloudFormation will support resource naming on a case by case basis.

What happens when one of the resources in a stack cannot be created successfully?

By default, the "automatic rollback on error" feature is enabled. This will cause all AWS resources that AWS CloudFormation created successfully for a stack up to the point where an error occurred to be deleted. This is useful when, for example, you accidentally exceed your default limit of Elastic IP addresses, or you don't have access to an EC2 AMI you're trying to run. This feature enables you to rely on the fact that stacks are either fully created, or not at all, which simplifies system administration and layered solutions built on top of AWS CloudFormation.

Can I save my data when a stack is deleted?

Yes. AWS CloudFormation allows you to define deletion policies for resources in the template. You can specify that snapshots be created for Amazon EBS volumes or Amazon RDS database instances before they are deleted. You can also specify that a resource should be preserved and not deleted when the stack is deleted. This is useful for preserving Amazon S3 buckets when the stack is deleted.

How much does AWS CloudFormation cost?

There is no additional charge for using AWS CloudFormation with resource providers in the following namespaces: AWS::*, Alexa::*, and Custom::*. In this case you pay for AWS resources (such as Amazon EC2 instances, Elastic Load Balancing load balancers, etc.) created using AWS CloudFormation as if you created them manually. You only pay for what you use, as you use it; there are no minimum fees and no required upfront commitments.

When you use resource providers with AWS CloudFormation outside the namespaces mentioned above, you incur charges per handler operation. Handler operations are create, update, delete, read, or list actions on a resource. For more information, please refer to the pricing page

Will you be charged for resources that were rolled back during a failed stack creation attempt?

Yes. Charges for AWS resources created during template instantiation apply irrespective of whether the stack as a whole could be created successfully or not.

For more questions and answers related to AWS CloudFormation please visit AWS CloudFormation FAQs page at: https://aws.amazon.com/cloudformation/faqs/

Interview Questions 20 mins

A company is planning to build a 2-tier architecture with a web server and a database server with separate environments for development and testing. The architecture will be hosted on EC2 Instances accordingly, and the database server would require more than 10,000 IOPS per volume. Which of the following EBS volumes are optimum for the underlying EC2 Instances? (Select Two)

A. General Purpose SSD for the web server
B. Provisioned IOPS for the web server
C. General Purpose SSD for the database server
D. Provisioned IOPS for the database server

Explanation:

Correct Answers – A and C

The General Purpose SSD would be suitable for development and test environments and the IOPS SSD for business critical applications

For more information on EBS Volume types, please visit the following URL:
https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ebs-volume-types.html

A website is hosted on two EC2 instances that sit behind an Elastic Load Balancer. The response time of the website has been slowed down dramatically, and customers are placing fewer orders due to the wait time. Troubleshooting showed that one of the EC2 instances has failed and only one instance is running now. What is the best course of action to prevent this from happening in the future?

A. Change the instance size to the maximum available to compensate for the failure
B. Use CloudWatch to monitor the VPC Flow Logs for the VPC, where the instances are deployed in
C. Configure the ELB to perform health checks on the EC2 instances and implement auto-scaling
D. Replicate the existing configuration in several regions for failover

Explanation:

Correct Answer: C

- Option C is correct. Using the elastic load balancer to perform health checks will determine

whether or not to remove a non-performing or underperforming instance, and have the auto-scaling group launch a new instance.

- Option A is incorrect. Increasing the instance size doesn't prevent failure of one or both the instances, therefore the website can still become slow or unavailable.
- B. Monitoring the VPC flow logs for the VPC will capture the VPC traffic, not the traffic for the EC2 instance. You would need to create a flow log for a network interface.
- D. Replicating the same two instance deployment may not prevent failure of instances and could still result in the website becoming slow or unavailable.

References:

- **https://d1.awsstatic.com/whitepapers/aws-building-fault-tolerant-applications.pdf**
- **https://docs.aws.amazon.com/vpc/latest/userguide/flow-logs.html#working-with-flow-logs**

Your application has two tiers in AWS: the frontend layer and the backend layer. The frontend includes an Auto Scaling group deployed in a public subnet. The backend Auto Scaling group is located in another private subnet. The backend instances should only allow the incoming traffic from the frontend ASG through a custom port. For the backend security group, how would you configure the source in its inbound rule?

A. Configure the frontend security group ID as the source.
B. Configure the public subnet IP range as the source.
C. Configure the frontend Auto Scaling group ARN as the source.
D. Configure the frontend Auto Scaling launch configuration as the source.

Explanation:

Correct Answer – A

Please visit the link below for how to configure security group rules.

https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-security-groups.html#security-group-rules

- **Option A is CORRECT**: By configuring the frontend security group as the source, any frontend instances that have the specified security group are allowed to access the backend.
- **Option B is incorrect**: Other instances in this subnet can also access the backend. This option is not as good as option A.
- **Option C is incorrect**: Because Auto Scaling group ARN cannot be configured in the source of a security group inbound rule.

You are hosting a web server on an EC2 Instance. With the number of requests consuming a large part of the CPU, the response performance for the application is getting degraded. Which of the following would help to alleviate the problem and provide a better response time?

A. Place the EC2 Instance behind a Classic Load Balancer.
B. Place the EC2 Instance behind an Application Load Balancer.
C. Place the EC2 Instance in an Auto Scaling Group with the max size as 1.
D. Place a CloudFront distribution in front of the EC2 Instance.

Explanation:

Correct Answer - D

Since there is a mention of only one EC2 instance, placing it behind the ELB would not make much sense, hence Options A and B are invalid.

Having it in an Auto Scaling Group with just one instance would not make much sense.

CloudFront distribution would help to alleviate the load on the EC2 Instance because of its edge location and cache feature.

For more information on CloudFront, please visit the following URL:

https://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/Introduction.html

A company is hosting a MySQL database in AWS using the AWS RDS service. To offload the reads, a Read Replica has been created and reports are run off the Read Replica database. But at certain times, the reports show stale data. What could be the possible reason behind this?

A. The Read Replica has not been created properly.
B. The backup of the original database has not been set properly.
C. This is due to the replication lag.
D. The Multi-AZ feature is not enabled.

Explanation:

Correct Answer – C

An AWS Whitepaper on the caveat for reading Replicas is given below which must be taken into consideration by architects:

Read Replicas are separate database instances that are replicated asynchronously. As a result,

they are subject to replication lag and might be missing some of the latest transactions. Application architects need to consider which queries have the tolerance to slightly stale data. Those queries can be executed on a Read Replica, while the rest should run on the primary node. Read Replicas may also not accept any write queries.

For more information on Amazon RDS Read Replicas, please visit the following URL:

https://aws.amazon.com/rds/features/read-replicas/

Video of the Week 15 mins

- **HOST A STATIC WEBSITE IN 5 MINUTES! for Beginners | AWS ELASTIC BEANSTALK**

  https://www.youtube.com/watch?v=KYPZpYUCJ-Y

Survey 10 minutes

- Which topic was interesting/exciting/easy for you?
- Which topic was boring/hard for you?
- What are the things you liked?
- What are the things you didn't like?

Retro Meeting On a personal and team level 10 mins

Below questions for the week before the break but you can also ask these questions for the break period. It can be beneficial to hear students' opinions about how they did in terms of studying, practicing during the break.

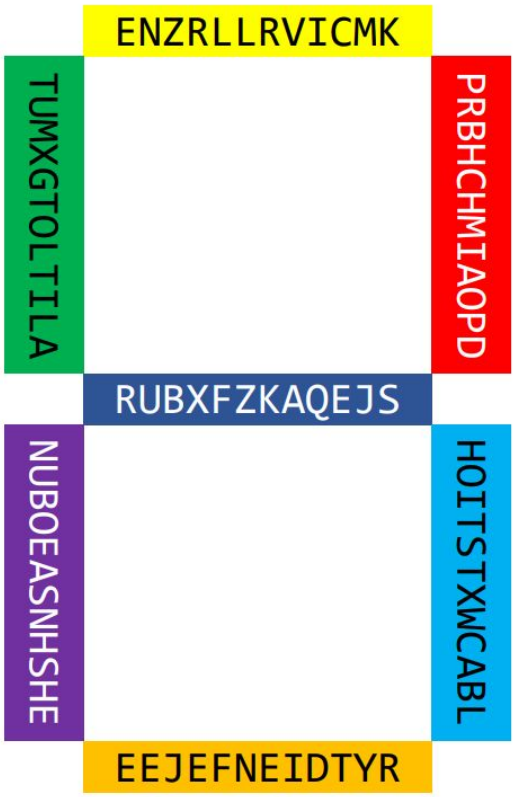
- What went well?
- What could be improved?
- What will we commit to do better in the next week?

Problem of the week: 5 mins

Students should work in small teams to complete the problem of the week.

DATES ON THE SCOREBOARD

Show how and which computational thinking concepts you have used.



Decoration Day
World Cancer Day
Independence Day
Guy Fawkes Day
Star Wars Day
Liberation Day

Armed Forces Flag Day
Peace Day
Flag Day
Independence Day
Ancestry Day
Unity Day

Answer: THIRTY
Solution:
https://www.youtube.com/watch?v=uKn90TXiEkg&list=PLhQjrBD2T381e1IyDsLSXFYveF6ggaPBx&index=8

- Computational Thinking:
- Abstraction: Understanding that the colored lines actually represent LED's and it can also represent different numbers when you light up certain parts of it.

- Pattern recognition: There countries and special days next to them. Also, you have a system to represent numbers. So you should be looking for dates.

- Decomposition: Find the dates of each special day for that particular country one by one.

- Algorithm Design: After finding the days and sorting them in order.

Algorithm proceeds like this:

1. Pick the date.
2. Represent the day of date with the LED.
3. From the LED's that are not lighted, pick the letters that are in the same order with the month of that particular date.
4. Repeat 1-3 until the end of the dates.

Presentation of Coding Challenge & POW 20 mins

We assume that each group has two sub teams. If this is possible one of the sub teams will present the coding challenge of last week. The other sub team will present the solution to the previous problem of the week. If there is only one sub team then, the sub team will present both of the solutions.

Coding Challenge 5 mins

Given a string containing just the characters `'('`, `')'`, `'{'`, `'}'`, `'['` and `']'`, write a function that determines if the input string is valid.
An input string is valid if:

1-Open brackets must be closed by the same type of brackets.
2-Open brackets must be closed in the correct order.

Note that an empty string is also considered valid

Example 1:
Input: "()"
Output: true

Example 2:
Input: "()[]{}"
Output: true

Example 3:
Input: "(]"
Output: false

Example 4:
Input: "([)]"
Output: false

Example 5:
Input: "{[]}"
Output: true

Example Solution:

```
def isValid(s):
    bracket_map = {"(": ")", "[": "]",  "{": "}"}
    open_par = set(["(", "[", "{"])
    stack = []
    for i in s:
        if i in open_par:
            stack.append(i)
        elif stack and i == bracket_map[stack[-1]]:
                stack.pop()
        else:
            return False
    return stack == []
```

Computational thinking:

Pattern recognition: There is a pattern regarding the number of brackets and numbers of combinations. Also, the way brackets are ordered has a pattern.

Presentation of Case Study of Sprint-8 20 mins

We assume that each group has two sub teams. Each week, one of the sub-teams will present their solution.

Case study 10 mins

Case study should be explained to the students during the weekly meeting and has to be completed in one sprint (2 weeks) by the students. Students should work in small teams to complete the case study.

Project-002 : Milliseconds Converter Application (Python Flask) deployed on AWS Application Load Balancer with Auto Scaling Group using AWS Cloudformation

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Closing 5 mins

- Next week's plan
- QA Session