jjwilson_@outlook.com Joseph Wilson

COGNITO OPERATIONS RECRUITMENT TEST

Part 1: Q&A

1) My website is down. Walk me through all the stuff you would check?

- If you are a Linux tech, assume LAMP stack
- ~~If you are a Windows tech assume IIS & SQL~~
- Also assume typical setup with firewall, load balancers and other typical components of such a setup
- Follow up: Website is back up but is slow, what would you do then?

Under the assumption that Linux tech is being used with a LAMP stack which is set up properly, there are several things I would check. The website being down could be anything, therefore I would first evaluate the website to see why it may be down so that the checks can be done more systematically.

The fundamentals would stem from the Apache Web Server being able to properly connect with the database, being MySQL; the database contains the content for the website. I would check the different areas to find out why the website is "down". The several ways of being able to do so are: can the webserver access the database, if using WordPress is it seeing a craft error page, is there a web server issue with Apache or a DNS issue.

The website is now back up and operational, but unfortunately, it is now being slow. What I would do now is that since the website went down I would check to see if all resources of the website have been restored and monitor with a form of health checker.

2) If I run the command /bin/chmod -x /bin/chmod will this run?

The answer is no this command will not run.

The chmod is the command and system call used within Unix-like operating systems to change the access permissions of file system objects. The -x specifies the execute access. The syntax for chmod is: chmod [options] mode filename. The command is fundamentally trying to change the file mode of itself being the executable chmod. It would not be possible to this, as the /bin location is the standard subdirectory of the executable programs that are required to attain minimal functionality for the system.

I also hard checked on my macOS device and it provides the error: Operation not permitted.

Source: https://en.wikipedia.org/wiki/Chmod

3) How long after an AWS security group rule is applied does it take for the rule to apply to all instances in that group?

After a new AWS security group rule has been applied, the new rules(s) are then automatically applied to all instances that are associated with the security group.

Source: https://www.youtube.com/watch?v=-9j7BvAyb2w

jjwilson_@outlook.com Joseph Wilson

Part 2: Scenarios

1) In a custom made AWS VPC, what would be some reason for lack of network connectivity?

In a AWS VPC there are several reasons why you may have lack of network connectivity, due to the configuration and interaction with the several components with the links between the EC2 instance, Network Access Control List (NACL) and route tables to the internet/internet gateway.

The first area may simply be that the Public and Elastic IP addresses have not been configured properly. The next being the security group rules allow access to the instance through the HTTP or SSH protocol.

A similar configuration issue may have occurred with the NACL and route tables. Examples of this are that for the NACL is that the inbound/outbound rules may not be configured, so to further justify this point – an inbound rule for traffic may have not been setup. For the route table it may not have an internet gateway properly configured or even set up, hence there would be no route to the internet.

Source: https://aws.amazon.com/premiumsupport/knowledge-center/instance-vpc-troubleshoot/

Source: https://www.youtube.com/watch?v=BCM9aaaWvR0&list=PLv2a_5pNAko0Mijc6mnv04xeOut443Wnk&index=32

2) 3 EC2 instances sit behind an ELB. All devices are on a security group that has one rule only, which allows all traffic from the security group itself. However, hitting the ELB times out. Why?

I believe that due to the security role only allowing traffic between the security group itself this is causing the ELB to time out. Elastic Load Balancing (ELB) automatically distributes incoming application traffic across multiple targets, such as Amazon EC2 instances. For the ELB to work it would need a form of external network access, which can be rectified in the security group rules.

Source: https://aws.amazon.com/elasticloadbalancing/

3) What's best practice to allow your EC2 instances to talk to, say S3 or RDS?

EC2 to S3:

To connect an EC2 instance to a S3 bucket the best practice would be utilizing an IAM profile role. The user will need to create an IAM profile role that grants access to S3 (AmazonS3FullAccess). The role needs to be attached to the EC2 instance. You then need to confirm the connectivity between the EC2 and S3, which can be done in the terminal through SSH.

Source: https://aws.amazon.com/premiumsupport/knowledge-center/rds-connect-ec2-bastion-host/

EC2 to RDS:

To connect an EC2 instance to a RDS the best practice would be to create/modify a security group. The security group will need a rule added to allow the data to flow to the RDS instance over the required port (3306 is a common port) and source for the database. The connection method is TCP. You then can test the connectivity between the EC2 and RDS.

jjwilson_@outlook.com Joseph Wilson

4) What steps would you follow to resolve the following problems?

Scenario 1 – Can't connect to server!

The steps I would follow to try to resolve this problem is firstly to log onto the AWS console, due to the settings being altered and verify that the server is still on at a login terminal. Confirming the server is still on, I would SSH into the webserver to ensure it's responsiveness.

Scenario 2 – Disk space is dangerously low!

The server is in a maintenance period and under the assumption the server is able to go into a downtime period to make changes. In the Amazon EC2 instance you can simply modify the volume of EC2 volume that is attached, which in this scenario will be greater than the previous one. I would then verify that the new size has been properly allocated.

Source: https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/recognize-expanded-volume-linux.html

Scenario 2a – Why didn't we know about disk space?

The main reason they did not know about the disk space is they have most likely not set up a method to be able to properly monitor changes and provide warnings.

They could therefore utilize a service like Amazon CloudWatch that can provide metrics for the EC2 volume space. The management tool than can have an alarm set up to provide a warning when a certain threshold has been reached i.e. 85%. The notification can then be sent to the chosen destination like an e-mail or something of their choice.

Source: https://aws.amazon.com/cloudwatch/

Source: https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/using-cloudwatch.html

Scenario 3 – We need a failover error page.

A failover error page is an automatic switchover from the primary server to a secondary server. Using the AWS, the primary server may be the EC2 instance and then the secondary, backup server will be located in a S3 bucket.

Under the assumption that the primary server has been configured properly. The secondary server that will be automatically switched over to if there is a problem will be a S3 bucket with a static website, displaying said information to notify the customer an issue is known and being worked on.

A form of health check (in my research a method can be Route 53) will have to be deployed to monitor the health of the primary server and ensure functionality. The service then allows a failover to bet setup, which should point to the static website located in the S3 bucket.

Source: https://medium.com/@nnamani.kenechukwu/how-to-setup-a-failover-to-a-static-website-on-s3-bucket-in-aws-8b572c96e4b6

Source: https://aws.amazon.com/route53/