aws CERTIFIED

Cloud Practitioner

lab

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Introduction to AWS

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About the Lab

Please note that not all AWS services are supported in all regions. Please use the US-East-1 (North Virginia) region for this lab.

These lab notes are to support the hands on instructional videos of the Introduction to AWS section of the BackSpace AWS Cloud Practitioner Course.

Please note that AWS services change on a weekly basis and it is extremely important you check the version number on this document to ensure you have the latest version with any updates or corrections.

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Checking your AWS Usage and Monthly Bill

In this section we will learn how to use the AWS Billing & Cost Management Dashboard to keep track of costs.

From the AWS management console select 'My Billing Dashboard" from the account drop down menu.

You will now see your total spend summary, spend by service and forecast spend (by clicking the Cost Explorer).

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Creating an S3 Bucket and Uploading Files

In this section we will create an S3 bucket, upload files to it and download files from it.

Click on the services menu and search S3.

Select *S3*

Click on Create Bucket

The create bucket dialog box will appear.

Enter a unique name for your bucket (it will need to different from the one below)

Click 'Next"

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Leave other settings as is and click *Create bucket* (by default the bucket is private)

You will now see your bucket has been created.

Uploading Files to your Bucket

Click on the link to the bucket

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Click *Upload*

Drag a folder with files onto the form.

Scroll down and click *Upload*

Your files will begin uploading

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Your upload will eventually complete.

Downloading files from your bucket

Click *Exit* to navigate back to the bucket details.

Click on the folder to view its contents

Select one of the files

Select *Actions -> Download*

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Troubleshooting

If you get the following screen it means you have clicked on the S3 URL and not the download link as detailed above. You cannot access files directly from a URL as they have private access.

Clean Up

We will now delete the files and bucket so that you will not be billed by AWS.

Go back to the S3 dashboard.

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Select the bucket

Click *Empty*

Enter *permanently delete*

Click *Empty*

You will see a green success message

Click *Exit*

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Click *Delete*

Confirm the name of the bucket to delete

Click *Delete bucket*

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Creating a SQL Database with RDS

In this section, we will use the Relational Database Service to create a database. We will also connect into the database.

Creating a Security Group

By default, inbound access from the Internet to our database instance is blocked. We will create a security group that defines an inbound rule that allows access from the Internet. We can then associate this security group to our database instance.

From the AWS console search *VPC*.

Select *VPC*

Scroll down and select *Security > Security Groups*

Click *Create security group*

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Give it the name *backspace-rds-intro-lab*

Give it a description

Click *Add rule* for Inbound rules

Select type *MySQL/Aurora*

Select source *Anywhere*

Click *Create security group*

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Creating an RDS Database

From the AWS console search *RDS*

Click on *RDS*

Select 'Databases"

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Select 'Create database"

Select *Standard Create*

Select *MySQL*

Select *Free Tier*

In the *Settings* section give your instance a name/identifier.

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Fill in a master username and password (remember this we will need it later)

In the *DB Instance size* section select db.t2.micro instance class

Uncheck *Enable storage autoscaling*

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Scroll down to *Connectivity*

Expand *Additional connectivity configuration*

Select *yes* for *publicly accessible* (we will look at security later in the course)

Select *Choose existing for VPC security group*

Select the *backspace-rds-intro-lab* security group we created previously (click outside the list after selecting to close the list)

Click outside the list to add the security group. You should then see the security group added.

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Scroll down to *Database authentication*

Leave as *Password authentication*

Scroll down and expand *Additional configuration*

Enter a database name.

Uncheck *Enable automatic backups*

Leave all other options default.

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Uncheck *Enable deletion protection* (we want to delete it easily when finished)

Click *Create database*

Click on the database details link

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Your instance will show status 'creating".

Connecting to your RDS Instance

To connect to your MySQL Database you will need to download and install the MySQL Workbench.

Instructions for Windows:

https://dev.mysql.com/doc/workbench/en/wb-installing-windows.html

Instructions for Mac:

https://dev.mysql.com/doc/workbench/en/wb-installing-mac.html

Instructions for Linux:

https://dev.mysql.com/doc/workbench/en/wb-installing-linux.html

Wait for your instance status to be 'available"

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Scroll down and copy the database server endpoint

Open the MySQL Workbench application click to add a new connection

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Give the connection a name.

The Hostname will be the RDS server endpoint.

The port will be 3306.

The Username will be the master username we created in RDS (i.e. admin)

Click *Test Connection*

Enter the password you created in RDS for your master username

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Click *OK*

Click on the Connection

You will soon be connected to your database server

If you cannot connect then please see the 'Troubleshooting Connection Issues" below.

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Hover over the 'test" database under 'SCHEMAS" and click the information icon to get information about the database that was created by us in RDS.

You then get an information screen for the database.

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Troubleshooting Connection Issues

If you are getting connection errors then check the following:

Wrong Username / Password

Make sure you use the correct username and password.

The username and password must be the one created when the RDS instance was created.

Bad Connection String

This error means nothing exists at the endpoint. Check the connection endpoint and port are correct.

The hostname will be the RDS Instance Connection Endpoint without :3306 on the end.

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No Connection

This error means your server exists but you are unable to connect to it. This can be caused by:

- You have not selected 'public' when creating instance and the security group inbound rules will be incorrect. This will block traffic to your instance. See *Security Group Inbound Rules* below.
- You have a dynamic IP address or multiple IP addresses passing through a load balancer. See *Security Group Inbound Rules* below.
- Firewall at your end is blocking access to port 3306. See *Client-side Firewall* below.

Security Group Inbound Rules

If you did not select *yes* for *publicly accessible* as detailed, your security group will block remote access.
The security group may have an inbound rule for your IP address. If you are using a dynamic IP address or you are connecting from different networks then this will need to be changed to "anywhere" for the lab.

Click the security group

You will be taken to the EC2 console

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Select the “Inbound” tab
Click “Edit”

Change inbound rule to “Anywhere” 0.0.0.0/0, ::/0

Client-side Firewall

If you are still having problems connecting, a firewall at your end may be preventing access on port 3306. This is common if you are connecting from your work environment as port 3306 traffic may be blocked.

Clean Up

To avoid incurring charges from AWS we will terminate the instance.

Go back to the RDS console.

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Click *Actions -> Delete* to terminate the instance

Select 'No" for 'Create final snapshot"

Check 'I acknowledge that upon instance deletion, automated backups, including system snapshots and point-in-time recovery, will no longer be available."

Click 'Delete"

Click on the VPC security group we created previously

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Select *Actions -> Delete security group*

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Creating a Web Server with EC2

In this section, we will launch a publicly accessible WordPress application on Amazon EC2.

From the AWS console search *EC2*

Click *EC2*

Select *Instances -> Launch Instances*

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Select the *AWS Marketplace* and search for *WordPress*

Select the Bitnami AMI

Click *Continue* (This lab will be covered under the AWS free tier for accounts less than 12 months old)

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Choose the t2 micro instance.

Click Next: Configure Instance Details

Select enable for Auto-assign Public IP

Click Next: Add Storage

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Click Next: Add Tags

Click to add a Name tag

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Give it a name and click Next: Configure Security Group

Click Review and Launch

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Click Launch

Select *Proceed without a key pair*

Select “I acknowledge that I will not be able to connect to this instance unless I already know the password built into this AMI.”

Click *Launch Instances*

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Wait for launch to initiate

When the launch process has started scroll to the bottom of the page and click “View Instances”

After a few minutes, the status of the instance will change to running and status checks will be completed (you will need to refresh the screen to see any changes).

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Viewing your web server

After the Status checks have completed click on the Instance ID to select the instance.

Copy the public IP address of your web server (don't click on *open address*).

Paste the IP address in your browser.

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Troubleshooting viewing your WordPress application

If you cannot view your website it probably hasn't finished the launch process completely.

If you navigate to your website and it displays a security message, you have tried to open with https not http.

If after quite some time you still can't view your website, it may be that your security group does not allow inbound requests on port 80 (http). The inbound rules should include:

80 tcp 0.0.0.0/0

Scroll down and click on the Security tab

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If the rule is not present you will need to add it by clicking on the security group to open it:

Click on the Inbound rules tab

Click on Edit

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Add a rule for HTTP and Anywhere

Click Save rules

Finding the Username and Password for your WordPress application

Go back to the EC2 console and select “Monitor and troubleshoot”, “Get System Log”. Do not click on connect.

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Scroll up until you find the log entry for the application username and password and copy it.

Go to the admin subdirectory of your website in your browser

Enter Username *user* and paste in the password

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You will now be in the admin section of your WordPress application

Troubleshooting logging in to the WordPress application

If you get the following message:

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You have tried to connect to the Linux operating system by clicking on “Connect”. Do not click on connect, select “Actions – “Instance settings” - “Get System Log” as detailed previously.

Clean up

Select *Actions -> Instance State -> Terminate*

Make sure you terminate the instance so that you are not billed for it anymore.

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Sending Emails with Amazon SES

In this section, we will use the Simple Email Service to send an email.

From the AWS console search *SES*

Click *Simple Email Service*

Click on 'Email addresses"

Click on 'Verify a New Email Address"

Enter your email address and click 'Verify this Email Address"

When you receive your verification email click on the supplied link.

You will then receive a success page

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Go back to the SES console page and refresh the information to see the email has been verified

Click on the email address and select 'Send a test email"

Enter the same email address for from and to.

Fill out the email information and click 'Send test email"

Check your email to see if it worked.

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Requesting full access to SES

New accounts only have sandbox access but this can be changed by applying to AWS.

Click on *Sending Statistic*

Click on *Edit your account details*

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Creating a Billing Alert with CloudWatch and SNS

In this section, we will create a CloudWatch billing alert that will send an email through the Simple Notification Service whenever our estimated monthly bill exceeds a certain level.

Enabling Billing Alerts

From the AWS management console search *Billing*

Select *Billing*

Select *Billing Preferences*
Check *Receive Free Tier Usage Alerts*
Check *Receive Billing Alerts*

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Click *Save preferences*

Creating a CloudWatch Alarm

From the AWS management console search *CloudWatch*

Select *CloudWatch*

Click on 'Alarms", 'Create Alarm"

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Click *Select metric*

Search *Billing*

If you do not see any billing metrics it is most probably you are not operating in the US-East1 (N. Virginia) region. Please ensure you always operate from the US-East region during the course.

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Select *Total Estimated Charge* from the billing metrics.

Select EstimatedCharges metric

Click *Select metric*

Set the alarm threshold to not exceed $10

Click *Next*

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Select *in Alarm* for notification

Select *Create new topic*

Enter a unique topic name

Enter an email address to receive the alert

Click *Create Topic*

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Click *Next*

Give the alarm a unique name

Click *Next*

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Click *Create alarm*

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If you haven't already confirmed your email a confirmation email will be sent to you.

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Click on the link in the email to confirm the SNS subscription

Go back to the CloudWatch console and refresh the screen.

The Alarm State will be INSUFFICIENT_DATA until enough data has been collected by CloudWatch

After a few days you will have plenty of billing data to view

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Creating an IAM User

In this section, we will use the Identity and Access Management (IAM) service to create a user with console access and programmatic access.

From the AWS console click search *IAM*

Select *IAM*

Select *Users -> Add user*

Give the user a name

Check *Programmatic access*

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Check *AWS Management Console access*

Click *Next: Permissions*

We won't set any permissions for the user at this point.

Click *Next: Tags*

We won't set any tags.

Click *Next Review*

Click *Create user*

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Download the csv file containing the user credentials (access key and secret access key) to a safe location.

You will need this for access using the Command Line Interface (CLI) later in the course.

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Creating a Highly Available Architecture with Elastic Beanstalk

In this section, we will create a highly available and fault tolerant architecture using the AWS Elastic Beanstalk service.

From the Management Console search *Elastic Beanstalk*

Click *Create Application*

Give your application a name *Test Application.*

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Scroll down to *Platform*

Select *Node.Js* as the platform

Scroll down to *Application code*

Select *Sample application*

Click *Configure more options*

Select High availability

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Scroll down and click *Create app*

Your application will now start being created.

After some time, your environment will be created.

Click on the website url

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You will now see the Sample Application

Clean Up

We will now delete the environment so that you will not be billed by AWS.

Click on *Applications*

Select the application

Select *Actions -> Delete application*

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Click on the environment

You will now see your environment is being terminated.

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