



C300 Final Evaluation

Project ID:

<Redacted>

Project Title:

Implementation of Security
Infrastructure on the Cloud

Team ID:

<Redacted>

Team Members:

1. MUHD WAFIYUDDIN BIN
ABDUL RAHMAN
2. NG ZI RUI
3. QAMARRUL DANIAL B RAZALI



Overview

- Introduction of project
- Project specification
- Website demonstration
- System design (Use Case Diagram)
- Database showcase
- System design (ERD diagram)
- AWS architecture diagram
- Cloud security implementation
- Monitoring
- Allocation of privileges
- Task allocation and progress
- Records of team meetings with supervisor



Introduction

- *Design a cloud infrastructure and deploy it ensuring it achieves similarities such as the traditional 3 tier web application (Web Tier, Application Tier and Database Tier) with security implementations put into place such as auto-scaling and application security. Cloud Infrastructure would be created through AWS cloud.*

QaZiWa Books - Login



Login

Email Address:

Password:

[Sign-up for free!!](#)

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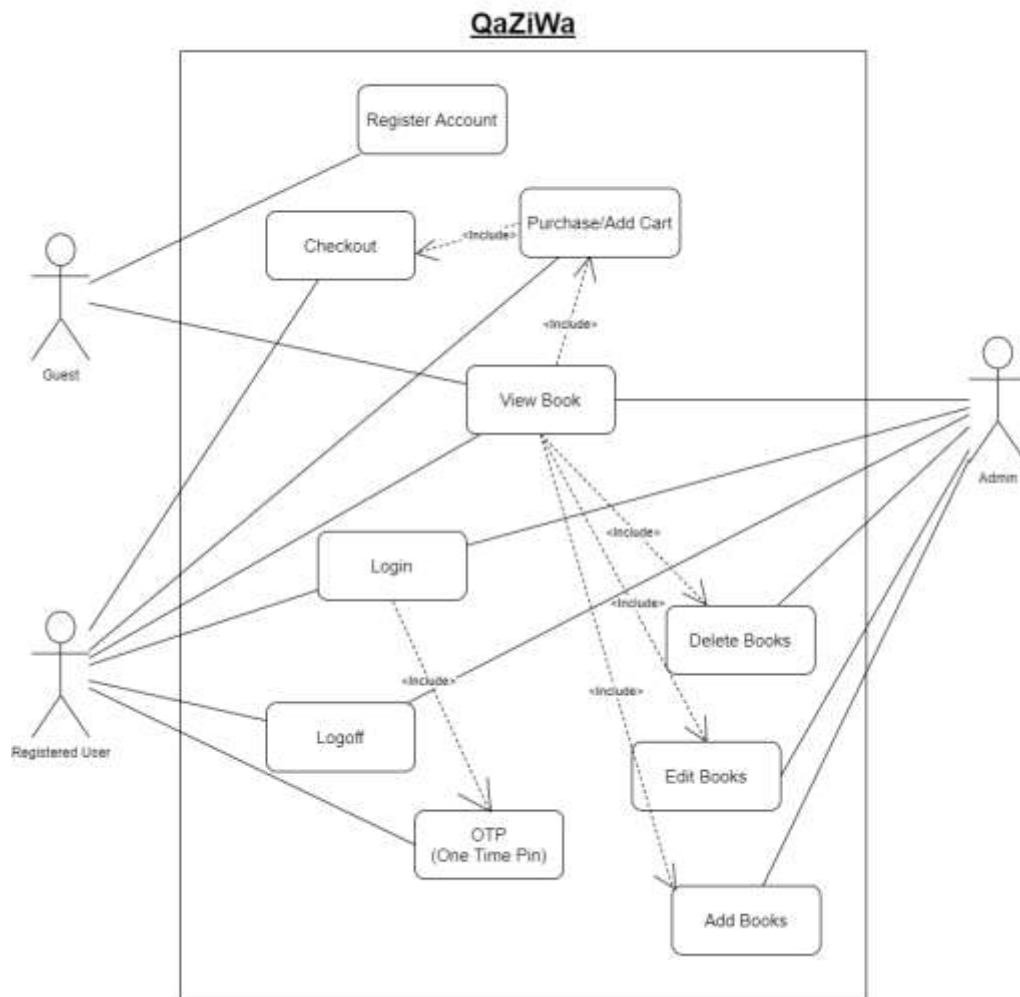
Project Specification

- *Deploy a Virtual Private Cloud (VPC); ✓□*
- *Design and deploy a 2 tiers architecture on Cloud (Web-App Tier and DB Tier); ✓□*
- *Web-App tier uses apache web server and PHP application while Database tier uses MySQL. Use XAMPP software for the various tiers. ✓□*
- *Encrypt data in transit (using HTTPS) and data at rest; ✓□*
- *Set up the necessary security groups and IAM groups/users/roles; ✓□*
- *Deploy auto-scaling for Web-App tier; ✓□*
- *Develop a simple web service where read and write to the database are applicable; ✓□*
- *Backup and restoration of MySQL database using manual snapshot for Elastic Block Store (EBS); Store the EBS snapshot on AWS Simple Storage Service (S3). ✓□*
- *Use AWS CloudTrail to monitor activities in the VPC. ✓□*
- ~~*Use AWS Security Hub to secure the cloud infrastructure.*~~





System Design (Use Case Diagram)



- 3 Users (Registered User, Admin, Guest)
- Admin has the most access
- Only admin can delete, add and edit books
- Guest has the least access
- A guest user can become a registered user



Website/Web Server Demonstration

- Our website contain User, Admin and Guest account
- Objective: A book selling website.

Showcase of Guest Account:

Privileges: View books only

QaZiWa Books - Login



Login

Email Address:

Password:

Login

Guest



[Sign-up for free!!](#)

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Welcome to QaZiWa Bookshop - Guest Login

[Login](#)

You are using guest account. To buy book do Login or Register your account.

	<p>Title: Beano Annual 2007</p> <p>Summary: One of Britain's longest running children's comics this edition compiles all of Beano's escapades in 2007 into one volume.</p> <p>★★★★★ Rating 5/5</p> <p>Author: Nigel Auchterlounie</p> <p>Price: \$0.00</p> <p>Quantity: 11 books left</p>
	<p>Title: The Cat in The Hat</p> <p>Summary: Poor Dick and Sally. It's cold and wet and they're stuck in the house with nothing to do... until a giant cat in a hat shows up, transforming the dull day into a madcap adventure and almost wrecking the place in the process!</p> <p>★★★★★ Rating 5/5</p> <p>Author: Dr. Seuss</p> <p>Price: \$15.67</p>



Website/Web Server Demonstration

Showcase of User Account:

Privileges: View books & Buy books or

QaZiWa Books - Login



Login

Email Address:

Password:

[Sign up for free!!](#)

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OTP Verification



OTP:

Do Install Google Authenticator App in your phone and scan the QR code above. After scanning, key in the number code that you see in the App. Thank you :")

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Website/Web Server Demonstration

Welcome to QaZiWa Bookshop - User Login



[Logout](#)

Welcome Muhammad Wafi to QaZiWa Bookstore



Title: Beano Annual 2007

Summary: One of British's longest running children's comic this edition compiles all of Beano's escapades in 2007 into one volume.

★★★★★ Rating:3/5

Author: Nigel Auchterlounie

Price: \$5.00


Quantity: 11 books left

[Add to Cart](#)

QaZiWa Bookshop - View Cart

[Back](#)

Missing something? Press back

Book Image	Book Title	Book Price	Deletion Button	Qaziwa Recommendations	
	Beano Annual 2007	\$5.00	Delete	<p>Sponsored by QaZiWa Bookstore</p>  <p>Healthy Morning Drinks to Start Your Day Off</p> 	



Website/Web Server Demonstration

← Back View Cart - Press back

Billing Address	Payment	
Full Name	Name on Card	
<input type="text" value="Andy Lau"/>	<input type="text" value="Andy Lau/Yan Boon"/>	
Email Address	Credit card number	
<input type="text" value="john@example.com"/>	<input type="text" value="1111-2222-3333-4444"/>	
Residential Address	Expiry Month/Year	CVV
<input type="text" value="542 Hooping Ave B"/>	<input type="text" value="MM/YY"/>	<input type="text" value="711"/>
Unit Number	Postal Code	
<input type="text" value="812-345"/>	<input type="text" value="S21147"/>	
<input checked="" type="checkbox"/> Shipping address same as billing		
Continue to checkout		

Total Books	
Cart	🛒 1
Beano Annual 2007	\$5.00
Total	\$5



Payment Successful

Thank you for shopping with us!

Your shipment will arrive around 3 weeks.

[Back to Listing page](#)
QaZiWa Copyright
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Website/Web Server Demonstration



Showcase of Admin Account:

Privileges: View, Edit, Delete, Add books



Welcome to QaZiWa Bookshop - Admin Login



[Logout](#) [Delete Books](#) [Add Books](#) [Edit Books](#) You are login as Admin

	<p>Title: Beano Annual 2007</p> <p>Summary: One of British's longest running children's comic this edition compiles all of Beano's escapades in 2007 into one volume.</p> <p>★★★★★ Rating:3/5</p> <p>Author: Nigel Auchterlounie</p> <p>Price: \$5.00</p> <p>Quantity:10 books left</p>
	<p>Title: The Cat In The Hat</p> <p>Summary: Poor Dick and Sally. It's cold and wet and they're stuck in the house with nothing to do ... until a giant cat in a hat shows up, transforming the dull day into a madcap adventure and almost wrecking the place in the process!</p> <p>★★★★★ Rating:5/5</p>



Website/Web Server Demonstration

[← Back](#) You are login as Admin - This is a Edit page

	<p>Title: Beano Annual 2007</p> <p>Summary: One of British's longest running children's comic this edition compiles all of Beano's escapades in 2007 into one volume.</p> <p>★★★★★ Rating:3/5</p> <p>Author: Nigel Auchterlounie</p> <p>Price: \$5.00</p> <p>Quantity:10 books left</p> <p>Click here to Edit</p>
	<p>Title: The Cat in The Hat</p>

QaWaZi Bookshop - Add Books

[← Back](#) You are login as Admin - This is a Add book page

Title:

Author:

Summary:

Rating:

Price:
Amount \$

Quantity:

Book Image (Front view):
 No file chosen

QaZiWa Bookshop - Delete Books

[← Back](#) You are login as Admin - This is a deletion page

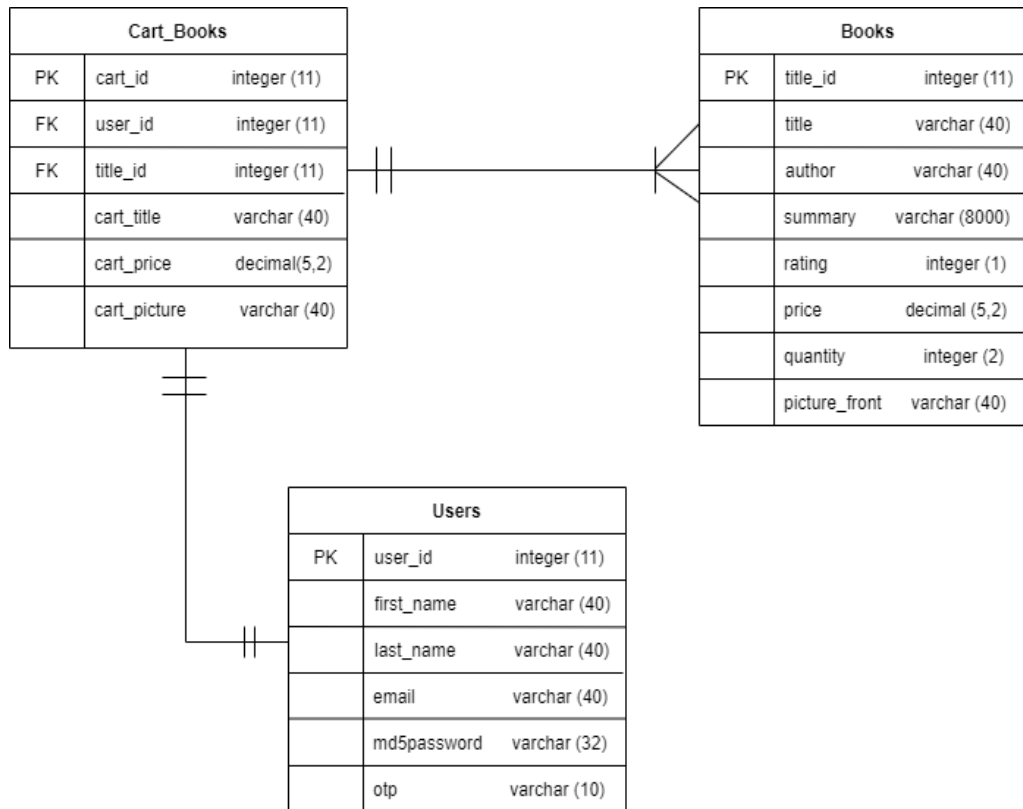
	<p>Title: Beano Annual 2007</p> <p>Summary: One of British's longest running children's comic this edition compiles all of Beano's escapades in 2007 into one volume.</p> <p>★★★★★ Rating:3/5</p> <p>Author: Nigel Auchterlounie</p> <p>Price: \$5.00</p> <p>Quantity:10 books left</p>
	<p>Title: The Cat in The Hat</p> <p>Summary: Poor Dick and Sally, it's cold and wet and they're stuck in the house with nothing to do . . . Until a giant cat in a hat shows up, transforming the dull day into a madcap adventure and almost wrecking the place in the process!</p> <p>★★★★★ Rating:5/5</p> <p>Author: Dr. Seuss</p> <p>Price: \$13.50</p> <p>Quantity:15 books left</p>

Confirm Deletion?

Beano Annual 2007



System Design (ERD Diagram)



- 3 tables total (Books, Users, Cart_Books)
- Cart_Books takes data from both Books and Users
- Both Users and Books can have their contents added.
- Any password in the database is immediately md5 hashed



Database Showcase

Database name: Qaziwa

- Contains users, books, cart_books tables
- user table

The screenshot shows a database management interface with a sidebar on the left listing databases and tables. The main area displays the 'Table structure' for the 'users' table. The table has 6 columns: user_id, first_name, last_name, email, md5password, and otp. The user_id column is marked as a primary key with an AUTO_INCREMENT attribute. Below the table structure, there are options to add new columns, with a dropdown showing '1 column(s) after otp'.

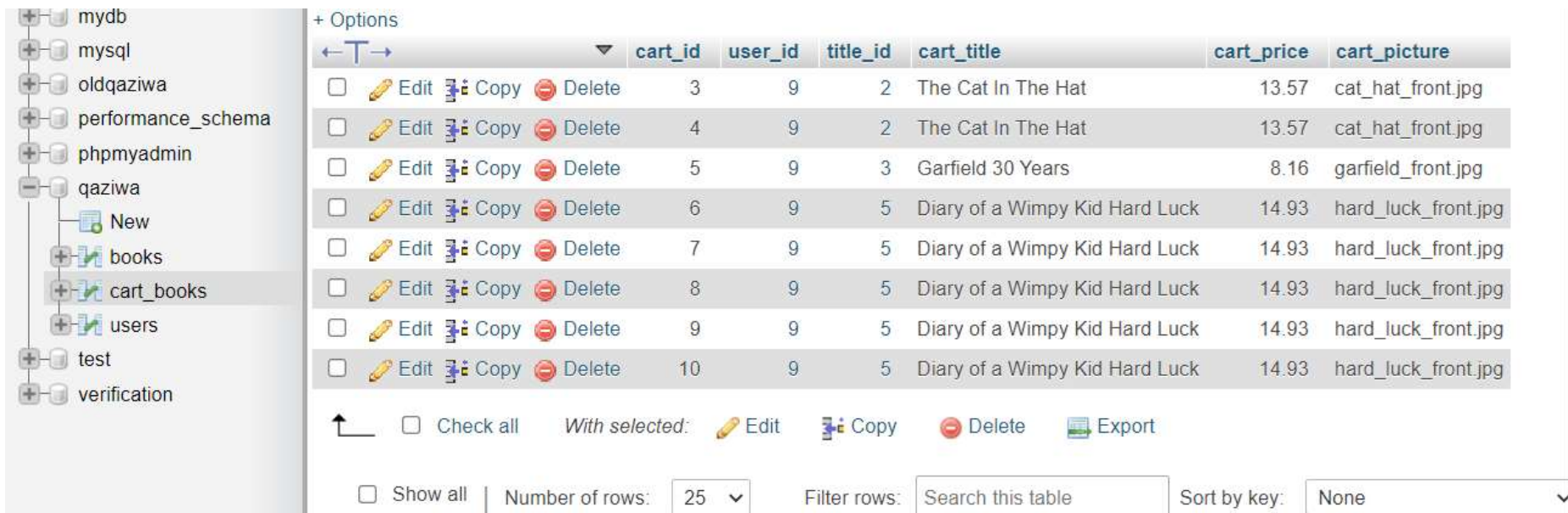
#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	user_id	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	first_name	varchar(40)	latin1_general_ci		No	None			Change Drop More
3	last_name	varchar(40)	latin1_general_ci		No	None			Change Drop More
4	email	varchar(40)	latin1_general_ci		No	None			Change Drop More
5	md5password	varchar(32)	latin1_general_ci		No	None			Change Drop More
6	otp	varchar(10)	latin1_swedish_ci		No	None			Change Drop More

Indexes



Database Showcase

- cart_books table



		cart_id	user_id	title_id	cart_title	cart_price	cart_picture
<input type="checkbox"/>	Edit Copy Delete	3	9	2	The Cat In The Hat	13.57	cat_hat_front.jpg
<input type="checkbox"/>	Edit Copy Delete	4	9	2	The Cat In The Hat	13.57	cat_hat_front.jpg
<input type="checkbox"/>	Edit Copy Delete	5	9	3	Garfield 30 Years	8.16	garfield_front.jpg
<input type="checkbox"/>	Edit Copy Delete	6	9	5	Diary of a Wimpy Kid Hard Luck	14.93	hard_luck_front.jpg
<input type="checkbox"/>	Edit Copy Delete	7	9	5	Diary of a Wimpy Kid Hard Luck	14.93	hard_luck_front.jpg
<input type="checkbox"/>	Edit Copy Delete	8	9	5	Diary of a Wimpy Kid Hard Luck	14.93	hard_luck_front.jpg
<input type="checkbox"/>	Edit Copy Delete	9	9	5	Diary of a Wimpy Kid Hard Luck	14.93	hard_luck_front.jpg
<input type="checkbox"/>	Edit Copy Delete	10	9	5	Diary of a Wimpy Kid Hard Luck	14.93	hard_luck_front.jpg

☐ Check all With selected: Edit Copy Delete Export

☐ Show all Number of rows: 25 Filter rows: Search this table Sort by key: None



Database Showcase

- Books table
- Stores all the values for books



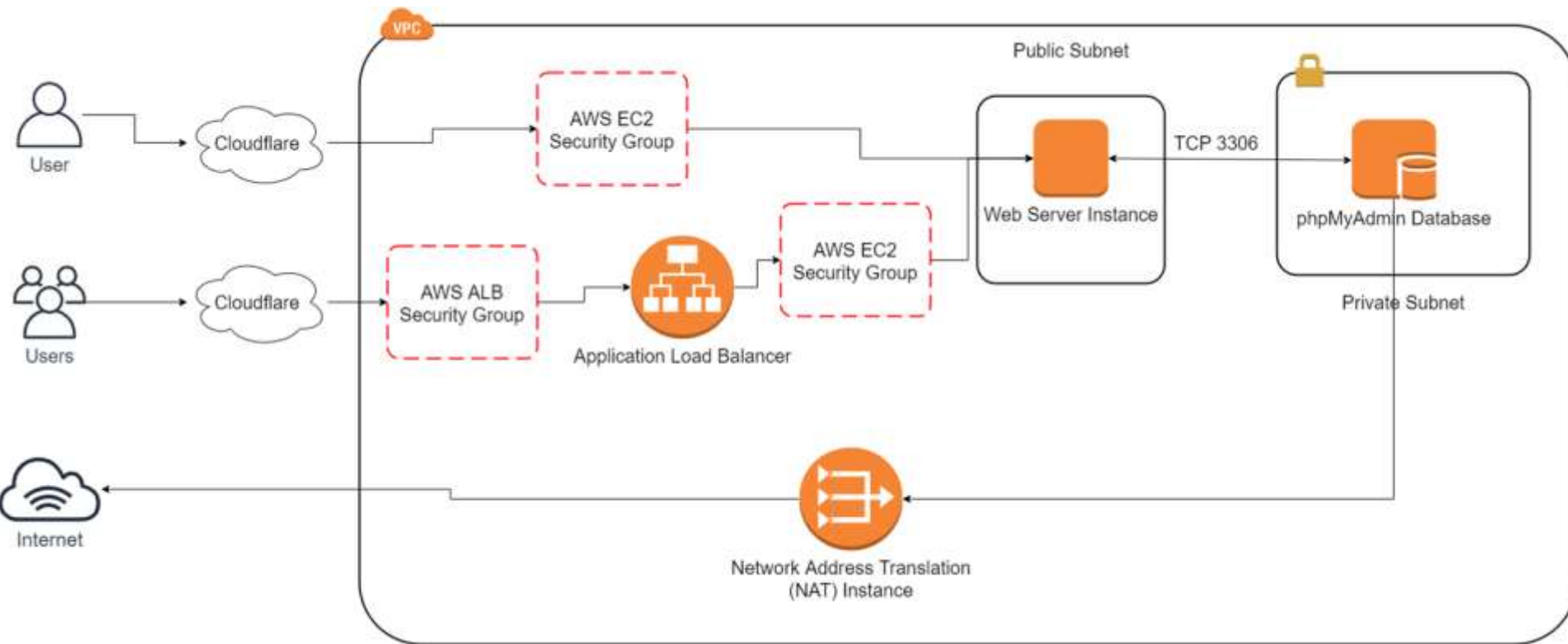
The screenshot shows a database management interface. On the left is a sidebar with a tree view of database schemas: mydb, mysql, oldqaziwa, performance_schema, phpmyadmin, qaziwa, and verification. Under 'qaziwa', there are sub-items: New, books, cart_books, users, test, and verification. The main area displays a table with columns: title_id, title, author, summary, rating, price, quantity, and picture_front. The table contains 11 rows of book data. Each row has a checkbox and three icons (Edit, Copy, Delete) to its left. Below the table, there are controls for selecting rows (Check all, With selected) and actions (Edit, Copy, Delete, Export).

	title_id	title	author	summary	rating	price	quantity	picture_front
<input type="checkbox"/> Edit Copy Delete	2	The Cat In The Hat	Dr. Suess	Poor Dick and Sally. It's cold and wet and they're...	5	13.57	8	cat_hat_front.jpg
<input type="checkbox"/> Edit Copy Delete	3	Garfield 30 Years	Jim Davis	30 years of laugh and lasagna bundled into one boo...	4	8.16	44	garfield_front.jpg
<input type="checkbox"/> Edit Copy Delete	4	True Singapore Ghost Stories 11	Russel Lee	Russel Lee investigates witchcraft and uncovers it...	2	10.59	7	ghost_stories_front.jpg
<input type="checkbox"/> Edit Copy Delete	5	Diary of a Wimpy Kid Hard Luck	Jeff Kinney	Greg Heffley's on a losing streak. His best friend...	4	14.93	0	hard_luck_front.jpg
<input type="checkbox"/> Edit Copy Delete	6	Insomnia	Stephen King	You'll lose a lot of sleep. Ralph does. At first h...	3	16.95	14	insomnia_front.jpg
<input type="checkbox"/> Edit Copy Delete	7	When I was a kid 2	Boey	A continuation of the hit book "When I Was a Kid"...	3	19.24	4	kid_front.jpg
<input type="checkbox"/> Edit Copy Delete	8	Diary of a Wimpy Kid Long Haul	Jeff Kinney	A family road trip is supposed to be a lot of fun ...	4	20.87	20	long_haul_front.jpg
<input type="checkbox"/> Edit Copy Delete	9	Diary of a Wimpy Kid Old School	Jeff Kinney	Life was better in the old days. Or was it? That's...	2	20.87	13	old_school_front.jpg
<input type="checkbox"/> Edit Copy Delete	10	As I was Passing II	Adibah Amin	Adibah Amin, the celebrated chronicler of everyday...	3	19.90	3	passing_front.jpg
<input type="checkbox"/> Edit Copy Delete	11	Transformers Saga of the Allspark	Simon Furman	Saga of the Allspark reveals untold events from th...	5	17.99	25	transformers_front.jpg

↑ ☐ Check all With selected: Edit Copy Delete Export



User Access Structure (Summary)





Cloud implementation (AWS educate)

1. VPC

Your VPCs (1/1) [Info](#)

Q Filter VPCs

Name: QaZiWa VPC X Clear filters

Actions Create VPC

<input checked="" type="checkbox"/>	Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR (Network border group)
<input checked="" type="checkbox"/>	QaZiWa VPC	vpc-090a8ad552bdc7ed6	Available	10.0.0.0/16	-

Details CIDRs Flow logs Tags

IPv4 CIDRs [Info](#)

CIDR	Status
10.0.0.0/16	Associated

IPv6 CIDRs [Info](#)

CIDR	Pool	Status
------	------	--------

You have no IPv6 CIDR blocks associated with your VPC.



Cloud implementation ('cont)

2. Subnets

Private subnet

Subnet ID subnet-04e9d1ba0d738e7d6	State Available	VPC vpc-090a8ad552bdc7ed6 QaZiWa VPC	IPv4 CIDR 10.0.2.0/24
Available IPv4 addresses 250	IPv6 CIDR -	Availability Zone us-east-1a	Availability Zone ID use1-az4
Network border group us-east-1	Route table rtb-0856a597fe2623a4d Qaziwa Route Table for NAT	Network ACL acl-0b0b4f76a0e828b49	Default subnet No
Auto-assign public IPv4 address No	Auto-assign IPv6 address No	Auto-assign customer-owned IPv4 address No	Customer-owned IPv4 pool -
Outpost ID -	Owner 501144450828	Subnet ARN arn:aws:ec2:us-east-1:501144450828:subnet/subnet-	



Cloud implementation ('cont)

Public subnets

Name	Subnet ID	State	VPC	IPv4 CIDR	IP
Qaziwa public subnet	subnet-0bca6218d2bed2e5	Available	vpc-090a8ad552bdc7ed6 Qa...	10.0.1.0/24	-
-	subnet-6bc58334	Available	vpc-cb9a0bb6	172.31.32.0/20	-

Subnet ID	State	VPC	IPv4 CIDR
subnet-0bca6218d2bed2e5	Available	vpc-090a8ad552bdc7ed6 QaZiWu VPC	10.0.1.0/24
Available IPv4 addresses	IPv6 CIDR	Availability Zone	Availability Zone ID
248	-	us-east-1a	us-east-1a
Network border group	Route table	Network ACL	Default subnet
us-east-1	rtb-073c5b0e955c1945f QaZiWu Route Table for Internet Gateway	acl-0b0b4f76a0e828b49	No
Auto-assign public IPv4 address	Auto-assign IPv6 address	Auto-assign customer-owned IPv4 address	Customer-owned IPv4 pool
Yes	No	No	-
Outpost ID	Owner	Subnet ARN	
-	901144450828	arn:aws:ec2:us-east-1:901144450828:subnet/subnet-0bca6218d2bed2e5	

-	subnet-cac5fac4	Available	vpc-cb9a0bb6	172.31.64.0/20	-
Qaziwa public subnet 2	subnet-0d563aaca151ca8f8	Available	vpc-090a8ad552bdc7ed6 Qa...	10.0.3.0/24	-
-	subnet-45da5274	Available	vpc-cb9a0bb6	172.31.48.0/20	-

Subnet ID	State	VPC	IPv4 CIDR
subnet-0d563aaca151ca8f8	Available	vpc-090a8ad552bdc7ed6 QaZiWu VPC	10.0.3.0/24
Available IPv4 addresses	IPv6 CIDR	Availability Zone	Availability Zone ID
249	-	us-east-1b	us-east-1b
Network border group	Route table	Network ACL	Default subnet
us-east-1	rtb-073c5b0e955c1945f QaZiWu Route Table for Internet Gateway	acl-0b0b4f76a0e828b49	No
Auto-assign public IPv4 address	Auto-assign IPv6 address	Auto-assign customer-owned IPv4 address	Customer-owned IPv4 pool
No	No	No	-
Outpost ID	Owner	Subnet ARN	
-	901144450828	arn:aws:ec2:us-east-1:901144450828:subnet/subnet-0d563aaca151ca8f8	



Cloud implementation ('cont)

3. Route table to internet gateway

The screenshot shows the 'Details' tab for a route table named 'QaZIwa Route Table for Internet Gateway'. The table is associated with VPC 'vpc-090a8ad55'. The details section shows the following information:

Property	Value
Route table ID	rtb-073c5b0a953c1945f
Main	Yes
Explicit subnet associations	2 subnets
Edge associations	-
VPC	vpc-090a8ad55 QaZIwa VPC
Owner ID	501144450828

The screenshot shows the 'Subnet associations' tab for the route table 'rtb-073c5b0a953c1945f / QaZIwa Route Table for Internet Gateway'. It displays two explicit subnet associations:

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-0b3ca6211d2bed2e5 / QaZIwa public subnet	10.0.1.0/24	-
subnet-0d565a3ca151ca0f8 / QaZIwa public subnet 2	10.0.3.0/24	-



Cloud implementation ('cont)

Route table to NAT instance

Route tables [1/4] info

Qazwa Route Table for NAT

Route table ID: rtb-0856a597fe2623a46

VPC: vpc-090a6af552bdc7e08 / Qazwa VPC

Main: No

Default ID: S01144450628

Explicit subnet associations: subnet-04e9d1ba0d7387195 / Qazwa private subnet

Edge associations: -

Route tables [1/4] info

Qazwa Route Table for NAT

Routes [1]

Destination	Target	Status	Propagated
0.0.0.0/0	arn:aws:ec2::us-east-1:route-table:rtb-0856a597fe2623a46	Active	No

Route tables [1/4] info

Qazwa Route Table for NAT

Explicit subnet associations (1)

Subnet ID	IP v4 CIDR	IP v6 CIDR
subnet-04e9d1ba0d7387195 / Qazwa private subnet	10.0.2.0/24	-



Cloud implementation ('cont)

sg-0aba88ff4c2c181fc - Qaziwa private security grp

Details **Inbound rules** Outbound rules Tags

Inbound rules (2) [Edit inbound rules](#)

Type	Protocol	Port range	Source	Description - optional
SSH	TCP	22	0.0.0.0/0	-
MYSQL/Aurora	TCP	3306	0.0.0.0/0	-

4. Security groups

Private security group

Only connects to database server, hence enable SSH for configuration and MySQL for connection to database.



Cloud implementation ('cont)

sg-0f6bd7a7a49643b7d - Qaziwa public security grp

Details **Inbound rules** Outbound rules Tags

Inbound rules (2) [Edit inbound rules](#)

Type	Protocol	Port range	Source	Description - optional
HTTP	TCP	80	0.0.0.0/0	-
SSH	TCP	22	0.0.0.0/0	-

Public security group

Also connect to SSH and HTTP port for connection to web server.



Cloud implementation ('cont)

Security Groups (1/5) Info

Filter security groups

Name	Security group ID	Security group name	VPC ID	Description	Owner
Qaziwa NAT security...	sg-0ba7db7eb35d30e50	Qaziwa NAT security grp	vpc-090a8ad552bdc7ed6	launch-wizard-1 create...	50114445C

Details Inbound rules Outbound rules Tags

Inbound rules (2) Edit inbound rules

Type	Protocol	Port range	Source	Description - optional
All traffic	All	All	0.0.0.0/0	-
SSH	TCP	22	0.0.0.0/0	-

NAT security group

Enable all traffic as each NAT instance has their personal firewall or security rules.



Cloud implementation ('cont)

5. Internet Gateway

Internet gateways (1/2) [Info](#)

[Refresh](#) [Actions](#) [Create internet gateway](#)

< 1 > [Settings](#)

<input type="checkbox"/>	Name	Internet gateway ID	State	VPC ID	Owner
<input checked="" type="checkbox"/>	Qaziwa gateway	igw-01a83952e83d2c8df	Attached	vpc-090a8ad552bdc7ed6 QaZiWa VPC	501144450828
<input type="checkbox"/>	-	igw-a2e521d8	Attached	vpc-cb9a0bb6	501144450828

igw-01a83952e83d2c8df / Qaziwa gateway

[Details](#) [Tags](#)

Details

Internet gateway ID	State	VPC ID	Owner
igw-01a83952e83d2c8df	Attached	vpc-090a8ad552bdc7ed6 QaZiWa VPC	501144450828



Cloud implementation ('cont)

Name	Route table ID	Explicit subnet associat...	Edge associations	Main	VPC
<input checked="" type="checkbox"/> Qaziwa Route Table for NAT	rtb-0856a597fe2623a4d	subnet-04e9d1ba0d738...	—	No	vpc-090a8ad552bdc7ed6 Qa...
<input type="checkbox"/> QaziWa Route Table for Internet Gateway	rtb-073c5b0a953c1945f	subnet-0bcca5218d2be...	—	Yes	vpc-090a8ad552bdc7ed6 Qa...
<input type="checkbox"/>	rtb-08ad0a73c...	—	—	Yes	vpc-090a8ad552bdc7ed6 Qa...

rtb-0856a597fe2623a4d / Qaziwa Route Table for NAT

Details

Routes

Subnet associations

Edge associations

Route propagation

Tags

Details

Route table ID

rtb-0856a597fe2623a4d

Main

No

Explicit subnet associations

subnet-04e9d1ba0d738e7d5 / Qaziwa private subnet

Edge associations

—

VPC

vpc-090a8ad552bdc7ed6 | Qaziwa VPC

Owner ID

501144450828

6. Instances

NAT instance

It enables the private IP address to connect to the internet while keep internet away from connecting to the private IP address. This ensure that database server is secured and accessible.



Cloud implementation ('cont)

Instance Name	Instance ID	Status	Instance Type	Tags
<input checked="" type="checkbox"/> Web Server Qaziwa 1	i-0eec8b9304eb2e77e	Stopped	t2.micro	-
<input type="checkbox"/> Danm Secure Qaziwa Website	i-01d0a821608a529fc	Stopped	t2.micro	-
<input type="checkbox"/> Qaziwa FTP Server	i-0b7e7d5f80e6b772	Stopped	t2.micro	-

Instance: i-0eec8b9304eb2e77e (Web Server Qaziwa 1)

Details

Security

Networking

Storage

Status checks

Monitoring

Tags

▼ Instance summary

Info

Instance ID i-0eec8b9304eb2e77e (Web Server Qaziwa 1)	Public IPv4 address -	Private IPv4 addresses 10.0.1.48
--	--------------------------	-------------------------------------

Web instance

Provide web services across all users to access the website and buy books. It is public facing where it user can access the website.



Cloud implementation ('cont)

The screenshot displays the AWS Management Console interface. At the top, a table lists two EC2 instances:

Instance Name	Instance ID	Status	Instance Type	Availability Zone
Database Server Qaziwa	i-0ed2eaa768bc3b479	Stopped	t2.micro	us-east-1a
Web Server Qaziwa 1	i-0eec8b9304eh2e77e	Stopped	t2.micro	us-east-1a

Below the table, the details for the selected instance, 'Instance: i-0ed2eaa768bc3b479 (Database Server Qaziwa)', are shown. The 'Details' tab is active, displaying the following information:

Property	Value
Instance ID	i-0ed2eaa768bc3b479 (Database Server Qaziwa)
Public IPv4 address	-
Private IPv4 addresses	10.0.2.216
IPv6 address	-
Instance state	Stopped
Instance type	t2.micro
Private IPv4 DNS	ip-10-0-2-216.ec2.internal
Public IPv4 DNS	-
Elastic IP addresses	-

Database instance

Help to store records of the user, books and the cart where the user buy the books. It is internal facing in which no internet user can access the database server.



Cloud implementation ('cont)

7. Snapshot

- Volumes of NAT, Web & Database imaged
- In the event of corruption new instance can be created with the volume of the either of this 3 pre-configured.

<input type="checkbox"/>		snap-0b7ef6c93ba4...	8 GiB	Database-EBS Encrytor
<input checked="" type="checkbox"/>	Web Server ...	snap-0d758b25fa0c...	8 GiB	Snapshot on 16/6/2021
<input type="checkbox"/>	NAT Instanc...	snap-0f9dceeb7747...	8 GiB	Snapshot on 2/6/2021

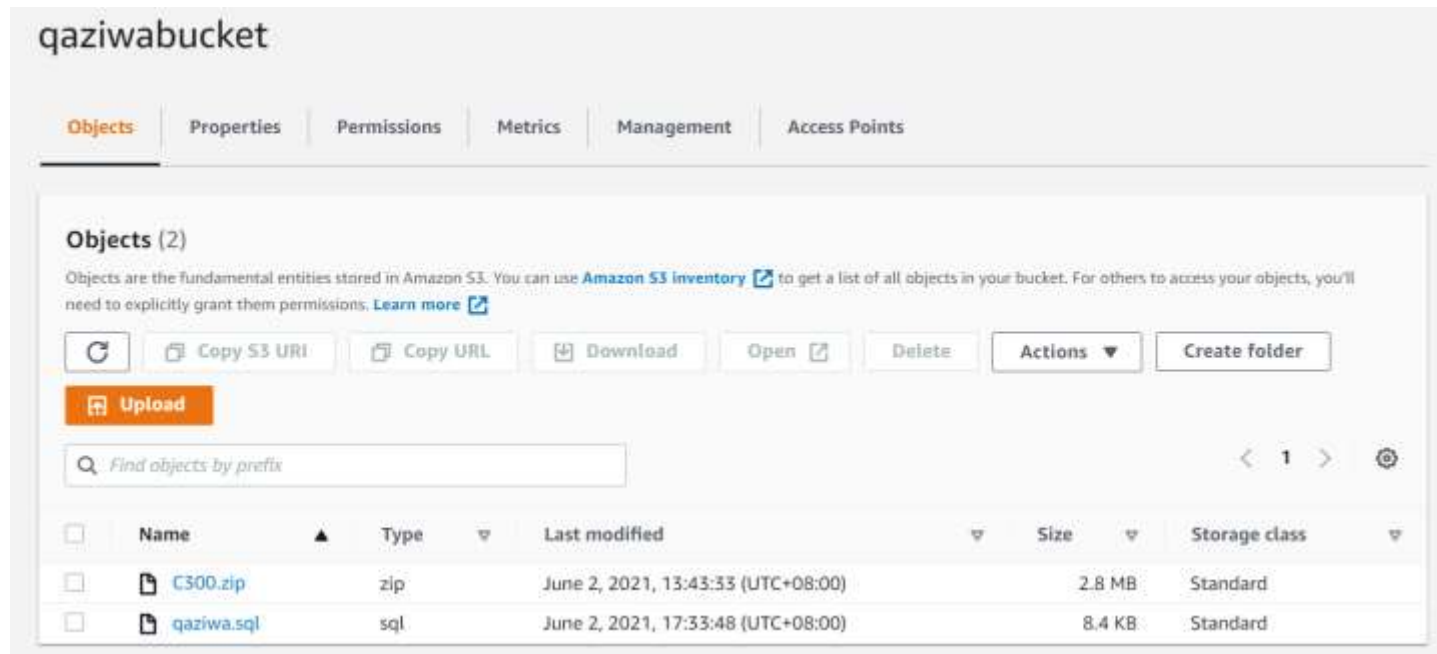
Snapshot: snap-0d758b25fa0cff804 (Web Server Volume Snapshot)

Description	Permissions	Tags
Snapshot ID	snap-0d758b25fa0cff804	
Status	completed	
Volume	vol-0fa75837e278949b2	
Started	June 16, 2021 at 2:25:56 PM UTC+8	
Owner	501144450828	

<input type="checkbox"/>		snap-0f2bc156fb7b...
<input type="checkbox"/>	Database Volume Snapshot	snap-0557dea4013...
<input type="checkbox"/>		snap-0b7ef6c93ba4...
<input checked="" type="checkbox"/>	Web Server Volume Snapshot	snap-0d758b25fa0c...
<input type="checkbox"/>	NAT Instance Volume Snapshot	snap-0f9dceeb7747...



Cloud implementation ('cont)



8. Storage (S3 bucket)

- Unblock public access allowing public users to have access to web server instance.
- Stores web code and Database template



Cloud implementation ('cont)

Elastic IP addresses (1/1)

Filter Elastic IP addresses

Name	Allocated IPv4 address	Type	Allocation ID	Associated instance ID	Private IP address
Web server elastic IP	52.6.166.103	Public IP	eipalloc-0ca2a7acbe5b75259	i-07e036f89a049c783	10.0.1.84

Summary

Allocated IPv4 address 52.6.166.103	Type Public IP	Allocation ID eipalloc-0ca2a7acbe5b75259	Association ID eipassoc-04b2225152ac58381
Scope VPC	Associated instance ID i-07e036f89a049c783	Private IP address 10.0.1.84	Network interface ID eni-09db5fb539b93dac7
Network interface owner account ID 501144450828	Public DNS ec2-52-6-166-103.compute-1.amazonaws.com	NAT Gateway ID -	Address pool Amazon
Network Border Group us-east-1			

9. Elastic IP

Allocate elastic IP address for web server so the IP address will remain the same after every refresh.



Cloud implementation ('cont)

10. Application Load Balancer

- Configured for Application type
- Set for availability zone 1a & 1b

Filter by tags and attributes or search by keyword

Name	DNS name	State	VPC ID	Availability Zones
QaziwaLoadBalancer	QaziwaLoadBalancer-18874	Active	vpc-090a8ad552bdc7ed8	us-east-1a, us-east-1b

ARN: [arn:aws:elasticloadbalancing:us-east-1:501144450828:loadbalancer/app/QaziwaLoadBalancer/366480bb2f579c92](#)

DNS name: [QaziwaLoadBalancer-1887492004.us-east-1.elb.amazonaws.com](#) (A Record)

State: Active

Type: **application**

Scheme: Internet-facing

IP address type: IPv4

[Edit IP address type](#)

VPC: [vpc-090a8ad552bdc7ed8](#)

Availability Zones: [subnet-0bcca6218d2bed2e5 - us-east-1a](#)
IPv4 address: Assigned by AWS

[subnet-0d563aaca151ca8f8 - us-east-1b](#)
IPv4 address: Assigned by AWS

[Edit subnets](#)



Cloud implementation ('cont)

10. Application Load Balancer - Target groups

- Web server 1 and Web Server 2 targeted for the Load Balancer
- Target set to HTTP Port
- Enable stickiness to keep session constant to that user

QaziwaTargetGroup

arn:aws:elasticloadbalancing:us-east-1:501144450828:targetgroup/

Details

Target type Instance	Protocol : Port HTTP: 80
Load balancer QaziwaLoadBalancer	

Total targets: 2 Healthy: 0

Targets							
Registered targets (2)							
Filter resources by property or value							
<input type="checkbox"/>	Instance ID	Name	Port	Zone	Health status	Health status details	
<input type="checkbox"/>	i-015628497df6338a4	Web Server Qaziwa 2	80	us-east-1b	unused	Target is in the stopped state	
<input type="checkbox"/>	i-0ee38b9304eb2e77e	Web Server Qaziwa 1	80	us-east-1a	unused	Target is in the stopped state	



Cloud implementation ('cont)

11. Auto scaling

- Amazon machine image (AMI)

Create and activate AMI before configuring auto scaling.

The screenshot displays the AWS Management Console interface for an Amazon Machine Image (AMI). At the top, a table lists the AMI with the following details:

Name	AMI Name	AMI ID	Source	Owner	Visibility	Status	Creation Date	Platform	Root Device 1	Virtualization	Deprecation Time
QazwaWebServer	ami-099476b22426eb0f0	501144450828/...	501144450828	Private	pending	June 24, 2021 at 4:41:41 PM	Other Linux	sbs	hvm	-	

Below the table, the 'Details' tab is selected, showing the following information:

Image: ami-099476b22426eb0f0

Details | Permissions | Tags

AMI ID	ami-099476b22426eb0f0	AMI Name	QazwaWebServer
Owner	501144450828	Source	501144450828/QazwaWebServer
Status	pending	State Reason	-
Creation date	June 24, 2021 at 4:41:41 PM UTC+8	Platform details	Linux/UNIX
Architecture	x86_64	Usage operation	RunInstances
Image Type	machine	Virtualization type	hvm
Description	A web server for Qazwa Book Store	Root Device Name	/dev/sda1
Root Device Type	efs	RAM disk ID	-
Kernel ID	-	Product Codes	-
Block Devices	/dev/sda1=8128mb gp2	Boot mode	-
Deprecation time	-		

An 'Edit' button is visible in the top right corner of the details section.



Cloud implementation ('cont)

Auto scaling configuration

EC2 > Auto Scaling groups

Auto Scaling groups (1/1)

Search your Auto Scaling groups

Refresh Edit Delete Create an Auto Scaling group

Name	Launch template/configuration	Instances	Status	Desired capacity	M...	M...	Availability Zones
QazwaAutoScaling	QazwaWebServerLaunchConfig	0	Updating capacity	2	2	3	us-east-1a, us-east-1b

Details Activity Automatic scaling **Instance management** Monitoring Instance refresh

Instances (2)

Filter instances

Instance ID	Lifecycle	Instance type	Weighted capacity	Launch template/configuration	Availability Zone	Health status	Protected from
i-0a4b4de91b0860064	InService	t2.micro	-	QazwaWebServerLaunchConfig	us-east-1a	Healthy	
i-0d34d1a8961bf276c	InService	t2.micro	-	QazwaWebServerLaunchConfig	us-east-1b	Healthy	

Lifecycle hooks (0) Info

Filter lifecycle hooks

Name	Lifecycle transition	Default result	Heartbeat timeout (seconds)	Notification target ARN	Role ARN
No lifecycle hooks are currently configured.					



Security

12. Web security (Wafi)

No	Attack done/ Vulnerability found	Outcome (success/not success)	Mitigation(s)
1	Session hijacking	success	session_regenerate_id() htmlspecialchars()
2	Session fixation	success	session_regenerate_id()
3	SQL injection	success	htmlspecialchars() PDO prepared statement
4	Cross-site scripting	success	htmlspecialchars()
5	DoS & DDoS	success	TimeOut MaxClients KeepAliveTimeout Implementation of Cloudflare
6	Invalid or insufficient condition attack	success	Use session tokens
7	Encrypted website (MITM)	success	HTTPS using Cloudflare



Security('cont)

Web security (Qamarrul)

No	Attack done/ Vulnerability found	Outcome (success/not success)	Mitigation(s)
8	Brute force attack	success	Google Authenticator OTP generateRandomSecret() Strong password creation upon register
9	Kill all session		session_destroy()
10	Improper validation upload section	success	Validation form
11	File inclusion attack	not success	
12	Showing of Apache Version and OS Identity	success	ServerSignature Off ServerTokens Prod
13	Web server directory listing	success	Using Options directive
14	Implementation of mod security		Mod security



Security('cont)

Web security (Zi Rui)

No	Attack done/ Vulnerability found	Outcome (success/not success)	Mitigation(s)
15	Unnecessary HTTP request	success	LimitRequestBody
16	Trace HTTP request	success	TraceEnable off
17	Command injection attack	Not success	
18	Separate database and web server interfaces		Using private and public network/zone in AWS
19	Exposed PHP version	success	expose_php = Off
20	Redirect all traffic to pass through cloudflare	success	Change the security group in AWS
21	Disable older version of TLS	success	Edit the TLS setting in cloudflare.



Security('cont)

13. CloudFlare

Support | Sales/787 0881 | @English


Cloudflare Solutions Products Documentation Resources Partners For Enterprise Pricing

Log In Sign Up [View Attack?](#)

Introducing Zero Trust Private Networking

Replace your VPN with identity-based Zero Trust policies inside your private network. Now you can lock down access to corporate applications, private IP spaces and hostnames. Free for up to 50 users.

[Learn More](#)



qaziwa.tk

+ Add site | Support | English (US) |

- Overview
- Analytics
- DNS
- SSL/TLS
- Firewall
- Access
- Speed
- Caching
- Workers
- Rules
- Network
- Traffic
- Stream
- Custom Pages
- Apps
- Screen Shield

A few more steps are required to complete your setup. [Hide](#)

- ✓ Add an A, AAAA, or CNAME record for your **root domain** so that **qaziwa.tk** will resolve.
- ✓ Add an MX record for your **root domain** so that mail can reach @**qaziwa.tk** addresses.

DNS management for qaziwa.tk

[+ Add record](#) [Advanced](#)

Type	Name	Content	TTL	Proxy status	
CNAME	www	qaziwa-loadbalancer-1887492004...	Auto	Proxied	Edit

Cloudflare nameservers

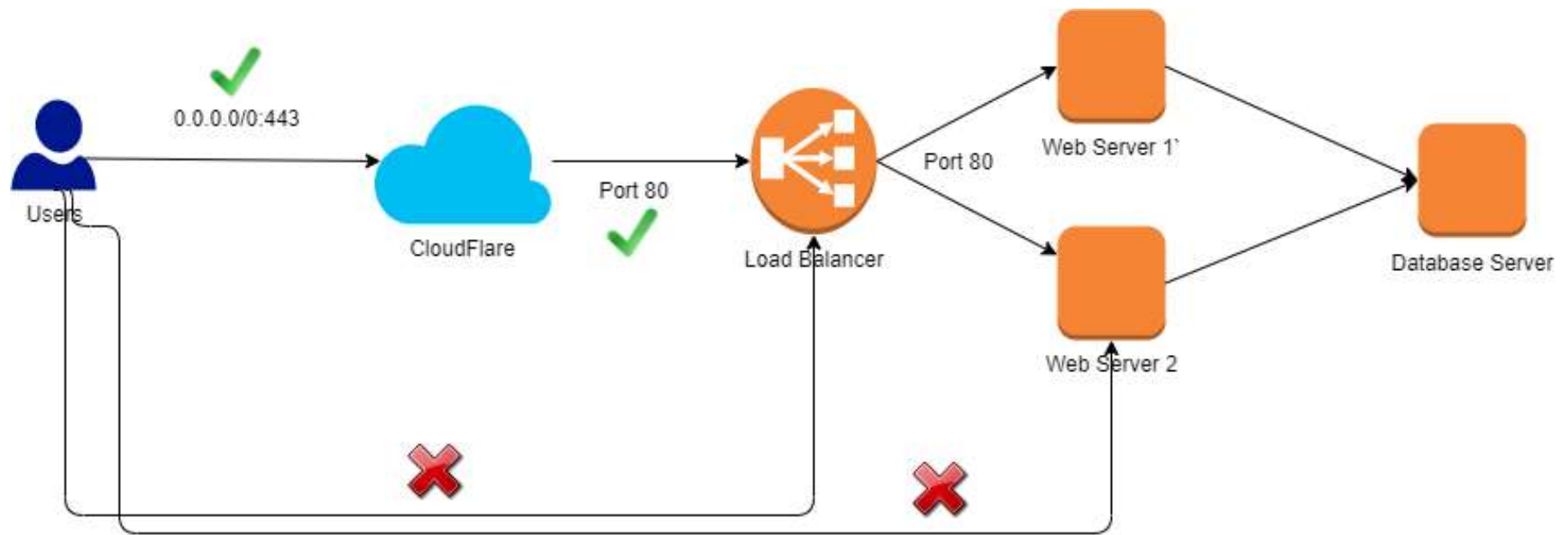
To use Cloudflare, ensure your authoritative DNS servers, or nameservers have been changed. These are your assigned Cloudflare

It even helps to improve the site performance and speed up loading time

CloudFlare offers a various range of protections such as SQL injection, Identity theft, DoS/DDoS protection



CloudFlare Summary network diagram





Ensure HTTPs from client to CloudFlare



Overview Edge Certificates Client Certificates Origin Server Custom Hostnames

Your SSL/TLS encryption mode is Flexible

This setting was last changed 34 minutes ago



Learn more about End-to-end encryption with Cloudflare

- ☐ Off (not secure) ?
No encryption applied
- ☒ **Flexible**
Encrypts traffic between the browser and Cloudflare
- ☐ Full
Encrypts end-to-end, using a self signed certificate on the server
- ☐ Full (strict)
Encrypts end-to-end, but requires a trusted CA or Cloudflare



QaZiWa Books - Login

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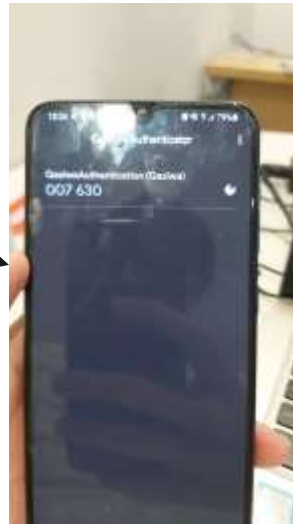
Security ('cont)

14. Google Authenticator



Do install Google Authenticator App in your phone and scan the QR code above. After scanning, key in the number code that you see in the App. Thank you :")

GaZiWa Copyright
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→ Implement a OTP QR code which change every pin (not a static QR code)

→ User need to download the google authenticator to use the function

→ Was motivated by OTP send via gmail account



Security ('cont)

15. Rest Encryption (Database encryption)

```
mysql> #Now time to verify;
mysql> SELECT TABLE_SCHEMA, TABLE_NAME, CREATE_OPTIONS FROM
-> INFORMATION_SCHEMA.TABLES WHERE CREATE_OPTIONS LIKE '%ENCRYPTION%'
;
+-----+-----+-----+
| TABLE_SCHEMA | TABLE_NAME | CREATE_OPTIONS |
+-----+-----+-----+
| qaziwa        | books       | ENCRYPTION='Y' |
| qaziwa        | cart_books  | ENCRYPTION='Y' |
| qaziwa        | users       | ENCRYPTION='Y' |
+-----+-----+-----+
3 rows in set (0.01 sec)

mysql>
```

We use innodb and plugins to encrypt our database and its tables.

Enable key rotation periodically (below)

```
mysql> SELECT SCHEMA_NAME, DEFAULT_ENCRYPTION FROM
-> INFORMATION_SCHEMA.SCHEMATA WHERE DEFAULT_ENCRYPTION='YES';
+-----+-----+
| SCHEMA_NAME | DEFAULT_ENCRYPTION |
+-----+-----+
| qaziwa      | YES                |
+-----+-----+
1 row in set (0.00 sec)
```

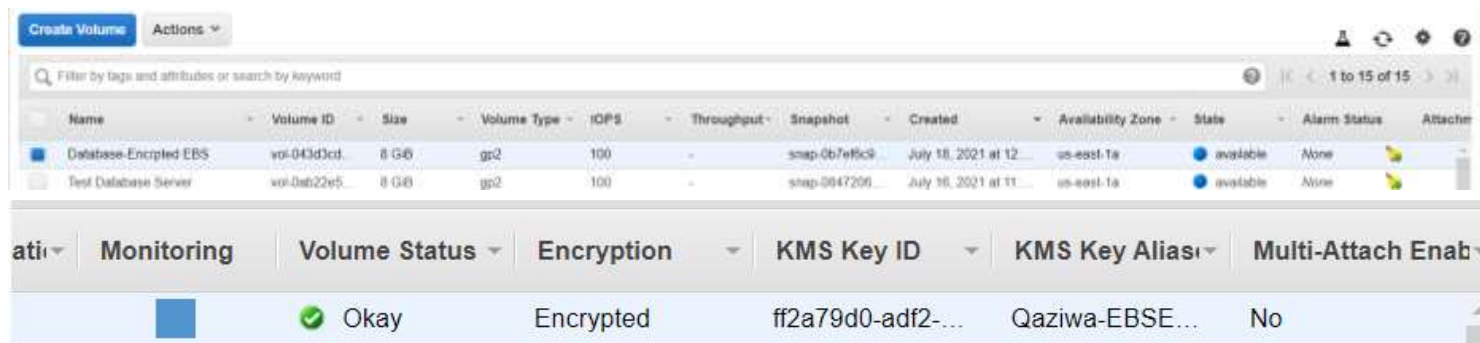
```
mysql> ALTER INSTANCE ROTATE INNODB MASTER KEY;
Query OK, 0 rows affected (0.00 sec)

mysql>
```



Security ('cont)

Rest Encryption (Database encryption)

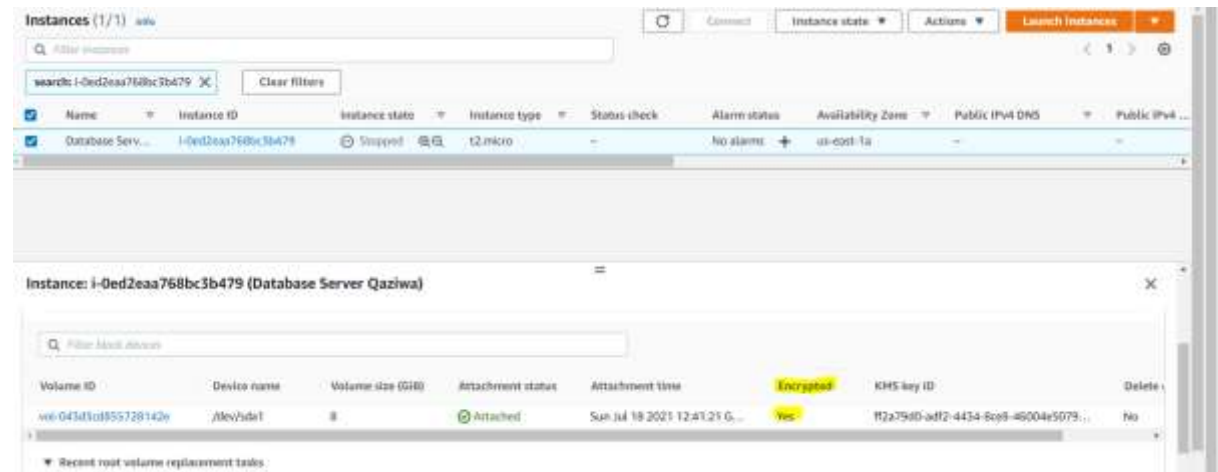


Name	Volume ID	Size	Volume Type	IOPS	Throughput	Snapshot	Created	Availability Zone	State	Alarm Status	Attachments
Database-Encrypted EBS	vol-043d3cd...	8 GiB	gp2	100	-	snap-0b7ef5c9...	July 18, 2021 at 12...	us-east-1a	available	None	
Test Database Server	vol-0ab22e5...	8 GiB	gp2	100	-	snap-0847206...	July 16, 2021 at 11...	us-east-1a	available	None	

Monitoring	Volume Status	Encryption	KMS Key ID	KMS Key Alias	Multi-Attach Enabled
	✓ Okay	Encrypted	ff2a79d0-adf2-...	Qaziwa-EBSE...	No

Encryption of EBS volume for the database instance

Change from unencrypted volume to encrypted volume



Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
Database Serv...	i-0ed2eaa768bc3b479	Stopped	t2.micro	-	No alarms	us-east-1a	-	-

Volume ID	Device name	Volume size (GiB)	Attachment status	Attachment time	Encryption	KMS key ID	Delete
vol-043d3cd855728142e	/dev/sda1	8	Attached	Sun Jul 18 2021 12:41:21 G...	Yes	ff2a79d0-adf2-4434-8c98-46004e5079...	No



Monitoring

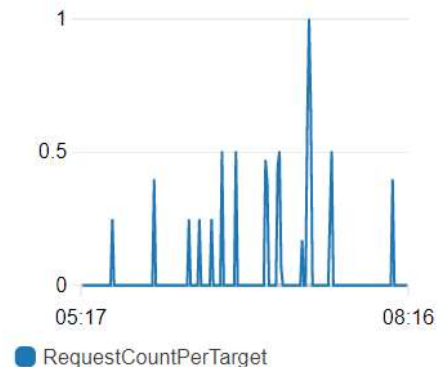
16. Cloudwatch

- Targeted to Load balancer, Auto Scaling, Instances
- Monitors user connection count for user traffic
- CPU consumption monitored, ensure load can handle

Load Balancer (Qaziwa)

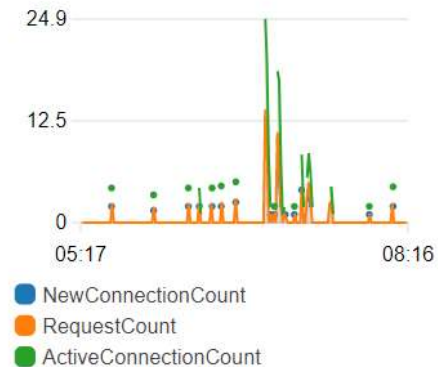
QaziwaLB_RequestCount...

RequestCountPerTarget



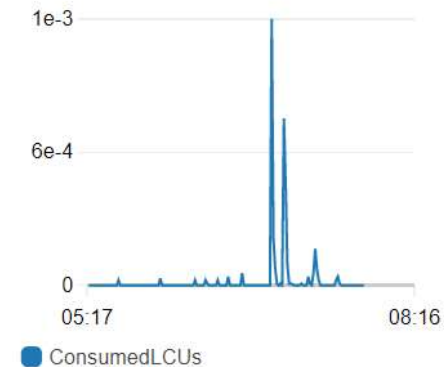
ActiveConnectionCount, N...

Count



ConsumedLCUs

Count





Monitoring ('cont)


Cloudwatch Alarm

- Configured alarms for targets monitored in CloudWatch
- Set threshold based of data that was collected for the dashboard
- Any alarms triggered would be notified via email

Details

Name	LoadBalancerCPU
Type	Metric alarm
Description	Alarm would alert if exceed 2 count
State	Insufficient data
Threshold	Load Balancing Request Count PerTarget > 2 for 1 datapoints within 15 minutes
Last change	2021-07-07 08:21:58
Actions	1 action(s) enabled

FW: ALARM: "Test" in US East (N. Virginia)

 MLIHD WAFYUDDIN BIN ABDUL RAHMAN
To: GAMMARRUL DANIAL B RAZAI

Reply Reply All Forward

Wed 7/7/2021 4:38 pm

Alarm Details:

- Name: Test
- Description:
- State Change: OK -> ALARM
- Reason for State Change: Threshold Crossed: 1 out of the last 1 datapoints [3.0 [01/07/21 07:21:00]] was greater than or equal to the threshold (2.0) (minimum 1 datapoint for OK -> ALARM transition).
- Timestamp: Thursday 01 July, 2021 07:23:15 UTC
- AWS Account: 501144450828
- Alarm Arn: arn:aws:cloudwatch:us-east-1:501144450828:alarm:Test

Threshold:

- The alarm is in the ALARM state when the metric is GreaterThanOrEqualToThreshold 2.0 for 60 seconds.

Monitored Metric:

- MetricNamespace: AWS/ApplicationELB
- MetricName: RequestCountPerTarget
- Dimensions: [TargetGroup = targetgroup/QadwaTargetGroup/b99f92eb253fa95a]
- Period: 60 seconds
- Statistic: Sum
- Unit: not specified
- TreatMissingData: missing

State Change Actions:

- OK:
- ALARM: [arn:aws:sns:us-east-1:501144450828:vcAlarmTopic]



Monitoring ('cont)

17. CloudTrail

- Record activities performed in the AWS and logs it.
- Logs are stored in a S3 bucket
- Log file validation enabled, all files logged are hashed

CloudTrail > Event history

Event history (50+) [Info](#) Refresh Download events Create Athena table

Event history shows you the last 90 days of management events.

Read-only ▼ X 30m 1h 3h 12h Custom < 1 2 > ⌂

<input type="checkbox"/>	Event name	Event time	User name	Event source	Resource type	Resource name
<input type="checkbox"/>	PutBucketPublicAccess...	July 14, 2021, 11:39:26 (UTC+0...	user1406304=190...	s3.amazonaws.com	AWS::S3::Bucket	qaziwa-cloudtrail-logs
<input type="checkbox"/>	CreateBucket	July 14, 2021, 11:39:25 (UTC+0...	user1406304=190...	s3.amazonaws.com	AWS::S3::Bucket	qaziwa-cloudtrail-logs
<input type="checkbox"/>	PutBucketPolicy	July 14, 2021, 11:39:25 (UTC+0...	user1406304=190...	s3.amazonaws.com	AWS::S3::Bucket	qaziwa-cloudtrail-logs
<input type="checkbox"/>	CreateEnvironment	July 14, 2021, 11:31:14 (UTC+0...	user1406304=190...	cloudshell.amazonaws.com	-	-
<input type="checkbox"/>	UpdateRole	July 14, 2021, 11:30:31 (UTC+0...	vocstartsoft16262...	iam.amazonaws.com	-	-
<input type="checkbox"/>	UpdateRole	July 14, 2021, 11:30:30 (UTC+0...	vocstartsoft16262...	iam.amazonaws.com	-	-
<input type="checkbox"/>	UpdateTrail	July 14, 2021, 11:09:12 (UTC+0...	user1406304=190...	cloudtrail.amazonaws.com	AWS::CloudTrail::Trail, ...	arn:aws:cloudtrail:us-east-1:50114...
<input type="checkbox"/>	PutBucketPolicy	July 14, 2021, 11:09:12 (UTC+0...	user1406304=190...	s3.amazonaws.com	AWS::S3::Bucket	aws-cloudtrail-logs-50114445082...
<input type="checkbox"/>	UpdateTrail	July 14, 2021, 11:07:00 (UTC+0...	user1406304=190...	cloudtrail.amazonaws.com	AWS::CloudTrail::Trail, ...	arn:aws:cloudtrail:us-east-1:50114...
<input type="checkbox"/>	PutBucketPolicy	July 14, 2021, 11:07:00 (UTC+0...	user1406304=190...	s3.amazonaws.com	AWS::S3::Bucket	aws-cloudtrail-logs-50114445082...



Monitoring ('cont)

Cloudtrail Email SNS

- Configured for us to be notified when a new log is created
- Email subscription follows the same as CloudWatch's.

From: AWS Notifications
Sent: Wednesday, 14 July 2021 11:08 AM
To: MUHD WAFIYUDDIN BIN ABDUL RAHMAN
Subject: AWS Notification Message

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

```
{"s3Bucket":"aws-cloudtrail-logs-501144450828-1ec5e12a","s3ObjectKey":["AWSLogs/501144450828/CloudTrail/eu-west-1/2021/07/14/501144450828_CloudTrail_eu-west-1_20210714T0305Z_JYWK5vMLjL6mXYdx.json.gz"]}
```

--

If you wish to stop receiving notifications from this topic, please click or visit the link below to unsubscribe:

<https://apc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fsns.us-east-1.amazonaws.com%2Funsubscribe.html%3FSubscriptionArn%3Darn%3Aaws%3Asns%3Aus-east-1%3A501144450828%3AvocAlarmTopic%3Ad329d2c9-cccb-4f40-ad50-b01f2f0a1906%26Endpoint%3D19031563%40myrp.edu.sg&data=04%7C01%7C19031563%40myrp.edu.sg%7C3edd5e6956044ede9b3e08d94674b398%7Cf688b0d079f040a4864435fcdee9d0f3%7C0%7C0%7C637618289320109428%7CUnknown%7CTWFpbGZsb3d8eyJWljojMC4wLjAwMDAilCjQjoiV2luMzliLjBjTil6lk1haWwWwLjCjXVCi6Mn0%3D%7C2000&data=OH%2F8dV%2FyJTu3Ayrxirf9G6O5Qe359oQ3rfo6toZVod4%3D&reserved=0>

Please do not reply directly to this email. If you have any questions or comments regarding this email, please contact us at

<https://apc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Faws.amazon.com%2Fsupport&data=04%7C01%7C19031563%40myrp.edu.sg%7C3edd5e6956044ede9b3e08d94674b398%7Cf688b0d079f040a4864435fcdee9d0f3%7C0%7C0%7C637618289320109428%7CUnknown%7CTWFpbGZsb3d8eyJWljojMC4wLjAwMDAilCjQjoiV2luMzliLjBjTil6lk1haWwWwLjCjXVCi6Mn0%3D%7C2000&data=CbbI%2BBqSG3MX7dA92jWN7U7d6KA%2Fv%2F2VH%2BcVujtrgc%3D&reserved=0>



Allocation of privileges

18. IAM users

IAM > Users

IAM users (3) Info							
An IAM user is an identity with long-term credentials that is used to interact with AWS in an account.							
<input type="text" value="Search"/>							
<div><div></div><div>1</div><div></div><div></div></div>							
<input type="checkbox"/>	User name	Groups	Last activity	MFA	Console last sign...	Access key age	
<input type="checkbox"/>	qaziwa-admin	0	Never	None	None	-	
<input type="checkbox"/>	Qaziwa-Developer	0	Never	None	None	-	
<input type="checkbox"/>	Qaziwa-NormalUser	0	Never	None	None	-	

You successfully created the following user, but some problems remain. Expand the following section for details. View and download user's security credentials as well as email users instructions to log into the AWS Management Console. This will be the last time these credentials will be available to download. However, you can manage and recreate these credentials at any time.

Users with AWS Management Console access may sign-in at: <https://501144430828.sk1ra.aws.amazon.com/console>

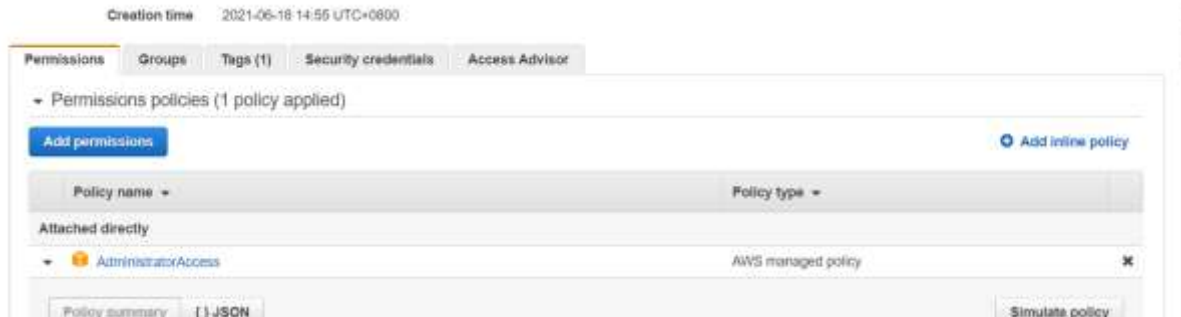
[Download .csv](#)

User
Qaziwa-NormalUser

- Created user Qaziwa-NormalUser
 - Attached policy EC2InstanceConnect to user Qaziwa-NormalUser
 - Attached policy IAMUserChangePassword to user Qaziwa-NormalUser
 - Could not create login profile for user Qaziwa-NormalUser
- User: iam:aws:sts:501144430828:assumed-role/vocabartoff/user1408304*19031853@myip.edu.sg is not authorized to perform: iam:CreateLoginProfile



Allocation of privileges ('cont)

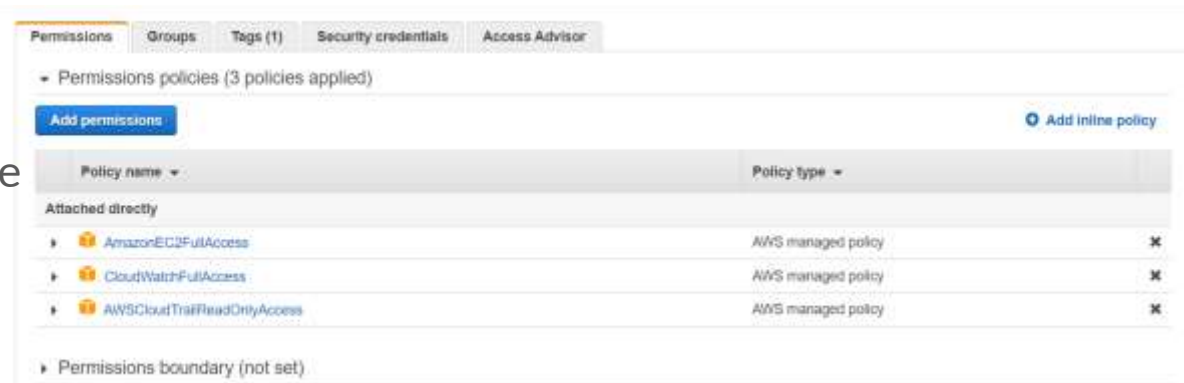


Admin

- Full privileges

Developer

- Full access for instance & cloudwatch
- Only read access for cloudtrail



Permissions summary

The following policies will be attached to the user shown above.

Type	Name
Managed policy	EC2InstanceConnect
Managed policy	IAMUserChangePassword

Normal user

- Only access to website



Allocation of privileges ('cont)

19. KMS

KMS > Customer managed keys

Customer managed keys (4)

Key actions ▼

Create key

Filter keys by properties or tags

< 1 > ⚙

<input type="checkbox"/>	Aliases ▼	Key ID ▼	Status	Key spec ⓘ	Key usage
<input type="checkbox"/>	Qaziwa-AdminKey	f23afe98-9689-4274-b2b0-9c939a41f956	Enabled	RSA_2048	Encrypt and decrypt
<input type="checkbox"/>	QaziwaSymmetricKey	f320f17a-9a0c-418f-be2f-e4d54bdf562a	Pending deletion	SYMMETRIC_DEFAULT	Encrypt and decrypt
<input type="checkbox"/>	Qaziwa-NormalUser	ef7b5354-3288-4bf8-a037-25b468ce7819	Enabled	RSA_2048	Encrypt and decrypt
<input type="checkbox"/>	Qaziwa-DeveloperKey	44bbb11a-1205-4f3f-95a8-15fa75d8dfb0	Enabled	RSA_2048	Encrypt and decrypt

KMS is a centralized zone for storing all cryptographic keys to protect data. It is integrated with CloudTrail for monitoring of the key usage from the logs to allocate required resources across the network.



Task Allocation and Progress

- *Wafi*

Task	Progress
<i>Website Planning</i>	<i>100%</i>
<i>Finalised website design</i>	<i>100%</i>
<i>Listing Page (Website)</i>	<i>100%</i>
<i>Cart Page (Website)</i>	<i>100%</i>
<i>Google Authenticator</i>	<i>100%</i>
<i>Route Table</i>	<i>100%</i>
<i>Subnet Creation</i>	<i>100%</i>
<i>Auto Scaling</i>	<i>100%</i>

Continue Next
Few Slides ->



Task Allocation and Progress

- *Wafi*

Task	Progress
<i>Domain Name</i>	<i>100%</i>
<i>Cloudflare</i>	<i>100%</i>
<i>FTP Server</i>	<i>100%</i>
<i>Internet Gateway</i>	<i>100%</i>



Task Allocation and Progress

- *Zi Rui*

Task	Progress
<i>Website Planning</i>	<i>100%</i>
<i>Use-Case Diagram</i>	<i>100%</i>
<i>Login Page (Website)</i>	<i>100%</i>
Checkout Page (Website)	100%
<i>Registration Page (Website)</i>	<i>100%</i>
Confirmed Payment Page (Website)	100%
Database Implementation (Cloud)	100%
NAT Implementation	100%



Task Allocation and Progress

- *Zi Rui*

Task	Progress
<i>KMS</i>	<i>100%</i>
<i>CloudTrail</i>	<i>100%</i>
<i>VPC Creation</i>	<i>100%</i>
<i>Elastic IP</i>	<i>100%</i>



Task Allocation and Progress

- *Qamarrul*

Task	Progress
<i>Database Planning</i>	<i>100%</i>
<i>ERD Diagram</i>	<i>100%</i>
<i>Database Structure (phpMyAdmin)</i>	<i>100%</i>
Database Creation	100%
Table Creation (Content)	100%
Web Server Implementation	100%
Snapshot Instances	100%
S3 Bucket	100%



Task Allocation and Progress

- *Qamarrul*

Task	Progress
Load Balancing	100%
IAM Roles	100%
CloudWatch	100%
Database (Rest) Encryption	100%



Records of Team Meetings with Supervisor

Name	21 April 2021	28 April 2021	19 May 2021	2 June 2021	16 June 2021	23 June 2021	7 July 2021
<i>Wafi</i>	Present	Present	Present	Present	Present	Present	Present
<i>Zi Rui</i>	Present	Present	Present	Present	Present	Present	Present
<i>Qamarrul</i>	Present	Present	Present	Present	Present	Present	Present

Note: For meetings without the presence of supervisor, the team meets every Wednesday and Friday with each member present for every meeting

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Records of Team Meetings with Supervisor

Name	14 July 2021	28 July 2021	4 August 2021				
<i>Wafi</i>	Present	Present	Present				
<i>Zi Rui</i>	Present	Present	Present				
<i>Qamarrul</i>	Present	Present	Present				

Note: For meetings without the presence of supervisor, the team meets every Wednesday and Friday with each member present for every meeting