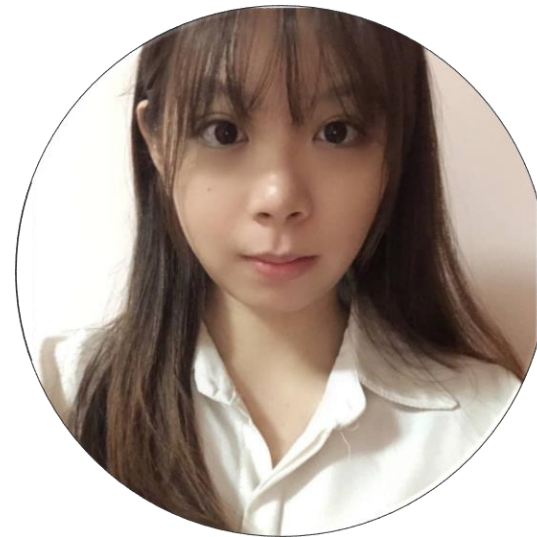


# CS301: ITSA

## GROUP 8

.....



**Jasmine**



**Wei Hao**



**Junxiang**



**James**



**Wen Jie**

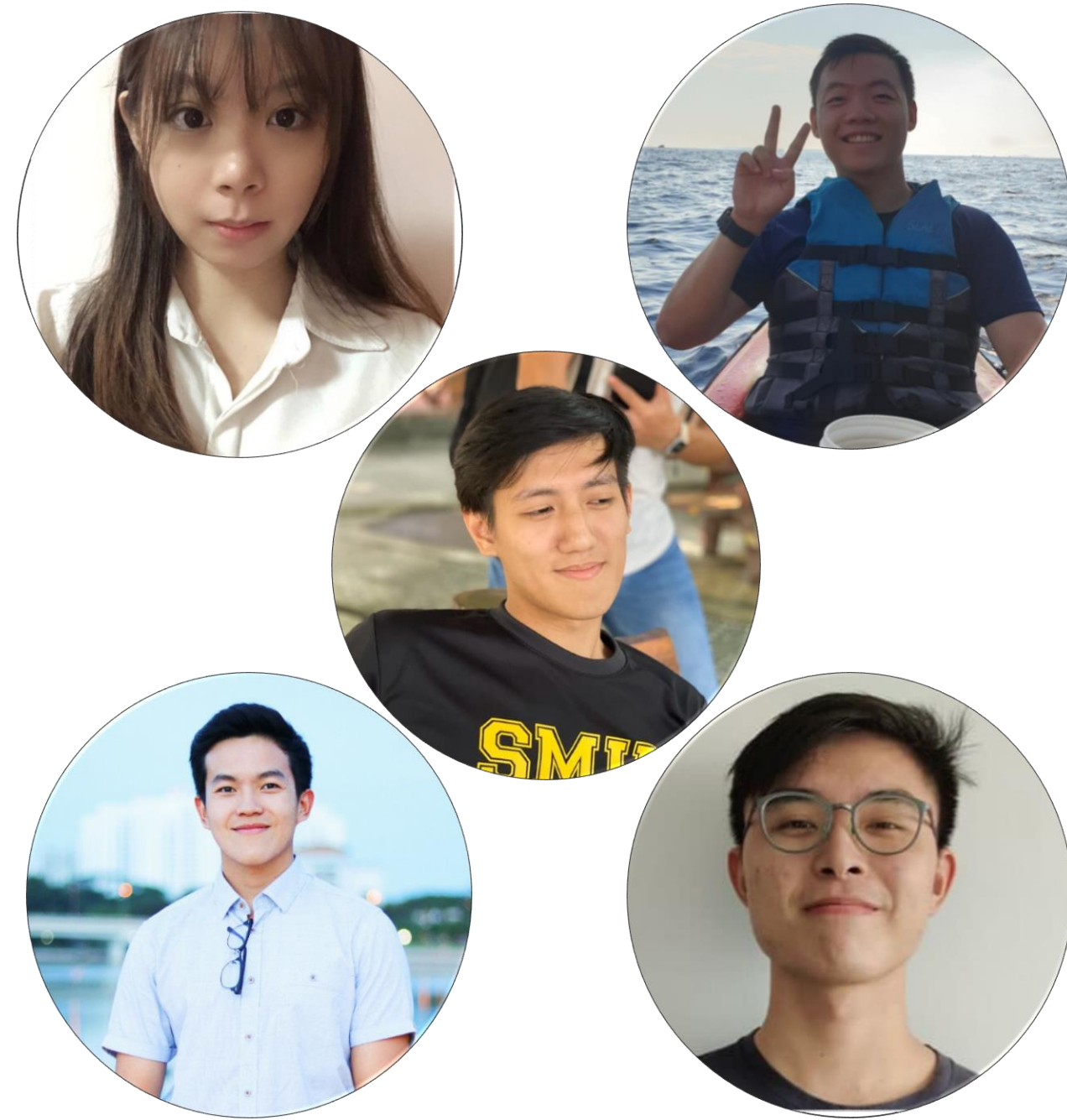
## Final Presentation

## Hotel Booking System

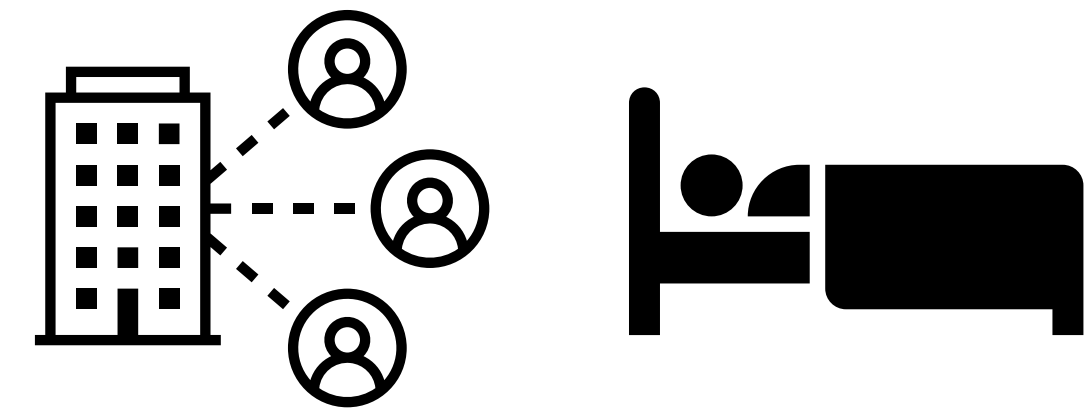


# Background

---



**Customers**



**Hotels**

**Background**

```
graph TD; Background --- Ascenda; Speed --- Ascenda; Scalability --- Ascenda; Maintainability --- Ascenda; Data_Security[Data Security] --- Ascenda; style Ascenda fill:#fff,stroke:#000,stroke-width:2px; style Background fill:#fff,stroke:#000,stroke-width:2px; style Speed fill:#fff,stroke:#000,stroke-width:2px; style Scalability fill:#fff,stroke:#000,stroke-width:2px; style Maintainability fill:#fff,stroke:#000,stroke-width:2px; style Data_Security fill:#fff,stroke:#000,stroke-width:2px;
```

**Speed**

**Scalability**

**Ascenda**

**Maintainability**

**Data Security**

# Features > Use Cases

---

**Hotel  
Search**



**View  
Available Rooms**

**Booking  
Data**



**Register + Login  
To System**

**Destination  
Search**



**Search Destination  
By Location**

---

**View Hotels  
By Price**

**Book Hotel**

**Autocomplete  
Search Input**

---

**Check Booking  
Information**

# Quality Metrics

## Performance



- Destination Autocomplete Caching
- API Gateway Caching

## Availability



- Multi-AZ Datacenters
- AWS Application Load Balancing Active/Passive Standby
- AWS Auto-Scaling Group (70%/20%)

## Maintainability



- CI/CD via Github Actions
- Terraform

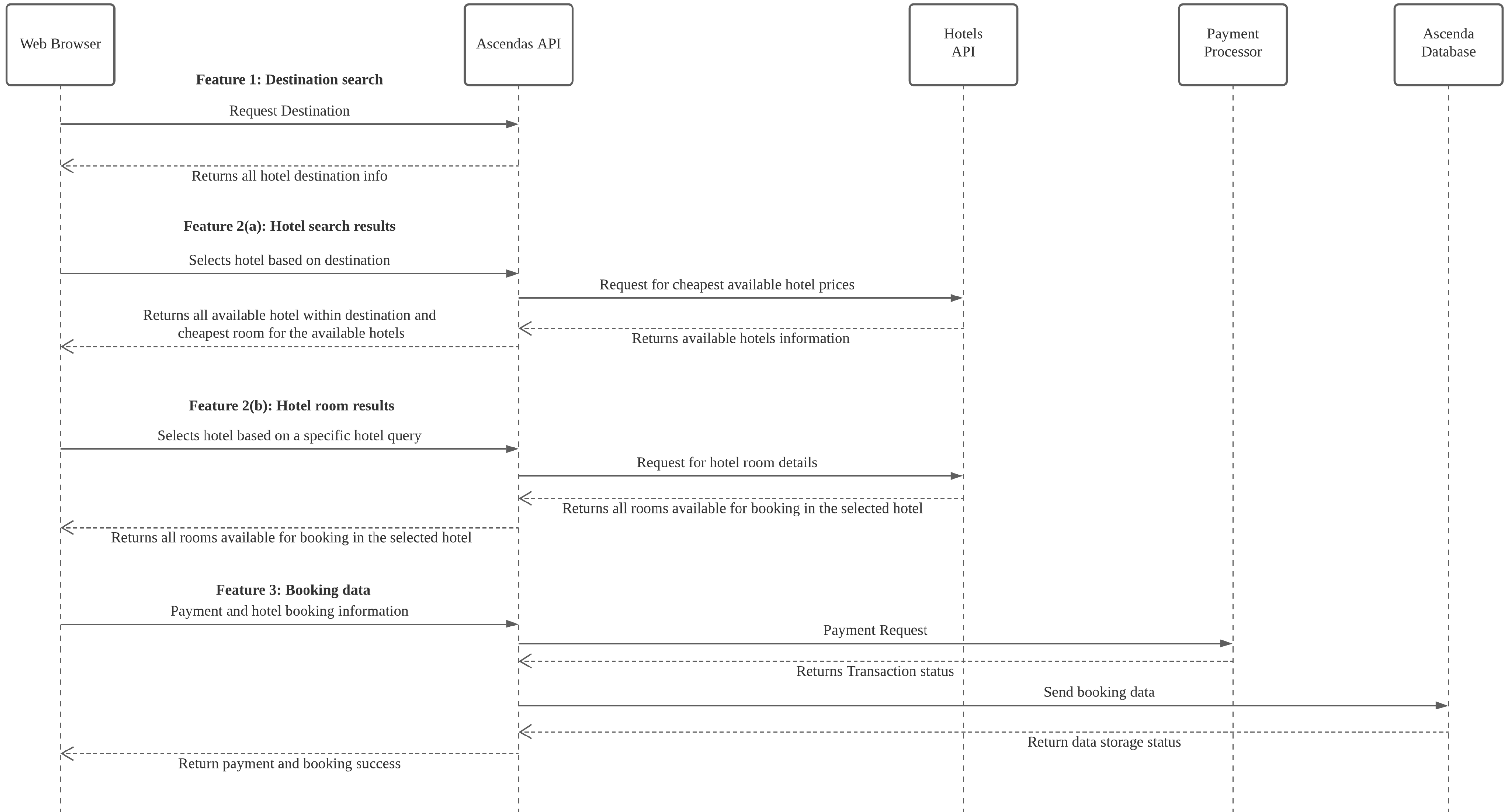
## Security



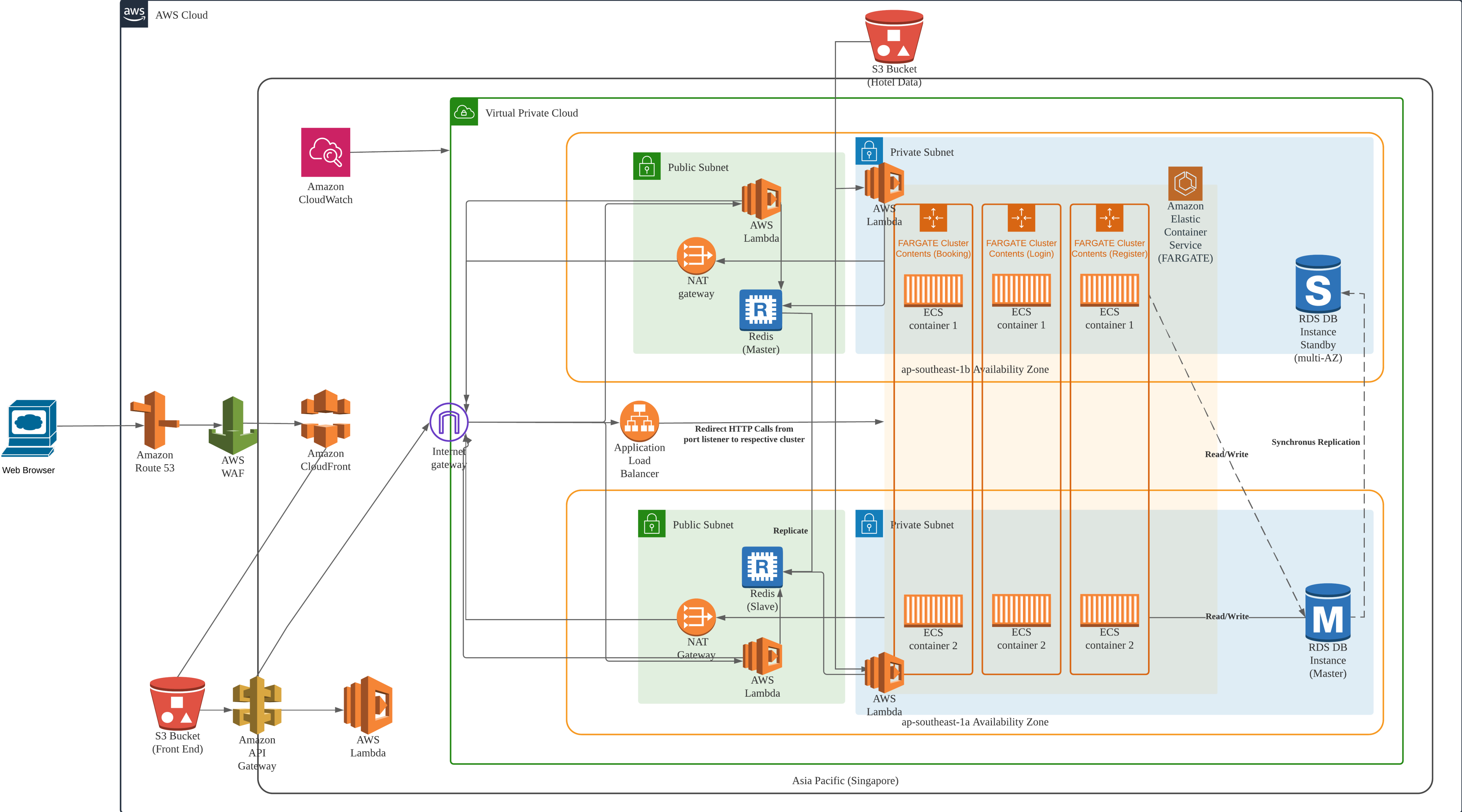
- Mozilla Observatory B Grade
- OWASP Secure Coding Practices
  - WAF Filter Rule
- Separate Web & DB Servers
  - Revalidate Data (Server Side)
- Server-Side Data Revalidation
- Secure Password Management (Hashed With Salt)
  - Authentication Token



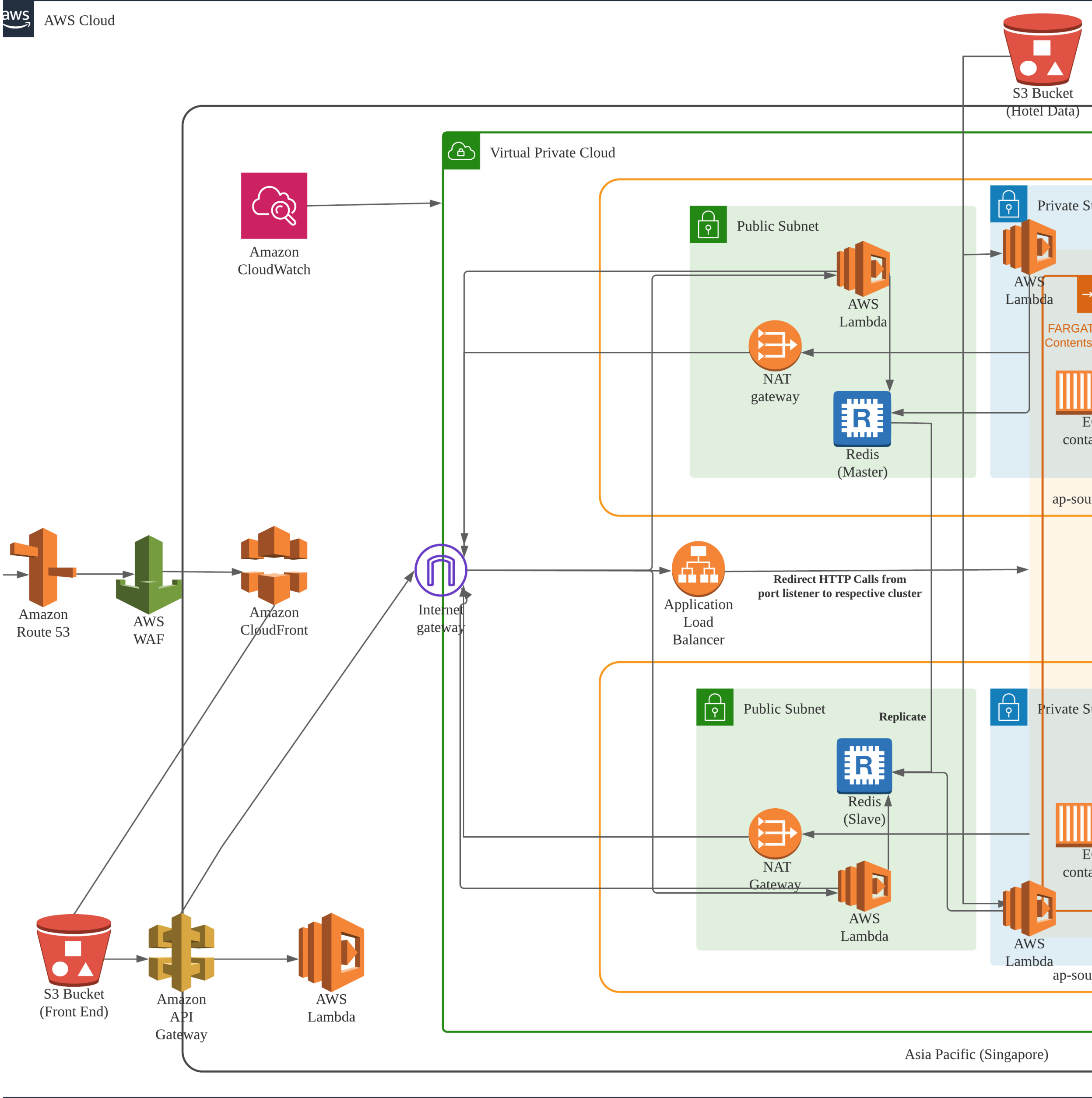
# Sequence View



# Architecture View



# Architecture View

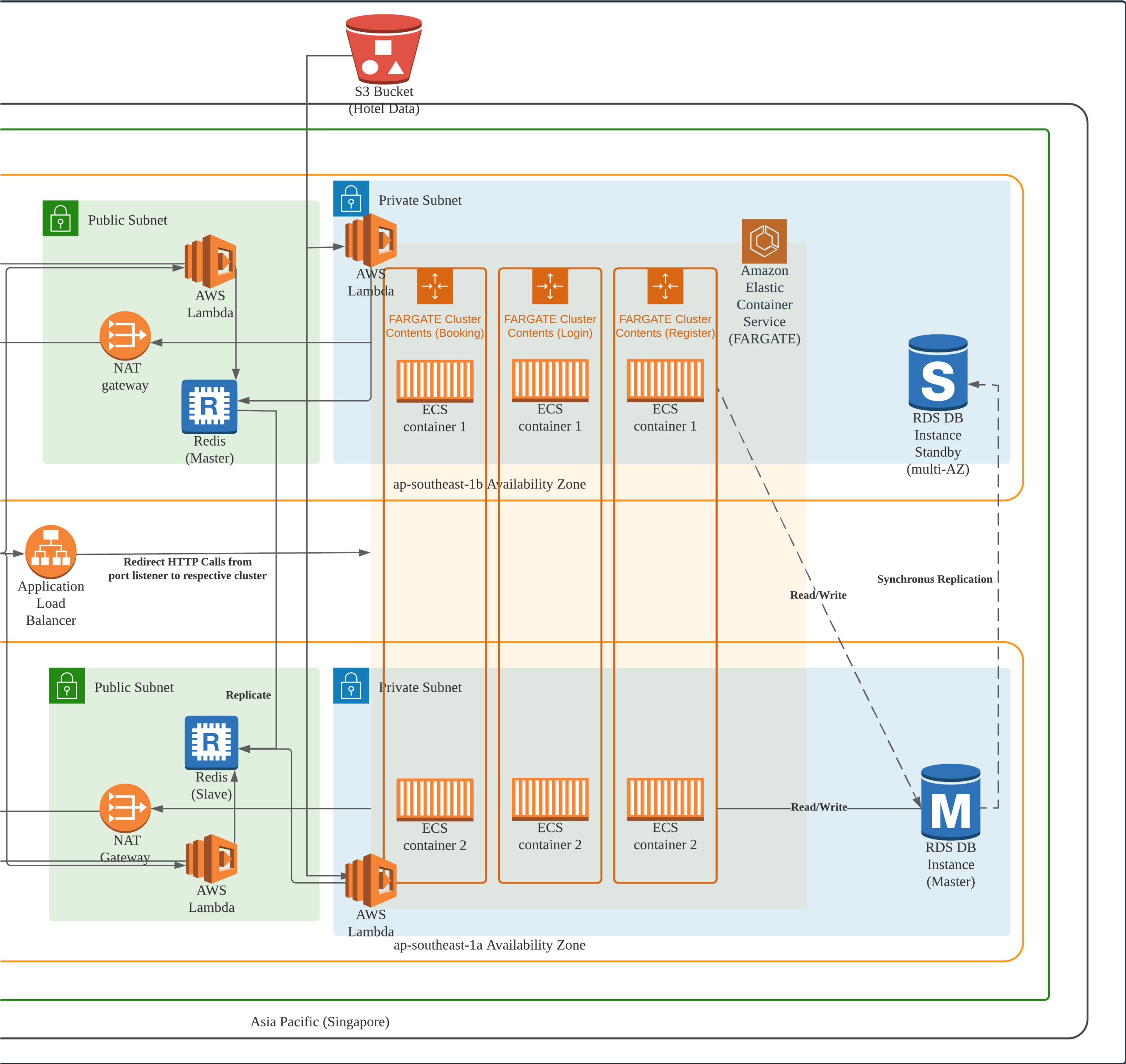


Performance



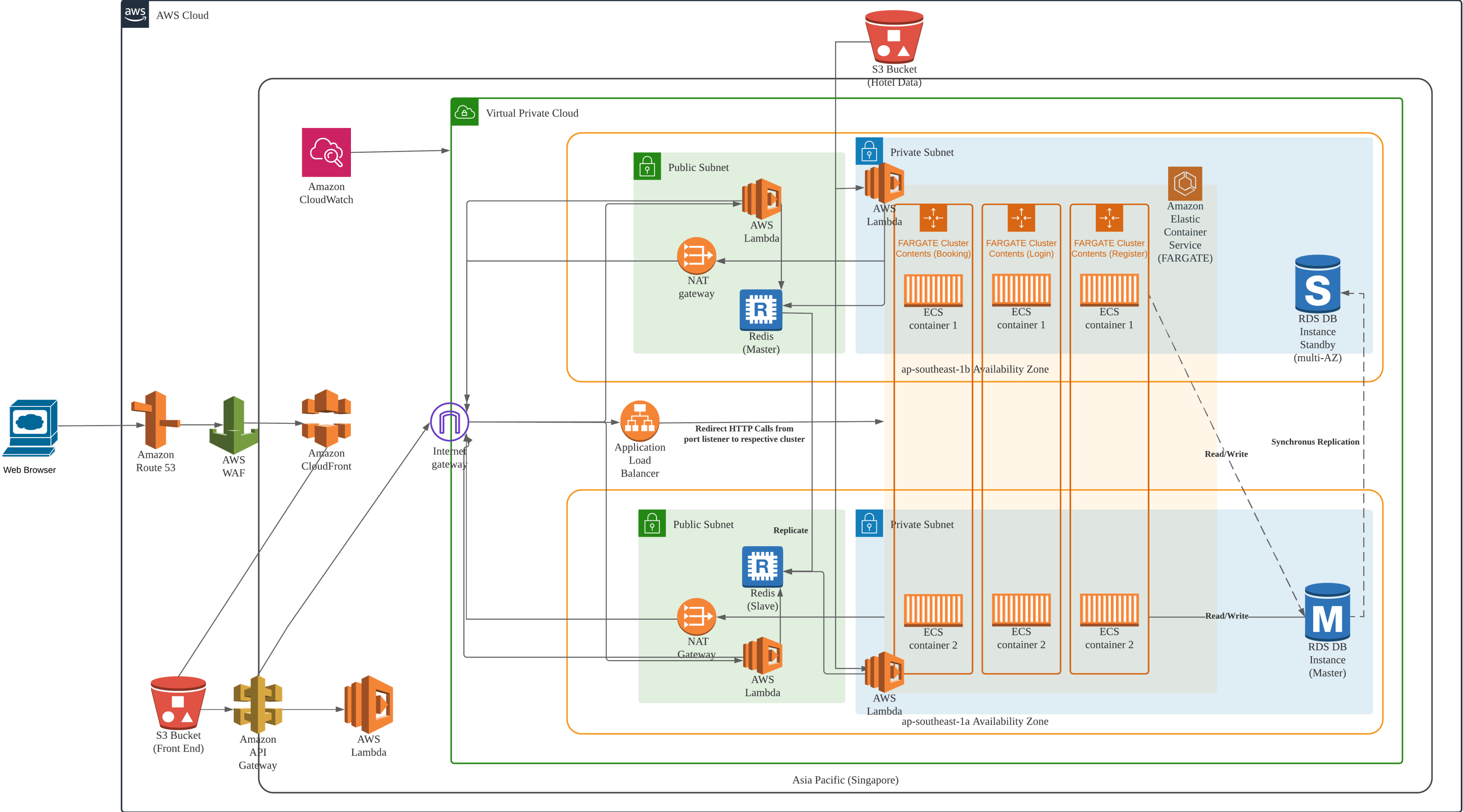
# Architecture View

Reliability



# Architecture View

Maintainability  
&  
Security



# Overall Budget (Proposal)

AWS Elastic Beanstalk (EBS)	\$6.26
AWS Application Load Balancer (ALB)	Free Tier
AWS RDS MySQL	Free Tier
AWS Simple Cloud Storage (S3)	Free Tier
AWS API Gateway	Free Tier
AWS CloudWatch	Free Tier
AWS API Gateway	Free Tier
AWS CodeDeploy	\$0.40
AWS CloudFront	Free Tier
AWS Web Application Firewall (WAF)	\$5.60
AWS Lambda	Free Tier
Domain Name (Domain.com)	\$6.99
Total:	\$19.61

# Overall Budget (Monthly)

## Development Budget



AWS EC2 INSTANCES	\$2.66
AWS ELASTICACHE	\$44.92
RDS MYSQL	\$11.54
ELASTIC CONTAINER SERVICE (FARGATE)	\$7.69
AMAZON ROUTE 53	\$3.35
AWS S3	\$0.053
AWS API GATEWAY	\$0.059
AWS VPC (NAT GATEWAY)	\$57.00
AWS CLOUDWATCH	\$0.059
AWS CLOUDFRONT	\$0.058
AWS APPLICATION LOAD BALANCER	\$2.82
AWS WAF	\$0.19
AWS EC2 CONTAINER REGISTRY	\$0.11
Cost/Month	\$130.51

## Production Budget



AWS Application Load Balancer	\$25.30
Elastic Container Service (Fargate)	\$66.55
Elastic Container Registry	\$0.013
RDS MySQL	\$58.29
AWS S3	\$0.05
AWS API Gateway	\$0.09
AWS VPC (NAT Gateway)	\$116.99
AWS CloudFront	Not Applicable
AWS Lambda	\$0.23
AWS WAF	\$12.08
Amazon Route 53	\$0.51
AWS ElastiCache	\$43.06
Cost/Month	\$323.27

# System Demo (Use Cases)

---

**Register + Login  
To System**



**Search Destination  
By Location**



**Autocomplete  
Search Input**



**Book Hotel**



**View Hotels  
By Price**



**View  
Available Rooms**



**Check Booking  
Information**



# System Demo (Qualities)

## Performance



- **Destination Autocomplete Caching**
- **API Gateway Caching**
- **Local (Client) Caching**

## Availability



- **RDS Failover (Multi-AZ)**
- **ElasticCache**
- **ECS Auto-Scaling Group (70%/20%)**

## Maintainability



- **CI/CD via Github Actions**
- **Terraform**

## Security



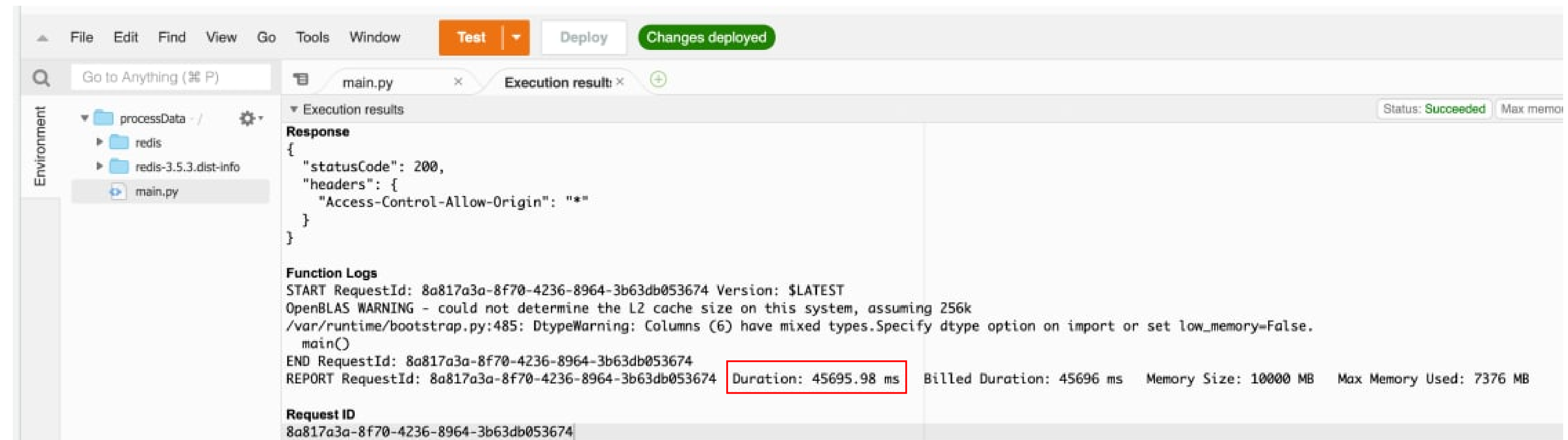
- **Mozilla Observatory B Grade**
- **OWASP Secure Coding Practices**
  - **WAF Filter Rule**
- **Separate Web & DB Servers**
  - **Revalidate Data (Server Side)**
- **Server-Side Data Revalidation**
- **Secure Password Management (Hashed With Salt)**
  - **Authentication Token**

# System Demo (Qualities)

## Performance



- Destination Autocomplete Caching
- API Gateway Caching
- Local (Client) Caching

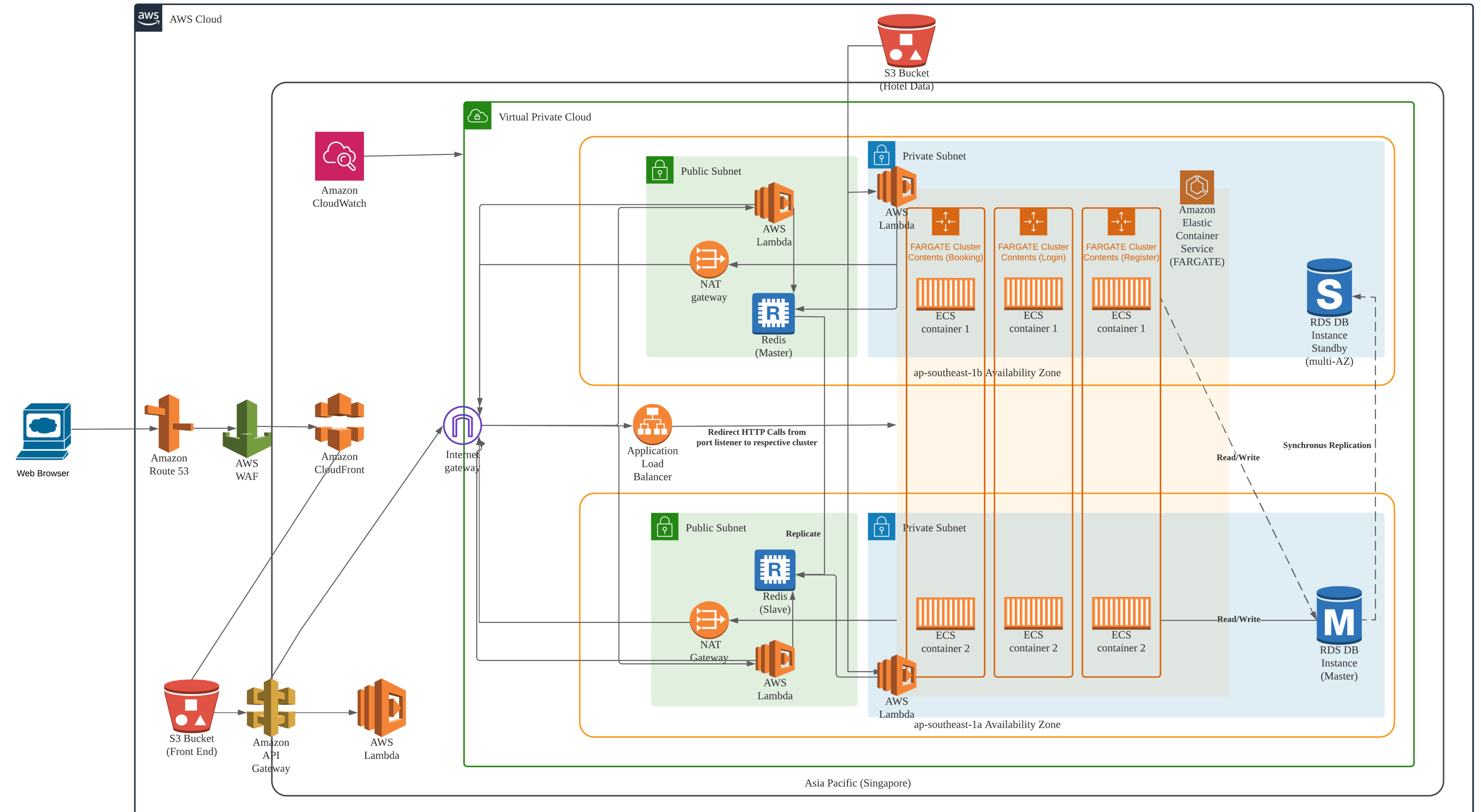


- Time Taken To Process Data: 45s
- Data Retrieval From ElastiCache (1st time load): 1.10s
- Data Retrieval From ElastiCache (1st time load, 2nd client): ~200 ms
- Data Retrieval From ElastiCache (2nd time load on any client): 0s

# System Demo (Qualities)

## Availability

- RDS Failover (Multi-AZ)
- ElastiCache
- ECS Auto-Scaling Group (70%/20%)



# System Demo (Qualities)

## Availability



- RDS Failover (Multi-AZ)
- ElastiCache
- ECS Auto-Scaling Group (70%/20%)

```
aws: error: the following arguments are required: replication-group-id
(base) junxiang@Juns-MBP aws-resources % aws elasticache test-failover --replication-group-id redis --node-group-id 0001
{
```

```
(base) junxiang@Juns-MBP aws-resources % aws elasticache describe-events
{
  "Events": [
    {
      "SourceIdentifier": "redis-002",
      "SourceType": "cache-cluster",
      "Message": "Finished recovery for cache nodes 0001",
      "Date": "2021-03-27T07:25:41.113000+00:00"
    },
    {
      "SourceIdentifier": "redis-002",
      "SourceType": "cache-cluster",
      "Message": "Recovering cache nodes 0001",
      "Date": "2021-03-27T07:23:55.568000+00:00"
    },
    {
      "SourceIdentifier": "redis-002",
      "SourceType": "cache-cluster",
      "Message": "Recovering cache nodes 0001",
      "Date": "2021-03-27T07:20:50.099000+00:00"
    },
    {
      "SourceIdentifier": "redis",
      "SourceType": "replication-group",
      "Message": "Failover from master node redis-002 to replica node redis-001 completed",
      "Date": "2021-03-27T07:20:25.814000+00:00"
    },
    {
      "SourceIdentifier": "redis-002",
      "SourceType": "cache-cluster",
      "Message": "Failover from master node redis-002 to replica node redis-001 completed",
      "Date": "2021-03-27T07:20:25.411000+00:00"
    },
    {
      "SourceIdentifier": "redis",
      "SourceType": "replication-group",
      "Message": "Test Failover API called for node group 0001",
      "Date": "2021-03-27T07:19:27.405000+00:00"
    },
  ]
}
```



# System Demo (Qualities)

Service : itsa-login-service

Cluster	BookingCluster	Desired count	2
Status	ACTIVE	Pending count	0
Task definition	itsa-login-task:34	Running count	2
Service type	REPLICA		
Launch type	FARGATE		
Service role	AWSServiceRoleForECS		
Created By	arn:aws:iam::650965765717:user/team8		

Details	Tasks	Events	Auto Scaling	Deployments	Metrics	Tags	Logs
Minimum tasks: 2		Maximum tasks: 4					
ScaleInPolicy: CPUUtilization <= 20		ScaleOutPolicy: CPUUtilization > 70					
Policy type: Step scaling		Policy type: Step scaling					
For alarm: LoginServiceScaleIn		For alarm: LoginServiceScaleOut					
Take the action:		Take the action:					
Remove 1 tasks when 20 >= CPUUtilization		Add 1 tasks when 70 < CPUUtilization					

Booking target		
5e85ba7b-bacb-489c-9d55-b34f326069a2	2021-04-08 00:52:36 +0800	Message: Successfully set desired count to 2. Change successfully fulfilled by ecs. Cause: monitor alarm BookingServiceScaleIn in state ALARM triggered policy ScaleDownPolicy
0e1bd45b-ab45-4948-95fc-a40447fc5eb4	2021-04-08 00:46:19 +0800	service itsa-booking-service has reached a steady state.
05e6216f-2cb1-4d1d-a0b5-664d649074a2	2021-04-08 00:45:58 +0800	service itsa-booking-service registered 1 targets in target-group itsa-booking-target
b3888c36-693b-4e4f-944e-3b6da32d9e23	2021-04-08 00:45:38 +0800	service itsa-booking-service has started 1 tasks: task 43342ba052fe48028b2cddf670b56f46.
f1b066af-95a3-451e-8f6e-33e895055617	2021-04-08 00:45:19 +0800	Message: Successfully set desired count to 3. Change successfully fulfilled by ecs. Cause: monitor alarm BookingServiceScaleOut in state ALARM triggered policy ScaleUpPolicy

## Availability



- RDS Failover (Multi-AZ)

- ElastiCache

- ECS Auto-Scaling Group (70%/20%)



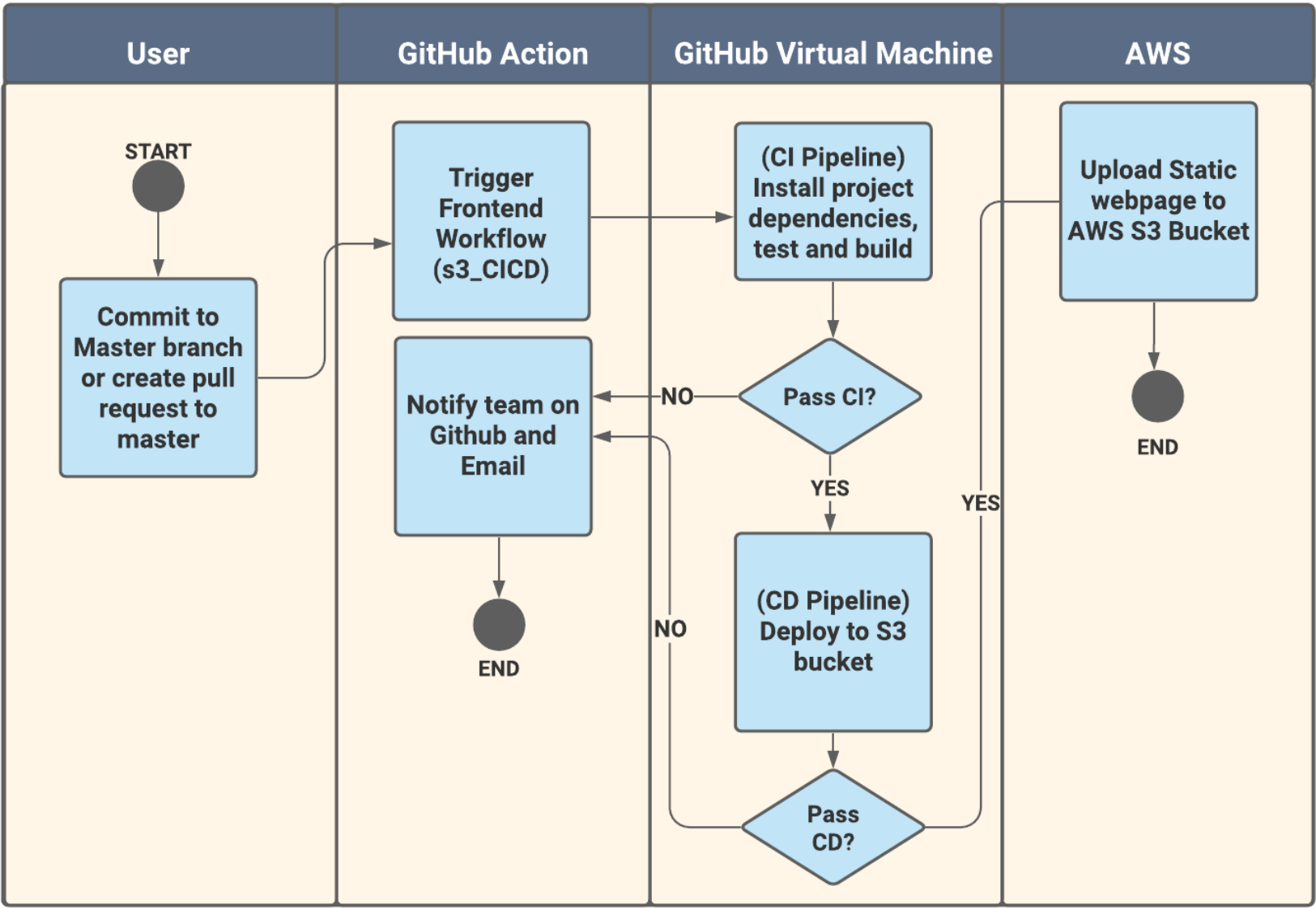
# System Demo (Qualities)

## Maintainability

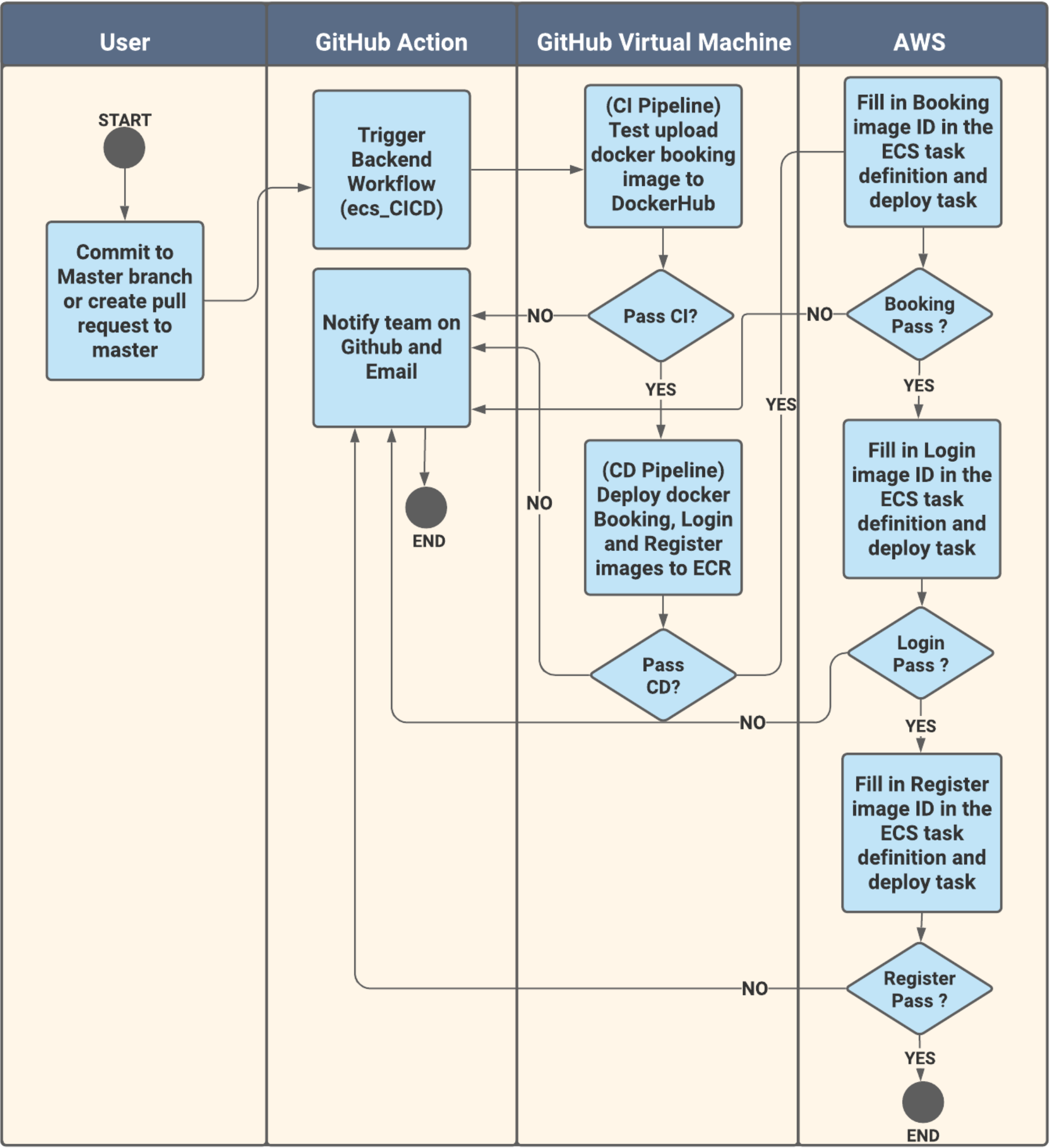


- CI/CD via GitHub Actions
- Terraform

### Frontend



### Backend



# System Demo (Qualities)

## Security

- Mozilla Observatory B Grade
- OWASP Secure Coding Practices
- WAF Filter Rule
- Separate Web & DB Servers
- Revalidate Data (Server Side)
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- Authentication Token

Observatory  
moz://a

HTTP Observatory TLS Observatory SSH Observatory This

### Scan Summary



Host:	ascendahotels.me
Scan ID #:	18583251 (unlisted)
Start Time:	April 8, 2021 3:56 PM
Duration:	9 seconds
Score:	80/100
Tests Passed:	10/11



← → ↺ 🔒 api.ascendahotels.me/backend/booking

Missing authorization token.

Server: MySQL:3306 » Database: itsa » Table: user

✓ Showing rows 0 - 3 (4 total, Query took 0.0003 seconds.)

SELECT \* FROM `user`

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

	userID	customerEmail	customerName	customerPassword	createdDate
<input type="checkbox"/> Edit Copy Delete	1	abc@apple.com	Apple Tan	\$5\$rounds=535000\$PB.l5/Dheg7SYpp8\$YWFpmmzgHkVwcquM...	2021-03-28 19:43:50
<input type="checkbox"/> Edit Copy Delete	2	ac@apple.com	Apple Tan	\$5\$rounds=535000\$HMscRuXPiS.1l2Q1\$2YTp3LoIXN8QV5RB...	2021-03-29 21:48:21
<input type="checkbox"/> Edit Copy Delete	3	a@apple.com	Apple Tan	\$5\$rounds=535000\$Yq3a/jW4BIlgrnum\$IDWYN5EanYsEB1T7...	2021-03-29 21:52:26
<input type="checkbox"/> Edit Copy Delete	4	b@apple.com	Apple Tan	\$5\$rounds=535000\$28cHH8fZwsi.7vj4\$wFThmwhAwq11amRw...	2021-03-29 21:54:12

☐ Check all | With selected: Edit Copy Delete Export

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

**Thank You**