

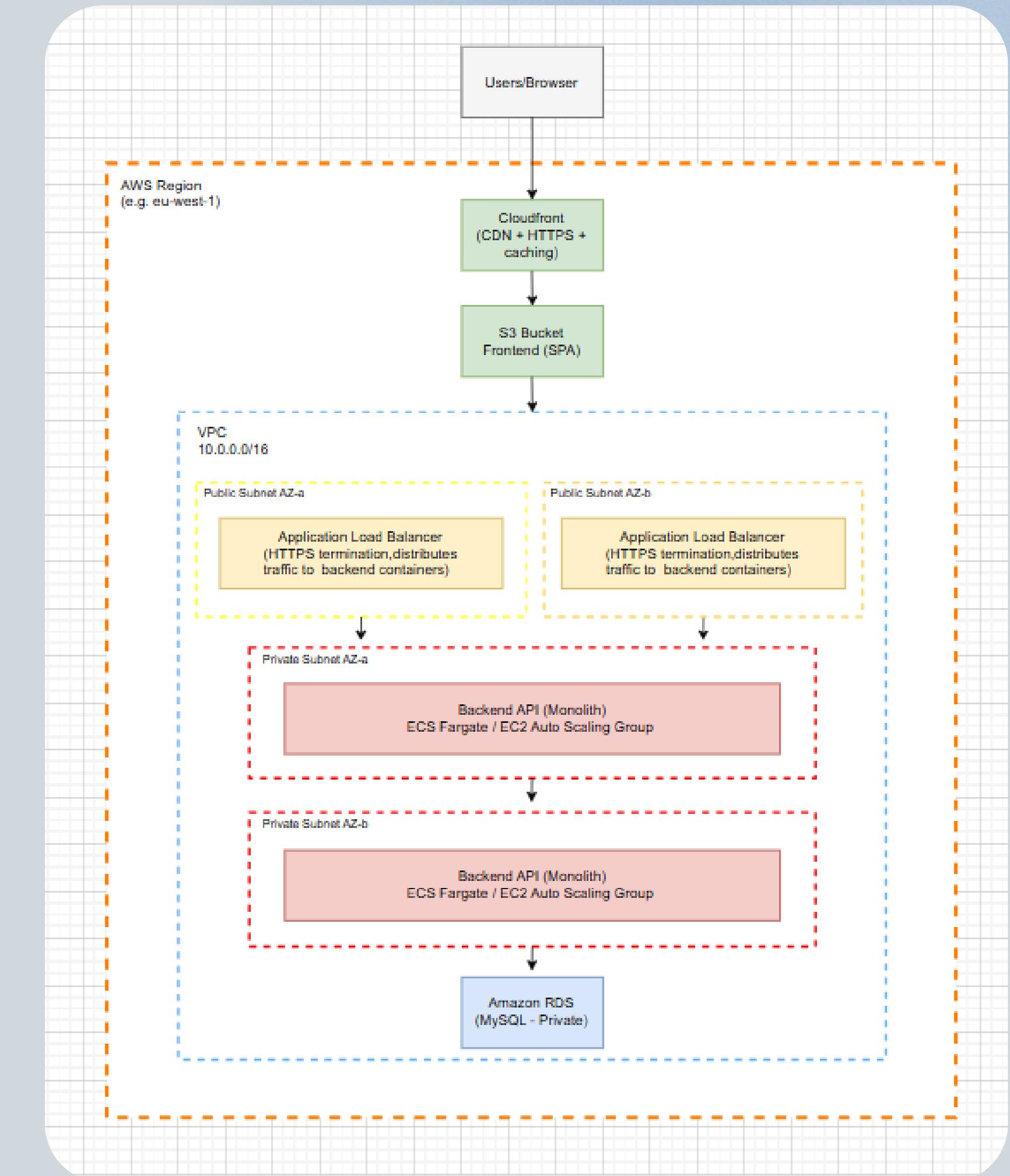
Quickbook.

AWS Scalable
Web App

Objectives

- 01** Design highly available AWS architecture
- 02** Deploy infrastructure using Terraform
- 03** Host frontend and backend securely
- 04** Implement monitoring and alarms
- 05** Control costs using AWS Budgets
- 06** Automate deployments with CI/CD
- 07** Deliver a production-ready system

Architectural Diagram



System Workflow

- User hits frontend CloudFront URL
- SPA calls API CDN
- CloudFront → ALB
- ALB → EC2 container
- EC2 → RDS
- Response returned

AWS Services Used

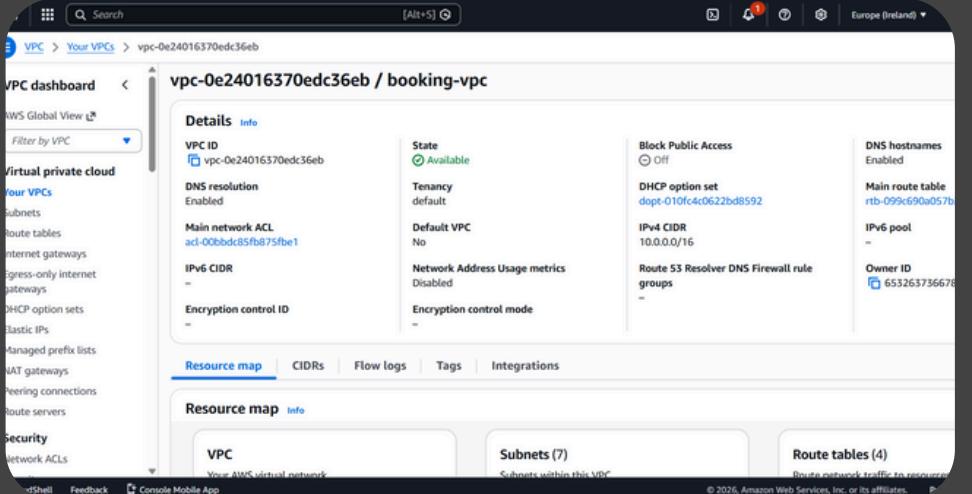
- VPC / Subnets / IGW
- EC2 Auto Scaling Group
- Application Load Balancer
- Amazon RDS
- S3
- CloudFront
- ECR
- Systems Manager Parameter Store
- CloudWatch
- AWS Budgets
- GitHub Actions
- Terraform



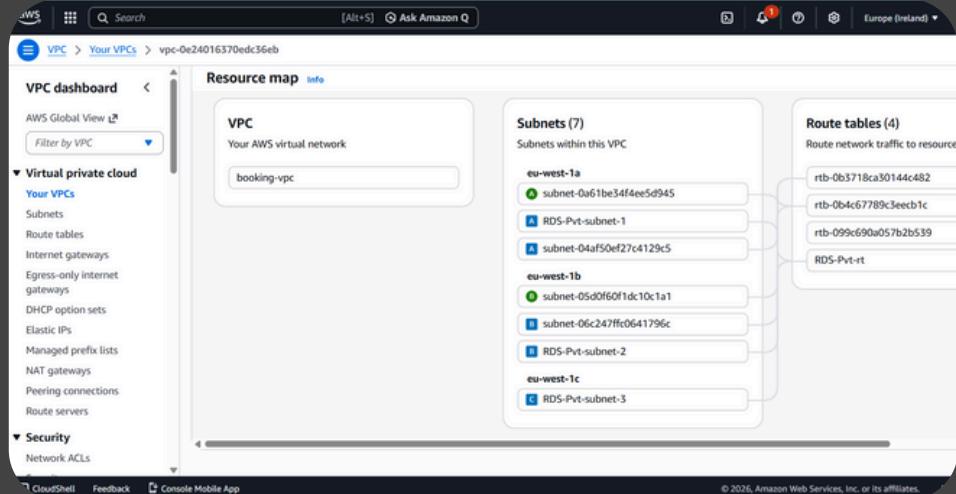
Networking Design



VPC



SUBNETS



KEY POINTS

- Database never public
- Backend isolated
- Only ALB exposed



Security Model

- **Security group chaining**
- **Least-privilege IAM roles**
- **Secrets stored in SSM**
- **HTTPS enforced**
- **No public DB access**
- **CORS restrictions**
- **Containerized workloads**



Backend Deployment

- Docker → ECR → EC2
- Launch template user-data
- ASG health checks
- Instance refresh for releases
- Node.js API
- Pulls secrets from SSM
- Auto-healing



Frontend Deployment

- **Vite build output**
- **S3 static hosting**
- **CloudFront CDN**
- **Cache invalidation**

- **HTTPS**
- **Global distribution**
- **Low latency**



The screenshot shows the AWS RDS MySQL database configuration page for a database named 'argodatabase-1'. The 'Logs & events' tab is selected. Key details shown include:

- Summary:** DB identifier: argodatabase-1, Status: Available, Role: Instance, Engine: MySQL Community, Region & AZ: eu-west-1a.
- CloudWatch alarms (1):** RDS-FreeStorageSpace, State: OK.
- Recent events (2):** Last 1 day.

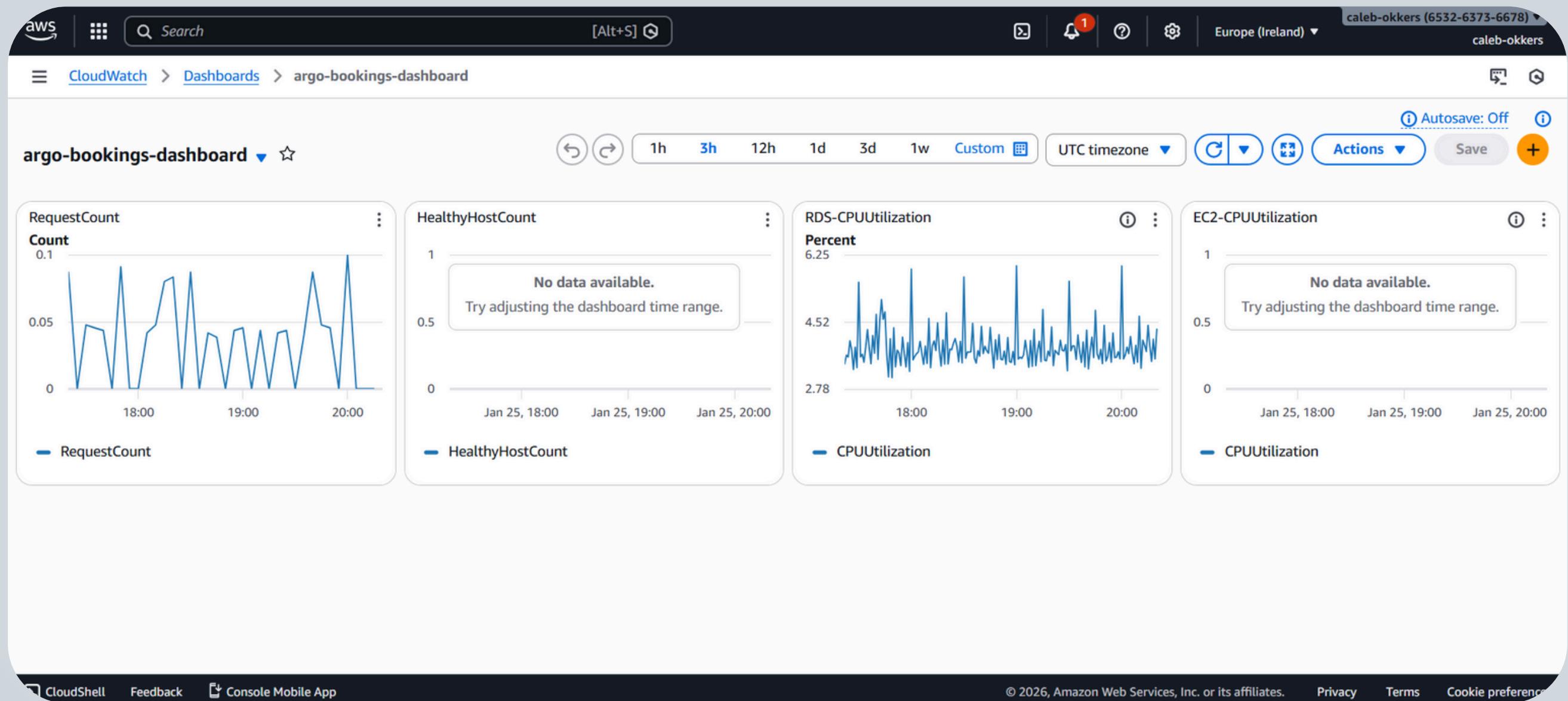
The left sidebar lists various RDS management options like Dashboard, Performance insights, Snapshots, and Proxies.

Database Layer

- **RDS MySQL**
- **Private subnet**
- **SG rules**
- **Managed backups**
- **Monitoring**
- **Security-group-only access**



- CPU utilization
- ALB healthy hosts
- RDS storage
- Request count



Monitoring Setup



- Budget alerts
- Free-tier sizing
- Auto Scaling limits

The screenshot shows the AWS Billing and Cost Management console with the following details:

Billing and Cost Management > **Budgets** > **Overview**

Budgets (1) Info

Name	Thresholds	Health status	Billing View	Budget	Amount ...	Forecasted...
My Monthly Cost Budget	Exceeded (2)	Healthy	Primary View	\$10.00	\$50.40	\$71.77

Billing and Cost Management sidebar:

- Billing View [New](#)
- Home
- Getting Started
- Dashboards [New](#)
- Billing and Payments
 - Bills
 - Payments
 - Credits
 - Purchase Orders
- Cost and Usage Analysis
 - Cost Explorer
 - Cost Explorer Saved Reports
 - Cost Anomaly Detection
 - Free Tier
- Data Exports

Bottom navigation: CloudShell, Feedback, Console Mobile App

Footer: © 2026, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Cost Optimization



- Build

- Test

- Push to ECR

- Deploy backend

- Build frontend

- Upload to S3

- Invalidate CloudFront

The screenshot shows the Argo Workflows interface for the repository 'caleb-okkers / argo-bookings'. The left sidebar has 'Actions' selected, with 'All workflows' highlighted. The main area displays 'All workflows' with the message 'Showing runs from all workflows'. It shows '2 workflow runs' with the following details:

Event	Status	Branch	Actor
35 minutes ago	Success	main	caleb-okkers
35 minutes ago	Success	main	caleb-okkers

Each run is labeled 'Finalize AWS scalable web app deployment' and includes a commit hash (8f6602b) and the user who pushed it (caleb-okkers). There are also links to the Frontend and Backend workflow definitions.

CI/CD Pipeline



- Simple Booking App
- Mobile First/ Responsive
- Smooth UI
- Quick to Market

Quickbook
Simple appointment booking

+ Add Booking

Upcoming Appointments

Jane Doe Consultation 20/01/2026 Tuesday 12:00 – 12:25 Edit Cancel	Alex Brown Coaching Session 22/01/2026 Thursday 11:30 – 11:55 Edit Cancel	John Smith Investor Meeting 22/01/2026 Thursday 12:30 – 13:00 Edit Cancel	Alice Johnson Presentation 25/01/2026 Sunday 10:00 – 10:25 Edit Cancel	Charlie Lee Consultation 25/01/2026 Sunday 12:30 – 12:55 Edit Cancel
--	---	---	--	--

Deployed App



Scalability & Resilience

- ASG self-healing
- ALB load balancing
- CDN caching
- Horizontal scale ready
- Multi-AZ capable DB



Limitations

Honest constraints:

- Single EC2 instance
- No Redis cache yet
- IAM OIDC not implemented
- No WAF
- Local logs only



Future Improvements

Roadmap:

- ECS/Fargate
- ElastiCache
- ACM custom domains\
- GitHub OIDC
- Blue/green deploys
- WAF
- Central logging



Lessons Learned

- Terraform dependency management
- CORS and HTTPS issues
- SG chaining
- CloudFront invalidations
- Secure secrets handling
- Debugging networking



Final Demo Links

- Frontend URL
- API endpoint
- GitHub repo
- Architecture diagram



Presented by:
Caleb Okkers

**Thank
You**

for your time
and attention