ECS Architecture & Business Proposal (ap-south-1)

1. Executive Summary

This document presents the high-level architecture, cost analysis, operational workflow, scaling strategy, rollback mechanisms, CI/CD integration, load balancing, and CloudFront configuration for deploying applications using Amazon ECS in ap-south-1 (Mumbai region).

2. Cost Estimation (ap-south-1)

Component	Estimated Monthly Cost (Approx)
EC2 (2 x c5.large)	$140 - $160
Application Load Balancer	$20 - $25
ECR Storage	$5 - $10
Data Transfer	Depends on usage
CloudFront (Optional)	Based on traffic

3. Benefits of ECS

- Container-based architecture for consistency across environments
- Precise CPU and memory allocation per container
- Better cost optimization through resource packing
- Supports microservices and monolithic architectures
- Enterprise-grade deployment strategies (blue/green, rolling updates)
- Auto rollback using deployment circuit breaker
- Deep integration with AWS ecosystem

4. Scaling Strategy

- Horizontal scaling based on CPU/Memory metrics
- Auto Scaling policies triggered via CloudWatch
- Independent scaling per service
- Fast scale-out compared to traditional VM scaling

5. Auto Rollback Mechanism

ECS supports automatic rollback using deployment circuit breaker. If new tasks fail health checks, ECS automatically reverts to the last stable task definition revision.

6. CI/CD Integration (Jenkins + ECR + ECS)

- Developer pushes code to Git
- Jenkins builds WAR file
- Docker image is built
- Image pushed to ECR
- ECS task definition updated
- Rolling deployment initiated

7. Load Balancing & Task Configuration

- Application Load Balancer distributes traffic across containers
- Health checks ensure traffic only to healthy tasks
- Task Definition defines CPU, memory, environment variables, secrets
- Security groups control traffic between ECS, DB, Cache

8. CloudFront Configuration

- CloudFront placed in front of ALB
- Improves global latency
- Provides edge caching
- Enables WAF integration
- SSL certificate via ACM (us-east-1 required)

9. Additional Enterprise Considerations

- Use private subnets for ECS tasks
- Use Secrets Manager for DB credentials
- Enable CloudWatch logging and monitoring
- Implement WAF for security
- Consider Savings Plans for cost optimization