AWS CLOUDATHON

Cloud Computing Architecture and Implementation Report

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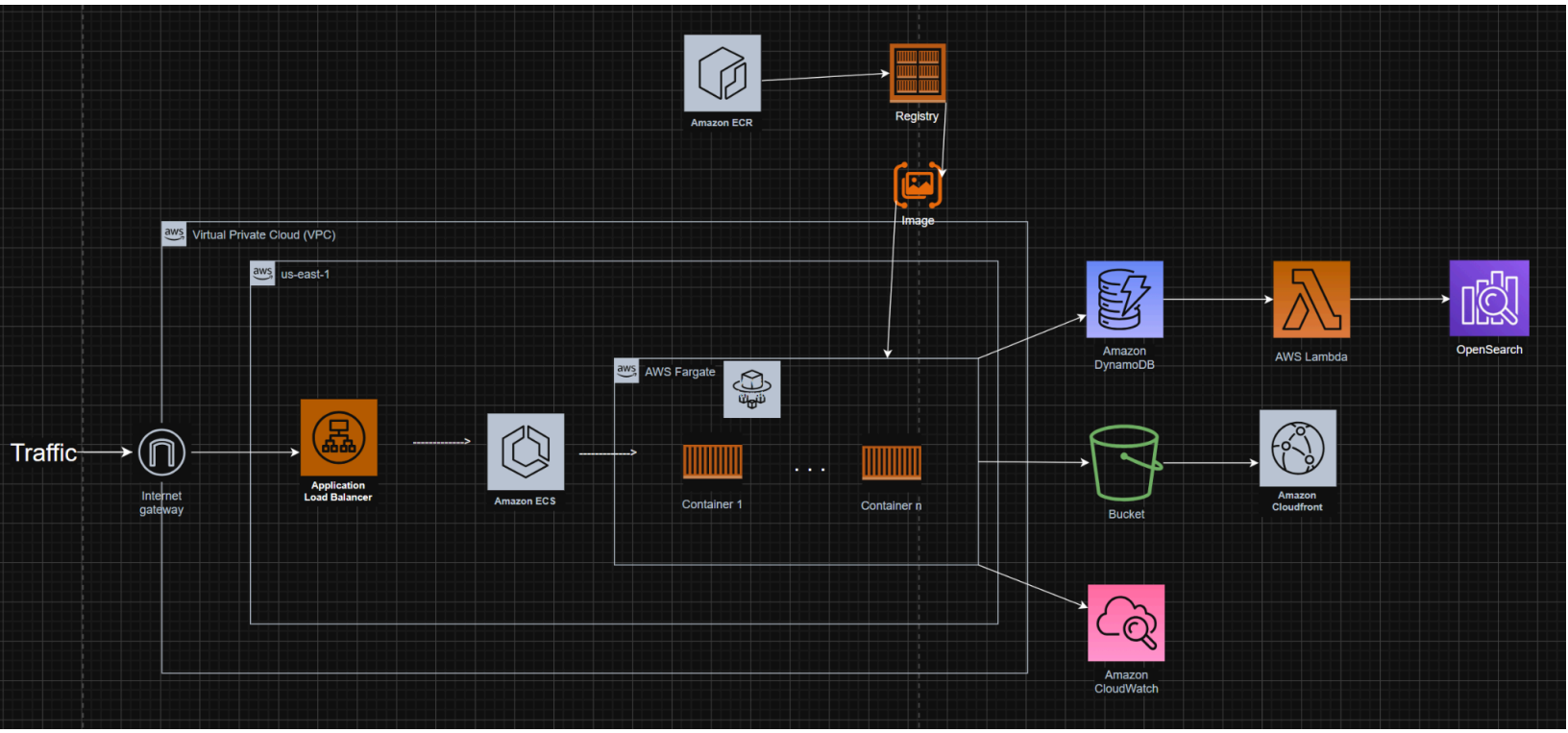
Architecture Diagram



Purpose and Benefits

Goals:

1. Horizontal scaling
2. Low latency (i.e. positive user experience)
3. Zero downtime deployment
4. Version control and snapshots/rollbacks for failing deployments
5. Analytics & Business Intelligence

Services Used	Benefits
Application Load Balancer	Distributes incoming requests

	SSL termination, saving latency as we offload this heavy operation from our application servers
ECS w/ Fargate	Horizontal scaling, managed by ECS Auto scales according to load, minimizing cost during times of low load Zero downtime deployment where newly-created tasks will contain the latest updates and the old tasks will stop
ECR	Stores built images. We are uploading image manifests with the option to use different computer architectures. We choose linux/ARM64. Language-agnostic and portable across systems
CloudWatch	Application logging; with integration with X-Ray for distributed tracing
S3	Near-infinite object storage
CloudFront	CDN to ensure low latency, serving S3 items
DynamoDB	Predictably performant, no matter the volume of data Pricing model is based on read/write data amount. Lowers cost to scale with load on demand; however, we can also have provisioned mode if we desire. Request-based, so no need for connection limit considerations or maintenance overhead NoSQL, so flexible schema to accommodate further extensions if AnyCompany desires to expand to new sectors
OpenSearch	OLAP system for analytics and business intelligence.

	Schema-less, with significant freedom and flexibility of querying and searching capabilities
CloudFormation	Rolling updates to minimize downtime Stores stack state in S3 bucket, establishing version control on infrastructure Rollback on failing infrastructure deployment
AWS SAM	The IAC template language we use to create and configure CloudFormation stacks Packages code in containers, allowing freedom to choose languages and system

Configuration Options and Reasoning

Regarding AnyCompany's pain points and concerns, we have taken several points into consideration: scalability, latency, deployment, security, and cost. With that, we have established five goals as pointed out above.

- Horizontal scaling
- Low latency (i.e. positive user experience)
- Zero downtime deployment
- Version control and snapshots/rollbacks for failing deployments
- Analytics & Business Intelligence

AnyCompany already has the following set up: on-premises web server fleet, database backend for persistent storage, and log processing jobs for usage analytics. We will detail our choices and outline a potential migration to a cloud-based architecture. We use ALB and ECS with Fargate to address horizontal scaling. We recognize that there is cold-start latency associated with starting up Fargate tasks, so we use DynamoDB to utilize its predictably-performant capabilities. We use S3 and cloudfront to lower latency on the client side. We use CloudFormation and AWS SAM to address the deployment pain points and gain zero downtime, version control, and rollbacks. We utilize DynamoDB as the OLTP system and OpenSearch as the OLAP system. We accordingly use DynamoDB

Streams as ELT into OpenSearch.