



Mentoring Activity: AWS MERN Stack Blog App Deployment Lab

Objective

Design and deploy a scalable MERN stack blog application using AWS services within the free-tier limits. This lab emphasizes hands-on infrastructure setup, secure configuration, and deployment automation using EC2, ALB, ASG, S3, and MongoDB Atlas.

Tasks Overview

1. **Design Architecture** – Draft and review the system architecture diagram.
 2. **VPC Setup** – Create a custom VPC with public subnets.
 3. **Security Configuration** – Set up IAM roles, policies, S3 bucket permissions, and security groups.
 4. **MongoDB Atlas Setup** – Use MongoDB Atlas cluster as the application's primary database.
 5. **S3 Configuration** – Create buckets for frontend and media uploads with public access and proper CORS settings.
 6. **Launch Template for Backend** – Define an EC2 launch template.
 7. **Backend Server Setup with ASG & ALB** – Deploy backend instances with Auto Scaling Group and expose them using Application Load Balancer.
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Project Requirements

◇ Networking

- Create a **custom VPC** with:
 - At least two **public subnets** in `eu-north-1`
 - An **Internet Gateway** attached
 - Route tables configured for internet access

◇ Compute

- Create a **Launch Template** using a t3.micro EC2 instance and Ubuntu 22.04 AMI
- Configure an **Auto Scaling Group (ASG)** using the launch template
- Configure an **Application Load Balancer (ALB)** to route HTTP traffic to backend servers in ASG

◇ Manual Installation

- Use SSH to connect to EC2 instances created via ASG
- Manually install Node.js, configure backend, and run using PM2

◇ Database

- **MongoDB Atlas:**

- Configure a free-tier cluster
- Add ALB IP range to access list
- Use connection string in backend `.env`

◇ **Storage**

- **S3 (Frontend)**: Host static React frontend
- **S3 (Media)**: Store user-uploaded content
 - Public access policy
 - Proper CORS settings

◇ **Security**

- Create **IAM User** for S3 media programmatic access
- Use **environment variables** to store sensitive data
- Set up **Security Groups** for EC2 and ALB:
 - Allow ports 22, 80, and 5000

Deliverables

1. Architecture Diagram
2. Terraform scripts for:
 - VPC
 - Security Groups
 - EC2 Launch Template
 - ASG
 - ALB
 - S3 Buckets
3. Manual deployment proof (screenshots):
 - PM2 backend status
 - MongoDB Atlas cluster
 - ALB DNS URL serving backend
 - S3 public URL loading frontend

Success Criteria

- MERN app runs and accepts blog posts/media uploads
- MongoDB Atlas properly connected and used
- ALB exposes backend securely with multiple instances managed by ASG
- S3 hosts frontend and serves media publicly
- SSH access used to configure and run the backend manually