**Problem statement:**   
  
The Operate Edge project lacks end-to-end infrastructure automation using Terraform. While the project is managed in Azure DevOps, the team wishes to transition to GitHub and GitHub Actions to improve integration, flexibility, and alignment with modern DevOps practices. There is a need to establish a fully automated pipeline that includes infrastructure provisioning, Docker image builds, and Kubernetes deployments, which will significantly enhance consistency, reduce manual effort, and streamline the overall delivery process.

**Pain Points:**

**End to End Infrastructure and Application deployment Automation:**

* There’s no integrated pipeline for infrastructure creation, image build, and app deployment.
* Separate, manual processes reduce delivery speed and consistency.

**Increased Operational Overhead**

* Manual setup and lack of reusable modules increase team workload.
* Repetitive tasks are prone to drift and misconfiguration.

**Limited Scalability and Reusability**

* The current setup isn’t optimized for scale or reuse across environments.
* Missing modular automation makes future expansion difficult.

**Solution Implemented:**

**Internal GitHub Self-Hosted Runner Setup**

* A GitHub self-hosted runner was deployed in a **private subnet**, ensuring all jobs run internally and securely.
* This eliminates the need for public exposure and improves security posture.

**2. Modularized Terraform Codebase**

* All Terraform snippets were **modularized**, making the codebase reusable and easier to manage.
* This allows for seamless deployment of Operate Edge across **multiple customer environments**.

**3. End-to-End Automation Achieved**

* Infrastructure provisioning, **database installation**, **Docker image builds**, and **application deployment** are all fully automated.
* This significantly reduces manual effort, speeds up delivery, and ensures consistency across environments.

**Value additions:**

* End-to-end automation drastically reduced deployment time and eliminated manual bottlenecks.
* Modular Terraform code allows easy replication of infrastructure for multiple customers with minimal effort.
* Private GitHub runner setup ensures all workflows run within a secure network boundary, aligning with security best practices.
* Full automation of infra, database, and application layers reduced team workload and improved consistency across environments.