

Project Proposal: CloudMatrix - Multi-Cloud Asset Inventory & Monitoring Platform

1. Overview

CloudMatrix is a cloud-agnostic, agentless asset inventory and monitoring platform designed to provide unified visibility, compliance,

2. Goals & Objectives

- Continuously discover and normalize cloud assets across all major CSPs.
- Offer near real-time updates using event-driven harvesting.
- Provide advanced filtering, search, and custom insight/policy enforcement.
- Design for future extensibility with AI/ML-powered modules.
- Support agentless onboarding and least-privilege access.
- Ensure easy deployment (without Kubernetes), extensibility, and developer-friendly APIs.

3. Core Components

a. Cloud Integrators

- AWS: IAM Role (read-only), CloudTrail/EventBridge
- Azure: Service Principal, Event Grid
- GCP: Service Account JSON or Identity Federation, Cloud Asset Inventory (Pub/Sub)
- OCI: IAM User or Dynamic Group, Audit Log Polling

b. Harvesting Engine

- Polling-based resource enumeration per CSP API
- Configurable by region, resource type, and frequency

c. Event Listener System

- Asynchronous event ingestion
- Resource update triggers on creation/modification/deletion
- Managed with Redis/SQS + background workers

d. Normalization Service

- Abstract cloud-specific resource types (e.g., EC2, GCE) into a unified model
- Store native fields and normalized fields

e. Inventory API

- RESTful service using FastAPI
- Endpoints for asset retrieval, filtering, insights, search

f. Admin UI

- Built with React + Tailwind
- Real-time dashboard for resource inventory
- Filters by cloud, type, region, tag, and risk

g. Policy Engine

- Rules-based insights (e.g., unencrypted buckets, public VMs)
- Custom rule creation via UI or JSON
- Periodic or event-triggered evaluations

h. Storage

- PostgreSQL or cloud-native equivalent (Cloud SQL, RDS)
- Redis for caching and real-time queues
- Optional: MinIO/S3-compatible blob storage for raw config snapshots

... (continues with AI/ML extensions, deployment strategy, roadmap, security, metrics)