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TechSprint

Leveraging the power of AI

Team Details

a. Team Name - EterTech
b Team Leader Name - Shashwat Shekhar
ç Problem Statement- AI Data Pipeline Failure Detection & Resilience
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Problem Statement

How can we proactively detect, measure, and heal silent data schema changes in complex AI data pipelines before they cause large-scale system and financial failures?

How Project Aegis Solves This

> Detects schema drift before models fail
>
> - Calculates blast radius using data lineage graphs
> - Converts technical risk into a Data VIX score
> - Uses AI to generate instant SQL-based remediation
> - Keeps systems alive even during partial failures

Exisiting Project		Our Project
Great Expectation	Monte Carlo	Aegis
detects after pipeline run → minutes to hours	detects via monitoring → 5–30 minutes	impact calculated via graph traversal → < 500 ms ~100× faster impact awarenes
Blast Radius Visibility-1 table at a time	Blast Radius Visibility-affected assets list (limited context)	full lineage graph → Source → Staging → Warehouse → AI → 100% downstream systems mapped
Business Impact Quantification none	qualitative severity	Aegis: single numeric risk score (Data VIX: 0–100) Normal: ~12 Systemic failure: 99+
Recovery Time-manual fix → hours–days	alert + human response → hours	Aegis: AI-generated SQL virtual patch → < 1 minute,-95% downtime reduce One-Line Kill Shot

How Project Aegis Solves the Problem

- Builds a complete data lineage graph across sources, warehouses, and AI models
- Simulates schema changes (column rename/removal) instead of waiting for real failure
- Calculates blast radius using graph traversal in < 500 ms
- Converts technical failures into a numeric risk score (Data VIX: 0–100)
- Uses AI to generate SQL virtual patches (CREATE VIEW) to restore compatibility
- Keeps AI models and dashboards running without downtime
- Reduces recovery time from hours/days → seconds

Key Features Offered by Project Aegis

- Data Lineage Visualization across Source, Staging, Warehouse, and AI layers
- Schema Drift Simulation without affecting production data
- Real-Time Blast Radius Analysis using graph traversal
- Data VIX Risk Score (0–100) to quantify system and business impact
- AI-Powered Remediation with auto-generated SQL virtual patches
- One-Click Global Heal to restore entire data pipelines instantly
- Interactive Schema Inspector for column-level failure analysis
- Resilient Execution Mode with frontend failover support

+ Google Technologies used in the solution

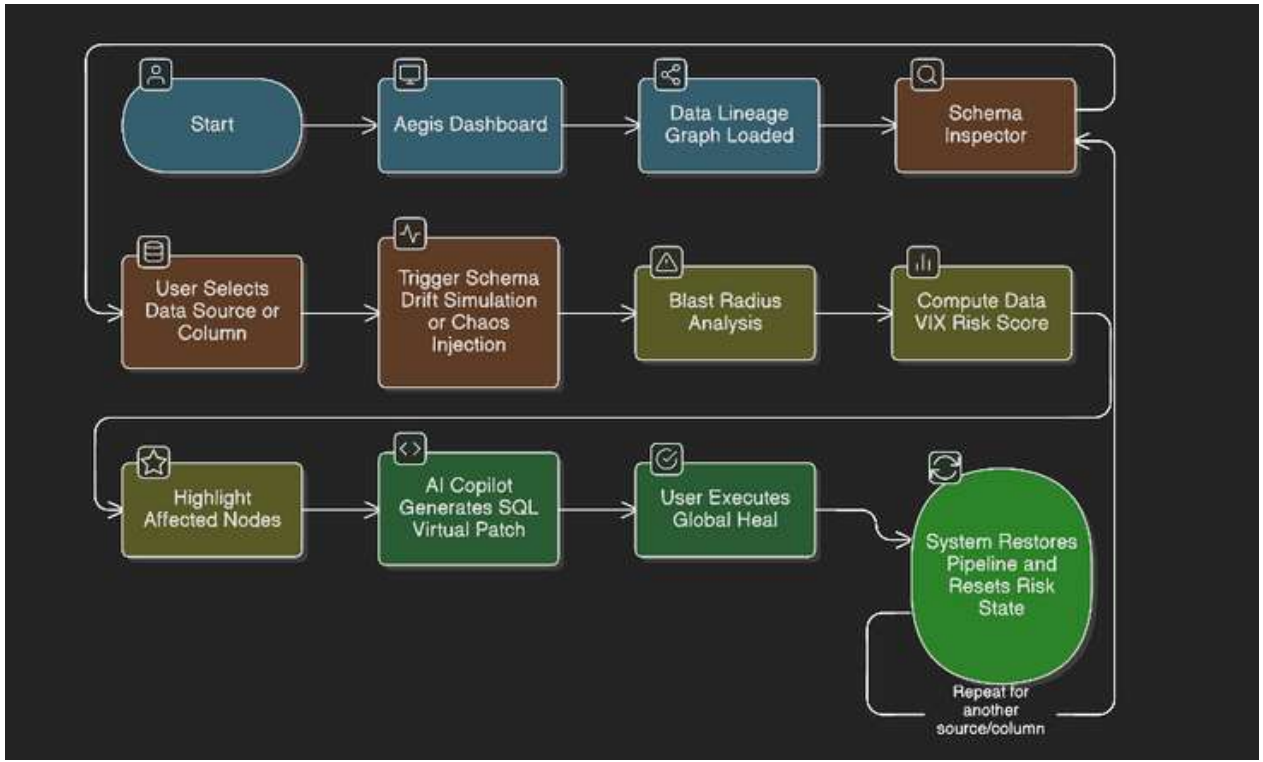
Google Cloud Run
– Serverless backend hosting with auto-scaling and scale-to-zero

Google Container Registry (GCR)
– Storage and deployment of Dockerized frontend & backend images

Google Cloud Platform (GCP)
– End-to-end cloud infrastructure for deployment and execution

Google Cloud IAM
– Secure access control for cloud resources (implicit via GCP)

Process flow diagram or Use-case diagram



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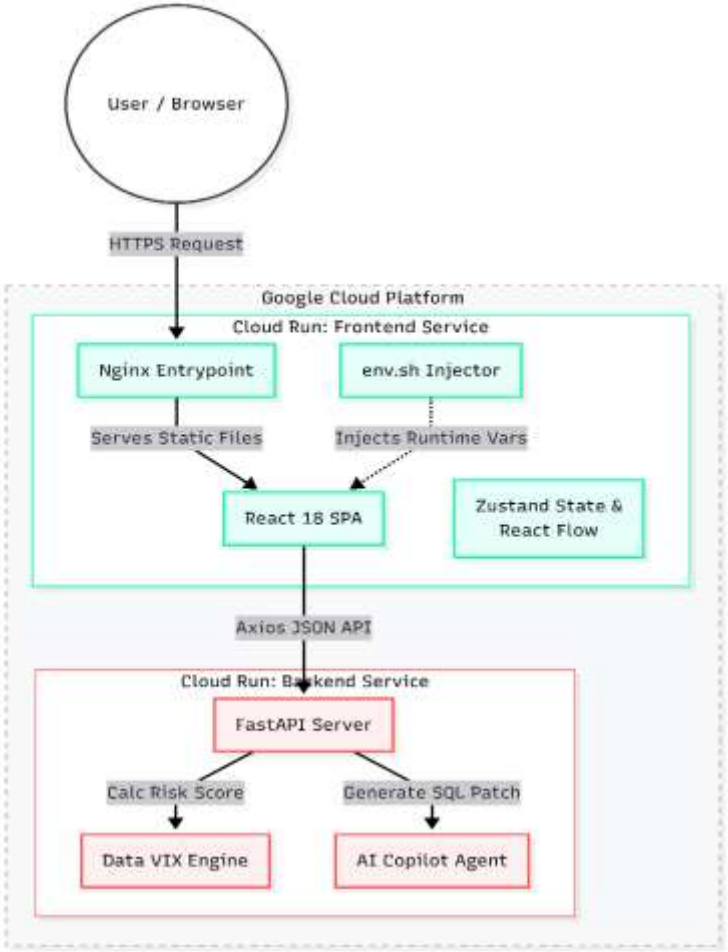
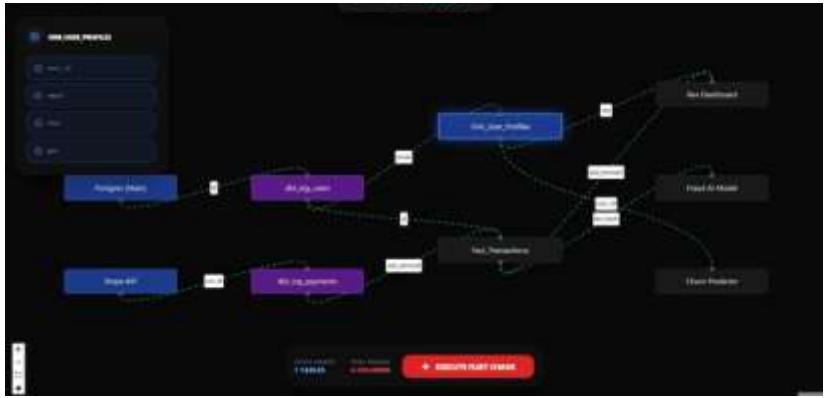
Architecture diagram of the proposed solution

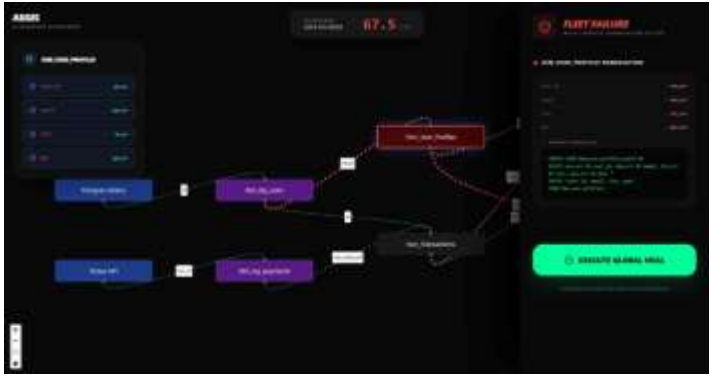


Snapshots of the MVP

AI Mode

Images





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Additional Details/Future Development

Future development of Project Aegis will focus on expanding from schema-level risk detection to full enterprise data-risk governance. Planned enhancements include automated integration with production data catalogs and orchestration tools (e.g., dbt, Airflow), continuous background monitoring for proactive risk alerts, and role-based dashboards tailored for executives, engineers, and SRE teams.

The Data VIX metric can be extended to incorporate historical trends, financial impact estimation, and alert thresholds for automated incident response. Additionally, the AI Copilot will evolve to support multi-step remediation workflows, approval gates, and integration with CI/CD pipelines to prevent high-risk changes from reaching production.

These enhancements position Aegis as a systemic risk control layer for modern data and AI platforms, not just a monitoring tool.

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Provide links to your:

1. **GitHub Public Repository Demo -** https://github.com/DeveshMudaliar1/Aegis-platform
2. **Video Link - https://www.youtube.com/watch?v=fAV8Jt_0nO8**
3. **MVP Link- https://aegis-frontend-1079363418946.us-central1.run.app/**