FROM REACTION TO PREDICTION- AN AI POWERED EARLY WARNING SYSTEM FOR WILDFIRE RESPONSE

TEAM NO: GAT027

TEAM ALPHA

TEAM MEMBERS	ROLE
HARSHAVARDHAN MG	Team Lead: Responsible for selecting, implementing, and optimizing the core deep learning models
P PRAVEEN RAJ	Responsible for designing and maintaining the complex data pipeline
RISHITH P	Responsible for setting up the K-Fold cross-validation scheme
SUMUKHA K	Responsible for translating the technical model output the into an intuitive, real-world representation

PROBLEM STATEMENT

Every year, wildfires grow more ferocious, consuming homes, devastating ecosystems, and costing lives. Firefighters are heroes, but they are often forced to be reactive, chasing a blaze that's already raging. The critical gap isn't in their bravery, but in their foresight. They need to know not just where the fire is, but where it will be tomorrow. This project tackles that challenge head-on.

SOLUTION

- We are building a **24-hour early warning system** for wildfire spread. Our solution is a deep learning model that acts like a weather forecast for fire, predicting its perimeter on a granular, **500-meter grid**. It provides an actionable intelligence map that allows emergency services to move from a reactive to a proactive stance—allocating resources, planning evacuations, and establishing containment lines before the fire arrives.

- Engineered a **deep learning model** that forecasts wildfire perimeters with 24-hour lead time, turning emergency response from **reactive to proactive** decision-making.

WOW FACTORS

- Designed a **24-hour AI-driven wildfire early warning system** using deep learning to forecast fire spread on a **granular 500m grid**, enabling proactive evacuation and containment planning.
- Leveraged the **IBM LinuxONE framework** for handling **massive geospatial and environmental datasets** with exceptional speed, reliability, and security.
- Implemented complex **data fusion and feature engineering** on the **Next Day Wildfire Spread dataset**, integrating variables like topography, vegetation, and weather for high-accuracy predictions.
- Showcased **end-to-end innovation** — from problem framing to deployment — demonstrating how **enterprise AI on IBM Z** can create **real-world social impact** in disaster management.

LET'S JUMP INTO THE DEMO!

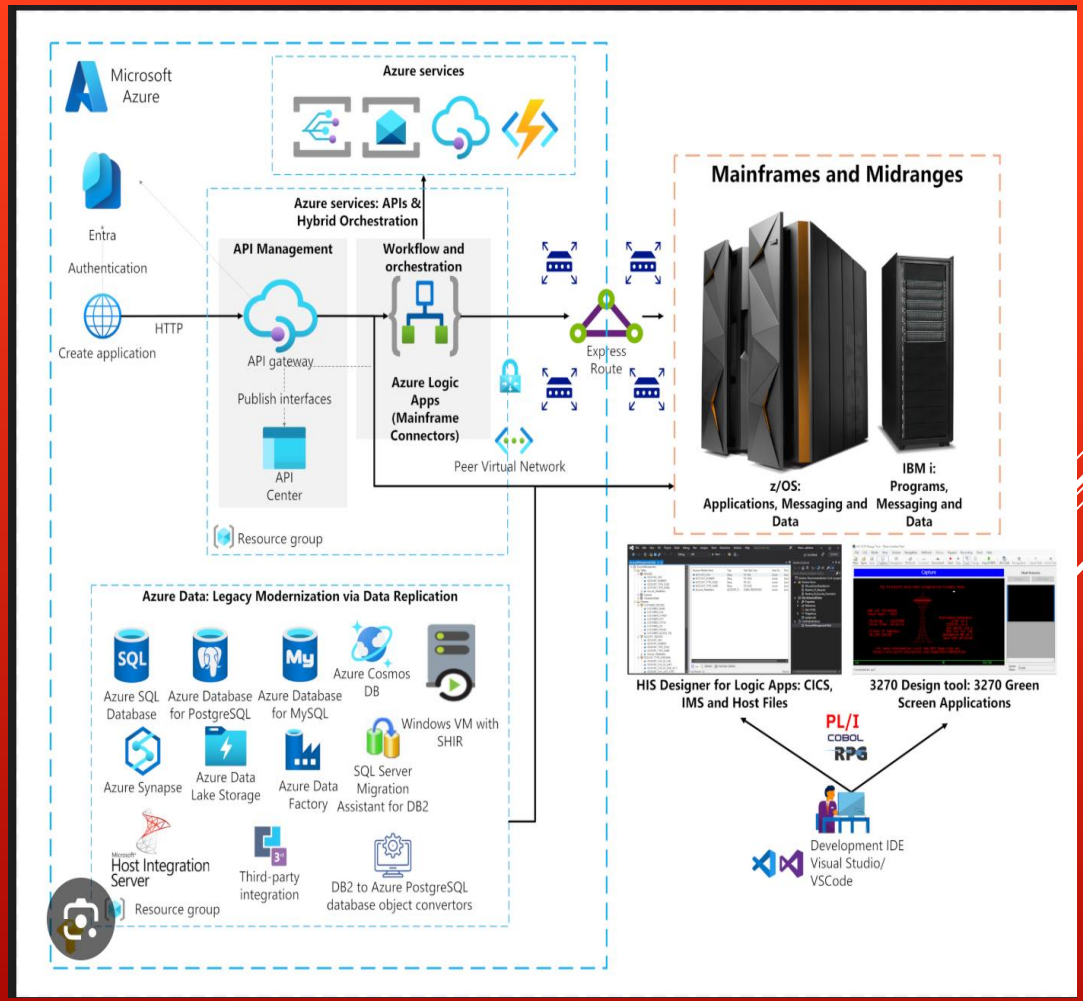
LEARNINGS DURING DATATHON

- The IBM Z Datathon 2025 gave me a deep dive into **high-performance data computing** using the IBM LinuxONE framework. I learned how **enterprise Linux systems manage massive workloads, ensure top-tier security, and deliver unmatched performance**. The event pushed me to experiment with data handling, analytics, and optimization on one of the most powerful architectures ever built. It was a transformative experience that proved how **mainframe technology fuels the future of intelligent data systems**.

- Beyond the tech, the datathon sharpened my **problem-solving, teamwork, and critical thinking** skills under tight deadlines. It was a true hands-on journey that showed how **data, cloud, and AI converge on powerful IBM infrastructure** to solve real-world challenges

IBMZ Framework

- Enables efficient training of deep learning models on large geospatial wildfire datasets through high-performance computing and fast I/O.
- Ensures continuous, reliable operation during emergencies for accurate real-time wildfire predictions.
- Utilizes LinuxONE's vertical scalability to handle heavy traffic securely while keeping all sensitive data encrypted during processing.



THANK YOU!