MICHIGAN STATE UNIVERSITY

Beta Presentation

Weather Monitoring and Impact Assessment

The Capstone Experience

Team NetJets

Imad Nasser
Jeet Jhaveri
Omar Almazrouei
Joseph Robertson
Sai Marusoupali
Raj Ambekar

Department of Computer Science and Engineering
Michigan State University

Fall 2025

From Students…
…to Professionals

Project Overview

- Monitor live flights for potential risks and analyze historical flights to assess unforeseen weather events
- Interactive web based application that displays weather, flights, risk zones, and plane risk levels
- Historical records of flight paths with weather displayed along the routes with playback
- Anticipate and mitigate flight risks with knowledge of path risks and review past plane paths for unknown variables

Team Member's Technical Tasks

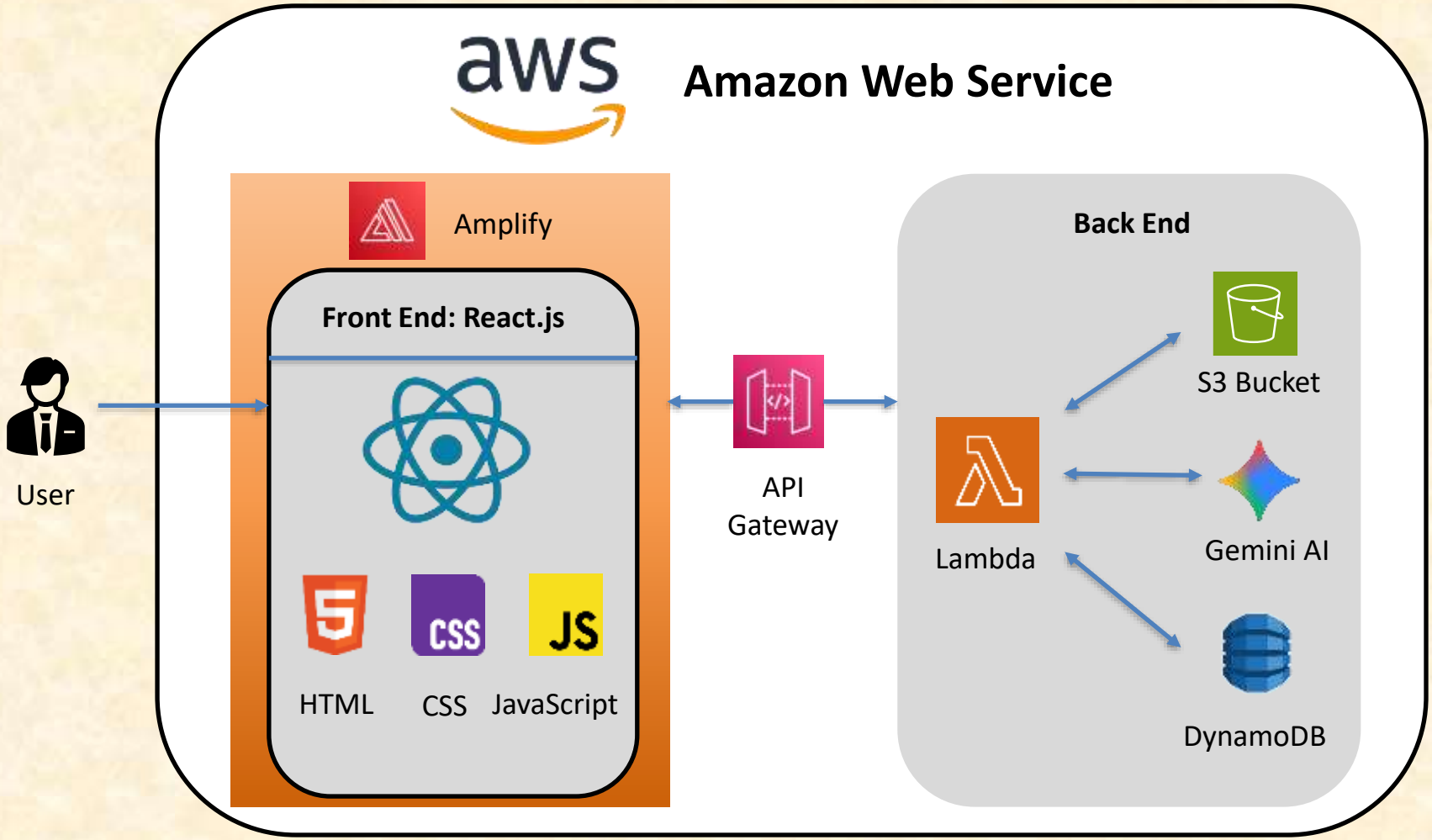
Technical Tasks Assigned

- Imad Nasser
  - Create site structure
  - Integrate satellite map into site and add weather to weather map
  - Create settings menu and script to create mock historical record
- Omar Almazrouei
  - Add NetJets Planes on the Webpage
  - Color the Planes based on live weather
  - Add an alert notification for planes that are risky
  - Add inbound flights with ETA on airports popup
- Joseph Robertson
  - Implement caching for current weather using AWS S3
  - Implement AWS Lambda functions to show historical data
  - Create chat bot to handle historical data
- Jeet Jhaveri
  - Build the Zone map
  - Build the Max map
  - Calculate the flights prospective destination
- Sai Rohan Morusupalli
  - Get planes to show up on the map in real-time
  - Implement filtering system for flights and risk zones
  - Verify flight origin and destination using third party API
  - Cache API data locally for cost and financial efficiency
- Raj Ambekar
  - Research and add weather data APIs
  - Back-end database management
  - Configure the historical records for planes and sync with weather

Technical Tasks Completed

- Imad Nasser
  - Created website structure
  - Integrated all three map types (satellite, weather, zone) into site with weather options
  - Created settings menu and script to created mock historical record
- Omar Almazrouei
  - Added NetJets flights on the Webpage
  - Made the planes change color based on live weather
  - Added an alert notification with a panel of all risky flights
  - Added inbound flights with ETA on airports popup
- Joseph Robertson
  - Implemented AWS Lambda functions to store and query historical data
  - Implemented multiple Lambda functions to store and query historical weather data
  - Created a chat bot to query historical data
- Jeet Jhaveri
  - Created the Zone map to showcase risky areas.
  - Created the max map to showcase risky areas to oversee for the day
  - Calculated a flights prospective route based on an approximated destination.
- Sai Rohan Morusupalli
  - Got planes to show up on the map in real-time
  - Implemented filtering system for flights and risk zones
  - Verified flight origin and destination using third party API
  - Cached API data locally for cost and financial efficiency
- Raj Ambekar
  - Added weather APIs to be used on the main map features9
  - Back-end database management for planes historical data collection and organization
  - Configured the historical records for planes and synced with weather playback

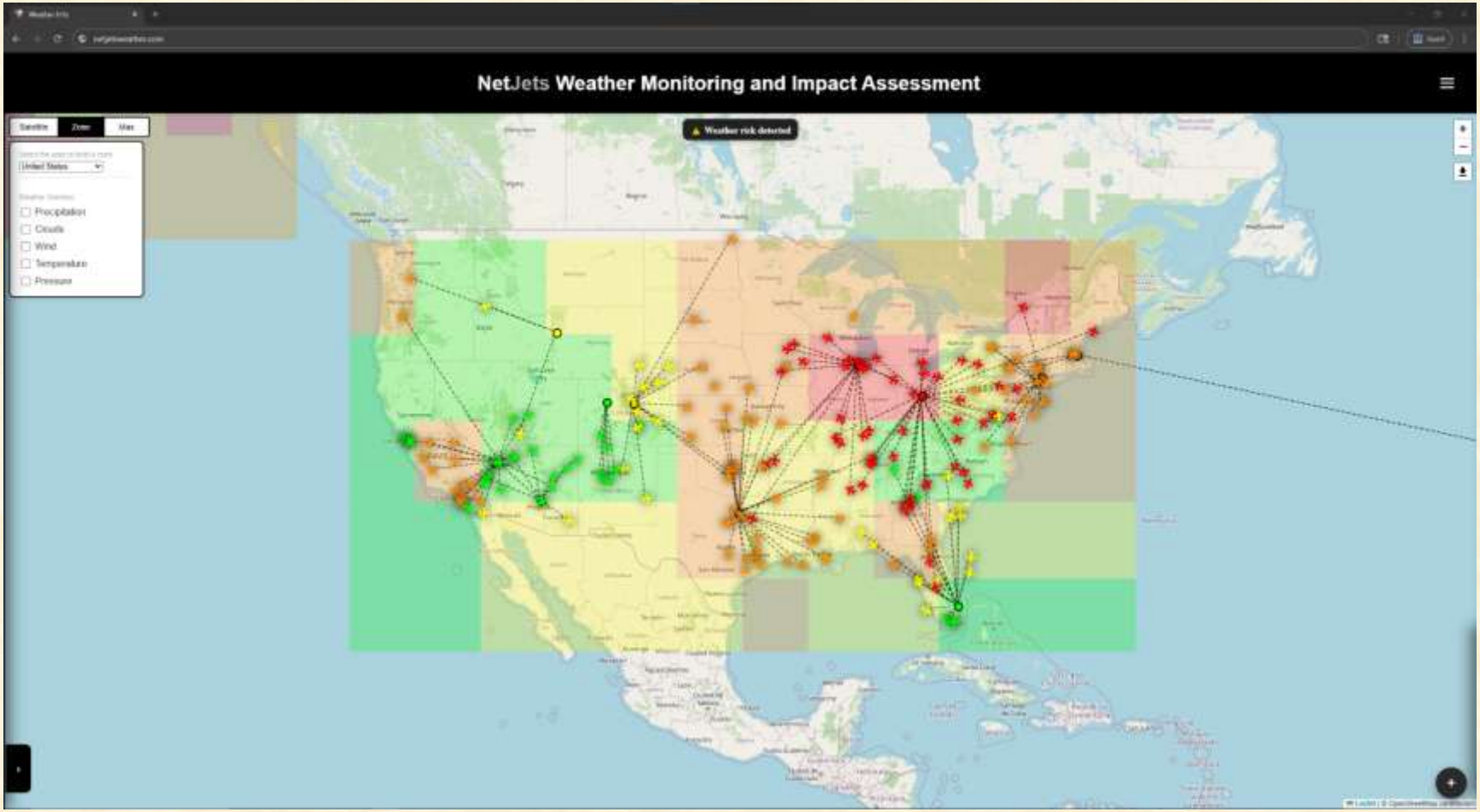
System Architecture



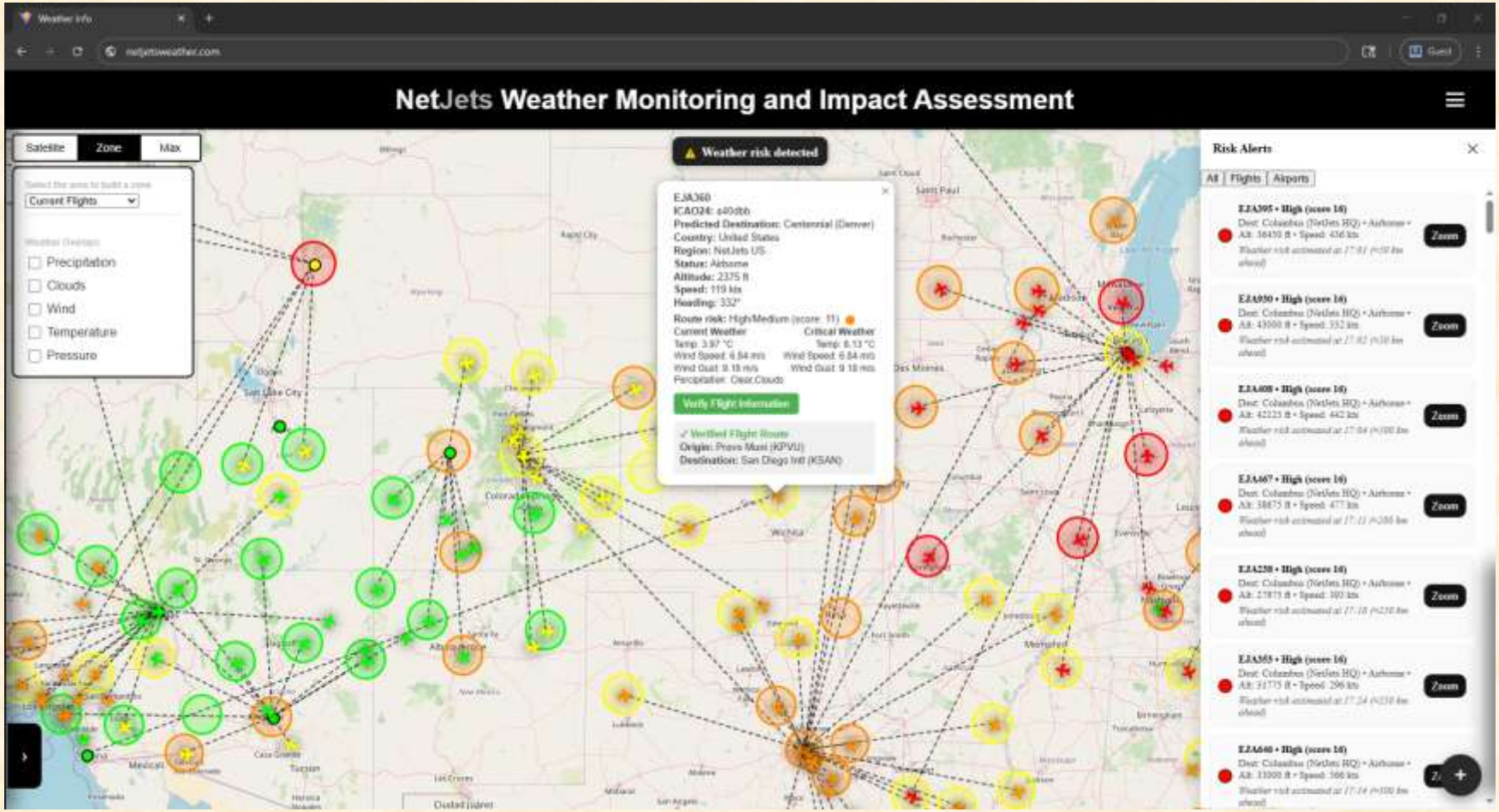
Weather Map


NetJets Weather Monitoring and Impact Assessment
Precipitation
Clouds
Wind
Temperature
Pressure

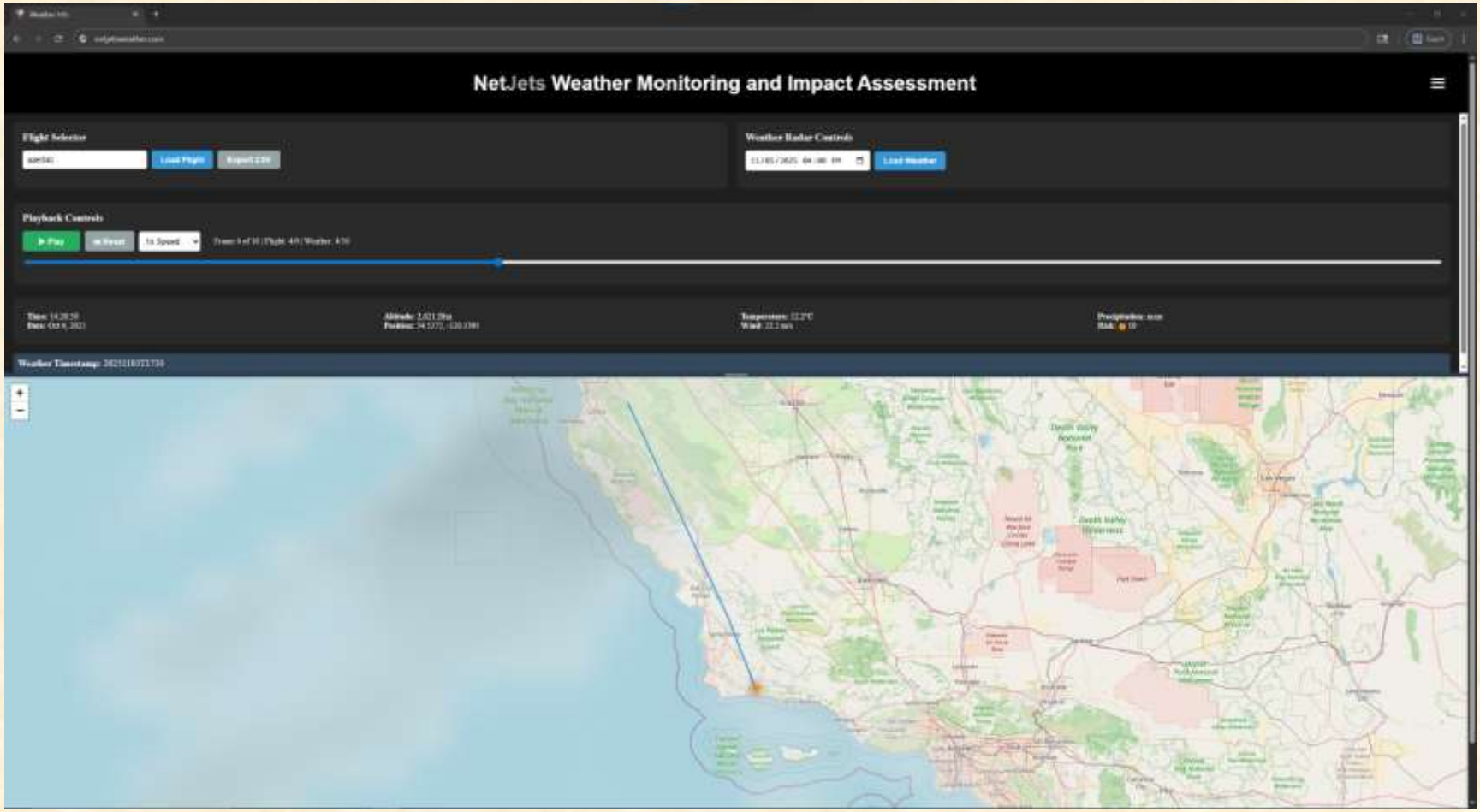
Zone Map


NetJets Weather Monitoring and Impact Assessment
Satellite
Zone
Map
Precipitation
Clouds
Wind
Temperature
Pressure
Weather risk detected

Alert System



Weather Playback



What's left to do?

- Features
- Stretch Goals
  - Avoiding unnecessary zone calls
  - Add caching to normal zone map
- Other Tasks
  - Latitude wraparound issue
  - Fix airport inbound flights loading late
  - Fix bug where page crashes when verify & zone happen
  - Make plane routes geodesic

Questions?