Dynamic Weather Forecasting for Road Trips

Combining GPS Routes with Weather Forecasts using Blazor WASM and Azure Functions

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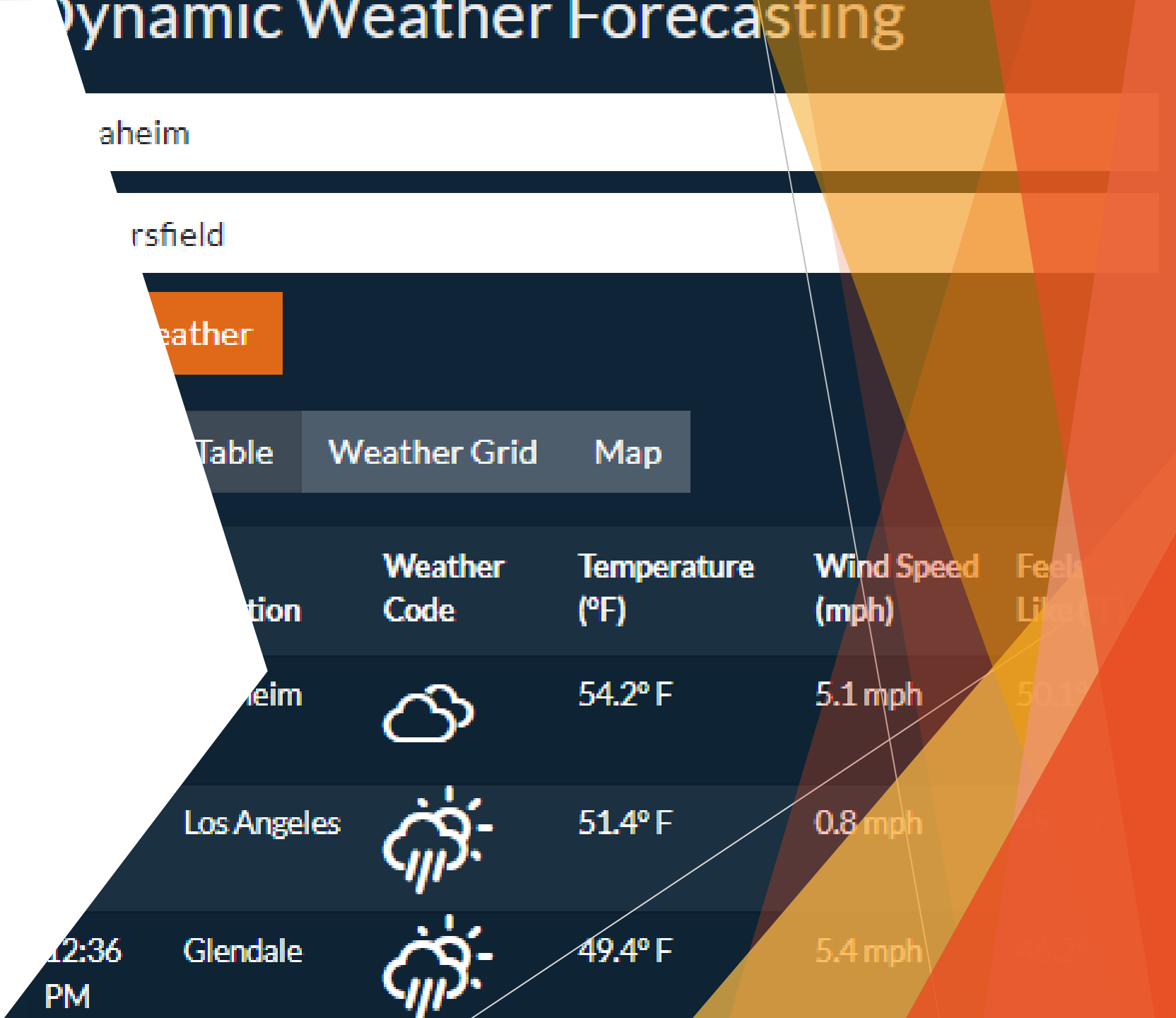
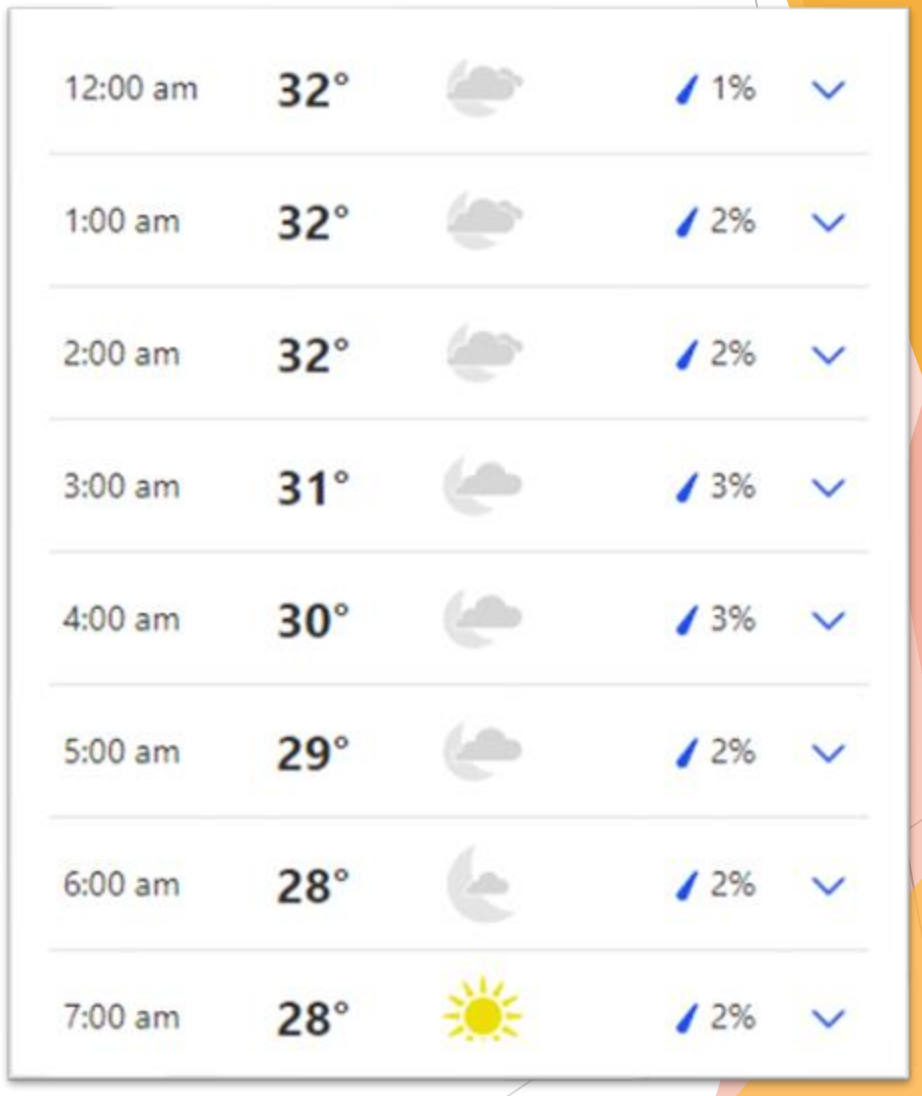
Introduction

- Weather route forecasting web app
- I'll be covering the following:
  - Problem
  - Goal
  - Technology Used
  - Solution
  - Lessons Learned



The Problem

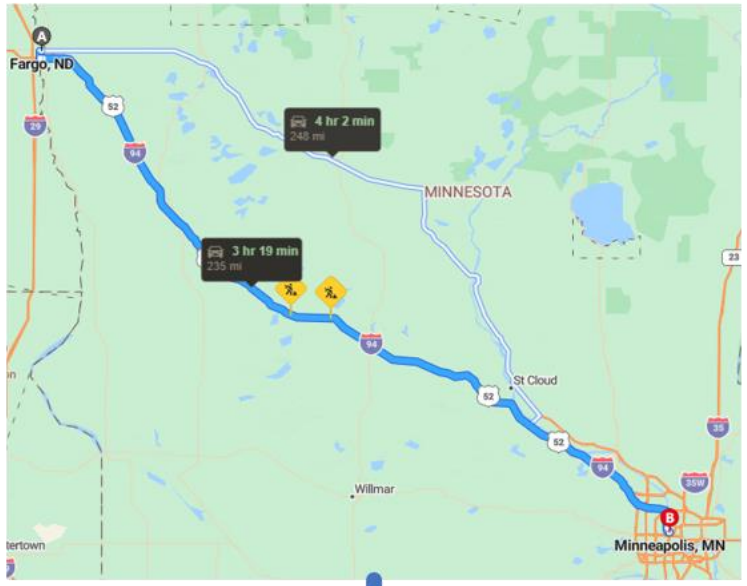
- Typical hourly forecasts:
  - Useful when you're not moving far.
  - Not helpful when you're on the move.
- Workaround:
  - Cross-reference multiple forecasts
  - Use radar
- Problem:
  - Complex
  - Prone to errors.



The Goal

- Main Goal
  - Develop Web App
  - Combine Route and Weather Data
- Secondary Goal
  - Explore emerging web technologies

Route Data

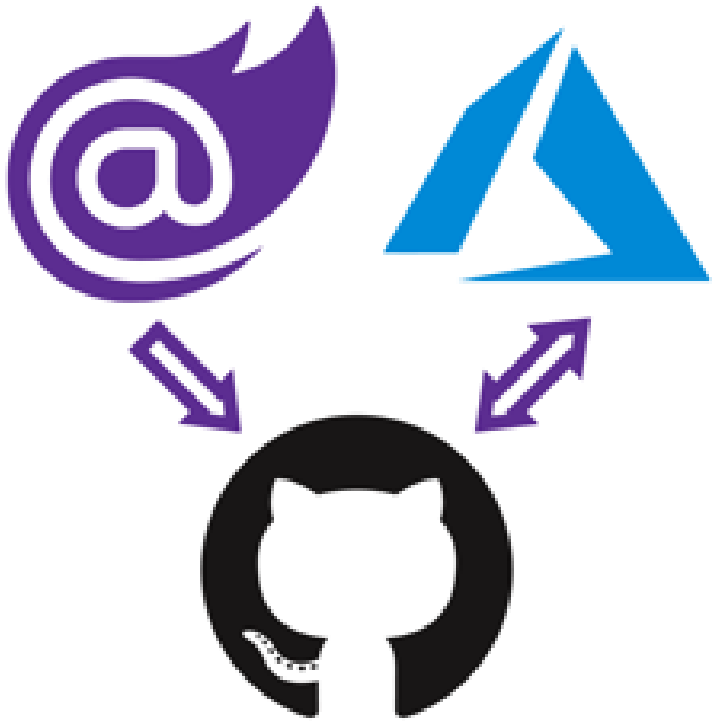


Route Weather

Weather Data

Overview of Technology

- Blazor WASM
  - Client
- Azure Functions
  - Server
- GitHub
  - Storage, Deployment

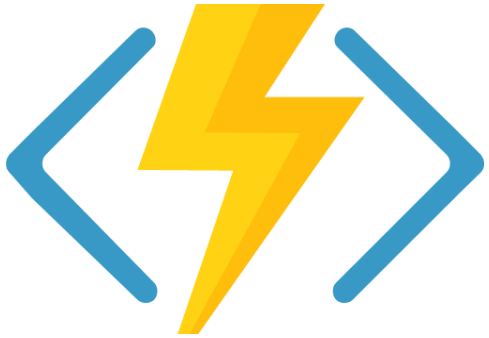


Blazor WASM

- What is it?
  - Interactive Web App
  - Runs .NET
  - No Plugins
- Benefits:
  - Fast
  - Allows C#
    - Unified Code
- Role:
  - User Interface
  - User Interaction

```
public List<WeatherForecast> GetWeatherForecastByTimeAndInterval(
    Route route, int offsetMinutes, int intervalMinutes)
{
    var result = new List<WeatherForecast>();
    // Get the legs that fall within the interval.
    var legs = GetLegsByTimeInterval(route, intervalMinutes);
    // Get the forecast for each leg at the specified time.
    for (int i = 0; i < legs.Count; i++)
    {
        var leg = legs[i];
        // Calculate the index of the forecast for the specified time.
        int index = (i * intervalMinutes + offsetMinutes) / 15;
        var forecast = leg.Forecasts[index];
        result.Add(forecast);
    }
    return result;
}
```

Azure Functions



- What is it?
  - Serverless
  - Runs code on demand
- Benefits
  - Efficient
  - Hide API keys
- Role
  - Retrieves data
    - Weather Forecasts
    - GPS Routes

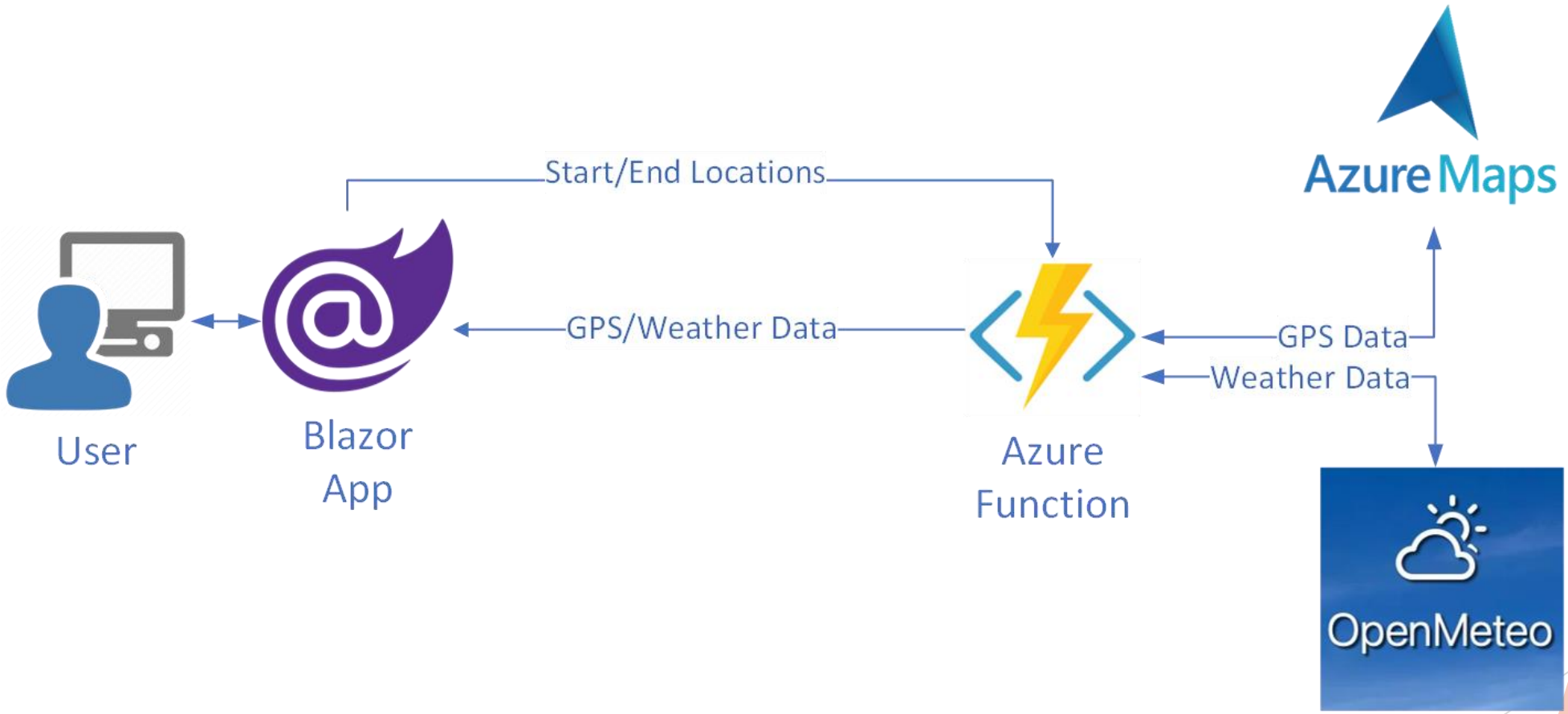
```
try
{
    var route = await routeService.ProcessRoute(start, end);
    var forecasts = await weatherService.GetForecasts(route.SampledWaypoints);

    var result = new JObject
    {
        ["route"] = route.RouteData,
        ["locations"] = route.SampledLocations,
        ["weather"] = forecasts
    };

    return new OkObjectResult(result.ToString());

}
catch (Exception ex)
{
    log.LogError(ex, "Failed to process route and weather");
    return new StatusCodeResult(StatusCodes.Status500InternalServerError);
}
```

GitHub

- What is it?
  - Code repository
  - Tracks changes
- Benefits
  - Safety
  - Automated app deployment
- Role
  - Stores code
  - Uploads new app to server

co4715hc Create weather map ✓		f20fe98 · 4 days ago	24 Commits
.github/workflows	Update azure-static-web-apps-icy-ocean-009ef9110.yml	2 months ago
.idea/.idea.Weather/.idea	Add rate limiter	last month
Weather.Api	Add grid feature displaying weather codes.	last week
Weather.Web	Create weather map	4 days ago
.gitattributes	Add .gitattributes, .gitignore, README.md, and LICENSE.txt.	2 months ago
.gitignore	Add .gitattributes, .gitignore, README.md, and LICENSE.txt.	2 months ago
LICENSE.txt	Update LICENSE.txt	2 months ago
README.md	Update README.md	last week
Weather.sln	Remake API and add dependency injection.	2 months ago

Architecture

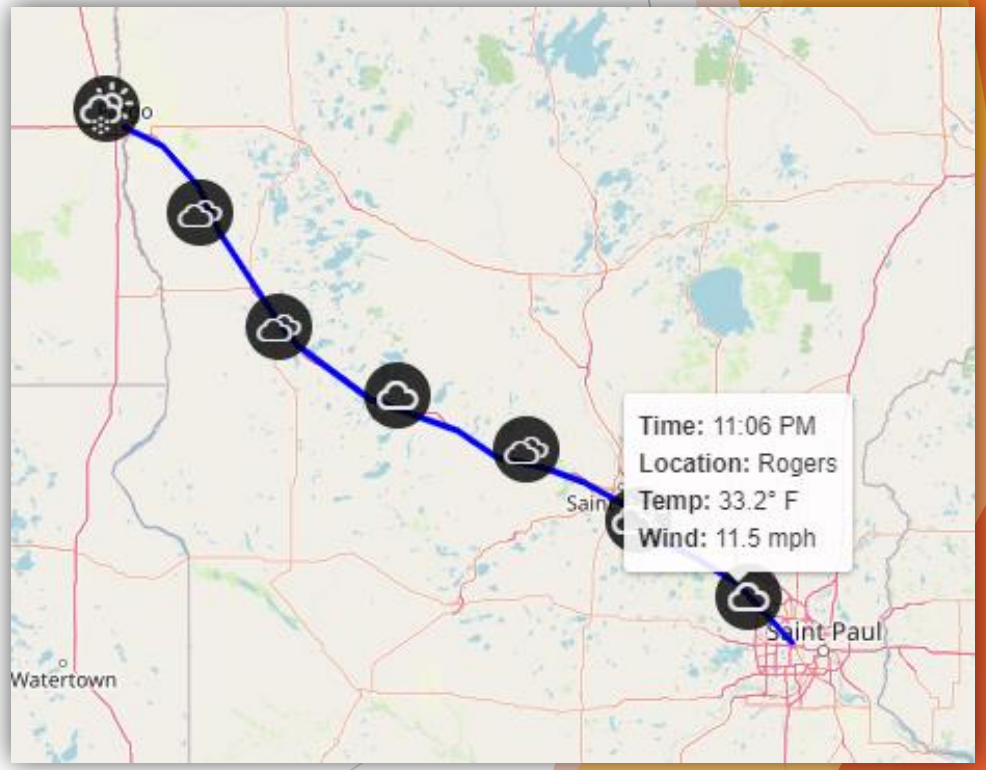


Result

Weather Forecast Table

Time	Location	Weather Code	Temperature (°F)	Wind Speed (mph)	Feels Like (°F)
7:59 PM	Fargo		33.5° F	16.8 mph	22.1° F
8:14 PM	Glyndon		32.1° F	17.2 mph	20.4° F
8:29 PM	Barnesville		32.5° F	14.3 mph	21.5° F
8:44 PM	Rothsay		31.5° F	10.9 mph	22.2° F

Weather Forecast Map



What I Learned

- Full-Stack Web Development
- CI/CD with GitHub Actions
- Creating New Insights from Multiple Data Sources

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9538

Q&A

Any questions?

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