TxDOT's Custom Map for GIS Roadway Network Workload Tracking
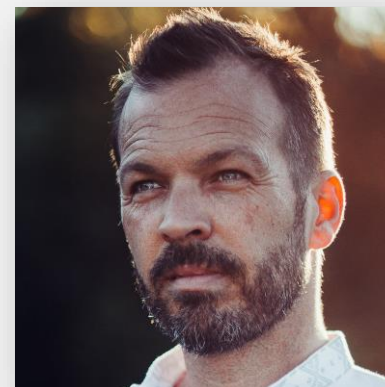
RETS – Roadway Edits Tracking System

October 29, 2024

Texas Department of Transportation

About us

Within the Texas Department of Transportation – or TxDOT – the Mapping Branch manages the GIS roadway network.

Chris Bardash
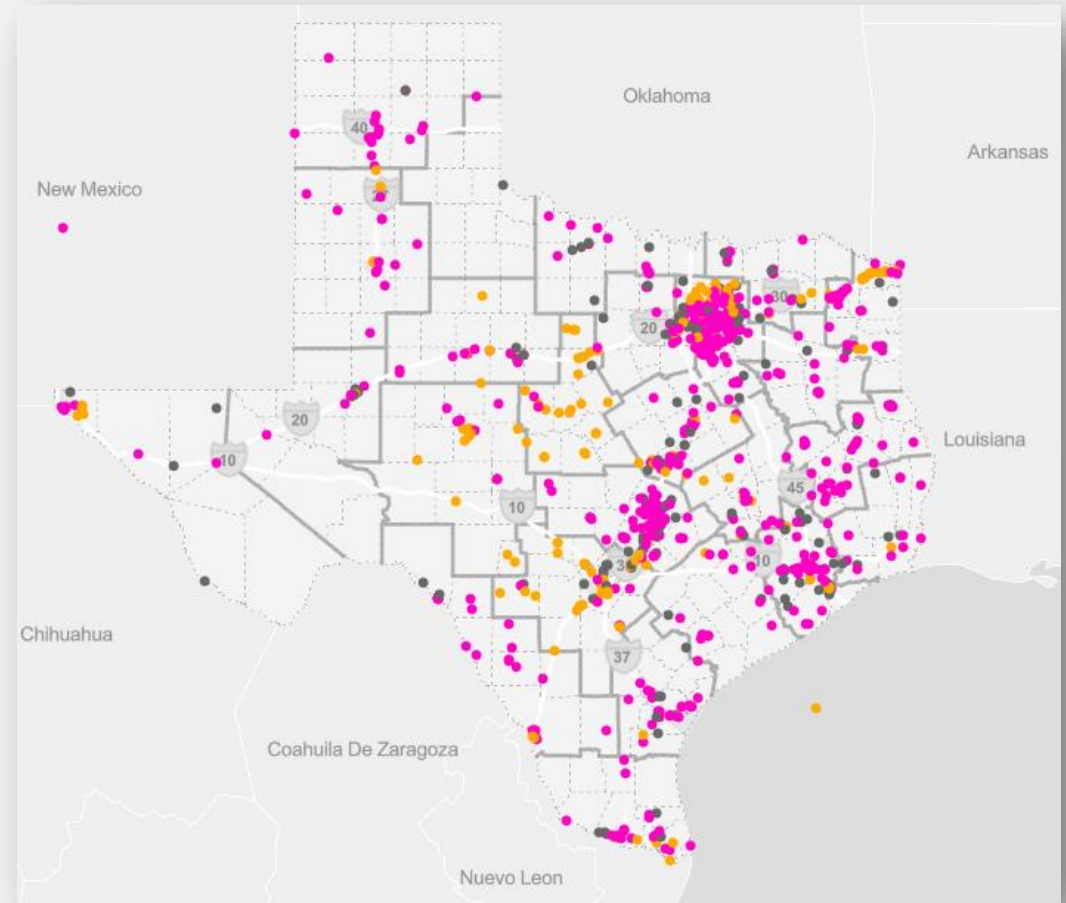*Mapping Branch Manager*

David Prosack
Senior GIS Analyst

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Senior GIS Analyst

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What is RETS?

Roadway Edits Tracking System

RETS is a custom map created by TxDOT to manage the workload for required roadway network edits.

Why should you care?

- Many organizations have statewide or regional workloads.

- Integrating with your production database is key to success.

- FME, specifically FME Flow, is a powerful resource.

- Team projects can ensure buy-in and build skills.

Why we developed it?

A simple list was inadequate

The previous version was a SharePoint list. Locations were sometimes lost.

Lacking functionality

The first version of the app – a custom web map – solved the spatial problem but was still difficult to filter and had limited options for documenting comments.

New Version

Improved user experience

The app is pre-filtered for the logged-in user, making it more personalized and focused on their needs.

Inbox organization

The new version of RETS is organized like an inbox, making it easier for users to navigate through the app and find the information they need.

Integrated database

The new version of RETS is integrated with TxDOT's GRID database, providing users with access to important data.

History feed

The history feed allows for a more in-depth conversation about each RETS.

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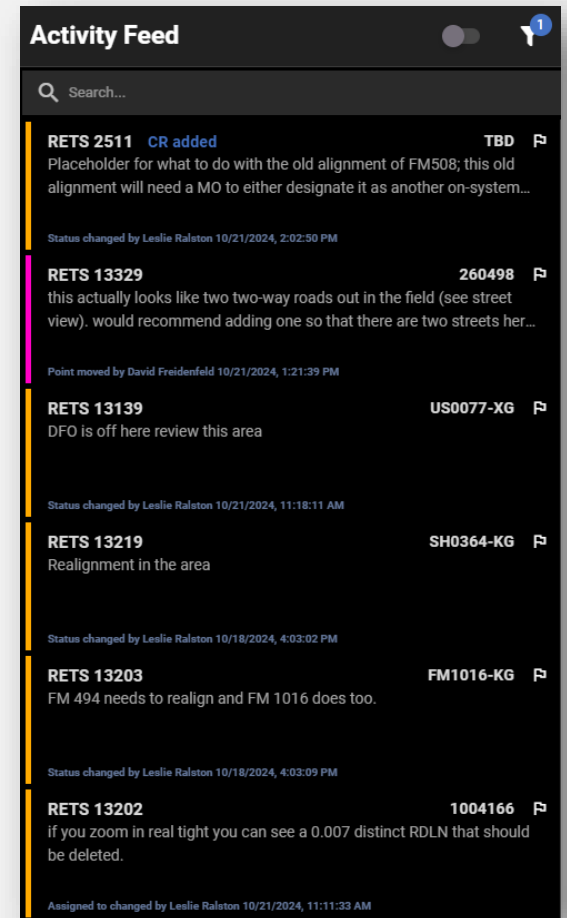
Demo

Technical Details Overview

Back End:

- Oracle database tables

- Enterprise Portal

  - Data store

  - Feature Services

- FME Flow

Front End:

- Esri JS API

- Vue/Vuetify

Other Tools:

- Git for version control
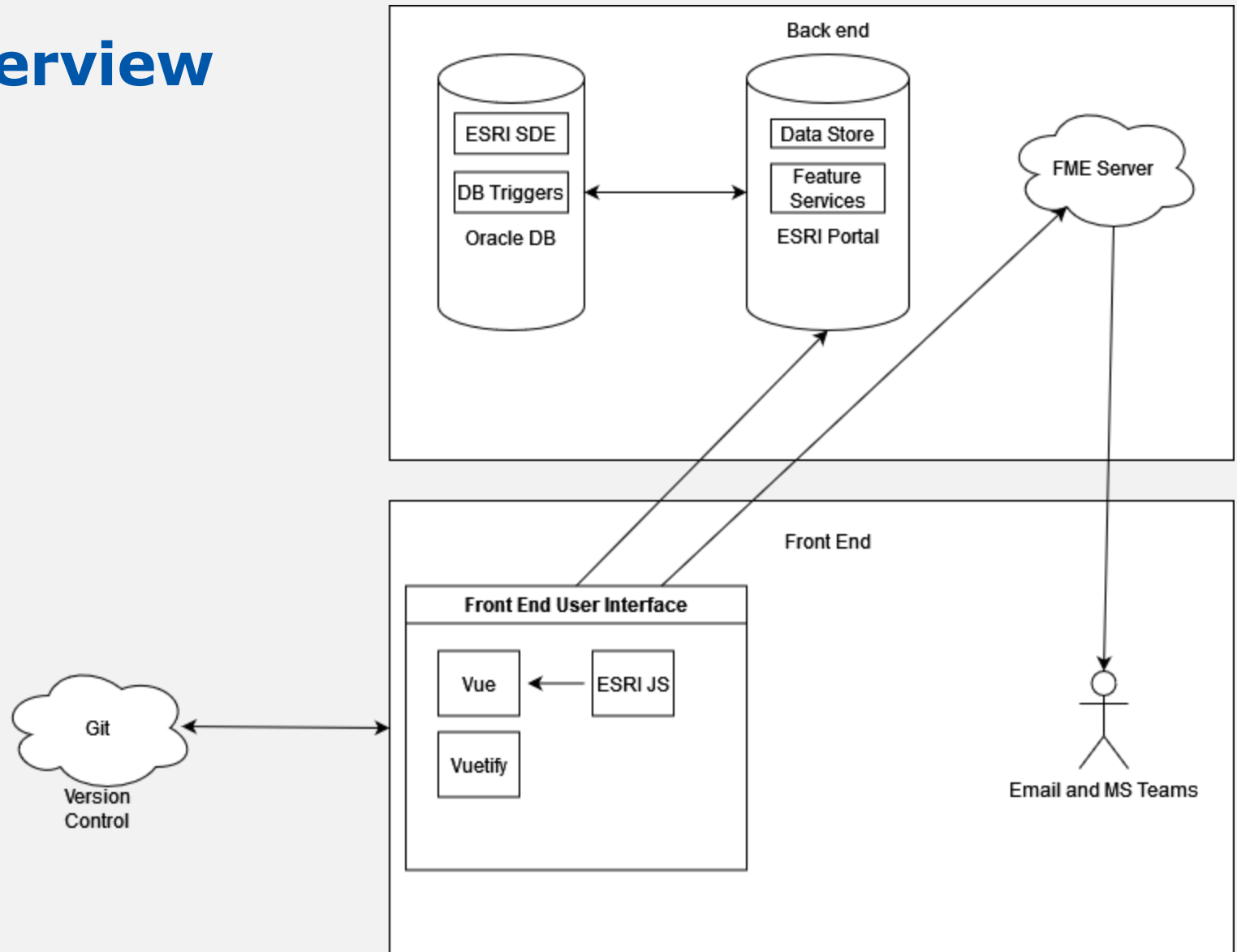
Oracle Database

Why connect with database directly?

- Hosted Services reside on ESRI Servers
- Live data
- Connect with DB tables
- Use of DB functionality e.g. Triggers

How is it done?

- ESRI SDE Connection
- Link up with Data Store on ESRI Portal Server
- No write access to production data needed

Benefits

- Access to live production data
- Database triggers

Database Triggers and Stored Procedures

What Are They?

- Database Triggers:

    - Is a block of SQL code that is executed when the condition is met
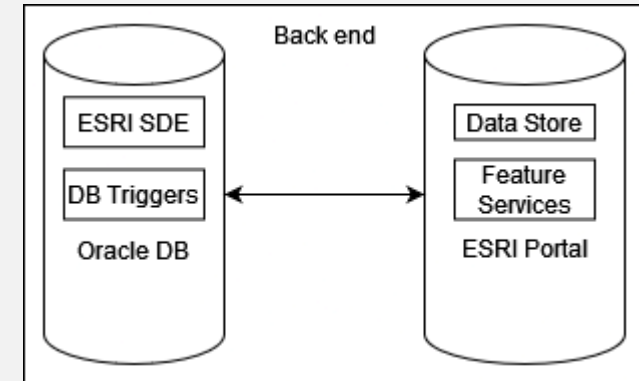
- Stored Procedures:

    - A block of SQL code that must be explicitly invoked

Examples:

- *Archive on delete* - Puts deleted records into an archive table

- *Main comment trigger* - Monitors changes in activity, status, etc and adds comment/history item according to change

- *Move trigger* - Looks for geom changes and adds comment/history item

- *Pop Analyst* - Calculates district and populates users according to responsibility table

- *GEM task (stored procedure)* - Runs every hour looking for related GEM tasks in RETS. Adds comment/history item when completed

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FME Flow (formerly FME Server)

What is FME Flow?

- Brings FME Form to a Server Environment

Why use it?

- Run multiple workbenches at once
- Additional Functionality that desktop doesn't provide
  - Webhooks
  - Automations

How it works?

- Server Services gives the ability to download and stream data back
- Directories hold your workbench

Use cases

- Data Check
- Send Emails based on different triggers
- Create your own DocuSign process

FME
by Safe Software

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Vue.js, Vuetify and Esri SDK for JS

Why use Vue?

- Esri SDK JS can integrate with Vue via Node.js

- Vue is flexible and customizable

- Well maintained / documentation

- Provides numerous of tools

  - Routing

  - State Management

Vuetify

- Quickly add modern CSS styling and components

- Complies with Material Design Specification

- Integrates seamlessly with Vue

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Group Project

- Team collaboration
  - Buy-in and ownership
  - Growth of skills
  - Mentorship
- Wider group testing and feedback

Agile...ish

- Quasi "Agile" style development

  - E.g. user stories, decomp, sprints, user acceptance testing, bug fixes, deployment, etc.

- Fit the method to your team

- Roles and skills – Lean into team strengths

- Wider group testing and feedback

Credit: Nexapp.ca

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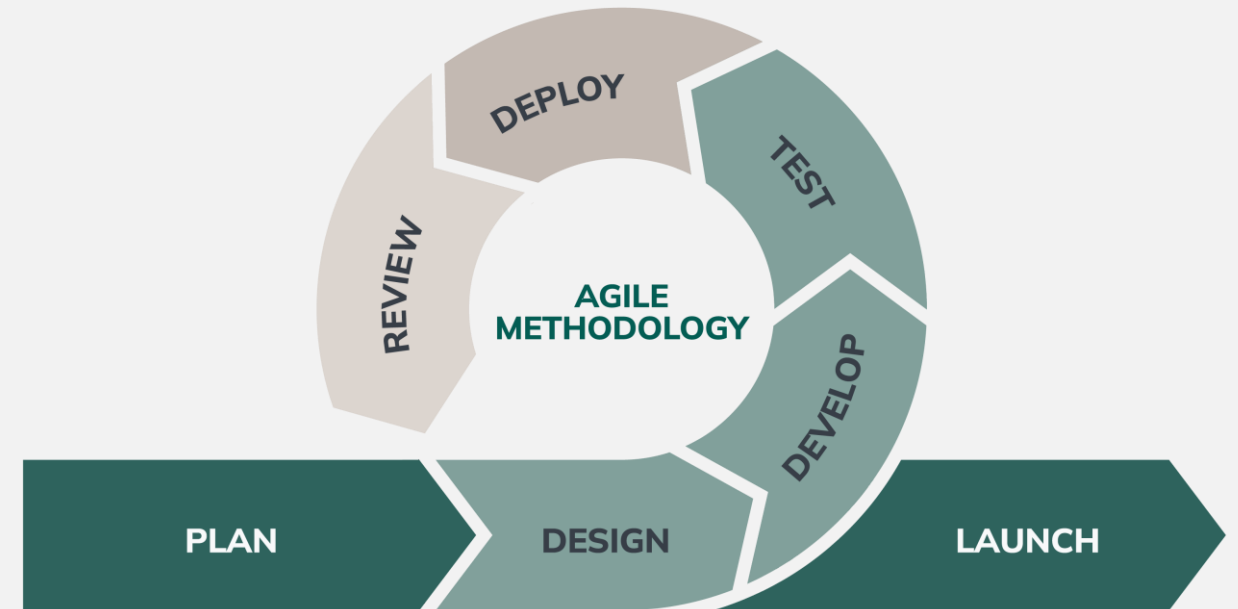
Documentation and Resources

- Develop requirements

  - Break into "user stories"

- Mockups in PowerPoint

- Documented in Azure DevOps

  - Could use other organizational systems, like Trello

  - Stories don't have to be sequential

  - Sorting stories into sprints

  - Comment tracking!

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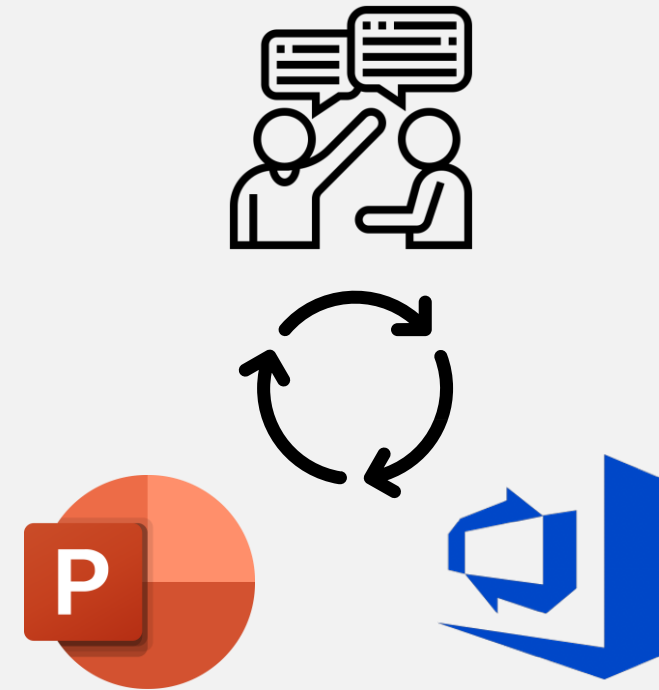
The Team

John Phillips – Project and Back End Lead

Eric Kinsey – Back End Developer

David Prosack – Front End Lead

Salvador Saldana – Front End Developer

Chris Bardash – Design Lead

Brian Alt – DevOps Lead/Tester and Designer

Travis Scruggs – Designer/Tester

Key Takeaways

There are many use cases for a web map to manage work

Sometimes you have to go custom when out of the box apps don't provide enough functionality

Integration with your database of record is a powerful pairing

Using FME can add benefits for automation

Group projects build team morale, give everyone buy-in and opportunity to share and learn new skills