ALTERNATIVE SOLUTIONS FOR INVENTORY AND ASSET MANAGEMENT

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CENTURY
ENGINEERING

INSPIRATION

Why are you not using Arc <this>?!

DELDOT RAILROAD PROGRAM MANAGEMENT (RPM) SYSTEM

DELDOT RAILROAD PROGRAM

DelDOT Agreement 1705
(Railroad Design Services)

- Over 650 crossing Statewide
- Maintenance & Compliance
- Safety & Security
- Public Complaints & Incidents

OPERATIONAL PICTURE

- What do we have?
- What is its condition?
- What is the priority?
- How can we improve it?
- How was it improved?

RPM COMPONENTS

Inventory

- Statewide coverage of crossing related assets
  - Warning Devices, Rail Equipment Road Striping, Crossing Envelope
- Internal and Federal level reporting requirements (FRA)
- Mobile data collection
- Construction dispatch
- Map viewer

Incidents/Maintenance

- Portal-based incident entry and dispatch
- Provides lineage of incidents with action step logging and close-out reports
- Accountability & project planning
- Emergency & long-term tracking

RPM COMPONENTS
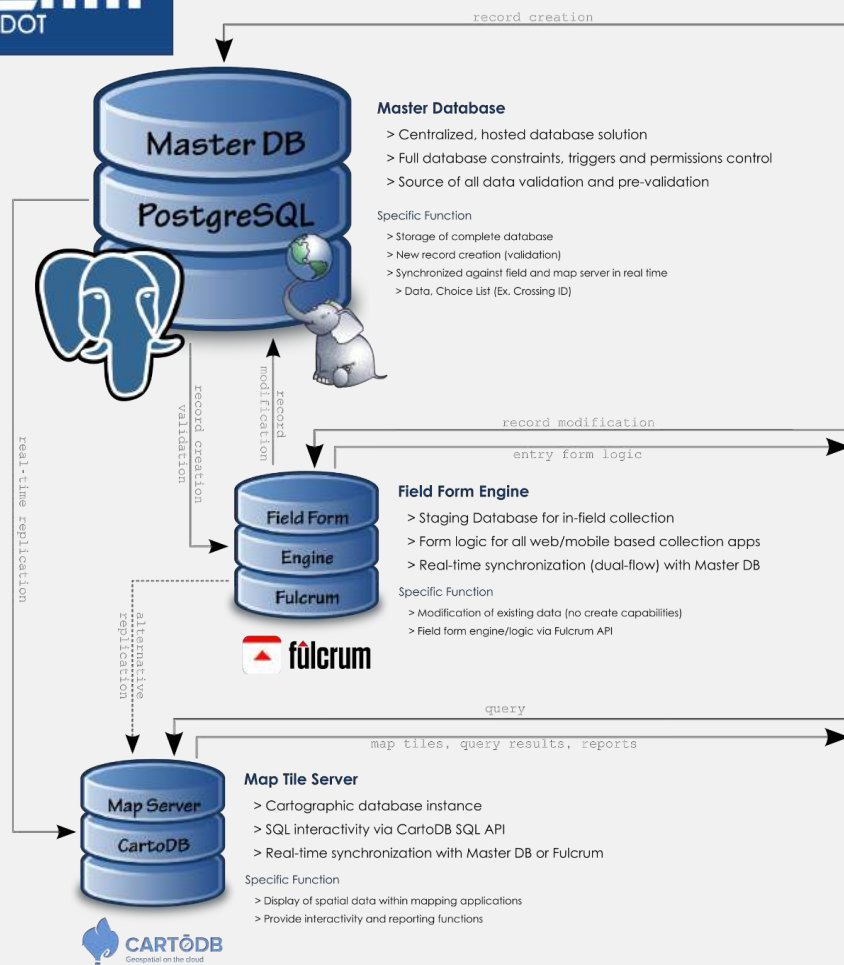
Projects (Construction)

- From project planning to acceptance
- Digital replication of DelDOT's Inspector Daily Report (IDR)
- Real-time field to office communication
- Web-based entry / Inspection dispatch

Portal

- Centralized hub of railroad information
- Visualization and reporting
- Web/mobile accessible

Data Flow Model

DelDOT

record creation

Master Database

> Centralized, hosted database solution
> Full database constraints, triggers and permissions control
> Source of all data validation and pre-validation

Master DB

PostgreSQL

Specific Function
> Storage of complete database
> New record creation (validation)
> Synchronized against field and map server in real time
   > Data, Choice List (Ex. Crossing ID)

record creation validation

record modification

real-time replication

record modification

entry form logic

Field Form Engine

> Staging Database for in-field collection
> Form logic for all web/mobile based collection apps
> Real-time synchronization (dual-flow) with Master DB

Field Form

Engine

Fulcrum

Specific Function
> Modification of existing data (no create capabilities)
> Field form engine/logic via Fulcrum API

fulcrum

alternative replication

query

map tiles, query results, reports

Map Tile Server

> Cartographic database instance
> SQL interactivity via CartoDB SQL API
> Real-time synchronization with Master DB or Fulcrum

Map Server

CartoDB

Specific Function
> Display of spatial data within mapping applications
> Provide interactivity and reporting functions

CARTODB
Geospatial on the cloud

CENTURY ENGINEERING

Web Portal

Portal Overview

> Dashboard landing page
> Multi-modal/responsive
> Reporting/visualization

Specific Function
> Display various app/db graphics
> Create new crossing record
> Launch specific applications
> Pushbutton reporting

direct app access

Asset Inventory

> Main map-based interface
> Retrieve related data
> Develop custom queries

Specific Function
> Modify inventory data
> View incidents and construction entries
> Flag for construction

interfaced access

Construction Monitoring

> View construction data
> Real-time data sync
> Inspector dispatch

Specific Function
> Create new construction records
> Edit existing construction records
> Launch inventory record
> Generate IDRs
> Document management

Incident Reporting

> View incident data
> Real-time data sync
> Field dispatch

Specific Function
> Create new incident records
> Edit existing incident records
> Launch inventory record
> Track remediation

Maintenance Tracking

> View maintenance data
> Real-time data sync
> Field dispatch

Specific Function
> Create new maintenance records
> Edit existing maintenance records
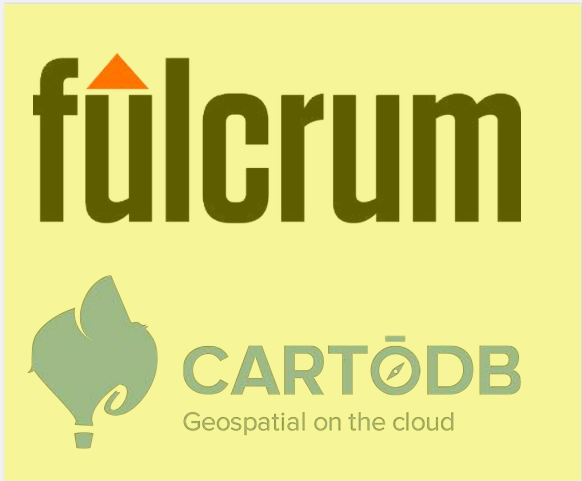> Launch inventory record
> Generate reports
> Document management

THE STACK

COLLECTION

fülcrum

- Inventory
- Inspection
- Construction Management

- iOS / Android
- Relational DB Structure
  - Mirror RPM data model
- Open APIs
  - Flexibility and control
- Real-time information transfer
  - Immediate data value
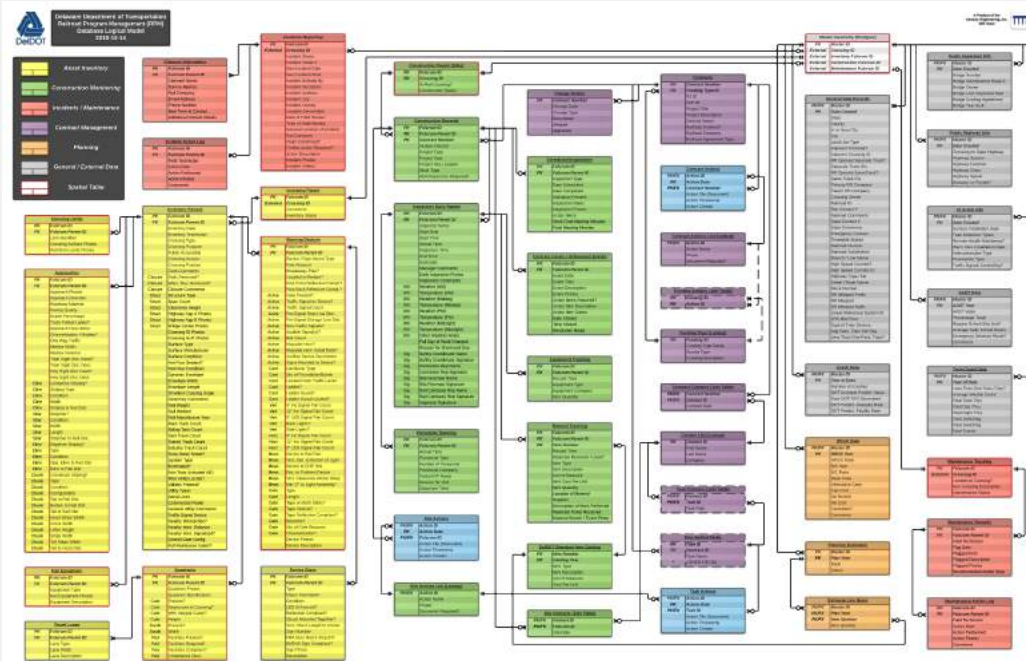- Webhooks / Data Shares
  - Interoperability

DATABASE

- PostgreSQL – RDBMS
- PostGIS – Spatial Extender

- Sequelize – promise-based ORM

MAPPING / VIZ

- Google Maps – Javascript Mapping API

- D3js – Data-Driven Documents

- ~~CartoDB~~ Carto
  - Cloud PSQL/PostGIS
  - Web Visualizations
  - Spatial SQL

- Mapnik – Tile Renderer
- TileStache – Tile Map Server

DEMO

RPM Demo

PERCEPTIONS

DIFFICULT

Where do I start?

Do I have to be a developer?

There are too many options!

- Plethora of official documentation
- YouTube, Coursera, Udemy, etc…

- Programming skills do help

- OpenGeo Suite (Community Edition)

NO DEDICATED SUPPORT

I need dedicated support!

- Not True

- Dedicated Open Source companies
  - Boundless
  - Redhat
  - EnterpriseDB
  - …

- SaaS – Subscription-based

IT'S FREE!

Cheaper? YES!

- Not all Open Source is free
- Not all free is Open Source
- Generally refers to licensing

- Training

- Contributions – Don't just be a user
  - Contribute to core product
  - Provide documentation support
  - Monetary contribution

WHY?

- Community developed software works
  - Power in numbers: More contributors = Better product
- Viable alternative/supplement to traditional solutions

- Reduce – Software licensing burdens/maintenance
- Focus – Build only what we need now
- Flexibility – But be adaptive to changing needs
- Responsive – Adapt quickly
- Scalability – Expand level of service

Thanks!

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