



Validating GeoJSON Data in Real-Time for Federal Crop Insurance

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Introduction

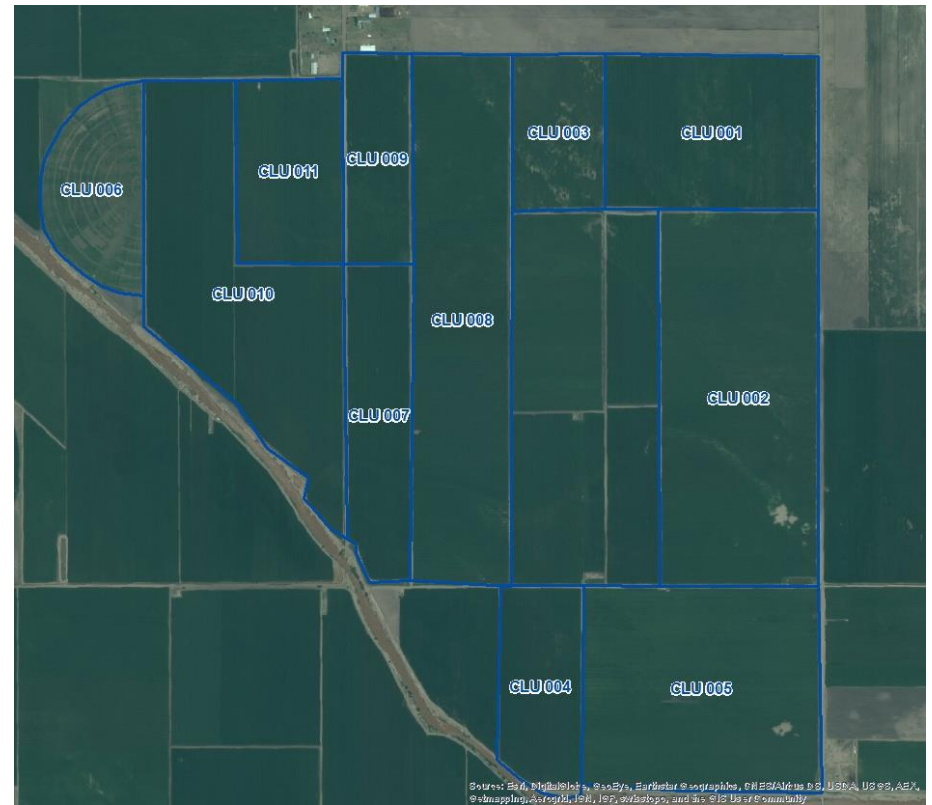
- USDA – Risk Management Agency (RMA)
 - Federal Crop Insurance Corporation, created 1996
 - Crop insurance for American farmers and ranchers
- Approved Insurance Providers (AIPs)
 - Sell and service insurance policies
- RMA
 - Reinsures, administers, approves, develops
 - Over \$100 billion insurance liability annually

Problem

- 40 million polygons
 - Gaps
 - Attribution errors
- Data remediation
 - Not timely, local

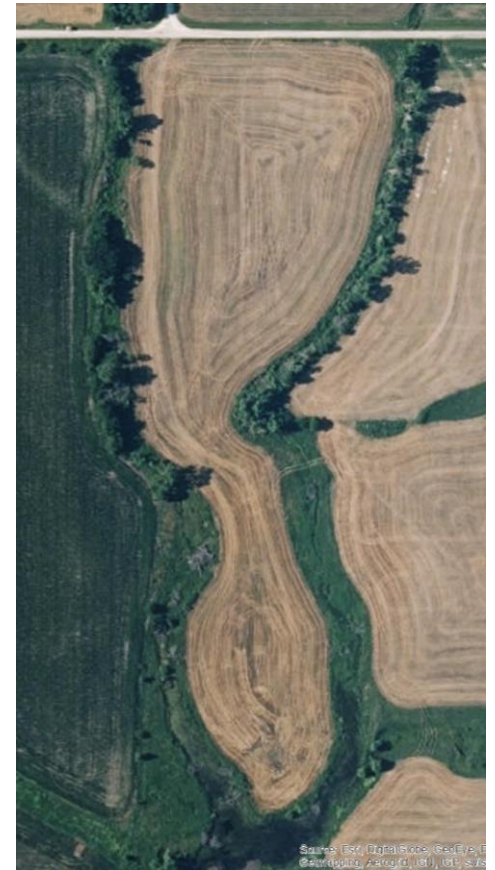
Solution

- Enable AIPs to submit spatial data centrally
 - Open Source to ESRI platform
 - Quick return of data
 - Resource Land Unit (RLU)



Common Land Unit (CLU)

- Producer data, but...
- Farm Service Agency maintained
 - Provided monthly
- CLU = field with contiguous boundaries
- Field level reporting benefits:
 - Enhance actuarial soundness
 - Data sharing
 - Compliance oversight
- CLU data not available to public
 - Food, Conservation, and Energy Act of 2008



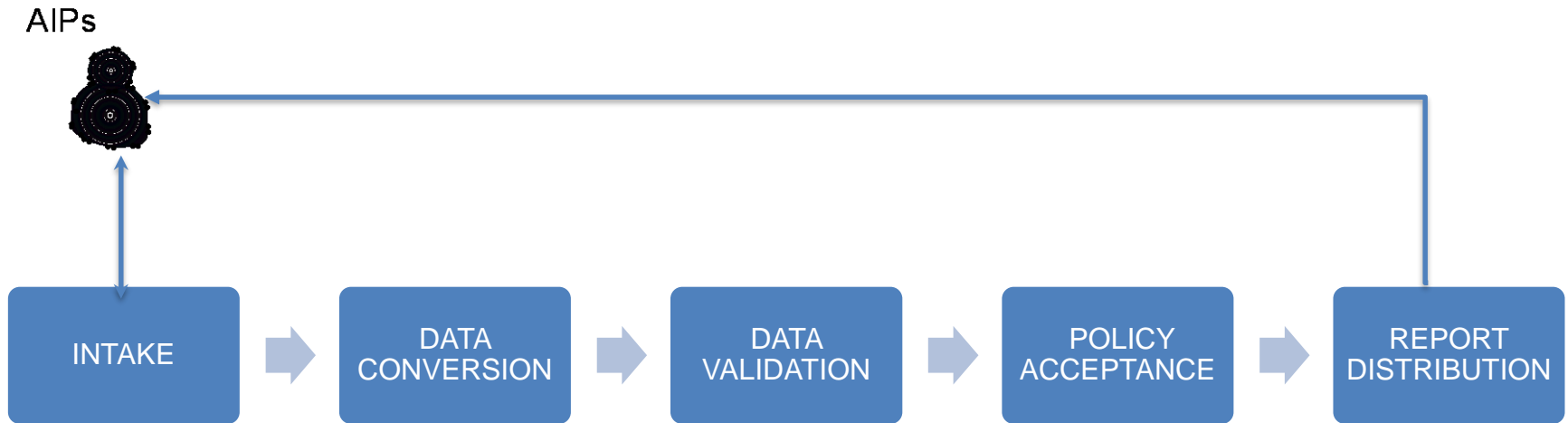
Technical requirements

- Check for gaps against database of 40 million polygons
- Real-time validation & feedback to AIPs
- Real-time updates to RMA systems
- Open source and proprietary tools

Application infrastructure & environment

- Enterprise user of ESRI software
- Tech Stack – ArcGIS, SQL Server, .NET, Azure on premise
- Agile methodology, Scrum framework
- Web service, Service end point
- Windows service

Application Workflow

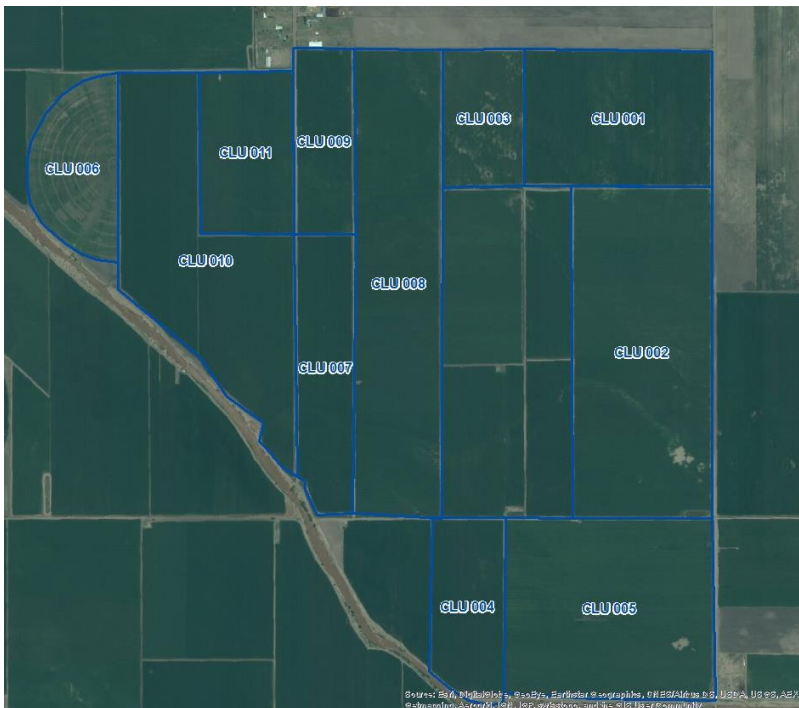


File formats and translations

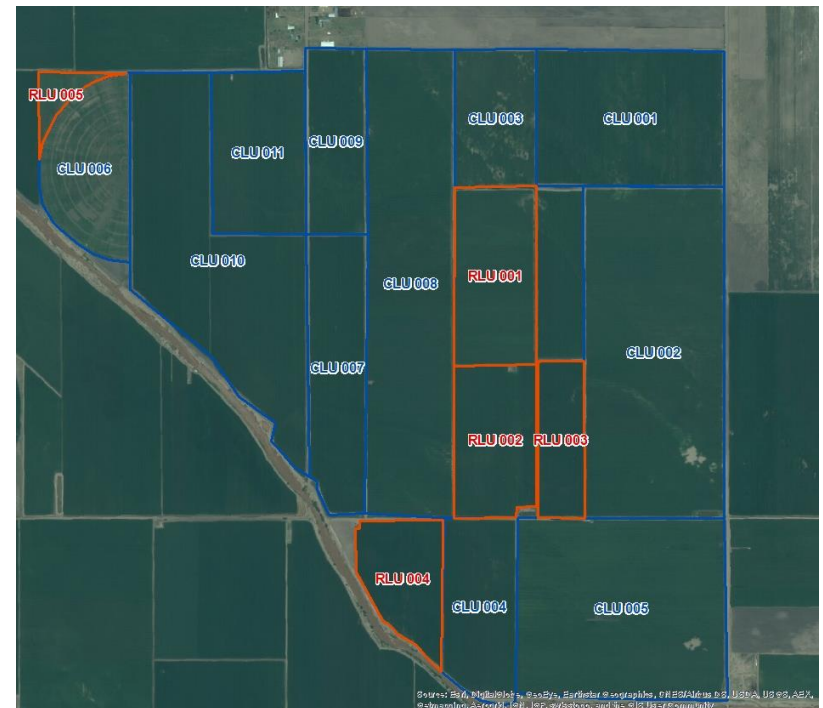
- Input: GeoJSON
 - ArcJSON
 - » ArcSDE featureclass
 - ArcJSON
- Output : JSON
- Response times:
 - Schema check ~ 30 sec
 - End to end processing
 - 1 record - ~ 60 sec
 - 3 records - ~ 90 sec
 - 50 records - ~ 120 sec

Impact of RLU Application

Before



After



Gaps, errors
Remediation time - Months

Increased coverage, Clean data
Remediation time – Minutes
Open source and ESRI tools

Conclusion

- Increases spatial coverage
- Producer/AIP generated and owned
- Combination of open-source and ESRI

Path Forward

- Operational reporting
 - Acreage fluctuation with season/commodity/precipitation
 - Spatial standard for other USDA programs
- Productivity/yield modeling
 - Combined with weather, soils, elevation
- Technology
 - Precision agriculture
 - Drones

Questions?

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Risk Management Agency Homepage:

<http://www.rma.usda.gov>

