

# Leveraging ArcGIS Enterprise as a solution ecosystem for a startup or small operator

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GISP | May 2022

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# Tellurian

- Building a low-cost, fully-integrated Liquid Natural Gas business
- Includes Upstream, Pipeline, LNG terminal teams
- Upstream activities are fully operational
- ~150 employees

# Project Team

*Identifying key roles: Champion, Executive Sponsor, & Technical Leadership*

## Technical

Mike Bailey, GISP – GIS Advisor, Upstream

Dee Glazebrook – Manager, IT Enterprise Reporting Products

Jason Ramirez, GISP – GIS Consultant, Cartodyne

## Management

Ami Arief – SVP, Upstream Resources

Matt Williams - VP, Upstream Geoscience

Rafael Ordonez - Director, IT Application Support



# Business Challenge

*Develop your **business-first** geospatial strategy*



Upstream Team (2017):

**Use Case:** Easily accessible web-based GIS tools to visualize and interact with operational data

## Activities

- Initial data aggregation for Area of Interest (public domain)
- ArcGIS Enterprise Deployment (Azure)
- Visualizations & Mapping (land, regulatory, ad hoc)
- Integrate subscription data (Enverus, IHS, Rextag)
- Special projects



# Data Aggregation

## *Project Data, Where to Start?*

Public facing and Esri data:

- U.S. Energy Information Administration
- SONRIS
- Texas Railroad Commission
- Esri Data and Maps

Maps



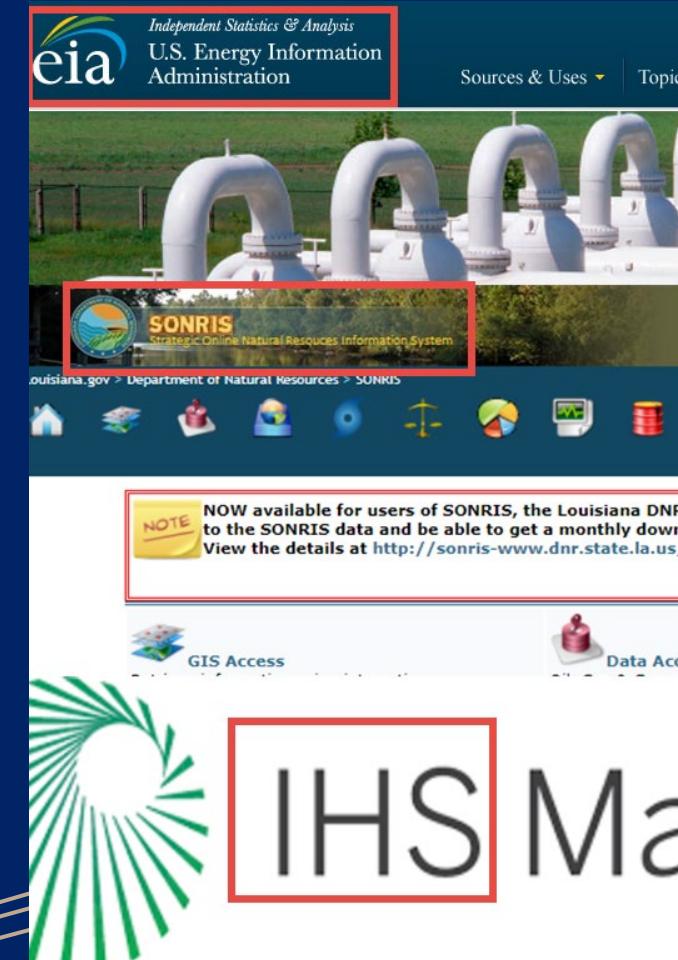
File



Shapefile

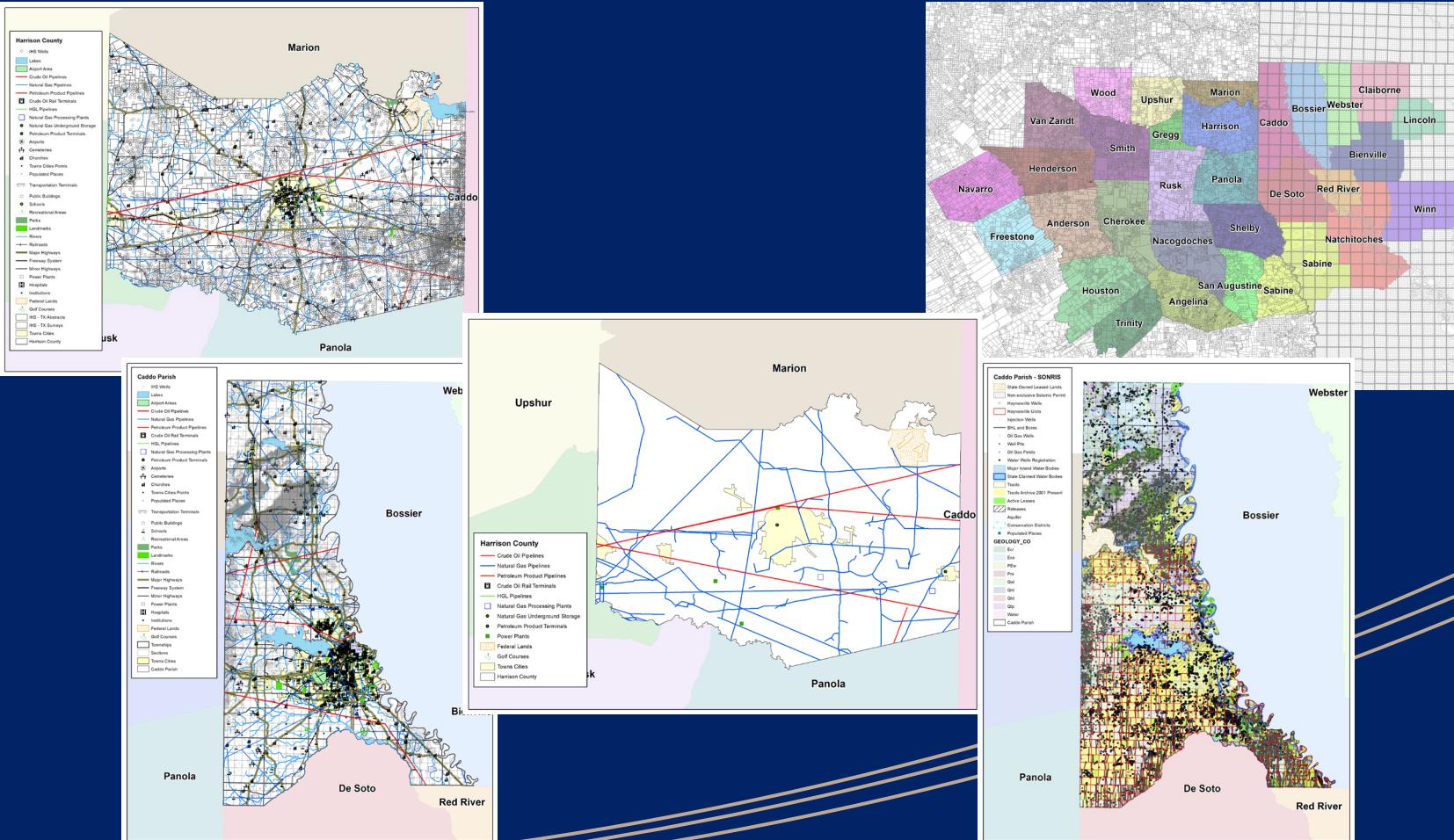


Tables



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# Data Aggregation



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# ArcGIS Enterprise Deployment

*How do we share and collaborate?*

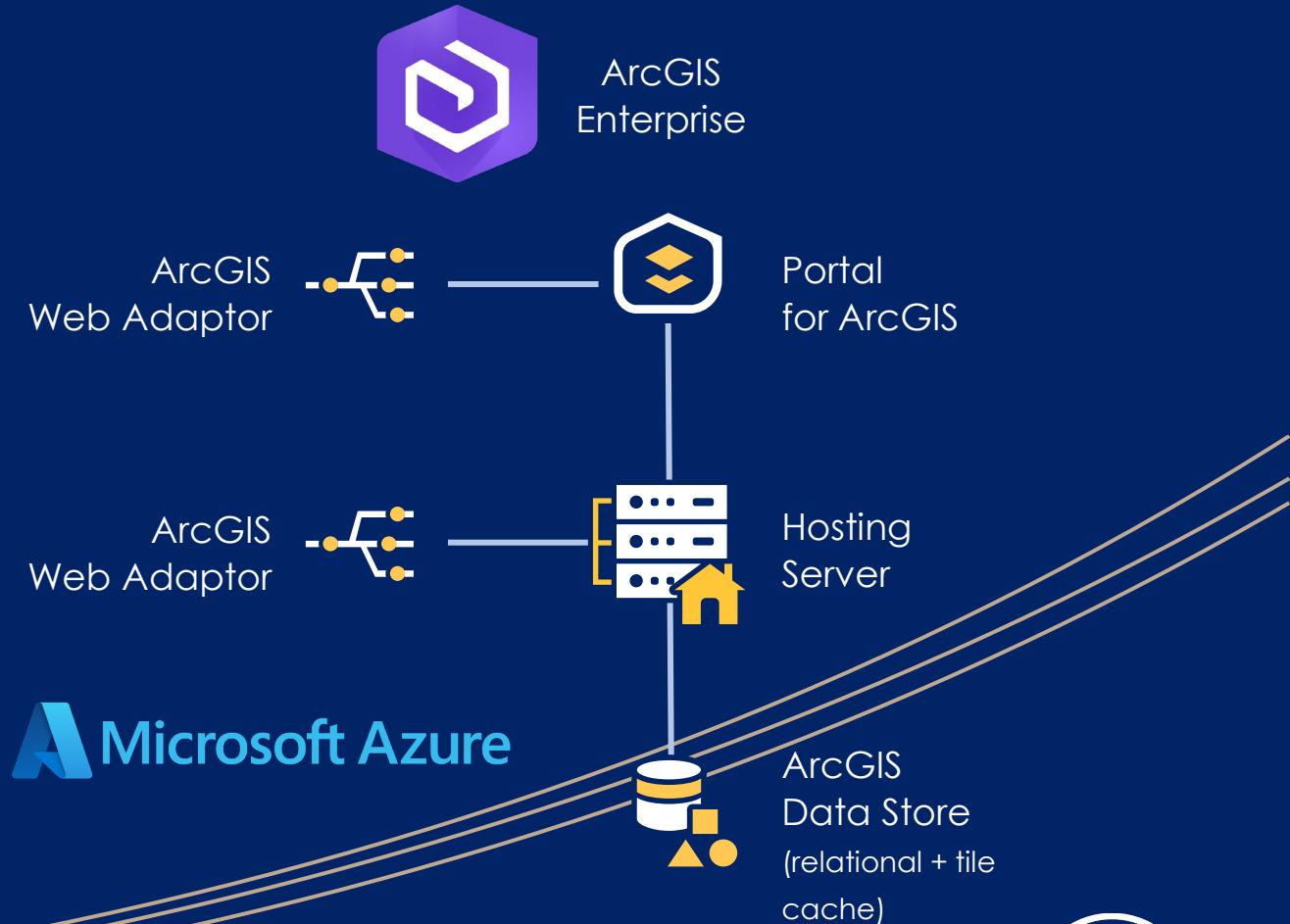
IT cloud-first strategy with emphasis on security:

- Single Machine Base Deployment
- Microsoft Azure
- Security, VPN access only, no external

Desktop

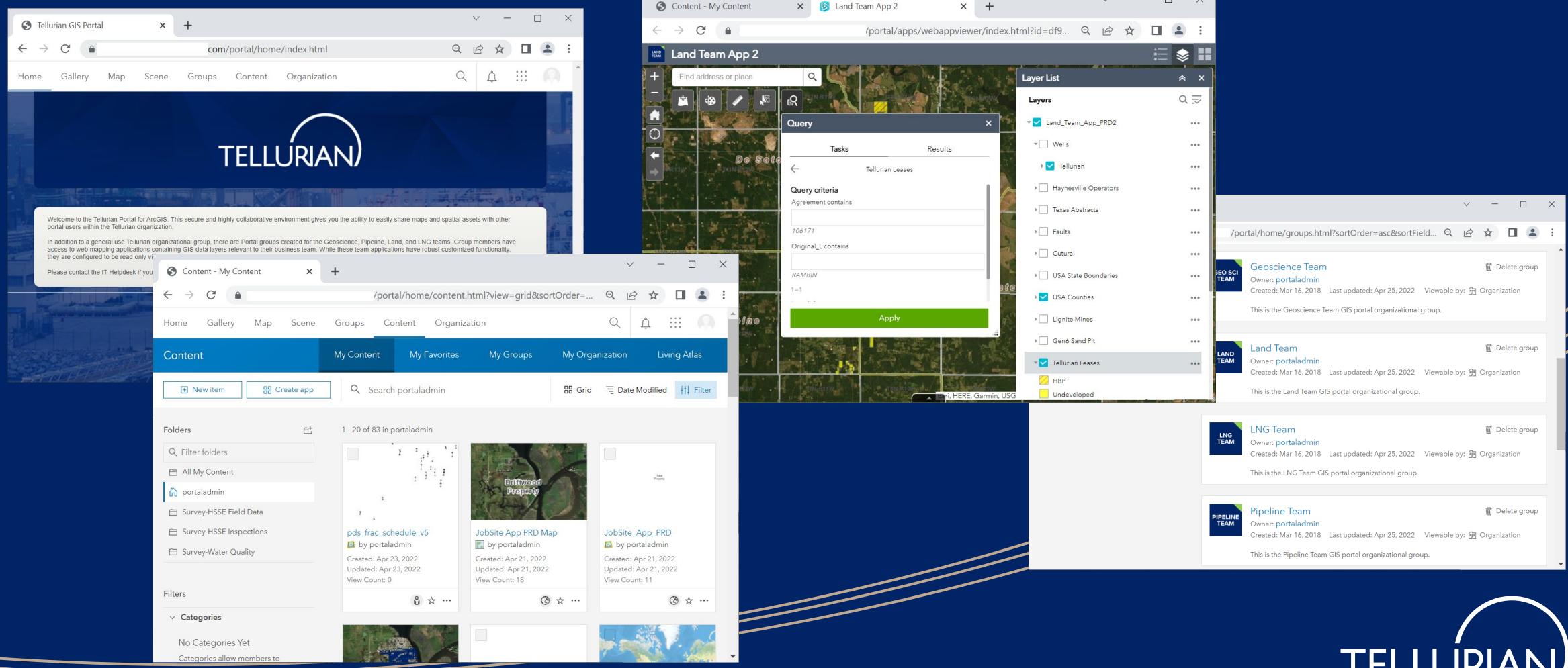


Webmap



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# ArcGIS Enterprise Deployment



The image displays a composite screenshot of a Tellurian GIS Portal deployment. The top portion shows the main home page with a large 'TELLURIAN' logo and a map of a property. Below this, a 'Content' management interface is shown, featuring a grid of items like 'Survey-HSSE Field Data' and 'Survey-HSSE Inspections'. To the right, a 'Land Team App 2' window is open, showing a map with a 'Query' dialog box. The 'Query' dialog has fields for 'Query criteria' (e.g., 'Agreement contains 106171', 'Original\_L contains RAMBIN') and an 'Apply' button. A 'Layer List' panel on the right lists various spatial data layers. The bottom right corner features the Tellurian logo.

**Content - My Content**

Welcome to the Tellurian Portal for ArcGIS. This secure and highly collaborative environment gives you the ability to easily share maps and spatial assets with other portal users within the Tellurian organization.

In addition to a general use Tellurian organizational group, there are Portal groups created for the Geoscience, Pipeline, Land, and LNG teams. Group members have access to web mapping applications containing GIS data layers relevant to their business team. While these team applications have robust customized functionality, they are configured to be read only via the portal.

Please contact the IT Helpdesk if you have any questions.

**Land Team App 2**

Land Team App 2

Find address or place

Query

Tasks

Results

Query criteria

Agreement contains

106171

Original\_L contains

RAMBIN

1=1

Apply

Layer List

Layers

- Land\_Team\_App\_PRD2
- Wells
- Tellurian
- Haynesville Operators
- Texas Abstracts
- Faults
- Cultural
- USA State Boundaries
- USA Counties
- Lignite Mines
- Gen6 Sand Pit
- Tellurian Leases
- HBP
- Undeveloped

Content - My Content

Home Gallery Map Scene Groups Content Organization

Content My Content My Favorites My Groups My Organization Living Atlas

New item Create app

Search portaladmin

Folders

1 - 20 of 83 in portaladmin

- Filter folders
- All My Content
- portaladmin
- Survey-HSSE Field Data
- Survey-HSSE Inspections
- Survey-Water Quality

Filters

Categories

No Categories Yet

Categories allow members to

Content - My Content

Land Team App 2

/portal/apps/webappviewer/index.html?id=df9...

Content - My Content

Groups

Geoscience Team

Owner: portaladmin

Created: Mar 16, 2018 Last updated: Apr 25, 2022 Viewable by: Organization

This is the Geoscience Team GIS portal organizational group.

Land Team

Owner: portaladmin

Created: Mar 16, 2018 Last updated: Apr 25, 2022 Viewable by: Organization

This is the Land Team GIS portal organizational group.

LNG Team

Owner: portaladmin

Created: Mar 16, 2018 Last updated: Apr 25, 2022 Viewable by: Organization

This is the LNG Team GIS portal organizational group.

Pipeline Team

Owner: portaladmin

Created: Mar 16, 2018 Last updated: Apr 25, 2022 Viewable by: Organization

This is the Pipeline Team GIS portal organizational group.

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# Visualization & Mapping

*Defining the look, style, and functionality of spatial information*

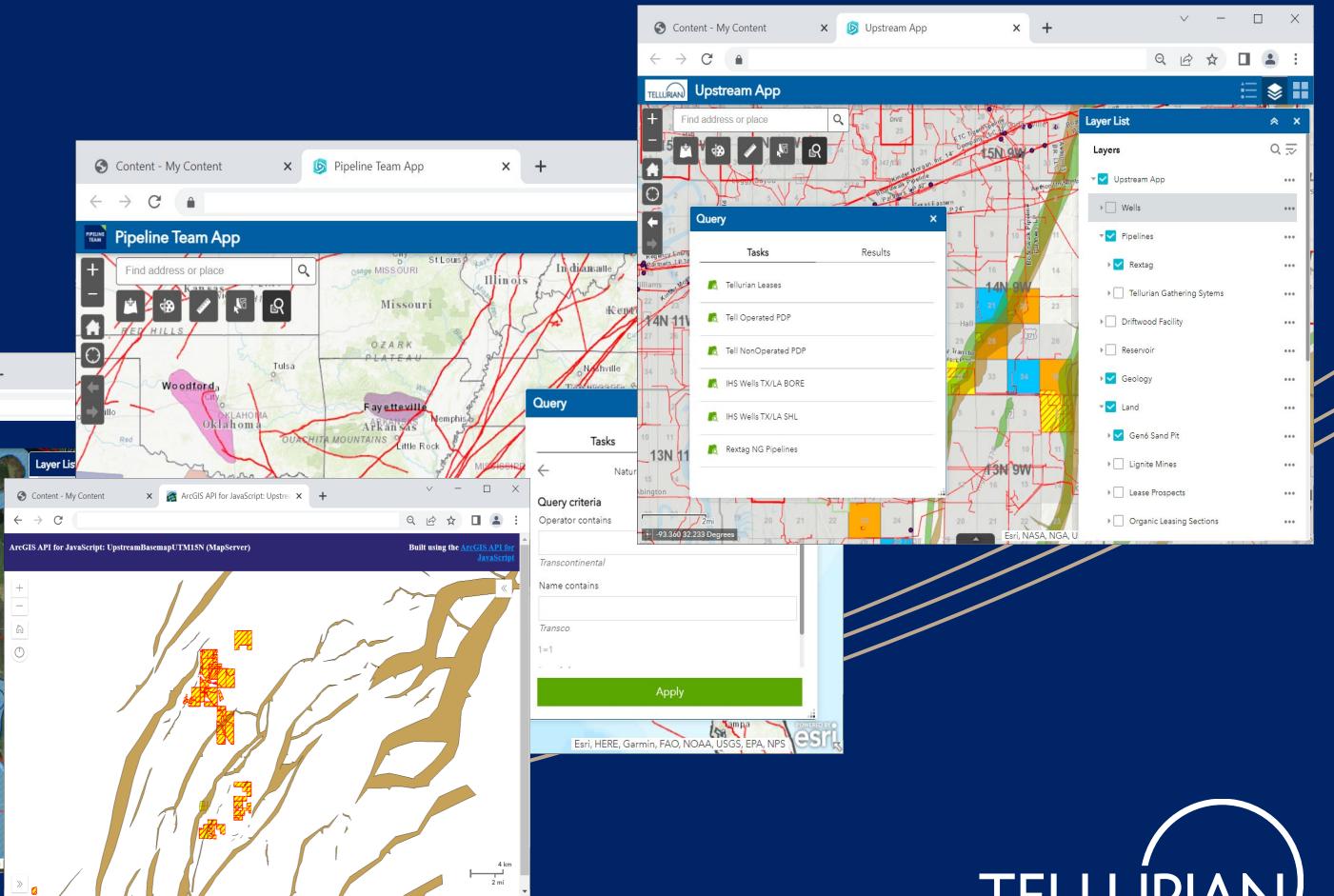
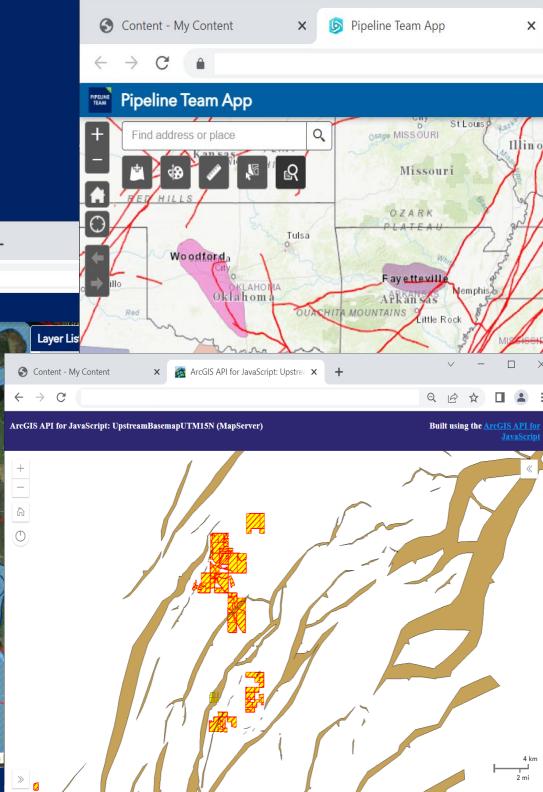
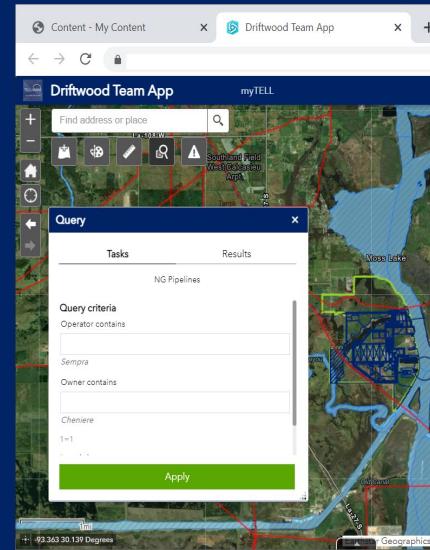
Team Web Apps:

- Upstream Team
- Pipeline Team
- LNG Team

Desktop Map



Plotter



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# Data Integration

*Combining internally-produced data with data subscriptions*

ENVERUS

Who are the vendors and how do we automate the updates?

- IHS Markit (Python)
- Enverus (toolbox/REST API)
- Rextag (Python)

REXTAG

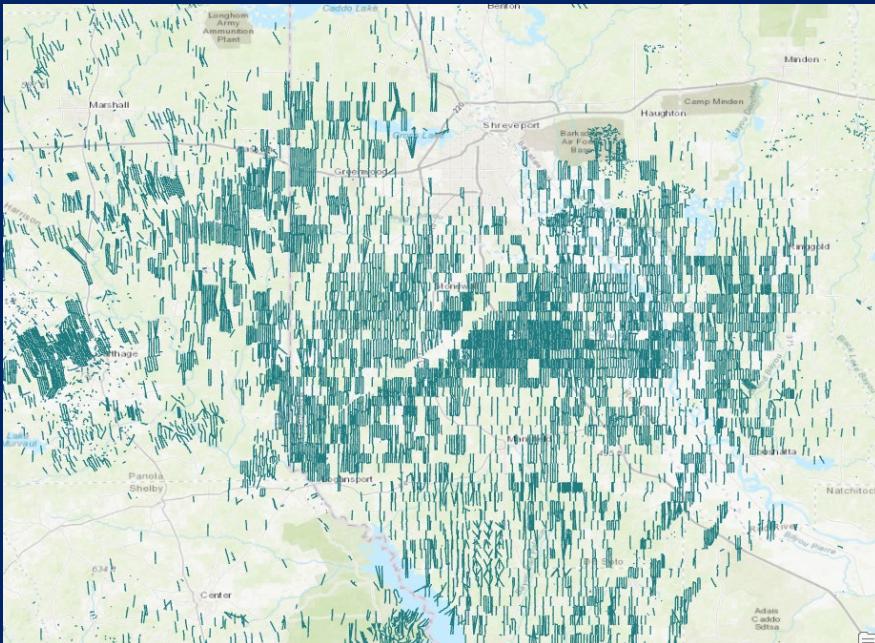


IHS Markit®

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# Data Integration

## IHS – Well Locations & Well Header Info



```
import arcpy

# set input/output parameters
outputgdb = r"\\azu-file-01\GIS_Data\Geodatabase\IHS_Markit\AllWells_IHS\AllWells_IHS.gdb"
sdefile = r"\\azu-file-01\GIS_Data\Geodatabase\IHS_Markit\AllWells_IHS\azu-sql-01.sde"
databasename = "IHSM_Meridian"
viewname = "UCS_AllWells_TX_LA"

arcpy.env.workspace = outputgdb
arcpy.env.overwriteOutput = True

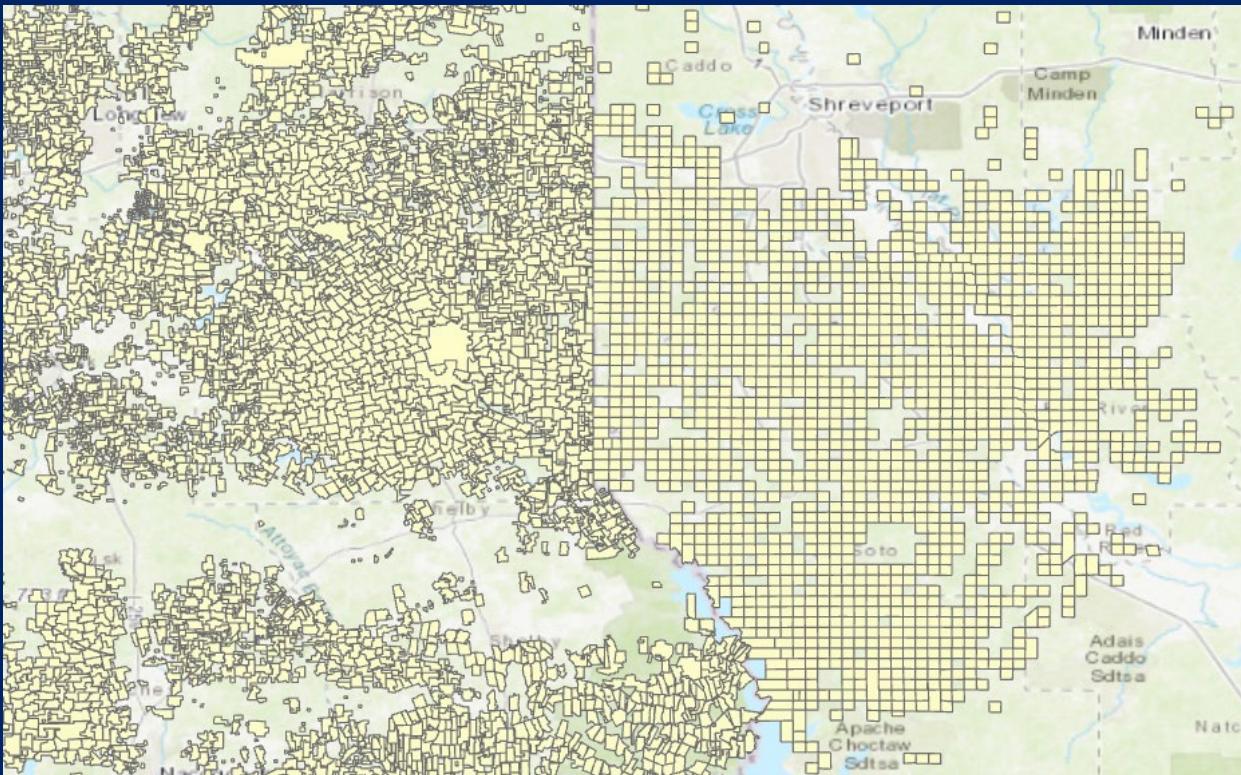
# delete the old feature classes
while len(arcpy.ListFeatureClasses(viewname + "*")) > 0:
    ListFC = arcpy.ListFeatureClasses(viewname + "*")
    for FC in ListFC:
        arcpy.Delete_management(FC)

# set the input feature classes
fcWB = sdefile + "\\\" + databasename + ".dbo." + viewname + "_WB"
fcSH = sdefile + "\\\" + databasename + ".dbo." + viewname + "_SH"
fcBH = sdefile + "\\\" + databasename + ".dbo." + viewname + "_BH"

# copy FC to geodatabase
arcpy.FeatureClassToFeatureClass_conversion(fcWB, outputgdb, "UCS_AllWells_TX_LA_WB")
arcpy.FeatureClassToFeatureClass_conversion(fcSH, outputgdb, "UCS_AllWells_TX_LA_SH")
arcpy.FeatureClassToFeatureClass_conversion(fcBH, outputgdb, "UCS_AllWells_TX_LA_BH")
```

# Data Integration - Enverus

## Enverus – Leases and Units



```
import arcpy

## this isn't working as a tool, but if you copy all the code below
## and run it from the Python window in ArcGIS Pro, it should work
arcpy.ImportToolbox(r"H:\arcgis projects\Enverus GIS Tools\Enverus GIS Tools.pyt")

# set input/output parameters
currentgdb = r"H:\arcgis projects\Enverus GIS Tools\Enverus GIS Tools.gdb"
outputgdb = r"\azu-file-01\GIS_Data\Geodatabase\DrillingInfo\LandtracLeasesUnits.gdb"
arcpy.env.workspace = currentgdb
arcpy.env.overwriteOutput = True

# delete the old feature classes
while len(arcpy.ListFeatureClasses("landtrac_*")) > 0:
    ListFC = arcpy.ListFeatureClasses("landtrac_*")
    for FC in ListFC:
        arcpy.Delete_management(FC)

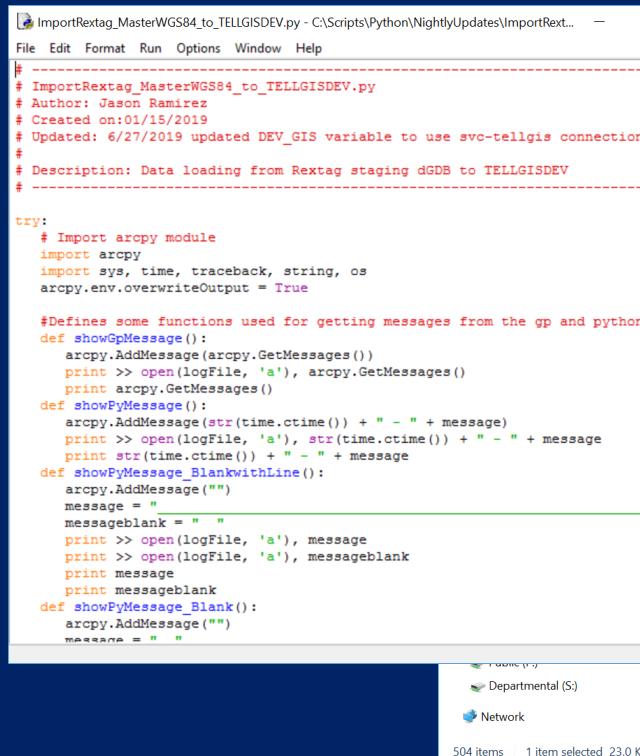
# set the feature class names
fcLAlease = "landtrac_leases_LA"
fcTXlease = "landtrac_leases_TX"
fcLAunit = "landtrac_units_LA"
fcTXunit = "landtrac_units_TX"

# download data from Enverus
arcpy.EnverusGISTools.SaveCredentials("17350-direct-access", "ef9ad9cb-8360-4922-8")
arcpy.EnverusGISTools.DataToFeatureClass("landtrac-leases", "CountyParish #;Deleted")
arcpy.EnverusGISTools.DataToFeatureClass("landtrac-leases", "CountyParish #;Deleted")
arcpy.EnverusGISTools.DataToFeatureClass("landtrac-units", "CountyParish #;Deleted")
arcpy.EnverusGISTools.DataToFeatureClass("landtrac-units", "CountyParish #;Deleted")

# merge TX & LA feature classes
arcpy.management.Merge(fcLAlease + ";" + fcTXlease, outputgdb + "\\landtrac_leases")
arcpy.management.Merge(fcLAunit + ";" + fcTXunit, outputgdb + "\\landtrac_units")
```

# Data Integration

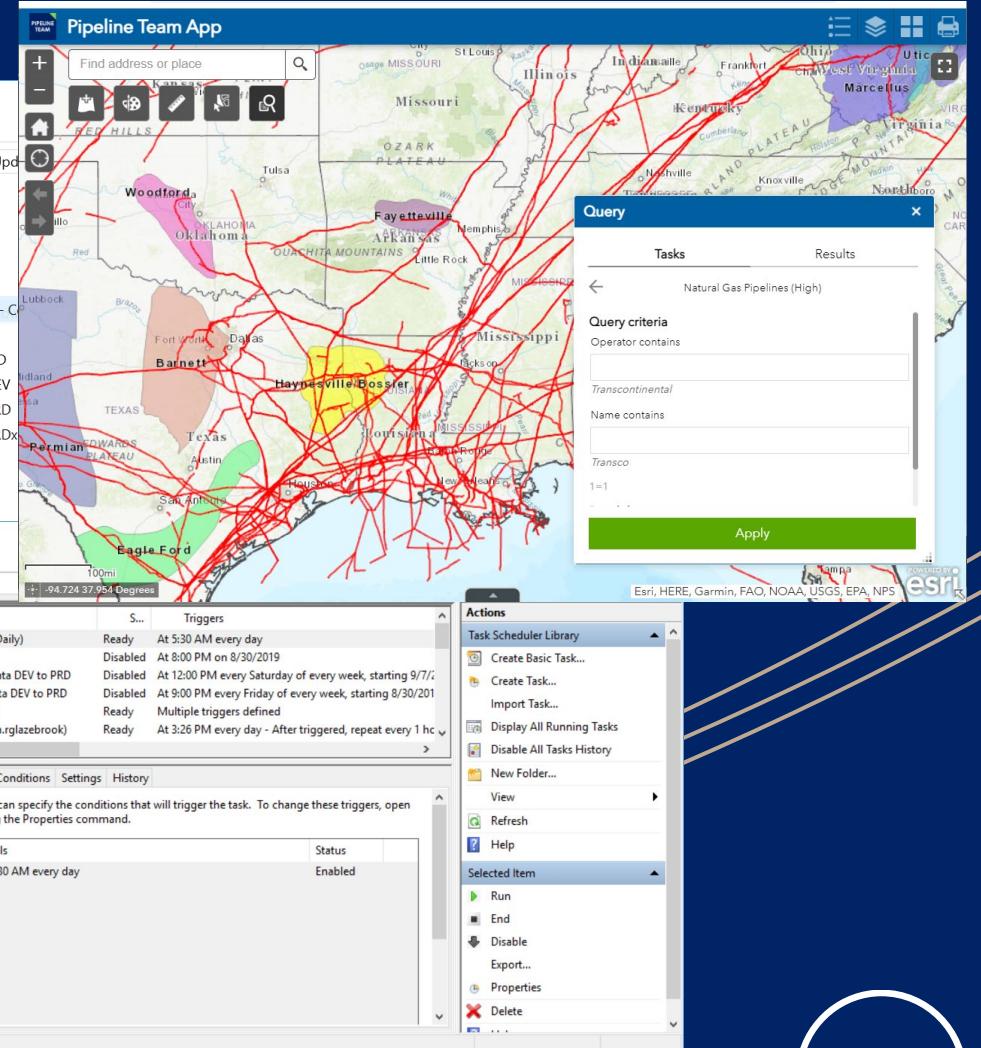
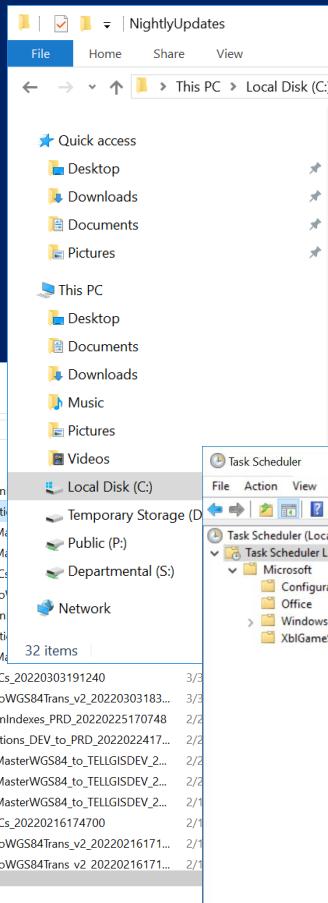
## Rextag - Python



```
# ImportRextag_MasterWGS84_to_TELLGISDEV.py - C:\Scripts\Python\NightlyUpdates\ImportRextag...
File Edit Format Run Options Window Help
# ImportRextag_MasterWGS84_to_TELLGISDEV.py
# Author: Jason Ramirez
# Created on:01/15/2019
# Updated: 6/27/2019 updated DEV_GIS variable to use svc-tellgis connection
# Description: Data loading from Rextag staging dGDB to TELLGISDEV
#
try:
    # Import arcpy module
    import arcpy
    import sys, time, traceback, string, os
    arcpy.env.overwriteOutput = True

    #Defines some functions used for getting messages from the gp and python
    def showGPMessage():
        arcpy.AddMessage(arcpy.GetMessages())
        print >> open(logFile, 'a'), arcpy.GetMessages()
        print arcpy.GetMessages()

    def showPyMessage():
        arcpy.AddMessage(str(time.ctime()) + " - " + message)
        print >> open(logFile, 'a'), str(time.ctime()) + " - " + message
        print str(time.ctime()) + " - " + message
    def showPyMessage_BlanckwithLine():
        arcpy.AddMessage("")
        message = ""
        messageblank = " "
        print >> open(logFile, 'a'), message
        print >> open(logFile, 'a'), messageblank
        print message
        print messageblank
    def showPyMessage_Blanck():
        arcpy.AddMessage("")
        message = ""
```



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# Special Projects

*Answering emergent business challenges with spatial solutions*

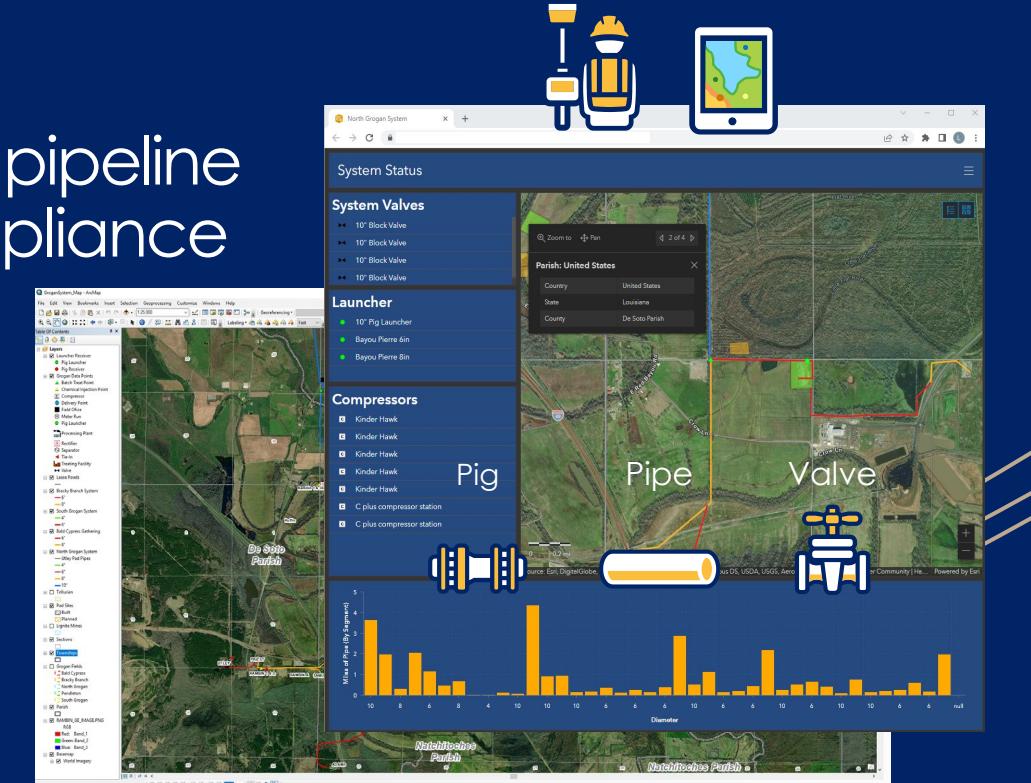


# Special Projects

## Infrastructure Dashboard

**Use Case:** We need to capture and visualize pipeline infrastructure for analysis and regulatory compliance

- Tablet interface for field works capturing assets
- Feed enterprise web apps like the Upstream App
- Collected data provide regulatory reporting under LDNR and PHMSA pipeline rules



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# Special Projects

Construction Job Site Status App

# Thank you!

## **Presentation Questions**

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