Professional Petroleum Data Management

Houston Expo 2022

A data governance journey to MDM - best practices and implementation

Hilda Espinoza
University Lands

Together with IHSMarkit (now part of S&P Global)

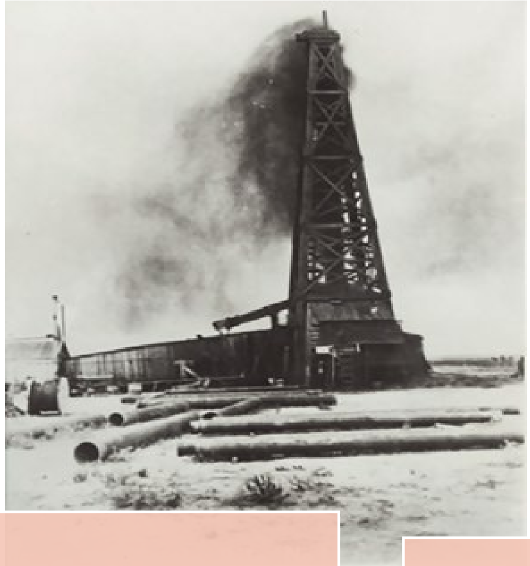
Agenda

- Quick Intro to University Lands
- Data Governance: Inside University Lands Walls
- UL Data Governance and IHS Markit’s EDM
- University Lands and IHS Markit Partnership Benefits
- University Lands Next Steps

Quick Intro To University Lands

UNIVERSITY LANDS

University Lands History and Now …



- 2.1 million acres of land, surface and mineral interests for the benefit of the Permanent University Fund (PUF)
- University Lands covered 19 Counties
- The PUF is one of the largest endowments in the United States
- The PUF benefits more than twenty educational and health institutions across The University of Texas System and Texas A&M University System
- > 250 Operators
- > 4,000 active O&G Leases
- > 10,000 producing wells

1839

Grant #1

- The Republic of Texas Congress set aside fifty leagues (220,000 acres) of land for the establishment and endowment of a university

1876

Grant #2

- The State of TX Constitution Congress called for the creation of the University of Texas and appropriated 1 million acres of land for the establishment of a PUF

1883

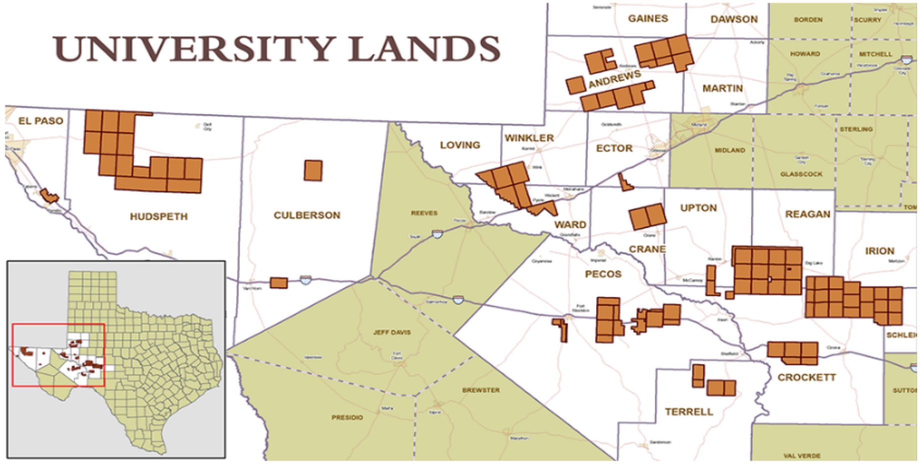
Grant #3

- An additional 1 million acres were added to the PUF Lands

1923

Oil discovered

- First completed well, Santa Rita No. 1, in Reagan County
- Well plugged on May 20, 1990 after producing 131,775 barrels of

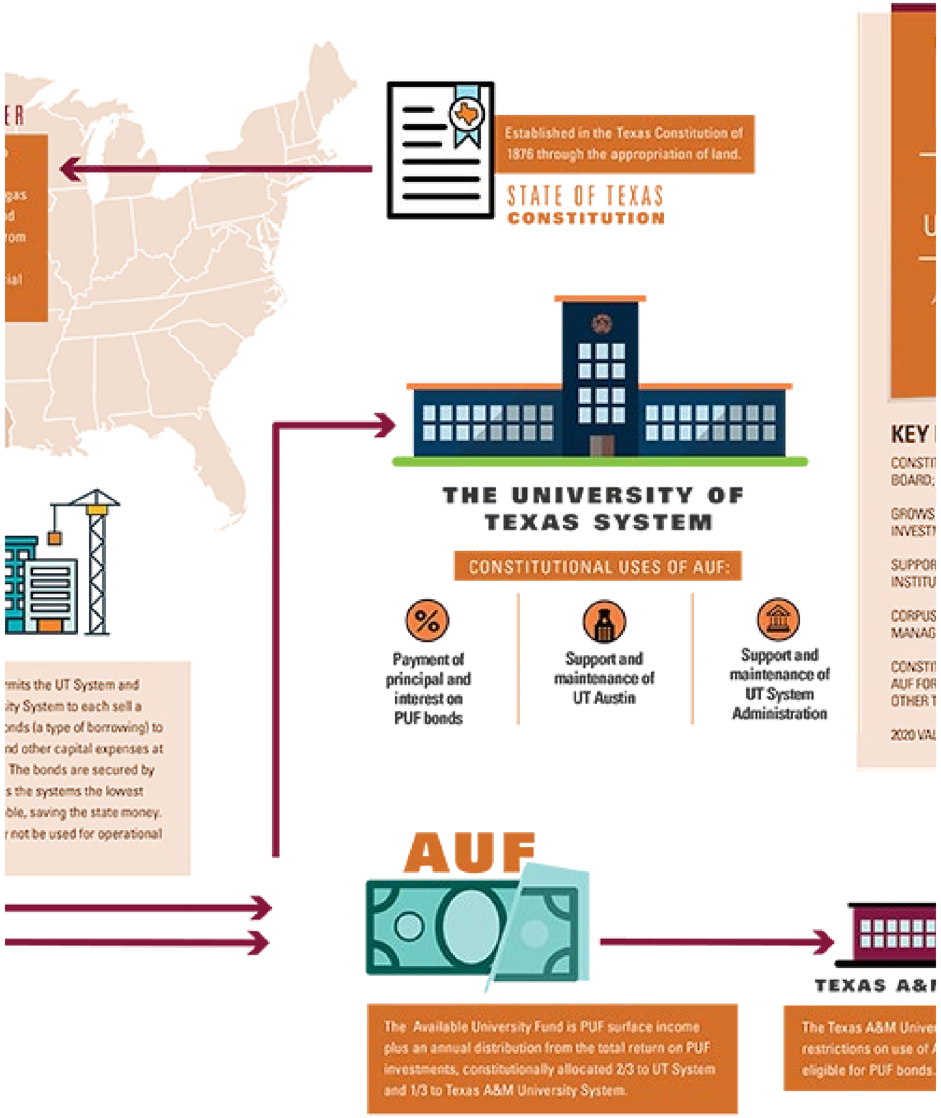


Today, the PUF Lands comprise 2.1 million acres in nineteen counties in West Texas.

County	# Acres	County	# Acres	County	# Acres
Andrews	293,029	Crane	65,244	Crockett	368,523
Culberson	46,421	Dawson	163	Ector	6,317
El Paso	11,745	Gaines	2,805	Hudspeth	493,405
Irion	25,353	Loving	25,881	Martin	16,687
Pecos	190,863	Reagan	218,105	Schleicher	61,835
Terrell	61,885	Upton	86,429	Winkler	49,036
Ward	81,047			Total Acres: 2,104,772	

Our Mission…

To maximize the revenue from the Permanent University Fund (PUF) Lands, protect the interests of The University of Texas System and promote awareness and sensitivity for the environment

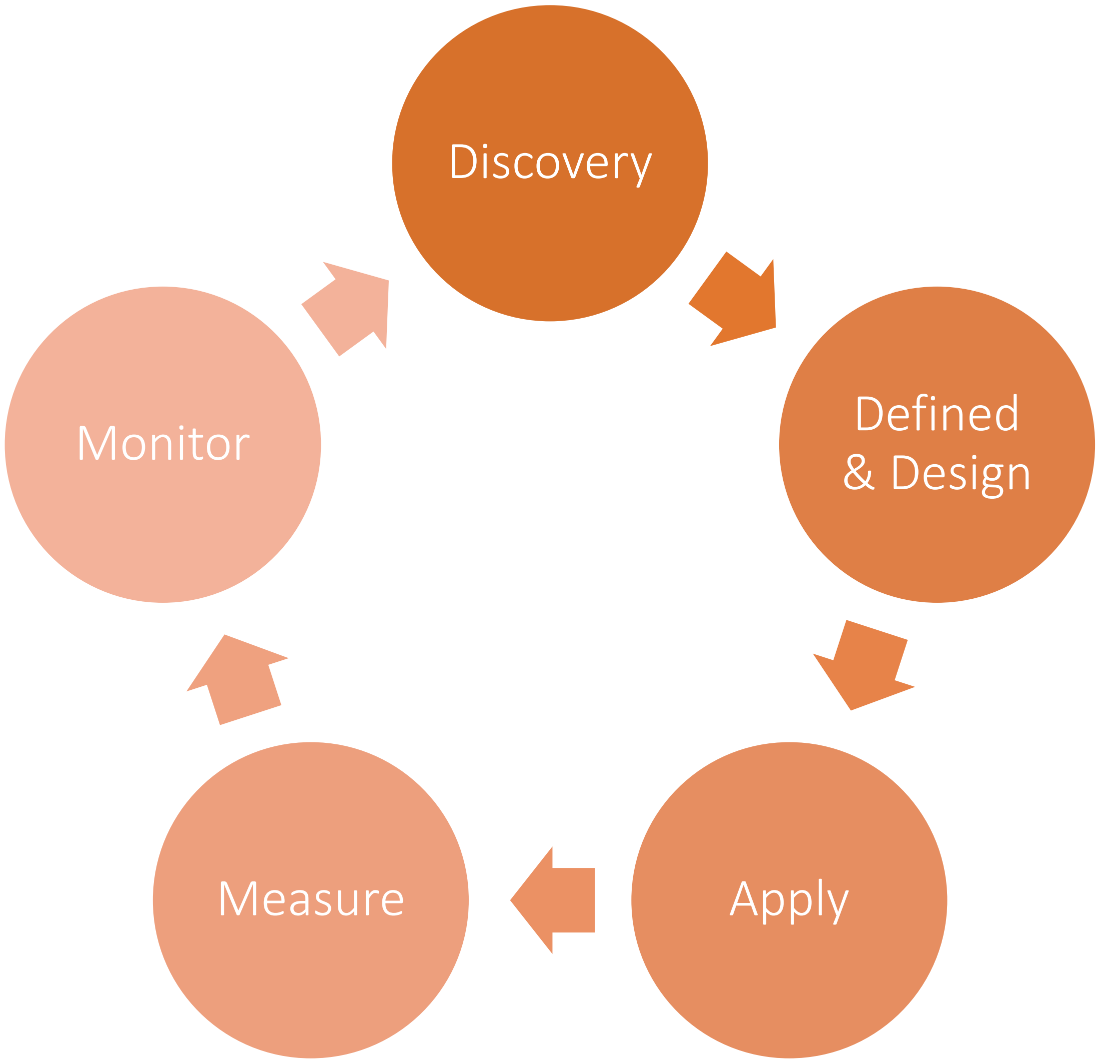


Data Governance:
Inside University Lands Walls

Establishing Data Governance Out of the Gate

1. IT forms an informal workgroup
2. Introduction of concept to immediate supervisors
3. Presentation to executives and leadership teams
4. Sponsorship support obtained
5. Disseminate information to organization
6. Selection of technology, identification of key employees as SMEs

Continuous Approach to Data Governance



MDM/DG Wellbore Lifecycle Implementation Timeline

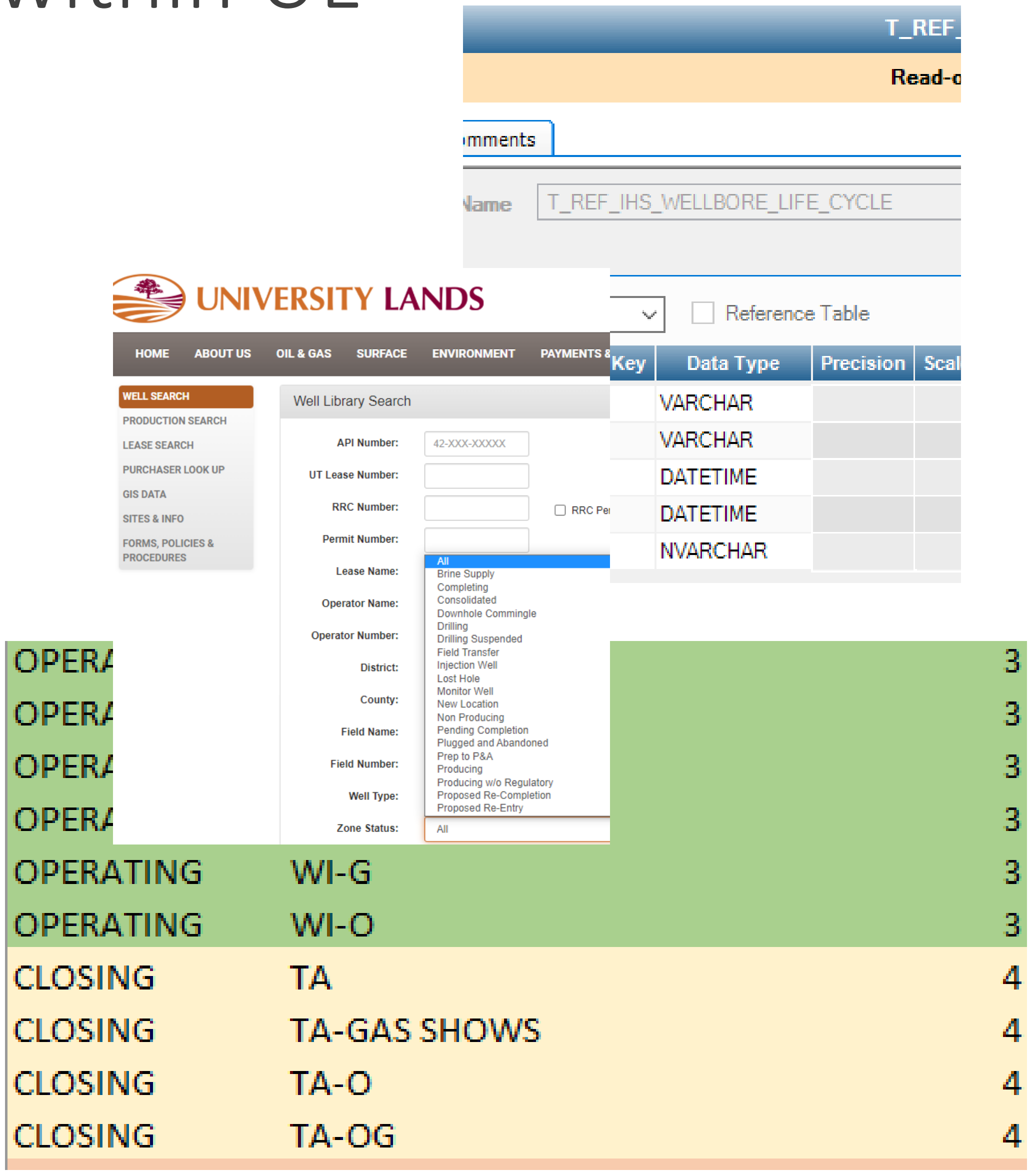
Jan 2020	Jun 2020	Aug 2020	Nov 2020	Jan 2021	Mar 2021	Apr 2021	Aug 2021	Oct 2021
• Initial discussion	• Workgroup formed • Presentation to Management Team	• Focus group discussions • Domain questionnaire distribution to focus groups • Committee formation • High level definition domain, subdomains, elements • Domain Stewards identified, data owner, user or creator • Starting point selection … and the winner is … WELL DOMAIN	• MDM platform selection – Enterprise Data Management (EDM) IHS Markit now S&P Global • Well domain and data element workshop	• First rounds of Discovery Meetings • EDM Official Implementation kick-off • Discovery and Design with IHS/SPGI • MDM Design Approval and Sign-off	• Match/Align sources and attributes • Master data to obtain the master/golden well record • Knowledge Sharing Sessions on MDM WM Build	• Discussion PPDM wellbore life cycle • Incorporate PPDM business and data rules into WM solution for well header and surveys • Discussion for phase 2 for WM build to bring in Completions and Production Data	• Production promotion sign-off for both phase 1 and 2 • Go Live with Mastering Well Header and Well Production	• Wellbore life cycle implementation finalized

UL Data Governance And IHS Markit (SPGI)

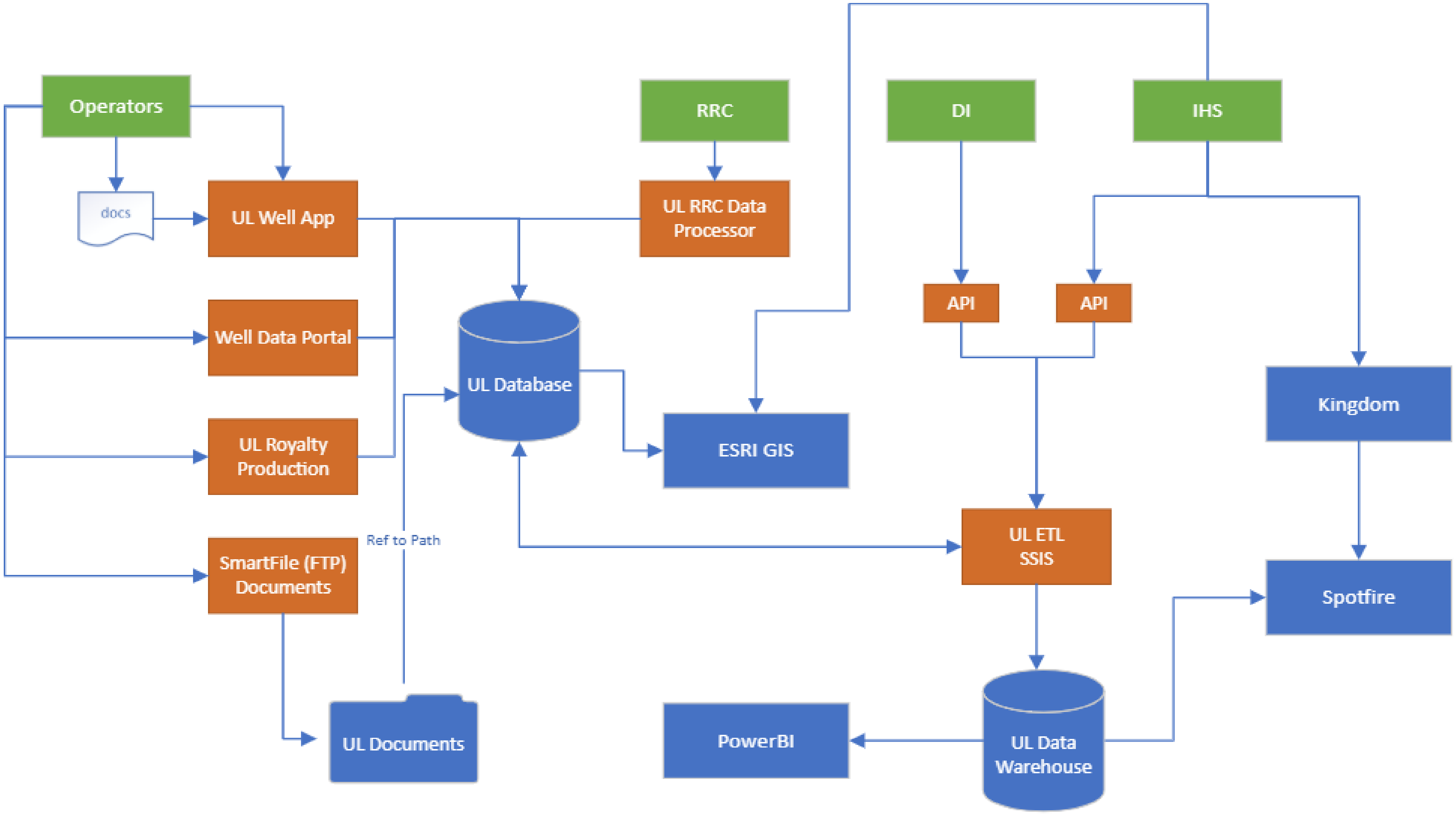
Using PPDM as a guide how did we do it?

EDM and PPDM Well Life Cycle within UL

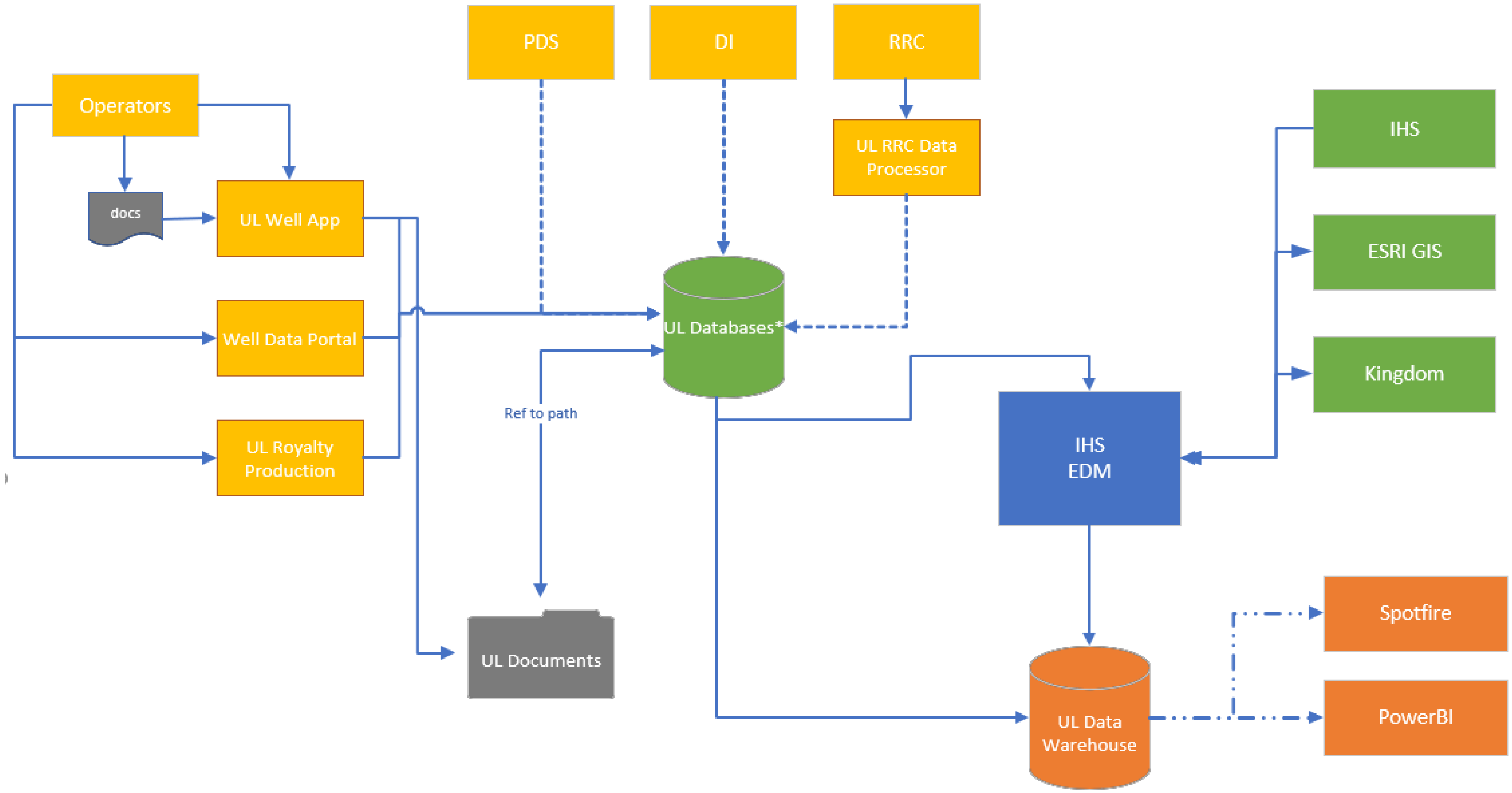
- A Well Life Cycle is a set of major phases that are significant to regulators and/or business stakeholders.
- By mapping a well life cycle to each source's wellbore status, UL internal processes have the advantage to compare them and make business decisions and improve workflows.
- UL utilized the processes and workflows within EDM to further DG goals for established a well-defined wellbore lifecycle and align all sources internally to obtain a master well record



Initial Architecture

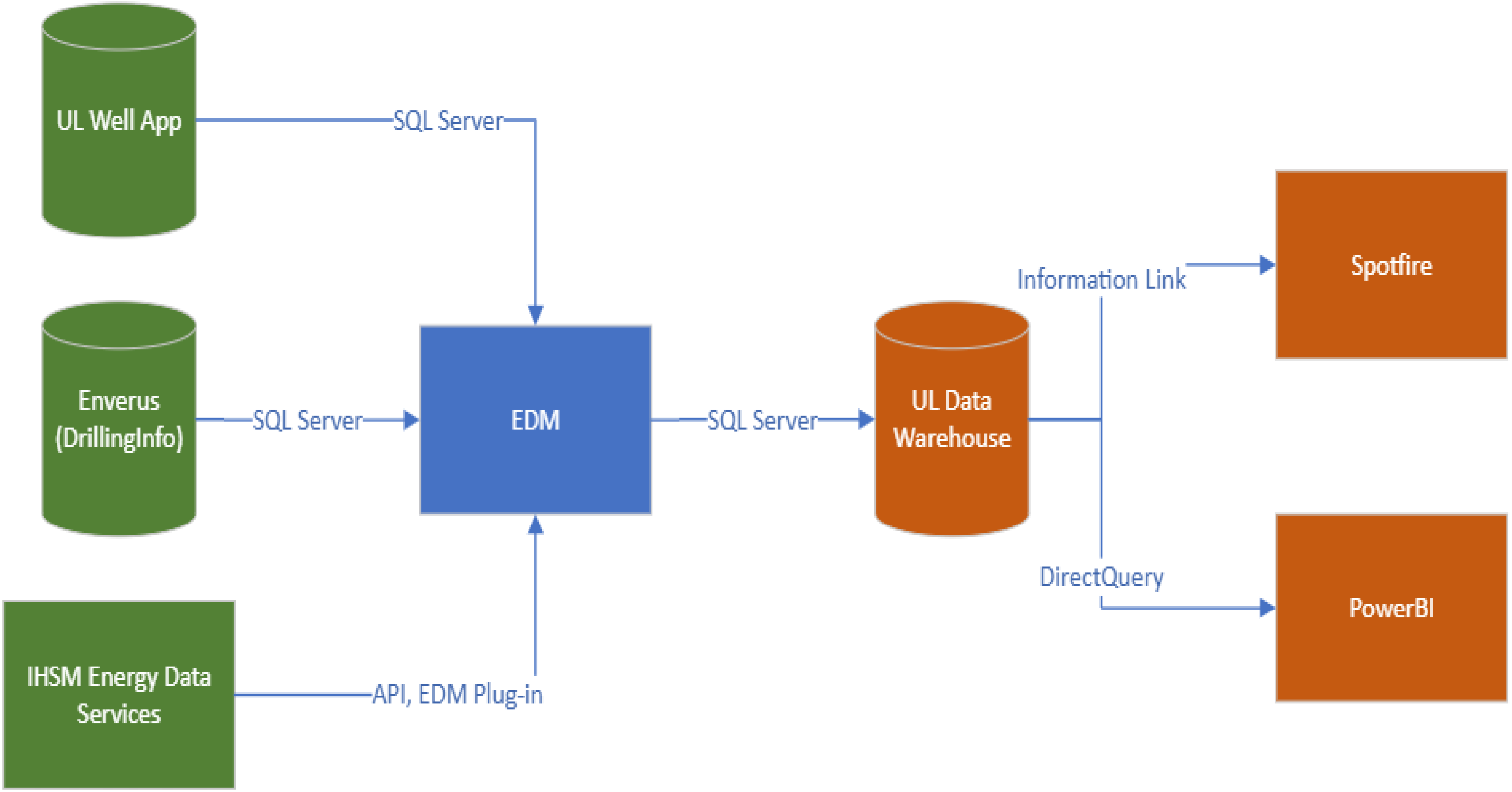


Redesigned Architecture



*UL Databases source for EDM is multiple instances for the sources feeding into them. This will also house staging tables/views for EDM consumption

EDM Integration



Data Governance Results, Mastering Well Data

Master Attribute	1st	2nd	3rd	4th	5th
API_10	Source 1	Source 2	Source 3	Source 4	Source 5
API_12					
API_14	Source 2	Source 3			
AVG_PROD_INTVL_TVD	Source 1				
BH_LATITUDE_WGS84	Source 1	Source 2	Source 3		
BH_LONGITUDE_WGS84	Source 1	Source 2	Source 3		
BLOCK_SURFACE_ORIGIN	Source 1	Source 3	Source 5		
COMPLETED_INTERVAL_LENGTH	Source 1	Source 2			
COMPLETED_TRUE_VERTICAL_DEPTH					
COMPLETION_DATE	Source 3	Source 2	Source 1		
COUNTY_SURFACE_ORI					
DEEPEST_TRUE_VERTIC					
WELL_ STATUS					
WELLBORE_LIFE_CYCLE					
FIRST_FLOWBACK_DAT					
FIRST_PRODUCTION_DA					
FIRST_PRODUCTION_MC					
FRAC_START_DATE					
GEOLOGIC_BASIN					
GEOLOGIC_PROVINCE					
GROUND_ELEVATION					
HOLE_DIRECTION					
HORIZONTAL_LATERAL_					
IHS_WELL_STATUS					
IHS_WELLBORE_LIFE_C					
IP_GAS_GRAVITY					
IP_OIL_GRAVITY					
IP_TEST_DATE					
IS_UL_WELL					
OPERATOR_NAME_ALIA					
OPERATOR_NAME_CURR					
OPERATOR_NAME_DRILI					
OPERATOR_RRC_NUMBER_CURRENT	Source 1				
OPERATOR_RRC_NUMBER_DRILLING	Source 1				

Master Attribute	ULDB source mapping	IHS Mapping	Enverus source attribute	Allegro source mapping	Compass source mapping
API_14	ULDB.Well.Wellbore.APINbr + ULDB.Well.Zone.UWIExt	UWI	well-rollups.API14		
API_10	ULDB.Well.Wellbore.APINbr	API	well-rollups.API10	dbo.Property.Property (with Prefix AP)	dbo.Property Control.Comments (API added in the comments)
API_12			well-rollups.API12		
RRC_LEASE_NAME	ULDB.Well.Zone RRCLease.LeaseName	LEASE	well-rollups.LeaseName	dbo.Property.decription	dbo.Property Control.Lease Name
RRC_WELL_NUMBER	ULDB.Well.Zone RRCLease.WellNbr	WELL_NUMBER	well-rollups.WellNumber	dbo.Property.description (lease and well number combined)	
COMPLETION_DATE	ULDB.Well.Zone.DateCompletion	COMPLETION_DATE	well-rollups.CompletionDate		
RIG_SPUD_DATE		SPUD_DATE	well-rollups.SpudDate		
BH_LATITUDE_WGS84	ULDB.Well.BHLLatitude (transformed from NAD83)	BOTTOM_HOLE_LATITUDE (Requires blue marble conversion)	well-rollups.BottomHoleLatitudeWGS84		
BH_LONGITUDE_WGS84	ULDB.Well.BHLLongitude(transformed from NAD83)	BOTTOM_HOLE_LONGITUDE (Requires blue marble conversion)	well-rollups.BottomHoleLongitudeWGS84		

- Worked through the data elements of the well header one by one
- Identified source preferences
- Identified a list of master attributes
- Established hierarchy for each attribute
- Incorporated rules from PPDM
- Enabled validations on data

MATCHING / ALIGNING SOURCES

Name	Match Condition	Match Attribute Score
API_10	**Equals**	**90**
RRC_LEASE_NAME	**Like**	**80**
RRC_WELL_NUMBER	**Like**	**80**
WELL_ORIENTATION	**Equals**	**50**
COMPLETION_DATE	**Tolerance 10 Days**	**70**
RIG_SPUD_DATE	**Tolerance 10 Days**	**70**
BH_LATITUDE_WGS84	**Equals, truncated to 4 decimal places**	**50**
BH_LONGITUDE_WGS84	**Equals, truncated to 4 decimal places**	**50**
SURFACE_LATITUDE_WGS84	**Equals, truncated to 4 decimal places**	**50**
SURFACE_LONGITUDE_WGS84	**Equals, truncated to 4 decimal places**	**50**
COUNTY	**Equals**	**50**
STATE/PROVINCE	**Equals**	**50**
KB_ELEVATION	**Tolerance +- 10**	**50**
GR_ELEVATION	**Informational (For user reference)**	**0**
MD	**Tolerance +- 10**	**50**
TVD	**Informational (For user reference)**	**0**

UL WM UI Workflow Results

Master Well

Search

(EDM Well Id, API10, RRC Well Name)

State

☐ Survey (Place Holder)

Wells

EDM Well Id	API10	API12	API14	UL Zone Id	Is UL Well	RRC Lease Name	RRC Well Number	Rig Spud Dat
70000000	4200300000			1	☑	UNIVERSITY BLOCK 9 PENN UNIT	3WSW	
70000001	4200300001			23808	☑	MAGUTEX QUEEN UNIT	1WSW	
70000002	4200300012		42003000120000	2	☑	Phillips-Lion-University "T"	1	9/12/1954 12
70000003	4200300013		42003000130000	3	☑	Phillips-Lion-University "T"	2	1/27/1955 12
70000004	4200300014		42003000140000	4	☑	EMMA SAN ANDRES UNIT	5-1	8/5/1939 12:(
70000005	4200300015		42003000150000	5	☑	Emma San Andres Unit	502	9/22/1939 12
70000006	4200300017		42003000170000	6	☑	STATE UNIV. 2 QN CONS. UT.	3139W	11/20/1956 1
70000007	4200300020		42003000200000	7	☑	EMMA SAN ANDRES UNIT	12-1	6/29/1941 12
70000008	4200300021		42003000210000	8	☑	Samedan University	1	9/22/1962 12

1 2 3 4 5 ... 1 - 50 of 581,083 items

MAP COMPLETENESS

SUBMIT OVERRIDE

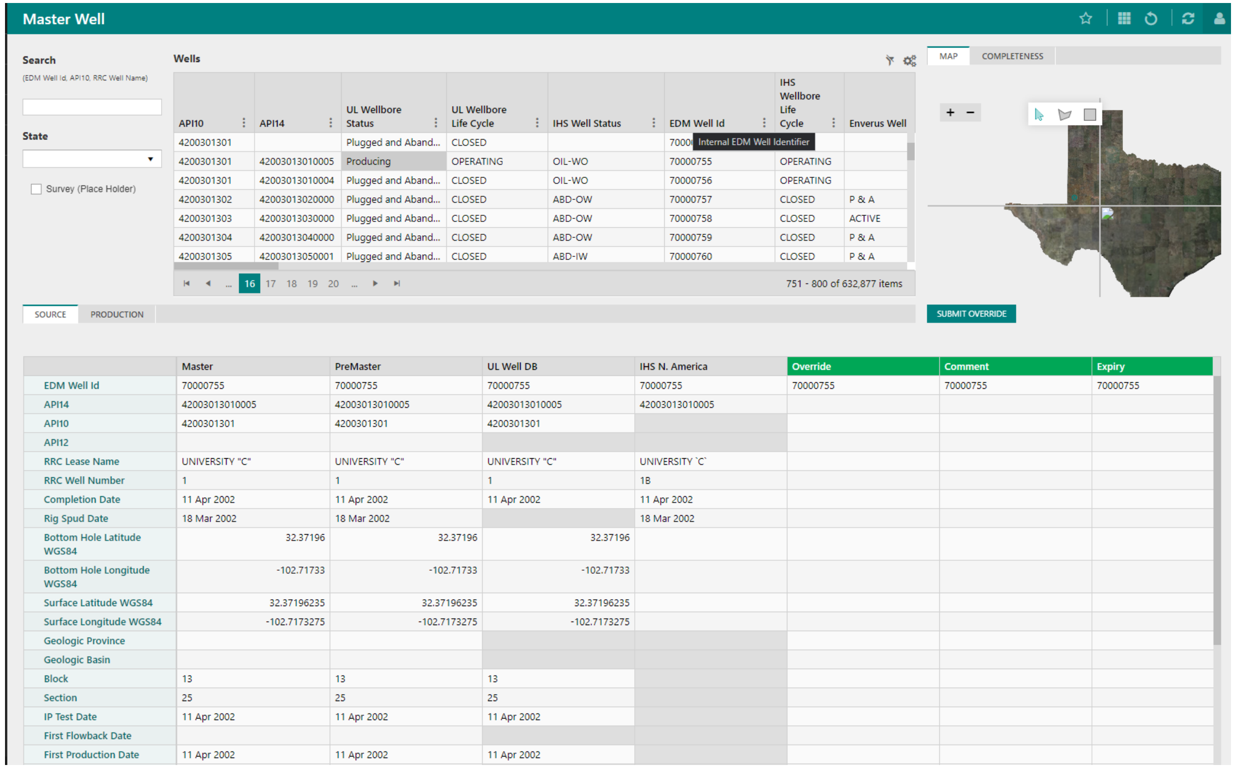
SOURCE

	Master	Override	Comment	Expiry	PreMaster	UL Well DB	IHS N. America	Enverus	Allegro
EDM Well Id	70000006	70000006	70000006	70000006	70000006	70000006	70000006	70000006	70000006
API14	42003000170000				42003000170000	42003000170000	42003000170000	42003000170000	
API10	4200300017				4200300017	4200300017		4200300017	4200300017
API12									
RRC Lease Name	STATE UNIV. 2 QN CONS. UT.				STATE UNIV. 2 QN CONS. UT.	STATE UNIV. 2 QN CONS. UT.	STATE UNIV 2 QN CON	STATE UNIV #2 QN CONS UT.	STATE UNIV. 2 QN CONS. UT.
RRC Well Number	3139W				3139W	3139W	31-39	3139W	3139W
Completion Date	24 Jan 1994				24 Jan 1994	12 Dec 1956	12 Dec 1956	24 Jan 1994	
Rig Spud Date	20 Nov 1956				20 Nov 1956		20 Nov 1956	21 Mar 1958	
Bottom Hole Latitude WGS84	32.40388				32.40388	32.40388		32.40378	
Bottom Hole Longitude WGS84	-102.46755				-102.46755	-102.46755		-102.46791	
Surface Latitude WGS84	32.40382602				32.40382602		32.40382602	32.4037793	
Surface Longitude WGS84	-102.4679202				-102.4679202		-102.4679202	-102.4679081	
Geologic Province	PERMIAN BASIN				PERMIAN BASIN			PERMIAN BASIN	
Geologic Basin	MIDLAND				MIDLAND			MIDLAND	
Block	04				04	04		4	04
IP Test Date	12 Dec 1956				12 Dec 1956	12 Dec 1956			
First Flowback Date									
First Production Date	12 Dec 1956				12 Dec 1956	12 Dec 1956		01 Nov 1963	
First Production Month	01 Dec 1956				01 Dec 1956				
County	ANDREWS				ANDREWS	Andrews	ANDREWS	ANDREWS (TX)	Andrews

University Lands And IHS Markit Partnership Benefits

Benefits of the Partnership

- We learn a lot ☺
  - — be patient, target small work units
- An improved version of the truth for the well header data can give us insights of our own data
- Mastering data gave our different business units access to the same data in a centralized location
- Existing analysis tasks improved utilizing a dataset with less data gaps
- Centralized data use and diminishing data silos
- There's more to learn …



*Master Well Page Adjustments post learnings

University Lands Next Steps

University Lands Next Steps

- Continue to improve our data quality and business processes
- Growth in our data understanding by utilizing different data sources
- Expand EDM by continuing to master other areas of University Lands data using PPDM well life cycle and PPDM Business and Data Rules

Q&A

Thank You!