(PILOT) REPORTING DATA SYSTEM CONCEPT OVERVIEW

Delta Measurement Experimentation Consortium
Tuesday, July 17, 2018 @ 2:00 p.m.

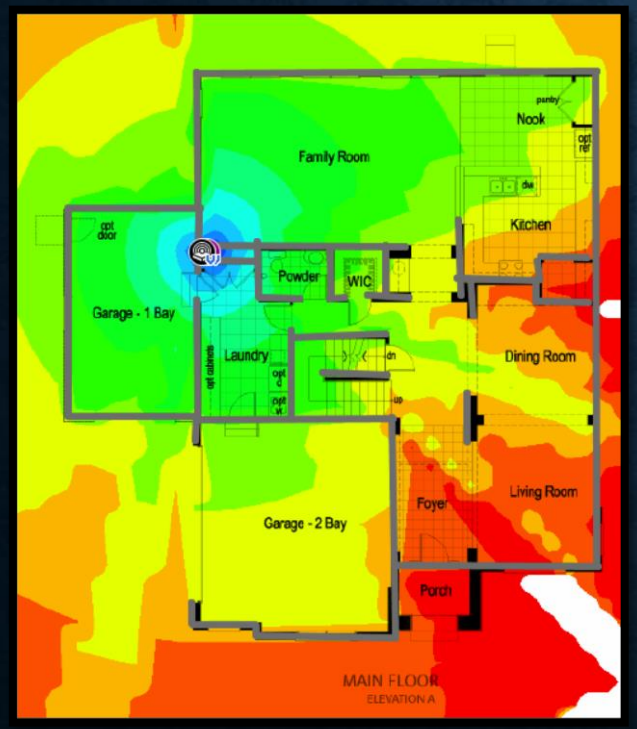
Brent Vanderburgh, PG
Groundwater Management Program
CA State Water Resources Control Board
Brent.Vanderburgh@waterboards.ca.gov

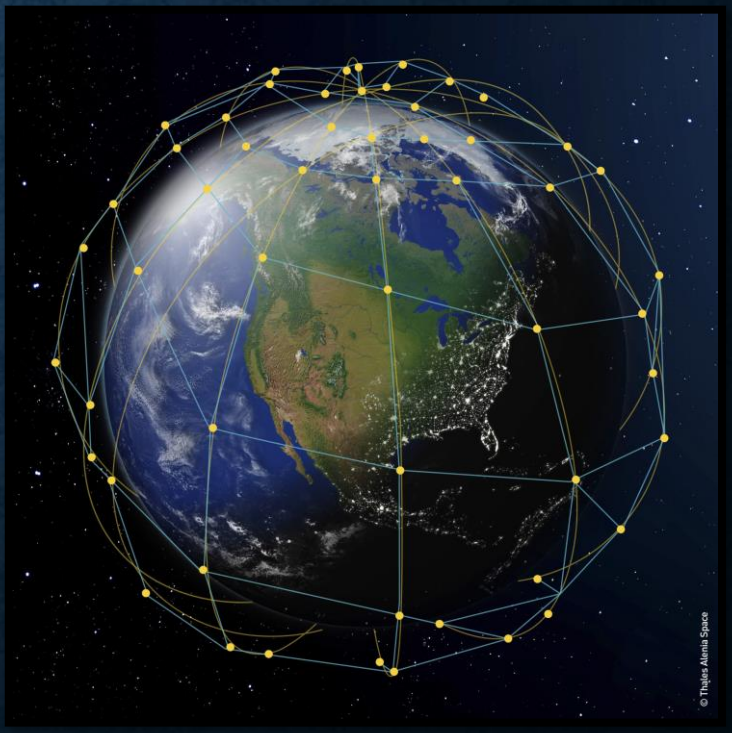
REFRESHER FROM LAST MEETING

- **Needs**
  - SB88, SGMA, and other demands for a modern, web-based, reporting solution
- **Goals**
  - Design user-centered reporting platform (Catcher's Mitt): *A secure, authenticated data system to receive, store, and make accessible water use data across multiple scenarios, scopes, and scales*.
  - Intended as proof-of-concept (not the final solution)
  - "In-place" data collection with minimal reporting hurdles (as-is data)
  - Data lifecycle focus
    - Test out QA protocols and data structure requirements (break silos, strengthen data integrity)
- **Defined a few basic terms** (Glossary)
- **Developed basic conceptual diagramming**

TELEMETRY (IN 2018)

- What is "telemetry"?
  - Merriam-Webster: "*…an electrical apparatus for measuring a quantity (such as pressure, speed, or temperature) and transmitting the result especially by radio to a distant station.*"
- What "radio" communication protocols are there for flow/stage gauging?



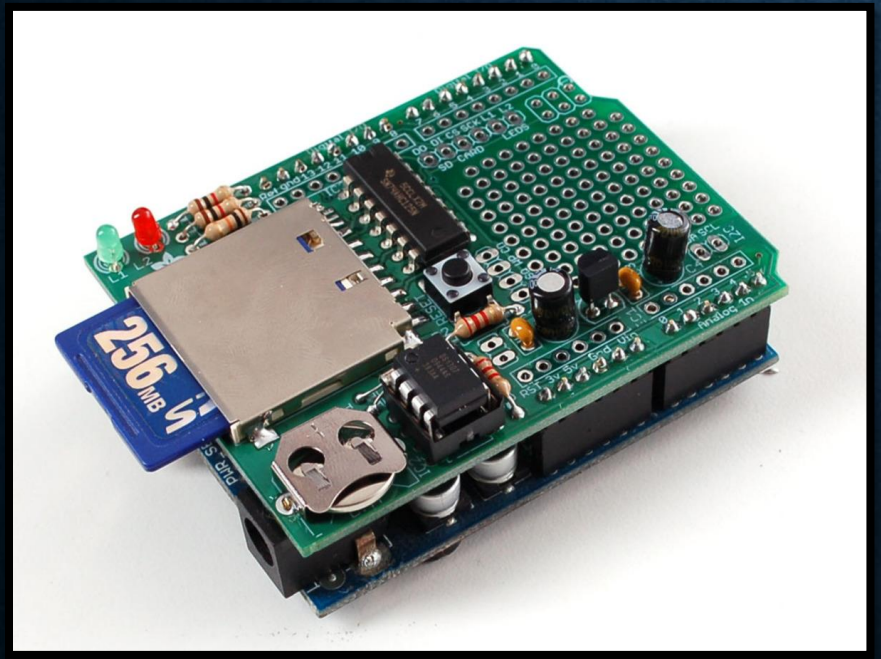


Increasing spatial coverage →

DATA SUBMITTAL VEHICLES

- How can the data get to the Board?
  - On-board data logging (manual upload from SD card – csv, xlsx, etc.)
  - Web data logging (automatic upload to web – requires API access/authorization for reporting)
  - ~~Direct link logging (deprecated)~~
- Different transaction for web vs SD card processes = *different system business processes*

Manual



Automatic (mostly)

MANY INCOMING DATA FORMATS

Mesotech

DATE	TIME	FLOW3.WFR	FLOW3.WVI	FLOW3.WVT	BATT.V
MM/DD/YYYY	HH:MM	gpm	gal	Ac-Ft	V
11/9/2017	9:30	0	0	0	15.974
11/30/2017	11:15	0.10254	0.82035	2.52E-06	12.212
11/30/2017	11:30	0.05469	0.82035	5.04E-06	12.193

Yk Creek

Date and Time	Seconds	Pressure (PSI)	Temperature (C)	Depth (ft)
3/18/2015 17:00	0	0.255	17.027	0.588
3/18/2015 17:15	900.001	0.253	16.981	0.585
3/18/2015 17:30	1800.001	0.255	16.969	0.588

HydroVu_Yk Creek (In-Situ)

Date Time	Pressure (psi)	Temperature (C)	Depth (ft)
1/18/2018 13:00	0.30052471	12.476074	0.69443953
1/18/2018 14:00	0.30965328	12.401855	0.71416068
1/18/2018 15:00	0.32568073	12.424225	0.75191188

ExampleData_Stage

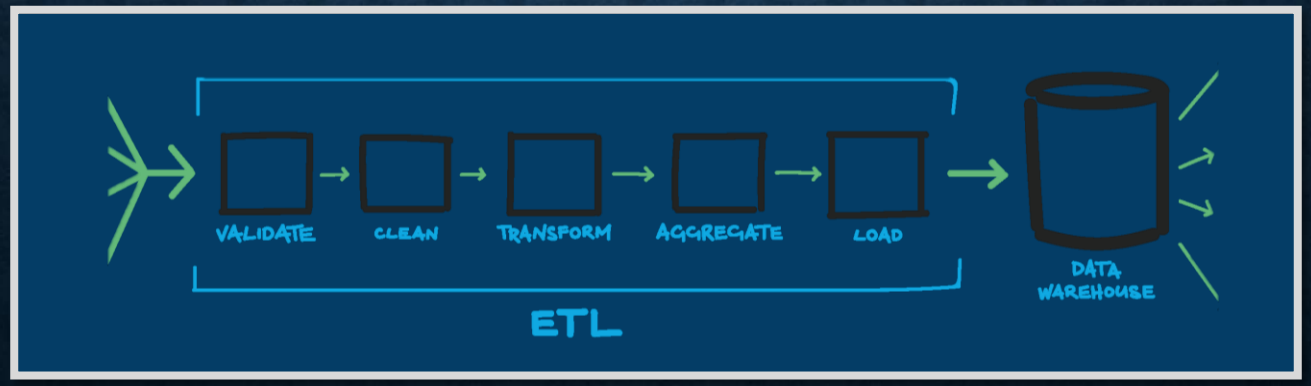
Date Time, GMT-08:00	Abs Pres, psi (LGR S/N: 10837757, SEN S/N: 10837757)	Temp, °C (LGR S/N: 10837757, SEN S/N: 10837757)	Abs Pres Barom., psi (LGR S/N: 10837759, SEN S/N: 10837759)	Sensor Depth, feet (LGR S/N: 10837757)
43026.44792	15.3723	14.038	14.748	1.441
43026.45833	15.3704	14.134	14.7495	1.434
43026.46875	15.3678	14.325	14.7461	1.435

Mace w/ status

!Names	VELOCITY	DSI	FLOWRATE	TOTAL FLOW	INTERNAL BATTERY	EXTERNAL/SOLAR
!Units	ft/s		gal/min	acft	V	V
!Interval	1800					
43117.28762	*Upload	HTTP: OK				
43117.29167	0	0	0	1937.02	12.2	0.3
43117.3125	0	0.01	0	1937.02	12.22	0.3

CONSOLIDATING DATA FORMATS
(REFERENCE ARCHITECTURE…*MAKING FORMATS MATCH*)

- What is a reference architecture? A single source to "aim" for when transforming data. Allows for ETL and X-walk processes to automatically transform data.
- How does it work? Conceptual Water Board "Data Exchange" module:
  - Quality Assurance/Control protocols
  - Extract Transform Load code ("ETL" layers)
  - Cross-walk tables ("X-walks")
- Question for discussion…Would "auto-magic" streaming reporting be a good idea or not, and why?



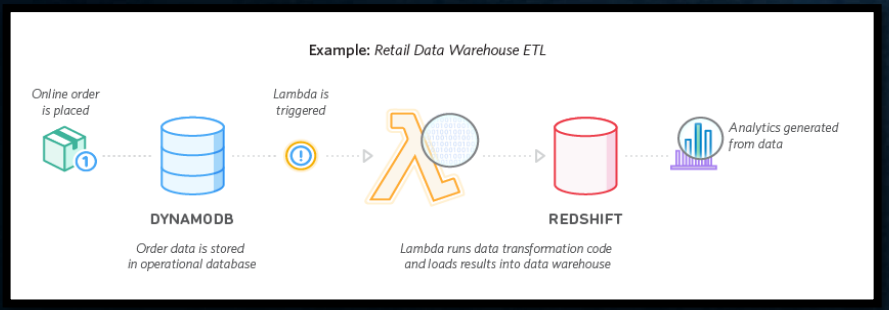
EXAMPLE REFERENCE ARCHITECTURE

Mesotech	MM/DD/YYYY	HH:MM	gpm	gal	Ac-Ft	V
	11/9/2017	9:30	0	0	0	15.974
	11/30/2017	11:15	0.10254	0.82035	2.52E-06	12.212
	11/30/2017	11:30	0.05469	0.82035	5.04E-06	12.193
	DATE	**TIME**	**FLOW3.WFR**	**FLOW3.WVI**	**FLOW3.WVT**	**BATT.V**

Example "Reference" Header

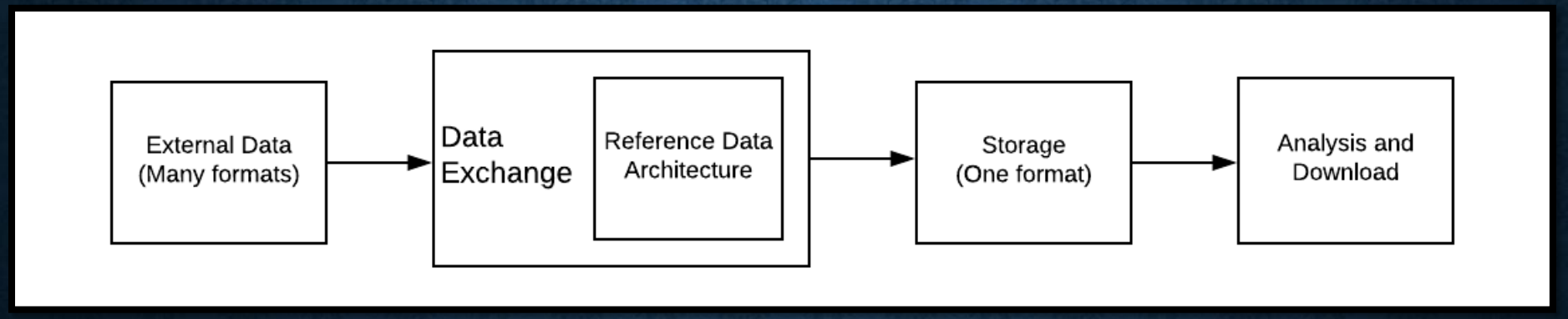
Conceptual Table Schema	**Reporter ID**	**Station ID**	**Equipment ID**	**Date**	**Time**	**Measurement type**	**Measurement**	**Measurement unit**	**...**

HydroVu_Yk Creek (In-Situ)	**Date Time**	**Pressure (psi)**	**Temperature (C)**	**Depth (ft)**
	1/18/2018 13:00	0.30052471	12.476074	0.69443953
	1/18/2018 14:00	0.30965328	12.401855	0.71416068
	1/18/2018 15:00	0.32568073	12.424225	0.75191188

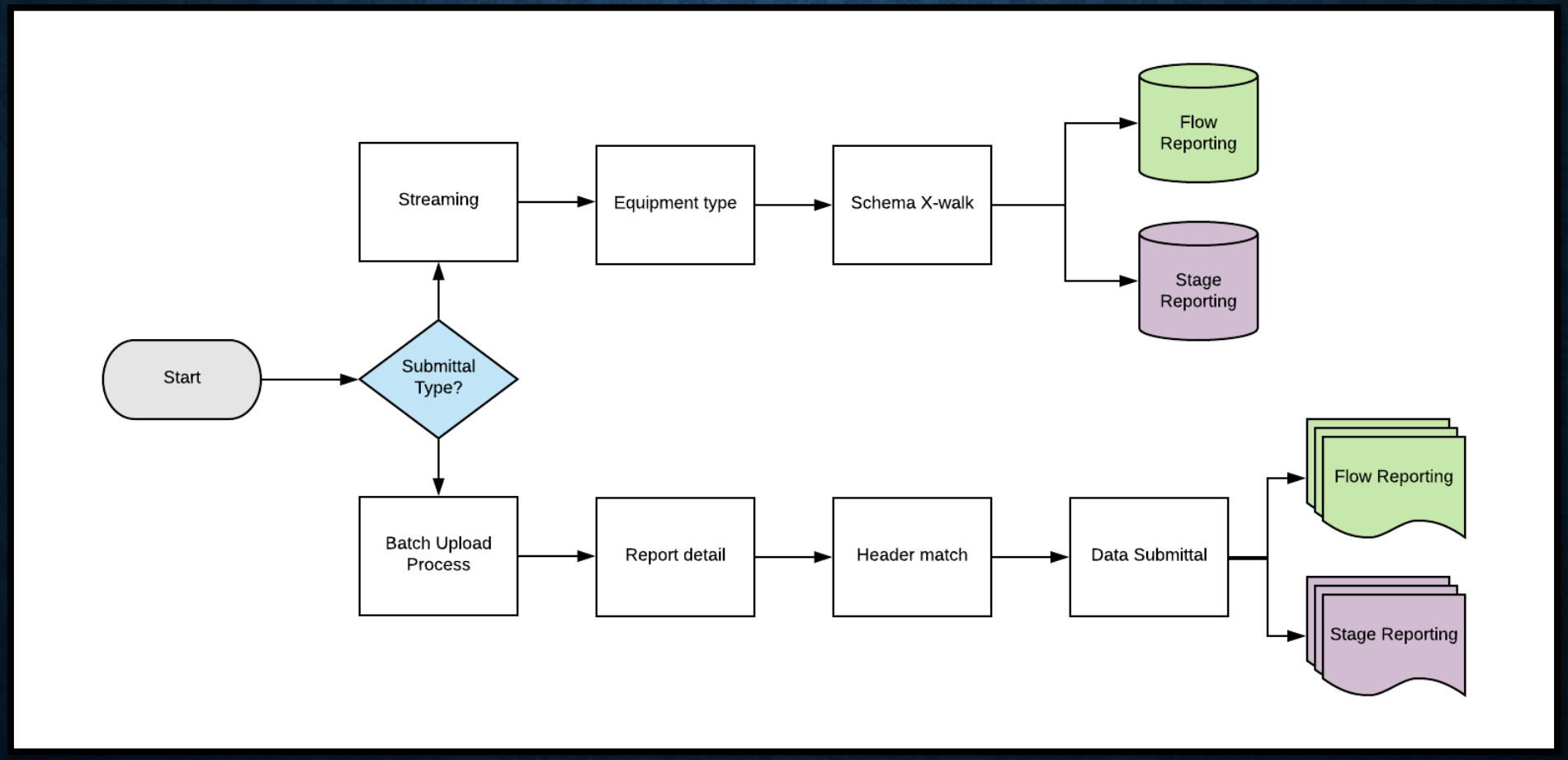


Bonus: *Data relations are hard scriptable…*

ISS CONCEPT OVERVIEW

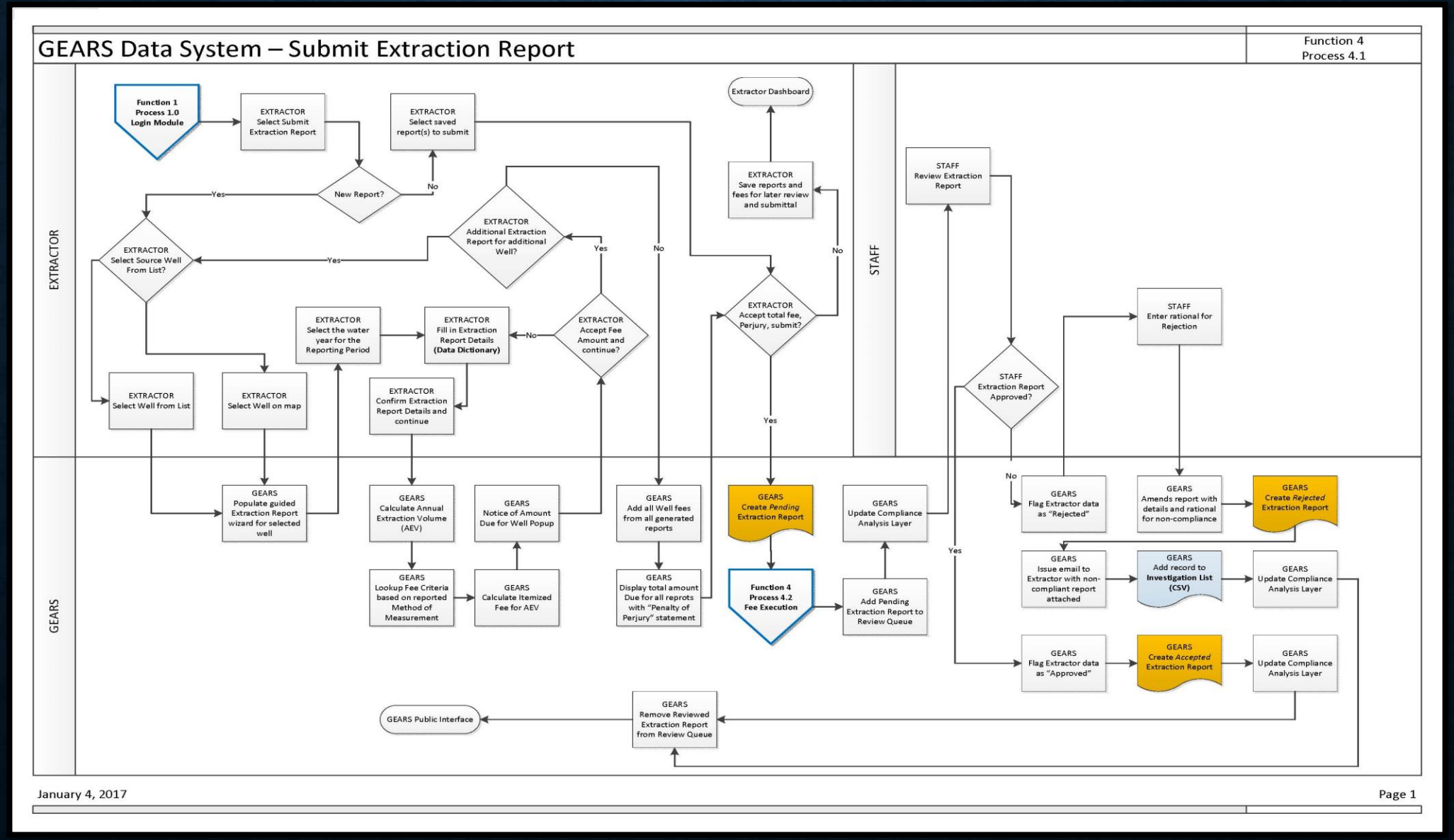


30K' CONCEPT OVERVIEW



3K' CONCEPT OVERVIEW

(GEARS EXAMPLE)



(CONCEPTUAL?) **NEXT STEPS**

Define	Define narrative scope (30k')
Define	Define reference data architecture for x-walking & ETL (data standards)
Define	Define business requirements to match scope (3k')
Define	Define budget to match business requirements
Review and submit	Review and submit RFI/RFO