IBM Maximo 9.0+ at Leland Stanford Junior University – Energy Operations

An Overview of the ongoing **Maximoization** of Stanford's Energy Utility Operations

By Giovanni Alvarez

2 years and counting

We are Stanford University

- 7,289 Undergraduate students.
- 10,025 Graduate students.
- 7 schools
- 630 buildings
- 8353 acres
- 2402 Faculty members, currently including 20 Nobel laureates
- Over 7500 externally sponsored research projects ongoing.

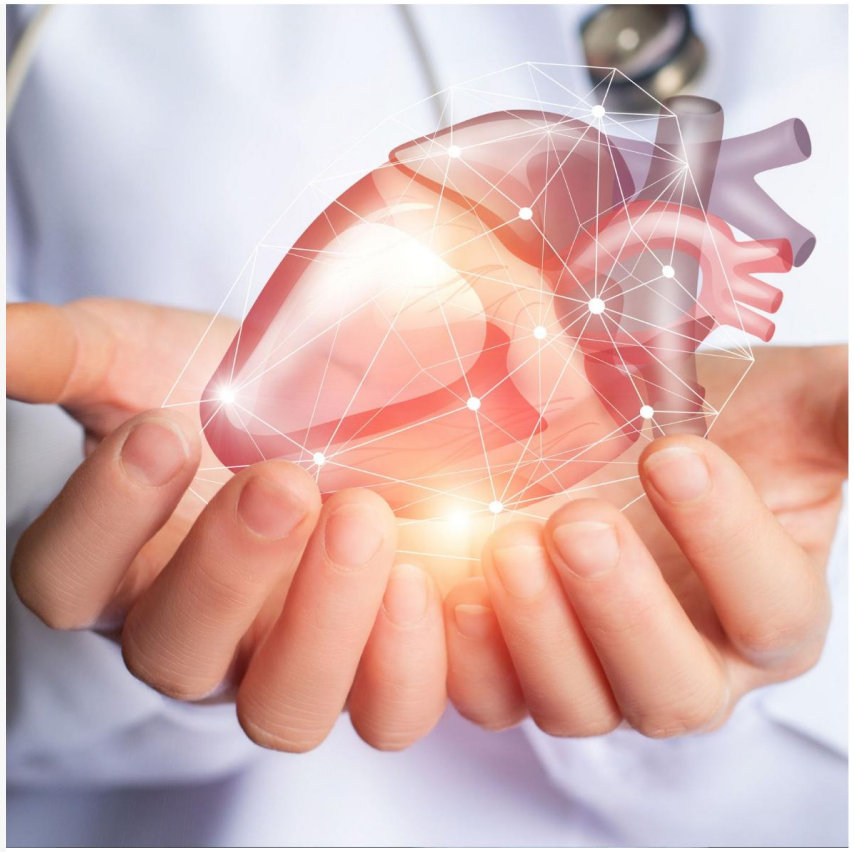
Stanford Health is home to life-saving care and groundbreaking research

Stanford Medicine surgeons perform first beating-heart transplants from cardiac death donors

By Roxanna Norman

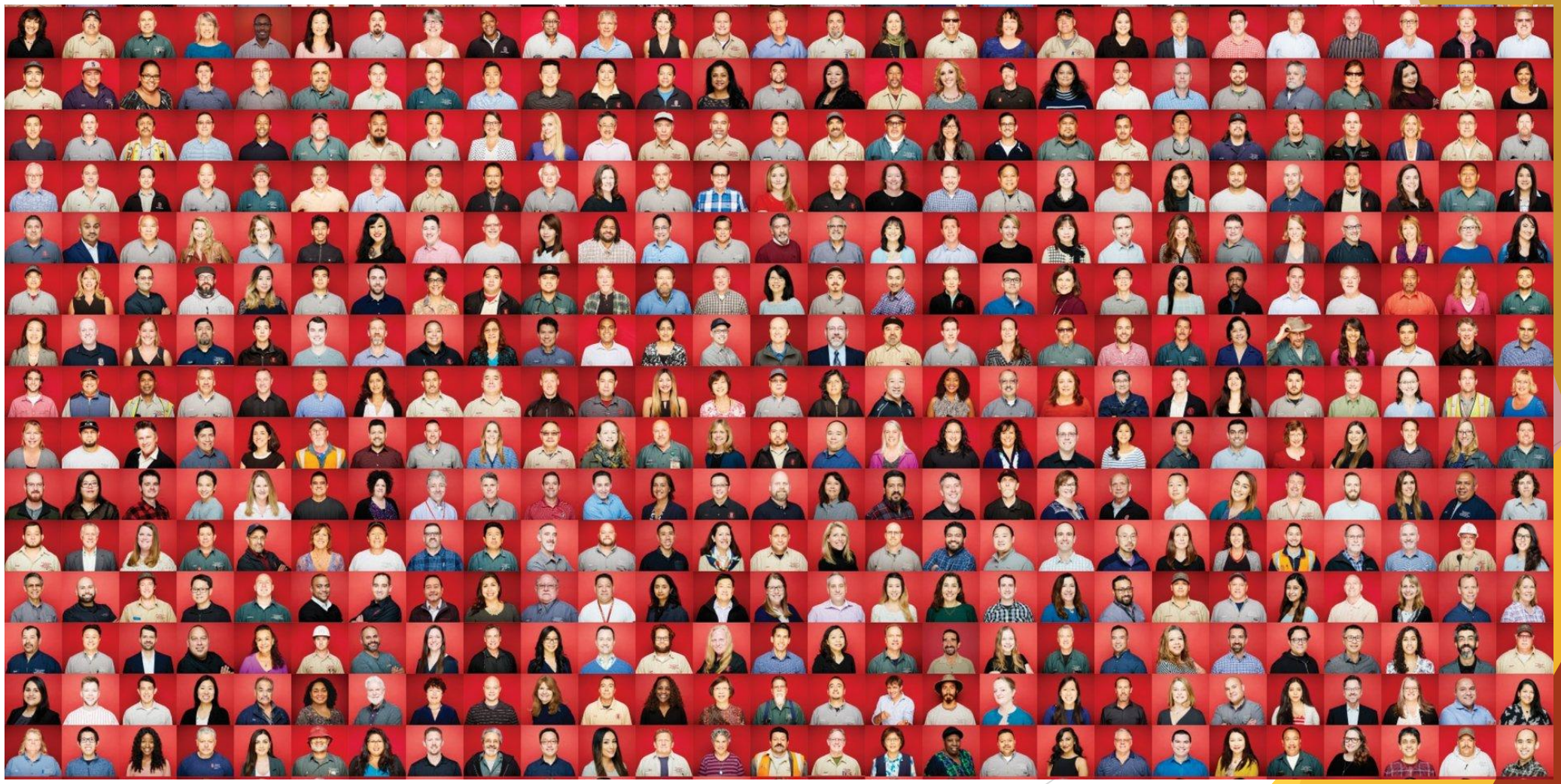
Surgeons at Stanford Medicine believe the new technique, which has now been performed on six patients, will improve health outcomes for recipients and boost the pool of available organs.

Transplantation | April 19, 2023



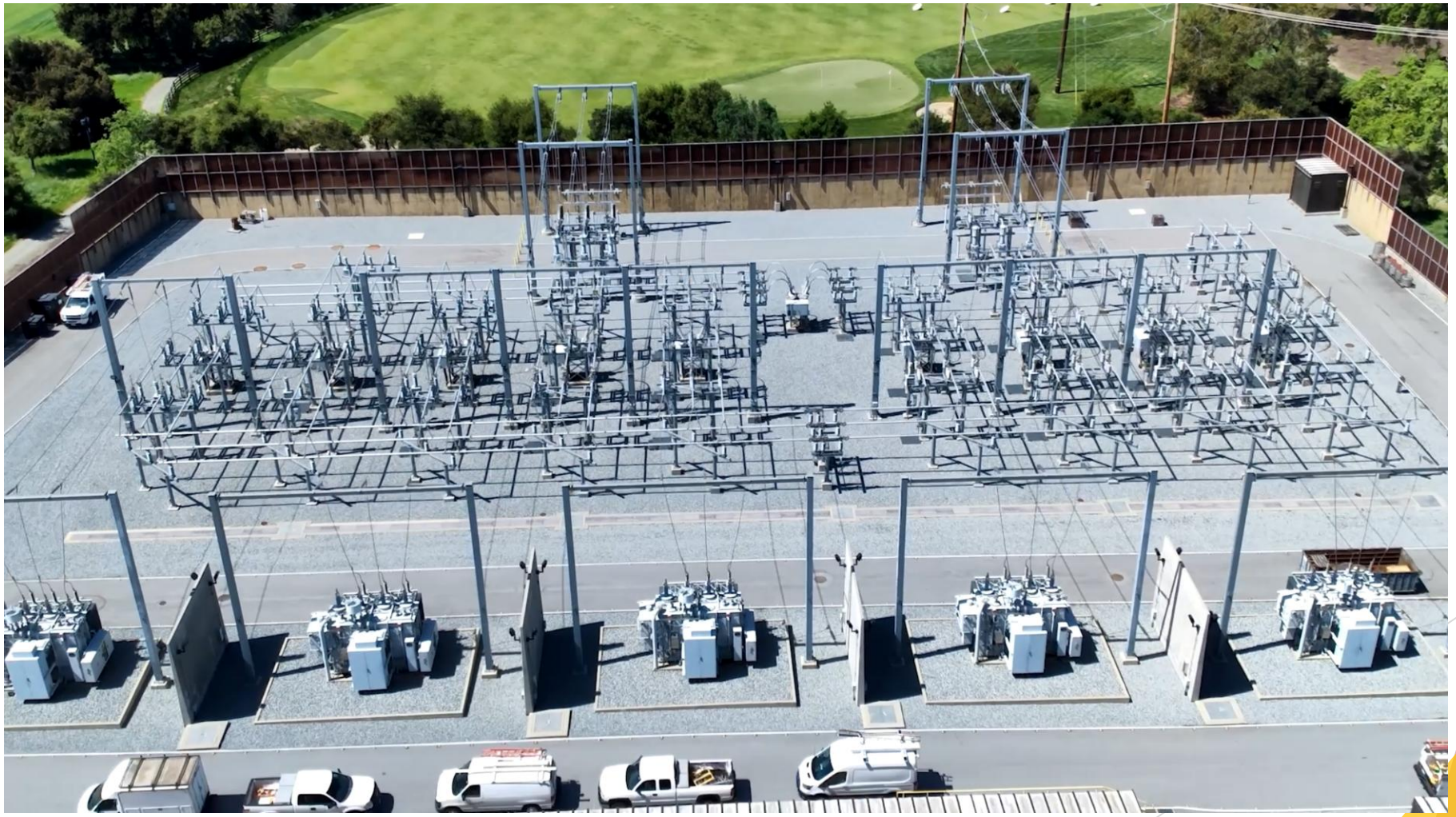
Joseph Woo and his team performed the first beating-heart transplant from a cardiac death donor.
Natali _ Mis/Shutterstock.com

A school needs its stewards
Stanford's stewards are the LBRE team



Energy Operations ensures clean and reliable energy is available for the campus community

High Voltage Electric Operations and Thermal Operations

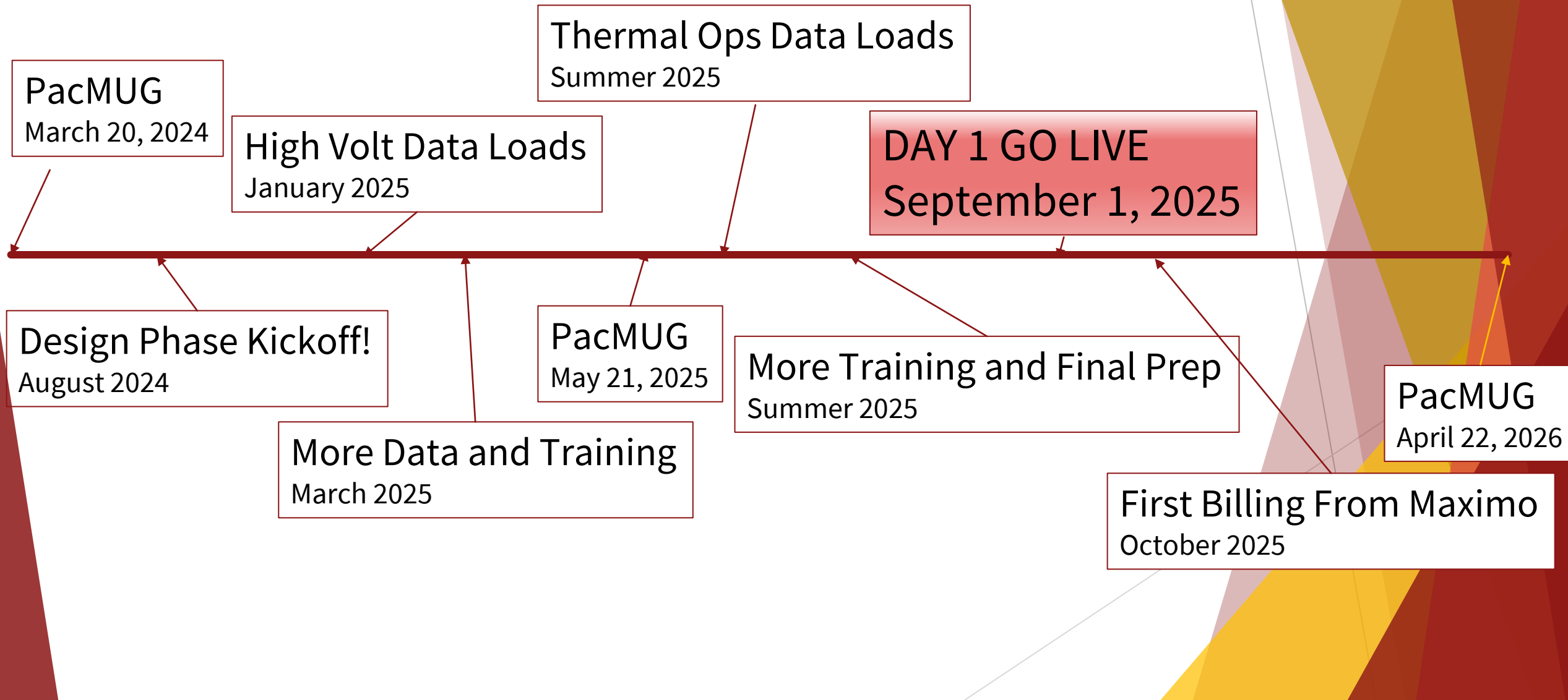


High Voltage Electric Operations and Thermal Operations

We run a powerplant with many team members, many assets, and many responsibilities

Lets Build a Maximo!

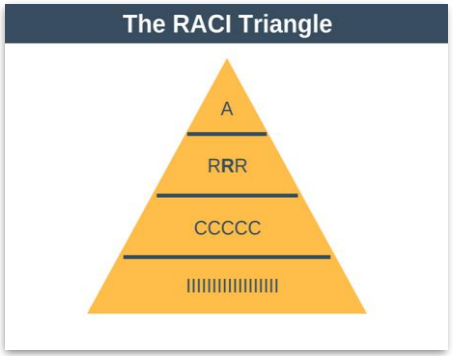
Timeline of a Dream, in retrospect



Design phase and scoping narrowed the focus to measurable and achievable goals

- IBM-Maximo SaaS implementation at Stanford Energy Ops
- Financial integration
  - PTAe Validations and monthly billing
- Inventory management with Maximo
- Reporting and Analytics
- Mobile access
- ESRI Spatial Data Configuration – utility distribution systems

Stakeholders



Business Owner:
Dan Arellano-Davis

Project Management:
Supriya Bhagwat, Kingshuk Roy

Project Oversight:
Swati Prabhu

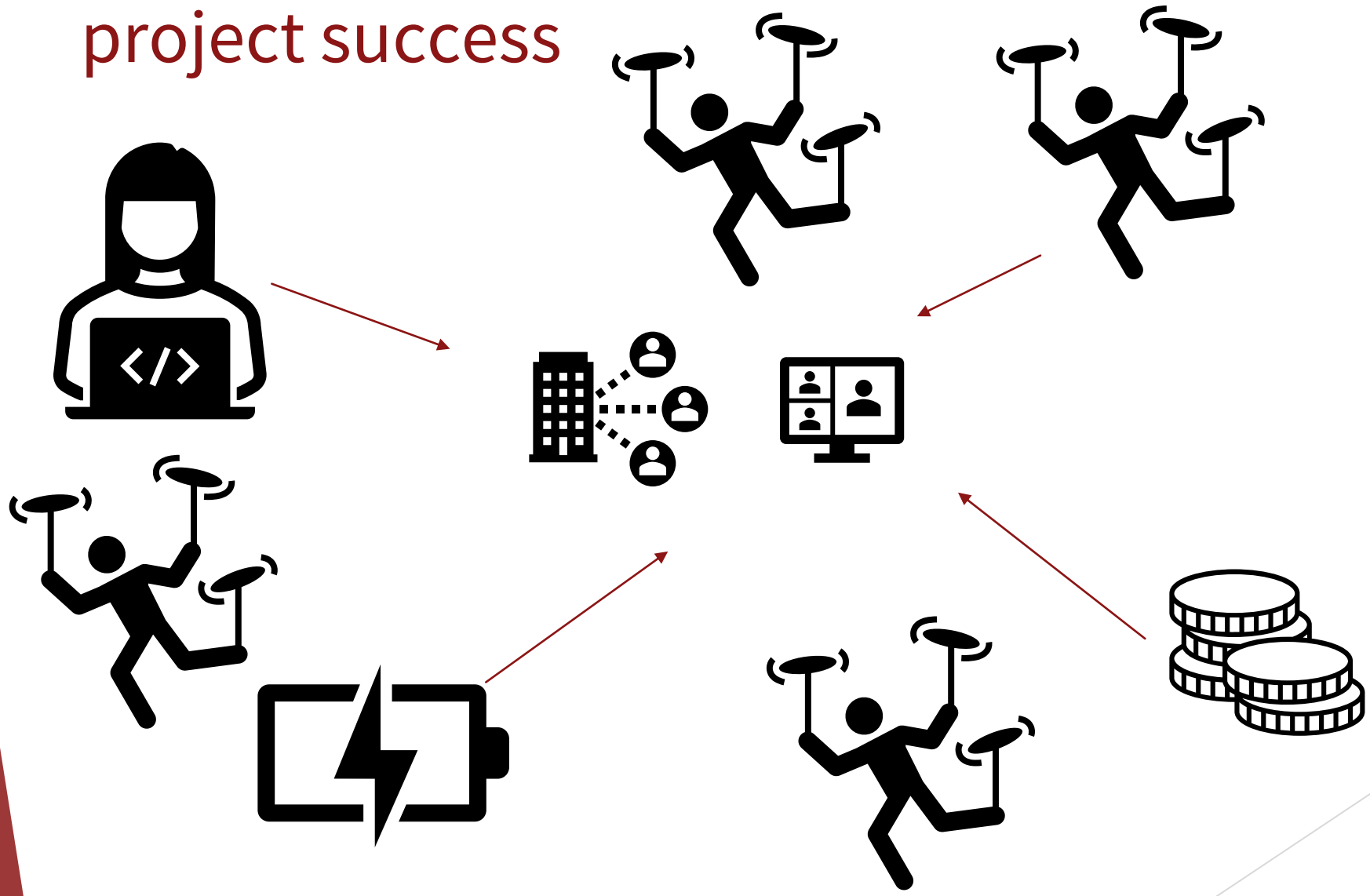
Role	***Description***	***Names***
Approver	Attend key milestone meetings and approve scope, resources and adoption. Remove obstacles. (Upto 4-5 meetings)	**Executive Approval:** Megan Davis, Jack Cleary, Lincoln Bleveans
Responsible/ Representative	Represent the business unit and project needs; make the critical business decisions working with approvers and contributors. Attend standing meetings for decisions/progress checks (Bi weekly project meetings + vendor discussions)	**Energy Operations:** Ron Gawer, Dan Arellano-Davis,
Contributors	Contribute input and support the representative; subject matter experts (SMEs); Can be process leads for each module/subject area; Testing and validation; Training and outreach; Attend Working group meetings as defined (tbd for now)	**Fin-Operations:** Renuka Kommineni, Lisa Cahners, Grace Liu-Xiu, **Energy Operations**: Christine Ellis, Chris Garcia, Mike Mayo, Tong Ou, Celicia He. Allen Hughes, Gio Alvarez, Dan Young, Anuj Gupta, Alex Heaphy **LBRE IT:** Ed Chow, Pier Polo **Maps and Records:** Wilson Lee, Jay Marianowits **UIT-IT:** Randy Durante, Ashish Kulkarni
Informed/FYIs	Informed team members. Receive emails/ raise questions and concerns. Provide feedback. Attend 4-6 meetings as needed;	**LBRE:** Water Shop: Sandra Heredia, Richard Souza, Mitch Bousson, Maps and Records: Galen Schmidt, Dobie Howard Finance: Grace Liu-Xiu, Sabrina Wu, Andrew Lee, Ken Chang Safety: Lizzette Vargas FEM: Chris Guest Fac-Operations: Jacob Herrera, Matt Tovar, David Whitlock **Non-LBRE:** UIT - Sivleng Taing, Rocco Petrunti EHS - Yong Kim

The Dream

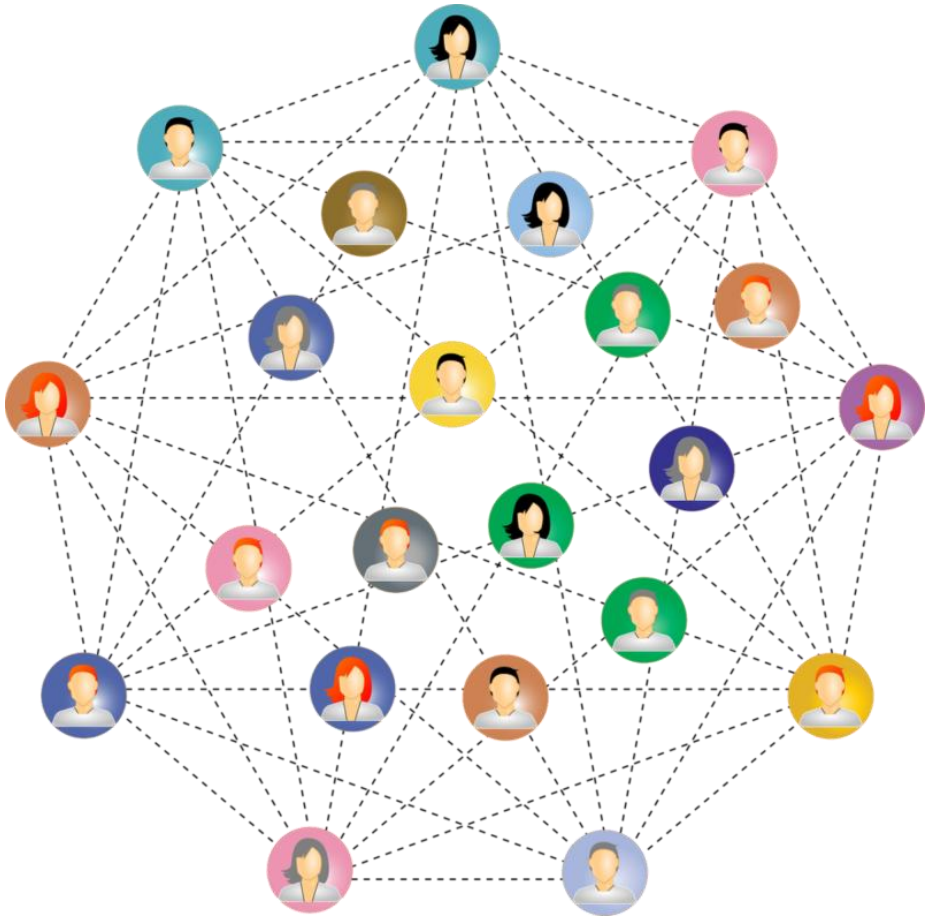
- Safety Programs-WO flow
- Mobile Application (Android and Apple devices)
- Operator Roundsheets
- **Inspections Checklist**
- Operations Logbook Implementation
- Implement HW, CW Meters Application <convert from google apps to Work Order>
- High Volt distribution System application WO process
- **AVEVA Pi database integration**
- Integration with Oracle Financials ---> Integrations to support financial operations
- **Inventory Management**
- Scheduling and Leave Management
- **Asset Health Monitoring**
- Utility system maps integration

Moving Beyond Conceptual

Building a strong team is paramount to project success



Working with IBM experts was a unique experience



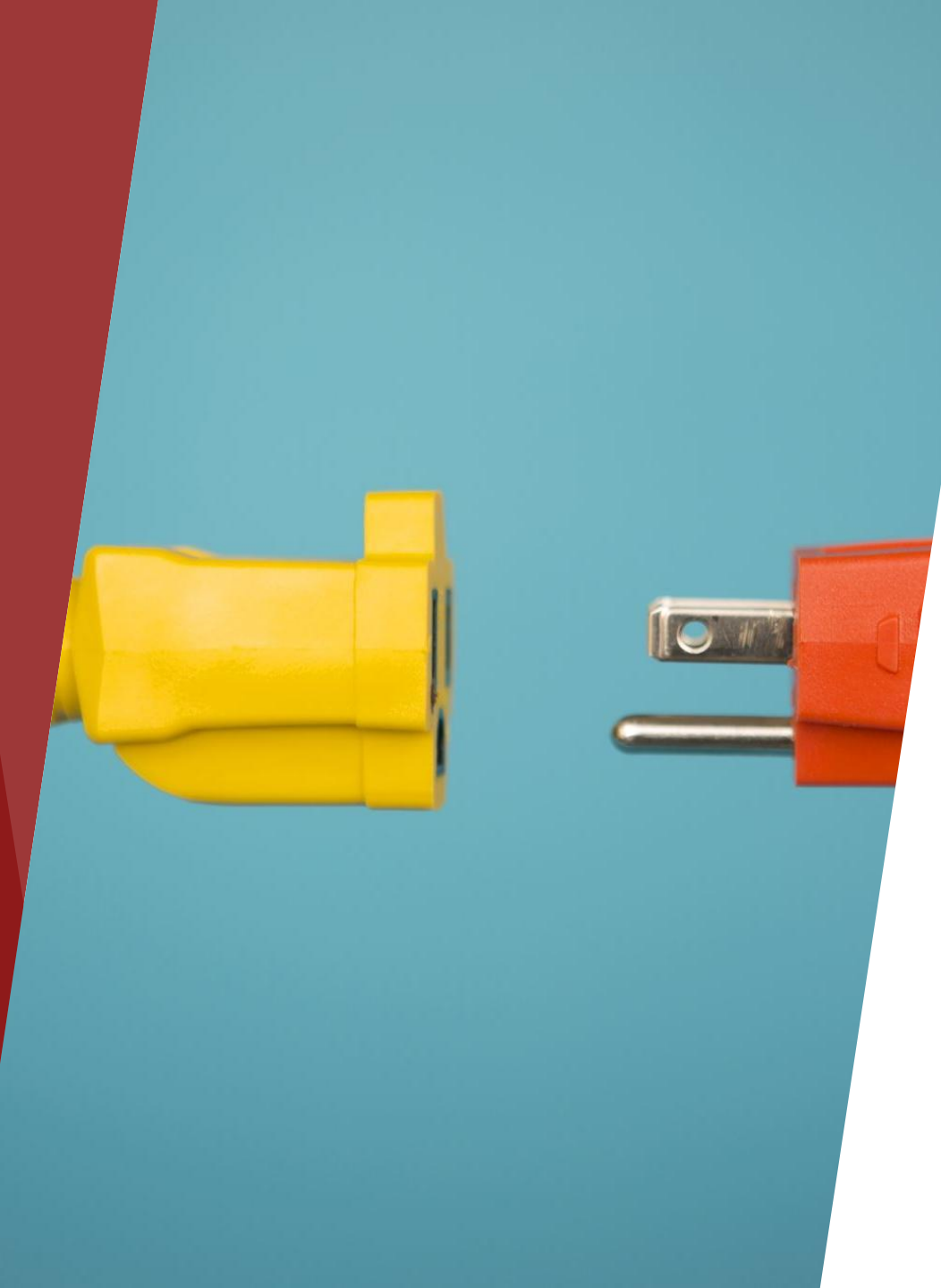
Energy Operations had subject matter experts that could guide implementation, but Energy Ops was not the only customer to consider

Time to Build a Maximo!

Bringing the project together

Keeping afloat through rough waters

Plugging Things In

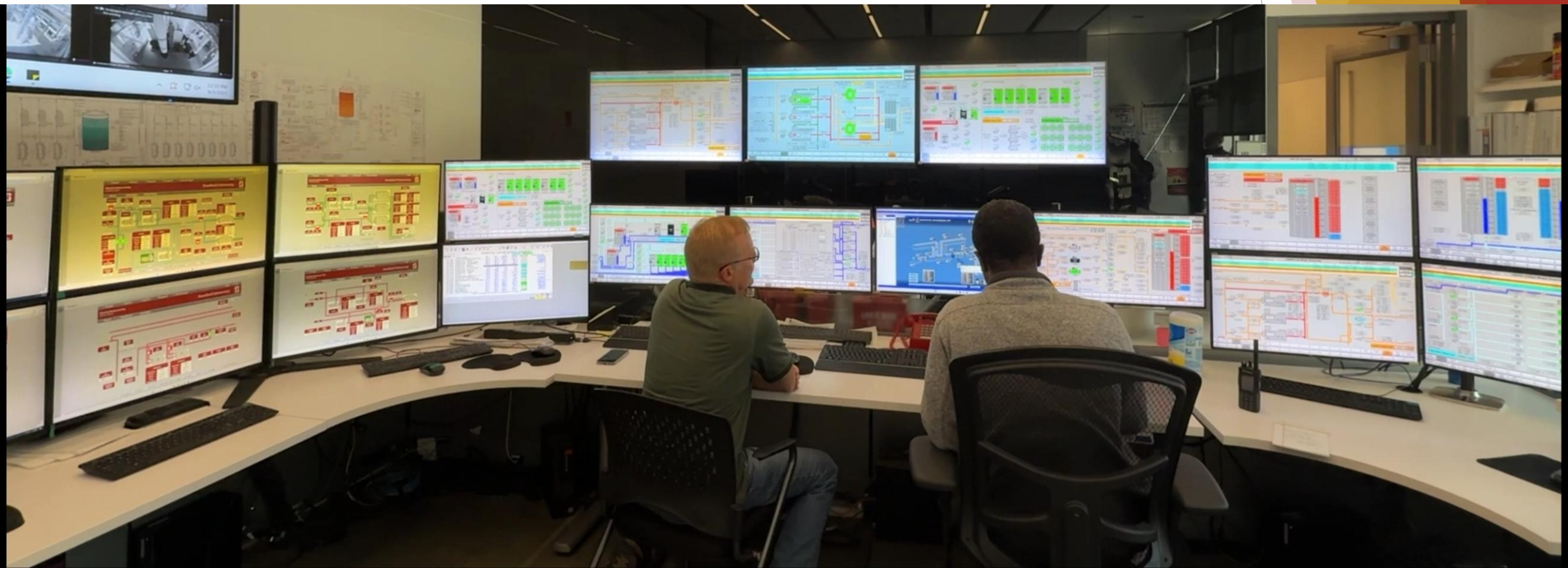


Plugging Things In

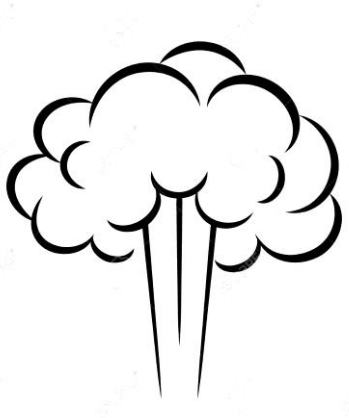
High Volt Data Time!

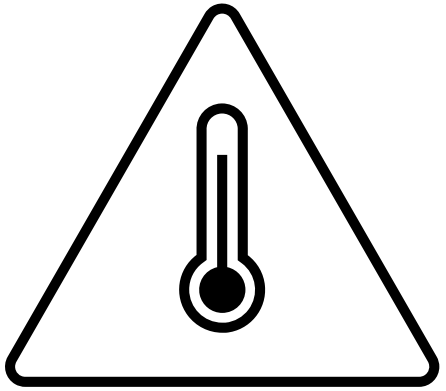
- 1000’s of Assets
- 300+ Transformers (12400 Volts/ 3 Phase)
- 250+ Switches
- 600+ Confined Spaces
- 9 High Voltage Professionals

Thermal maintenance data was more readily verifiable and was mostly newer

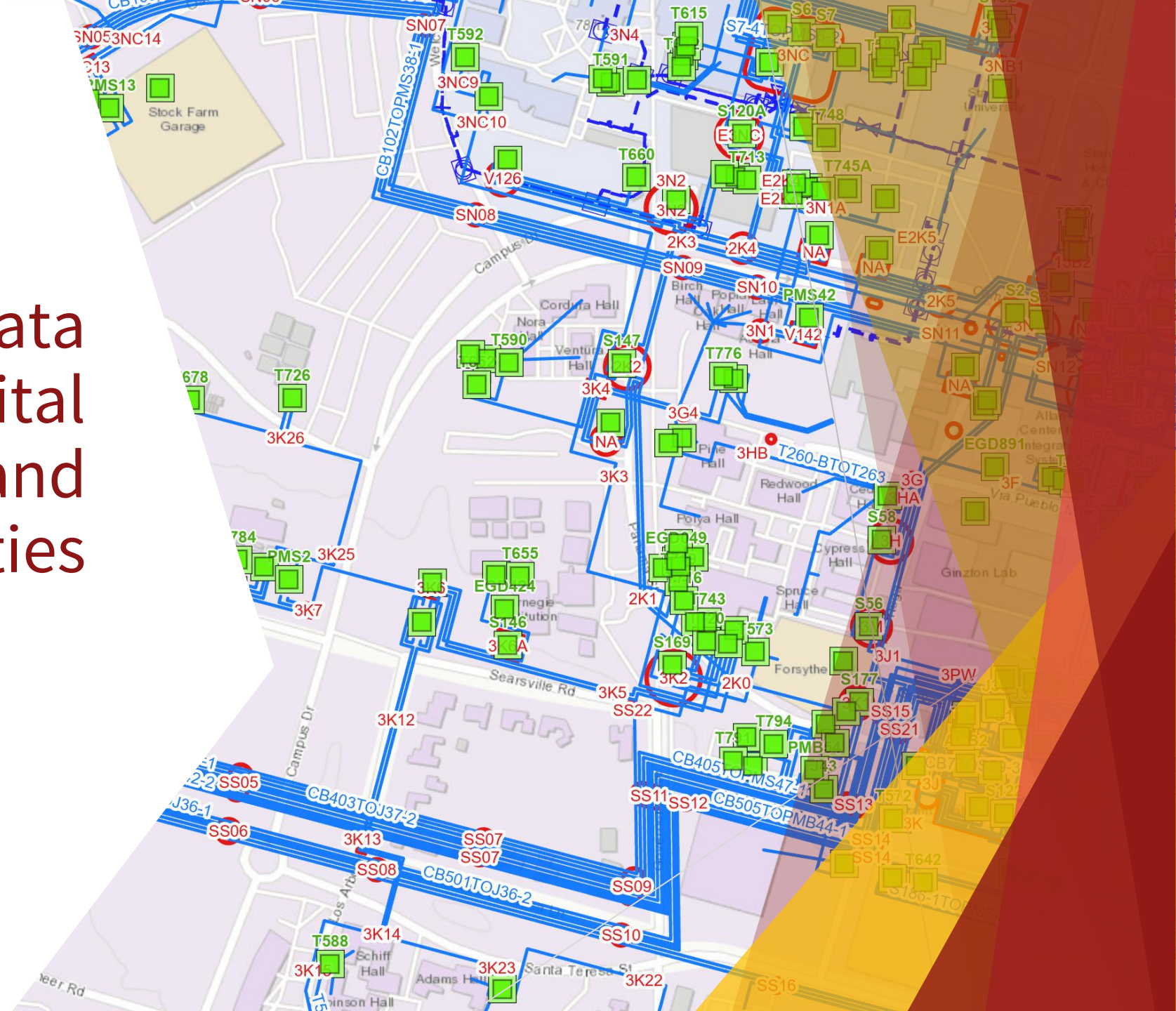


3000+ assets across hot water, chilled water, and steam production and distribution had to be integrated. This includes 3 separate power plants.





GIS and building data integrations are vital for operations and for buried utilities



Existing data sources needed some cleanup

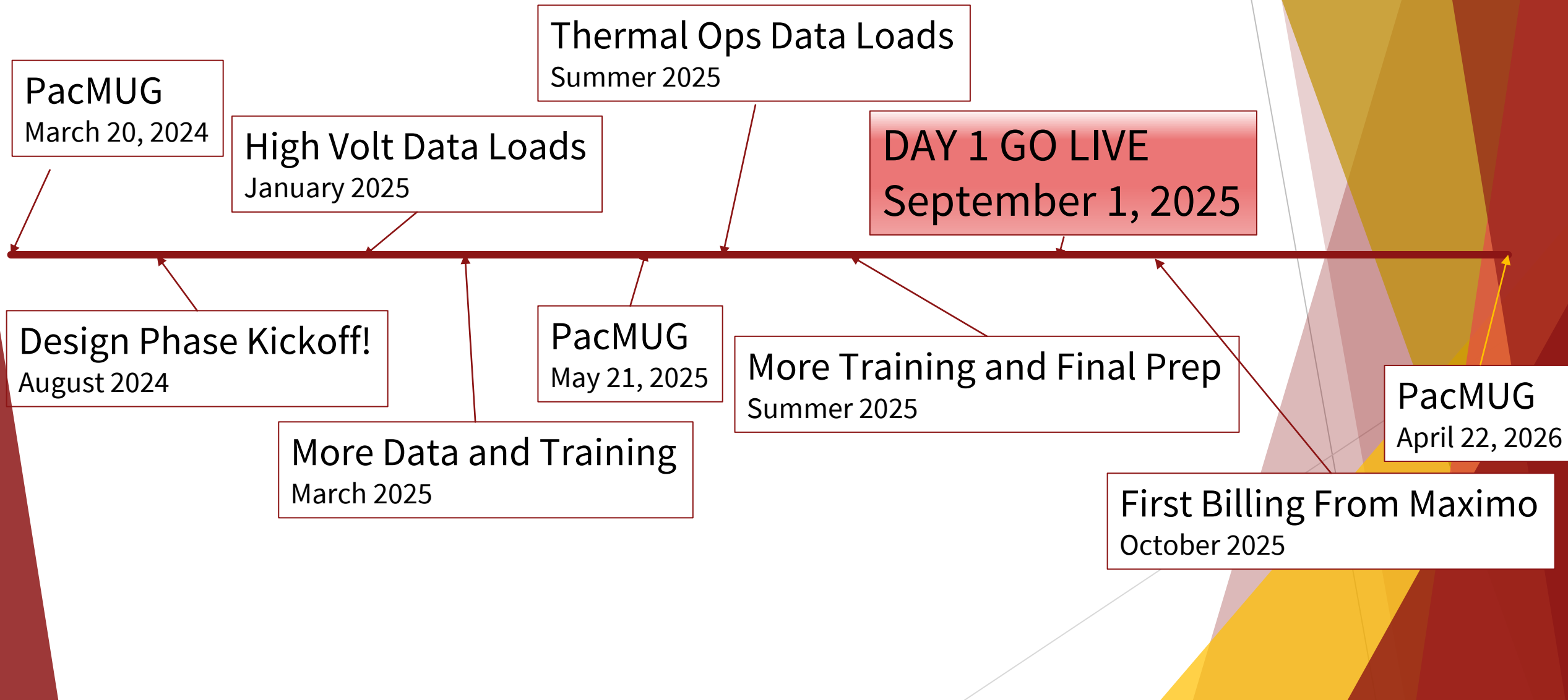
Lessons learned

- Be Wary of Scope creep
- Never enough training. More hands-on workshops
- IBM deliverables and timelines
- IBM experts around the globe – Many Timezones
- If it sounds too good to be true, it probably is

Our masterpiece was complete… or at least close enough to meet some deadlines!

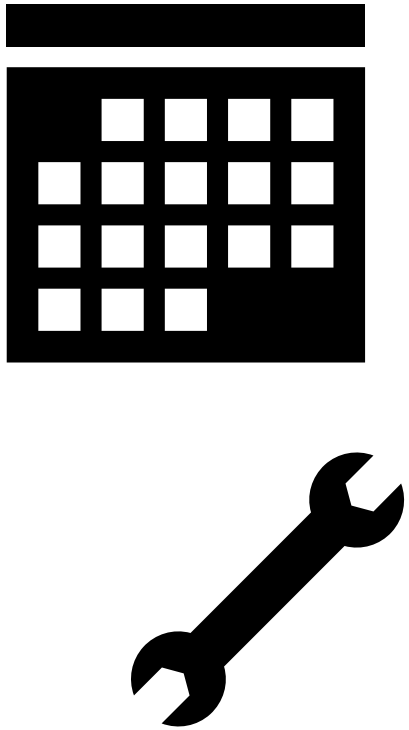
Pictured here: The Stanford Energy Ops Maximo integration, the day before Go Live

Timeline of a Dream, in retrospect

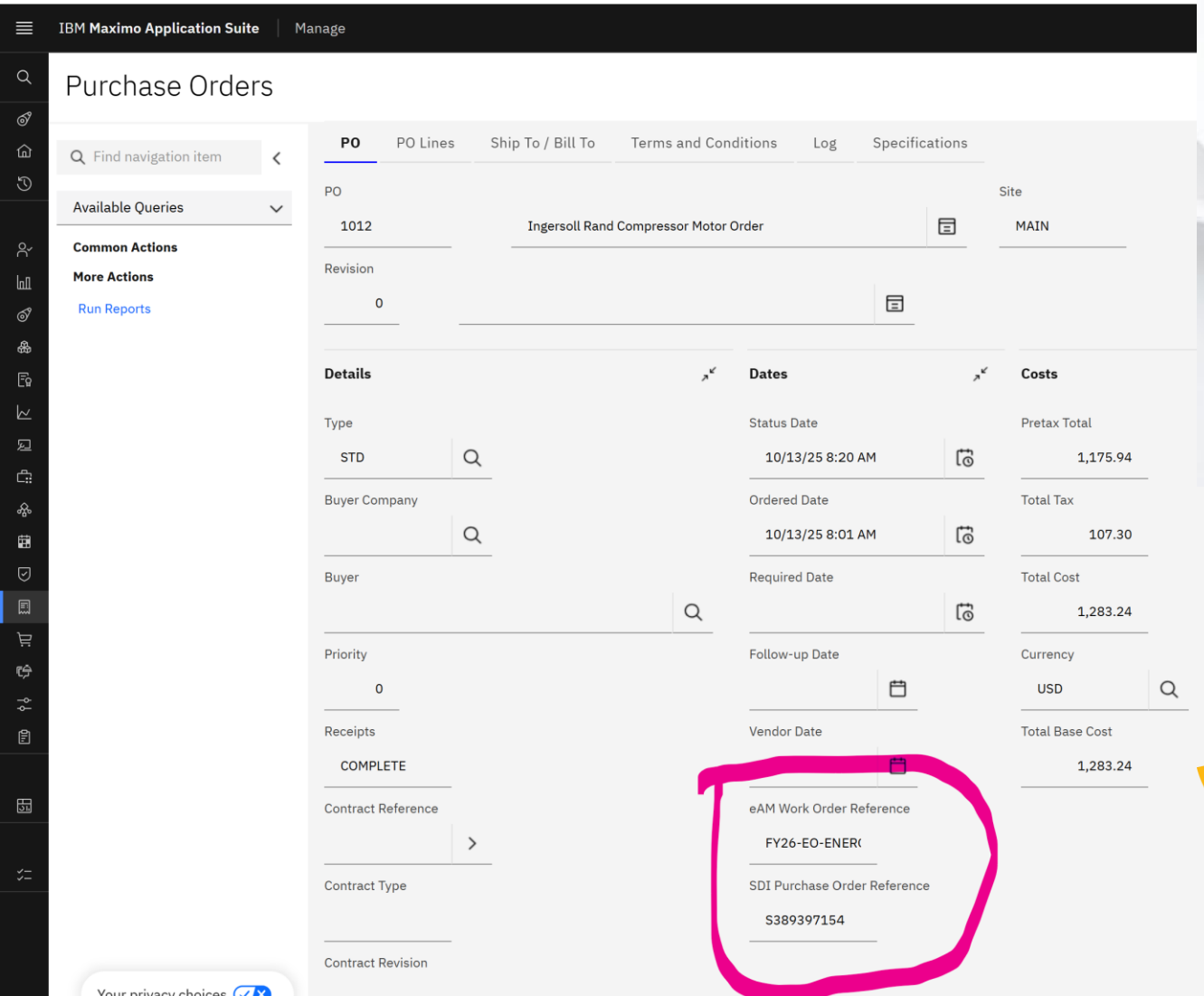


Going Live

The GO LIVE transition included technicians charging time to work orders and managing inventory with maximo



Growing pains. Swivel chairs



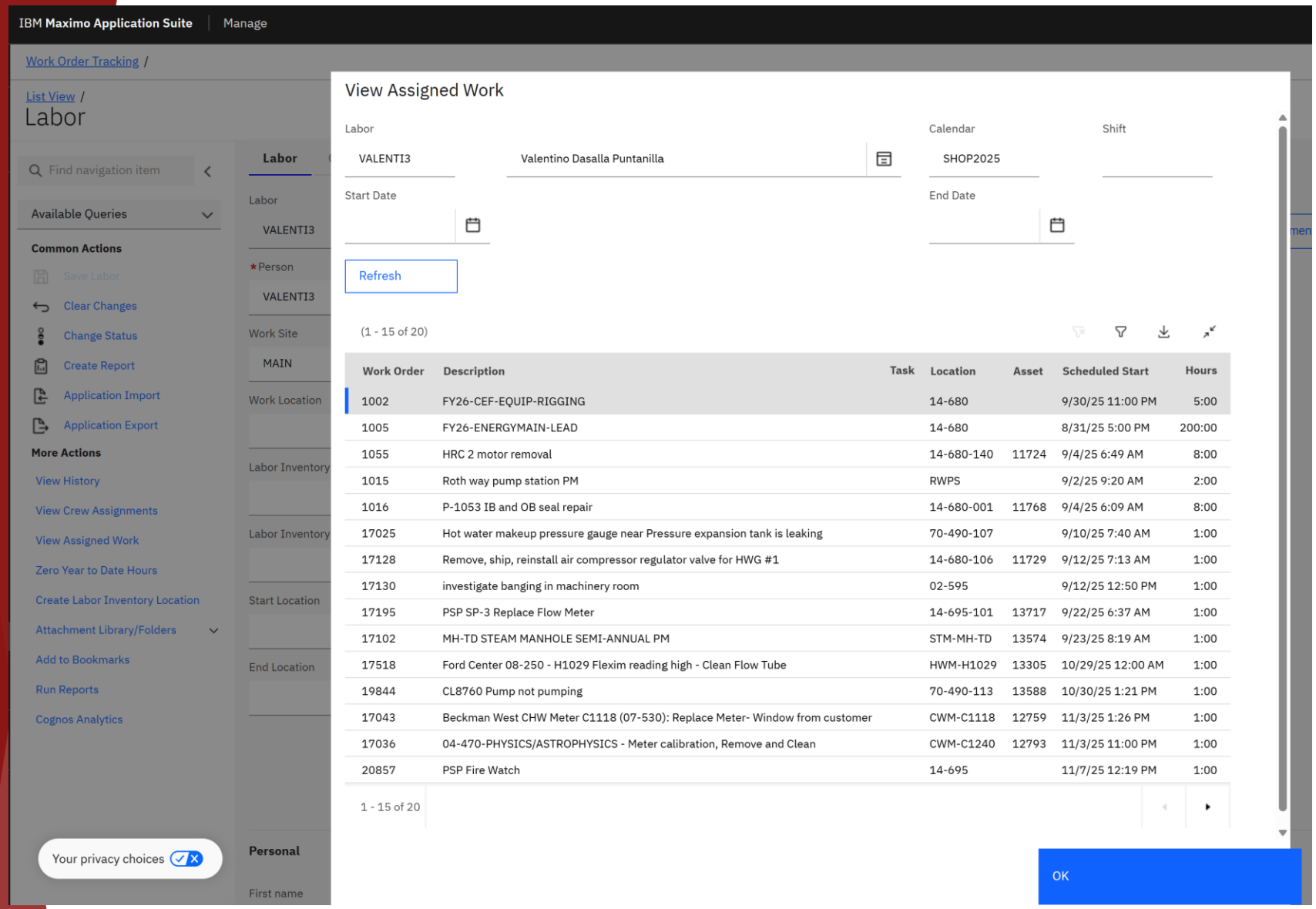
SAP EAM

SDi

Hey this thing is pretty good

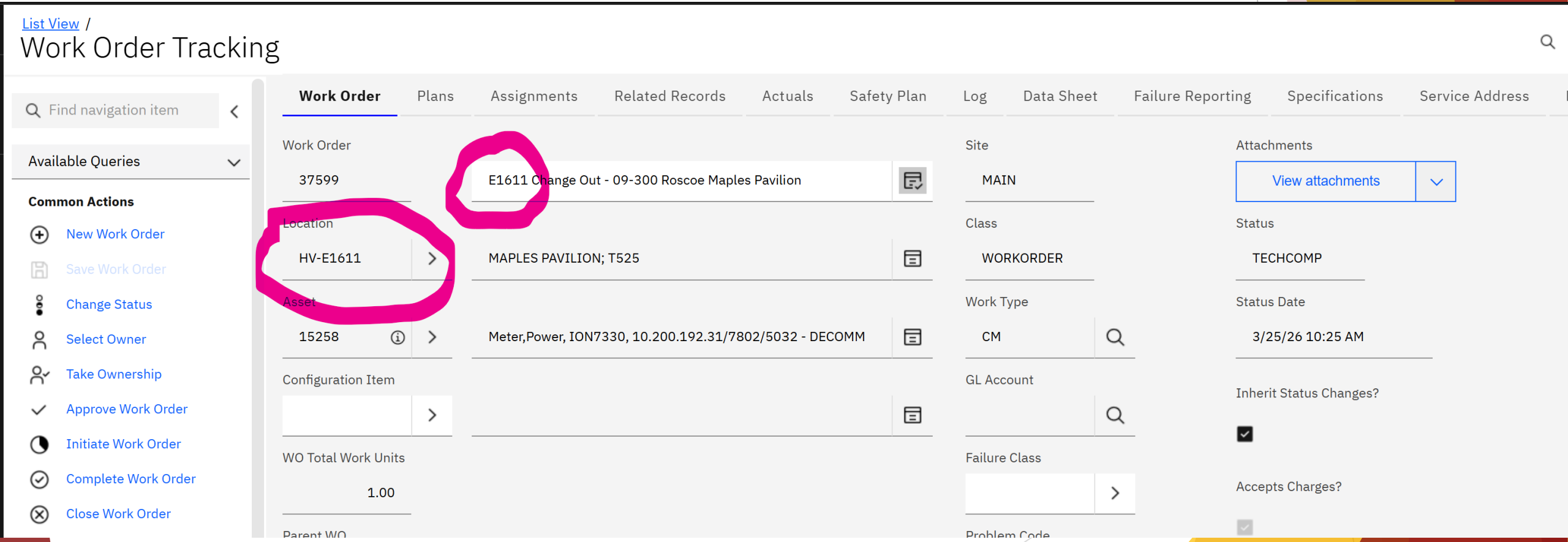
- 837 COMP work orders
- 5328 Assets
- 8865 Locations
- 35+ regular users

Things We Do Today with Maximo

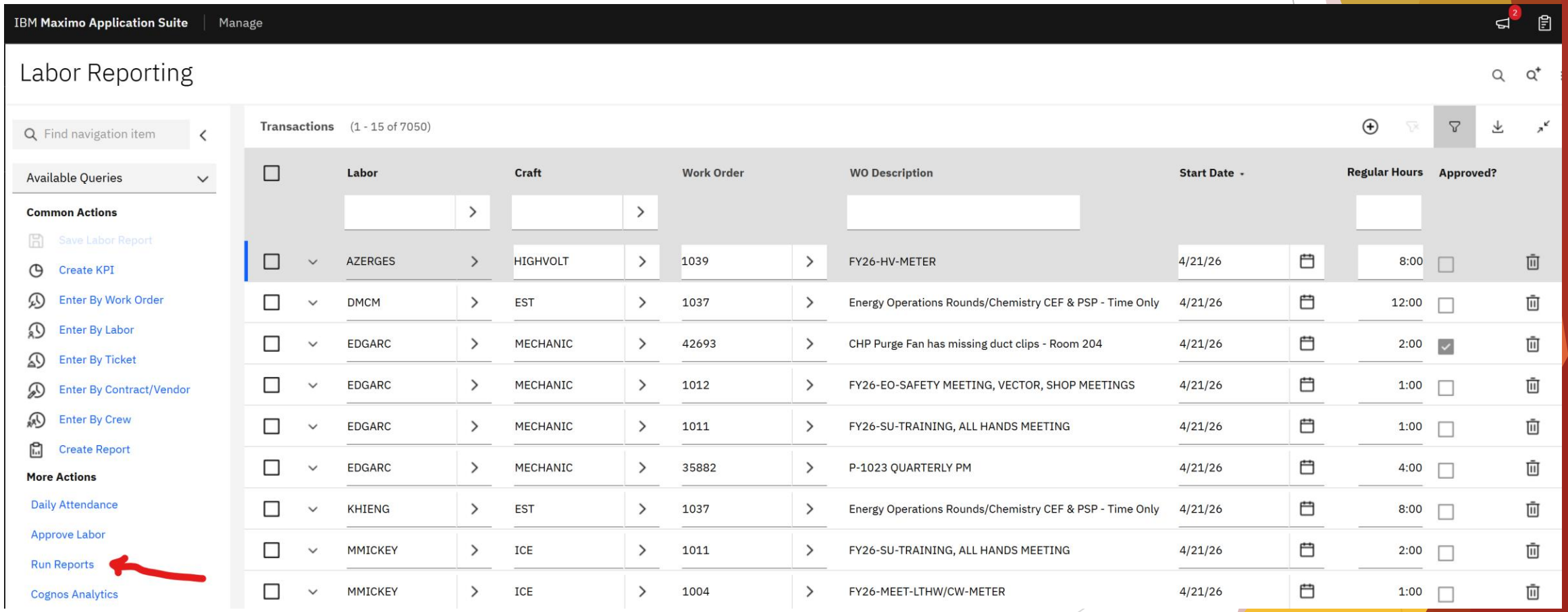


Charging time

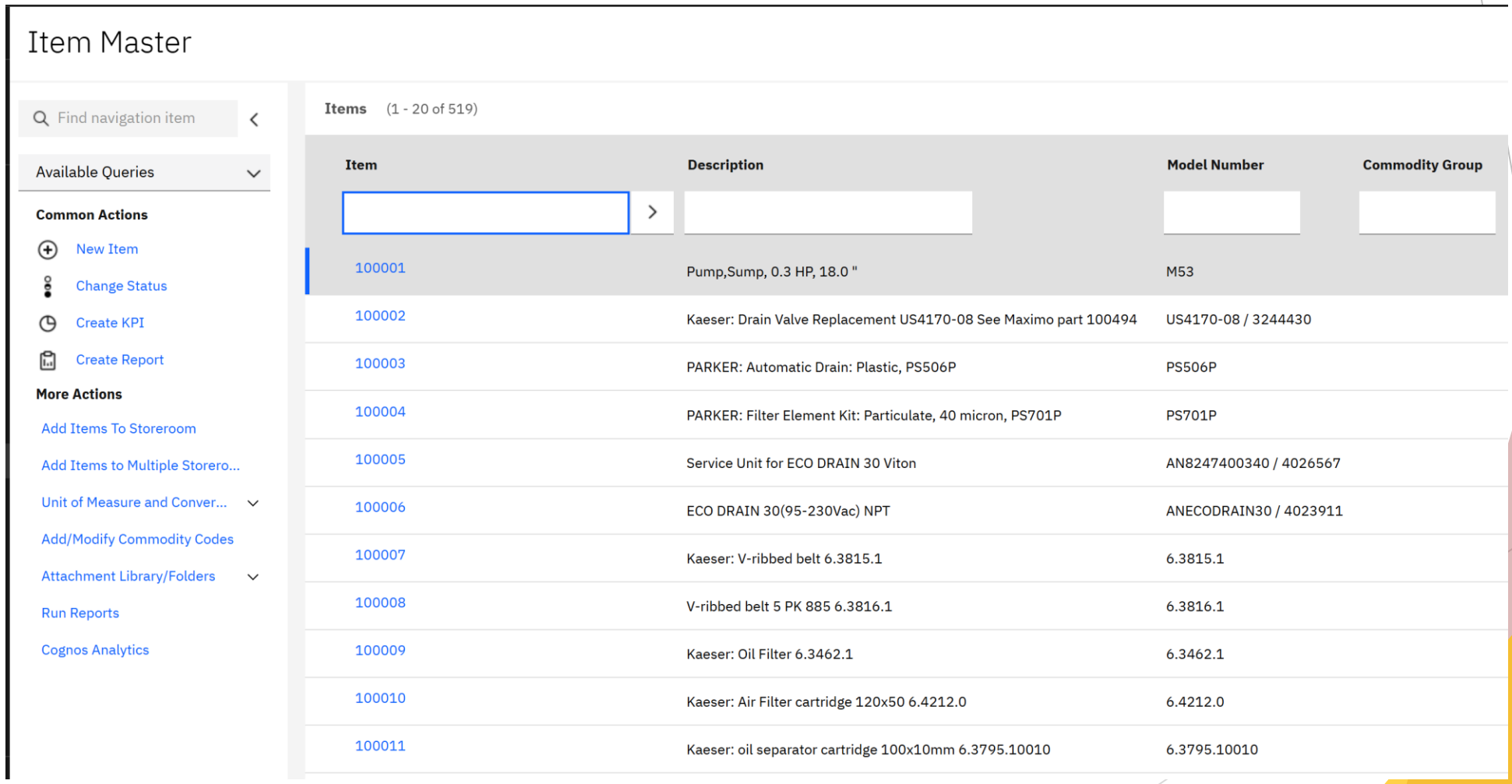
Blanket workorders that applied to several assets have been eliminated, improving asset and work tracking



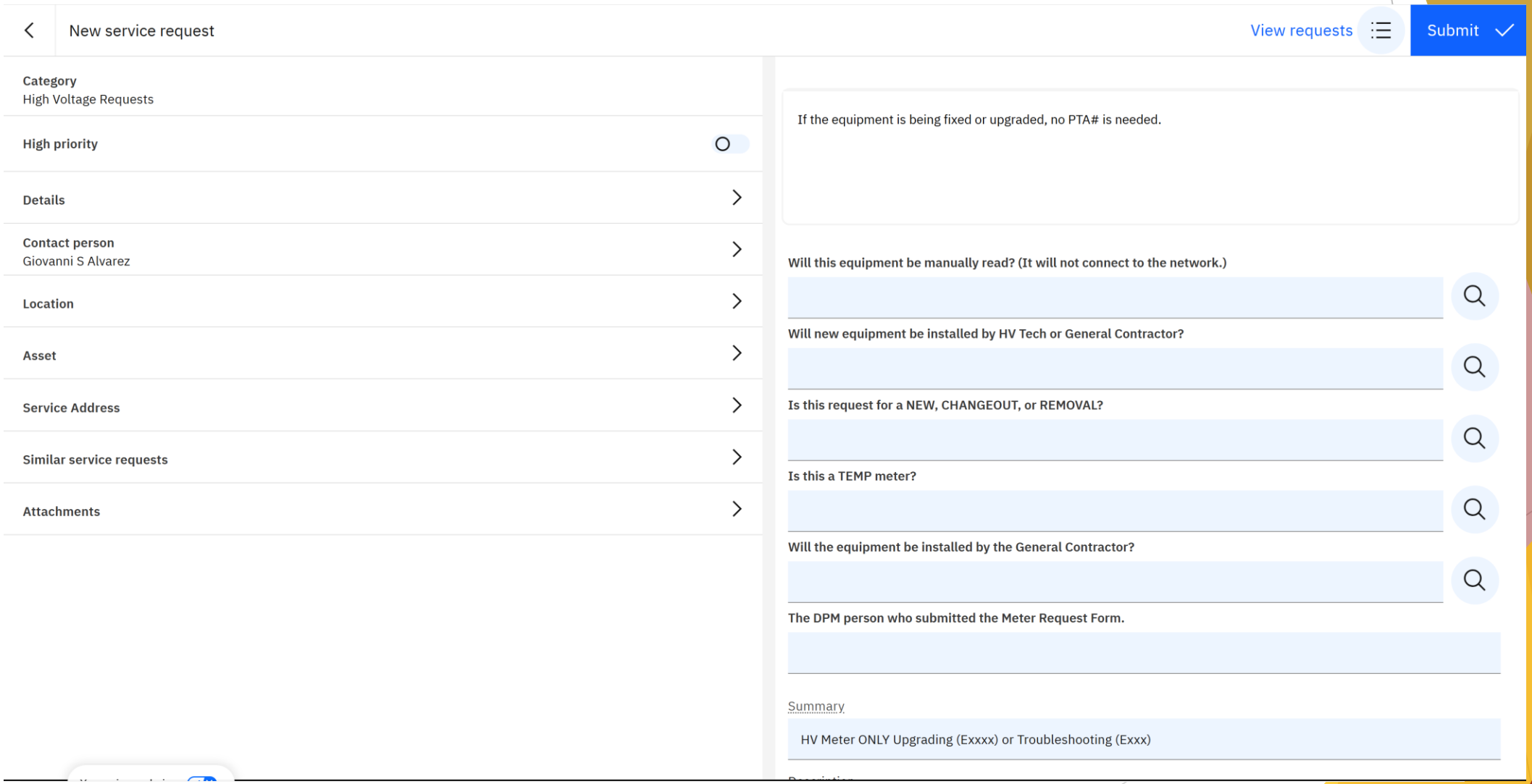
Financial Reporting business requirements are met



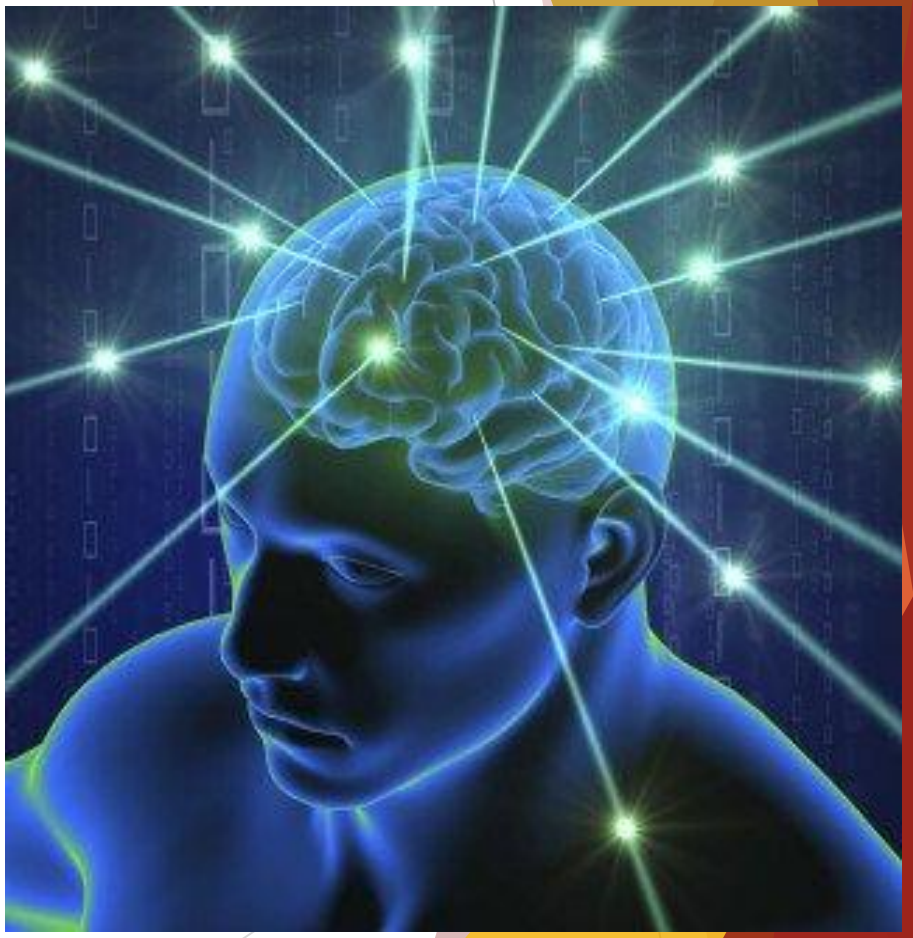
Inventory is tracked and improving constantly. Currently 519 unique items on record across 7 storerooms.

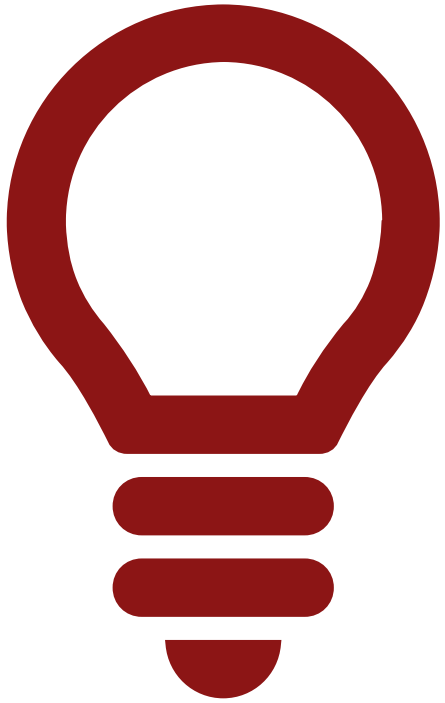


Service requests



Maximo has become our source of truth for a majority of maintenance activities





The Streetlights case study illustrates how we bridge the gap between operations and clean data using

CLAUDE AI

About Brooke

- Just graduated undergrad from UC Berkeley
- B.S. / M.S. in Industrial Engineering and Operations
- PhD at Princeton in the Fall
- Previously Data Science @ Amazon & chemical engineering research
- Interested in energy and systems!

Problem

Data spread across multiple formats

Maintenance and repair projects difficult to track

3000+
Lights across campus

30
Campus maps

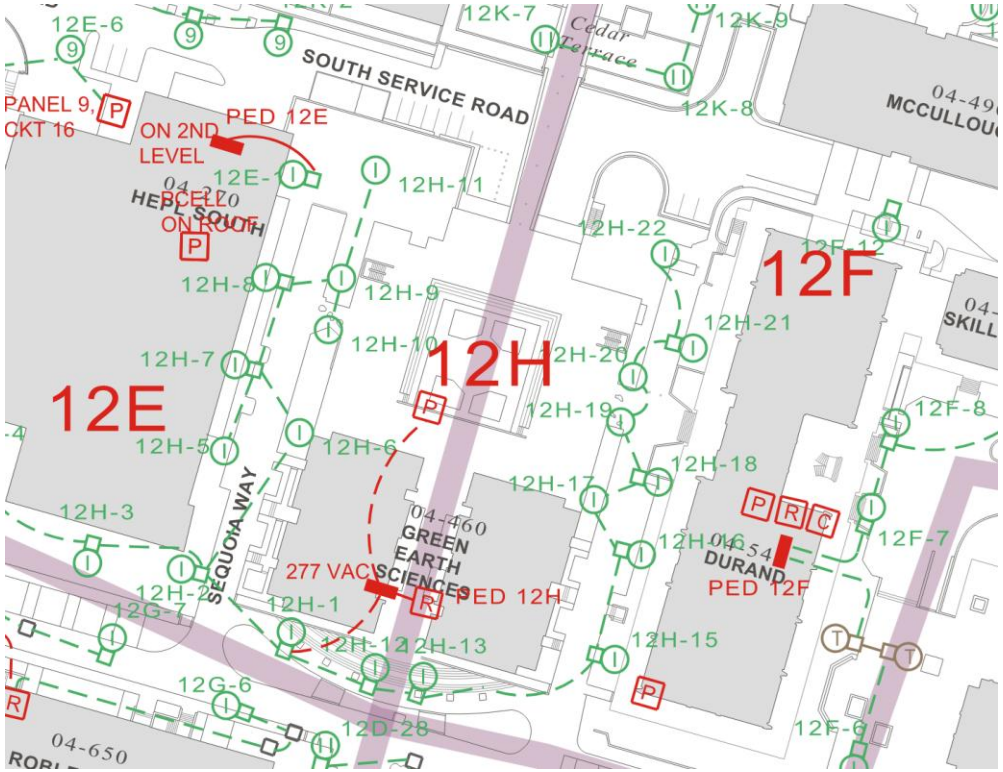
10+
Types of street lights

Solution

Database with data for each light!

Ⓘ	SUI FIXTURE
ⒾⒾ	SUII FIXTURE
⑤	GE 101 (TEARDROP)
④	24' GLOBE - 300W. INC.
▢	LT. REMOVED, RODS PROT.
⊗	LT. REMOVED, ROD CUT
⑦	HOLOPHANE POST TOP
•—⑧	ROADWAY LUMINARE
⑧—•—⑧	
⑨	HOLOPHANE 350
■⑩	GARDCO FORM 10
■⑩■	
Ⓣ	TREE LIGHT
Ⓕ	FLOOD LIGHT
△	
⓪	LT. ON SERIES CCT.
Ⓚ	KIOSK
Ⓞ	LT. NOT LISTED ABOVE
◯	DBL. OR NUMBER OF LTS.
□	PULL BOX
◬	TYPE RO, 6.6A, C.C. XF
•	POLE OR STANDARD
○	WOOD POLE
🅿	PHOTO CELL

Street Light Maps



Campus Area 12: Circuit 12E, 12H, 12F

Campus Area 12

Result

Campus Region ID	Panel ID	Light ID	Location Type	Fixture Type	Pole Type	Control Type	Department	Status	Line Type	Does Not Exist	Notes
2	2A	2A-1	Pathway	SUI FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-2	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-3	Pathway	SUI FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-4								Does Not Exist	
2	2A	2A-5								Does Not Exist	
2	2A	2A-6	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-7	Pathway	SUI FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-8	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-9	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-10	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	Labeled as "2A-"
2	2A	2A-11	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-12	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-13	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-14	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-15	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-16	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-17	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-18	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-19	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-20	Pathway	SUII FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-21	Pathway	SUI FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-22	Pathway	SUI FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	
2	2A	2A-23	Pathway	SUI FIXTURE	N/A	PHOTO CELL REMOTE BYPASS	Energy Ops.	Active	Underground	Exists	

Data Extraction and Processing

Prompt: Please extract a list of the lights in the circuit and the type based on the legend. Match the format of this spreadsheet.

(upload spreadsheet template and screenshots of the map)

Stanford AI Playground

For 12J:

Claude-4-Sonnet was the best model for this!

Campus Region ID	Panel ID	Light ID	Location Type	Fixture Type	Pole Type	Control Type	Department	Status	Line Type	Does Not Exist	Notes
12	PED 12J	12J-1		Holophane 350	N/A	PHOTO CELL	Energy Ops	Active	Underground	Exists	
12	PED 12J	12J-2		Holophane 350	N/A	PHOTO CELL	Energy Ops	Active	Underground	Exists	
12	PED 12J	12J-3		Holophane 350	N/A	PHOTO CELL	Energy Ops	Active	Underground	Exists	

	A	B	C	D	E	F	G	H	I	J	K
	Campus Region ID	Panel ID	Light ID	Location Type	Fixture Type	Pole Type	Control Type	Department	Status	Line Type	Does Not Exist
	12	PED 12A	12A-1		SUI FIXTURE	N/A	PHOTO CELL	Housing	Active	Underground	Exists
	12	PED 12A	12A-2		SUI FIXTURE	N/A	PHOTO CELL	Housing	Active	Underground	Exists
	12	PED 12A	12A-3		HOLOPHANE 350	N/A	PHOTO CELL	Energy Ops.	Active	Underground	Exists
	12	PED 12A	12A-4		HOLOPHANE 350	N/A	PHOTO CELL	Energy Ops.	Active	Underground	Exists
	12	PED 12A	12A-5		HOLOPHANE 350	N/A	PHOTO CELL	Energy Ops.	Active	Underground	Exists
	12	PED 12A	12A-6		HOLOPHANE 350	N/A	PHOTO CELL	Energy Ops.	Active	Underground	Exists
	12	PED 12A	12A-7		HOLOPHANE 350	N/A	PHOTO CELL	Energy Ops.	Active	Underground	Exists

Other Applications?

Data Analysis & Insights

ex. Quick statistical summaries and trends, anomaly detection in datasets

Query & Formula Assistance

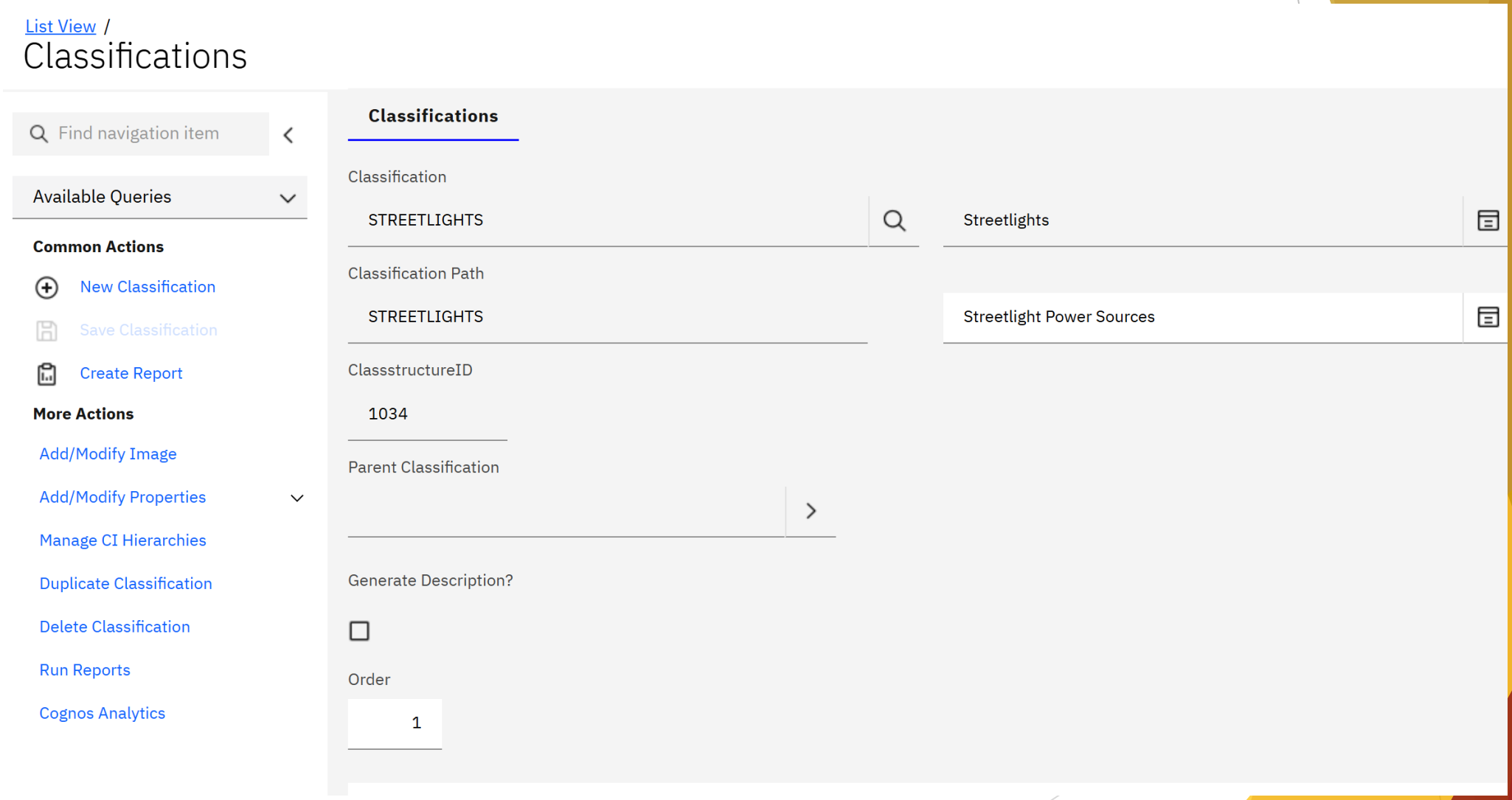
ex. SQL query generation and optimization

Data Processing & Cleanup

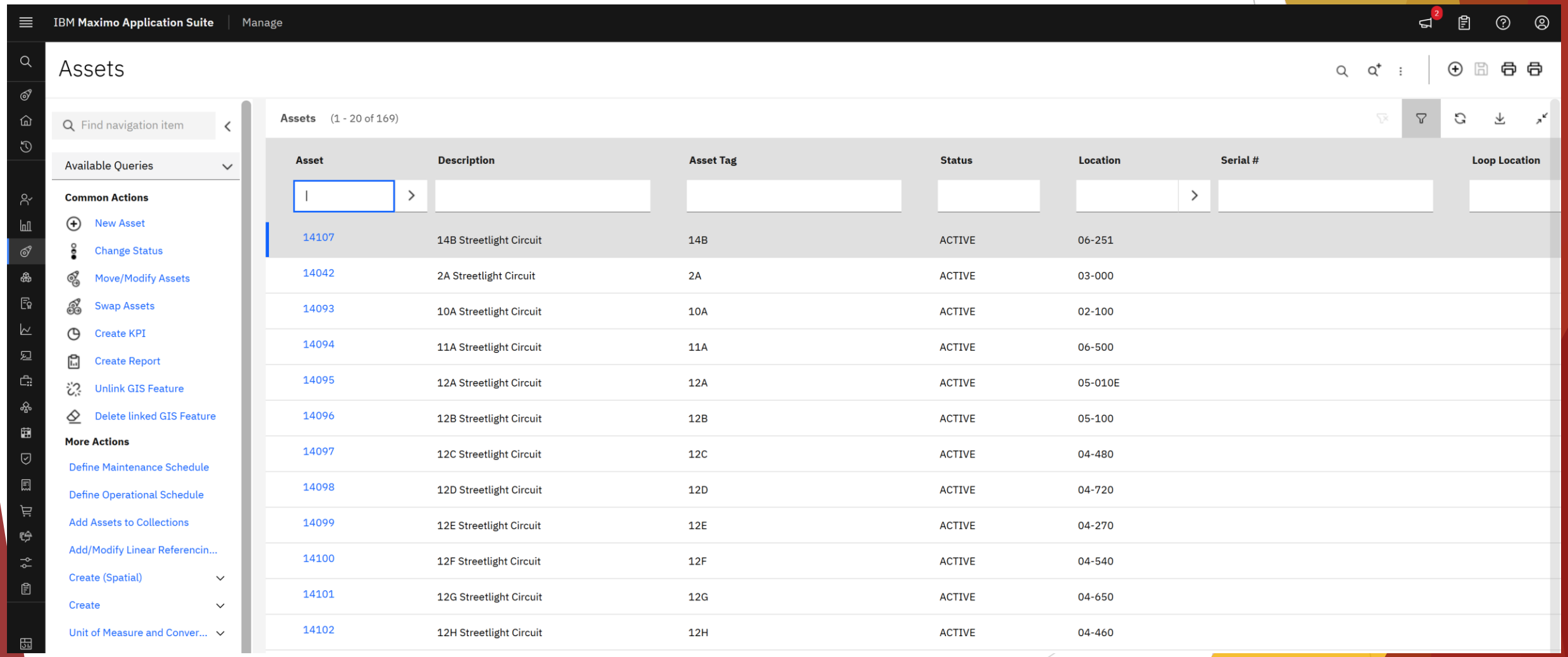
ex. "Find and highlight duplicate entries in this employee database and standardize phone number formats."

Stanford AI Playground

MAXIMOIZATION



MAXIMOIZATION

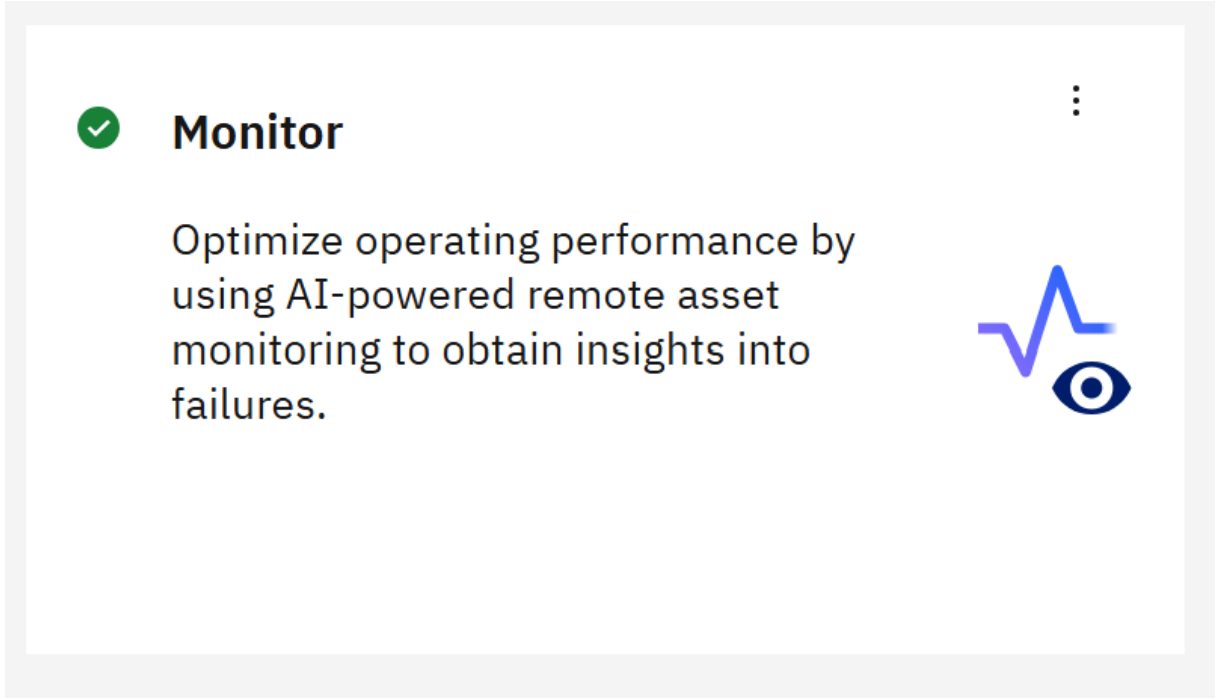


The Future With Maximo

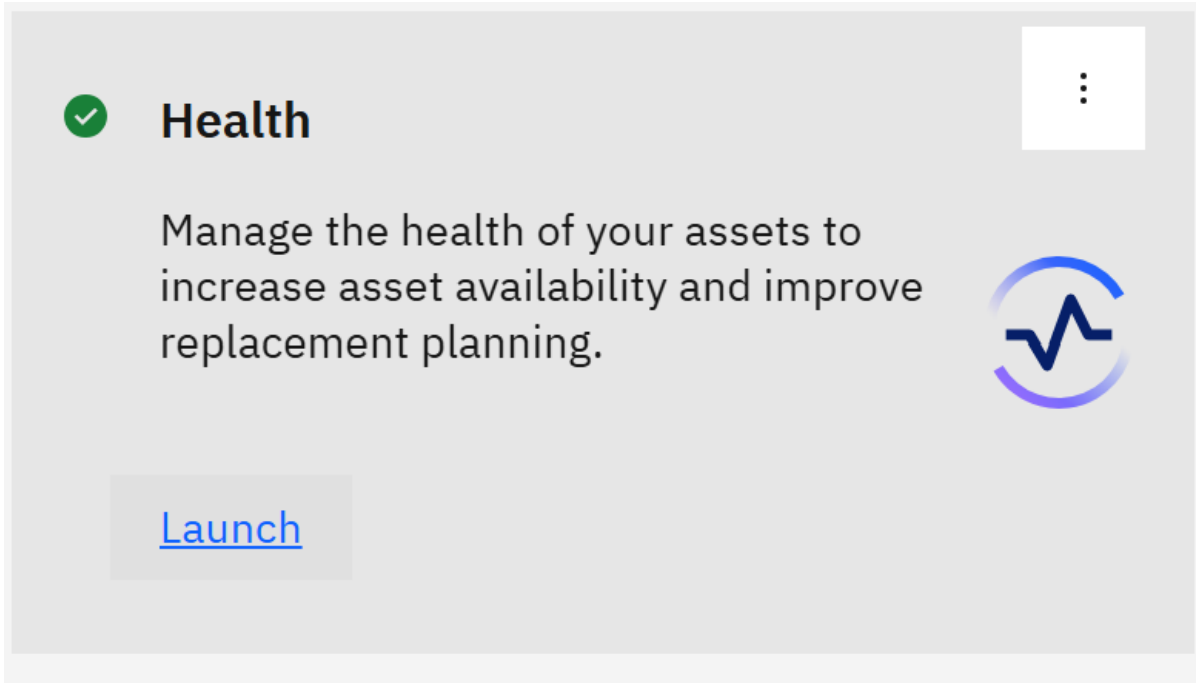
Prioritizing for the future

- Phase 1 – Foundation (Apr–Jun 2026)
  - Failure codes, hierarchy, PM standards
- Phase 2 – Condition to action (Jul–Sep 2026)
  - PI triggers and Maximo integration
- Phase 3 – Reliability and safety (Oct 2026–Mar 2027)
  - PM optimization and safety workflows
- Phase 4 – AI advisory and pilot (Apr–Sep 2027)
  - AI recommendations and anomaly detection
- Phase 5 – Lifecycle planning (FY28+)
  - Capital planning and full predictive model

Monitor will open the door to predictive maintenance but requires more Pi integration



Health will help with long term capacity planning and capital projects



Folks with decades of service are retiring and we need to document their institutional knowledge

We hope to eliminate swivel chairs in the future and eliminate pain points in inventory and supply chain

Safety plan and qualifications integration with work orders and job plans

Change management is a priority to keep plant operations documented

Other departments of LBRE may be joining us soon in MAXIMOIZATION

Thanks for listening