
AWS
re:Invent
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IOT001

ML exception-based surveillance application for industrial assets

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If you knew **the state of everything** and could **reason on top of that data . . .**

what **problems** would you solve?

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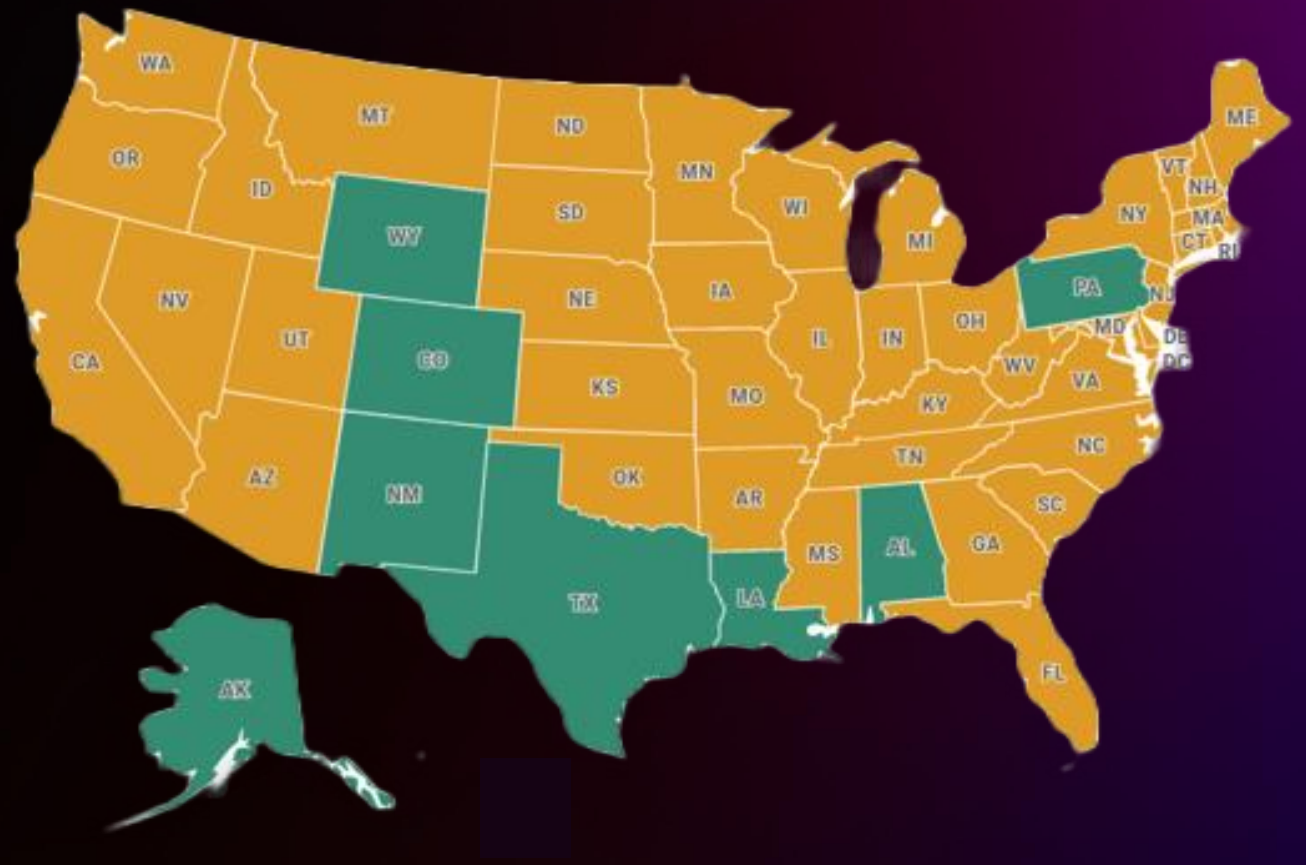
Hilcorp is…

An acquisition-based company with 15 (independent) asset teams

Multiple SCADA systems

- Honeywell
- CygNet
- ABB
- Schneider Electric
- AVEVA
- …

- 30,000 wells across 9 states
- No fully deployed historian
- No comprehensive asset model
- Lean, mean, keep the lights on

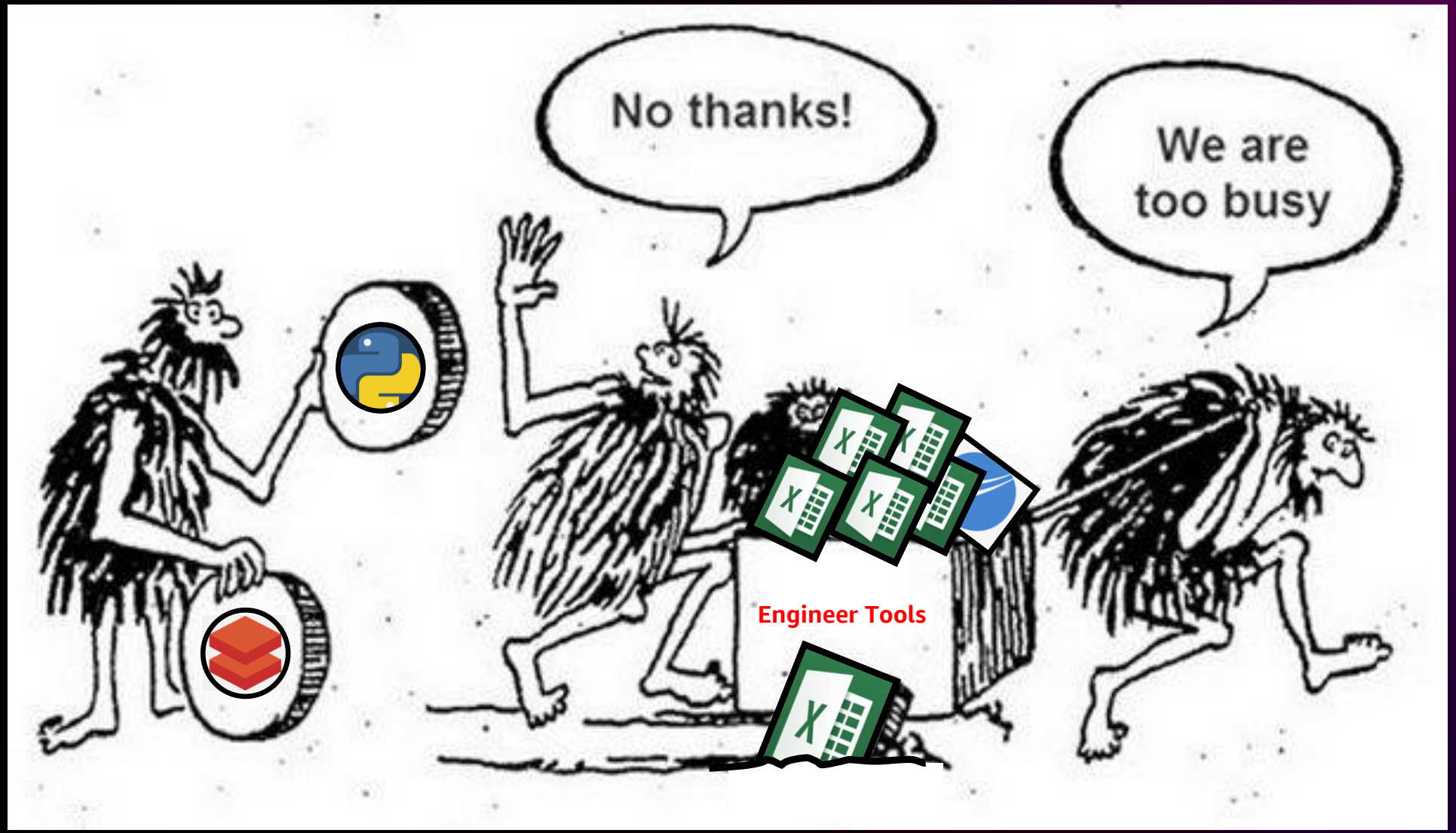


Hilcorp digital/operational landscape

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Important But Not Urgent



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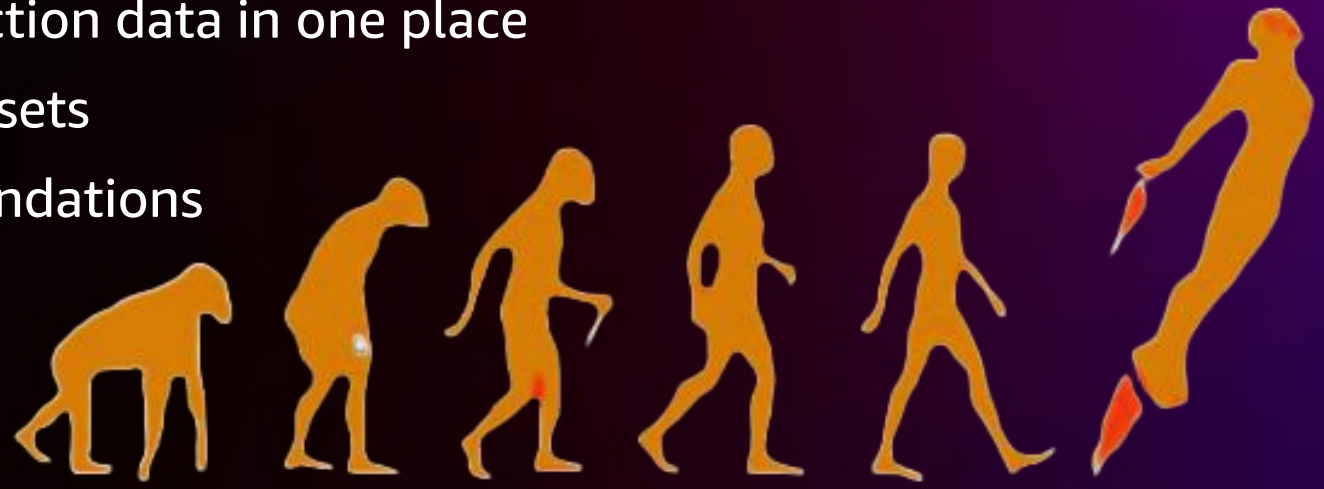
Business evolution

What do executives want?

- Do more, spend less

What does operations want?

- Show me all equipment, wells, and production data in one place
- Allow for rapid assimilation of acquired assets
- Provide high-quality, actionable recommendations
- Increase production, reduce downtime
- Avoid spend as much as possible



What does IT want?

- Deploy collaborative-engineering calculation library and ML models at scale
- Be data-agnostic, recycle the workflow
- Make it modern, serverless, and easy to maintain

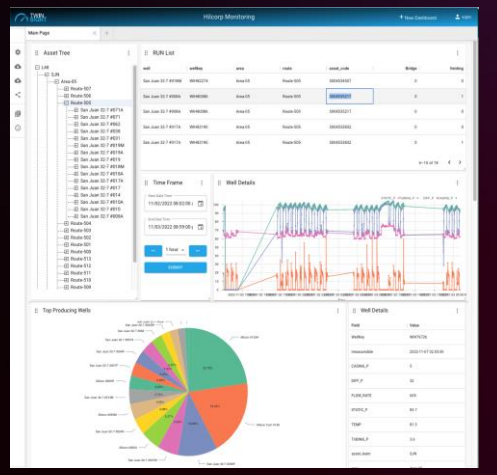
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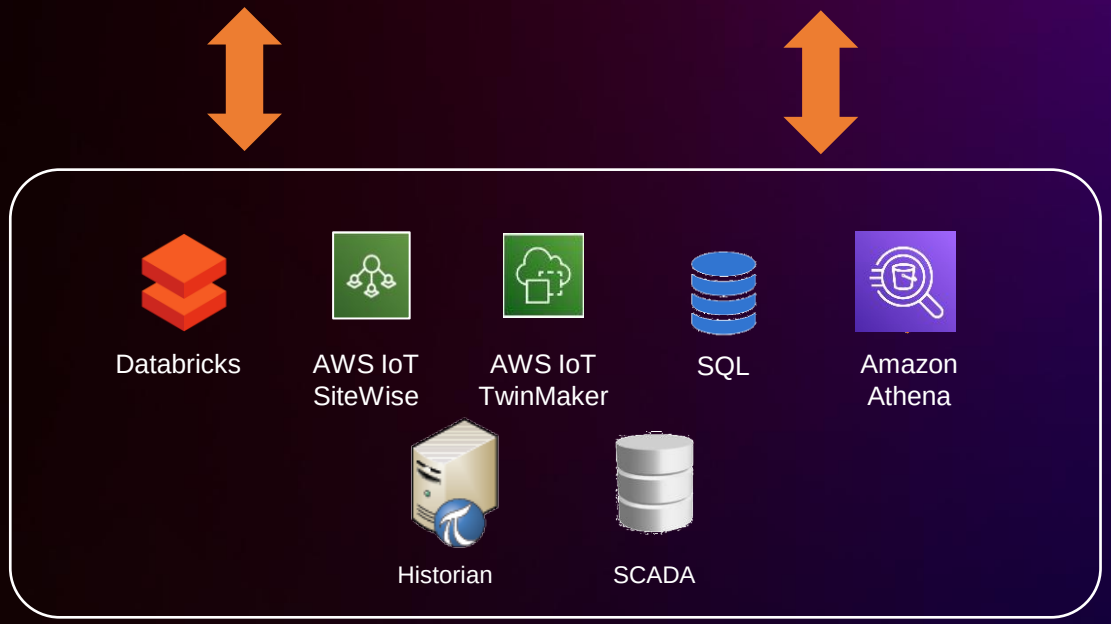
The solution

Analytics platform and cloud historian

- Built on AWS
  (Make it modern)
- Utilizes Amazon S3 as a time-series historian
  (Make it serverless)
- Unifies production and equipment data
  (Make it actionable)
- Deploys ML and calc/alert library (100s of calcs)
  (Make it scalable)
- Delivers insights and recommendations
  (Increase production)
- Avoids spend on unnecessary components
  (Do more with less)

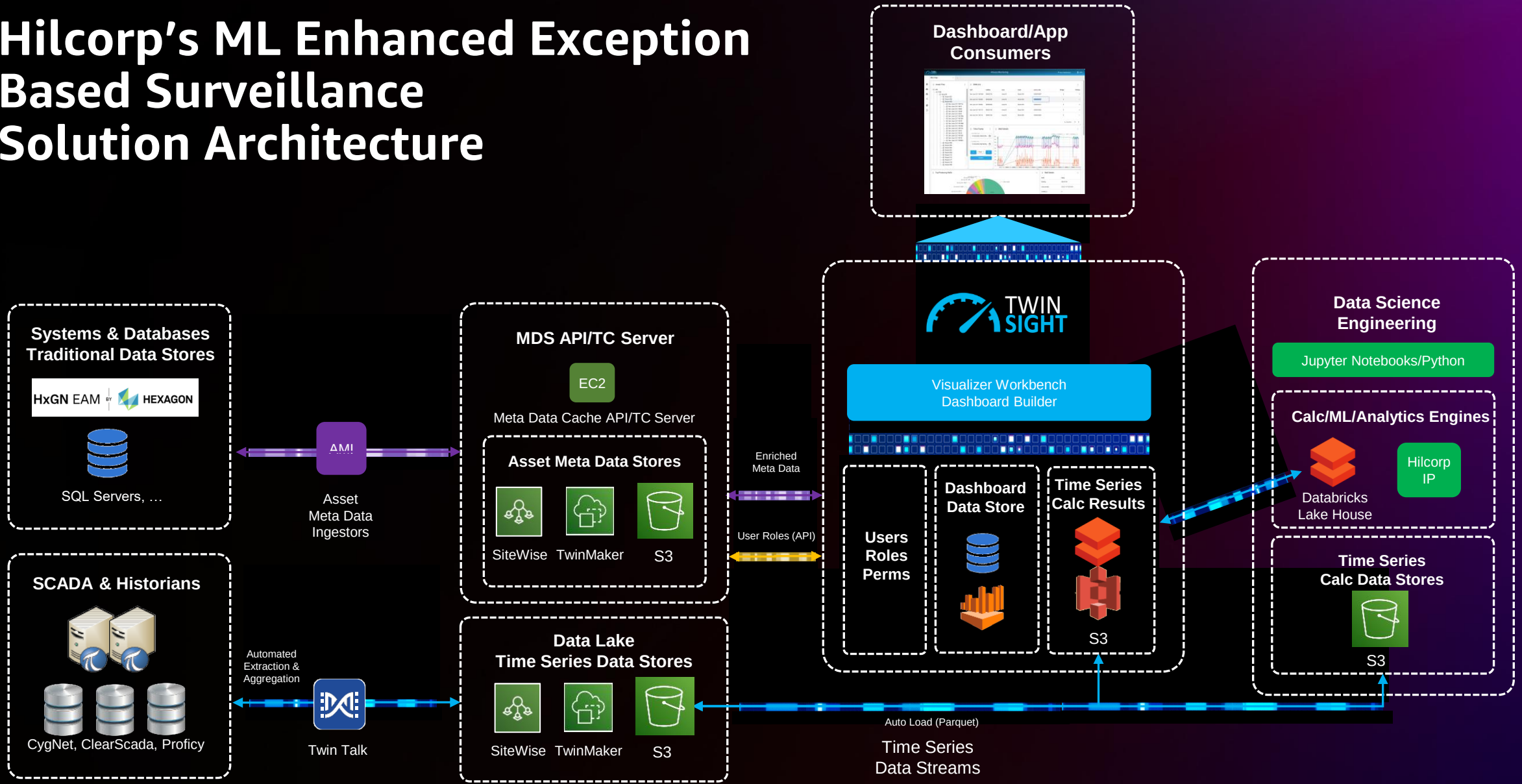


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      keras.metrics.Precision(name='precision'),
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      keras.metrics.AUC(name='auc'),
      keras.metrics.AUC(name='prc', curve='PR')
]
```



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Hilcorp's ML Enhanced Exception Based Surveillance Solution Architecture



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Calculation library

- Current library of 100+ equations
- Created a ‘hive-mind’ calculation library based on ideas throughout the company

Goal: make it scalable 

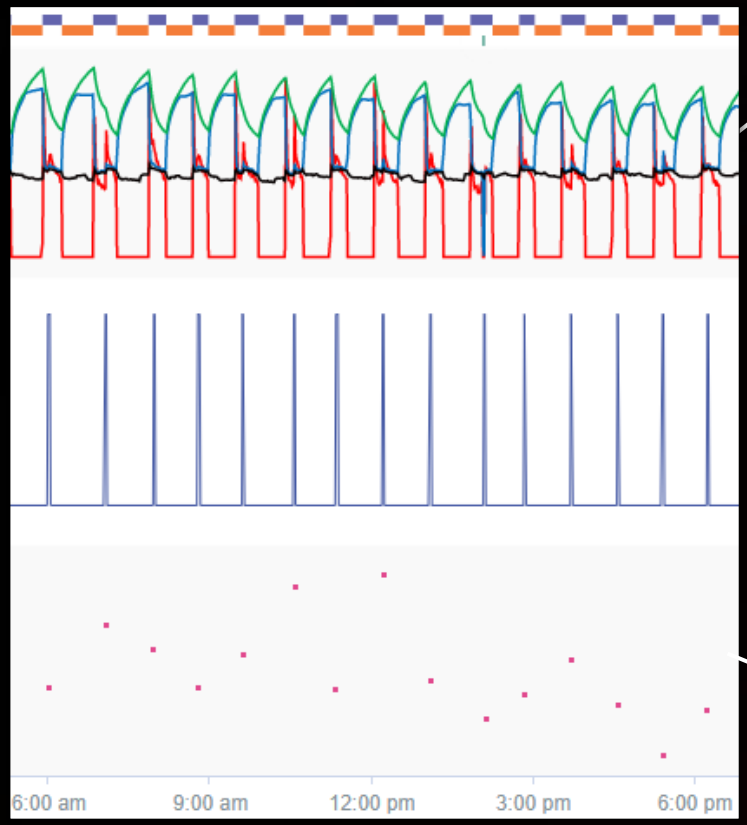
Example of current calculations	
Vent minutes/day	Fundamental rule
Plunger arrival (3 methods)	Rate variances
Plunger speed/cycle	Sales leaks
Plunger on bottom	Bridging off
Plunger fall time	Cycles/day
Afterflow duration	1-, 10-, 30-, 60-day avg
On/off start & length	Rolling derivatives

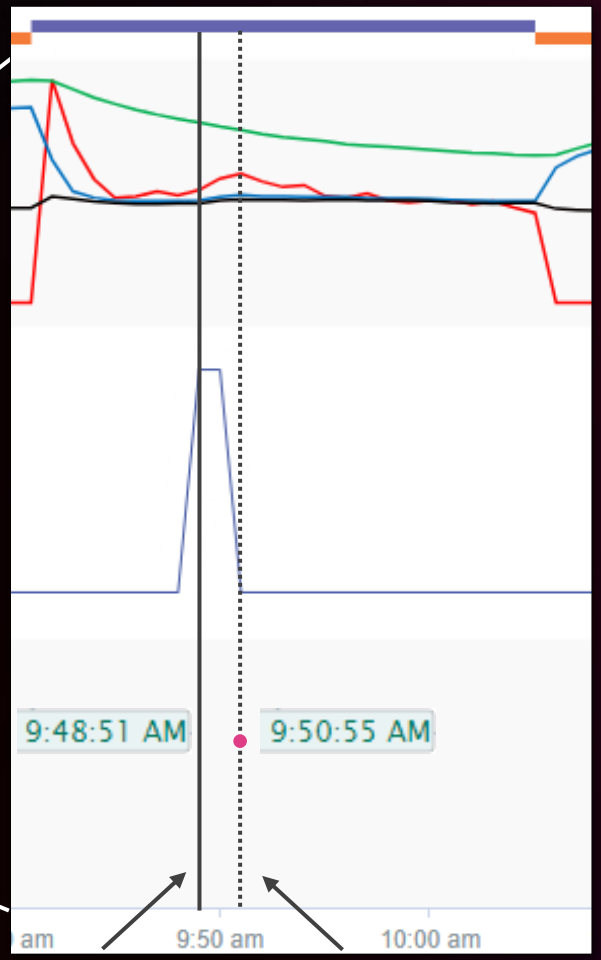
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Accuracy matters

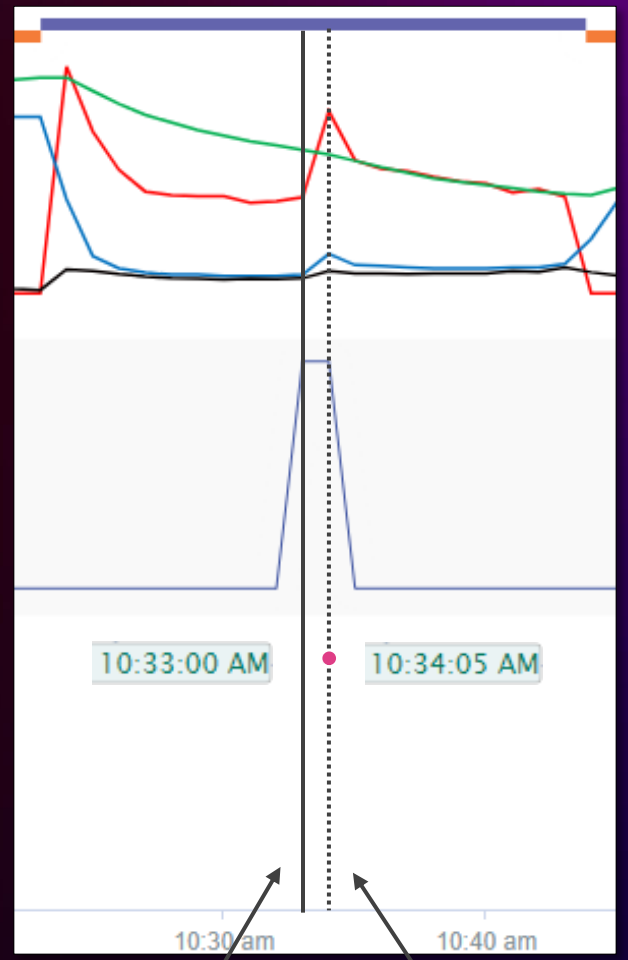
Goal: increase production

Goal: make it actionable





Seeq

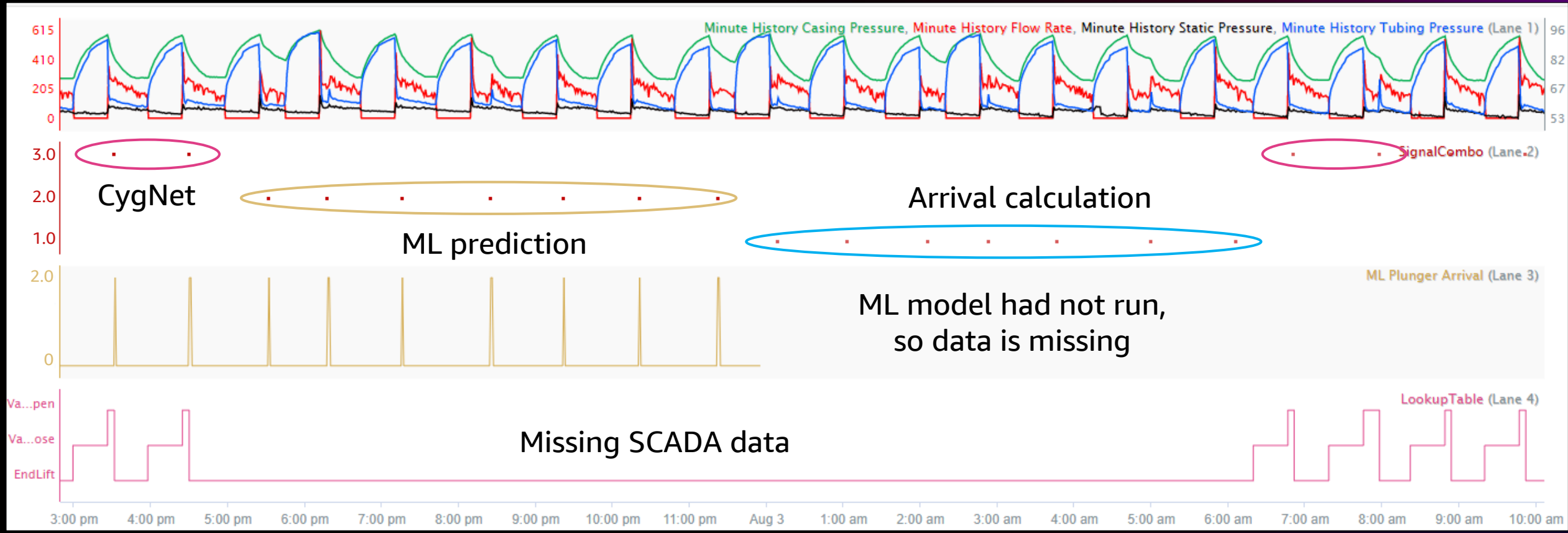


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Data is valuable...

Seeq



Goal: do more with less

Goal: make it actionable

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Hilcorp's ML Enhanced Exception Based Surveillance Demo

Powered by:





What's next and what did we learn?

We can

- Ingest and enrich SCADA data at scale
- Deploy calculations and alerts to the field rapidly
- Increase base production by identifying wells that need intervention before they go down

We learned

- Scaling ML and calculations to millions of rows is hard
- Finding the right partners is key
- Understanding the problem is essential
- Failing fast is a virtue
- ETL should be easy to manage and scalable

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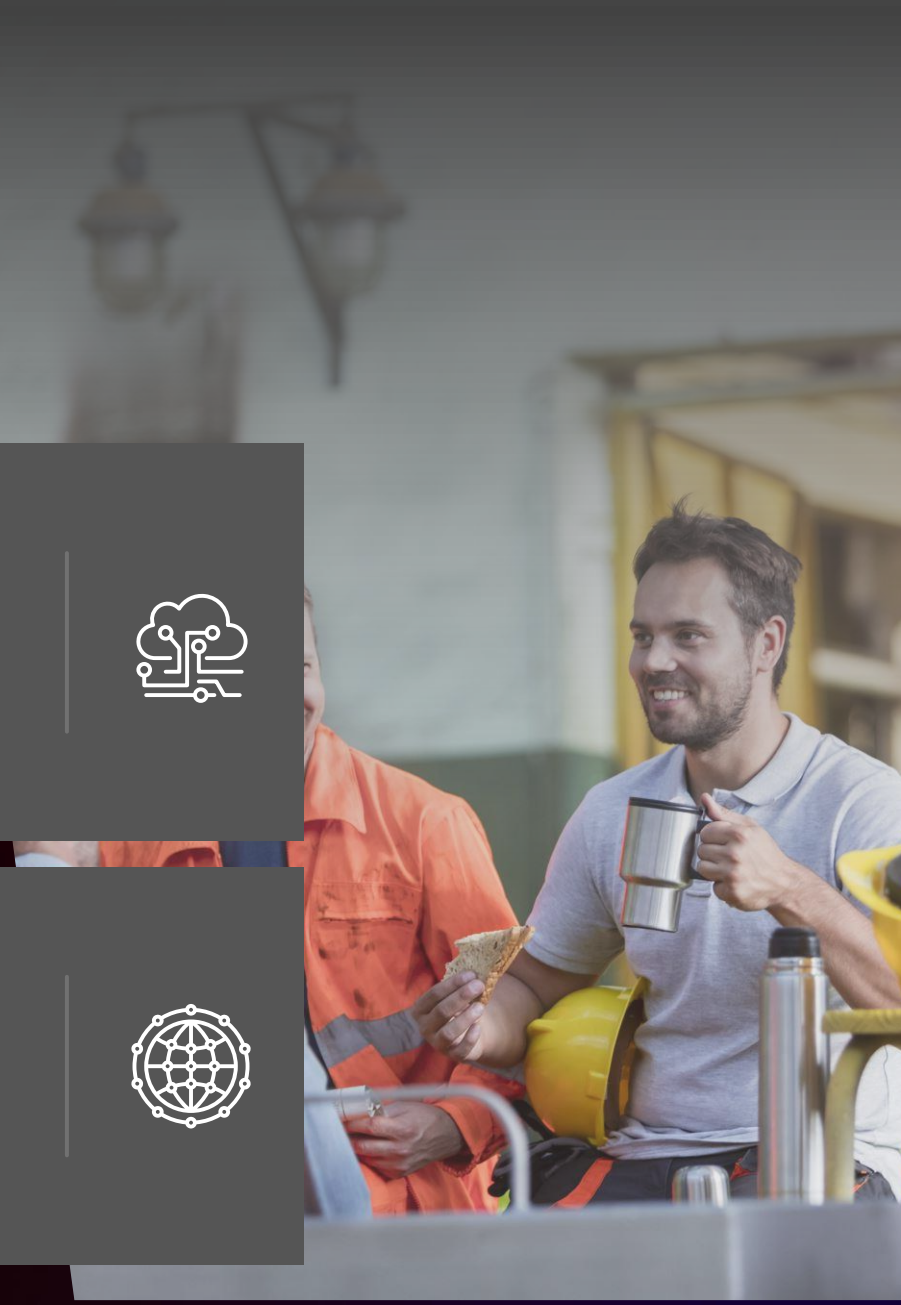
Why AWS for Industrial?

AWS was born from complex automation & factory operations at Amazon

AWS has **purpose-built services to optimize operations at industrial sites**, adding to AWS's leading suite of industrial services and solutions

AWS customers take advantage of security designed for the most sensitive organizations

AWS massive, global scale reduces risk



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aws for Industrial

simplifies the process of locating, building, and deploying innovative IoT, AI/ML, analytics, and edge solutions to achieve step-change improvements in operational efficiency, quality, and agility

https://aws.amazon.com/industrial/

AWS IoT webpage

https://aws.amazon.com/iot/

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