AWS re:Invent

IOT368

Introduction to AWS IoT SiteWise

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Uptake

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Agenda

Getting started with Industrial IoT

Key capabilities and benefits of **AWS IoT SiteWise**

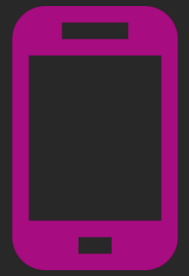
Gateway: Sending industrial data streams to AWS Cloud

Views: Representing and monitoring assets, processes or entire facilities

Demo

How customers and partners are using AWS IoT SiteWise

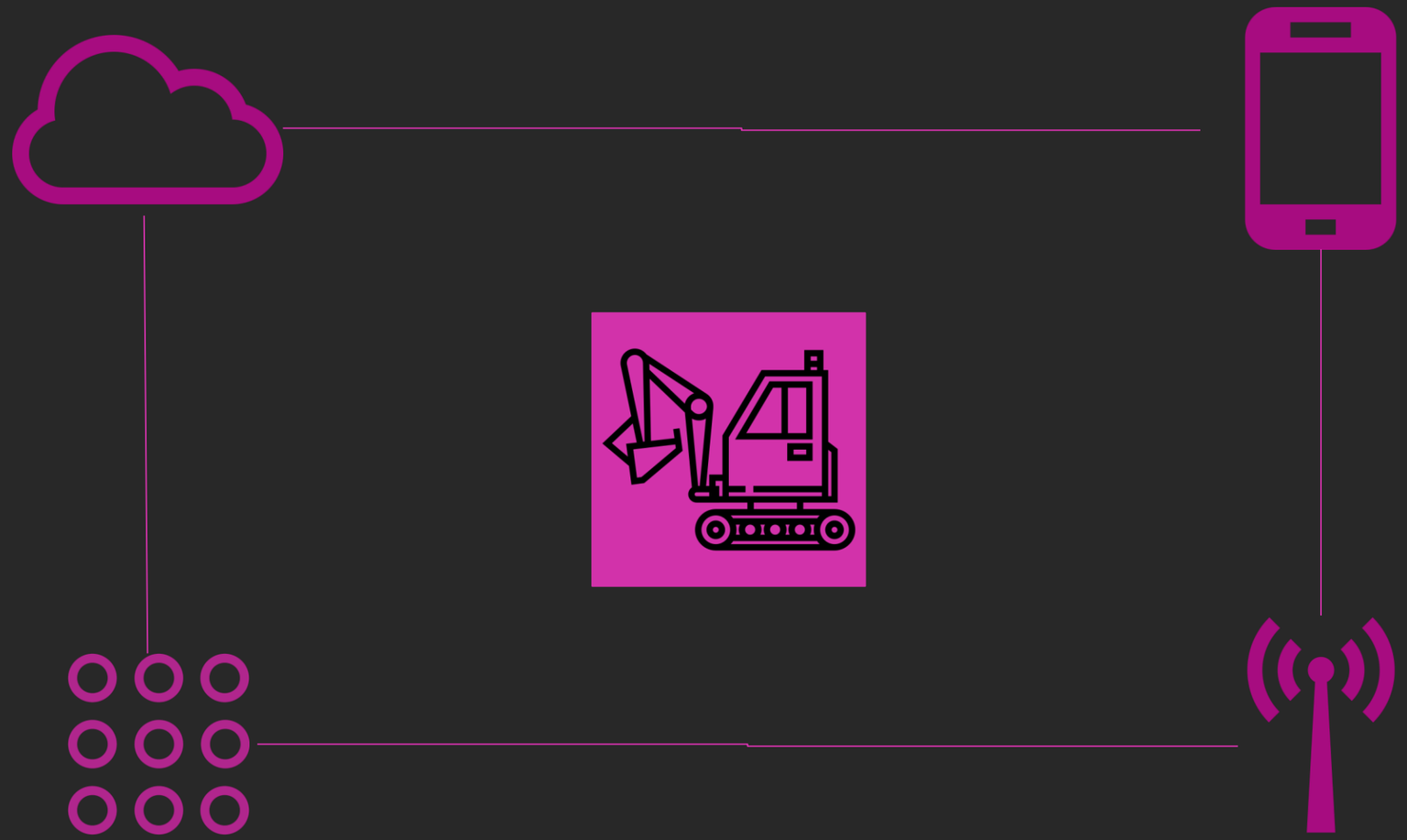
Businesses in every market segment using the cloud.



60-70% penetration across US and EMEA.

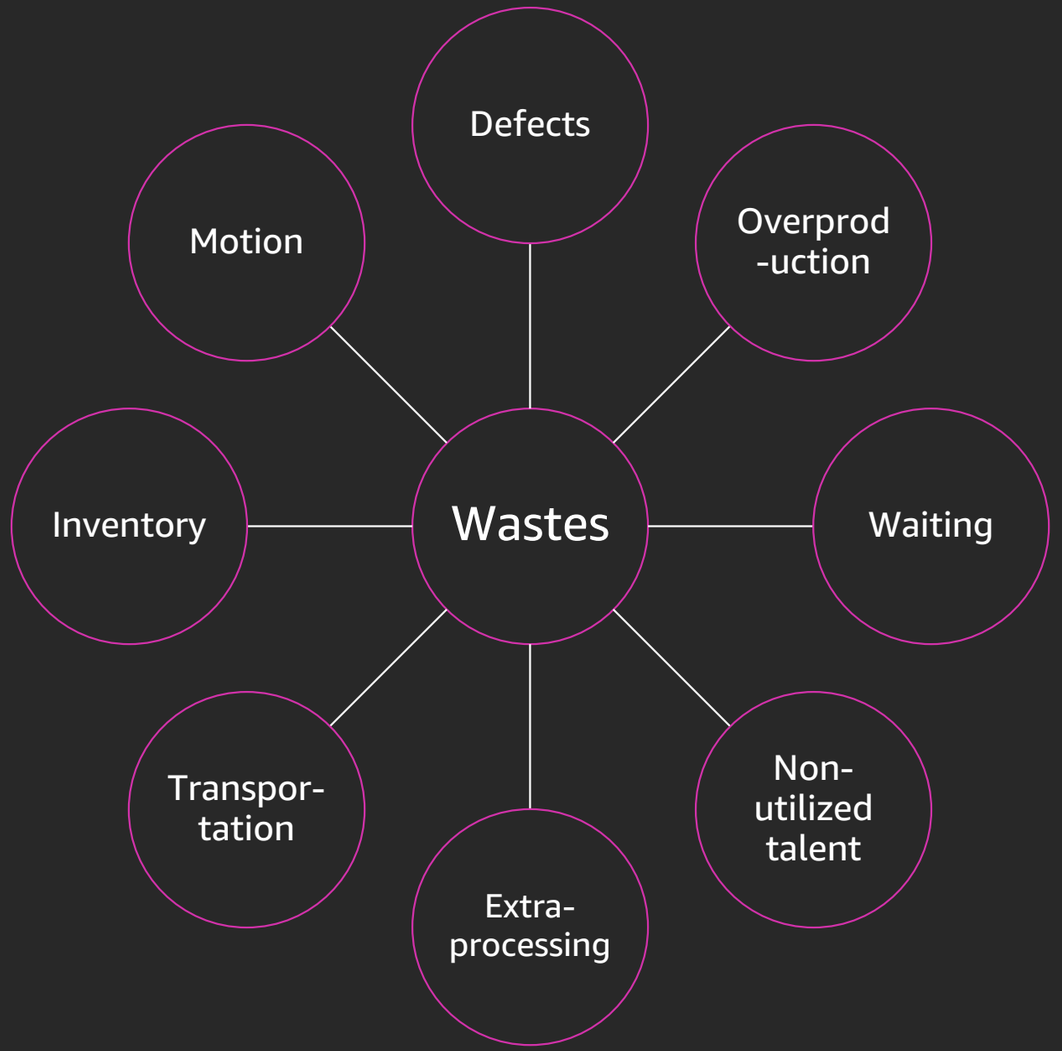
20.5B IoT devices by 2022 predicted.

99.7% of US covered by 4G. 40% increase in speeds over two years.

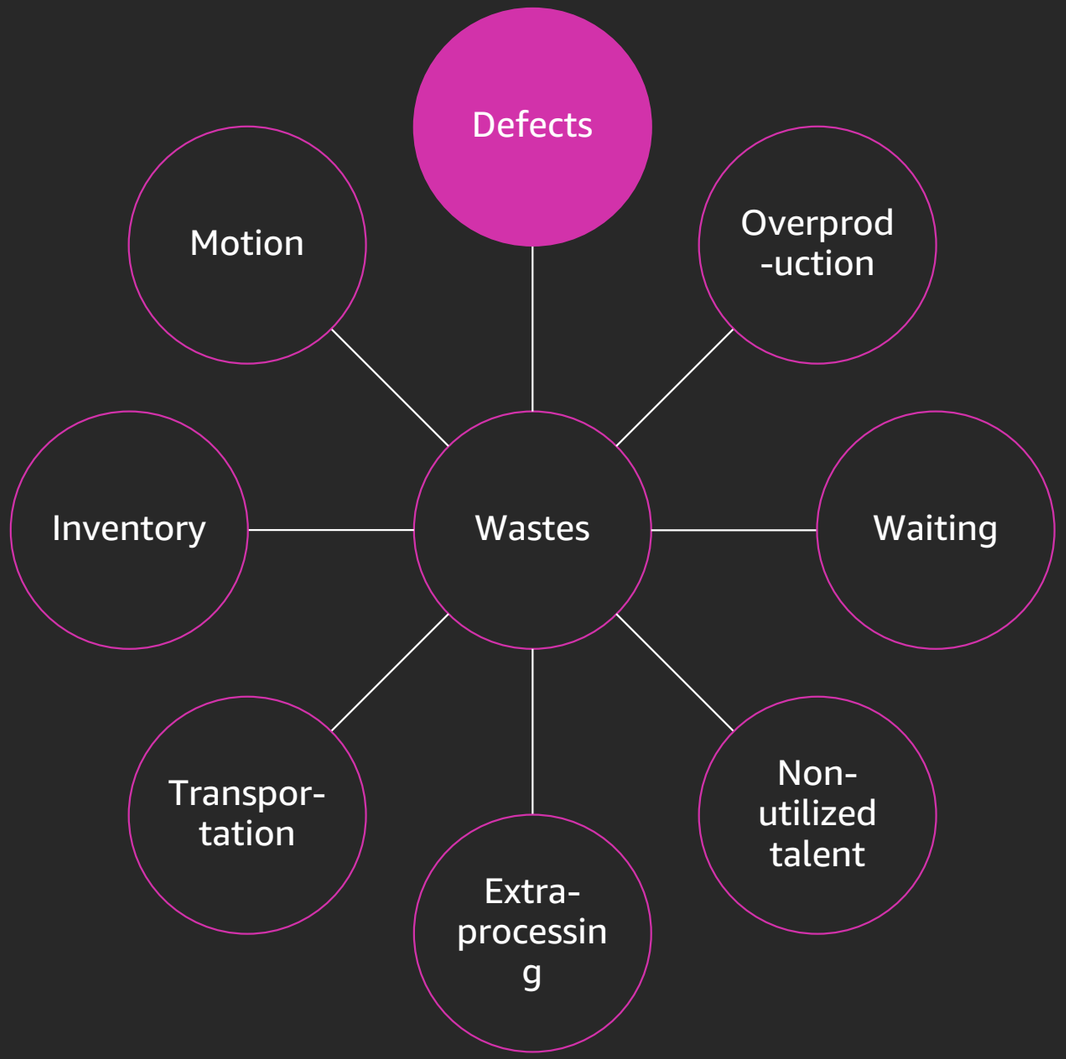


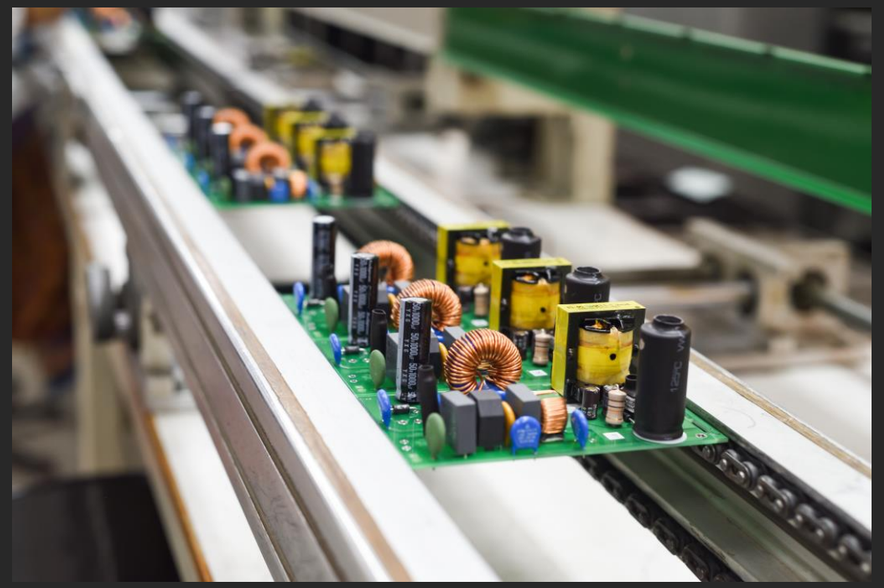
How do I get started?

Look for waste



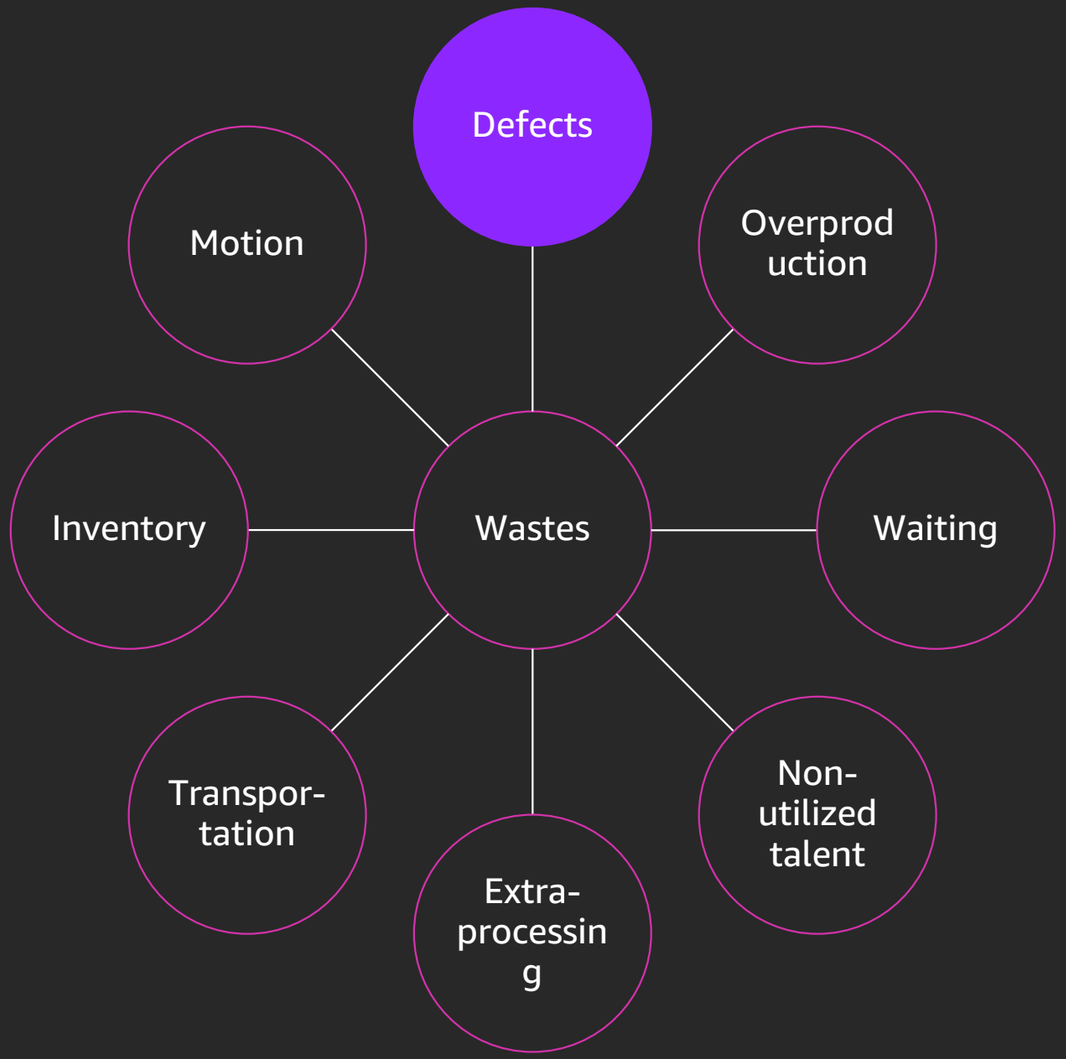
Consumer electronics manufacturing

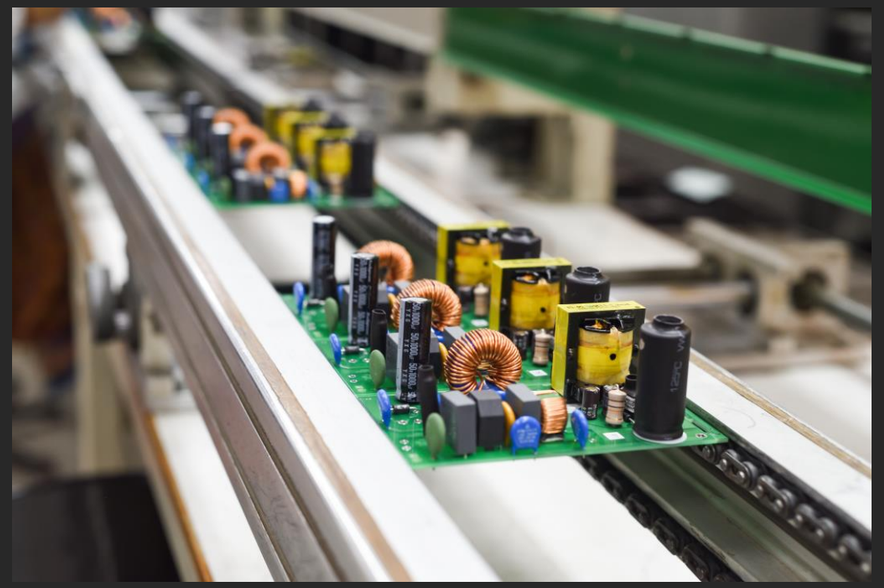




Defect rate can be higher in one facility than in others for the same manufacturing process

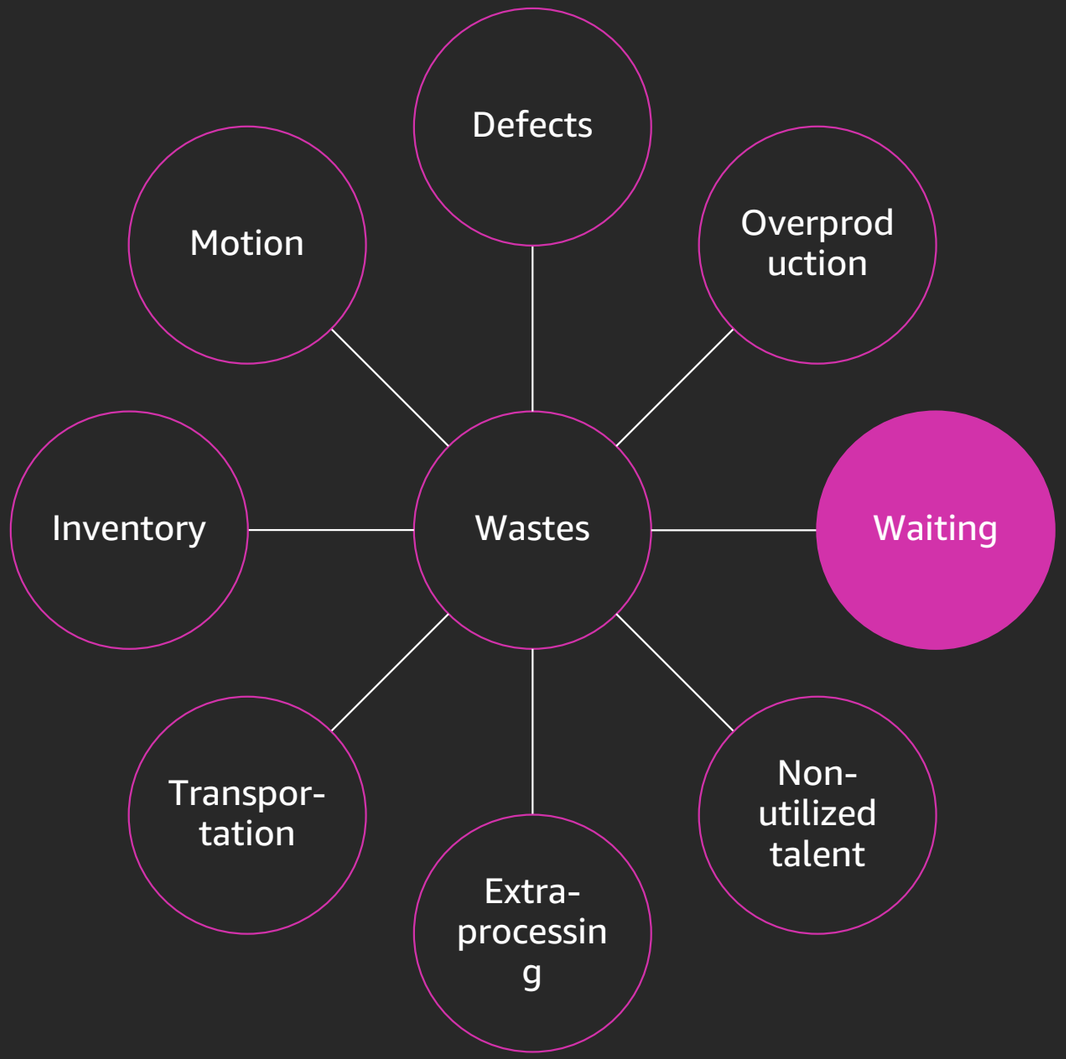
Comparison across sites and production lines





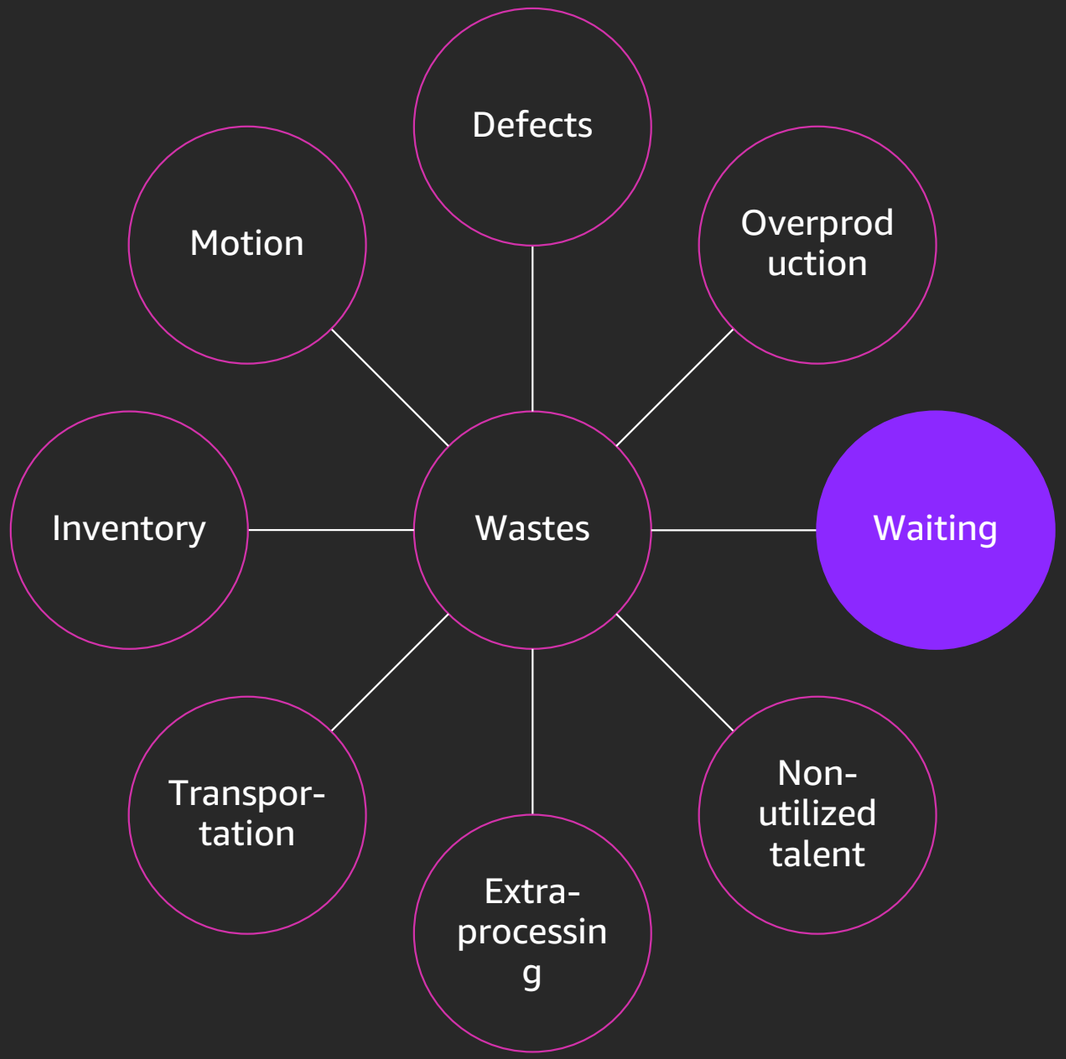
Comparing data from similar production lines across multiple facilities can isolate defect causing issues

Renewable energy generation



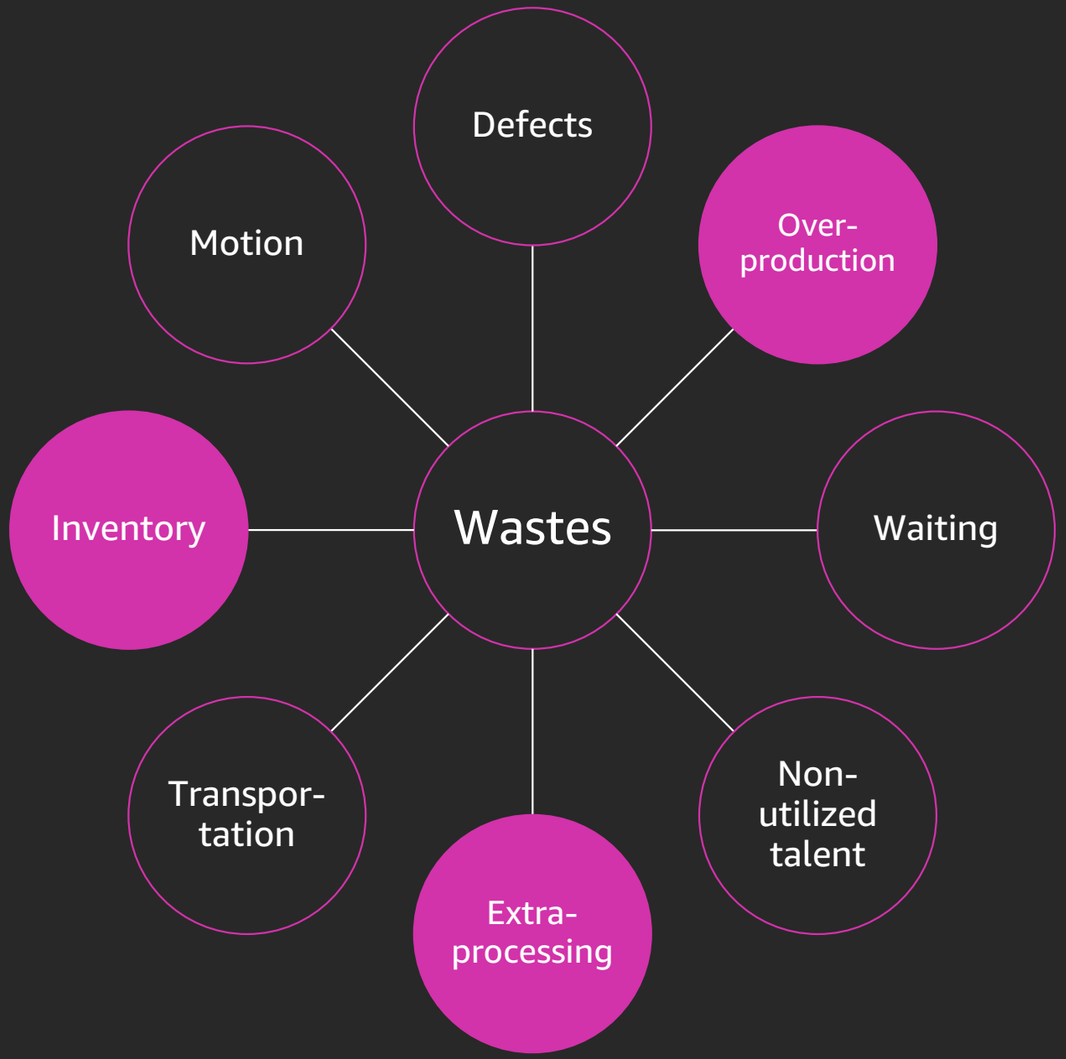
Equipment down-time or performance can be costly for customers in competitive commodities markets

Remote diagnostics



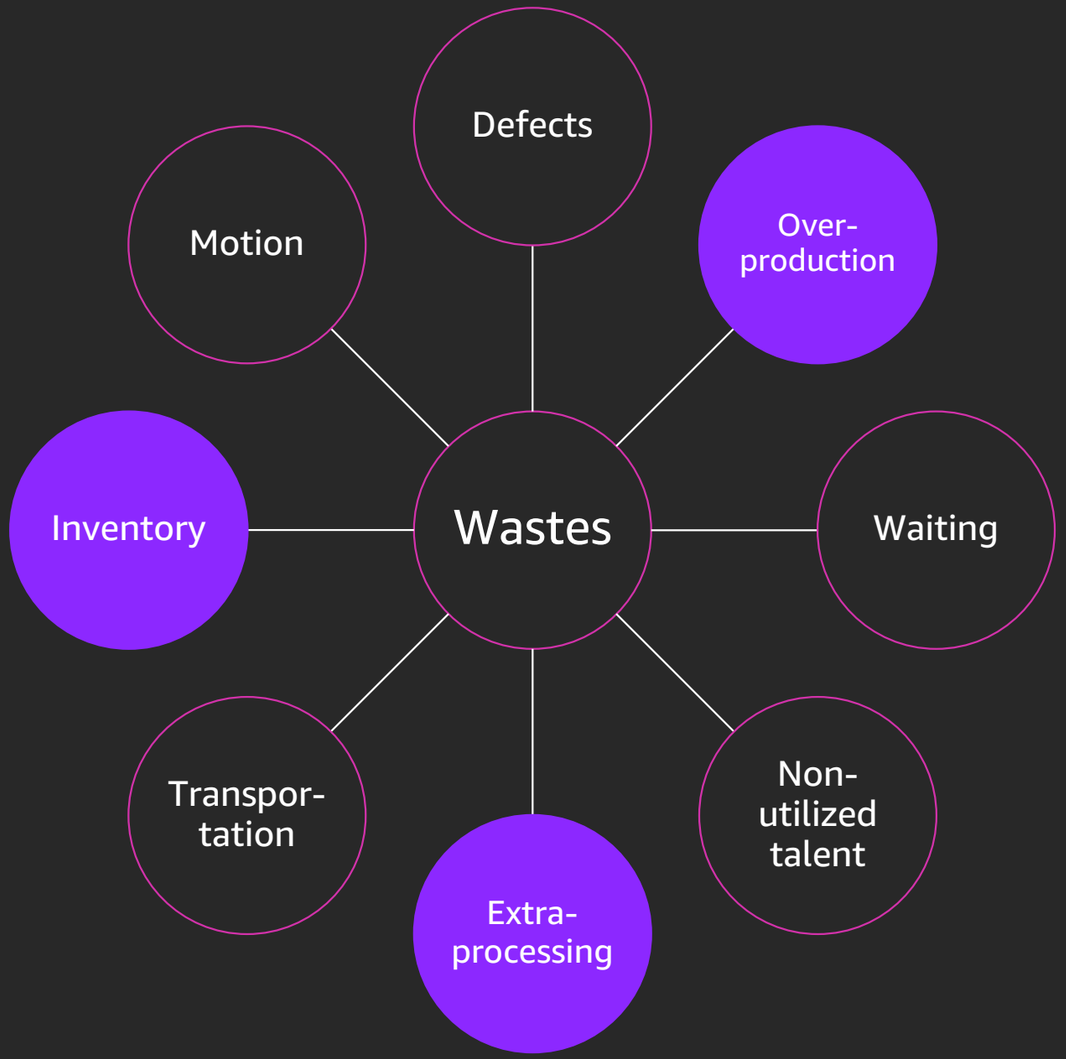
Having access to historical and near real-time data from equipment can speed up recovery efforts and shorten downtime

Food and beverage processing



Perishable raw materials such as meat and dairy are expensive to store and handle

Production process monitoring

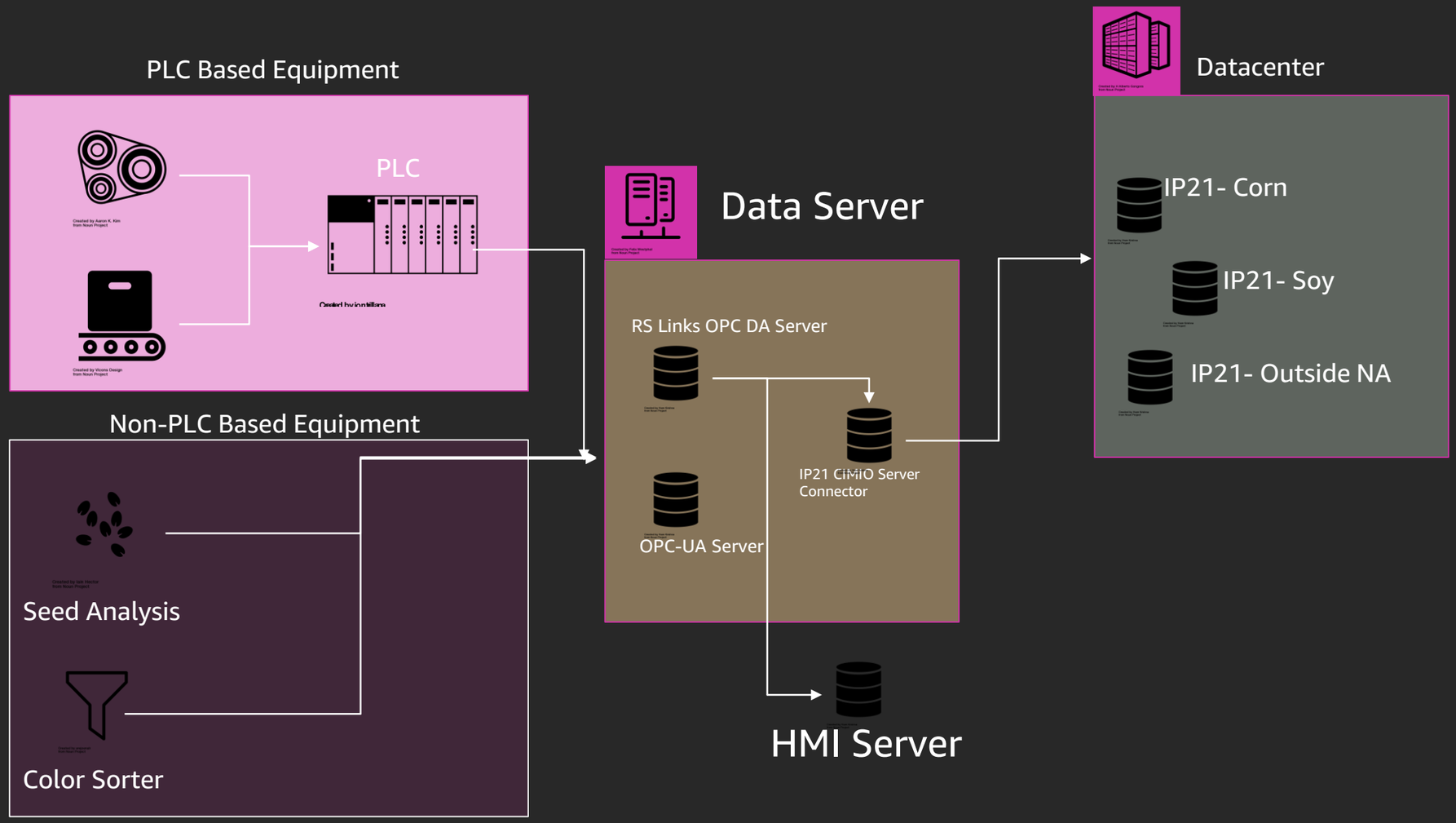


Knowing state of various production processes can help manage excess stock resulting from delays in production

Common requirements in cross-site monitoring

Data collection
from facilities

Data locked on-premises limits customers



Common requirements in cross-site monitoring

Data collection from facilities

Data labeling and organization

Data is inherently unstructured

tag name	description	units	source	type
43PDI1674.PV	C-43332 PRESSURE DIFFERENTIAL	psi	PRMN	Float32
43JI1675.PV	C-43332 POWER	KW	PRMN	Float32
43FI1676.PV	C-43332 MEASURED FLOW	m3/min	PRMN	Float32
43JI1677.PV	C-43332 POWER	KW	PRMN	Float32
43PI1679.PV	PRESSURE TO C-43332	psi	PRMN	Float32
43II1680.PV	CURR C-43332	a	PRMN	Float32
43PI1681.PV	DISC PRESS C-43332	psi	PRMN	Float32
44PDI7631.PV	A_PRESS C-44729	psi	BAYT	Float32
44JI7632.PV	C-44729 POWER	KW	BAYT	Float32

Common requirements in cross-site monitoring

1

Data collection from facilities

2

Data labeling and organization

3

Data accessibility

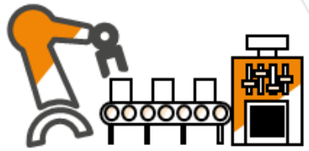
AWS IoT SiteWise

Collect, structure, and consume data from industrial sites

Acquire a **SiteWise Gateway** (OEM provides or Snowball Edge)

Use **SiteWise App** and configure your gateway. See data flowing in minutes.

Data stored in a time-series data lake



Create representations of your assets, processes, and facilities with **Views**

Configure **metrics** for assets or processes

Quickly diagnose issues across sites remotely

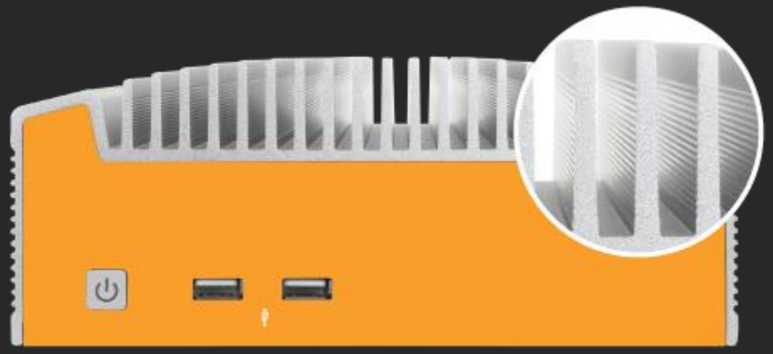
Create monitoring dashboards for critical processes

Perform analytics, detect events, create alarm applications

Gateway: Liberate data from factories

Gateway and data management

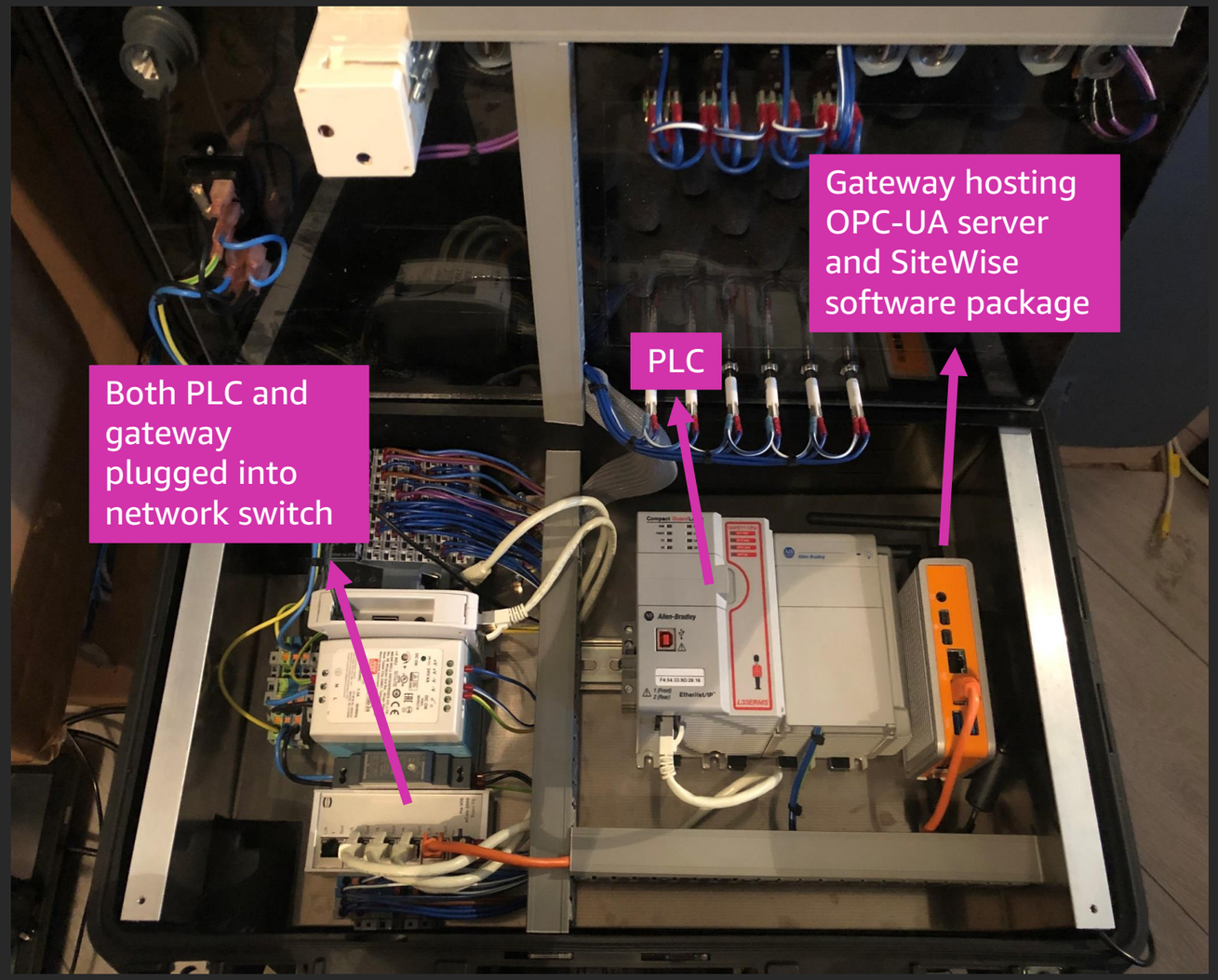
- Read thousands of data streams with OPC-UA protocol
- Manage data streams across all your sites
- Manage and configure gateways remotely
- Minimum firewall changes needed



Logic Supply ML-500-30

AWS Snowball Edge

Gateway: Liberate data from factories



Gateway dashboard

Represent and monitor your sites

Views

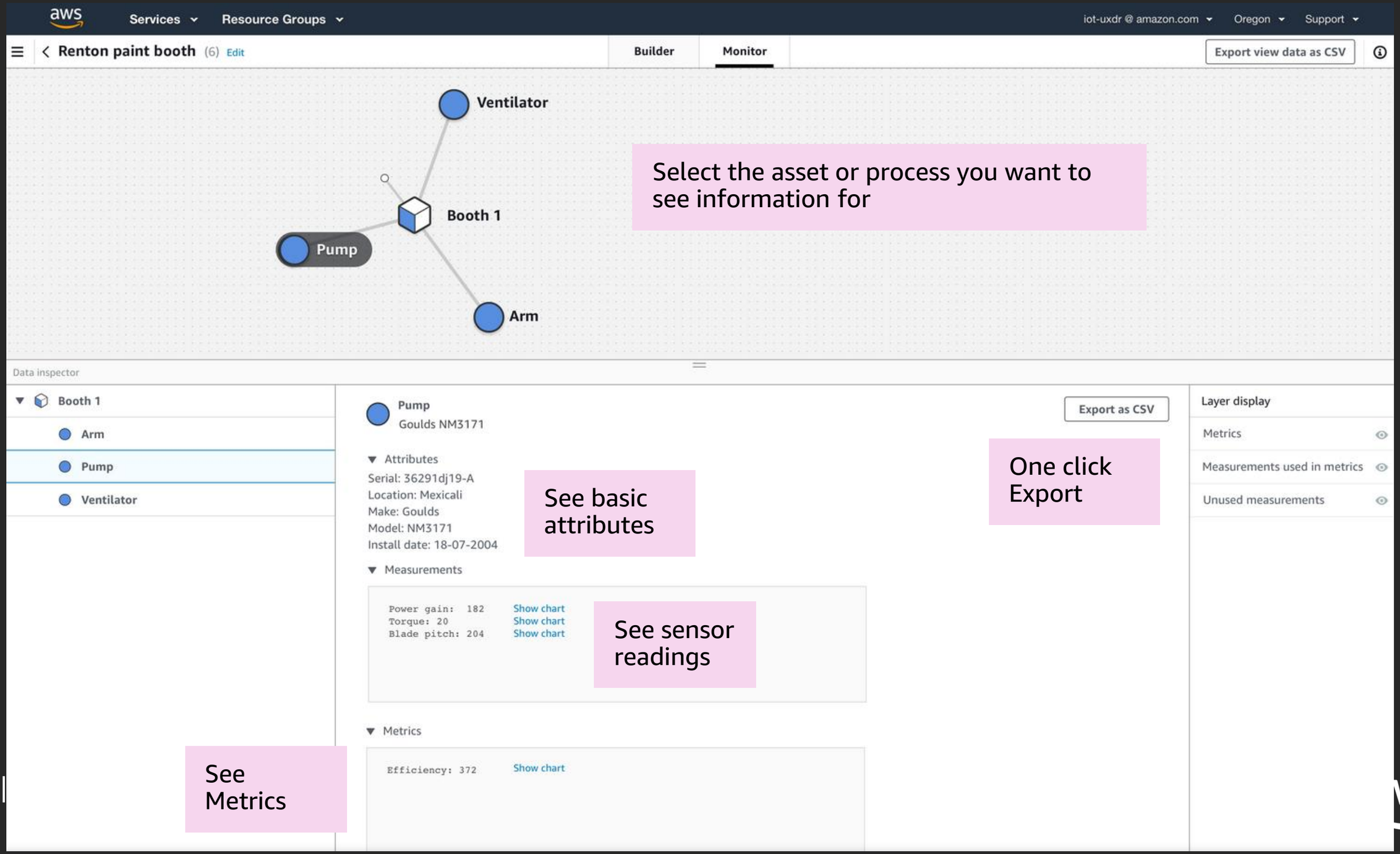
- Represent assets, workcells, and processes
- Create your own “view” with existing assets and processes
- Track metrics for assets and processes or drill down into details
- Download data for assets and processes as an Excel file

“*Lots of my time is wasted helping technicians get equipment data.*”
– process engineer at an automotive company

“*Experts in HQ have no easy way to access all the data, so they rely on tribal knowledge.*”
– engineering analyst at a global manufacturing company

“*We want to identify the problem before we send people to our remote site.*”
– reliability engineer at an energy company

“*Connect with our tools.*”
– engineering analyst at a global manufacturing company


aws
Services
Resource Groups
iot-uxdr @ amazon.com
Oregon
Support
Renton paint booth (6) Edit
Builder
Monitor
Export view data as CSV
Ventilator
Booth 1
Pump
Arm
Select the asset or process you want to see information for
Data inspector
Booth 1
Arm
Pump
Ventilator
Pump
Goulds NM3171
Export as CSV
Layer display
Metrics
Measurements used in metrics
Unused measurements
Attributes
Serial: 36291dj19-A
Location: Mexicali
Make: Goulds
Model: NM3171
Install date: 18-07-2004
See basic attributes
One click Export
Measurements
Power gain: 182 Show chart
Torque: 20 Show chart
Blade pitch: 204 Show chart
See sensor readings
Metrics
Efficiency: 372 Show chart
See Metrics

AWS IoT SiteWise Gateway

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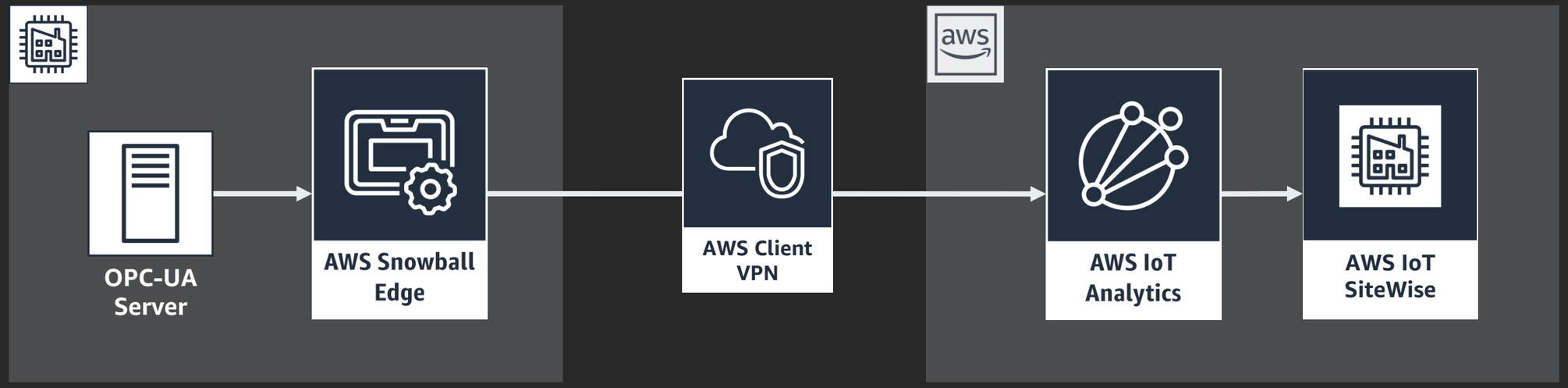
AWS IoT SiteWise - Gateway

Sending industrial time-series data from factory floor to the cloud for cross-site analysis and machine learning



AWS IoT SiteWise - Gateway

Software package from AWS

Supports vendor-neutral **OPC-UA** protocol

Enables end-to-end secure connectivity

Uploads data to **AWS IoT Analytics** for further analysis and ML

Software package/appliance from AWS

Non-intrusive installation to existing factory networks

Software is kept up-to-date by AWS via **OTA**

Easy provisioning and management from AWS console/API/CLI

Runs atop **AWS Greengrass**

Supports vendor-neutral OPC-UA protocol

Support most common OPC-UA identity provides including certificate-based

Consumes time-series using OPC-UA subscription model

Automatically handles connection drops/time-outs

Enables end-to-end secure connectivity

Encrypted endpoint-to-VPN connection via **AWS Client VPN**

OPC-UA server credentials are stored in **AWS Secrets Manager** and securely deployed to the gateway

Ability to provide OPC-UA server certificate for secure connectivity

Uploads data to **AWS IoT Analytics** for further analysis and ML

Buffers data locally to handle intermittent connectivity

Batches time-series for efficient upload to **AWS IoT Analytics**

Periodically checkpoints upload progress both locally and in the cloud

AWS IoT SiteWise views

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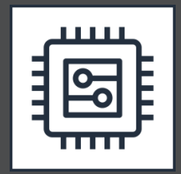
Modeling solar farm

AWS IoT SiteWise helps modeling solar farm and track power output on different levels (per site, per geo location, more)

AWS IoT SiteWise—Views

Name:	CA1751-1A
Nominal Power:	320
Units:	watts
Real Power:	f(Power Meter)
Efficiency:	f(Power Meter)
Power Meter:	CA/17/260-477

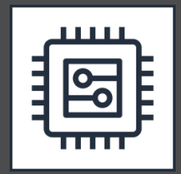


Power Meter

AWS IoT SiteWise—Views

Asset

Name:	CA1751-1A
Nominal Power:	320
Units:	watts
Real Power:	f(Power Meter)
Efficiency:	f(Power Meter)
Power Meter:	CA/17/260-477



Power Meter

AWS IoT SiteWise—Views

Attributes

Name:	CA1751-1A
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Units:	watts
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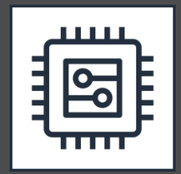
Power Meter:	CA/17/260-477



Power Meter

AWS IoT SiteWise—Views

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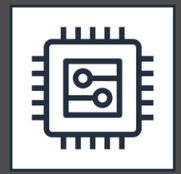
Nominal Power:	320
Units:	watts
Real Power:	f(Power Meter)
Efficiency:	f(Power Meter)
Power Meter:	CA/17/260-477

Metric



Power Meter

AWS IoT SiteWise—Views

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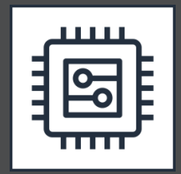
Units:	watts
Real Power:	f(Power Meter)
Efficiency:	f(Power Meter)
Power Meter:	CA/17/260-477

Measurements



Power Meter

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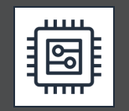

Power Meter

Asset

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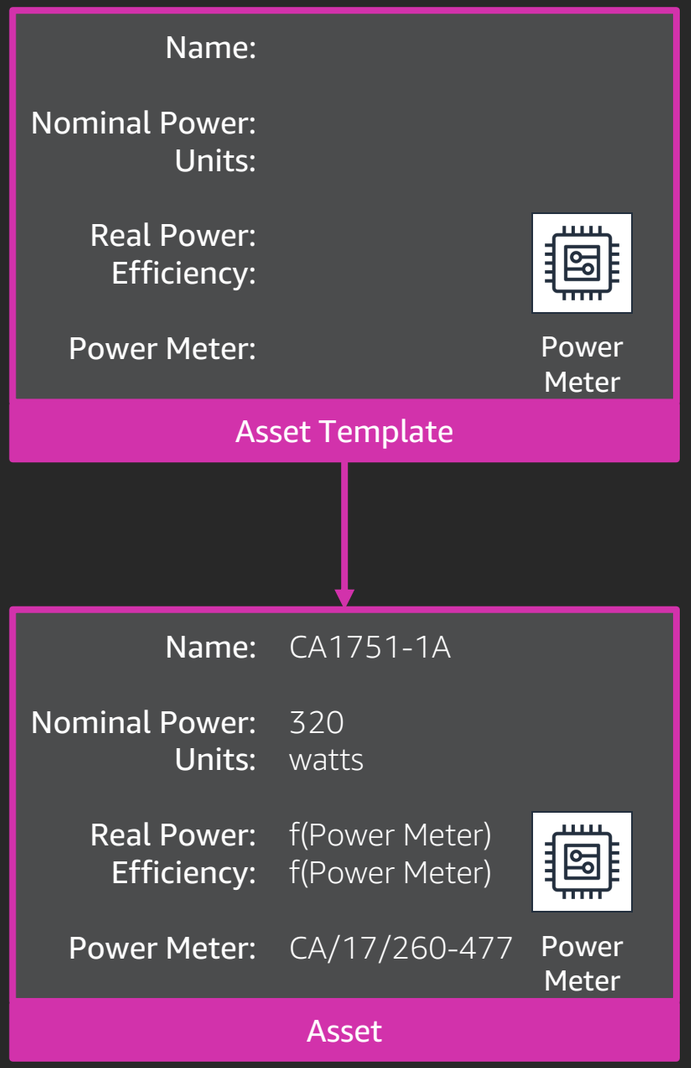
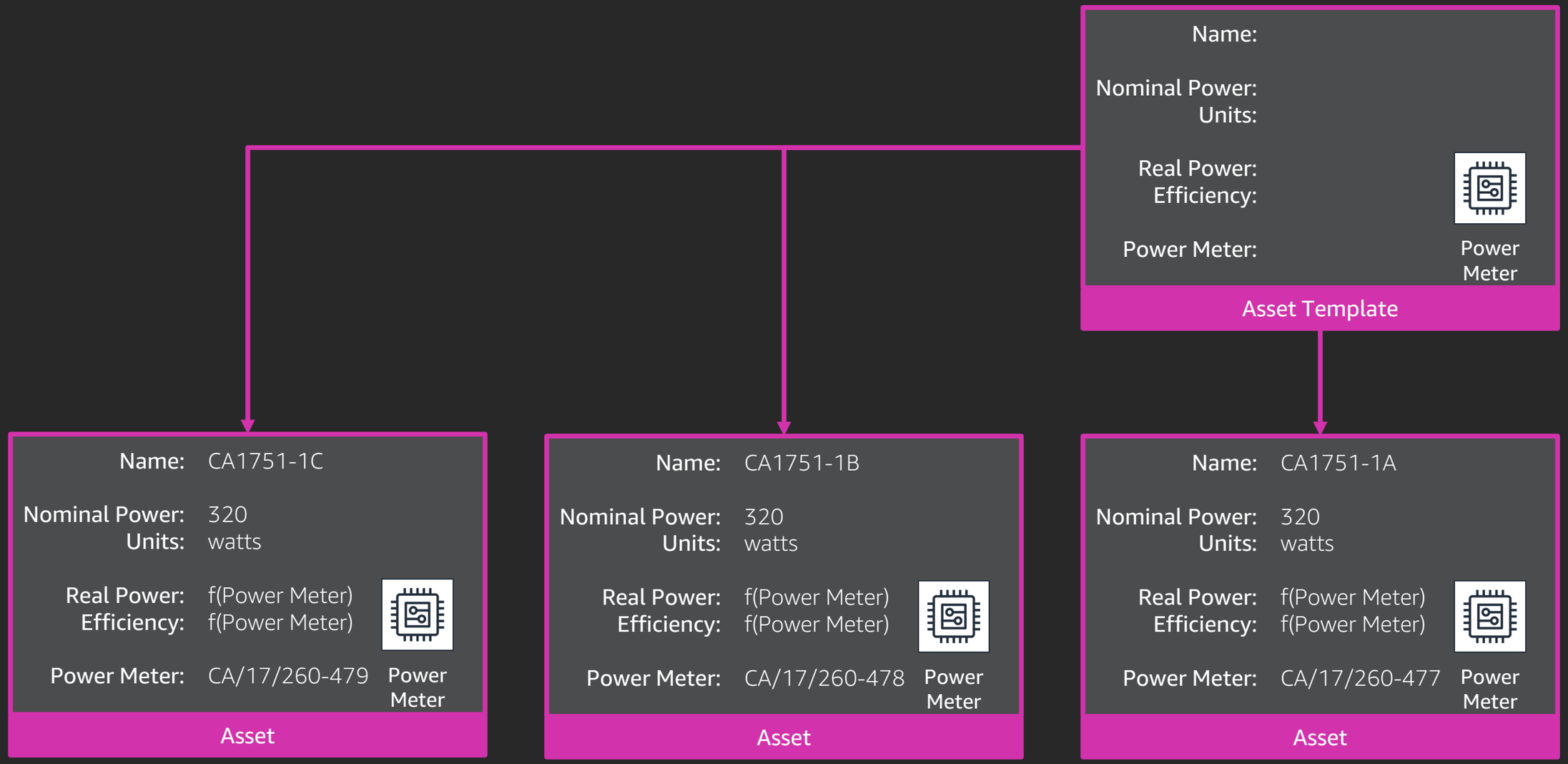
AWS IoT SiteWise—Views



AWS IoT SiteWise—Views



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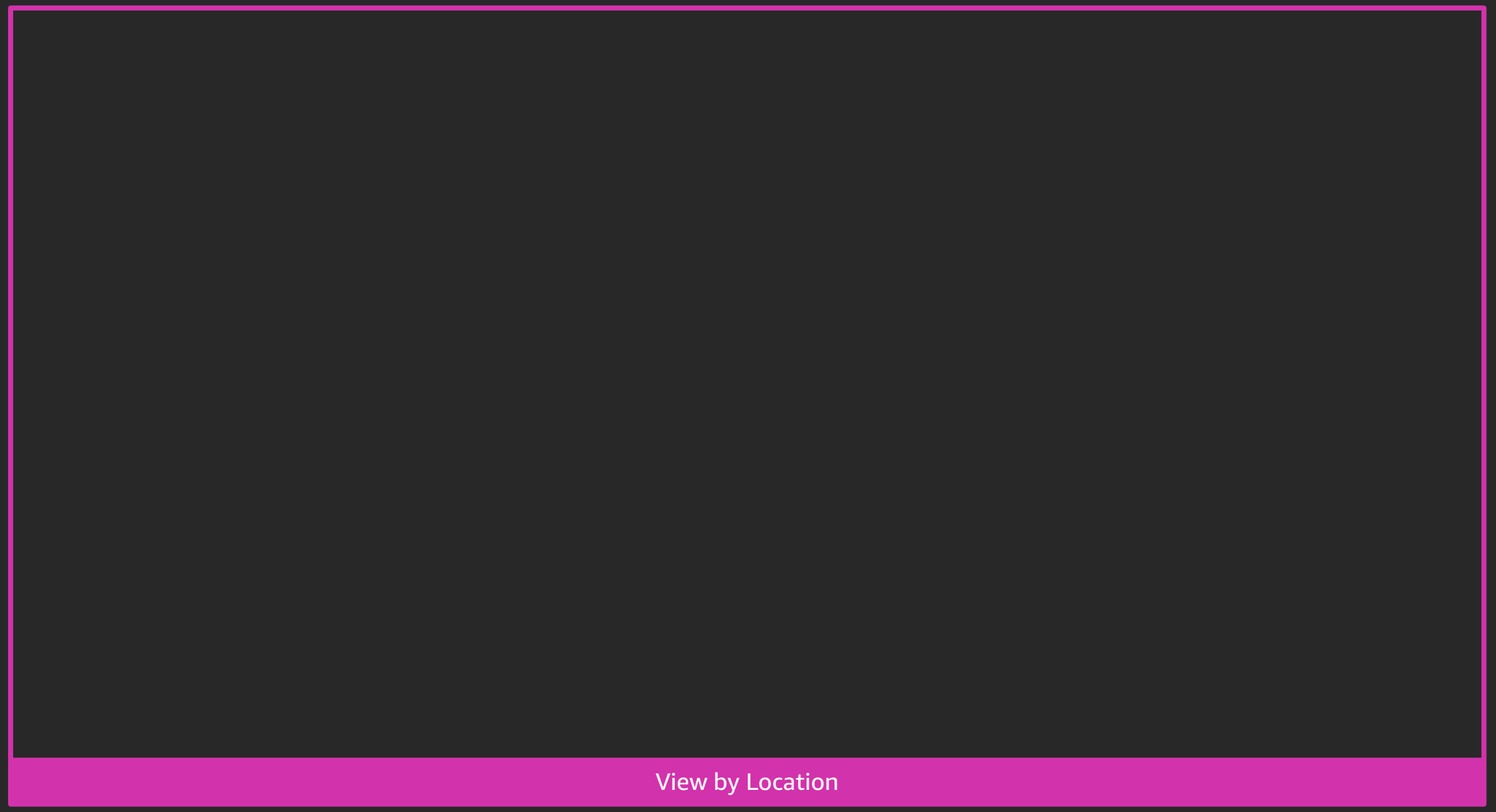
AWS IoT SiteWise—Views



Name: CA1751-1A

Real Power: f(CA/17/2..)
Efficiency: f(CA/17/2..)

Asset

Name: CA1751-1B

Real Power: f(CA/17/2..)
Efficiency: f(CA/17/2..)

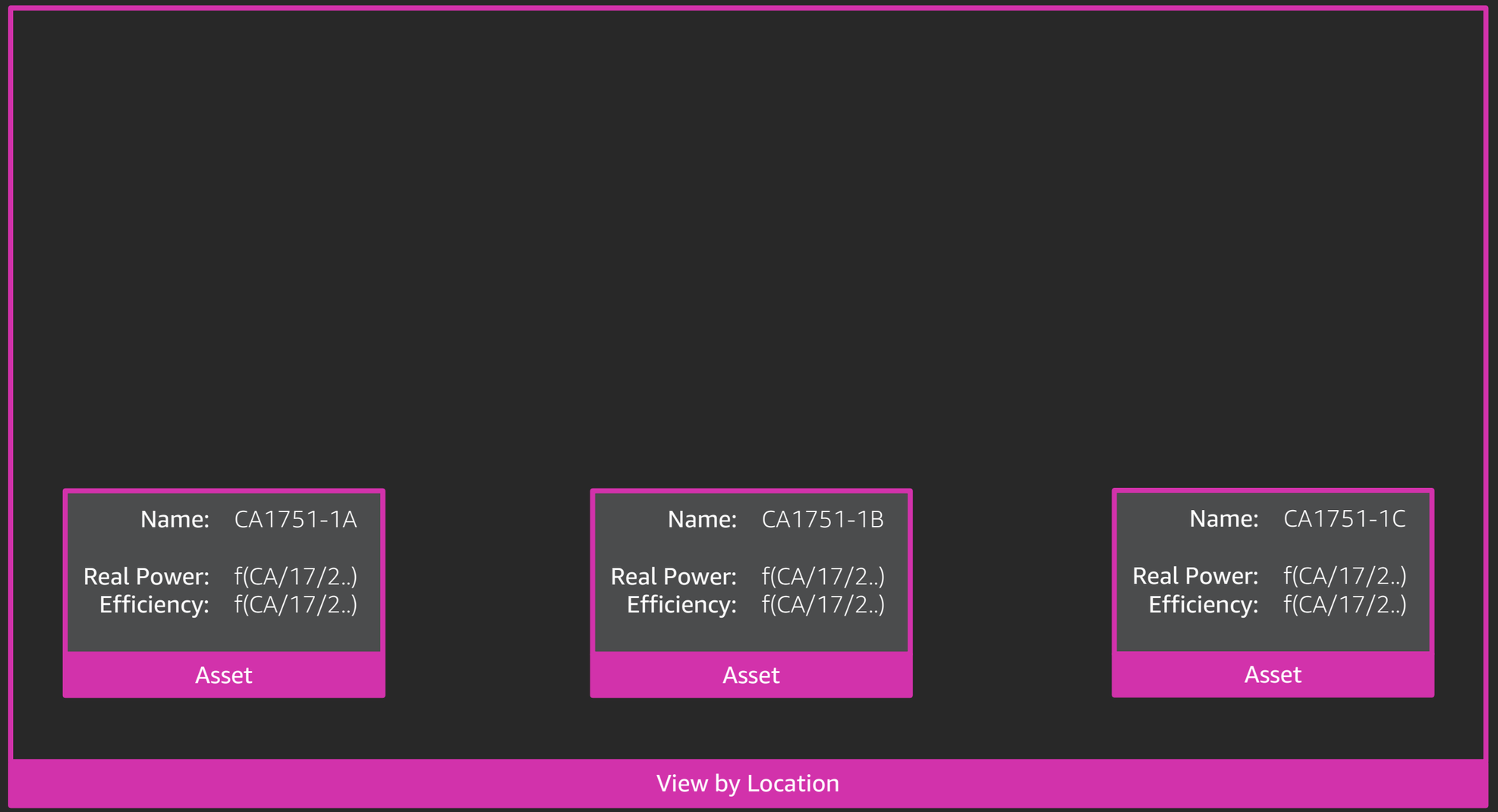
Asset

Name: CA1751-1C

Real Power: f(CA/17/2..)
Efficiency: f(CA/17/2..)

Asset

AWS IoT SiteWise—Views



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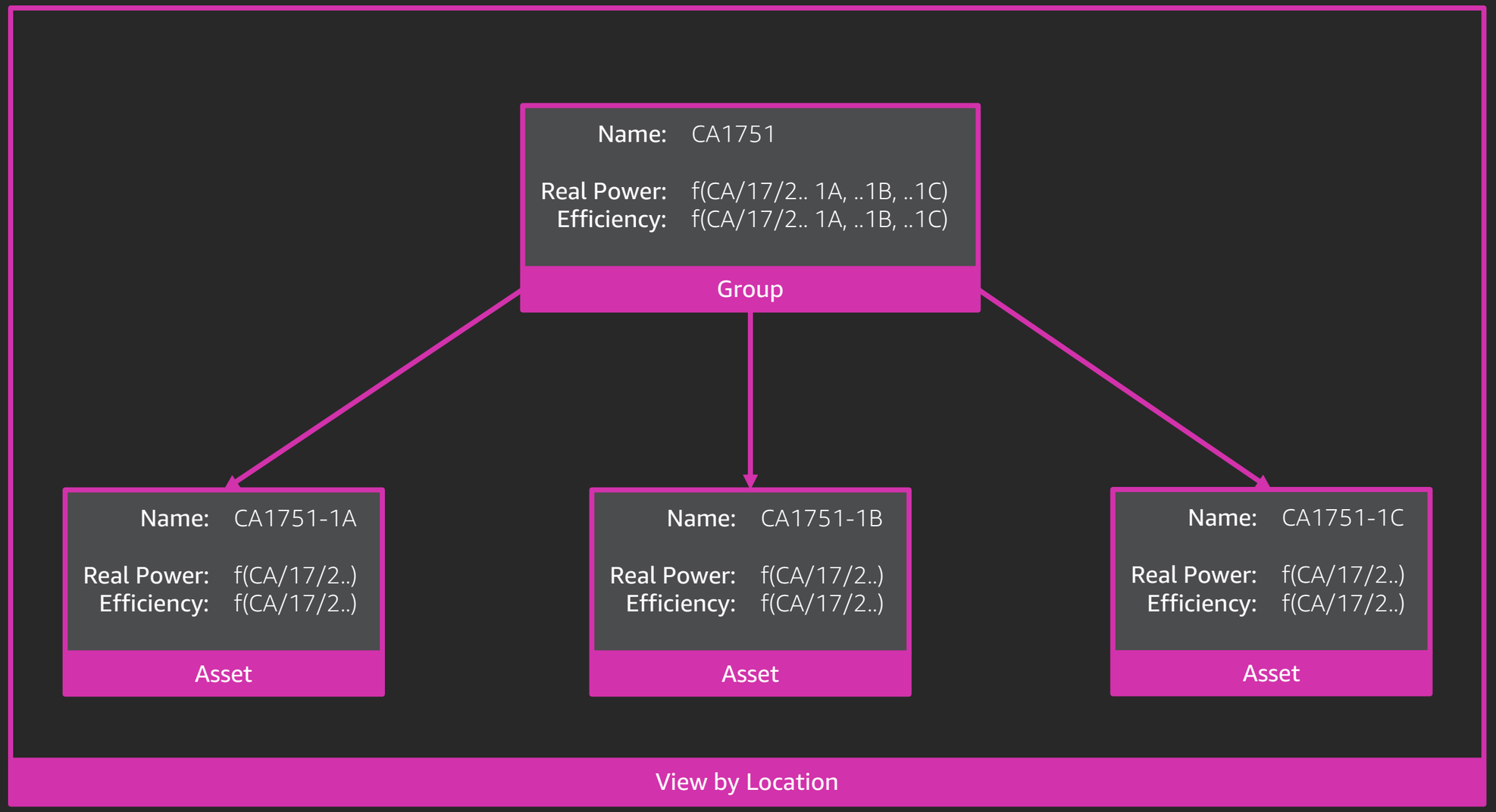

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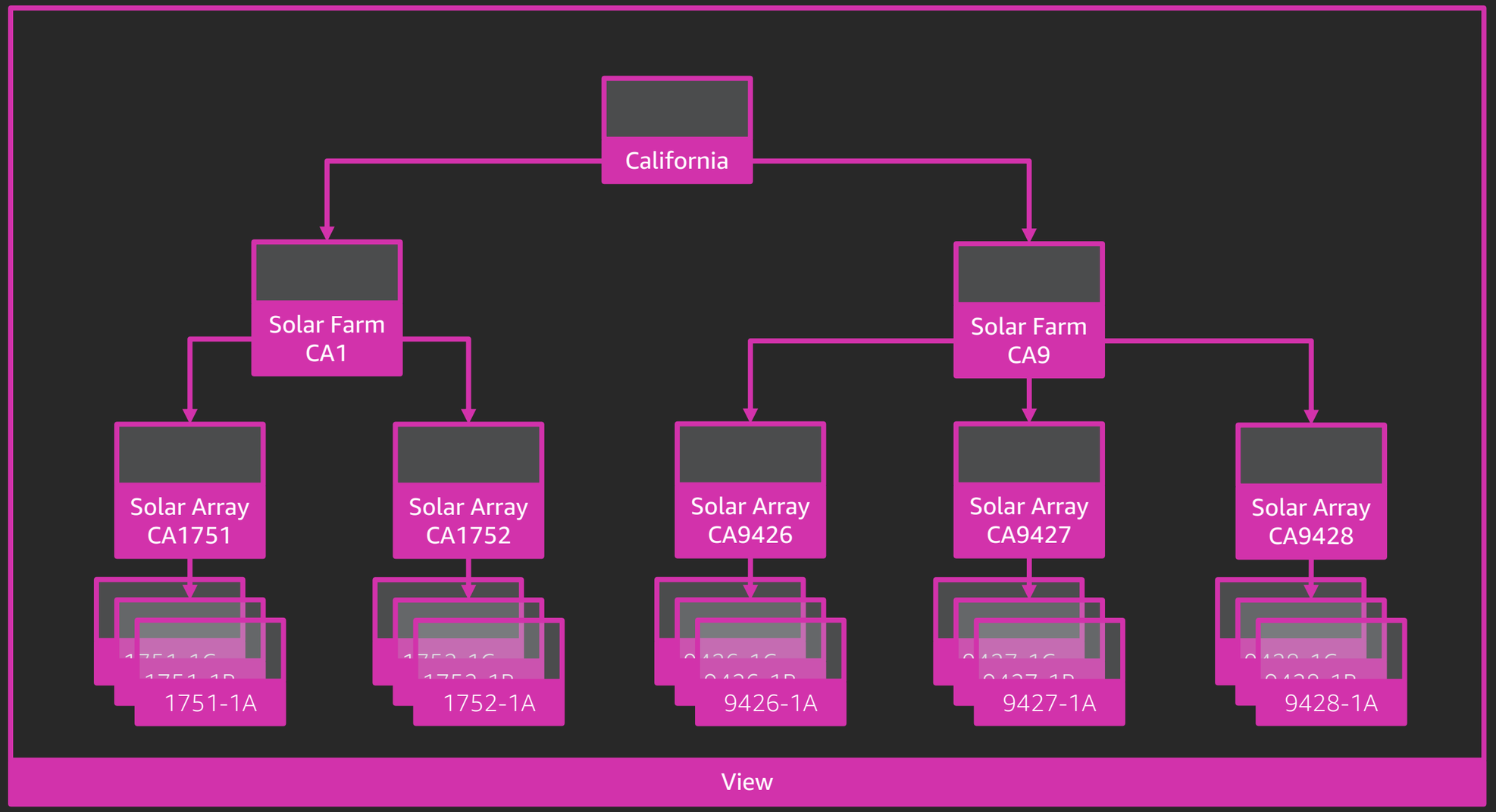

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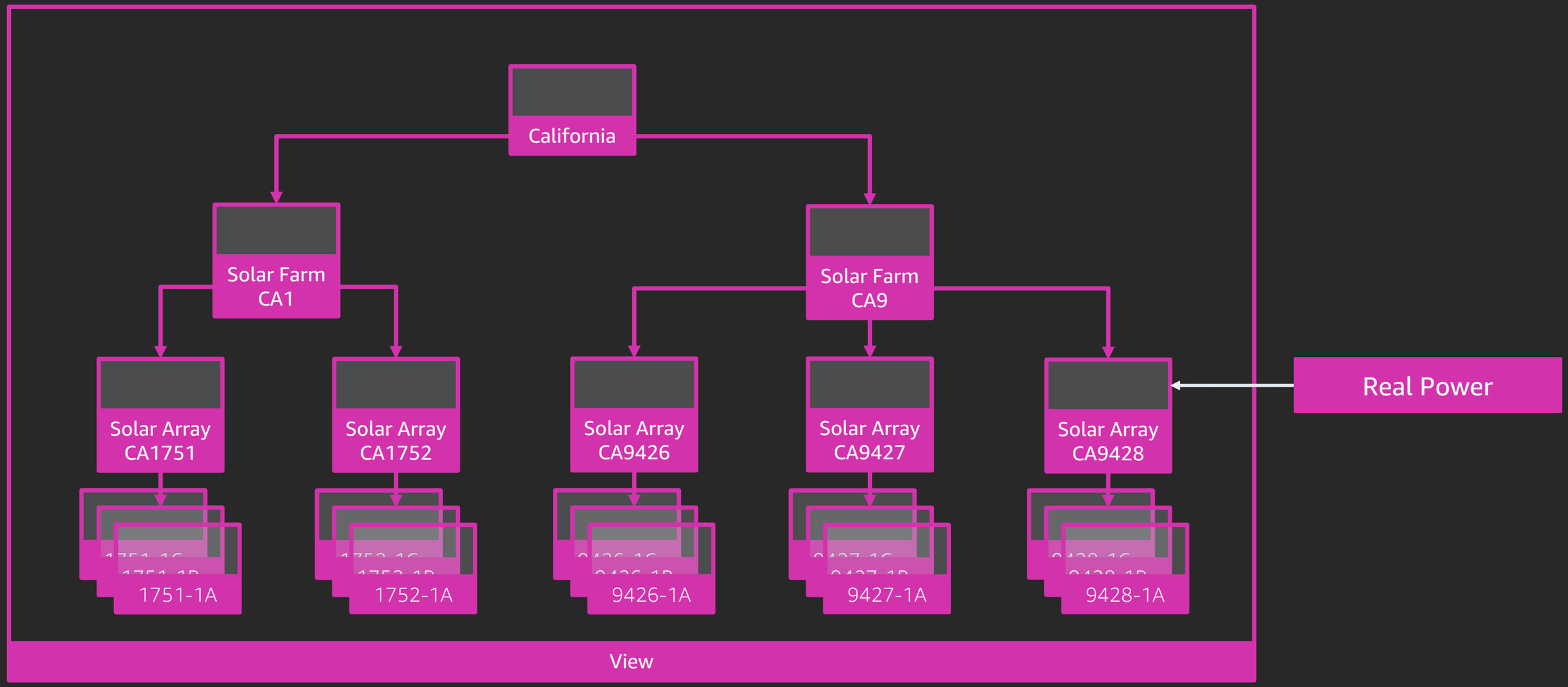

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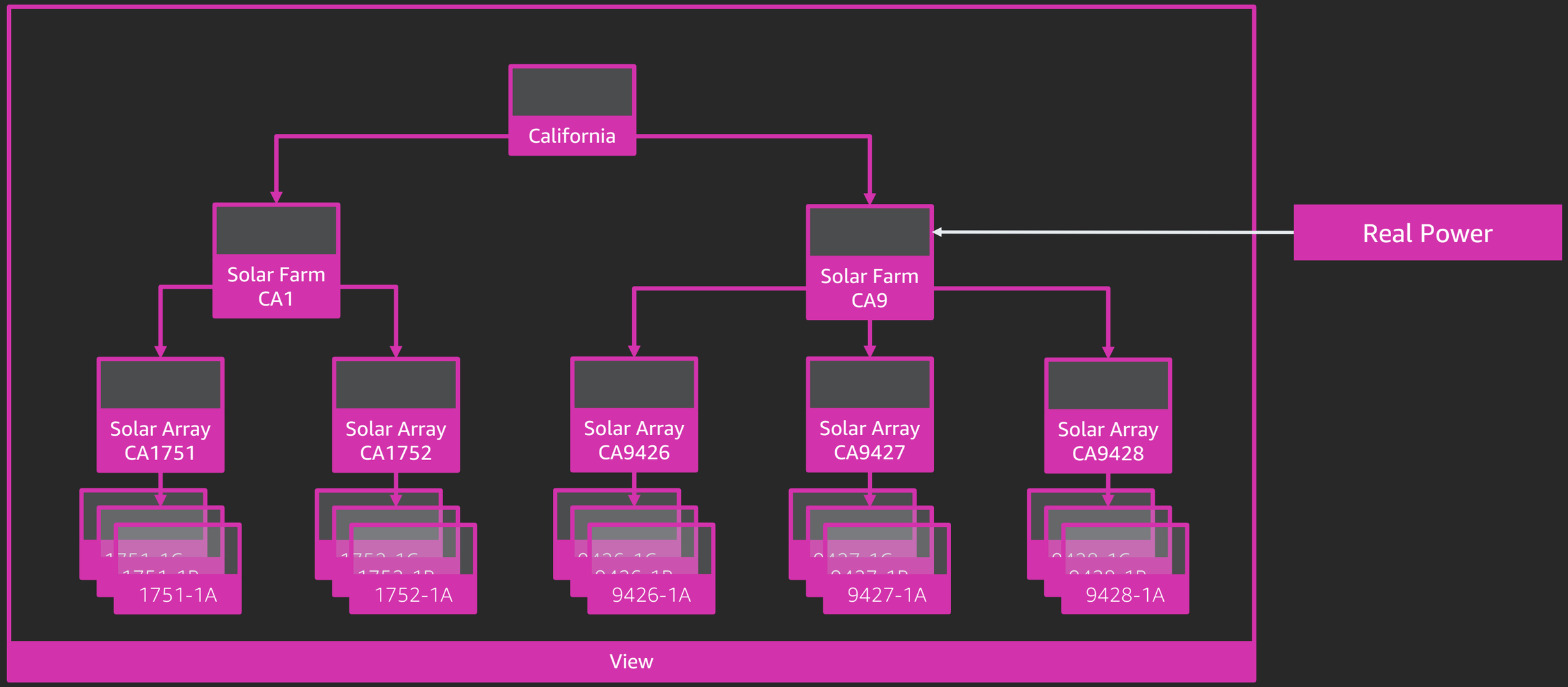

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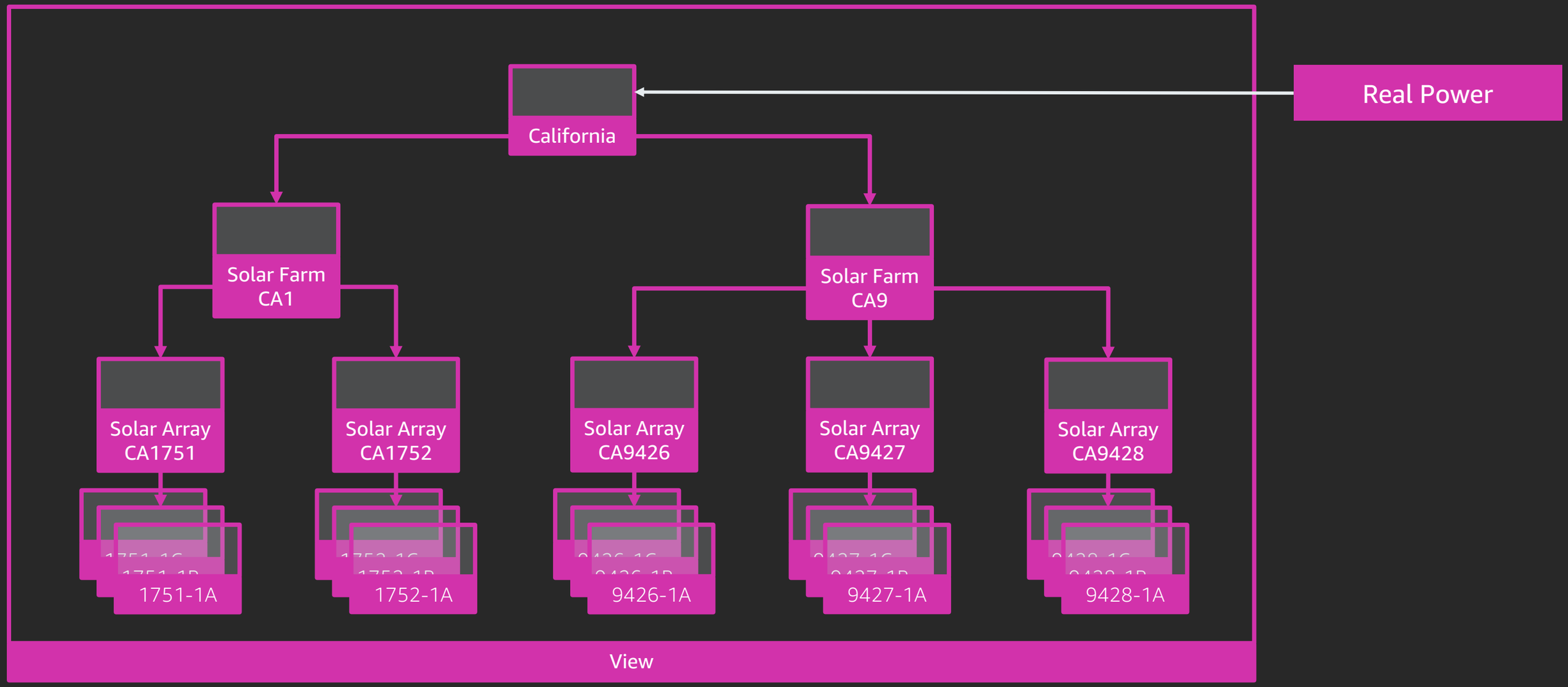
AWS IoT SiteWise – Views



Demo

Customers and Partners

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Bayer Crop Science

"Using the latest technologies and decision science to bring our operations and agriculture to the next level."

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Monitoring crop processing

Goal: reduce process waste across all crop science locations

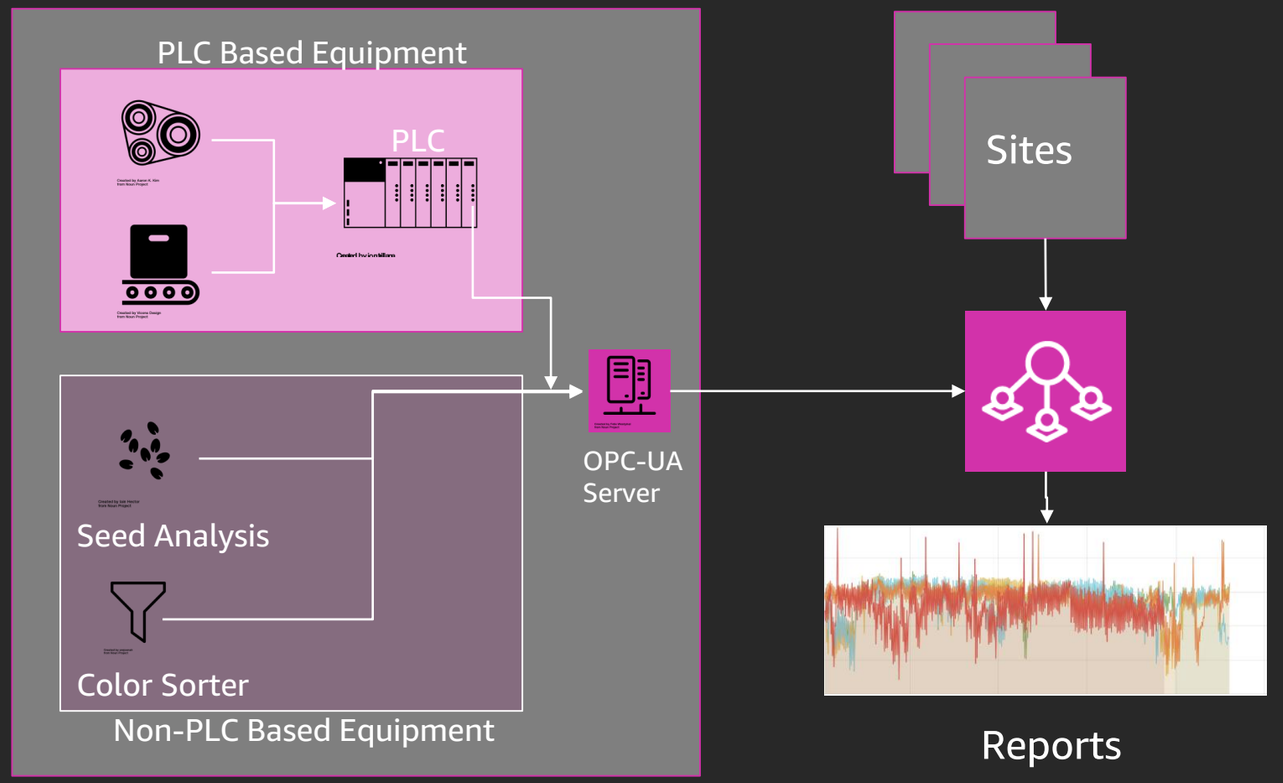
Metric: overall equipment efficiency (availability, performance, quality)

Assets: husker, sheller, treater, chopper

Data source: OPC-UA server

Views: shelling lines, husker lines, treater lines across sites/regions/countries

Applications: configurable canned reports/dashboards with search capability for information by asset name and location (ad-hoc reporting)



Intended site set-up

Reply

Accelerating IoT solution for Industrial customers.

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AWS IoT Platform Accelerator

CUSTOMER PAINS AGAINST AWS IOT PLATFORM

- Complex architecture
- A wide variety of protocols and devices
- Significant investment
- Lack of internal competences
- Unclear benefits of a platform approach
- Integration effort for vertical solutions

AWS IOT PLATFORM ACCELERATOR BENEFITS

- “Plug & Play” on AWS
- Set of protocols already included
- Small upfront investment
- Ready-to-use and highly configurable
- Try, measure, and extend approach
- Availability of integration APIs

Accelerated adoption of AWS IoT Solutions by Reply Customers with lighter projects and less risks

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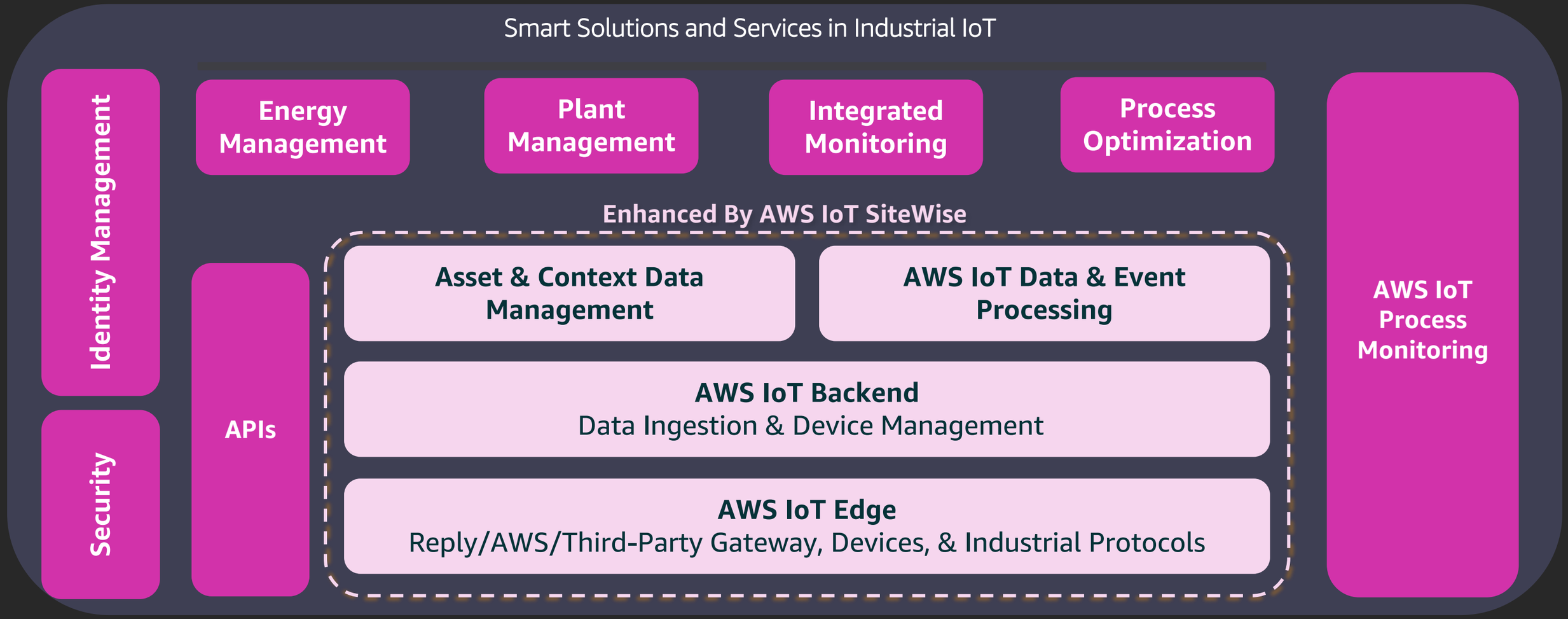
Reply IIoT accelerator platform



Adoption of AWS IoT SiteWise

FEATURES PROVIDED BY AWS IOT PLATFORM ACCELERATOR

- Integrate industrial device protocols, connectivity methods, and multiple data sources
- Model and gain access to assets, sites, context data, and their relationships
- Provide AWS IoT reporting, control, and meaningful metrics to customer business

ENHANCED FUNCTIONALITIES BY SITEWISE

Asset-Site Management

Helps model self-provisioning gateways with connected devices, their properties, and relationships with industrial facilities/sites

Geo Mapping

Shows gateways and devices distribution over the map to quickly spot and solve issues

GUI

Allows customer users to query asset data flows and monitor metrics they care about

Using AI and ML to solve problems for industrial customers

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— WHAT IS UPTAKE?

UPTAKE IS THE LEADING AI SOFTWARE PROVIDER FOR INDUSTRIAL COMPANIES

PRODUCTIVITY

Make sure industrial equipment is always ready to go. Decrease delays from failures, minimize operational interruptions and maximize uptime.

SAFETY

Ensure employee and customer safety. Diagnose and predict malfunctions and failures. Prevent them by visualizing health status and timing maintenance strategically.

RELIABILITY

Downtime is expensive. Prevent it with real-time analytics. Understand equipment health to inform decisions and boost utilization of every industrial asset.

PROFITABILITY

Solutions built and deployed with a clear focus on financial optimized outcomes. Immediate value addition for connected and unconnected assets.

ENERGY

OIL & GAS

TRANSPORTATION

MANUFACTURING

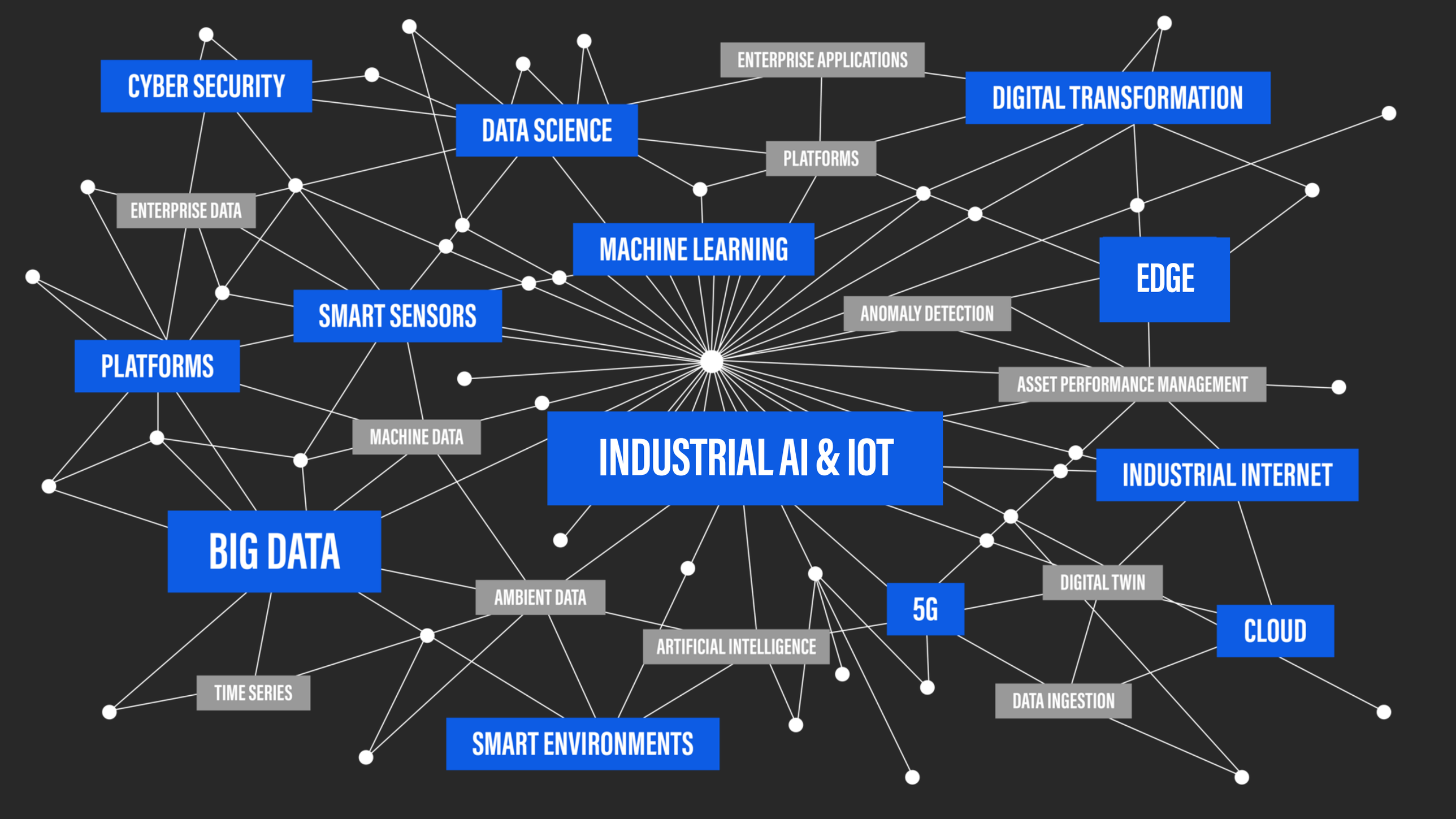
MINING

CHEMICALS

CONSTRUCTION

RAIL

Built to scale across industries and geographies


CYBER SECURITY
DATA SCIENCE
ENTERPRISE APPLICATIONS
DIGITAL TRANSFORMATION
PLATFORMS
ENTERPRISE DATA
MACHINE LEARNING
EDGE
SMART SENSORS
ANOMALY DETECTION
PLATFORMS
ASSET PERFORMANCE MANAGEMENT
MACHINE DATA
INDUSTRIAL AI & IOT
INDUSTRIAL INTERNET
BIG DATA
DIGITAL TWIN
AMBIENT DATA
5G
CLOUD
ARTIFICIAL INTELLIGENCE
TIME SERIES
DATA INGESTION
SMART ENVIRONMENTS

World’s largest asset strategy library

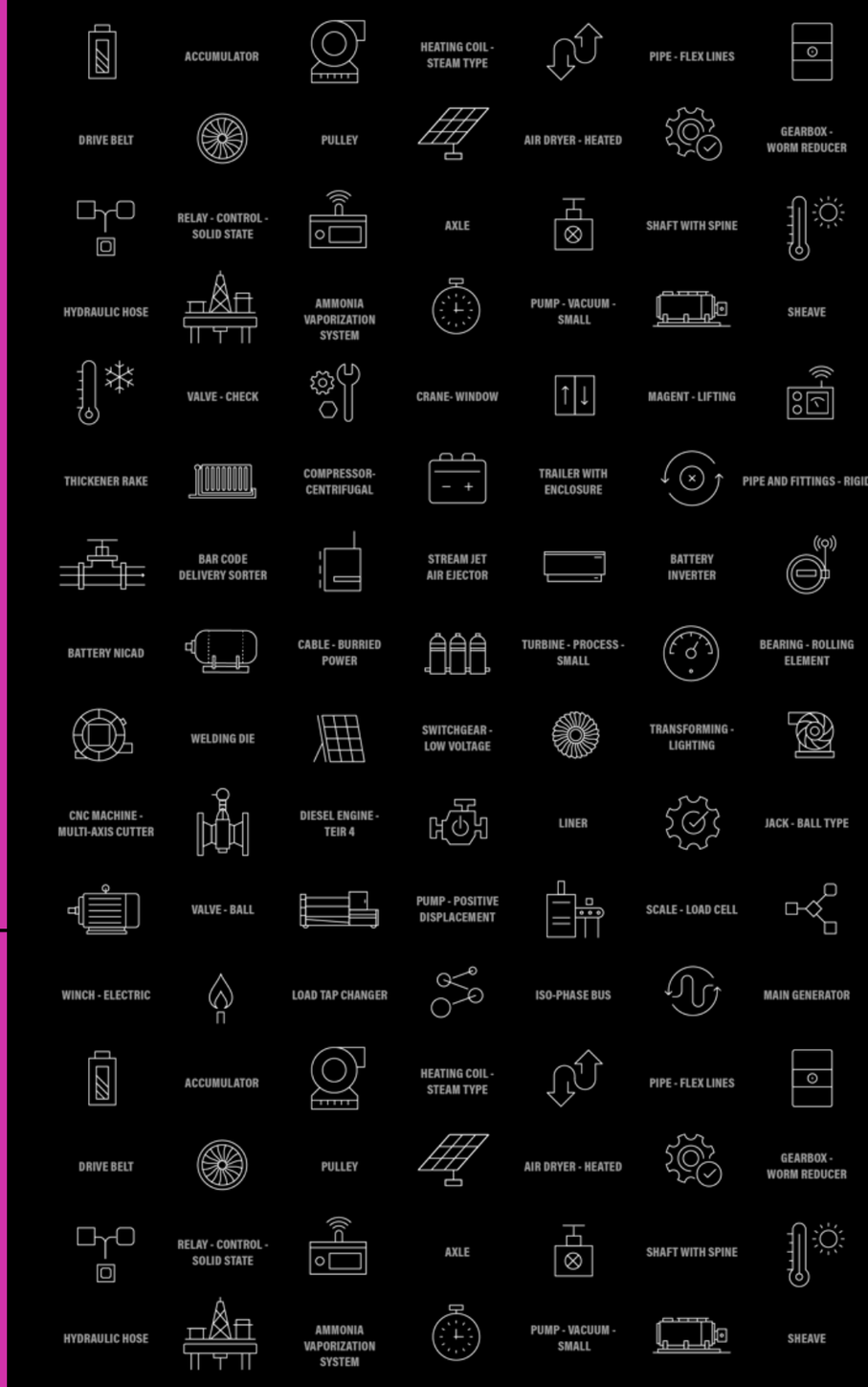
800+
critical asset types

178,125+
found reportable conditions

55,000+
failure modes

10M
components covered

32,000
human working years of industrial experience



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Exhaustive Components Coverage across:

Power Generation	**600+**
O&G - Refineries	**675+**
Mining	**675+**
Utilities	**690+**
Transmission & Distribution	**175+**

Switchgear Boilers Emissions Controls Motors

Wind & Steam turbines Power Transformers Pumps

Compressors Heat Exchangers Substations Valves

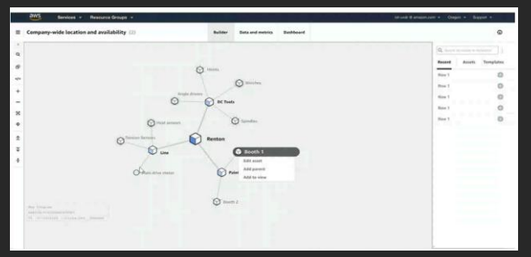
Uptake + AWS IoT SiteWise

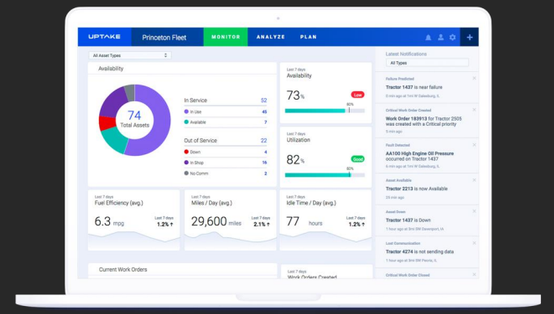
Wind Turbine

OPC UA Server

SiteWise Gateway

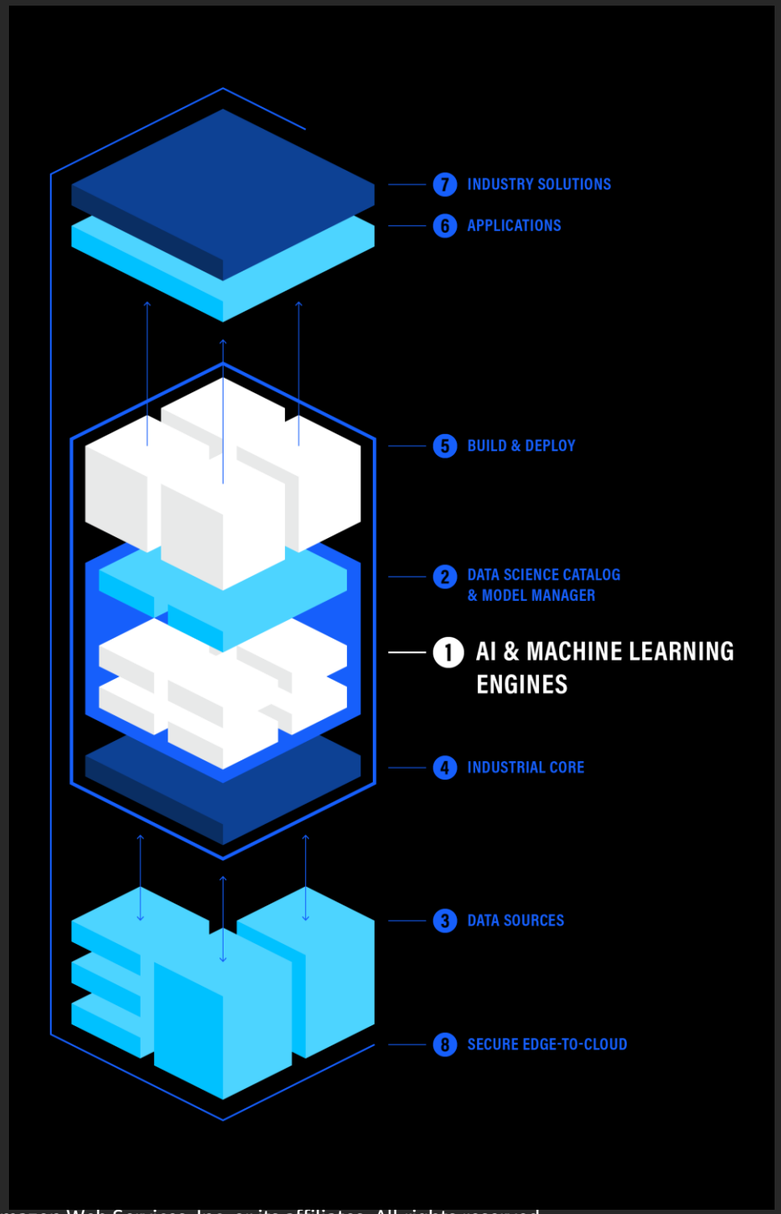
Uptake Industrial Blueprint





Uptake Platform

Applications deployed on the purpose-built AI & IoT platform



Outcomes delivered by APM

UPTAKE
ASSET PERFORMANCE
MANAGEMENT

Improved availability and reliability of physical assets and cost-optimized maintenance.

RELIABILITY-CENTERED MAINTENANCE

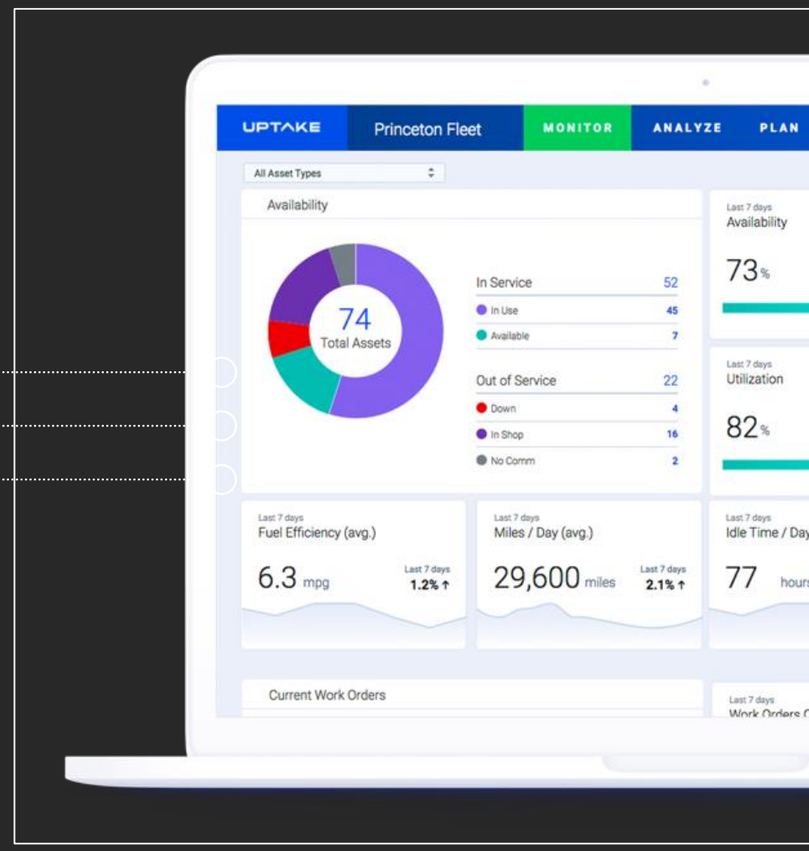
Make critical decisions about your assets (whether connected or not) based on known failure modes.

CONDITION-BASED MONITORING

Monitor your assets to determine which require maintenance based on current, real-time, conditions.

PREDICTIVE ASSET MANAGEMENT

Make critical future decisions about your assets based on predictive insights about them.



Why Uptake

CONTENT

+

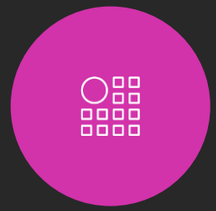
APPLICATIONS

+

PLATFORM

Outcomes-driven

Open & purpose-built



Fiercely independent

Increased speed to value

Cross-industry machine learning

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See live demo at Uptake Re:Invent Expo Booth (2714)
http:// www.uptake.com

Learn more about Industrial IoT on AWS
https://aws.amazon.com/iot/solutions/industrial-iot/

Thank you!

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