
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

IOT203

Accelerate your digital twin journey with AWS

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Amazon Web Services

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Principal, Product Management, IoT
Amazon Web Services

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Industry 4.0 Lead
Deere and Company

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Agenda

Why now is the right time for digital twins

Unlocking business outcomes with customers

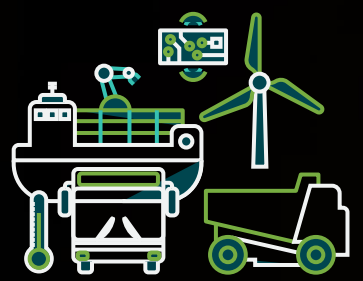
Accelerating the journey with AWS IoT TwinMaker

Digital twins at Deere and Company

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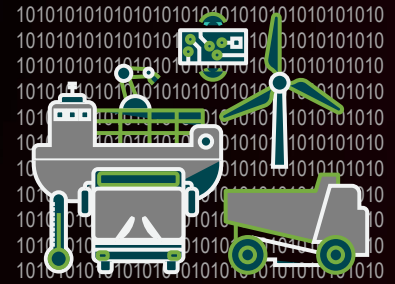
Digital twins

A living digital representation of a physical system that is dynamically updated to mimic the structure, state, and behavior of the physical system to drive business outcomes



PHYSICAL SYSTEMS

CONNECTED WORLD



DIGITAL TWINS



BUSINESS OUTCOMES

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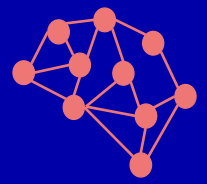
Why digital twins now?



Sensors



IoT connectivity



Modeling



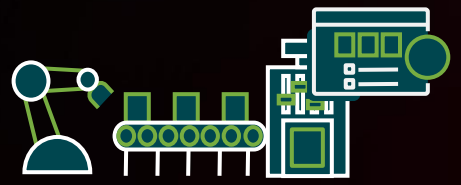
At-scale compute

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3 keys to unlocking business value



Using data from disparate sources



Modeling assets over their lifetime

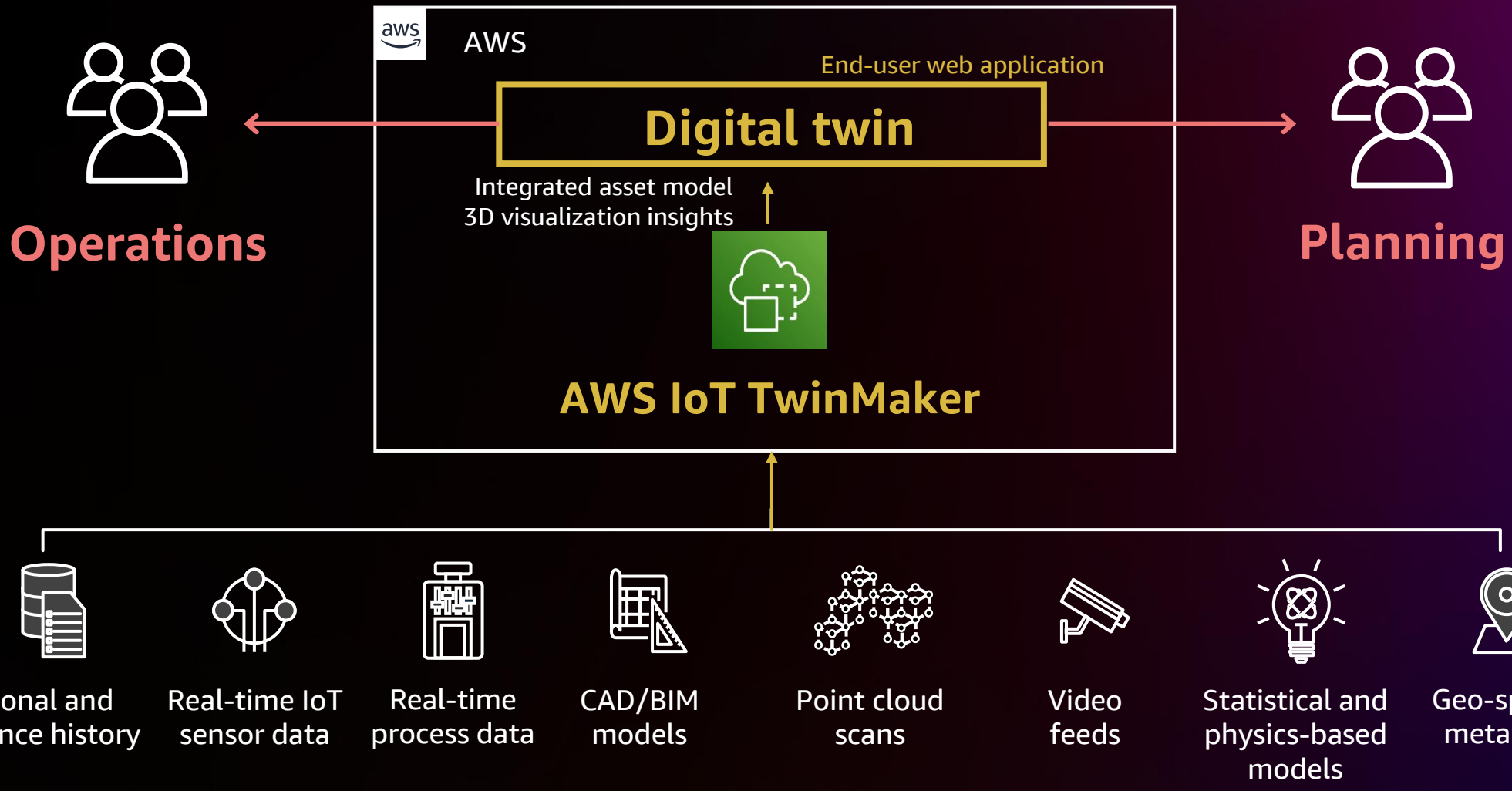


Creating effective visualizations

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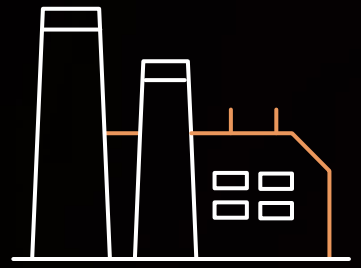
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AWS IoT TwinMaker – How it works



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Unlocking business outcomes with customers



INVISTA™



Toronto Metropolitan University

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CHALLENGE

INVISTA is a leading global manufacturer of fiber, resins, and chemical intermediates. Its field personnel need to efficiently address operational notifications and alerts from the plant floor; however, equipment information is distributed across different systems. An integrated platform bringing the right information to the right person, at the right time, in the right context is highly desirable.

APPROACH AND SOLUTION

With AWS IoT TwinMaker, INVISTA can now build a digital twin of its manufacturing operations into a Connected Worker application that brings together live sensor data, equipment maintenance records, and plant-floor camera feeds into a recognizable visual context.

- Improved productivity and efficiency in field operations
- Excellence in EHS performance
- Further opportunities to use employee expertise in finding new and better ways to create value for its customers

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How INVISTA uses AWS IoT TwinMaker



Asset information

Live equipment data

Alerts



Matterport 3D scans

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"With AWS IoT TwinMaker, we can quickly and easily build a digital twin of our manufacturing operations to give field workers a consolidated view of all assets and operational data"

Jerry Grunewald

Vice President of Operations Transformation



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Toronto Metropolitan University

CHALLENGE

Toronto Metropolitan University (TMU) is a public research university with approximately 50,000 students and staff; university researchers wanted to bring all the data from the disparate IoT systems across buildings together to gain new insights

APPROACH AND SOLUTION

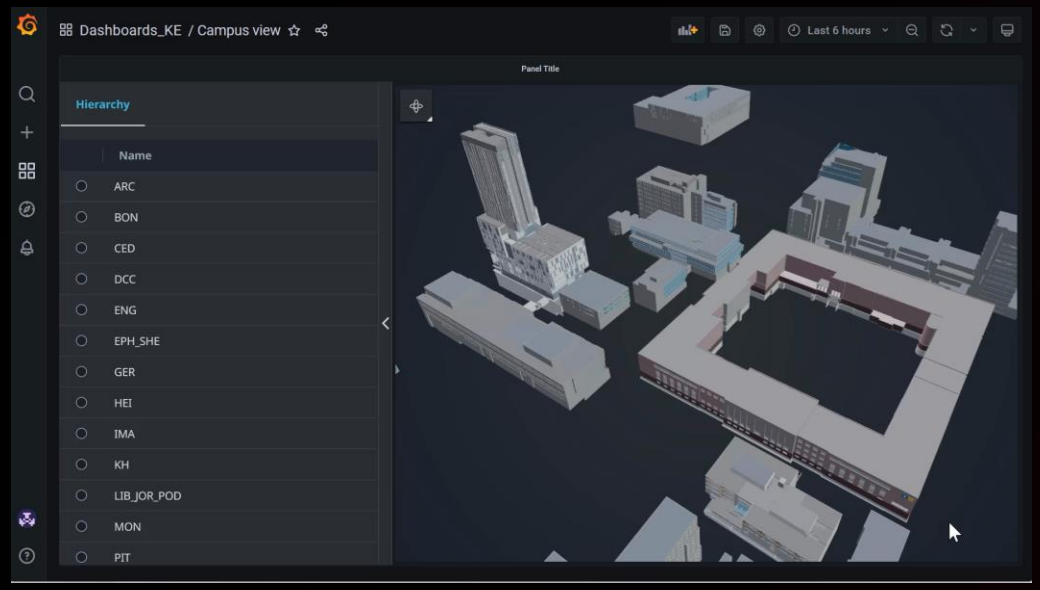
TMU worked with FuseForward, an AWS Premier Partner – using AWS IoT TwinMaker, the FuseForward Smart Campus solution brings together data from building management systems (BMS), air sensors, cameras, and renders it in a visual model of the TMU downtown campus

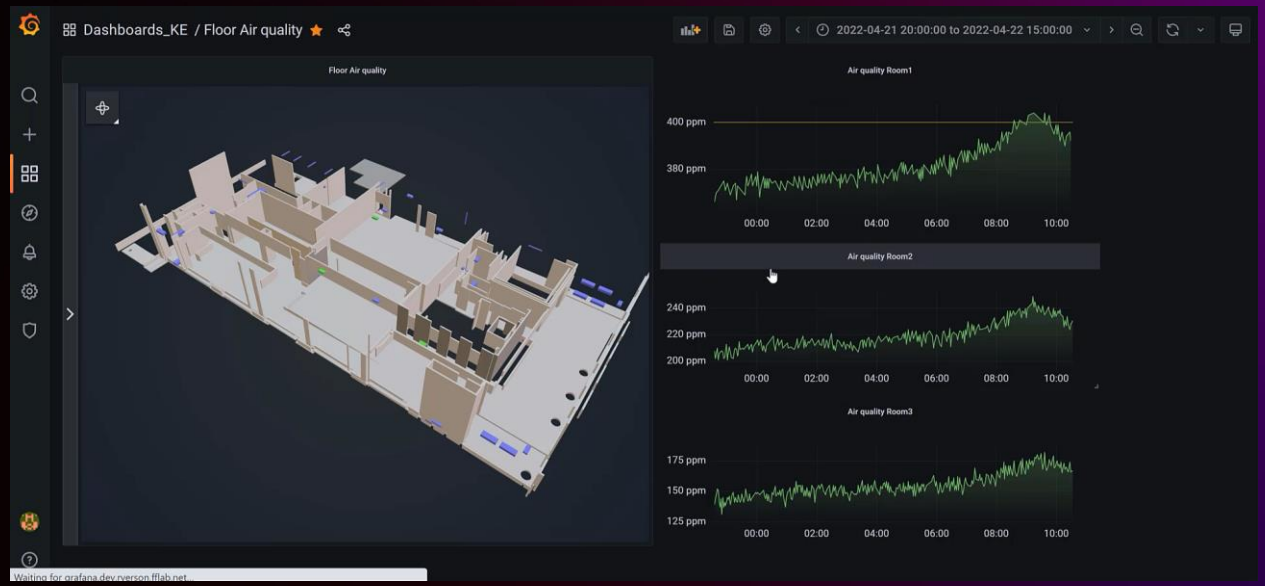
- Data retention went from 10% to 100%
- Root cause of equipment faults identified
- Analytics to identify anomalies and further optimize air quality and energy use

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How TMU uses AWS IoT TwinMaker





Air quality sensors

Building management system

Building information model

Ontology

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"The solution is giving us visibility into things we couldn't see before. It's almost like having a full-time energy manager watching every single piece of equipment and flagging things that don't look right or aren't working."

Dr. Jenn MacArthur

Associate Professor, Department of Architectural Sciences

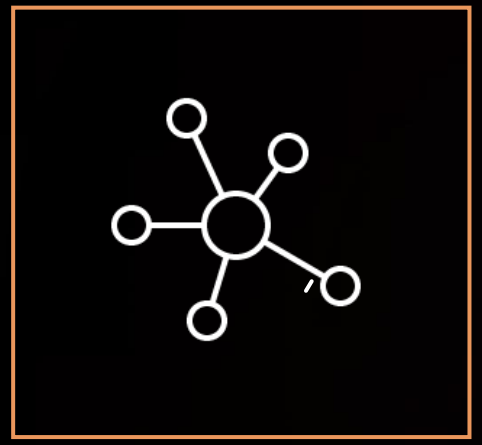
Toronto Metropolitan University

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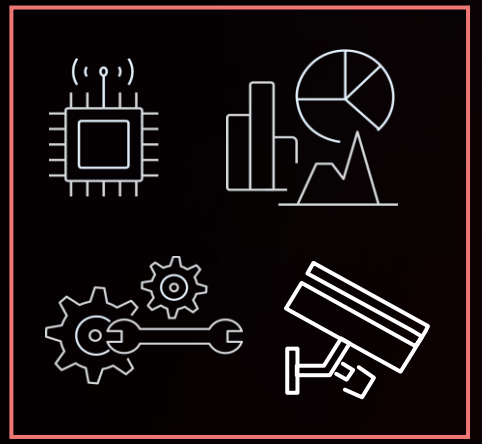
Digital Twins

Model builder



Create entities to virtually represent physical systems, specify relationships between them

Data connectors



Access data from diverse sources using built-in or by creating your own connectors to AWS and third-party data sources.

Scene composer



Combine existing 3D visual models with real-world data to compose an interactive 3D view of your environment

App toolkit

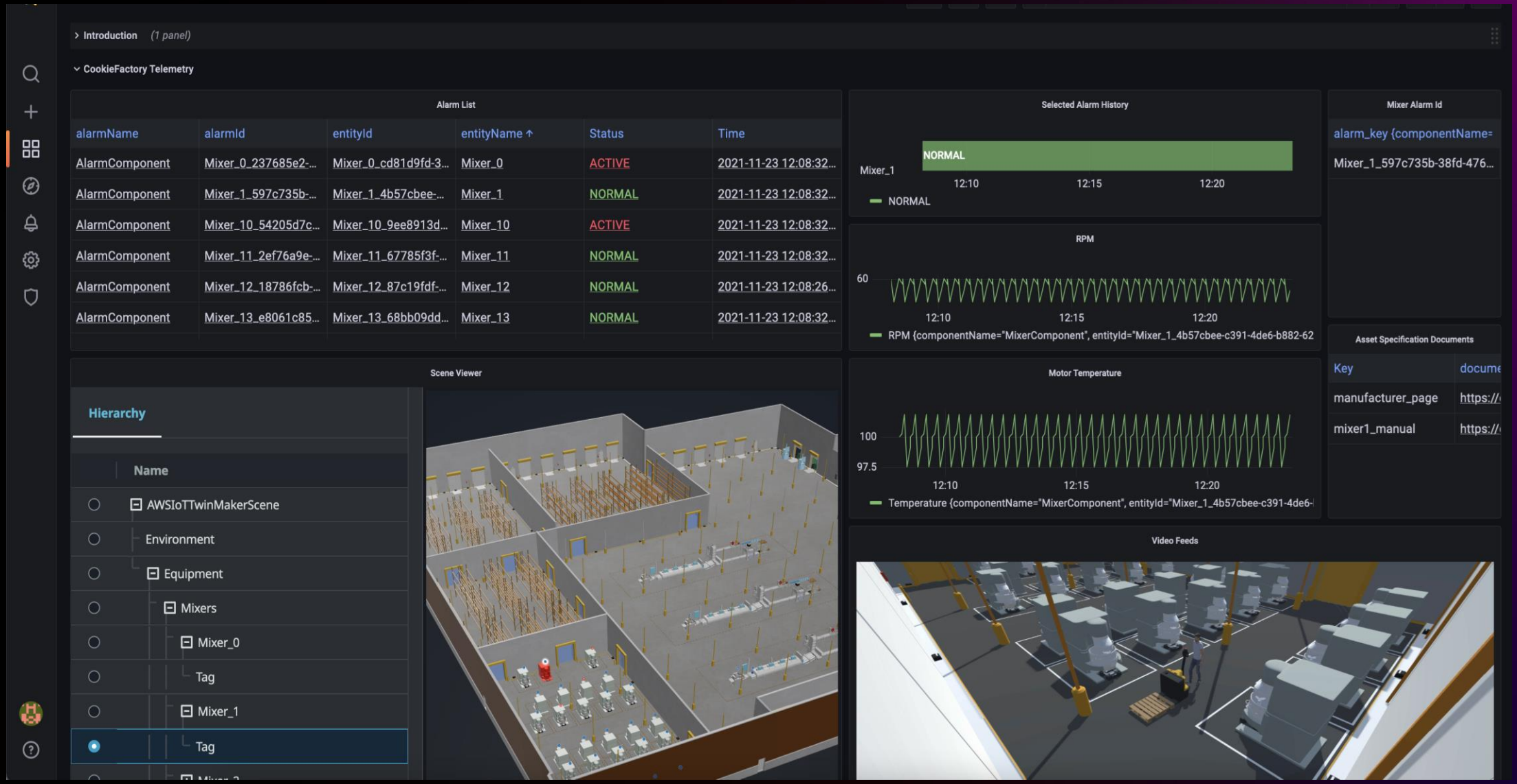


Integrate digital twins into 3D applications using to monitor and improve operations

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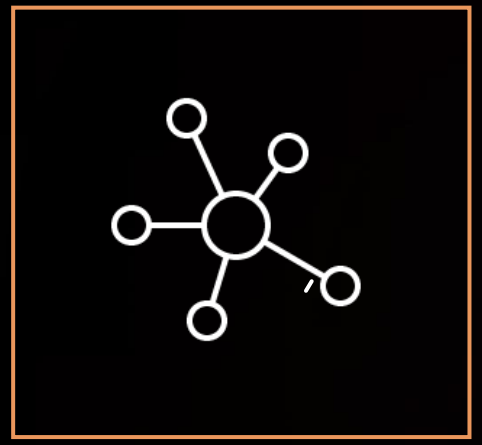
Digital Twins in IoT TwinMaker



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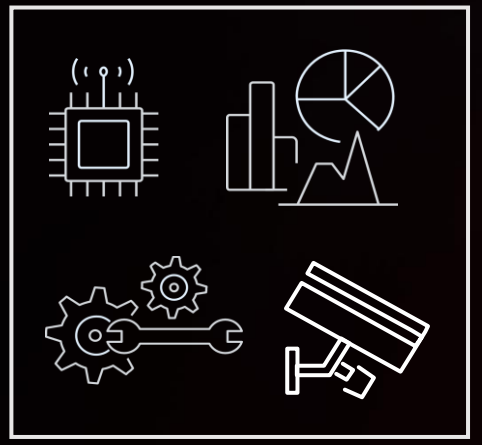
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Model builder



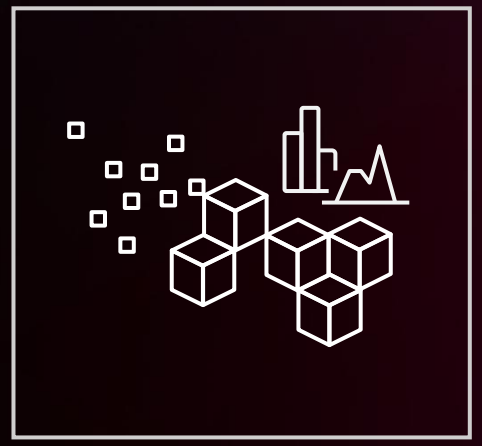
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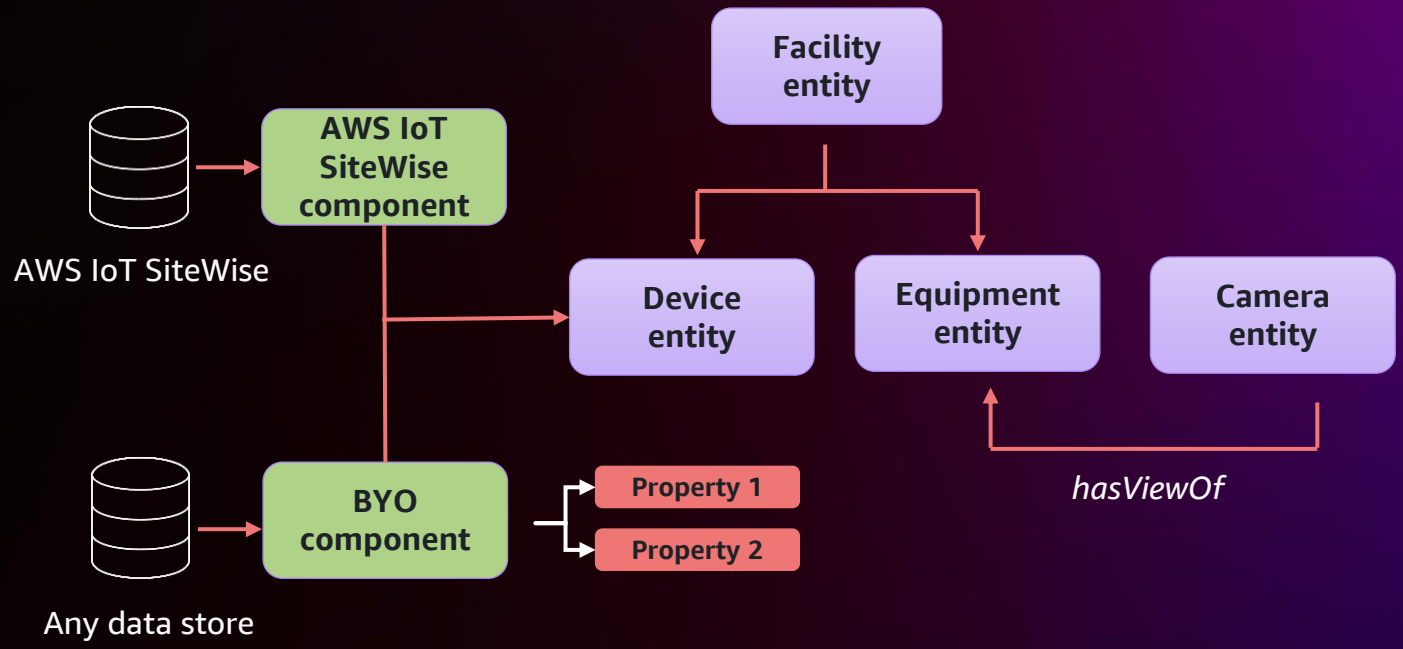
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Model builder

Entities are digital representations of physical resources

Components add data and context to entities

Properties describe current state of an entity



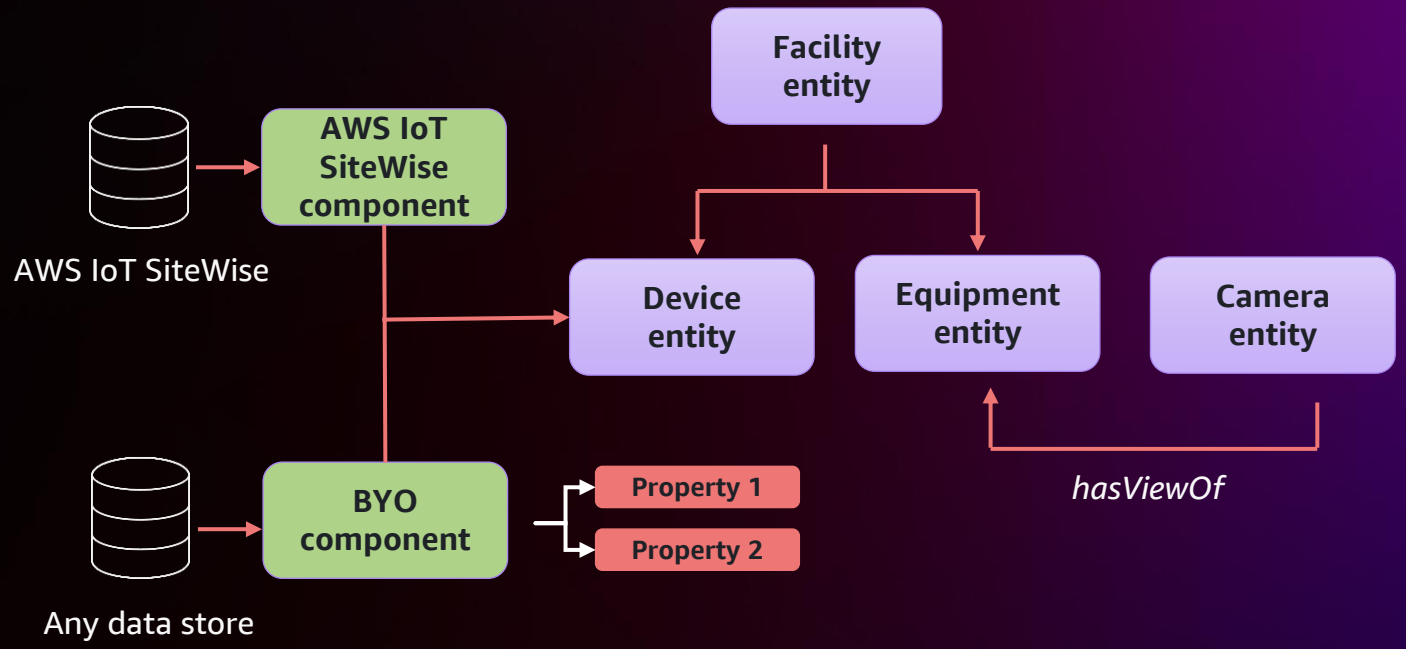
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Model builder

Flexible: Model physical systems with a flexible framework that creates a knowledge graph

Simple: Use a single, unified API interface to access all connected data stores

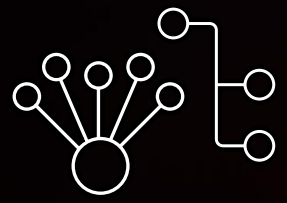
Adaptable: Easily update the digital twin as the physical environment evolves



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NEW

AWS IoT TwinMaker Knowledge Graph



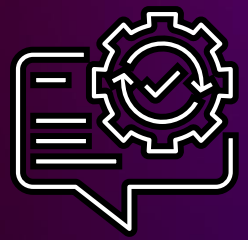
Contextualize Data

Relate any two entities in your digital twin, creating context and organizing information



Reduce time to resolution

Help field service personnel pinpoint location and cause of systems failures. Use PartiQL to query related entities and the data associated with them



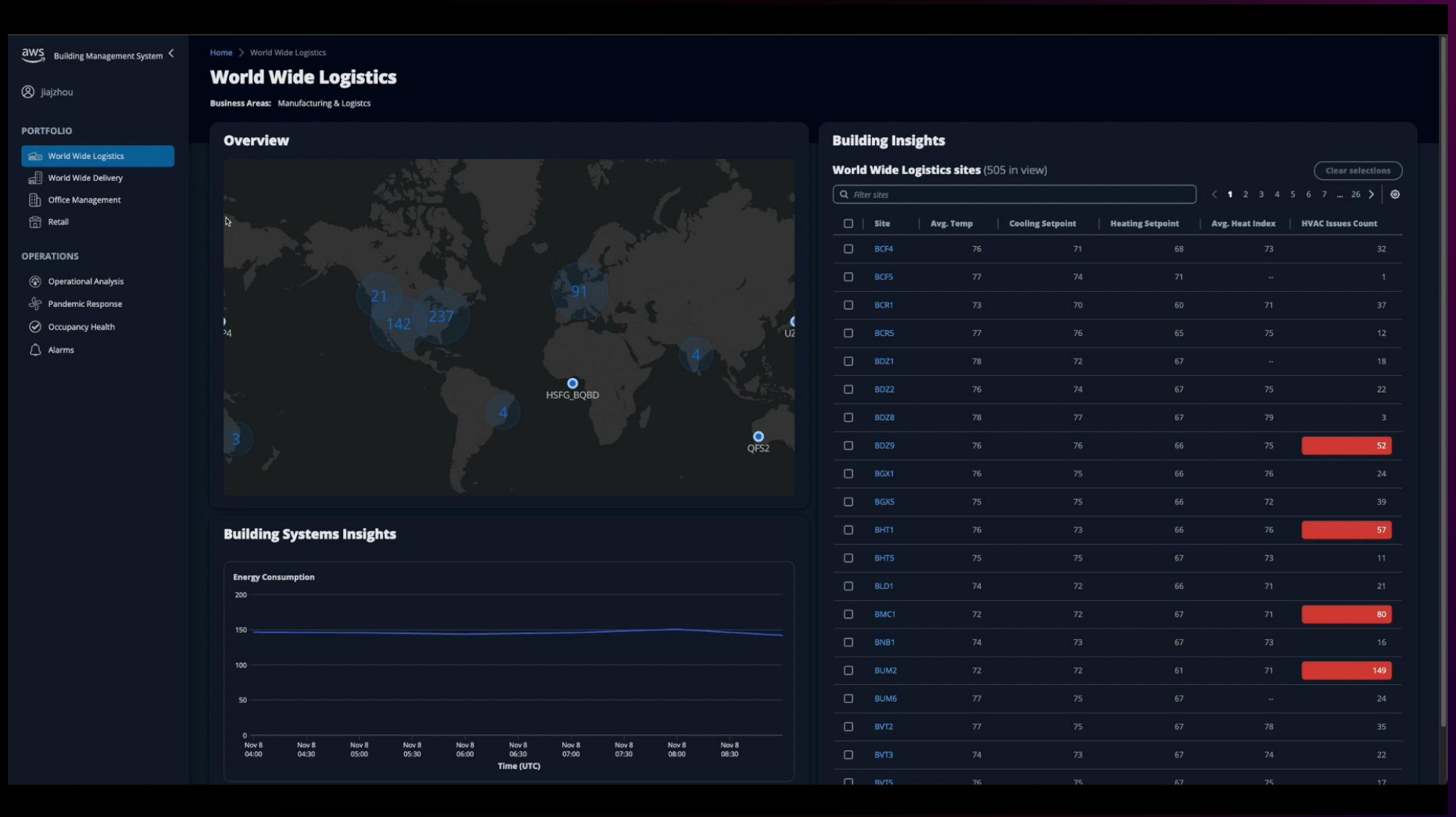
Enable Operational Insights

Make informed decision based on insights from entity metadata and relationships

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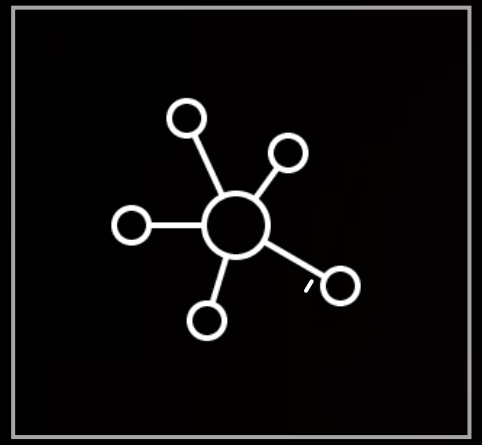
IoT TwinMaker Knowledge Graph



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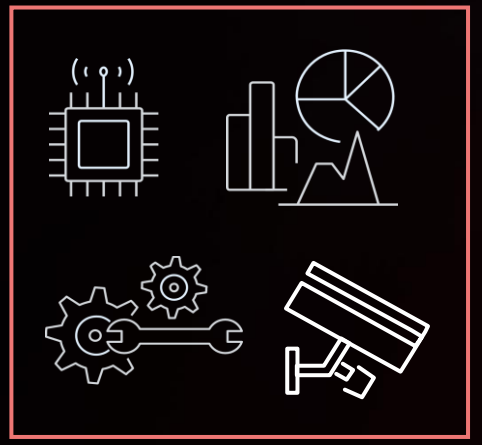
Digital Twins

Model builder



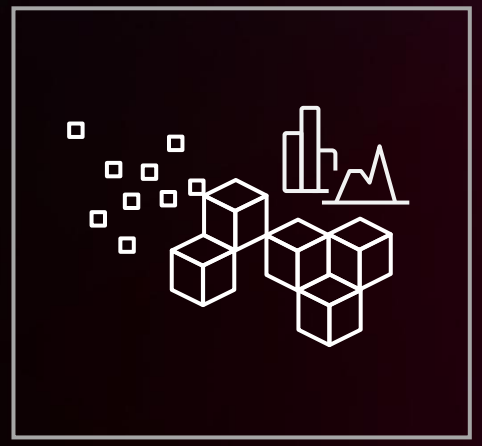
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Integrate digital twins into 3D applications to monitor and improve operations

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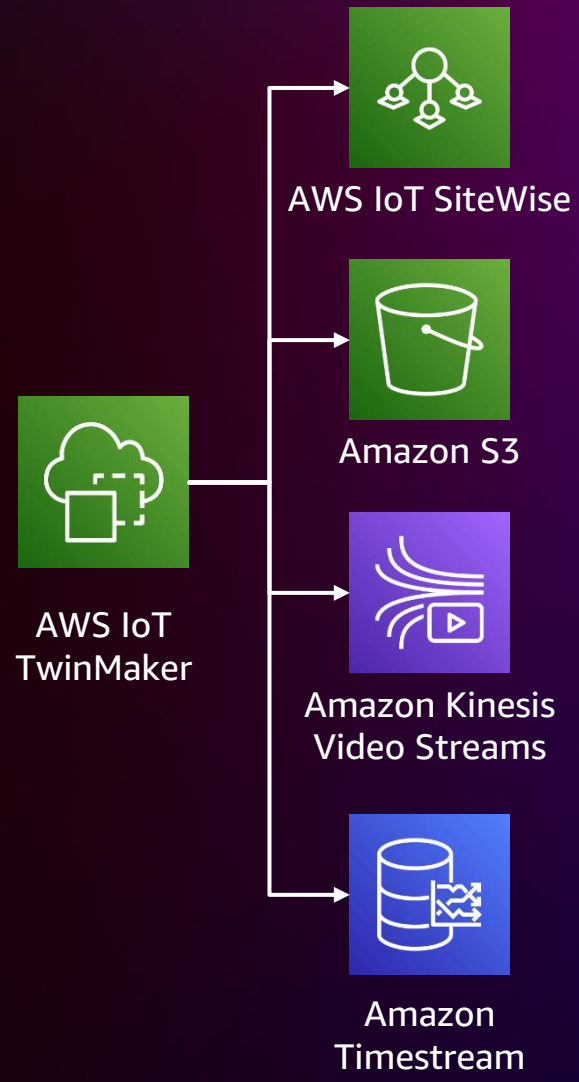
Data connectors

Multiple sources: Fuse data across disparate sources

Data stays where it is: Connect to existing data sources without moving data

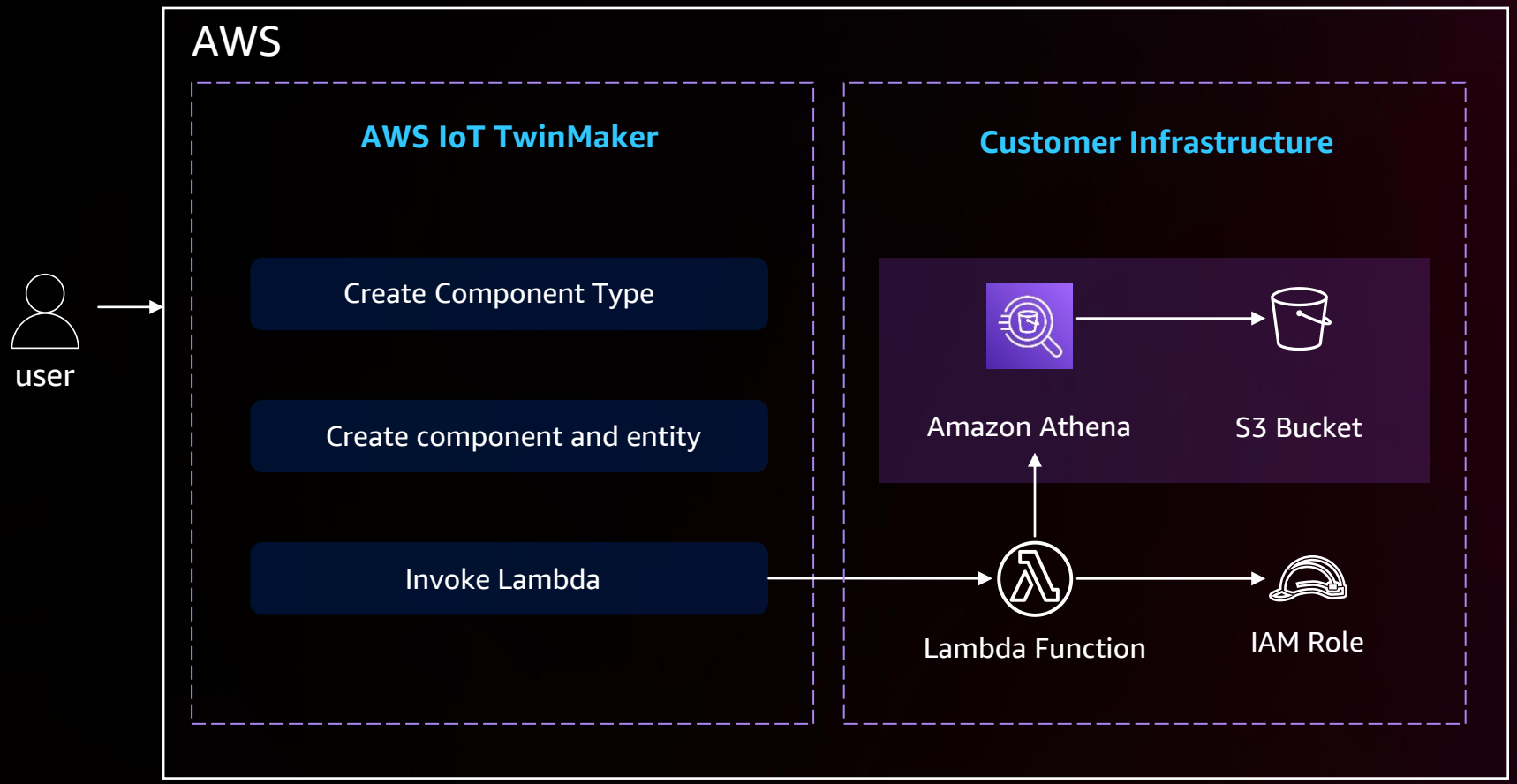
Integrated with AWS: Built-in connectors to AWS IoT SiteWise, Amazon S3, and Amazon Kinesis video streams

Open to any sources: Write your own connectors to other Amazon services or third-party data sources



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NEW AWS IoT TwinMaker Athena Data Connector



BEFORE

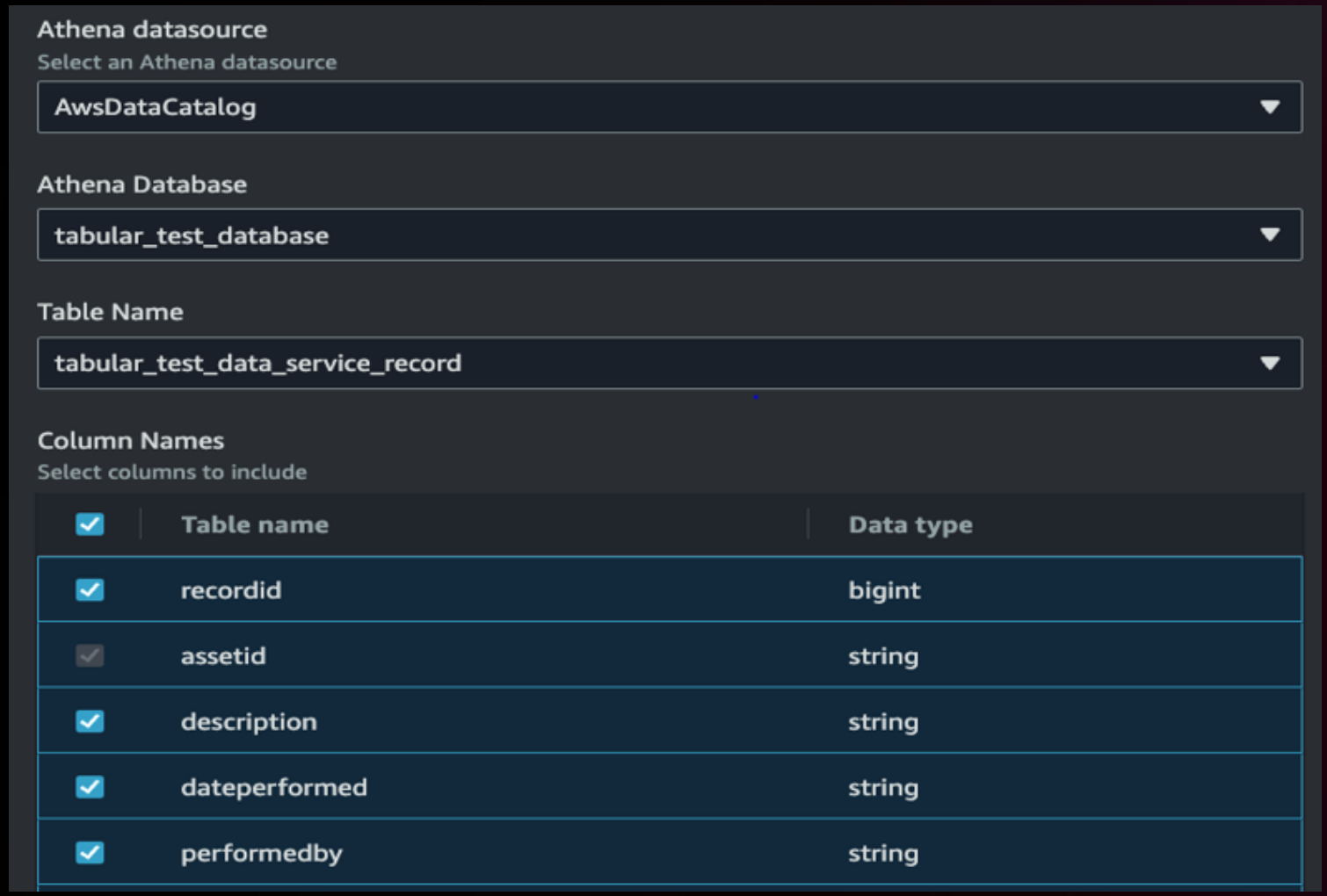
Create Role
Author Lambda function
Create a Component Type
Create Entity and Component
Fetch your data!

NOW

Create Entity and Component
Fetch your data!

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NEW AWS IoT TwinMaker Athena Data Connector



BEFORE

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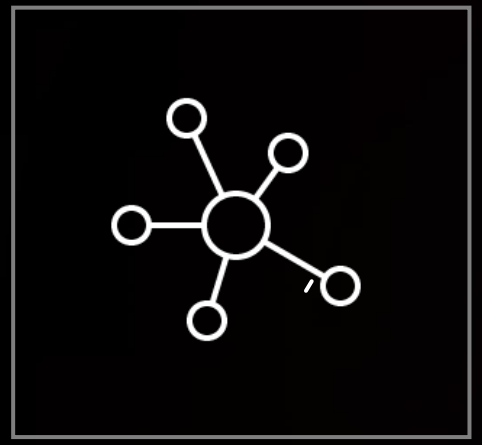
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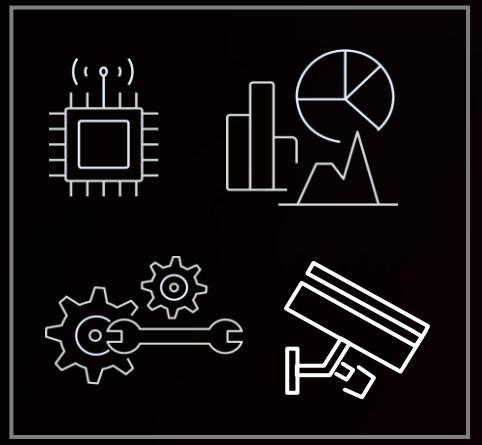
Digital Twins

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App toolkit



Integrate digital twins into 3D applications to monitor and improve operations

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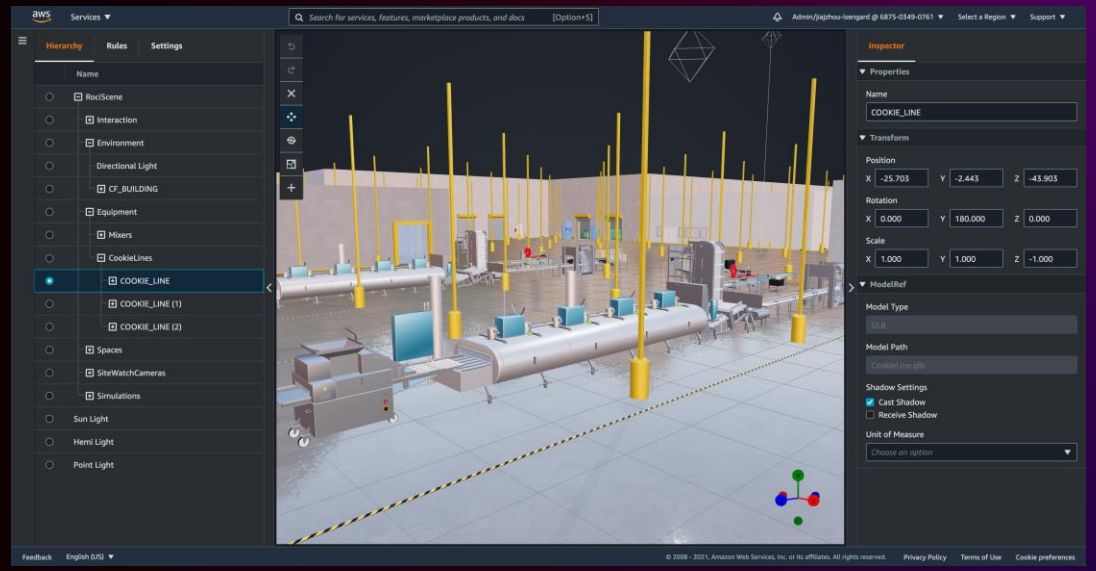
Scene composer

Use existing visuals: Import 3D models such as CAD/BIM files or point cloud scans

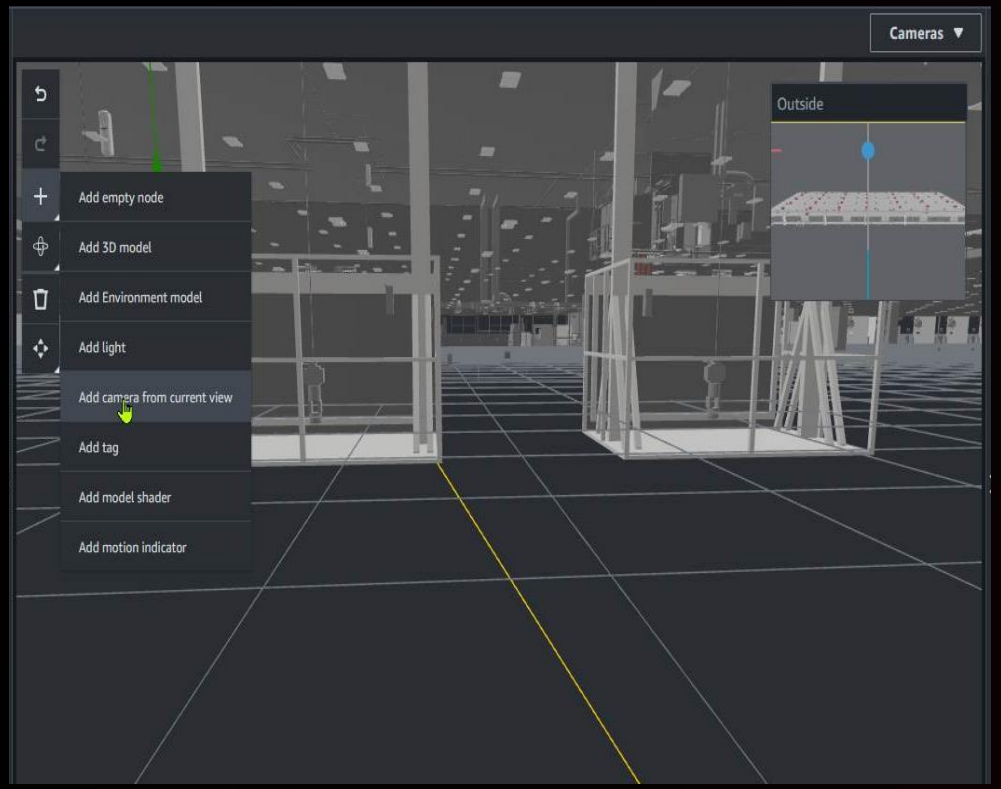
Straightforward positioning: Compose and arrange 3D scenes using composition and positioning tools

Data Rich: Add 2D charts and diagrams, interactive video and sensor data overlays

Manage change: Easily update as things change in the real world

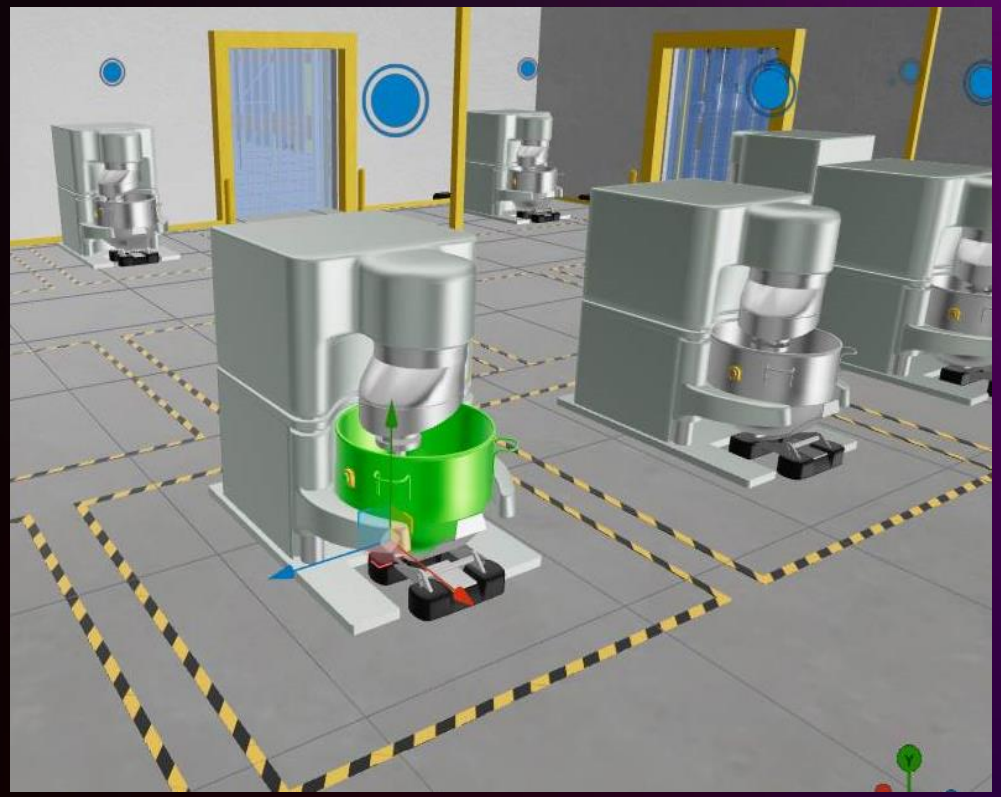


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Camera View



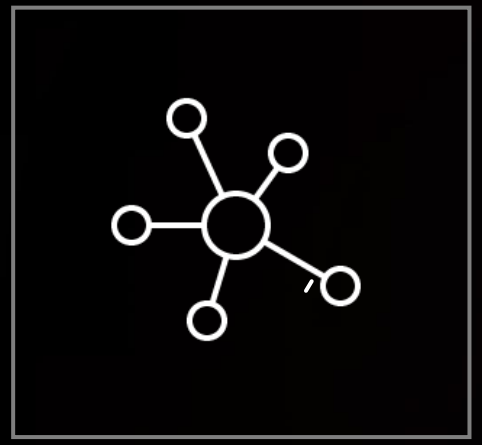
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Sub-model interaction

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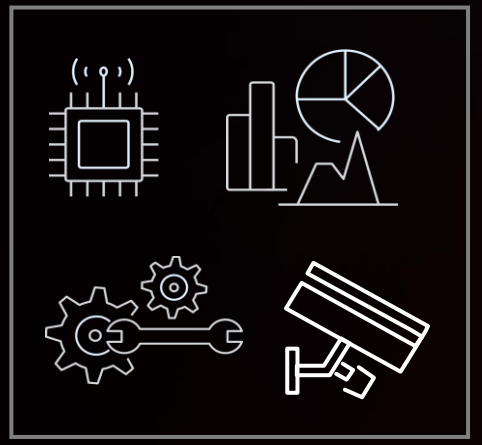
Digital Twins

Model builder



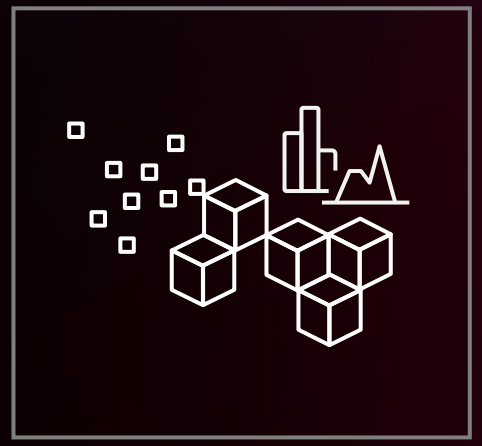
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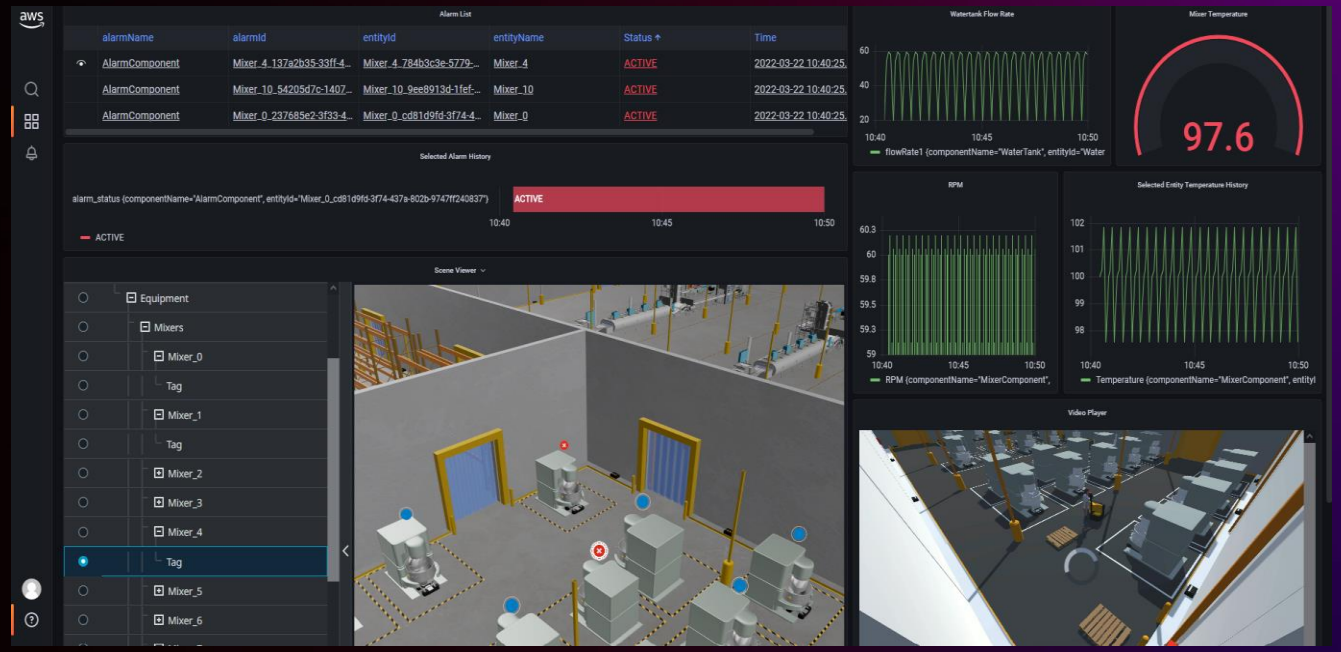
Integrate digital twins into 3D applications to monitor and improve operations

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IoT Application toolkit

Developer SDK: Custom app development or integration with AWS Partner solutions

Open-source GitHub: Sample code, tutorials, and instructions on using AWS IoT TwinMaker and integrating with AWS Partner tools and services



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AWS IoT TwinMaker support in App toolkit

AWS IoT TwinMaker Application Kit increases flexibility and options in creating dashboard experiences with three new components: the Scene Viewer for 3D model visualization and interaction, the Video Player component for displaying video streams, and the Data Source component.

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But wait, there’s more . . .

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NEW

AWS IoT TwinMaker With Matterport



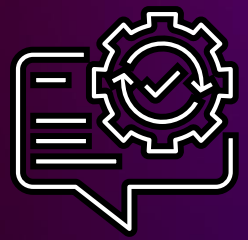
Easily Scan Environments

Scan with LiDAR enabled cameras, hire a team to scan you environment, or simply use your smartphone



Full Integration with Spatial Accuracy

Live data is embedded in digital twins, including tags. Toggle between dollhouse and immersive views



Operationalize and Scale

Build digital twins faster, enable remote management, training, and more.

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WE RUN SO LIFE CAN LEAP FORWARD

PRODUCTION & PRECISION AGRICULTURE



SMALL AGRICULTURE & TURF

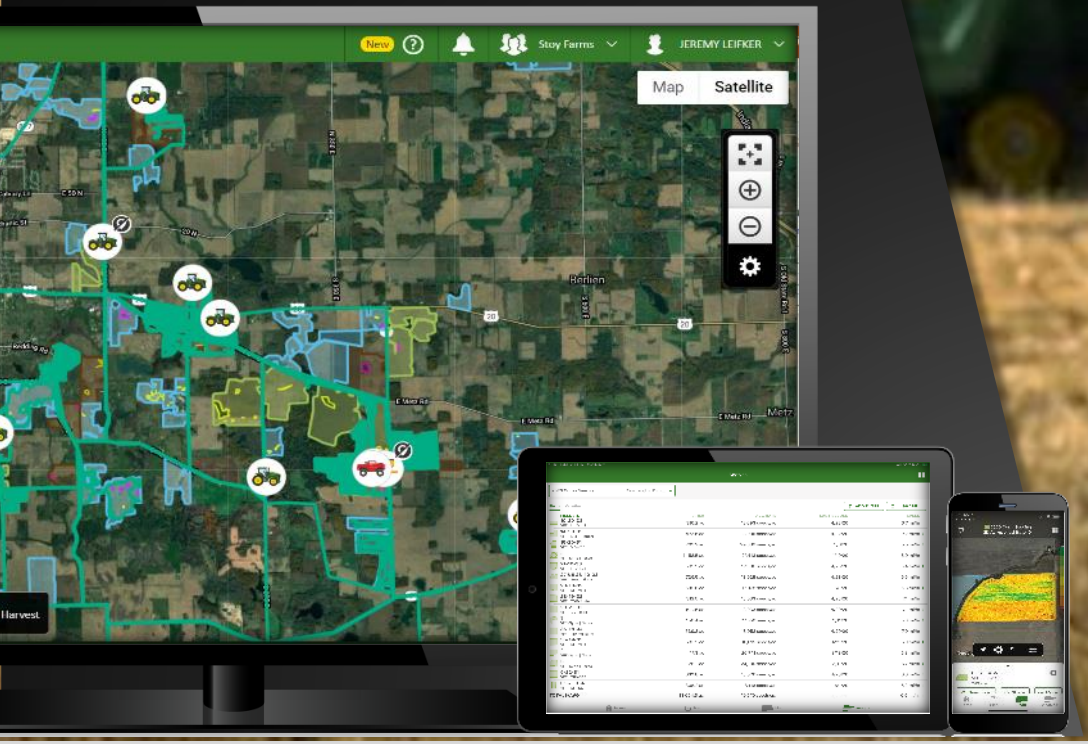


CONSTRUCTION & FORESTRY

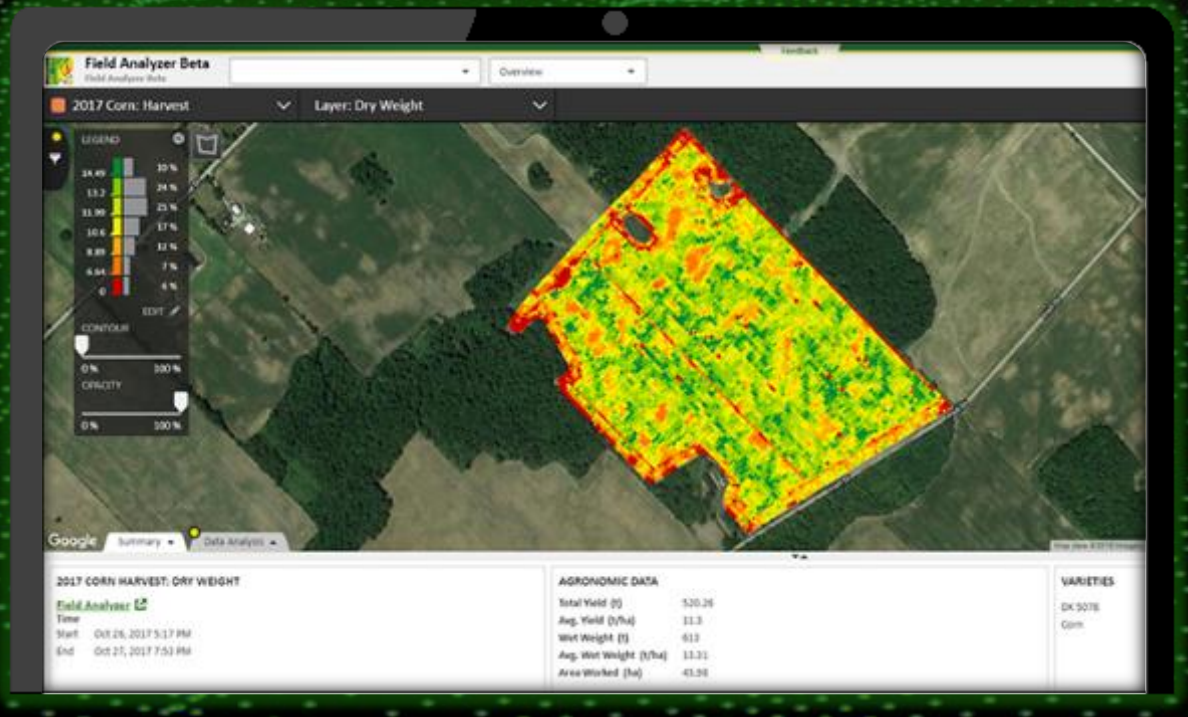


John Deere Operations Center

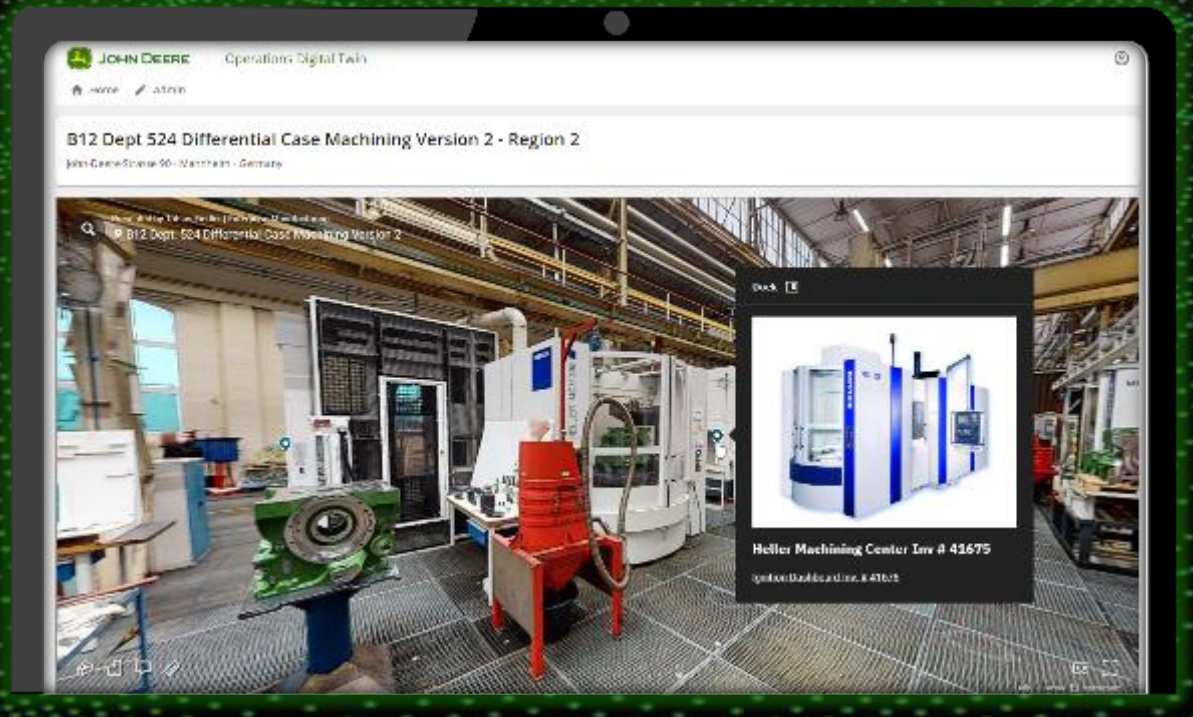
> Collaborate with the right people and tools to make decisions that save time, optimize yield, and maximize profits



Confidential with no Personal Information

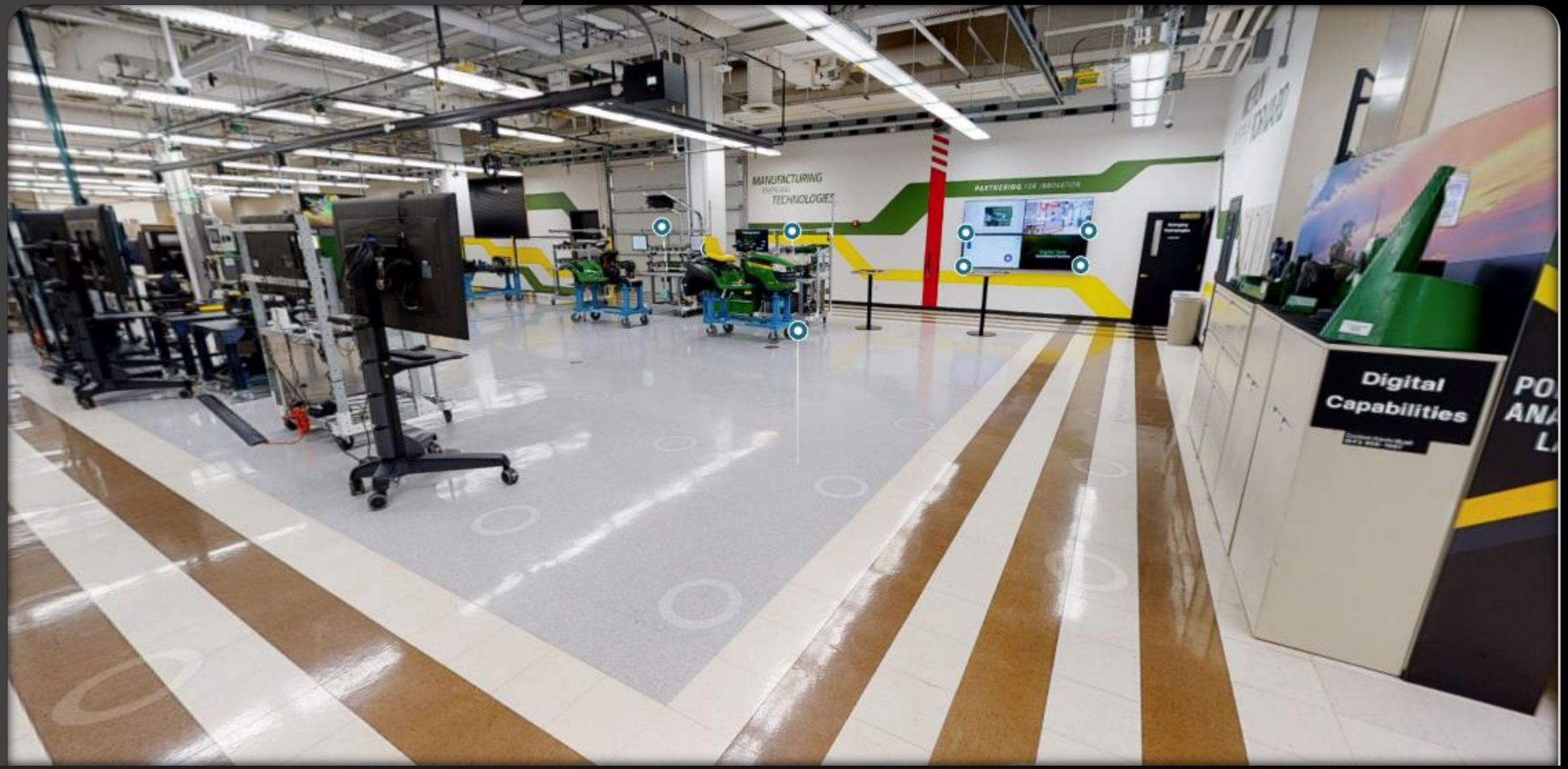


OPERATIONS CENTER

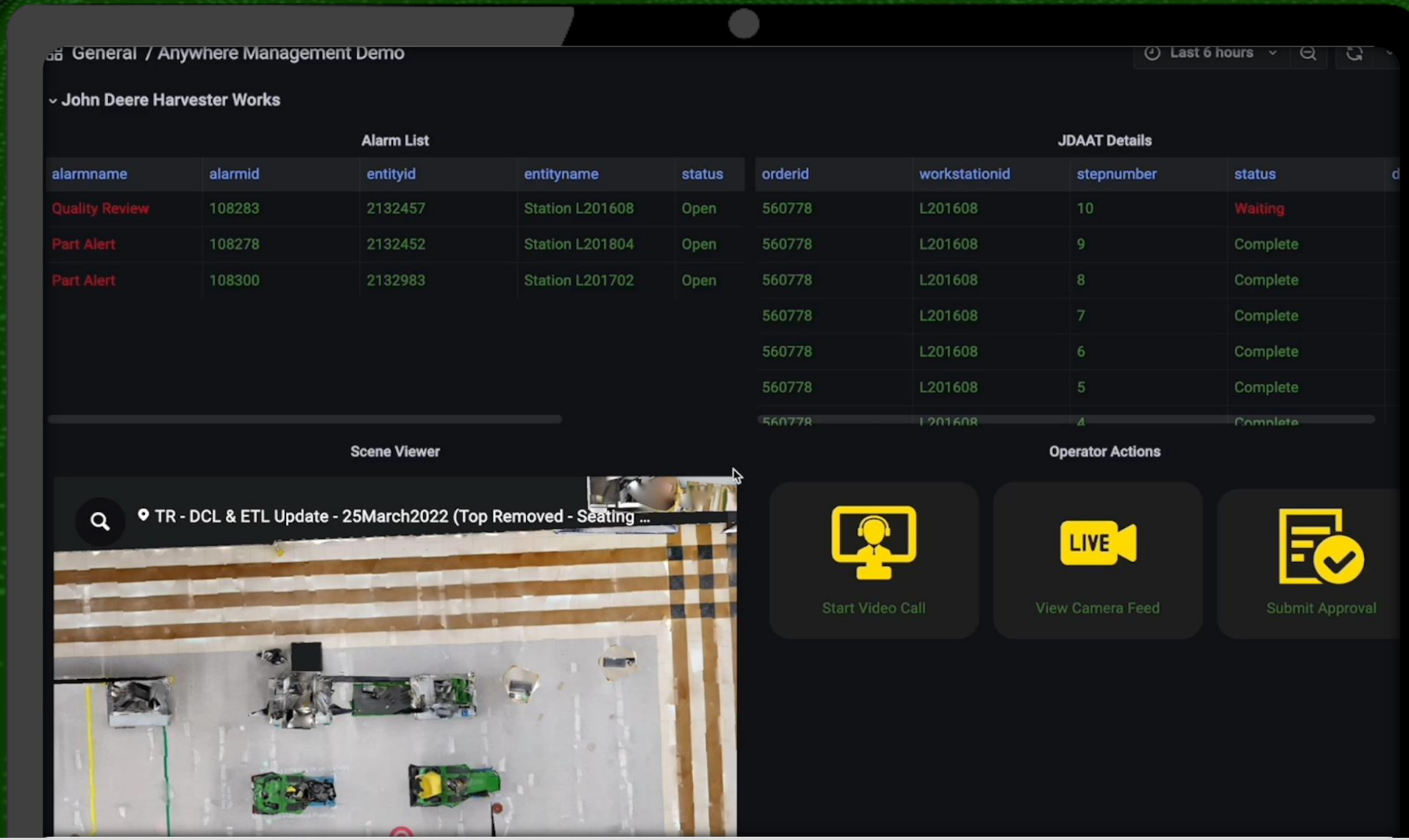


OPERATIONS DIGITAL TWIN

DIGITAL TWIN DEMO

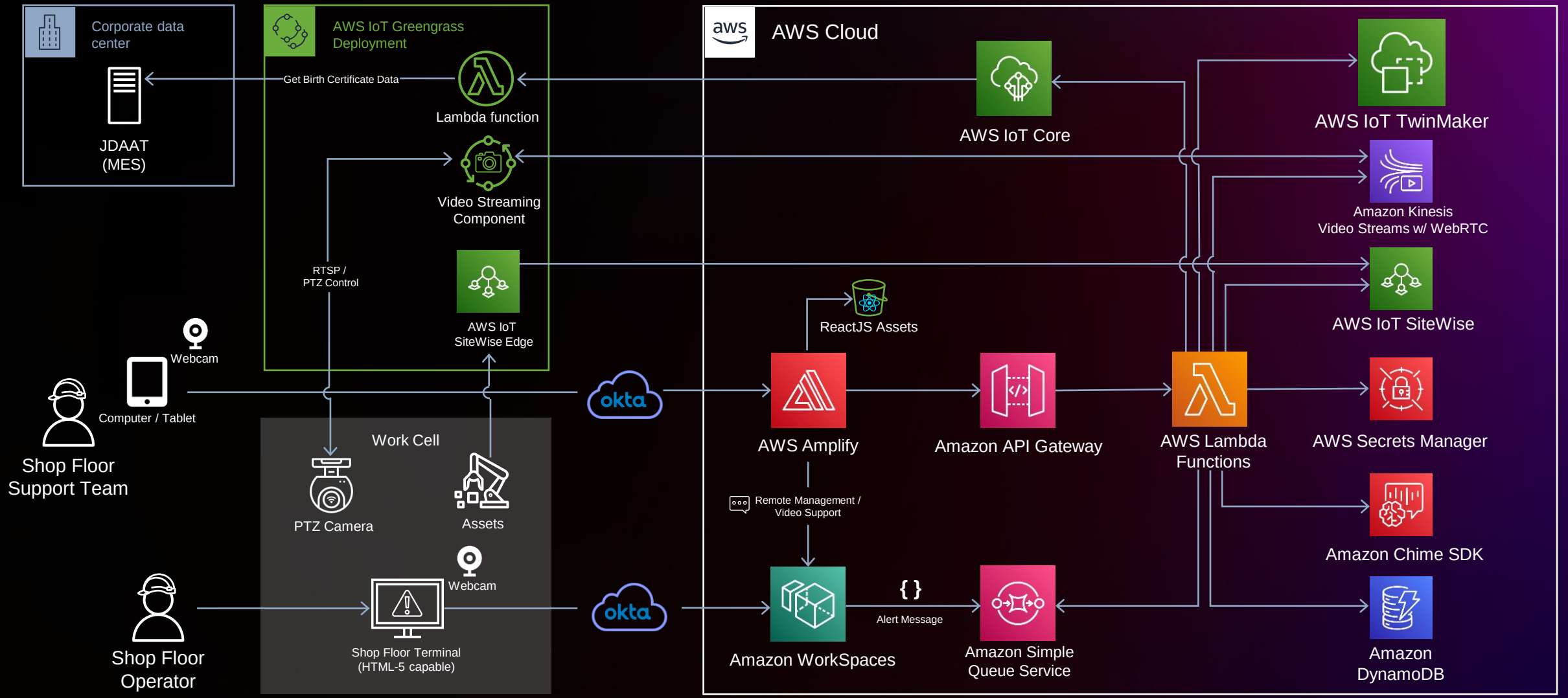


REMOTE ASSIST DEMO



Confidential with no Personal Information

Deere Connected Support Architecture



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Thank you!

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Please complete the session survey in the **mobile app**

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