



Generative AI and Internet of Things (IoT)

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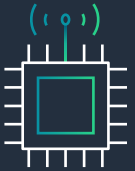


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What is IoT?

Internet of Things (IoT)

Network of connected devices that can use technology to communicate with each other and the cloud, and then unlock rich insights and outcomes



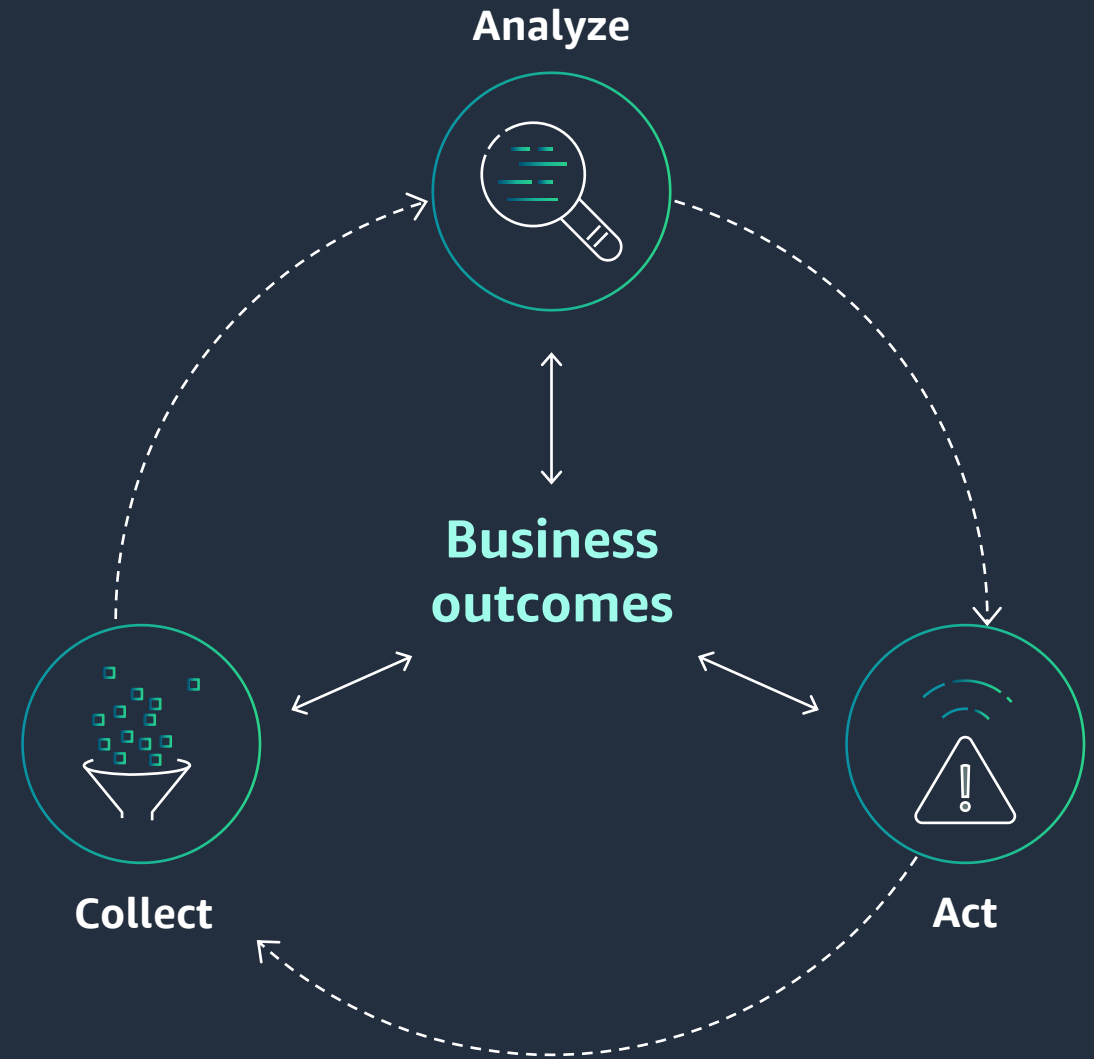
'Things'

Devices connected to the cloud in a single system, which can sense and collect data from places (buildings, spaces), people (trackers, presence), and hardware (production machines, equipment)



IoT applications

Offerings that connect and manage data from various devices, analyze the data (such as with machine learning), and then communicate actions back to the device to achieve intelligent business outcomes



The impact of IoT is growing



\$400 billion+ IoT spend forecasted across key industries by 2025

Gartner, Cross-Industry Insight: IoT Market Opportunities and Top Spend Use Cases
<https://www.gartner.com/en/documents/4432199>



51% of manufacturers use IoT in manufacturing

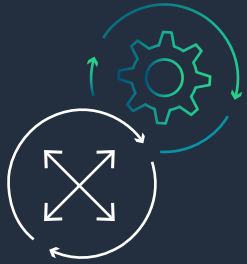
IDC, IDC TechBrief: IoT in Engineering, March 23, 2022, <https://www.idc.com/getdoc.jsp?containerId=US48629422&pageType=PRINTFRIENDLY>



95% of new vehicles sold globally will be connected by 2030

McKinsey, Unlocking the full life-cycle value from connected-car data, Feb 2021, <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/unlocking-the-full-life-cycle-value-from-connected-car-data>

Investing in IoT transforms business operations



**Optimize
performance and
efficiencies**



**Make more
informed business
decisions**



**Generate
new value**



**Reimagine
customer
experiences**

← Enabled by data connectivity →

IoT innovations driving growth at scale for Amazon



520K+ robotic drive units support 300 facilities



775K hours saved for drivers and carriers during check in & out



World's 1st store with Just Walk Out technology for fast, frictionless shopping



Consumer

Quickly build secure products, unlock data connectivity, and support scalability and reliability to streamline product development processes and lower costs

WYZE



Industrial & manufacturing

Improve process performance and productivity, track inventory, manage warehouse operations, and enhance safety on the factory floor

CCI



Connected vehicle

Manage vehicle data, estimate ranges for electric vehicles, train autonomous machine learning models, support remote diagnostics, and add advanced in-cabin experiences

WirelessCar



Public sector, smart cities, & transportation

Support operations, logistics, and automation for public sector assets and the tactical edge and manage traffic, public safety, and transit

Heidelberg, Germany

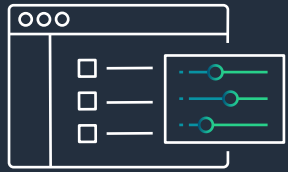


Commercial & smart buildings

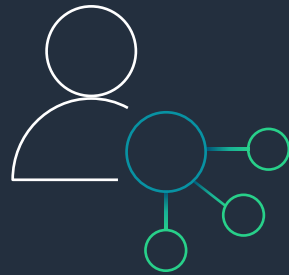
Improve customer experiences and the power, utility, and sustainability of buildings

entrata

When does IoT become complex?



Navigating the breadth
of technologies and
skills needed in the
ecosystem



Challenges in
adoption, scaling,
and managing devices



Connecting and
securing devices



Concerns with
future-proofing
investments

Take the complexity out of IoT with AWS services, solutions, and AWS Partners



AWS Cloud Services

A broad and deep set of cloud services to help customers create custom IoT applications with the highest security, flexibility, and control



Purpose-Built AWS IoT Services

Services optimized for building secure, reliable, and scalable IoT applications for specific industries and use cases

e.g. AWS IoT Core, IoT SiteWise, IoT FleetWise, ...



AWS and AWS Partner Solutions

Ready-to-deploy code, configurations, and customizable architectural guidance, built by AWS and AWS Partners



LG is using AWS IoT FleetWise to standardize and analyze their fleet vehicle data in near-real time to provide enhanced experiences to customers



BISSELL is migrating its 1 million registered devices to a newly created scalable, high-performing, and cost-effective IoT platform, powered by AWS IoT



Miso Robotics is cost-effectively testing product development changes with AWS RoboMaker and using AWS IoT Greengrass for its IoT data pipeline



JOHN DEERE

John Deere is improving factory operations with AWS IoT TwinMaker as well as transforming the farmer experience with precision agriculture, powered by AWS IoT Core



AWS supports customers across every industry

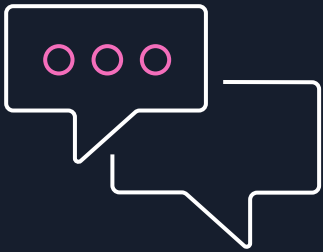


Innovation can
transform industries



GENERATIVE AI

Generative AI creates significant business value



NEW EXPERIENCES

Create new innovative and engaging ways of interacting with your customers and employees



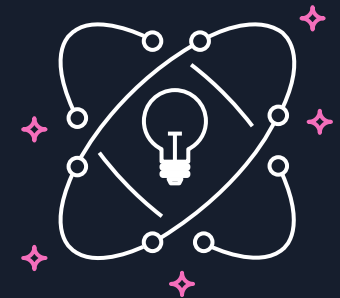
PRODUCTIVITY

Radically improve productivity across all lines of business, for example **Amazon CodeWhisperer** helped complete tasks 57% faster



INSIGHTS

Extract insights and clear answers from all your corporate information, enabling faster and better decisions



CREATIVITY

Create new content and ideas, including conversations, stories, images, videos, and music

Generative AI can be used for a wide range of use cases

Chatbots &
Virtual assistants

Agent Assist

Contact Center
Analytics

Personalization

Conversational search

Content Localization

Text, image,
video generation

Text summarization

Code generation

Document processing

Content moderation

Synthetic data creation

Maintenance assistance

Anomaly detection

Image generation
for web pages

Video enhancement

Music creation

Image enhancement

Creating animations

**Enhance
customer
experience**

**Boost
employee
productivity**

**Improve
business
operations**

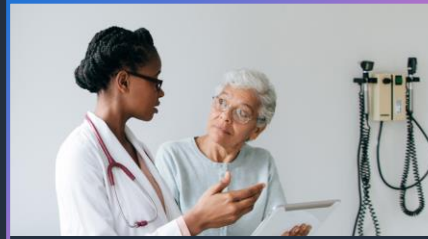
Creativity



Generative AI is transforming all industries



Financial Services



Healthcare & Life Sciences



Automotive



Manufacturing



Media & Entertainment



Retail



Telecom



Energy



Travel & Hospitality



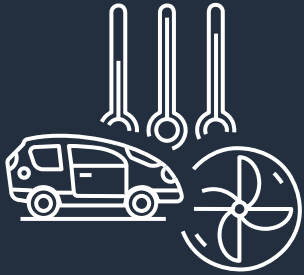
Consumer packaged goods

**A strong data pipeline is
critical to generative AI**

**40B+ IoT devices will generate
175 Zettabytes of data by 2025**

**Your data is
your differentiator**

Generative AI reduces barriers to create IoT solutions



Generate prototype code for multiple board types, sensors, and languages.



Create realistic, de-identified, synthetic IoT test data



Automatically populate cloud asset models and device configurations from datasheets.

Providing next-generation IoT customer experiences with Generative AI



Synthesize multi-source data to diagnose root causes of unpredictable failures.

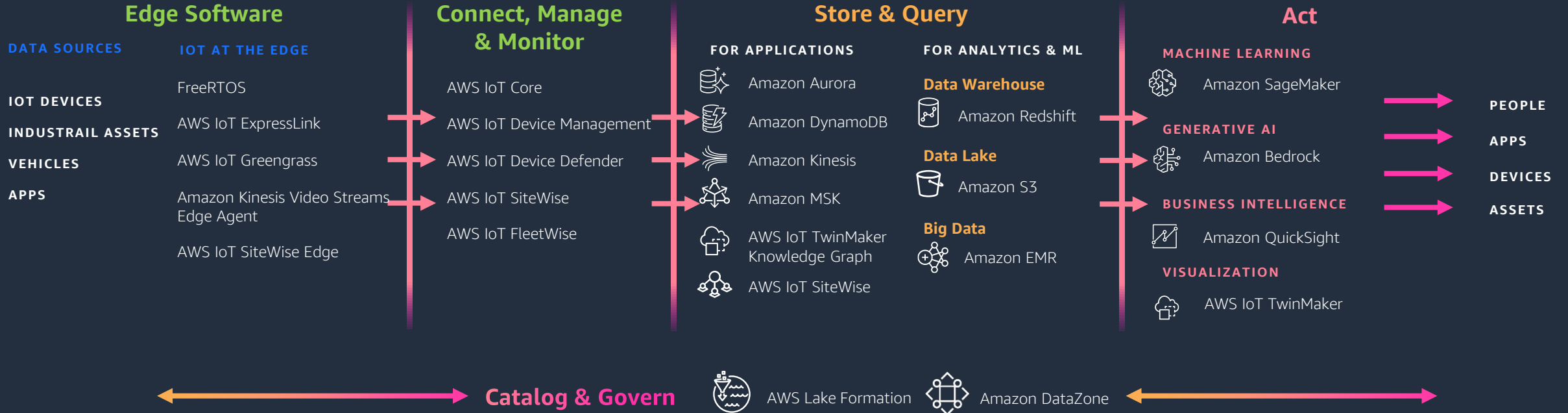


Provide conversational AI assistant to personalize and troubleshoot devices.



Generate more accurate maintenance plans with access to more data

A comprehensive set of services for your IoT applications





IoT & Generative AI for Utilities

Water Smart meters management solution

Current Challenges

- Water providers want to decrease demand and leakage
- Revenue implications to water providers due to poor data driven decisions around claims, where faults arise

Desired Outcomes

- Solution to water providers to save more water by reducing leakages
- Solution will enable water utilities with desired visibility lower customer consumption to reach 110 litres of water per person, per day

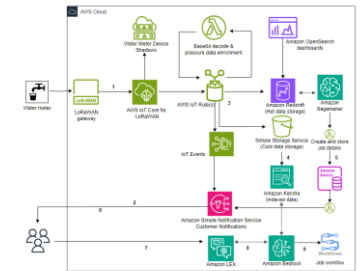
Solution

- Smart meter management interface to address the below initial use cases
 - Demand management to detect leakage and High usage using AI (Anomaly detection)
 - Automatically generate tailored notifications to customers using Generative AI

Use Case & Solution

IoT & Analytics

1. Smart water meter readings & telemetry are sent to AWS IoT Core for LoRaWAN via a LoRaWAN gateway.
2. Based on rules and configured events, notifications can be sent to customer in real time.
3. Data is stored in S3 and Amazon Redshift for analytics & anomaly detection using Amazon Sagemaker + Redshift ML.
4. Data is also stored in S3 which is indexed in Kendra. Kendra will also be indexed with data on how to fix water leakage etc.
5. When an anomaly is detected, a job is also autogenerated and stored in a Amazon Aurora database.
6. A notification is sent to the customer via Amazon SNS.



Generative AI & Chatbot

7. The customer can communicate with the solution via Amazon LEX chatbot.
8. The chatbot sends the customer's enquiries to Amazon bedrock using RAG. Bedrock then generate a tailored response.
9. Based on the outcome of the conversations, using Amazon Bedrocks generative AI capabilities a task will be generated and added to the earlier created job workflow. Bedrock will provide detailed instructions to customer/third party engineers, on the steps to take to deal with unusual usage patterns or leakage.



IoT & Generative AI for SmartHome

Smart homes are not easy or convenient

By 2024, **50% of households** in North America will have **smart home products** and yet:



37% of users reported complexity of setup, too many apps and concerns on device compatibility



Consumers spend ~2.5 hours on support and speak with 3+ people to resolve issues
22% give up and return the product for a refund

08-02-21 | CONNECTED WORLD

The smart home is flailing as a concept—because it sucks

The smart home was supposed to be the next big computing platform. Now it seems lost in a fog of frustration.

SIMON HILL GEAR JUN 11, 2022 7:08 AM

Controlling My Family's Smart Home Is Driving Us Mad

The smart home was supposed to make our lives easier, but errant light switches and too many apps are frustrating. There must be a better way.

TC

The average person doesn't have a chance with the smart home

Owen Williams @ow / 9:22 AM PST • February 18, 2022

 Comment

Smart Home Challenges



Limited AI driven services

by Smart Home Solution provides



Heterogeneous devices & platforms

with limited cross platform routines and interoperability



Difficulties around Technical support & user education

impacts customer experience



Complex & Manual

Smart Home Management for consumers



SECURITY



MOTION SENSOR



CAMERAS



LIGHTING



TEMPERATURE



SMOKE SENSOR



PLUGS



Why generative AI for Smart Home?



Intelligent routines suggestions



Seamless automation



Simplified smart home management



Personalized experience & support



Zero touch integration

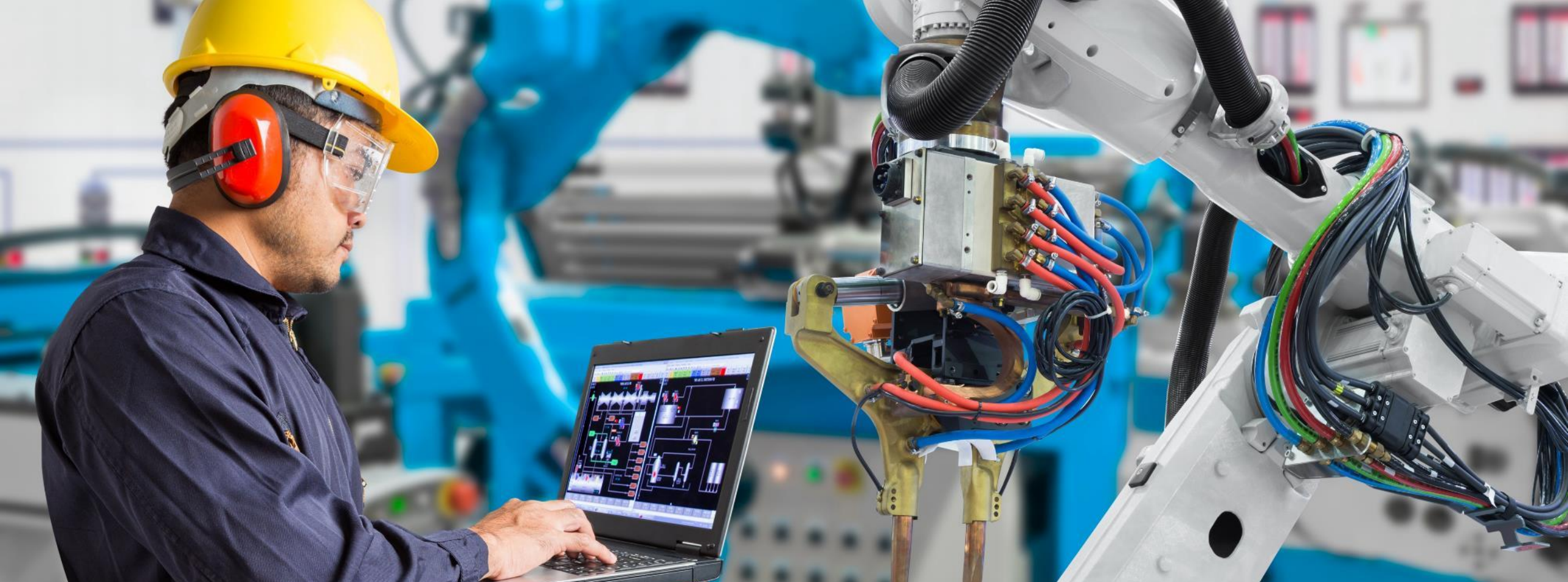


Hyper-Personalize the Smart Home Experience with Generative AI



Demonstration
(Click on video)





IoT & Generative AI for manufacturing

Generative AI for real-world tasks in manufacturing

Benefits



Improve efficiency and productivity for employees and plants



Reduce time and cost of production



Grow revenues with product and service differentiation

Capabilities



Assist HR, legal, design, procurement, and contracts with document generation, research, and summarization



Agents and search for plant maintenance, operations, and research



Generate and enhance new product design
Market and customer research to support market development

Generative AI in manufacturing

IoT related use cases



Text generation for contracts and SOPs



IT SDLC and code generation



Customer service and agent assistants



Product design



Research and summarization for supply-chain optimization



Synthetic data and product testing



Conversational search and manuals in predictive maintenance and quality control



Training content generation



Add maintenance assistance for improved machine availability



Production planning

AI assisted diagnosis

of a production quality alarm

Demonstration
(Click on video)

Summary:

- Symbiotic relationship between GenAI and foundational technologies like IoT
- IoT devices act as the sensory organs of our digital ecosystem, gathering real-time, diverse and dynamic data that is crucial for GenAI models.
- IoT systems gain significantly from GenAI advancements enhancing its capabilities, enabling smarter, more autonomous, and efficient operations.
- For decision-makers and CXOs, understanding and investing in the IoT-GenAI partnership is a strategic necessity. This combination is crucial for businesses seeking to leverage the full potential of AI actively shaping its direction with high-quality, real-world data provided by IoT.