

# Implementing IoT Solutions from the Edge to the Cloud to Achieve Tangible Outcomes

The Internet of Things (IoT) is one of just a few truly transformative waves that is impacting businesses. Industrial companies and connected home providers will feel the impact more than others. The possibilities and benefits are infinite, and many companies are starting now to capitalize on its power. So, why aren't IoT initiatives where they should be? What's holding them back? This eBook explores the barriers to full adoption and how they can be addressed with a value chain.



## IoT: The opportunity and the barriers

IoT opens the doors to new opportunities for operational efficiency, intelligent manufacturing, connected homes and buildings, disease prevention, and healthcare—even revenue. Companies are discovering that “things” not previously connected provide intelligence into new areas of the business, along with insights that can improve customer experience and fuel innovation. IoT makes it possible to automatically track assets, monitor systems in real-time, and use data for cost reduction and revenue growth. The result? All aspects of an enterprise become data-driven. Companies can understand business operations better, making accurate decisions about products, processes, and customer satisfaction. It's easier to manage assets and equipment and power new services and business models.

Yet, some companies initially struggle to advance their IoT initiatives. Why? IoT is new for so many and more complex than the average IT project. To get the most from IoT solutions, companies have to build them from a variety of services delivered by different devices, connectivity options, platforms, and cloud vendors. Harnessing so many moving pieces and parts creates **three main challenges** that are keeping businesses in many sectors from making the most of all the opportunities IoT has to offer them:

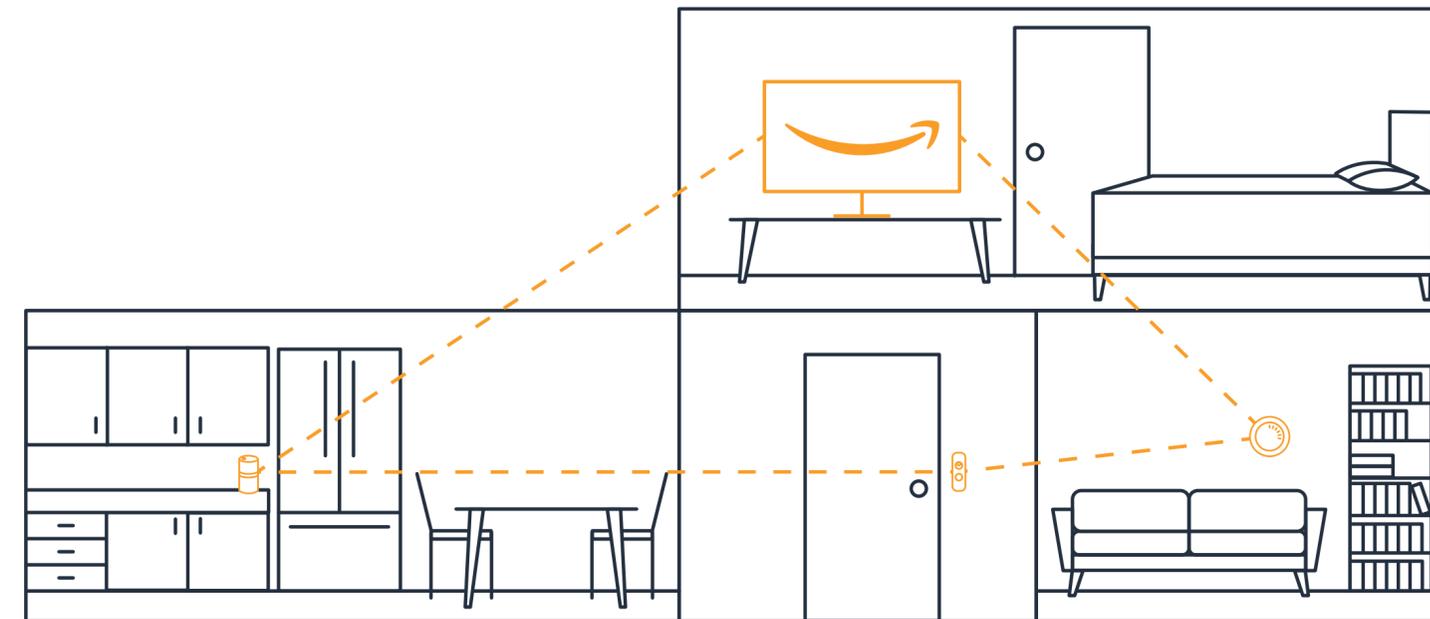
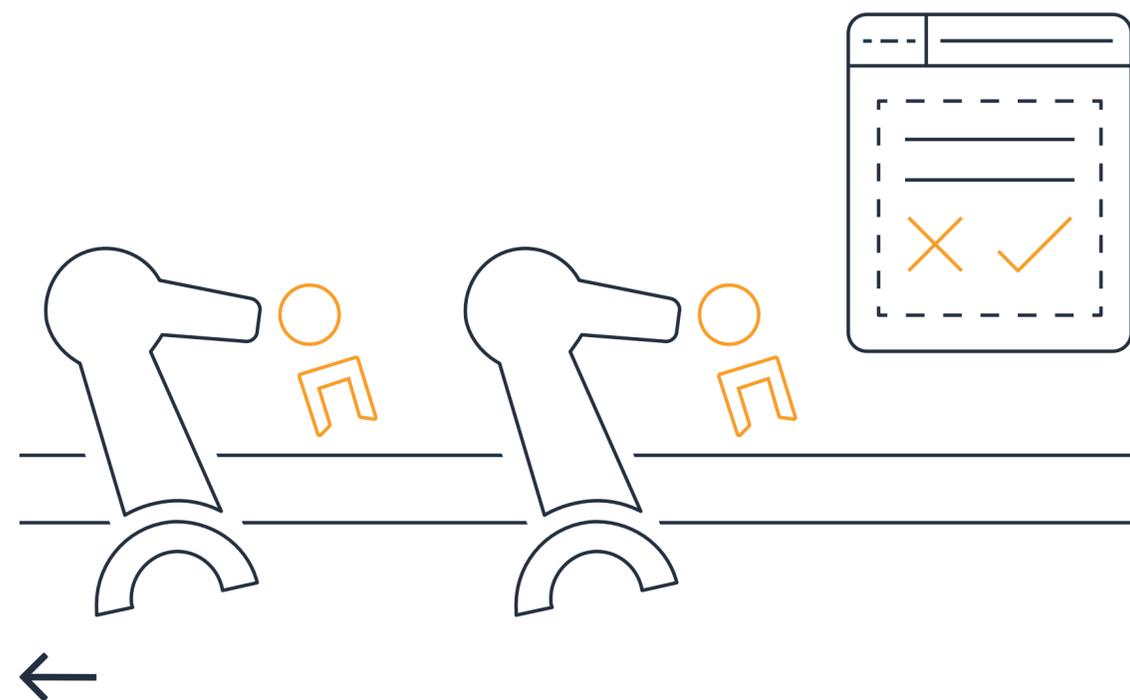
1. Businesses don't have the knowledge, skills, or IT data integration technology necessary for machine learning, devising strategies for IoT projects, executing on them, and deriving actionable insights.
2. The technology for implementing IoT projects is new, diverse, and complex.
3. They need solutions that are relevant to their industries and business needs, not individual services.

The good news is AWS and the AWS partner community have solutions to help you overcome these challenges.



# The three challenges of IoT implementation in the industrial and connected home sectors

Picture this industrial sector scenario. A business manager asks an industrial plant manager, "What are the condition-based alerts telling you about our manufacturing equipment that could eliminate downtime and increase throughput?" The plant manager receives these alerts but can't answer the business manager's question. The two managers need infrastructure, a device management system, a way to collect data, and reliable connectivity to get the answer. So, they assemble a team with IT and engineers to build it, and quickly run into problems. The specific sensor data needed for queries isn't easily accessed. Extracting the data requires a data model, something the team cannot build. A system administrator is then brought on board. Eventually, the business manager gets an answer. But then a question comes up about predictive maintenance, and the new model can't provide the answer. The process starts all over again.



For a connected home, it starts with smart appliances, motion sensors, outdoor weather stations, a Nest thermostat, a smart HVAC system, Echo, and a ringless doorbell. All have separate remotes and control interfaces, and they don't always connect as advertised. Providing a centralized management platform requires integration, but it's not easy because of all the different protocols, protocol libraries, and smart object definitions involved in enabling handshaking capabilities. The device and appliance manufacturers have their own problems, such as communicating locally to all devices possible by means of APIs. Gluing all these things together is complex, time-consuming, and, at times, very difficult. And that doesn't even include adding the capability to analyze the valuable data generated from the connected devices.

All three challenges are at work in both scenarios. Fortunately, AWS and our partner network have solutions and services that address them throughout many regions across North America, the European Union, and Asia Pacific. Local availability helps ensure optimal performance and supports compliance with government regulations. Here's a high-level overview of how together, we can help, including real-world examples.

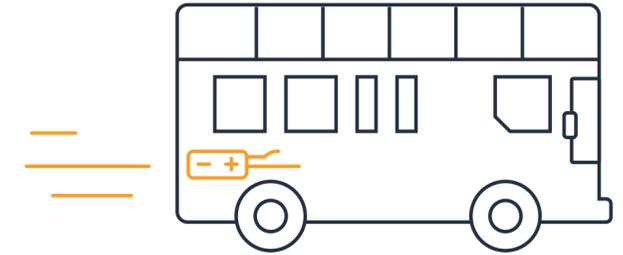
# 1: IoT implementation knowledge, skills, and data integration technology

The teams and departments in companies in the industrial and connected home sectors are full of resources with the skills needed to keep manufacturing, product development, production, and distribution running, all while maintaining a competitive edge. For many, IoT is new and touches new business functions, and businesses haven't yet developed the IoT expertise or data technology integration skills across teams necessary to lead a successful project.

That's where the AWS partner community can help. Our partners are skilled at developing IoT solutions with AWS from start to finish and can even help with go-to-market strategies and initiatives. They have the technical skills, competence in AWS services, and experience to deliver successful implementations for and with their customers. With AWS IoT services, our partners can build IoT applications that span hardware, connectivity, data transfer, integration, and decision making. Design, connectivity, security, device management, and analytics are all part of the solutions.

Case Study

## Vantage Power

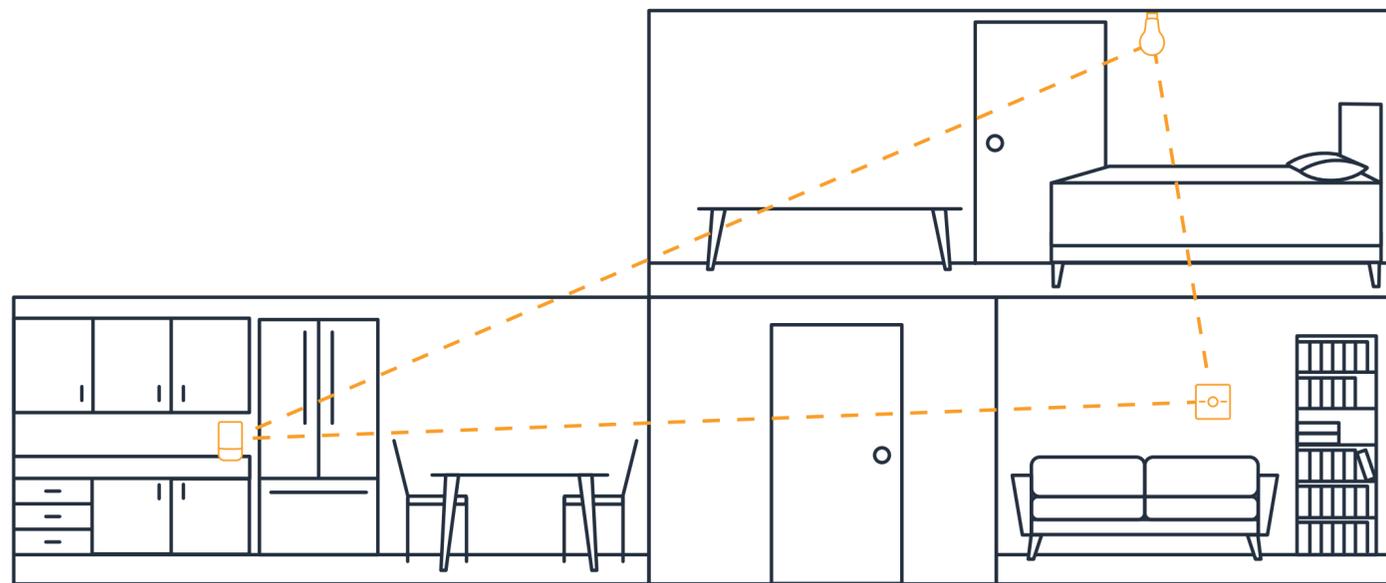


Vantage Power designs and manufactures technology that can connect and electrify powertrains in heavy-duty vehicles. They wanted a vehicle telemetry system that would deeply integrate into the powertrain, vehicle control software, and other existing systems to collect rich data from the field that could be used to tell a comprehensive story about how parts were performing. For example, they wanted to create a way to closely monitor their lithium-ion battery systems to help customers detect cell-level defects early and mitigate issues.

AWS IoT Partner, Luxoft, created an AWS-based telemetry platform which brings the cloud platform to each connected vehicle. The solution provides Vantage Power's customers with a comprehensive technical understanding of powertrain components including engines, batteries, control systems, electric generators and motors. The solution is fully customizable to specific engines and fleets.

Luxoft leveraged AWS' IoT services that include AWS IoT Core, AWS IoT Greengrass ML Inference, and AWS IoT Analytics. These services are combined with Amazon Simple Storage Service (Amazon S3) and AWS Lambda to optimize processing of hundreds of thousands of data points per minute to derive insights and predictive analytics models that can then be distributed to the vehicles to take preventative action in real time.





Case Study

## Centrica Connected Home

Centrica offers Hive, the UK's most popular smart home ecosystem. The entire infrastructure for the Hive Platform—including marketing and support websites, data collection services, and the real-time store for user and analytics data—runs on AWS technology. With the AWS IoT Service Team in EMEA, its device management platform was migrated to a specialized AWS IoT-based service for new and existing devices leveraging AWS IoT Core. As a result, they replaced platform components with a leaner, faster Lambda-based microservices infrastructure, along with Amazon EC2 and Amazon RDS for longer lived components such as data stores and platform UIs. Using AWS services cost-effectively abstracted away some of the common problems of operating system configuration and architecture design. It made it easier to maintain a good, common framework for product development across their globally distributed teams.

**centrica**



## 2: The technology is new and diverse

IoT projects in the industrial and connected home sectors require all kinds of different technology. Many businesses in these markets have a limited understanding of the required technology and how to apply it for each application. AWS and our partner community have a complete set of IoT technology, hardware, and services that leave no stone unturned in the IoT implementation, execution, and success process.

Our partners lead the industry in every category of the IoT value chain, delivering interoperable end-to-end IoT solutions. In fact, the edge, device, connectivity, platform, solution, and consulting partners in the AWS Partner Network (APN) must prove their products' interoperability. In addition, we have an IoT Competency program whereby partners seeking this designation must prove their IoT expertise.



Case Study

### EMS

EMS developed Fuelsuite, which their gas station customers across Australia use to monitor inventories, deliveries, and prices, and receive alerts of possible environmental incidents. To connect sensors in underground tanks and pumps and, regardless of their configurations, collect all their data at 30-second intervals, they engaged with [AWS Partner Network \(APN\) Advanced Consulting Partner DiUS](#). DiUS and EMS designed the new version of Fuelsuite so that data from the sensors is aggregated by a custom-built physical device located in gas stations. Then, this device wirelessly transmits the data to the AWS cloud, where it gets processed and delivered via the Fuelsuite web-based interface. DiUS also designed the solution to take advantage of [AWS IoT Device Management](#) to securely onboard, organize, monitor, and remotely manage the Fuelscan devices.





Case Study

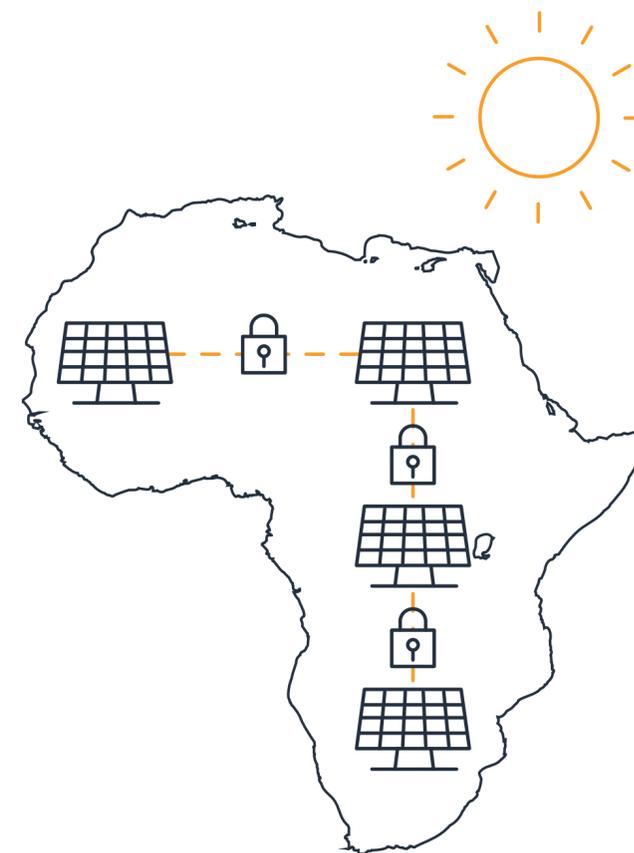
## Xenon

Xenon needed to build a home automation system for large a real estate investment trust (REIT). The problem was how to manage the 10–15 connected devices and sensors being deployed per home, scaled across the 17,000 rental property homes managed by the REIT. After working on an in-house solution, Xenon connected with AWS partner ThingLogix. ThingLogix deployed Foundry, its propriety IoT cloud platform, into Xenon's AWS account and developed the features required to centrally manage all the devices across the 17,000 homes. Foundry uses AWS IoT services like AWS Device Shadows and AWS IoT Greengrass to enable developers to model and test IoT solutions in the cloud, rapidly deploy these solutions to connected devices at the edge, and manage the entire device ecoystem from a simple abstraction layer. To implement Foundry into Xenon's home automation system took only 4 weeks. This allowed the property management system to be delivered ahead of schedule and far under budget.



### 3: Solutions specific to the needs of the industry

Finding IoT solutions that are specific to an industry is the third challenge in the quest for IoT success. It is easy to get stuck in the pilot stage of an IoT project because the nuances of all that goes into completing it for the business or bringing a product to market are often overlooked. Remember the story of the plant manager and the solution that only answered one question? Or, the device manufacturer who has to deal with all the different protocols, protocol libraries, and smart object definitions involved in enabling handshaking capabilities? AWS and our partners offer generally available solutions, including hardware, that use IoT services designed to address the specifics of an IoT solution. They bring together IoT edge and cloud technology with partners who have core competencies in the industrial and connected home sector. As a result, our packaged solutions fully address the specific use cases of these two sectors.



#### Case Study **SolarNow**

Ugandan solar equipment, energy, and services provider SolarNow was concerned about disruptive, malicious, and costly service interruptions for remotely deployed solar equipment. With AWS IoT Device Defender and AWS Partner Eseye's AnyNet Secure SIM, affordable and scalable preventative and ongoing security management services can be configured to match SolarNow's specific products and business objectives. Thanks to the AnyNet solution that incorporates AWS IoT Core and Device Defender, SolarNow can achieve a high level of security management while still delivering reliable, powerful solar energy to its customers. No costly customized software configuration required.



Case Study

## Zimplistic

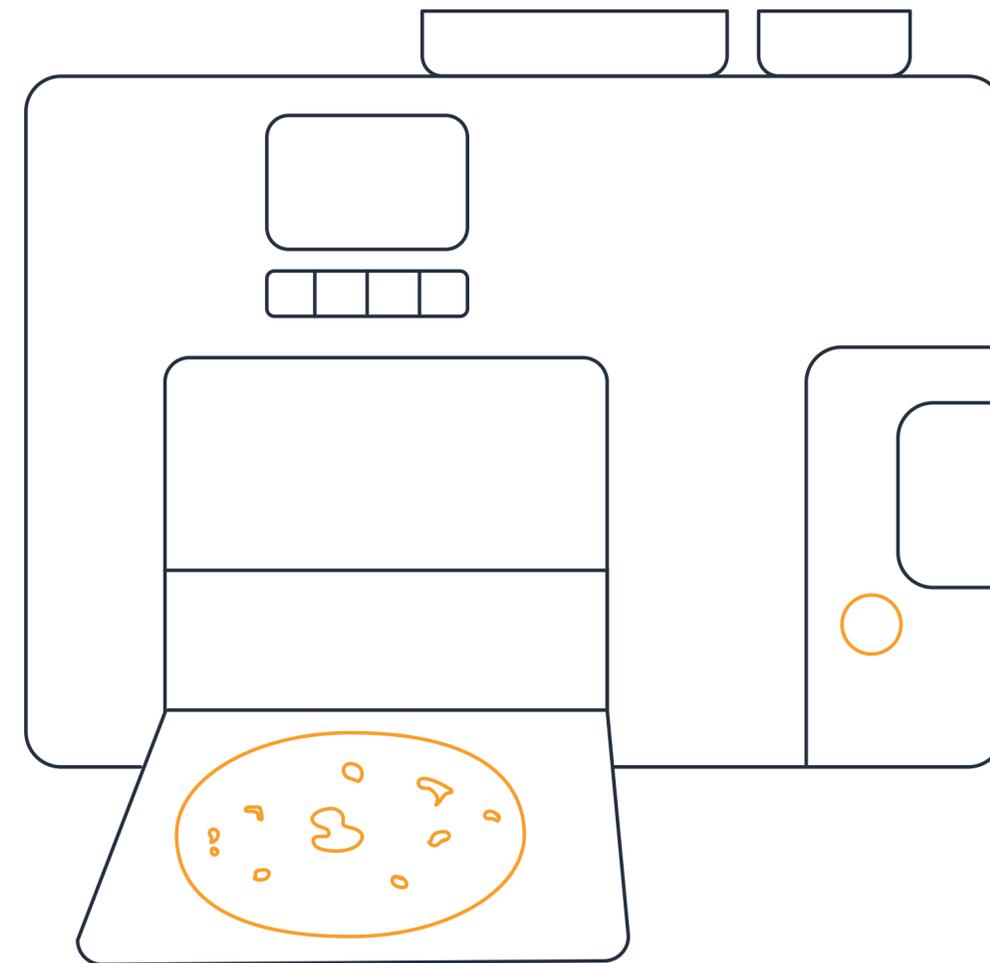
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Zimplistic wanted to capitalize on the growing “smart” trend in people’s kitchens. The company developed Rotimatic, a smart device that measures, mixes, kneads, flattens, cooks, and puffs rotis—flatbreads made from stoneground flour, which are traditionally popular in India, Pakistan, and parts of Southeast Asia.

Before Zimplistic could go to market with Rotimatic, it needed an IT infrastructure that could handle the constant stream of data coming in and going out to the Rotimatic devices. But, Zimplistic didn’t have the resources to build an on-premises infrastructure that could manage as well as process and store the quantities of data Rotimatic would generate. Zimplistic turned to AWS to build an IoT solution with AWS IoT Core to enable data traffic to pass securely and reliably from Zimplistic’s cloud applications to the Rotimatic devices and from the devices to the cloud applications.

Now, Zimplistic can monitor the performance of the machines, making changes to its software if errors occur. Crucially, Zimplistic can also gather data on customer usage and feed that information into design updates. The connectivity also enables Zimplistic to roll out new software quickly and easily to all machines at the same time. With this kind of information, they can evolve its product with updates—right down to new recipes they send out to the device—that they know will add value to their customers.

# rotimatic



Together with our partners, we simplify the complex nature of IoT projects to make you successful and derive the optimal value from them. For the industrial sector, the focus is on optimizing operations and production, enabling predictive maintenance, improving production, increasing safety and security, distributing and managing energy more effectively, and finding new business opportunities. For the connected home sector, the emphasis is on building-in secure and reliable connectivity, managing connected product lifecycles, analyzing device-generated data, ensuring device operability, and scaling across millions of devices and broad product lines.



partner  
network



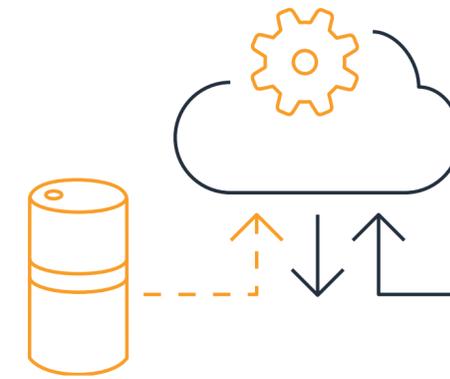
# The roadmap: The Edge-to-Outcome Value Chain

How do AWS and our partners deliver on the promise of IoT? It starts with the deep AWS IoT portfolio, which includes edge software to cloud-based services that can connect a diverse fleet of devices to the cloud, manage them at scale, continuously audit and secure them using IoT cloud services, and provide the intelligence needed to create new revenue streams, new value for businesses and customers.

While that market still lacks comprehensive standards and regulations for IoT, AWS and our partners are able to take the complexity associated with varied protocols and authentication mechanisms and abstract it away to help industrial sector and connected home customers scale and move faster so that devices can sense continuously and act quickly.

Backed by this portfolio, we have developed the Edge-to-Outcome Value Chain, a series of interrelated hardware components, software, and services that make up a chain where partners and AWS add value at each step of an IoT strategy. It includes the critical stages of an IoT project and is meant to simplify the complex nature of such projects. This prescribed approach enables business value by removing the complexity of planning and executing an IoT project for any use case throughout the critical stages of strategy, designing and finding an IoT solution, and bringing it to market.

## Edge-to-Outcome Partner Value Chain



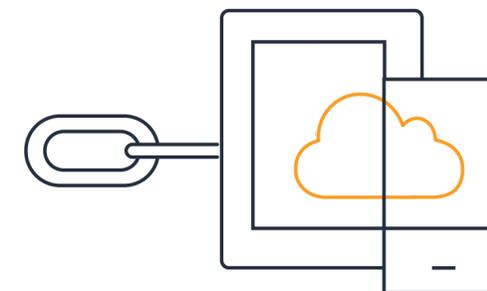
### Edge to Device

Silicon OEM ODM/CM



### Connectivity

Gateway Network/Carrier



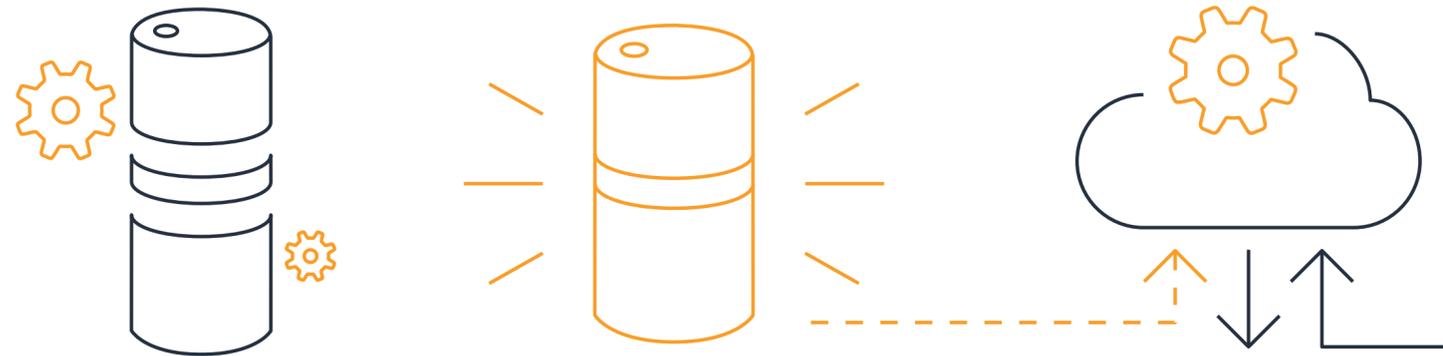
### Solution to Outcome

ISV Regional SI Global SI



# It's all about value

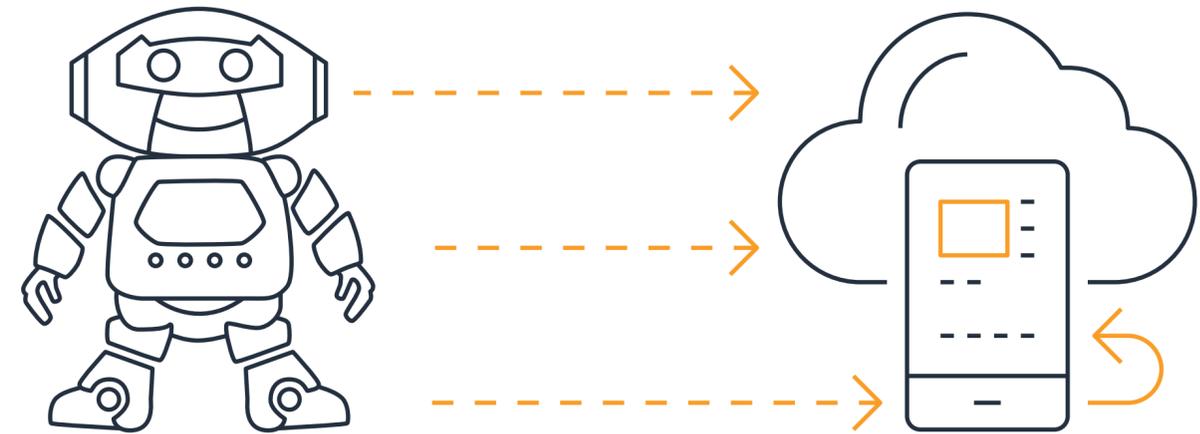
The Edge-to-Outcome Value Chain is a complete roadmap for successful IoT solutions, focusing on the value your business derives from AWS and partners at every link in the chain.



## Edge to Device

Silicon OEM ODM/CM

This chain starts at the “edge” of IoT with the hardware components related to embedded processing, device connectivity, or both that are used in both edge and gateway devices. It includes intelligent edge devices, which can use services found in the AWS IoT suite that are purpose-built for edge computing. Connected devices produce data that is gathered at the edge and sent to the cloud. From this data, edge computing enables devices to sync and communicate with each other while still using the cloud for management, analytics, and durable storage.

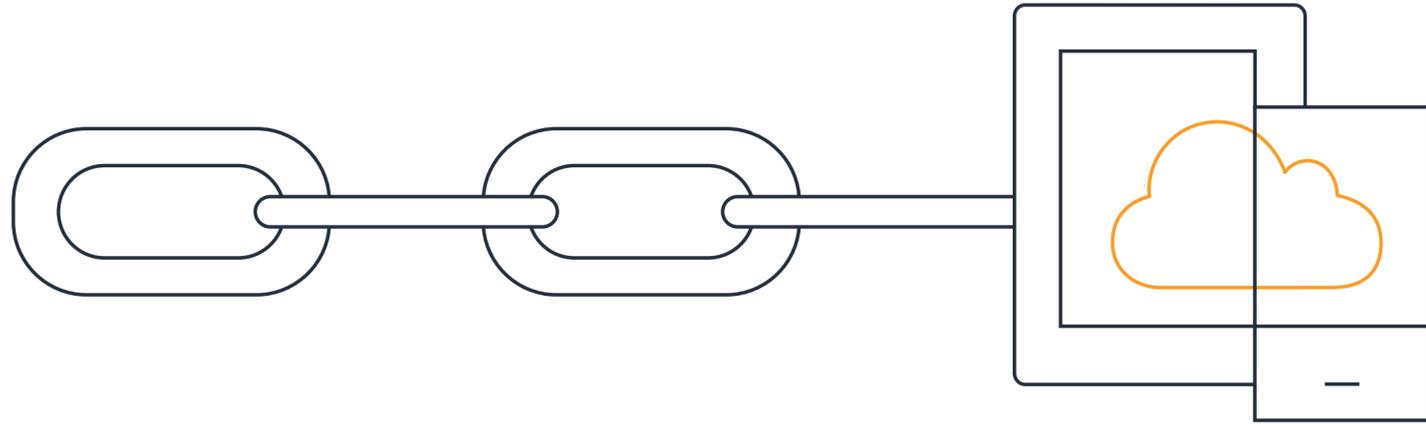


## Connectivity

Gateway Network/Carrier

From the edge it goes to the gateway, which consists of the APN and AWS hardware or software components used to design, build, and manage the devices that provide the connection point between the cloud and controllers. Then come the original device manufacturers and contract device manufacturers who create the gateway designs and manufacture devices and products as specified and eventually are offered by another company for sale. AWS IoT helps customers connect more devices faster by supporting a multitude of protocols, offering software and services to connect a huge range of devices from microcontrollers to robots, and managing devices efficiently once they are connected.





## Solution to Outcome

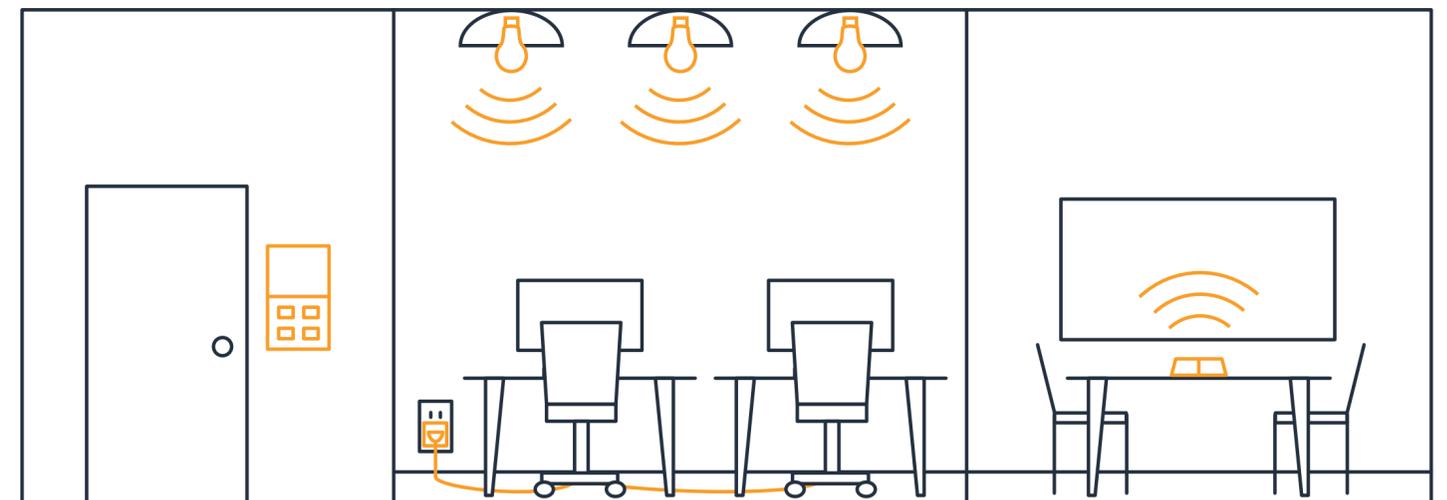
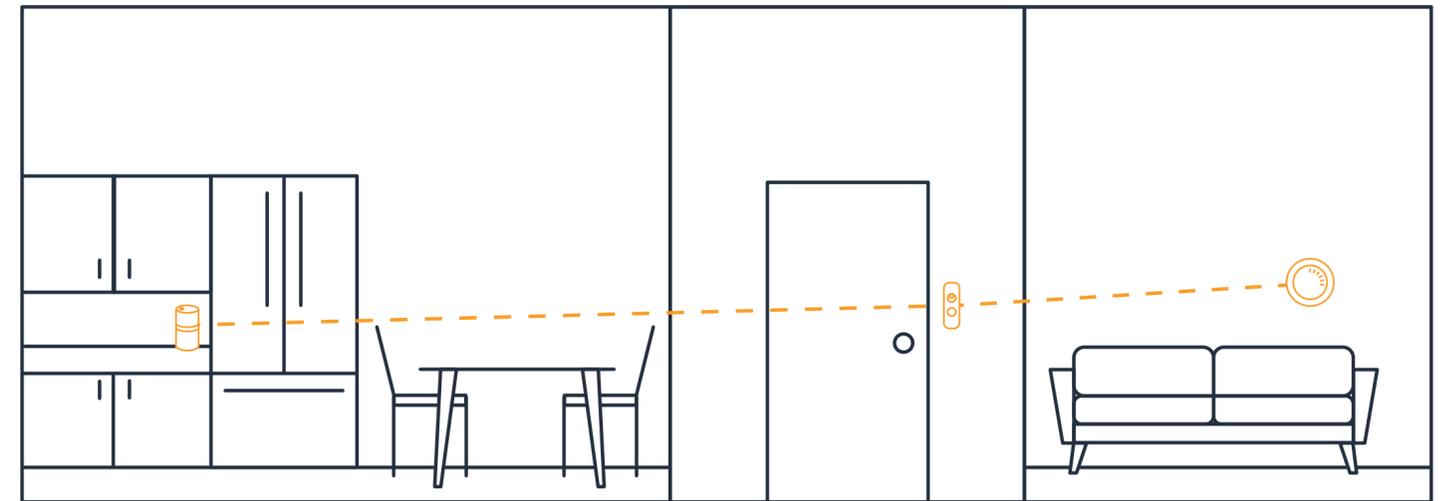
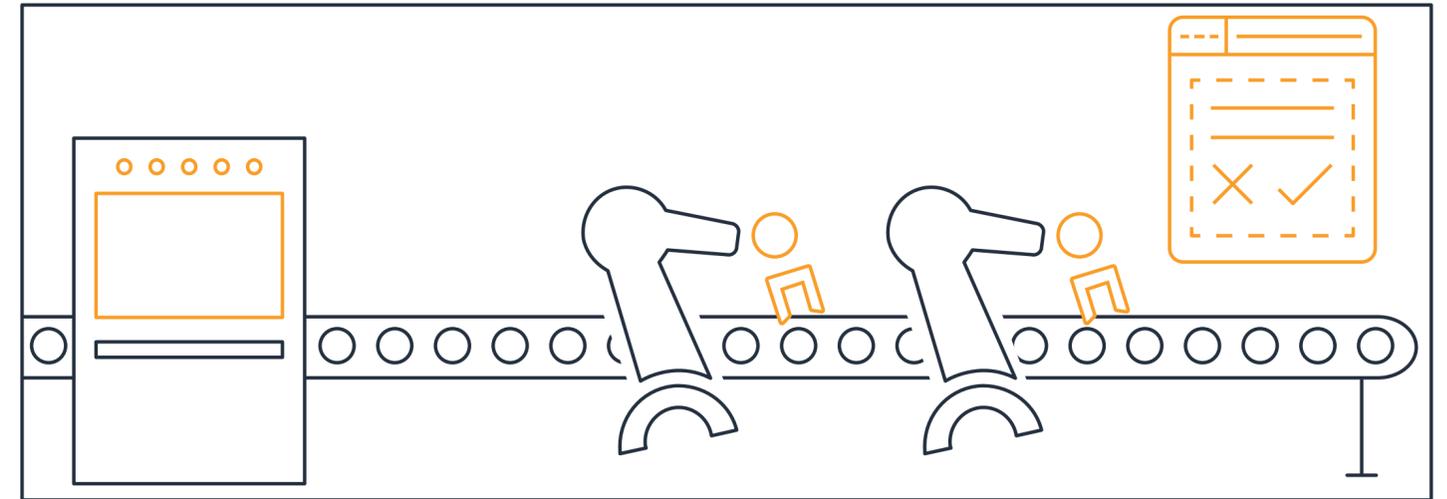
ISV

Regional SI

Global SI

The last links in the chain cover the move from device to a platform and to the desired results. Network, virtual carriers, and AWS IoT Partners provide services such as billing and rating and device and subscription management (network connectivity). Partner and AWS platforms then offer the tools to build, develop, and manage IoT applications. Then, Systems Integrators bundle all the hardware, devices, connectivity, platforms, cloud, and SDKs into solutions that provide the desired business outcome.

In short, the Edge-to-Outcome Value chain considers all parts of the IoT ecosystem so that nothing is left behind and the most value is derived from each investment. And, companies in the industrial and connected home sectors are already benefitting.



## Ready to get started?

There are several ways to get started, depending on what you want to achieve with IoT. To learn more, visit our website at [aws.amazon.com/iot](https://aws.amazon.com/iot). It details key use cases, AWS IoT services, and our IoT Competency Partners.

If you know what kind of partner you need and want to find the best match, [AWS Partner Solutions Finder](#) is an easy way to identify which partner fits the needs of your IoT project. You can filter by location, use case, industry, products, and competency expertise. Also, you can source and purchase any needed hardware or devices by accessing the AWS Partner Device Catalog: <https://devices.amazonaws.com/>

You can always reach out to an [AWS sales associate](#) or directly to your preferred APN partner.

Get started faster with AWS. We can assist you wherever you find yourself in your IoT journey.





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