Describe the major components of IoT

Inside an IoT architecture include four key components

1) Sensors/Devices

First, sensors or devices collect data from their environment. This data could be as simple as a temperature reading or as complex as a full video feed.

We use “sensors/devices,” because multiple sensors can be bundled together or sensors can be part of a device that does more than just sense things. For example, your phone is a device that has multiple sensors (camera, accelerometer, GPS, etc), but your phone is not just a sensor since it can also perform many actions.

However, whether it’s a standalone sensor or a full device, in this first step data is being collected from the environment by something.

2) Connectivity

Next, that data is sent to the cloud, but it needs a way to get there!

The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), connecting via a gateway/router or connecting directly to the internet via ethernet (don’t worry, we’ll explain more about what these all mean in our connectivity section).

Each option has tradeoffs between power consumption, range, and bandwidth. Choosing which connectivity option is best comes down to the specific IoT application, but they all accomplish the same task: getting data to the cloud.

3) Data Processing

Once the data gets to the cloud (we’ll cover what the cloud means in our data processing section)), software performs some kind of processing on it.

This could be very simple, such as checking that the temperature reading is within an acceptable range. Or it could also be very complex, such as using computer vision on video to identify objects (such as intruders on a property).

But what happens when the temperature is too high or if there is an intruder on property? That’s where the user comes in.

4) User Interface

Next, the information is made useful to the end-user in some way. This could be via an alert to the user (email, text, notification, etc). For example, a text alert when the temperature is too high in the company’s cold storage.

A user might have an interface that allows them to proactively check in on the system. For example, a user might want to check the video feeds on various properties via a phone app or a web browser.

However, it’s not always a one-way street. Depending on the IoT application, the user may also be able to perform an action and affect the system. For example, the user might remotely adjust the temperature in the cold storage via an app on their phone.

And some actions are performed automatically. Rather than waiting for you to adjust the temperature, the system could do it automatically via predefined rules. Rather than just call you to alert you of an intruder, the IoT system could also automatically notify security teams or relevant authorities.

How does IoT support decision making?

IoT is all about the enhancement of business processes and solutions with sensors, devices, gateways and platforms. By gathering all their data in one place, manufacturers can make intelligent decisions and design more efficient processes. oT devices can collect performance data automatically, which can be used for predictive maintenance to avoid down-time or increase machine availability

With Machine Learning.. A trend that has started in recent years and which is expected to continue in the coming years, the use of ML to manage the enormous amounts of data created by IoT provides valuable insights that businesses can use to make decisions and improve their operations.

Elimination of Data Junk

Today, a plethora of information is available to businesses, which makes it difficult for them to distinguish the useful data from the ‘junk’. It’s virtually impossible for any human to quickly and accurately perform this function.

But, ML can do that for you as one of its main function is determining which data is useful, and which is not. Even if the big data coming into your organization is unstructured and difficult to sort, machine learning can separate the useful data from the ‘junk’.

Recognition of Patterns

Say, you are provided with thousands of customer profiles with each profile containing the five-year buying history of the customer. Next, your manager asks you to identify patterns in the purchases — throughout the entire customers’ batch and not just by customer.

Sounds impossible?

Well, ML can do this for you and quickly to help you understand your customers and their decision making. With this information, you can determine the product, ad, or incentive your customer is most likely to respond to, which in turn can help you increase sales.

Eliminate Bias and Improve Decision Making

By providing information based on facts and data trends, IoT data managed by ML eliminates bias from business decisions, thus improving business decision making. Additionally, machine learning provides insights in real-time when the data is relevant and meaningful, which again aids the decision-making process.

What role does the RFID perform in IoT?

Connecting RFID reader to the terminal of Internet, the readers can identify, track and monitor the objects attached with tags globally, automatically, and in real time

They are useful in identifying objects and even people. For example, you can find an RFID chip in the latest biometric passports.

RFID finds natural application in Industrial Internet of Things (IIoT) to track objects in bulk such as boxes or pallets. As we will discuss, though, the role of RFID in IoT is far more descriptive than that of industrial goods.

Increased efficiency and accuracy in tracking

Since this technology uses radio waves to identify and track assets, it provides a much faster and more accurate tracking process than traditional methods. With RFID, enterprises can receive real-time scan data the moment that readers scan assets, inventory, and even personnel. If implementing with a proven infrastructure, such as Apptricity’s enterprise-level tested system, your team can track all of these in real-time. This eliminates the need for manual data entry, reducing errors and improving overall efficiency.

Real-time visibility in managing inventory and assets

With RFID tags, enterprises can track location, movement, lifecycle, custodianship history, and more data in real-time. This greatly improves asset and inventory visibility. In addition, Apptricity’s technology has the ability to pair with sensor data such as light sensitivity, pressure, temperature, etc. This enables enterprises to make informed decisions about inventory management and asset utilization. By acting upon the data, enterprises reduce the risk of stockouts and increasing productivity.

Reduced labor costs

RFID tracking technology eliminates the need for manual data entry, reducing labor costs associated with tracking inventory and assets. This is especially true when considering cycle counting. Employees spend lots of time locating lost or misplaced assets. During cycle counts, this time increases as employees manually search and scan every asset and inventory item. With an automated RFID tracking solution, the process becomes streamlined. Employees get to focus on more important tasks, such as optimizing inventory, rather than spending time manually inputting data.

Improved supply chain management

In addition, this technology provides enterprises with end-to-end visibility in their supply chain, from raw materials to finished goods. With RFID, businesses can easily track the movement of their goods, including where they are in the supply chain, their shipment status, and their expected time of arrival. Apptricity’s RFID inventory tracking software can scan items even within vehicles. This provides inventory managers with real-time updates on how much inventory is onboard vehicles. The software also sends alerts the moment inventory exits a vehicle or falls below user-defined thresholds. When these thresholds break, managers use the software to automate purchase orders from preferred vendors. This level of visibility enables enterprises to optimize their entire supply chain processes, from purchase to retirement or sale. The whole process becomes easily visible and manageable with Apptricity.

Enhanced security

RFID tracking technology can help enhance security by allowing businesses to monitor the movement of assets and personnel in real-time. Simply put, RFID tags can track employees who have access to certain areas, ensuring only authorized personnel can enter. It can also restrict certain personnel from checking out tools or equipment that they do not have clearance to operate, preventing injuries and ensuring employee safety.

This technology can also help identify potential theft or loss of assets. Missing items become easier to track and recover. Users can also establish geofences to restrict assets from leaving specific locations. The same users can receive alerts as these assets get closer to their geofences. The same goes for personnel, which is especially important for large enterprises where safety is a chief concern.