

IOT assignment

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0.1 What Is IoT Architecture?

IoT architecture consists of the devices, network structure, and cloud technology that allows IoT devices to communicate with each other. A basic IoT architecture consists of three layers:

Perception (the sensors, gadgets, and other devices) Network (the connectivity between devices) Application (the layer the user interacts with) These layers support IoT devices through data collection and processing. This architecture goes beyond the OSI model to include the transformation of data into usable information. These insights allow businesses to take immediate action through the use of automation, machine learning, and artificial intelligence.

1 IoT Architecture Use Cases

It's clear how IoT architecture transforms data, but where is it most useful? Below we'll explore a few real-world IoT architecture examples to show how these networks create value.

2 IoT in Healthcare

Hospitals and clinics can generate a lot of untapped data that could be used to improve patient care and increase operational efficiency. IoT architecture can help bridge the gap between isolated patient data and the health insights doctors can use to make better decisions and respond to alerts more quickly.

Devices such as health monitors, EKG machines, ventilators, and staff devices generate data that can be transformed into valuable healthcare insights. Below are a few examples:

Real-time patient health monitoring and alerts through IoT health sensors. Equipment and inventory tracking with GPS/Bluetooth-enabled sensors. Preventive maintenance with IoT sensors that automatically create work orders. Remote surgeries through IoT-enabled robotic equipment.

2.1 IoT in Manufacturing

The manufacturing industry was one of the earliest adopters of IoT technology with many companies seeking a competitive advantage. IoT sensors can help manufacturers gain insight into processes that aren't even connected to the internet.

For example, replacing manufacturing equipment is expensive and requires downtime. This leaves many factories relying on older machines that don't support internet connectivity. Businesses in this case can use IoT sensors to collect data and wirelessly transmit that information without having to replace the machine. Below are some examples of how manufacturers can benefit from IoT architecture:

Measuring change over time through short-range IoT sensors. Developing demand forecasts by monitoring production rate in real time. Tracking the cycle time to understand your baseline efficiency. Monitoring fluid levels, conductivity, and other data points for preventive maintenance.

2.2 IoT in Agriculture

When we think of IoT, many of us forget that farmers are taking advantage of IoT architecture to help improve their yield, predict outputs, and even autonomously manage their crops. A major challenge with IoT architecture on farms was the limited infrastructure and level of coverage required.

Thanks to private 5G, farmers are now able to design and build their own 5G networks to support their IoT architecture across hundreds of acres of land. A few different ways farmers use IoT architecture include the following:

Monitoring soil temperature to plant crops as early as possible. Using autonomous tractors and farmer equipment powered by GPS. Finding the root cause of machinery issues with root cause analysis via a mobile app. Automatically adjusting water, temperature, and humidity levels for indoor growing operations