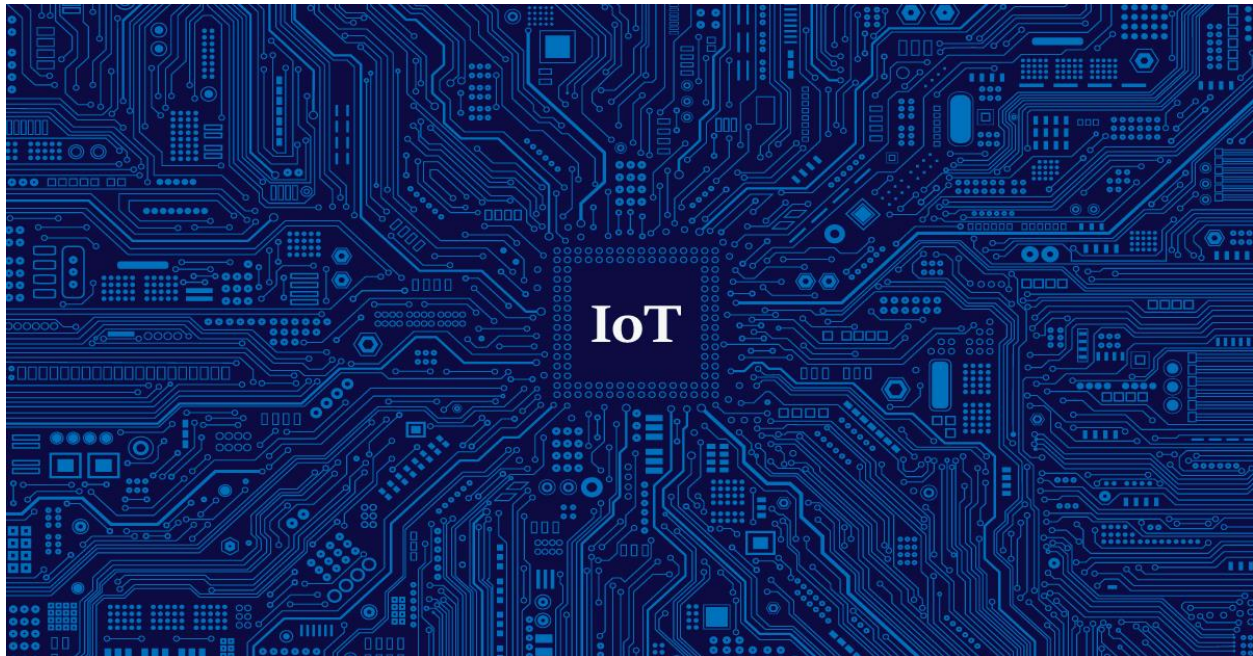


Embedded Systems and IoT Solutions – An Overview

by Satya K Vivek | January 13, 2023



During the initial phase of the IoT wave, the expectations from IoT devices revolved primarily around their networking capabilities. However, with the fast-spreading popularity of IoT devices and their deep penetration across vast sectors, expectations are growing about enhancing the capabilities of the devices much beyond networking for smarter applications. To meet the new expectations of consumers and industries, IoT product manufacturers are innovating networked devices that do much more than just connect and can handle more complex computation tasks.

The relation between embedded systems and IoT

Original equipment manufacturers (OEMs) are continuously searching for better ways of harnessing the capabilities of their sensors that expand the data monitoring capabilities. More computing power aids efficient processing of information and improved connectivity resulting in better control of the devices' ecosystems. The efforts are expanding the scope of IoT applications from cars and homes to wearables and extending to not only industries but also to applications such as smart cities. The scope of IoT applications in agriculture also is expanding. Strengthening the embedded systems or the minicomputers in IoT devices has significantly expanded. This is enabling the adoption of IoT devices in all walks of life.

What are embedded systems?

[Embedded systems](#) integrate hardware and software to perform some specific functions. The internals of IoT devices comprising numerous Microcontroller Units (MCUs) and connectivity devices and are broadly considered as embedded systems. Embedded systems allow IoT designers

to design unique products that are aesthetically attractive, highly secure, and efficiently capable of delivering high performance. Chip manufacturers are making more feature-rich chips by including more peripherals for improving the processing power suitable for advanced capabilities such as artificial intelligence and machine learning. These embedded wireless computing devices work harmoniously to minimize design complexity.

Examples of embedded systems

A lot of IoT devices are built to work as embedded systems. Some of the most common examples of such applications in real life are ATMs, GPS systems, central heating systems, microwave ovens, washing machines, fitness trackers, electric vehicle charging stations, robots used in factories and airports, interactive kiosks, and transit and fare collection systems.

Opportunities and challenges in designing embedded systems.

Ease of use –As IoT applications are becoming more complex, producing user-friendly devices is a big challenge for product manufacturers. Using software tools that support both wireless systems and embedded systems can help enhance user-friendliness.

Security – Ensuring high security for embedded systems poses a big challenge because the widespread use of IoT devices is multiplying the security threats.

Choosing a cloud service– As the Cloud becomes overcrowded due to the rapid multiplication of IoT devices choosing a highly flexible cloud service is becoming quite challenging.

Conclusion

[Embedded system design](#) is making IoT devices a lot smarter and more capable and thereby encouraging smart living. The importance of embedded systems is growing by the day in our quest for improving our lives.