11 Important IoT Protocols a Developer Should Know

The myriad range of connectivity options often makes it hard for app developers and electronics engineers to judge which is the best. Each of these technologies serves one purpose or the other and can be considered as reliable IoT (Internet of Things) protocols.

IoT has ushered in a new era in various industries like construction, finance, retail and automobile to name a few. In a nutshell, IoT has transformed the way we work. It is the main thing that allows devices to connect with each other in real time, the deployment of embedded technologies often extending to multiple connections at a time.

Some of the protocols are already familiar to you, but many of them are newly emerging, and are well worth an introduction. Here, we have broadly categorized some of the best IoT protocols:

1. Bluetooth

Bluetooth, with its global 2.4 GHz personal area network, is now touted as one of the most frequently used protocol for low powered devices. But efforts are always in the pipeline to make this protocol more powerful enough to cover more range and speed.

At present, it is the most preferred protocol for wireless headsets, file transfers and wireless speakers. Another version of Bluetooth, known as Bluetooth Low-Energy (BLE) — or Bluetooth Smart, is specifically intended for devices that use less data. Hence, it is more suitable for using with the trendiest wearable devices like fitness trackers and health monitors.

2. WiFi

WiFi has become the most reliable choice for a home environment IoT protocol requirement. As WiFi is more likely to have an existing infrastructure (where an IoT protocol is required), data transfer with high amounts of data is easily possible. Presently, it is widely used in home environments and also in businesses.

WiFi-ah (HaLow), a low-power, long-range version of the IEEE 802.11, (which is another wireless networking protocol) gives you the added advantage when you need long-range sensors and controllers with low data rate.

3. ZigBee

ZigBee is somewhat like Bluetooth and covers a wider installation base. ZigBee is a 2.4 GHz mesh local area network (LAN) protocol. ZigBee is based on IEEE802.15.4 protocol, an industry-rated wireless networking technology that operates at 2.4GHz targeting applications.

It works well with infrequent data exchanges at low data rates and within very short ranges, for example, homes or buildings. The main application areas of ZigBee are lightning systems and wireless thermostats.

4. Symphony Link

Symphony Link, with its Fixed MTU of 256 bytes, is deemed to be a revolutionary wireless system suitable for wide-area IoT networks. Hence, it is ideally used for enterprise and industrial customers who need a highly secure connection to the cloud.

The advantage Symphony Link has over ZigBee and WiFi is that it is much more expansive and reliable.

5. Cellular

IoT devices that need to communicate for long distances can use GSM, 3G or 4G cellular communications. With 4G, it is possible to send high quantities of data but it could also be a bit expensive and the devices might consume too much power. In order to avoid such a situation, it would be better to use cellular applications for sensor-based, low-bandwidth-data requirements.

6. XMPP

XMPP is known as eXtensible Messaging and Presence Protocol (XMPP) and is used for real time exchange of data between connected devices. Though the features within XMPP were initially meant for instant messaging, they can be used with IoT devices as well.

The working of XMPP is similar to email, and like with an email, anyone can have his or her own XMPP server. And it allows API operators and device manufacturers to create their own server and manage it.

7. Sigfox

Sigfox comes somewhere in between WiFi and cellular technology and is well known for its wide range capability. An advantage of Sigfox is that it uses ISM bands, so there is no need to acquire any license for using it. It can easily transmit data over a narrow spectrum as long as the devices remain connected.

It beats the disadvantages of WiFi (range is short) and cellular (expensive, power consuming) by using a technology known as Ultra Narrow Band or UNB, capable of handling low data speeds in low power.

Sigfox is used in patient monitoring devices, street lighting, environmental sensors smart meters and security devices.

8. Radio frequency identification (RFID)

RFID is an IoT protocol where wireless use of electromagnetic fields helps identify objects. Reading tags known as Active Reader Passive Tag system (ARPT) that can store information are installed within the device so it does not require any power to operate.

This is also one of the reasons why RFID has become a widely used technology. The technology finds application in road tolls, building access, factory data collection and animal identification.

9. Neul

Neul, the Gaelic word for cloud is a simple way to “economically connect everything”, as they claim. The concept of Neul is similar to that of Sigfox and operates in the sub-1GHz band. Neul makes use of very small slices of the TV White Space spectrum to deliver highly scalable, wider coverage networks.

The communication technology in Neul is known as Weightless and proves a match for other IoT protocols like GPRS, 3G, CDMA and LTE WAN. It can communicate data as small as few bits per second to 100 kbps using the same link. Power consumption for devices is much less, thereby increasing their life as well.

10. LoRa

LoRa is a Long Range Wireless Protocol for wireless battery operated IoT and Machine to Machine (M2M) devices on a regional, national and global network. Cycleo originally developed it, and Semtech acquired it in 2012. It can be optimized for low power consumption, but it can also handle smart city and industrial applications by connecting millions and millions of devices.

The data rates can range from 0.3kbps to 50 kbps. The signals can penetrate obstacles and travel through long distances, therefore an ideal choice for IoT connected device. This is made possible through LoRa chips and a spread-spectrum strategy that can transmit through various frequencies and data rates.

11. NarrowBand

NarrowBand IoT, also known as NB-IoT, is a narrow band radio technology standard that connects several wide range devices using telecommunication bands. Hence, it would be more suitable for indoor coverage, and is thus a cost-effective option, especially when you are looking for longer battery life and would like to network many devices, especially in hard-to-reach places, even underground areas.

It can be deployed in existing cellular devices and provides excellent network security and reliability. Due to its low power consumption, NarrowBand offers 10+ year battery life.

Recently, Vodafone launched the first commercial NB-IoT network in Spain. This network is expected to connect more than 100 million new devices to the IoT environment.

Conclusion

Understanding the IoT protocols would help leverage the advantages offered by them, enabling you to build a great product in the long run. The heat will be on to protocols that enable real time monitoring and controlling so the interaction between devices will be instantaneous. Adding real-time communication to the technology stack always makes it a winner.
