IoT communication protocols: choosing the right one for you

By Darren Oxlee

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The internet of things (IoT) is more than just a buzzword - new developments emerge all the time. But with so many different communications technologies available, those wanting to break into this space are faced with a dilemma: which tech solution should they choose?

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Here are the six factors that I consider pertinent to this issue:

1. Standardisation

Technological standardisation in the IoT space varies broadly across geography, application, and organisation. This is because technologies are often developed in siloes to address very specific regional or company needs – like the differing tech of Microsoft and Apple.

With each new IoT device being developed, companies adopt the communication standards that best suit their aims or geographies.

3.5 billion IoT cellular connections predicted for 2023 - Ericsson

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Further, companies appear to leverage ‘ecosystems’ of products to convince consumers to continue using their devices out of convenience (Android vs iPhone, for example). These fragmented paths are active decisions taken by these companies, and we could see something similar in the IoT space.

In an industry where, by definition, the key component is communication between devices, the correct communication capabilities are paramount.

This leaves each company with an important strategic decision to make: do they take a measured approach and develop a modular, agile solution? Or do they back a protocol they anticipate will be the final standard?

2. Functional range

The importance of range depends largely on the application. For Advanced Metering Infrastructure (AMI), for example, range is relevant because of the economies that longer range enables. Range is dependent (but not limited) to things like:

- Transmitted power
- Antenna gain
- Free space loss (loss of power over distance)
- Data transmission rate
- Link budget

For our company, a reduction in concentrator density (and a corresponding increase in node coverage) is a critical commercial requirement, as is the ability to communicate bi-directionally. But range can also impact the amount (or cost) of data transmitted. So, this is something that I believe organisations need to explore carefully.

3. Geographic relevance

Different regions have different standards, compliance requirements, and incumbent or preferred technologies. For example, the communication protocol SigFox is predominant in France, while LoRa isn't.

LTE-M is gaining more traction than NB-IoT in the United States, while the converse is true for Europe.

Of course, in emerging markets, 2G GSM coverage may not even exist. Given the broad geographic sales strategy of many multinationals, geographic considerations can and do play a key role in technological choices.

4. Data considerations

One of the major data considerations in IoT is the direction of the communication. Many of the available protocols, for instance, only offer uplink capabilities (when the device functions as a transmitter of information, not a receiver). This is an important factor if the device must to be able to receive information. In our case, because bi-directional communication is so important, we have found our options to be tremendously narrowed by this issue.

5. Private/public networks

The choice between a private and public network is crucial when it comes to commercial and technical applications. The differences are:

- ### Private networks

  Private networks involve setting up nodes and concentrators, and backhauling data over a common data platform such as 2G/3G. This allows some environments (like the AMI space) to be set up wherever backhaul data is possible. But supporting these environments is complex and the initial setup is multifarious and costly.

- ### Public networks

  Networks like LTE-M, NB-IoT and LoRa have the advantages of no setup costs, but the commercial model (how much you pay per node per month) and network availability (where the network has been rolled out) fundamentally impact the technology.

  Commercial models are also immature and may change over time. Given the vast number of devices expected to proliferate the IoT space, these costs can make or break an IoT project.

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6. Chipset providers

The underlying chipsets and their providers are another, final, factor to consider. LoRa's patents, for example, are owned by Semtech, giving it a market monopoly. Semtech is prepared to licence this IP to other chip manufacturers, and there's limited risk for them.

Developing an IoT device isn't child's play. And, with new developments and technologies constantly exploding onto the market, it's hard to say where the industry will end up.

Ensure that you do your homework before settling on a long-term plan. And, most of all, good luck.

ABOUT THE AUTHOR

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