



INSIGHTS RELEASE

5 THINGS TO KNOW ABOUT IOT PROTOCOLS



5 things to know about IoT protocols

- 1  There is no one-size-fits-all IoT protocol
- 2  Protocols purpose-made for IoT are seeing increased adoption
- 3  Software is becoming more important to managing IoT connectivity
- 4  "Ease of use" and "reliability" are most important when choosing a new protocol
- 5  Decision making for IoT protocols has become a multi-stakeholder exercise

Source: IoT Analytics Research 2022. We welcome republishing of images but require source citation with link to original post and company website.

Hamburg/Germany, September 15, 2022: IoT Analytics, a leading global provider of market insights and strategic business intelligence for the Internet of Things (IoT), AI, Cloud, Edge, and Industry 4.0, published a 110-page report titled "IoT Communication Protocols Adoption Report 2022". The report details the usage of IoT communication protocols in the context of smart operations and connected products. The following article highlights some of the key insights.

Key insights:

- The latest [research](#) on IoT protocols shows an increasing popularity of purpose-made protocols for IoT. In 2022, "ease of use" and "reliability" top the list of most important protocol requirements

Knud Lasse Lueth, CEO of IoT Analytics says: "It is now well-established that there will be numerous IoT protocol standards, not one. Our research shows that the landscape is slowly but steadily shifting towards more modern protocols like MQTT or OPC-UA but it will take a long time before these protocols dominate the landscape."

Dimitris Paraskevopoulos, Analyst at IoT Analytics adds: "The connectivity landscape was much simpler 10-15 years ago when projects were mostly condensed on-premises. Nowadays, the rise of IoT protocols has increased software's importance as part of a connectivity setup and middleware such as IoT platforms and brokers have become commonplace in such endeavors."

There are 12.2 billion active global IoT connections at present. Therein lies the power of the IoT. A myriad of interconnected devices communicates with each other and produce meaningful data. But being connected is not enough for the devices to communicate. They need to speak the same “language.” That is where IoT protocols come in.

A protocol is a set of rules that enable the effective communication (i.e., data exchange) of distinct machines/devices in a network setting. The concept is similar to the languages that we use to communicate. If two people don’t speak the same language, the exchange between them will not be effective. Without these protocols, a digital Babylon would arise.

For the IoT Communication Protocols Adoption Report 2022, IoT Analytics surveyed 200 senior decision-makers on their IoT connectivity setup.

Here are five takeaways, from the report, that paint a picture of the IoT protocol landscape in 2022.

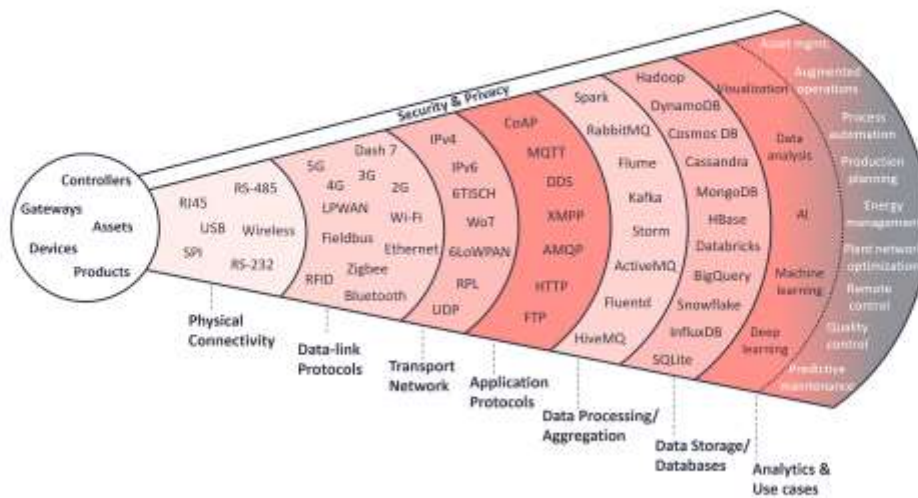
1. THERE IS NO ONE-SIZE-FITS-ALL IOT PROTOCOL

There is no undisputed, standard IoT protocol today. That is where the complexity of the topic begins. This fact is also evident in that 73% of our survey respondents noted that managing various data formats and protocols inhibited them from scaling their projects. The IoT market, as a whole, is fragmented, and IoT protocols are no different. There is no global standard. Some protocols dominate specific industries (e.g., CAN is a staple in vehicle component communication, DNP3 is most often used in utilities, and HART is the prevailing protocol used in process industries).

Still, for most projects, in general, ones pertaining to IoT, the protocol choice can make or break a proper network, and many requirements should be considered. For example, MQTT and NB-IoT (LPWAN standard) are compatible and can work together without flaws in a stable network. However, add a poor reception environment, and that is where the trouble starts. Are the devices battery-powered? How big is the transferred data volume? Is the network stable? Is there a need for messages to have a priority? These are just some questions that need answering before a decision is made. Zooming out, one can recognize a whole “ecosystem” of which IoT protocols are a part.

As can be seen from the image below, the IoT protocols landscape can be quite intimidating. It involves multiple layers that need to be compatible with each other. The communication protocol layers (e.g., connectivity, link, transport, session) constitute only the base of the landscape. Above them, there is data processing (e.g., Kafka, RapidMQ), storage (e.g., MongoDB), and, last, the corresponding applications (e.g., machine vision, asset management).

The IoT protocol landscape: From device to applications



Notes: 1. The list of protocols/applications appearing in the landscape is non-exhaustive. 2. Some of the protocols/applications listed in the landscape might cover more than one part of the stack.
Source: IoT Analytics Research 2022

Adding to that complexity is the fact that specific devices might only support proprietary protocols. These are protocols created and owned by a single organization or individual, often making them incompatible with other standard hardware. If that is the case, then a protocol converter is needed. All these various parts need to be set up in the correct manner and configured for a functional, efficient connectivity setup. Therefore, most respondents mention interoperability as a pain point when asked about their connectivity setup.

2. PROTOCOLS PURPOSE-MADE FOR IOT ARE SEEING INCREASED ADOPTION

Based on our research, the share of connections using protocols that have been purpose-made for IoT setups is expected to increase by +11% within the next two years. MQTT and CoAP are the protocols leading this growth. Both of them fit the requirements of IoT networks in all respects. They are lightweight (low energy consumption is crucial for battery-powered devices), have a low overhead (smaller message size), and can work in lossy networks (many IoT devices like sensors can be part of remote setups). For connections between assets/devices to middleware, MQTT is expected to have a +29% increase in its connection shares during this timeframe. However, between middleware and applications, CoAP is the IoT protocol expected to grow the most, with a +30% increase within these two years. AMQP should also be mentioned here as another necessary IoT protocol on the rise, showing an overall growth in both connection types.

3. SOFTWARE IS BECOMING MORE IMPORTANT TO MANAGING IOT CONNECTIVITY

This rise of IoT protocols has increased software's importance as a part of the connectivity setup. The connectivity landscape was much simpler 10–15 years ago. Most projects were condensed on-premises (including analytics and visualization). In the meantime, new pieces of software emerged to manage this connectivity. Tools like IoT platforms, brokers, protocol converters, and other such middleware are the pieces that complete the connectivity puzzle. As expected, when it comes to IoT platforms, most respondents are leveraging Microsoft Azure IoT and AWS IoT. Regarding brokers and protocol converters, the landscape is more diverse, and multiple companies are taking the spotlight. For example, HiveMQ and ActiveMQ are two popular brokers, and PTC Kepware and Matrikon are among the most used protocol converters.

4. "EASE OF USE" AND "RELIABILITY" ARE MOST IMPORTANT WHEN CHOOSING A NEW PROTOCOL

Finding the correct IoT protocol for each project's needs is vital. For example, MQTT is more centralized and better suited for low-bandwidth, remote location connections. In contrast, DDS is decentralized, more versatile, and can accommodate high-performance networks. Hence, it is essential to compare the potential IoT protocols and their attributes. According to IoT Analytics' research, the ease of use of a protocol is the most influential factor. It was the most crucial trait in a list of 20+ features based on our respondents. Distinct industries, regions, and company sizes put different values on each protocol trait; therefore, many patterns can be spotted. For example, interoperability with other protocols and scalability are more important for larger companies, while the ease of DevOps is more critical for smaller and medium companies.

5. DECISION-MAKING FOR IOT PROTOCOLS HAS BECOME A MULTI-STAKEHOLDER EXERCISE

These traits affect the decision process and can tip the scale in favor of a specific protocol. They must be evaluated in great detail by the decision maker. According to 88% of our respondents, the board/executive management has the final decision power. This fact highlights the significance this decision can have for the company. Nevertheless, they are not alone. Deciding on an IoT protocol is a daunting task with many stakeholders involved. Based on our results, six departments participate in that procedure, including the IT/technology and finance departments. When looking at the

separate regions, a clear difference can be highlighted. North American companies seem to have a more collaborative strategy since respondents are hesitant to spotlight one distinct department as the decision maker. On the contrary, 94% of European respondents point to the board/executive management as a decision-maker for a new IoT protocol.

OUR TAKE

The rise of IoT is bringing along radical changes in how devices communicate with each other, and IoT protocols will only increase in adoption and importance as the number of connected devices increases. The burden is on the adopters to plan well and decide on the most suitable IoT protocol to prevent an unwanted digital Babylon from happening.

MORE INFORMATION AND FURTHER READING

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