IoT Data Ready - A Revolution in Data Transfer and Data Management for IoT Solutions on the Kite Platform

Companies today are looking for ways to improve their productivity, reduce costs, enhance sustainability, and enable new business models. The Internet of Things (IoT) provides the tools for companies to digitize parts of their processes or even entire value chains. As IoT gains significance across industries, there's a growing demand for solutions tailored to sophisticated new use cases where outdated mobile standards may prove inadequate. This is particularly relevant in scenarios where companies deploy devices to collect data in areas with poor network coverage, such as rural regions, deep within buildings, or even in basements. Typically, these IoT devices are battery-powered, as a reliable power source may be absent, and the business case might not allow for frequent battery replacements.

NB-IoT: Efficient Solution for IoT Challenges

The 3GPP standardization addresses these emerging needs with a powerful technology within the framework of 5G: Narrow Band IoT (NB-IoT). This optimized protocol significantly reduces signaling overhead, minimizing the need for communication with the network. Significant transmit power is focused into a small 180kHz frequency channel to focus the energy and reach devices even in the most challenging indoor and outdoor environments. However, the reduced bandwidth means that IoT devices typically need to transmit smaller amounts of data irregularly.

Yet, as enterprises develop services with NB-IoT, they often realize that their implementation will not be as simple as plug & play. They must balance the needs of their power-optimized, best-effort NB-IoT front-end communication with the legacy world of their back-end IT systems, which are all suited for high bandwidth, reliable, and secure transport over the Internet. The result is that most hyperscaler-hosted and customer server applications want to communicate in a way that's too heavy for NB-IoT bandwidth and negatively impacting battery life.

IoT Data Ready: Efficient Data Communication Between IoT Devices and IT Backend Systems

Most back-end IT systems communicate via the Transmission Control Protocol (TCP), which guarantees reliable communication with higher data integrity over the internet. Additionally, Transport Layer Security (TLS) is often used as a cryptographic security protocol to secure entire TCP communication. Finally, IoT applications can use messaging protocols for their data sessions, including MQTT [1]or HTTP [2]for content delivery to individual endpoints. In summary, these protocols inefficiently package every amount of data, burdening communication with devices and rapidly draining the battery or even causing devices to compete for limited network resources.

To address these challenges and make NB-IoT compatible with traditional IT systems, Telefónica has developed "IoT Data Ready," recognizing that efficient data management is essential for a positive business case. This new feature is integrated into the Kite platform [3]from O2 Business.

Secure and Reliable Data Transmission

"IoT Data Ready" simplifies and enhances the processing of data generated by NB-IoT devices, acting as a bridge to classical IT systems. IoT Data Ready provides a power-efficient interface for exchanging

[1] Message Queuing Telemetry Transport
[2] Hypertext Transfer Protocol
[3] IoT Kite Platform wins Connect Professional Award 2023

data with devices using UDP[4], a lightweight protocol ideal for battery-operated devices. The Kite platform from O2 Business translates these uplink UDP messages into HTTP[5], a connection-oriented protocol, ensuring smooth data transport. The data can even be encrypted via HTTPS and sent to the customer's backend system.

Enriching Data with Useful Information

IoT Data Ready takes raw payload from IoT devices and enriches it with essential information such as ICCID[6], IMSI[7], IMEI[8], MSISDN[9], and timestamps. Once the data is enriched, it is directly forwarded to the customer's IoT platform. This feature also operates in the downlink[10]; HTTP messages can be sent to NB-IoT devices through an API interface, translating them onto a UDP transport carrier for transmission to the intended IoT devices. By automatically saving and forwarding messages, devices can remain in energy-saving mode for longer, conserving battery power.

Customer Benefits of "IoT Data Ready":

• **Extended Battery Life:** One of the outstanding benefits of IoT Data Ready is its ability to maximize the battery life of IoT devices by transmitting only the necessary data bytes for operation. Heavy data transfer protocols that discharge the device's battery can be avoided, ensuring longer device availability and reduced maintenance costs. The battery life of devices can be extended by up to four times in some cases!

• **Lower Operation Costs:** Especially in cases where higher roaming fees apply when data transmission is billed or more expensive non-terrestrial communication is used, the transmitted data volume directly affects operating costs. IoT Data Ready acts as a cost-saving mechanism by optimizing the transmitted data volume.

• **Effortless Data Management:** IoT Data Ready simplifies the entire process of data collection and enrichment, eliminating the need for companies to develop complex proprietary data transfer protocols.

• **Enhanced Data Insights:** The enriched data provides valuable context, , making it easier to analyze and gain insights from IoT device data.

• **Secure Communication:** All communication between the Kite platform and the customer's backend is encrypted and transported in IPSec tunnels to ensure the security of data.

• **Flexible Integration:** IoT Data Ready supports any backend capable of processing HTTP(s) messages, making it suitable for a variety of backend IT systems.

• **Data Overview:** On the Kite platform, the last 100 uplink and downlink messages, including information such as direction (uplink/downlink), target port, message type, and message content, can be easily tracked and monitored.

• **Data Export:** IoT Data Ready allows companies to export messages in CSV format for further analysis or sharing data with stakeholders.

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[4] User Datagramm Protocol
[5] Hypertext Transfer protocol Secure
[6] Integrated Circuit Card Identifier
[7] International Mobile Subscriber Identity
[8] International Mobile Equipment Identity
[9] Mobile Station International Subscriber Directory Number
[10] From IT Backend to IoT Device

IoT Data Ready: Versatile Benefits for Various IoT Use Cases:

• **Satellite Communication:** Costs can be significantly reduced when premium non-terrestrial communication is used. IoT Data Ready minimizes data overhead by transmitting only essential bytes pf payload.

• **Smart Metering:** Battery-operated smart meters are often used for monitoring and managing energy consumption. IoT Data Ready helps save energy, crucial for long-term operation and maximum return on investment.

• **Asset Tracking:** Real-time location data added by IoT Data Ready to records ensures the security and efficiency of enterprise assets.

• **Smart Cities:** Urban infrastructure can be managed and optimized by capturing data from various sensors, such as traffic lights, waste management, and environmental monitoring. IoT Data Ready provides an interface for integrating data from extensive sensor data into hyperscaler-hosted services.

In summary, IoT Data Ready can be the key to unlocking the full potential of NB-IoT deployments. With its efficient data management, enriched insights, and secure communication, this feature on the Kite platform is a game-changer for NB-IoT projects, providing a user-friendly experience and ensuring a high level of security. Companies can begin utilizing this feature from Q1 2024, extracting the best from IoT implementations, and staying one step ahead in the rapidly evolving world of IoT technology!