

NB-IoT for Enterprise

Unlocking the Potential of Narrowband Internet of Things (NB-IoT)
for Enhanced Enterprise Connectivity and Efficiency

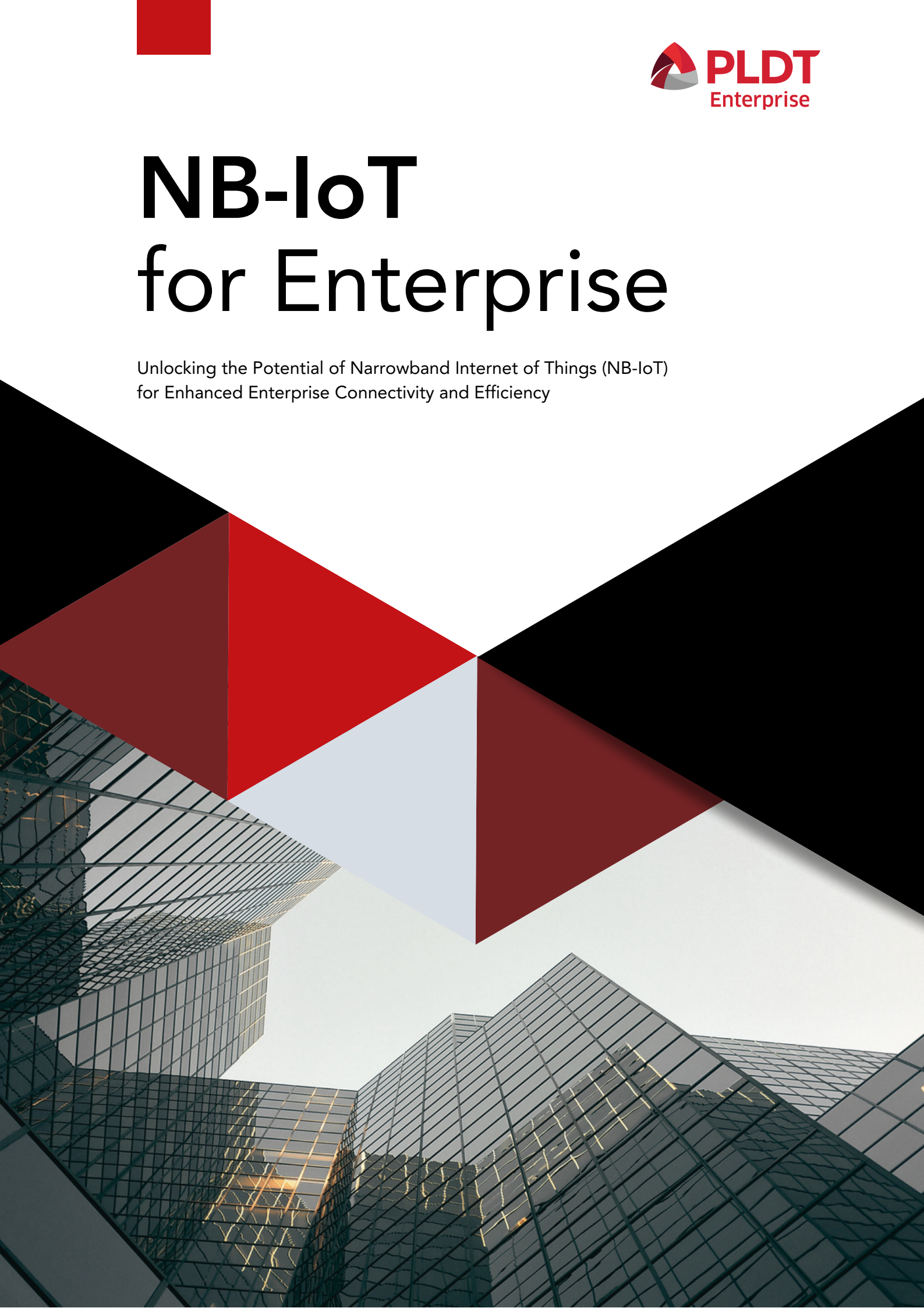


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What is NB-IoT?

Narrowband IoT (NB-IoT) is an efficient wireless cellular protocol designed for massive IoT deployments, offering reliable, scalable, and cost-effective connectivity across various industries. It operates in licensed spectrum, inheriting the reliability and security of existing cellular infrastructure, and provides excellent coverage and penetration in challenging environments. NB-IoT's power-saving modes enable long device battery life, making it suitable for applications requiring extended operation without frequent charging.

Benefits of NB-IoT

- NB-IoT is a **scalable technology** that can support thousands of devices in a single cell.
- NB-IoT is more **efficient and cost-effective** than legacy cellular networks like 2G and 3G for low-power, low-bandwidth IoT applications.
- NB-IoT can be an alternative in reducing infrastructure costs when connecting sensors and devices, making it an **affordable option for businesses** of all sizes.

For IoT applications that are situated in remote, hard-to-reach locations where battery replacement is difficult or impossible, this feature reduces the need for frequent maintenance and significantly lowers operating costs for IoT deployments.

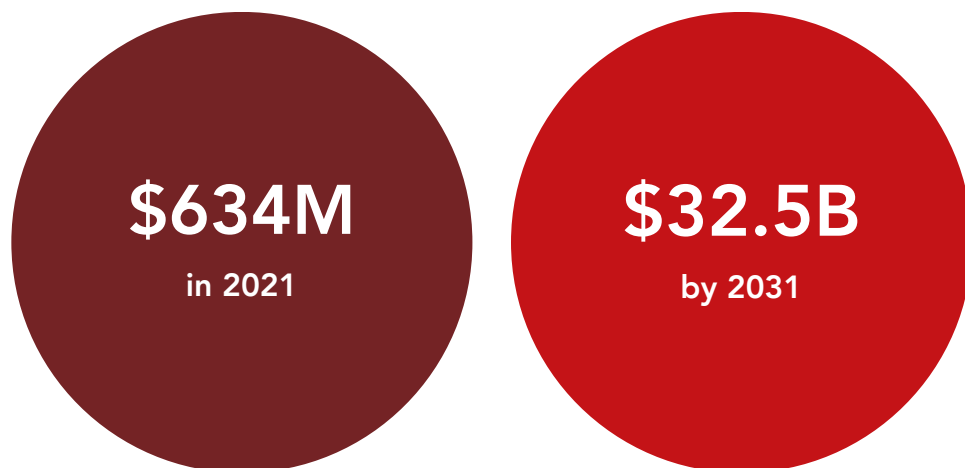
NB-IoT also provides end-to-end telecom-grade encryption for data transmission, secure device identification, and authentication. This ensures that IoT devices are protected from interferences, hacking, and unauthorized access. As it operates on a licensed spectrum, NB-IoT is a more secure option as compared to unlicensed communication protocols.

Benefits of NB-IoT

Another advantage of implementing NB-IoT lies in its ability to reduce both device and infrastructure costs. In the Philippines, where labor costs remain relatively low, the overall cost of deployment becomes a critical consideration for businesses aiming to maximize the return on investment. The low-cost nature of NB-IoT devices and network components allows enterprises to invest in IoT solutions without straining their budgets, thus fostering increased innovation and widespread adoption.

NB-IoT Business Value

The global NB-IoT market was valued at \$634.4 million in 2021 and is expected to reach \$32.5 billion by 2031 (Mayabrahmma, Beesetty, Shadaab, & Vineet, 2023). NB-IoT has been classified as a 5G technology, standardized by 3GPP, and is identified as a fast emerging, class-leading LPWAN technology that shall enable a new range of industrial IoT solutions. Battery-operated applications that transmit data occasionally such as smart parking, smart irrigation systems, and smart metering have fueled the adoption of NB-IoT in the enterprise space. The market of connected devices is rapidly expanding, especially in the industrial sector, as M2M communications in these industries have become more prevalent.



Global NB-IoT Market

NB-IoT Business Value

NB-IoT provides opportunities for businesses to collect vast amounts of real-time data from their devices. This data can be analyzed and turned into actionable insights that can be used to generate new revenue streams. For example, enterprises can use data generated by NB-IoT devices to improve supply chain management, optimize operations, and develop new products and services tailored to customer needs. Through big data analytics, enterprises gain valuable insights to optimize operations, create new products or services, and enhance customer experience. Additionally, NB-IoT can help decrease manpower and operational costs, as exemplified by asset tracking for predictive maintenance, proactive scheduling, and energy management to optimize consumption and minimize waste. Leveraging NB-IoT technology empowers enterprises with substantial cost savings, improved efficiency, waste reduction, and prolonged asset lifespan.

NB-IoT vs. Other Connectivity Options

NB-IoT vs. Legacy Cellular Connectivity

NB-IoT technology offers a significant advantage over legacy cellular connectivity such as 2G and 3G as it is specifically optimized for low-power, low-bandwidth IoT applications. Unlike legacy networks, which were designed for high-bandwidth applications like voice and video, NB-IoT can support a massive number of connected devices within a single cell. Its low-power consumption makes it ideal for battery-powered devices, whereas legacy networks consume high power due to their high-speed transfer capabilities. NB-IoT utilizes simplified communication protocols, reducing the power required for processing and management compared to complex protocols used in legacy networks.

NB-IoT Business Value

NB-IoT vs. Unlicensed LPWAN

One significant advantage of NB-IoT over unlicensed LPWAN is its reliability and security. NB-IoT operates on a licensed spectrum, which means it uses existing cellular infrastructure, making it a reliable and secure option for IoT deployments. It provides end-to-end encryption for data transmission and secure device identification and authentication.

NB-IoT utilizes licensed spectrum, which is regulated and controlled by telecommunication authorities. This arrangement offers scalability advantages as the management and allocation of licensed spectrum by regulatory bodies enable multiple operators to effectively utilize the available frequency bands without any interference.

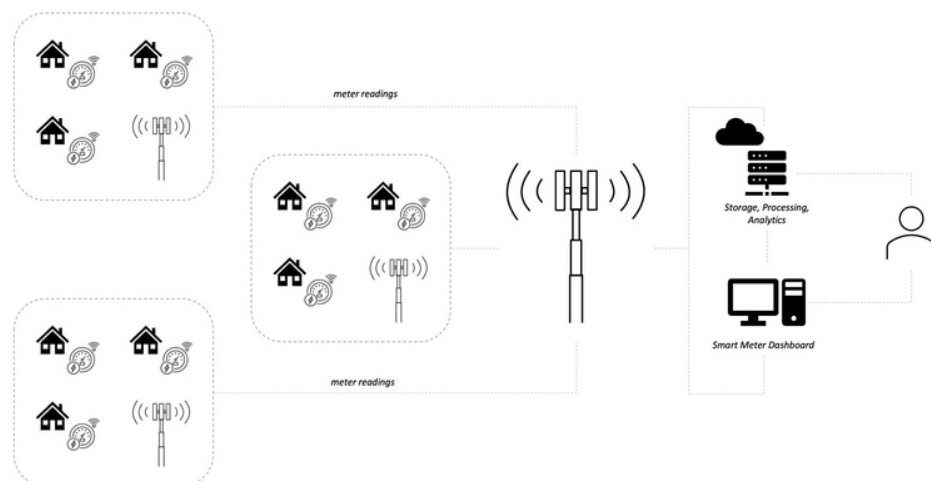
Deployment Considerations

When deploying NB-IoT devices, various factors need consideration. Coverage and capacity of the network are crucial, requiring alignment with base stations to ensure sufficient coverage for the planned devices. Additionally, efficient device management, including remote monitoring and data management, is essential for large-scale deployments. Enterprises face challenges in managing a massive number of devices manually, emphasizing the need for efficient device management systems. Maximizing the value of the collected IoT data is crucial. This entails establishing a robust infrastructure with analytics tools, security measures, and cloud platforms to manage, analyze, and secure the vast amounts of real-time data effectively. By addressing these aspects, enterprises can fully leverage their IoT deployments for improved efficiency and insights.

NB-IoT Use Cases in the Philippines

Smart Metering

The International Trade Administration's report on the Philippine Grid Market highlights that in the Philippines, the Electric Power Industry Reform Law has set forth requirements for the development of smart grid infrastructure, empowering distribution utilities and electric cooperatives. The National Capital Region (NCR) alone has approximately 3.5 million households consuming electricity. At this volume, there is a strong drive to adopt smart grid technologies. This collective effort aims to enhance the efficiency and sustainability of the energy sector, bringing about modernization. By optimizing energy distribution, improving operational effectiveness, and facilitating the integration of renewable energy sources, these initiatives benefit industry stakeholders and consumers alike. (The International Trade Administration, 2020)

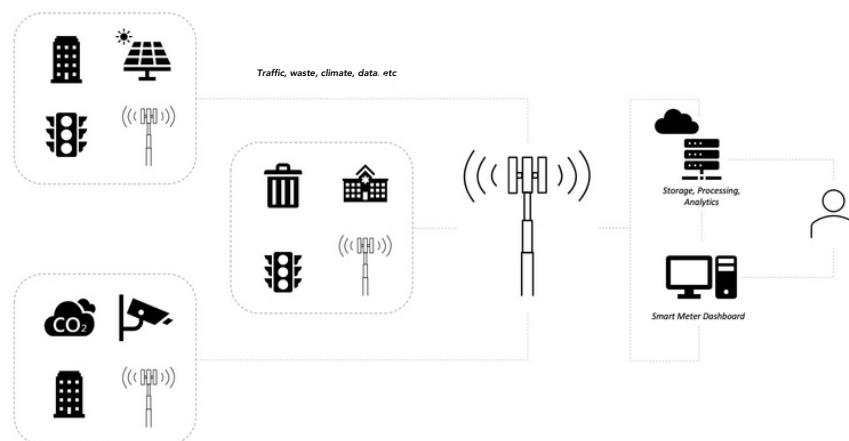


NB-IoT is the ideal wireless technology that can enable smart metering, a cost-effective and reliable solution for managing utility services. It provides extended coverage and penetration, enabling utilities to collect data from hard-to-reach meters. This helps utilities optimize their operations and reduce costs, and can even enable innovative pricing models that can help customers reduce their energy bills.

NB-IoT Use Cases in the Philippines

Smart Cities

Smart cities have tremendous potential in the Philippines, especially in urbanized areas where a significant number of people live. Although there are challenges, including operational costs and interoperability issues, the benefits are substantial. As of 2023, 48.6% of Filipinos reside in urban areas making the implementation of smart city initiatives increasingly important. By leveraging innovative technologies and intelligent infrastructure, smart cities can address issues like traffic congestion, environmental sustainability, and resource management. This includes optimizing transportation networks, implementing intelligent traffic systems, and improving mobility for urban residents. The goal is to create a sustainable and livable environment that enhances the quality of life for Filipinos (Ronquillo, Smart Cities, 2022).

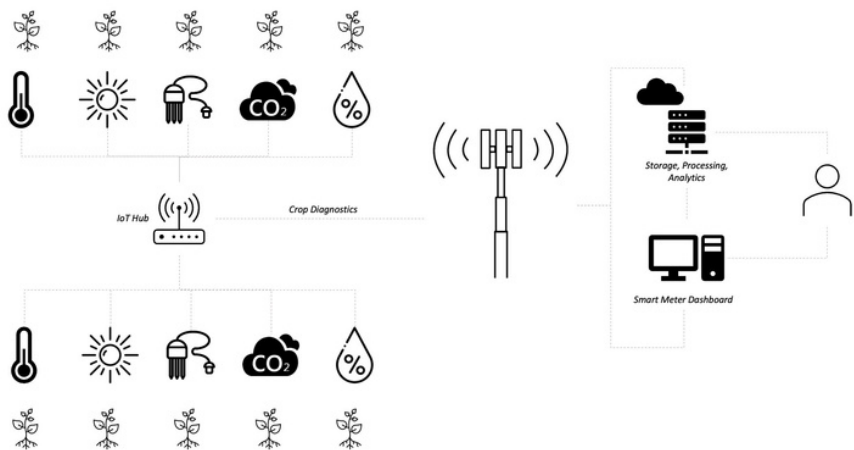


The increased coverage and penetration of NB-IoT will enable connectivity in hard-to-reach areas, support mission-critical functions, and accelerate the deployment of smart city solutions. From energy-efficient lighting to efficient parking systems, optimized waste management, and real-time air quality monitoring, NB-IoT is helping cities build more sustainable, efficient, and livable urban environments. to position the city at the forefront of smart urban development.

NB-IoT Use Cases in the Philippines

Smart Agriculture

In the domestic agriculture space, a transformation is underway with the advent of disruptive smart farming technologies. These cutting-edge innovations, explored in a recent study titled *"The Emergence of Disruptive Smart Farming Technologies in the Philippine Agriculture Under the New Normal,"* are reshaping farming practices in the country. The Philippines, with its vast agricultural land spanning approximately 126,750 square kilometers, holds significant potential for the adoption of these technologies. Utilizing the Internet of Things (IoT) and Wireless Sensor Networks, intelligent farming methods are gaining traction and can contribute to optimizing elements like fertilization, irrigation, and pesticide application. Through the integration of diverse data sources, these groundbreaking smart farming technologies have the potential to enhance productivity, sustainability, and efficiency in Philippine agriculture, paving the way for a brighter future in farming practices (Agustin, Alcaraz, & Bristol, 2022).

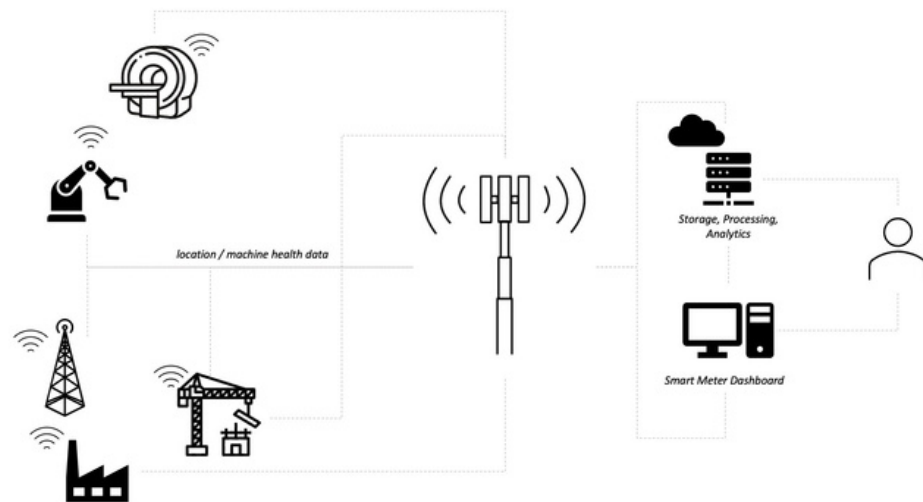


NB-IoT technology can revolutionize the vital agricultural sector in the Philippines, benefiting the economy and employment. By remotely monitoring soil conditions and tracking livestock and assets, farmers can optimize resource utilization, increase crop yields, and implement precision farming techniques.

NB-IoT Use Cases in the Philippines

Asset Monitoring

NB-IoT technology is an ideal solution for asset tracking applications, providing reliable and low-power connectivity for tracking and monitoring assets in real-time. NB-IoT enables asset tracking by providing extended coverage and penetration, enabling assets to be tracked in remote and hard-to-reach areas. Moreover, NB-IoT can help businesses optimize their asset management operations by providing real-time data on asset location, usage, and performance, enabling proactive maintenance and reducing downtime.



NB-IoT technology is particularly beneficial for base station monitoring. It provides seamless connectivity and real-time data analysis, allowing network operators to remotely monitor tower equipment. This includes tracking signal strength, power consumption, and device status to optimize performance and minimize downtime. The extended coverage and penetration capabilities of NB-IoT make it suitable for monitoring towers in remote or challenging locations, enhancing overall network reliability.

Conclusion

NB-IoT technology is a powerful tool for enabling IoT applications in various industries. Different use cases demonstrate the versatility and value of NB-IoT technology in different industries, providing opportunities for businesses to transform the way they operate.

Moreover, the development of new NB-IoT applications and services is expected to accelerate, driven by the increasing demand for IoT solutions in various industries.

As an enterprise, deploying NB-IoT technology can help you achieve significant cost savings, generate new revenue streams, and gain a competitive advantage. NB-IoT technology can enable you to transform the way you operate, providing opportunities to optimize processes, develop new products and services, and offer innovative solutions to your customers.

Get in touch with PLDT Enterprise today to explore the endless possibilities that NB-IoT offers and to discover how it can revolutionize your operations.

Visit www.pldtenterprise.com to get in touch with a dedicated team of professionals and embark on a journey towards a connected and innovative future.

Choose PLDT Enterprise and unlock the full potential of NB-IoT for your business today!



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Writer Credits

Authors:



Celina Julia C. Borromeo
Head of IoT Enterprise Innovations
PLDT Enterprise



Michael L. Ruiz
Head of Enterprise Innovations
PLDT Enterprise



Melvin Jeffrey C. Chan
VP & Head - PLDT Enterprise
Innovations, Business Development,
Consulting, and Presales
PLDT Enterprise

Contributors:



Giovanni Gil Abaquin
Head of Wireless Enterprise
Innovations
PLDT Enterprise



Ronell A. Jiao
Head of IoT/Enterprise 5G
Business Development
PLDT Enterprise