Internet of Storage Tanks

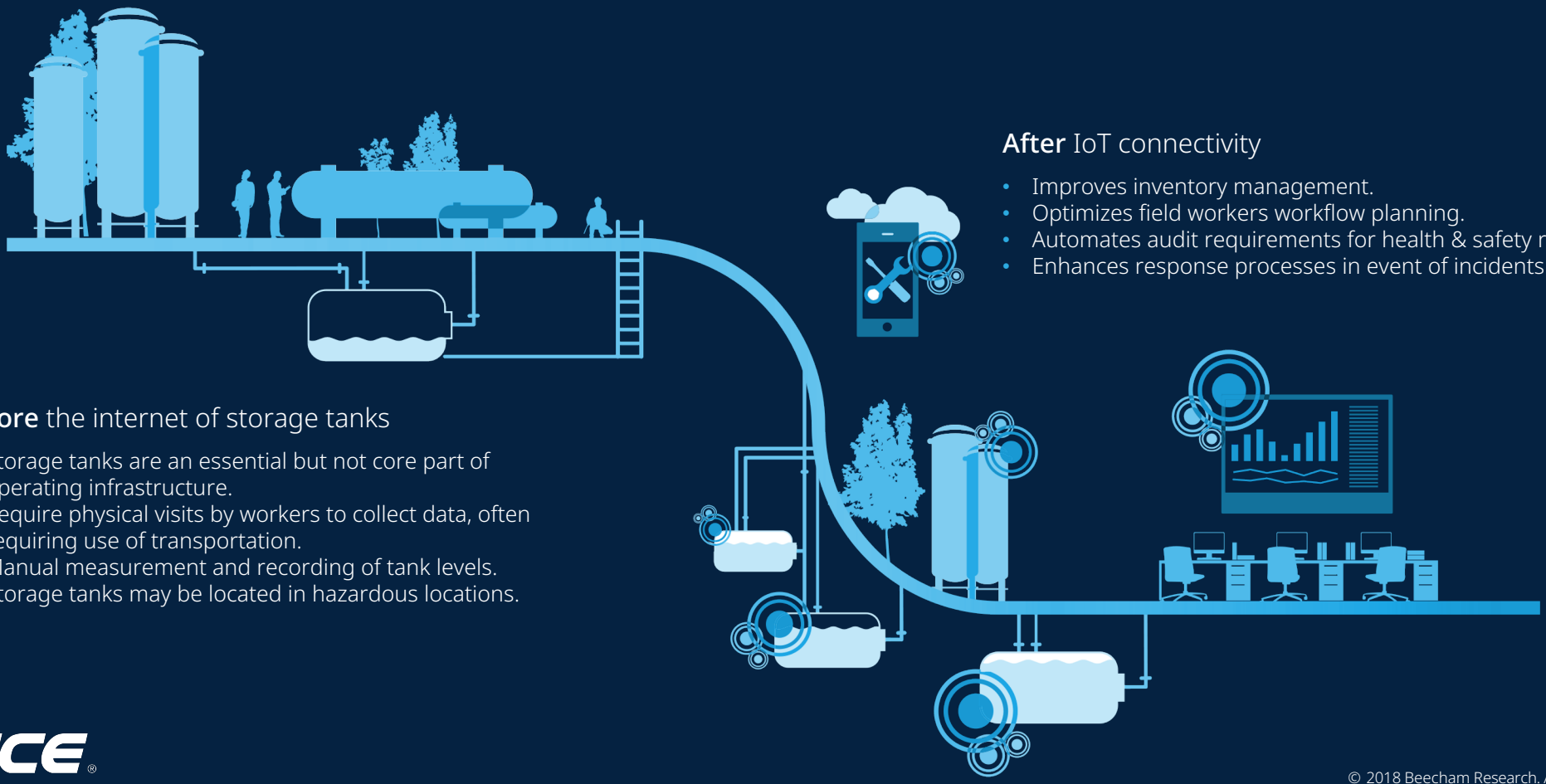
Connectivity Playbook

Building the Internet of **Storage Tanks**

This educational guide introduces the benefits of enabling connectivity as a feature to your tank monitoring products and solutions. It recommends the special considerations to consider when choosing a connectivity type.

IoT turns day-to-day measurements into **valuable insights**.

In the era of Internet of Things where everyday objects can be connected, the idea that storage tanks, usually an essential but not core part of operating infrastructure, can also be networked to the internet, is very appealing to any industry working with silos or containers. By connecting and automating the monitoring and management of tank levels or flows, end-users in the manufacturing, agriculture, utilities, oil & gas and transportation sectors can make better informed operating decisions by having available near real-time information and historical patterns of tank levels.



Before the internet of storage tanks

- Storage tanks are an essential but not core part of operating infrastructure.
- Require physical visits by workers to collect data, often requiring use of transportation.
- Manual measurement and recording of tank levels.
- Storage tanks may be located in hazardous locations.

After IoT connectivity

- Improves inventory management.
- Optimizes field workers workflow planning.
- Automates audit requirements for health & safety reporting.
- Enhances response processes in event of incidents.

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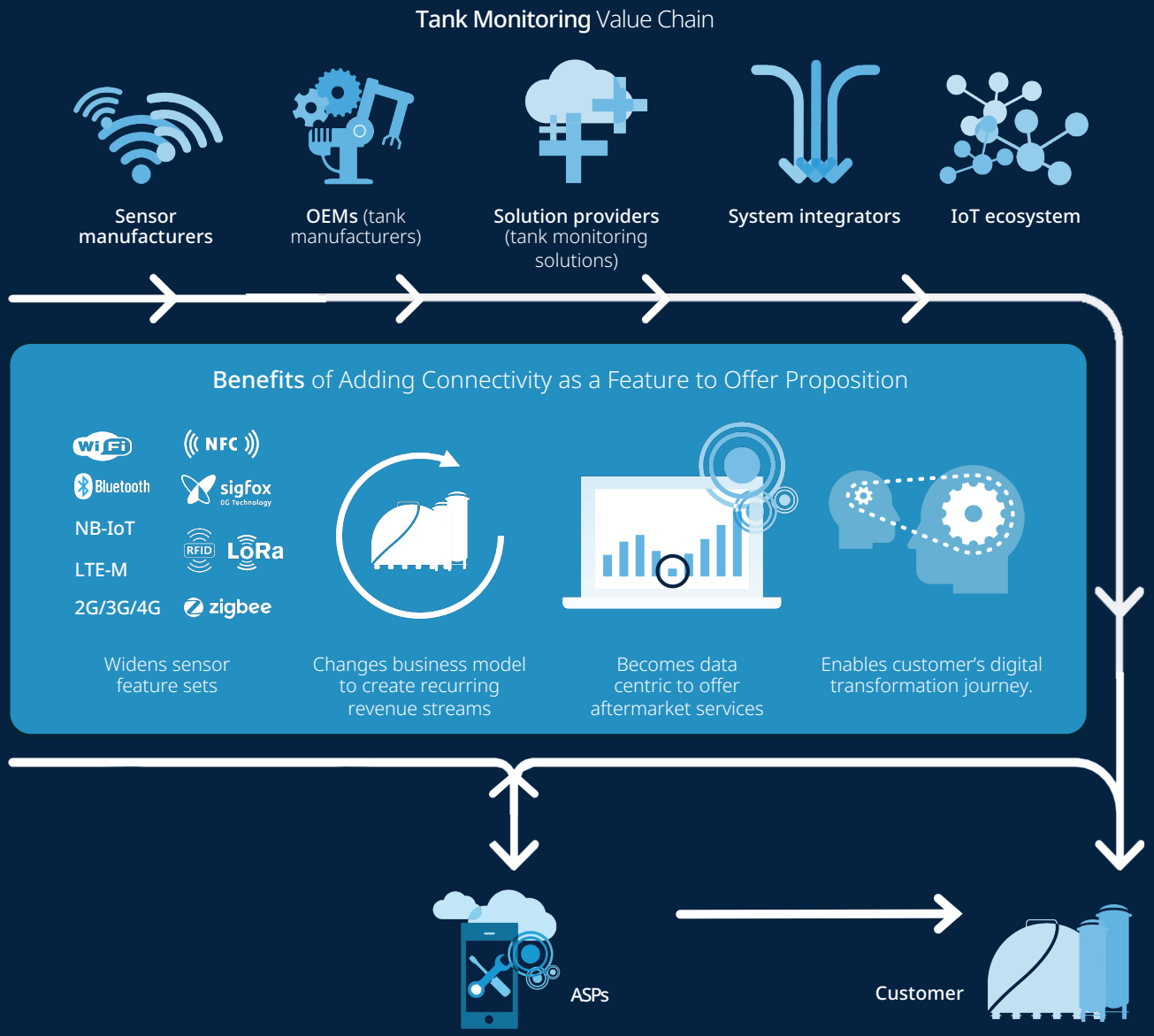
Adding connectivity as a feature creates revenue opportunities for the value chain.

The tank monitoring value chain, from tank manufacturers to solutions providers to applications service providers, can facilitate these end-user benefits by making connectivity a default feature in their products and solutions. As illustrated in the figure, once connectivity is enabled, everyone on the value chain can move closer to the end customer. Through resulting data about tank conditions, each value chain participant including application service providers can offer aftermarket services such as maintenance, upgrades, support and consultancy bundles.

Enabling IoT connectivity benefits everyone on the value chain.

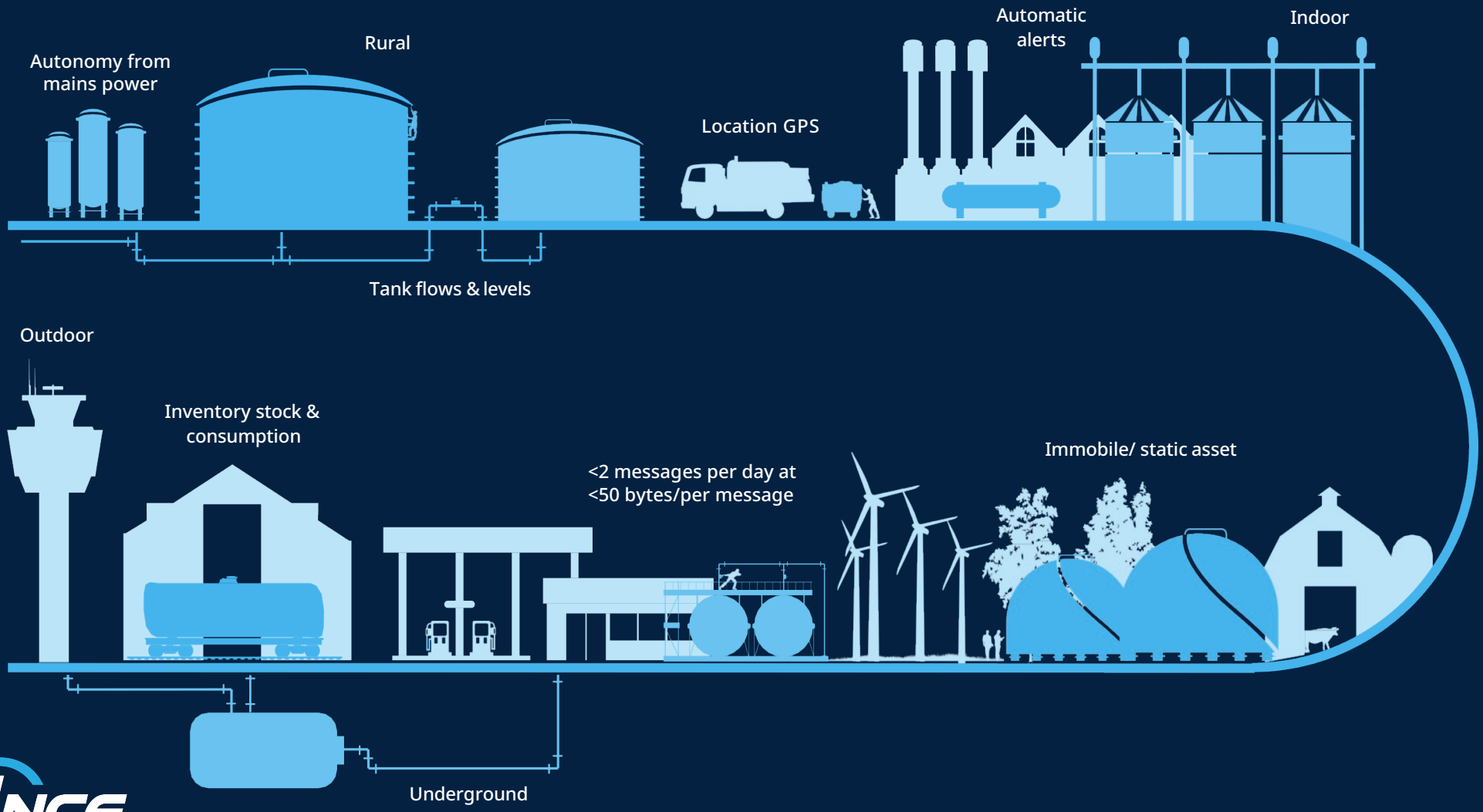
- **Sensor manufacturers** differentiate from their peers by simplifying the connectivity decision making for the rest of the value chain in the industry vertical.
- **Tank manufacturers (OEMs)** can distinguish themselves by being able to offer a connected tank product from the beginning, simplifying their customers' connectivity decision.
- **Solution providers (tank monitoring solutions)** expand their service portfolio by taking on their customers' non-core data centric functions. Once connectivity is enabled, solution providers can help their customers turn tank data into insights.
- **System integrators (consultancies and IT services)** in their capacity of running digital transformation project they have the potential to expand their consultancy to drive new applications derived from having tank monitoring data.
- **Application service providers (ASPs)** develop new applications for end customers in the industrial vertical through access to aggregated tank data.



Understanding the **connectivity needs** of tank monitoring.

The choice of connectivity for both customers in industry vertical and tank monitoring value chain becomes a critical business decision dependent on the specific cost, performance and benefit of tank monitoring. The below figure illustrates the diversity of connectivity requirements across different types of tank monitoring deployment in different environments.

Key Attributes of Tank Monitoring Application

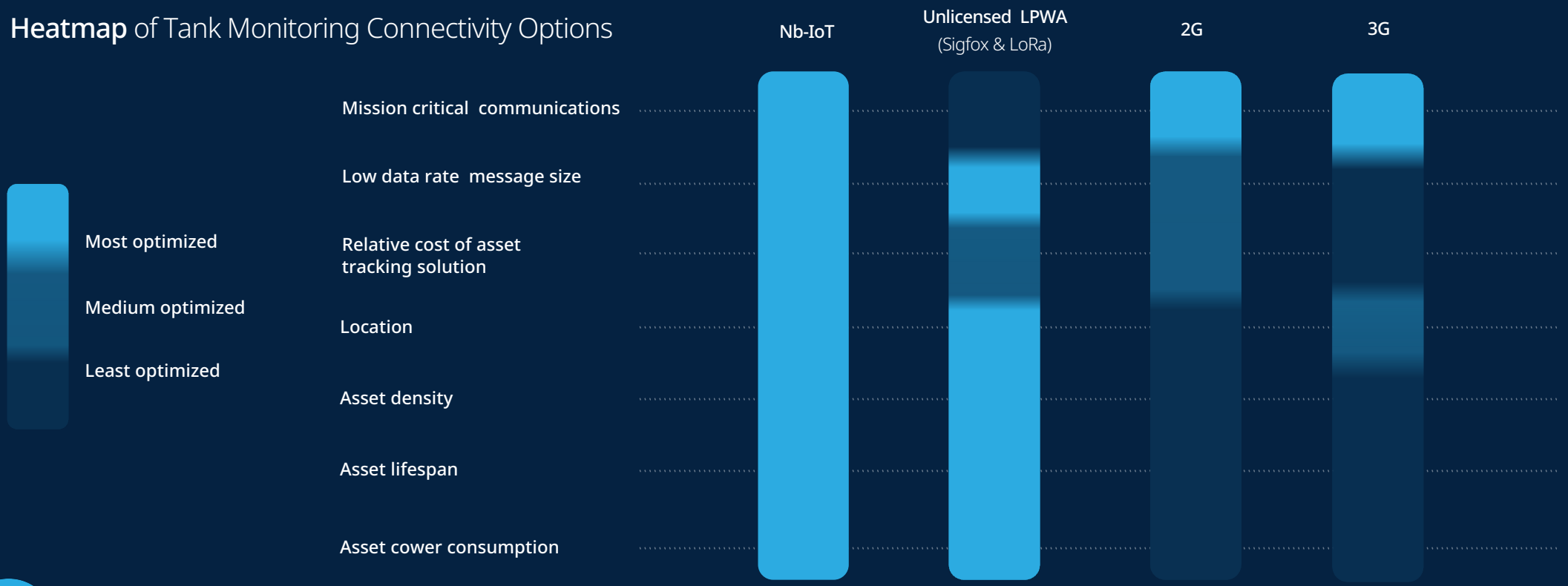


Tank Monitoring requires low data rate connectivity access.

Transformation opportunities for both end customers in the industry vertical and tank monitoring applications stem from connecting tanks. The choice of which connectivity must therefore be made with a view on cost, performance and benefit. There are a variety of connectivity options, from traditional cellular technologies such as 2G/3G and recent ones such as Low Power Wide Area (LPWA). There are two groups of LPWA technologies. Those that use unlicensed spectrum such as Sigfox and LoRa and those that use licensed spectrum that is cellular-based such as NB-IoT and LTE-M. The last are part of the 5G roadmap according to the GSM Association, which as a licensed and standardized technology, offer carrier grade connectivity reassurances. The figure below applies the 7 characteristics of tank monitoring to 4 types of common connectivity options and illustrates that tank monitoring is best served by NB-IoT in terms of cost, performance and expected benefit.

Reading the heatmap vertically, NB-IoT fulfils tank monitoring requirements that the connectivity is suited to handle mission critical communications, the actual data transmitted, in relative cost of tank monitoring solution, be used both indoors vs. outdoors and over and underground, communicate over long distances, to last more than 10 years, and to low power consumption. The heatmap can also be read horizontally. For example, tank monitoring, despite not being a core operational process, has mission critical requirements in certain industry vertical. As such, NB-IoT, 2G and 3G fulfil this requirement by virtue of being offered on a licensed spectrum.

Heatmap of Tank Monitoring Connectivity Options



1NCE **Offering**

1NCE is a perfect match with the Internet of Storage Tanks solutions, meeting all basic requirements while addressing key challenges:

Requirements	Typical customer challenge	Why 1NCE is the best match?	Standard solutions
Data & Pricing	• All-in-1 solution • Cost transparency • Low & high data project support	• **All-in-1:** 10 EUR/10 years for connectivity & software • **One-time cost:** no monthly or hidden fees • **Lifetime Flat**: 500 MB, 250 SMS + extra **High Data IoT:** 5 EUR/GB, speed 25 Mb/s	• Complex & fragmented pricing, costly integrations • Monthly, fixed & hidden fees • No high-data requirements met
Coverage	• Global coverage • Cellular and LPWA radio technology • Multiple network and operator switch	• **173 countries coverage;** no zoning or local pricing discrepancies. • Integration with LPWA networks. • Freedom-to-Switch to change providers without replacing a SIM.	• Region or zone-restricted coverage • NB-IoT and LTE-M limitations (10-20 networks globally) • Complex contracts and vendor lock-in
Services	• Device control through one interface • Interoperability with 3rd party services	• **Device monitoring and management** included • **3rd party software**, like Datacake, Mender, Microsoft Azure, natively integrated with 1NCE OS and CMP	• Extra costs for monitoring & data management • Limited compatibility with third-party IoT software
Longevity	• Supports emerging technologies • Ability to switch operators • Services that are liable for the device lifecycle	• **NB-IoT or LTE-M** for devices with lifecycle of 10+ years • **eSIM (eUICC)** for flexible, multi-operator functionality • **Reliable cellular-based networks** & Tier 1 operators	• Limited LPWA, especially in challenging environments • Extra costs due to network or service changes • Short-term contracts and pricing models

The 1NCE **Promise**

Simplify your value chain with **an all-inclusive model** and additional features & services.

1NCE **All-in-One** Solution

1NCE IoT **Lifetime Flat**

10 EUR for 10 years lifetime subscription

1NCE Connect

- ✓ **500** MB, **250** SMS
- ✓ **173 countries** coverage
- ✓ **NB-IoT, LTE-M**, 2G, 3G, 4G
- ✓ Connectivity management **platform**
- ✓ **Unlimited** API usage
- ✓ VPN, APN **included**

1NCE OS

- ✓ Device Authentication
- ✓ Energy Saver
- ✓ Device Inspector
- ✓ Device Locator
- ✓ Device Integrator
- ✓ Freedom-to-Switch

1NCE **SIM Card**

depending on the application

- \+ IoT SIM **Card Business** 1 EUR
- \+ IoT SIM **Card Industrial** 2 EUR
- \+ IoT SIM **Chip Industrial** 2.50 EUR

Extra Services

Top-up Option

when a device reaches data limits in 10+ years

- \+ **Extra 500** MB & **250** SMS for 10 EUR

Lifetime **Extension**

for those who want to exceed 10 years

- \+ **Extra** 10 years for 10 EUR

1NCE **Plugins**

available to trial **for free**

- \+ **FOTA** by Mender
- \+ **Data Visualization** by Datacake
- \+ **Azure IoT Integration** by Tartabit
- \+ **Device Debugging** by Memfault

Alternative Products

1NCE **High Data IoT**

for projects with high data requests

- \+ **5 EUR/GB,** speed 25 MB/s

About **1NCE**

Delivering **IoT software and connectivity** for life.

1NCE is a company offering a software platform for connected products that delivers future-proof, hassle-free IoT in 173 countries and regions. The software platform enables customers to easily, securely and reliably collect device data and turn it into actionable intelligence. This accelerates time-to-market for data collection projects by months, increases device lifetime by years, and allows efficient management of sensors from initial deployment to the end of the product lifecycle. More than 23,000 users and 60 Fortune 500 companies trust 1NCE with 30 million connected products worldwide. We see strong evidence of the high relevance of IoT solutions for the logistics sector, including asset tracking applications.

Tank monitoring relates to many industries where 1NCE supports their customers. Explore more:

- Industrial Automation
- Infrastructure
- Smart City
- Transport & Logistics
- Utilities
- Smart Agriculture

1NCE Shop

Customer References

Contact Us

Knowledge Base

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