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The IoT communications voyage
KEY CONSIDERATIONS FOR IOT DATA IN LOGISTICS AND FREIGHT

The need for seamless coverage and connectivity

IOT IS DRIVING OPTIMISATION AND PERFORMANCE IN MULTI-NATIONAL SUPPLY CHAINS

However economies develop post-COVID, it's clear that our world is entirely dependent on lengthy supply chains. Even if goods are manufactured or produced locally – and sold locally, for the vast majority of things we consume, freight transport is essential. These complex webs continue to evolve – just look at plans for new, pan-European transport corridors, spanning road, rail and inland waterways, or tentative steps to unlock new ocean routes to avoid bottlenecks and reduce the length of voyages.

The importance of IoT data connectivity in global supply and logistics

Since the safe and timely delivery of materials across these and other transport routes is paramount, freight companies are increasingly seeking to use IoT data to optimise performance, while manufacturers and others in the supply chain wish to collect information about goods while in transit.

There's nothing inherently new in this – data has always provided insights that can help all stakeholders. But, there's a growing recognition that new IoT data can be key to unlocking a host of future benefits from increasingly complex applications - from optimised supply chains to the condition of goods – all the way to full digital twins of container vessels and trains, and blockchain-enabled customs clearance.

One way or another, it's fair to say that data is essential to the development of the global supply and logistics industry.

That data needs to be collected and distributed, so that it can be processed. So, in this context, it's worth thinking about some key factors as you seek to optimise IoT data collection and transfer, across your freight journey.

Data sensors are everywhere – but not all data is the same

Whether freight moves by ship, rail or lorry, sensors will be involved. These sensors will move, across borders and through customs checkpoints. Vessels, vehicles and other forms of transport are already equipped with sensors that track position, collect data from on-board processes and more. They will also be embedded in containers, or attached to individual packages. So, we have data from the transporters and data from the goods transported to consider. As a result, it's important to remember that the data they collect has different characteristics:

- A significant proportion of this data is low volume – low packet size – and requires little bandwidth
- A growing proportion, however, will have much great bandwidth requirements, for example for key operational systems and reporting
- Again, not all data has the same time sensitivity. Some requires real-time transfer, while other data can be transmitted periodically, or when conditions change according to alarm triggers
- IoT connectivity needs to be arranged to reflect this, with prioritisation of critical data and secure gating to send less critical data at the right intervals

Data is different and your IoT solutions and connectivity need to respect this. And, as you introduce more sophisticated remote processes, automated operations and more, it will need to evolve.

Data is bidirectional...

BUT NOT SYNCHRONOUS

Data collected from vessels, containers and other resources has to be transmitted so that it can be processed, somewhere.

At the same time, data may need to be sent back to these sensors, so that settings can be adjusted, actions taken and so on. The data sent in both directions is not equal, so connectivity doesn't need to be either. A difference between up- and down-link speeds is fine, so long as the right transfer rates can be obtained, when required – or transmission controlled according to the data paths available.

Data will become active...

BUT NOT PASSIVE

Many organisations are integrating automation, backed by artificial intelligence and machine learning into their processes.

This will yield obvious benefits for operations, on board vessels, for example, but it will also feed into stock management, ordering and active interventions in how goods are handled in transit. IoT data is crucial to this and, while reporting remains a key focus, data will also provide a source of fuel to drive the optimisation of processes and to train algorithms.

In addition, data will become part of customs and import / export systems – so data will need to be shared at the right time, with the right agencies and with the right levels of protection. Data will be a currency as well as an internal resource.

Mobile networks are essential for IoT

BUT DO YOU GET THE CONNECTIVITY YOUR APPLICATIONS REQUIRE?

All this IoT data, of different classes and with different priorities needs to be transferred to and from freight Transport needs wireless connectivity.

This means using SIMs or eSIMs, that are inserted or embedded into devices and sensors from which you want to collect data.

Mobile networks have different capabilities too – apart from the speeds they offer, based on whether they are 2G, 3G, 4G or 5G. There are also private Access Point Names, which basically are the entry points to the network for the transfer of your IoT data.

You can use the public APNs, but there may be a benefit in using a private one, so that you can ensure that your data is isolated.

There are other considerations too – so, the bottom line is that you need make sure that your network providers can meet any requirements from your IT teams.

Freight routes span multiple networks

YOU NEED TO CONNECT TO ANY NETWORK

The freight journey – on land, sea or air – can be seen as a series of hops, during which different networks can be available. There may be continuous coverage, so these networks need to be seen as assets to be leveraged, whenever data transfer is possible or required. Being able to access all the networks, along a journey is essential.

That's obviously true for land-based freight, but it's also true at sea. That's because, even though some vessels do undertake long, cross-ocean voyages, a significant duration of most of these is close to shore. Similarly, air transport may involve several jumps, allowing connectivity at each point. In other words, land-based mobile networks are available for much more of the journey or voyage than many may think.

As such, mobile networks are key to the successful flow of IoT data and are integral to any data programme. So, you'll need the ability to connect to any available network, when in range – and to ensure that you can get any additional services you need.

Corridors are being designed with communications in mind

CONNECTIVITY IS INCREASINGLY IMPORTANT

The importance of logistics for global economies is recognised through a growing number of cross-border initiatives, aimed at facilitating the flow of goods and transport. These will augment existing, high-volume corridors, providing end-to-end passages, across land, sea and inland waterways, involving ships, barges, railways, as well as vehicles.

While this will undoubtedly stimulate the expansion of terminals and ports – inland or otherwise - on these routes, it also means that network connectivity will be increasingly important. Some routes are being built through the development of historic ways, while others are being formed through the clearance of obstacles and the construction of new infrastructure – but trackside, riverside and coastal connectivity is also being optimised in many, to follow these corridors. This will increase the quality of mobile network connectivity available, but there will be multiple providers of terrestrial access.

So, IoT devices will be able to move seamlessly from network to network – but they must be capable of doing so, as no one mobile network will span the entire length of such routes.

For IoT to deliver, you'll need to be able to select the best network for your needs, backed by the widest coverage options available.

Satellite has dominated...

BUT TERRESTRIAL NETWORKS ARE BECOMING MORE IMPORTANT

Satellite has long been the medium of choice for remote IoT connectivity, providing, as it does, global coverage options. However, it's expensive and even though essential for mid-ocean or the most remote land-based coverage, there is – and will be – a wider range of mobile networks available, as transport corridors receive an investment boost.

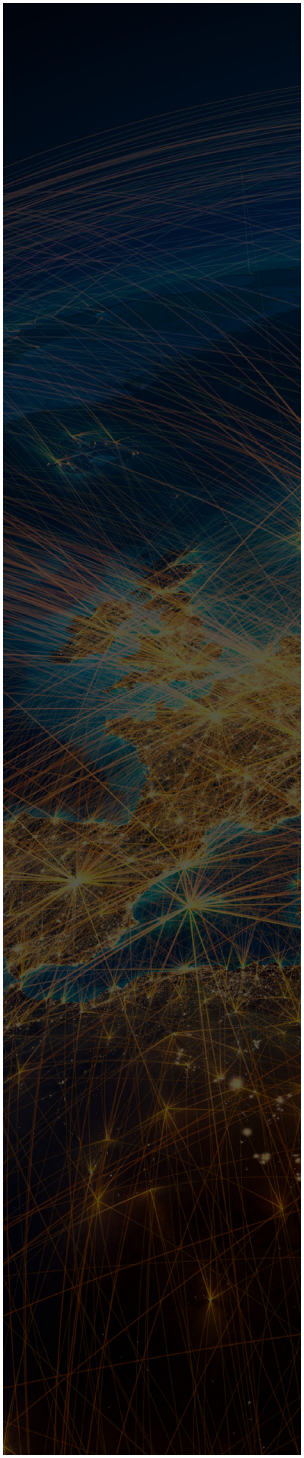
As such, mobile coverage is key – to complement any satellite connectivity – and to maximise choices when in range of terrestrial networks. Seamless roaming and immediate connectivity to the right network will make a difference to securing the benefits of IoT.

Networks are fragmented...

SO YOU NEED STREAMLINED PARTNERSHIPS

Any company that deals with cross border or global supply and delivery chains, and which seeks to leverage IoT capabilities must consider how that connectivity will be provided. What's the most appropriate option for the routes that goods and transport take? Which sea or land corridors do you use most frequently?

Whatever the result of this analysis – be it connectivity for the Panama Canal, the Strait of Malacca, the Baltic-Adriatic or Rhine-Alpine corridors, or even routes across Central Asia, you need a single partner that can provide the connectivity you need. If you are seeking to optimise supply chain performance and management, then managing multiple relationships across fragmented networks will run counter to that goals. You need to streamline partnerships.



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CONNECTIVITY FOR YOUR SUPPLY CHAIN

That's where we come in. We offer a single, global solution that spans the full distance of your supply chains, across sea, land or air. We can provide the optimised coverage and tailored solution you need, or give you out-of-the-box connectivity. Put simply, we enable you to secure the best connectivity, anywhere you need it.

So, if you are thinking about optimising supply, transport and logistics chains, you need a partner that understands both the tech and the geography, so you can get connected, end-to-end.

We offer a truly global IoT connectivity solution which matches your ambitions and requirements, backed by a unique mix of network assets.

Our expertise, knowledge and flexibility enable us to tailor solutions to specific markets and locations.

Telecom26 - The network that's optimised for IoT connectivity.

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