PORTFOLIO: SERVICES

TRANSFORMATION, VIRTUALISATION AND THE INTERNET OF THINGS

BORDERLESS MOBILITY - A NEW TECHNOLOGY PARADIGM FOR COMPETITION ON A GLOBAL BASIS

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THE NEXT BIG THING IS HERE

The scale of opportunity presented by the Internet of Things (IoT) is too big to ignore. By the end of 2017, the global number of cellular IoT subscribers is expected to have reached 647.5 million - around 8% of all total mobile subscribers. Running until 2022, this number is forecasted to grow at a compound annual growth rate (CAGR) of 33.1% to reach 2.7Bn1

This accelerating trend presents a major opportunity for global enterprises. Already, enterprises are applying IoT in innovative ways - from commercial vehicle fleet management to improved agricultural production, to better connected supply chains and more efficient factories. In doing so, they’re achieving greater operational efficiency, enhancing customer engagement, improving business intelligence, and creating new services and commercial models.

However, for enterprises to continue harnessing the possibilities of IoT as it evolves, further digital transformation is essential - and nowhere more so than in mobile communications. Given the changing connectivity demands associated with IoT, the traditional relationship between mobile communication service providers and their customers has to change - and fast.

As IoT-based applications expand, enterprises need new solutions that offer comprehensive visibility and control of their IoT-based business activities.

Enterprises aren’t the only ones that have to change. Mobile networks themselves need to evolve to deliver pervasive, global connectivity while giving enterprises more autonomy. The success of their customers’ IoT projects relies on it.

WHY IS IOT SUCH A HOT TOPIC?

Around the world, businesses of all sizes and from every sector are applying IoT technologies to real projects - and seeing tangible results. This is all down to the core mechanism of IoT: Applying cellular technology to IoT means that embedded SIM or eSIM technology can be applied to manage connected devices, enabling them to engage in efficient and secure two-way communications with central systems. They can then either transmit real-time data from sensors or receive instructions on how to behave. This opens up unlimited possibilities. Using IoT technologies in this way, companies can become significantly more efficient, launch new services, improve mobile customer engagement or reduce commercial risk factors, through better visibility of what is happening in the field.

These possibilities are already being realised - and this, unsurprisingly, is driving the exponential growth of IoT.

PIN-POINTING THE BIG IOT OPPORTUNITY

IDC forecasts worldwide IoT spending to sustain a compound annual growth rate of 14.4% through 2017-2021, surpassing $1 trillion in 2020 and reaching $1.1 trillion in 2021.2

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1 Berg Insight The Global M2M/IoT Communications Market - 3rd Edition
2 IDC Worldwide Semi annual Internet of Things Spending Guide
WHAT’S DRIVING THESE HUGE MARKET PROJECTIONS?

Two things:

• New Technology
• Unerring Market Globalisation

And here’s why- Cellular mobility is a highly secure and cost effective medium for IoT services - and both mobile technology and network infrastructure are evolving to be reliable and pervasive enough to support IoT anywhere. This is the big opportunity: thanks to the availability of new mobile data network technologies, enterprises can now operate without the constraints of national borders and serve an international customer base. This, in turn, is driving globalisation. In many ways, digital technology and mobility services act as a catalyst for globalisation trends.

THE BENEFITS OF BORDERLESS COMMUNICATIONS

Achieving borderless operations brings significant advantages. Remote IoT devices, with connectivity and information managed over a secure cellular network, can connect and interact from any location. So for example, heavy equipment, oil or gas exploration technology, and agricultural technology can all connect and exchange information wherever they are. Global enterprises will only ever become more interconnected, so this gives them an efficient and productive way to operate across regions. The information generated from these remotely deployed IoT connections also gives enterprises more insight into their operations and customers/partners. They’re then able to identify efficiencies and enhance their business models.

CONNECTED NEWBORN WRISTBANDS

**SCENARIO**

• In maternity wards newborn babies can potentially be vulnerable to abduction or identity confusion
• Healthy newborns in hospital don’t tend to be monitored 24/7 by nurses or doctors

**HOW TATA COMMUNICATIONS MOVE™ - IOT CONNECT HELPS**

• Connected wristbands can be placed on newborn babies to monitor location and general health whilst on wards
  • Proximity sensors linked to doors and alarm systems can detect when babies are removed from wards without permission
  • Wristbands can also proactively monitor a baby’s skin temperature, pulse, and oxygen levels. Where abnormal levels are detected medical help can be immediately summoned

Cellular is a secure technology to ensure the safety and security of new born babies in hospitals

For more information, visit us at www.tatacommunications.com.
HOW MOBILE NETWORKS NEED TO CHANGE

Mobile networks offer an effective and ubiquitous connectivity solution for many IoT projects. But for enterprises to manage new, globally deployed IoT projects, they need the kind of flexibility and autonomy that comes with a globally available mobile network. Today’s mobile networks are defined and licensed at a country level, not on a global level.

Does this matter? Absolutely - and here’s why. Traditionally, Mobile Network Operators (MNOs) control their networks in terms of network architecture, deployment, capacity and investment. Until now, MNOs have been responsible for all the devices connected to their own network. This model is adequate if the only connected devices are mobile phones, laptops, and mobile tablet devices - but IoT innovation is set to trigger a huge rise in the number and scope of connect devices. If the traditional connectivity model won’t work in this scenario, what will?

A NEW MODEL FOR IOT CONNECTIVITY

In terms of enterprise mobility management, responsibility for connected devices resides with the IT and Communications départements of an enterprise. As IoT expands, this becomes a more accepted paradigm. Having to rely on an MNO as an intermediary for thousands or hundreds of thousands of devices isn’t viable - so enterprises launching cellular-based IoT projects need to get real-time control of their connected devices and associated SIM cards.

The ability to manage policies, analyse information, make updates and change device parameters should all sit within the responsibility of the enterprise, not the MNO. Lack of access and control simply creates delays and inefficiencies in IoT projects.

WHAT ENTERPRISES NEED TO MAKE IOT WORK IN THE REAL WORLD

Enterprises need control and connectivity - and responsibility needs to sit with the enterprise customer. This idea of exposing the communications network via APIs is not new, but MNOs have been reluctant to take this step. Yet by converting their mobile network infrastructure into a more virtualised asset for enterprises to access, MNOs can create new opportunities and support enterprises by enabling their seamless digital transformation.

To realise the full potential of IoT and leverage mobile network connectivity, enterprises need four fundamental things:

1. Global connectivity via any network
2. Efficient network operation for highly available communications
3. Simple integration, preferably using APIs
4. A way to generate and assure revenue across the network
1. GLOBAL CONNECTIVITY, WITHOUT NETWORK LOCK-IN

As IoT moves increasingly to support critical business functions, enterprises need cellular connectivity defined at the global, rather than the national, level. Connected devices must be able to function from any destination and across all generations of mobile, from 2.5G all the way through to 5G. Moreover, there should be no connectivity 'lock-in' due to MNO roaming agreements or preferred partnerships. Connectivity must be available on the most appropriate network and enterprises should not be held hostage to MNO roaming strategies.

Enterprises will have different connectivity priorities. Reliability might be an important consideration for a smart city parking application for example, but becomes critical for an application monitoring oil well pressure, which would also rely on bandwidth availability to prevent accidents. Applications operating in remote locations with limited coverage need the ability to switch between networks to ensure service availability. While in supply chain management, there might simply be a need to choose the most cost-effective connection at each location.

Clearly, priorities will vary, so enterprises need the flexibility to define their connectivity requirements based on the parameters that are important to them.

2. CONTROLLING AND MANAGING MILLIONS OF CONNECTED DEVICES EFFECTIVELY

An enterprise may need to deploy anything from a few hundred up to several hundred thousand devices - it depends on the application they are managing and their business priorities.

Managing IoT connected devices and the SIMs inside them must rest with the enterprise. This gives enterprises better visibility of what is going on and for this to be valuable for enterprises requires:
- An online, real-time portal for SIM activation, device management, data monitoring, and information gathering
- The ability to manage connectivity at a device level, to help with updates and service configuration changes

Enterprises may wish to manage their devices and SIMs in different ways - from complete end-to-end control at one extreme, to a 3rd party, fully managed service model at the other. Connectivity providers should be able to support these extremes and any of the combinations between them.

SUPPLY CHAIN MANAGEMENT

**SCENARIO**
- Supply chain complexity can expose companies to issues with food safety & hygiene. This is particularly the case with food produce that is shipped over large distances. In the case of high value products, costs are incurred if goods are delayed, lost and stolen, resulting in direct costs and supply chain problems.

**HOW TATA COMMUNICATIONS MOVE™ - IOT CONNECT HELPS**
- Providing accurate information about the environmental conditions of goods, together with location information and updates about damage or criminal activity
- Monitoring of location and alerts about possible quality issues, lets companies respond to secure or recover items, or re-supply as needed
- Visibility also makes compliance to regulation easier to implement

Use cellular connectivity to track and monitor assets, to minimise loss in supply chains

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3. INTEGRATING MOBILE NETWORKS WITH ENTERPRISE SYSTEMS

Device and SIM management must integrate with back-end systems such as ERP, CRM or accounting platforms. This will give enterprises the information they need to maximise ROI on IoT deployments.

Given that enterprises could end up managing potentially millions of different devices, considerable automation is essential - and this applies to managing connectivity. Integrating connectivity management systems and enterprise systems will streamline operating processes and improve efficiency.

This integration must be simple and easy to keep costs under control and accelerate time-to-market. The mobile connectivity provider can enable this by providing a comprehensive suite of ready-to-use APIs.

4. GENERATING AND ASSURING REVENUE ACROSS THE NETWORK

IoT deployments should generate a return on investment and create new revenue streams - both from connected services and potentially new business models.

With this in mind, the mobile network must be flexible enough to support a range of monetisation models. This goes beyond billing to understanding revenue flows and how data itself can be monetised. Enterprises must be able to monetise their IoT deployment in a way that suits their own needs.

HOW CAN MOBILE NETWORKS DELIVER?

Mobile networks need to become value enablers for IoT transformation programmes. One viable way to do this is for an enterprise itself to become a Mobile Virtual Network Operator (MVNO).

The type of connectivity associated with IoT project requirements - including SIM provisioning, device management capabilities, flexibility and revenue management - is already very similar to the MVNO model. As with traditional MVNOs, the mobile network needs to become almost entirely self-managing, with the enterprise controlling its own Business Support System/Operational Support System (BSS/OSS) assets.

Developing the IoT transformation concept further, enterprises can become MVNOs to:

- Provision cellular connectivity on a local and global basis
- Control provisioning and policy management of IoT devices (SIMs)
- Monetise connectivity and data
- Monitor activity and be able to intervene as required

This functionality must be easy to integrate using APIs, to evolve the mobile network into a virtual extension of their own back office systems.

ADVANCE AGRICULTURE TECHNOLOGY

SCENARIO

- Traditional agricultural spraying equipment will go on routine schedules to spray fields with herbicides to prevent weeds from growing and ensure that the crop are in good condition for harvesting.

HOW TATA COMMUNICATIONS MOVE™ - IOT CONNECT HELPS

- With connected spraying equipment with machine learning capabilities, this means:
  - Less herbicides (resources) is needed, by spraying only where weeds are present, optimizing the use of resources
  - Better farm management - increases productivity through precision farming analytics to ensure potential harvest yield
  - Monitor heavy equipment for predictive maintenance, so the harvester does not break down in the middle of the harvest

Cellular is the only ubiquitous connectivity technology available to support IoT in rural areas

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NETWORK FUNCTION VIRTUALISATION

The mobile network should offer the appropriate cost structure that makes an IoT business model possible. Core network technology has tended to be a relatively inflexible and high cost asset. By transforming into a more software-defined, virtual environment, network functions can be transformed into more agile, cost efficient assets.

IDC’s research shows that organisations have been able to translate their digital network initiatives into significant financial value, achieving $188,000–745,000 per 100 users per year.³

By definition, a virtualised core network is faster to deploy and integrate with external systems. It is also more flexible and supports self-provisioning through APIs, which has become crucial in the IoT era.

GLOBAL CONNECTIVITY - A KEY DIFFERENTIATOR

Enterprises simply cannot afford the complexity and cost of integrating with multiple platforms for each local MNO, country by country. To succeed in adopting IoT, enterprises need a reliable, globally available connectivity solution with unified SIM management and a unified API suite - one that offers simplicity, flexibility and reliability from a single provider.

WHY THE TRADITIONAL NETWORK OPERATING MODEL WON’T WORK?

Although it may seem the obvious choice for enterprises to work with MNOs for IoT connectivity, the reality is that the legacy infrastructure of most MNOs lacks the flexibility needed for an enterprise to become an MVNO.

Traditionally, mobile networks were designed to maintain control of SIMs, device management and billing - both for traditional mobile voice and data services for phones, as well as some devices such as dingles for laptop computers. MNOs operate legacy systems that cater for their own business models.

These systems:

- Do not let an enterprise customise an IoT service for each SIM, for things like network services, data package, policy rules engine etc. Under the existing system, an enterprise has to align its IoT SIM management needs to the predefined standard packages and rules of the MNO
- Do not allow an enterprise to dynamically manage several thousand SIM cards. Legacy BSS/OSS are usually built with role-based provisioning flows that are controlled by the MNO and never opened to 3rd parties
- Do not present enterprises with the tools they need to monetise connectivity services themselves, thus removing any potential for value-adding commercial models.
- Do not let enterprises provide consistent support for the connectivity part of their connected services - monitoring tools are restricted to access by MNO customer care teams and are not available externally.
- Only offer international roaming options through a limited set of predefined offers, with no flexibility for enterprises

To support connected IoT models, MNOs need to transform their networks, processes and systems - and this is both costly and risky. So what’s the alternative?

³ The Business Case for a Digital Ready Network, IDC, 2017
A NEW MODEL FOR THE IOT AGE

Specialist Mobile Virtual Network Enablement (MVNE) answers the precise needs of enterprise IoT deployments. An MVNE specialising in IoT solutions can offer global connectivity, autonomous network management and technology-agnostic IoT platforms.

**Mobile Network Enablement**

- **MVNO for MVNO**
- **MVNE for MNO**
- **MVNE for IOT**
- **IoT / M2M global IoT connectivity and VAS**
- **900 MNO relationships**
- **MNO launch sub-brands & affiliates**

Tata Communications MOVE™ Mobile Network Enablement (MVNE) turns enterprises into MVNOs for their IoT transformation. Its virtualised mobile core network can be fully self-managed and easily integrated into back-end systems through extensive APIs - with all the billing capabilities needed to sell connected services.

**SERVICE DIFFERENTIATION VS OTT**

- **Multiple Persona**
  - (Personal or Business)
- **On a Native Dialer with Network Voice**
  - (VoLTE, iOS and Android)
- **Powered by Network Intelligence to deliver**
  - (Persona Management, Contextual Communication)
- **Bundled with an intuitive Collaboration App**
  - for SMS, Group Chat, Call Control, Video and more..

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INTRODUCING TATA COMMUNICATIONS MOVE™ MOBILE NETWORK ENABLEMENT

Tata Communications MOVE™ - Mobile Network Enablement incorporates all the functions needed for IoT lifecycle management for connected devices. Designed to meet commercial needs, it combines network-independent, global connectivity together with:

- A comprehensive BSS/OSS stack and self-care portal that puts enterprises in control
- A comprehensive suite of APIs offering access to all its functions – including the virtualised core network – so it’s easy and quick to integrate
- Tools for enterprises to monetise their connected services
- Complete “Things-to-Cloud” secure connectivity, delivered as a Communications Platform as a Service (CPaaS)
- SIM management support, putting enterprises in control of their connectivity
- A globally available roaming solution that optimises quality and cost

With Tata Communications managing the connectivity and device management elements, enterprises are free to focus on their core business proposition. What’s more enterprises can have confidence in the reliability of the service: Tata Communications is a market leader in roaming services, with roaming agreements with 600+ MNOs across 200 countries and territories. Our global customer support centres run 24x7, so our customers can count on us at any time, wherever they are.

For more information, visit us at www.tatacommunications.com.
CONCLUSION

Over the next decade, enterprises will drive the growth of the IoT market and will need to take responsibility for defining the connectivity solutions that underpin it. This is a significant change in the mobile communications industry. Enterprises that work with their local MNOs to provide connectivity for IoT services will be limited by the old, inflexible way of working. The virtualised model is a better option that offers flexible, seamless, global connectivity. Enterprises can work with specialist MVNEs to deliver IoT connectivity that suits their needs and ensures the success of their global IoT projects.

Tata Communications MOVE™ has been specifically designed for the IoT market. This purpose-built, IoT-only virtualised network easily integrates with enterprise systems via APIs – offering a level of flexibility that a traditional MNO network cannot match.

Leveraging Tata Communications’ next generation roaming capabilities lets enterprises access connectivity across multiple countries. They benefit from simplicity, reliability and peace of mind for IoT connectivity and capitalise on the tremendous opportunities this new technology brings.
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About Tata Communications

Tata Communications Limited (CIN no: L64200MH1986PLC039266) along with its subsidiaries (Tata Communications) is a leading global provider of A New World of Communications™. With a leadership position in emerging markets, Tata Communications leverages its advanced solutions capabilities and domain expertise across its global and pan-India network to deliver managed solutions to multi-national enterprises, service providers and Indian consumers.

Tata Communications’ depth and breadth of reach in emerging markets includes leadership in Indian enterprise data services and leadership in global international voice.

Tata Communications Limited is listed on the Bombay Stock Exchange and the National Stock Exchange of India.

The Tata Communications global network includes one of the most advanced and largest submarine cable networks and a Tier-1 IP network, as well as nearly 1.5 million square feet of data centre and collocation space worldwide.

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