

OPTUS

The hype and hope of the Internet of Things



The future has arrived

With the Internet of Things, the future has officially arrived and what a wonder it is.

"The Industrial Internet".
"Machine-2-Machine Networking".
The "Internet of Things".

If you haven't heard these terms buzzing around your social network feed for the past few years, you may as well have been living next door to the Flintstones.

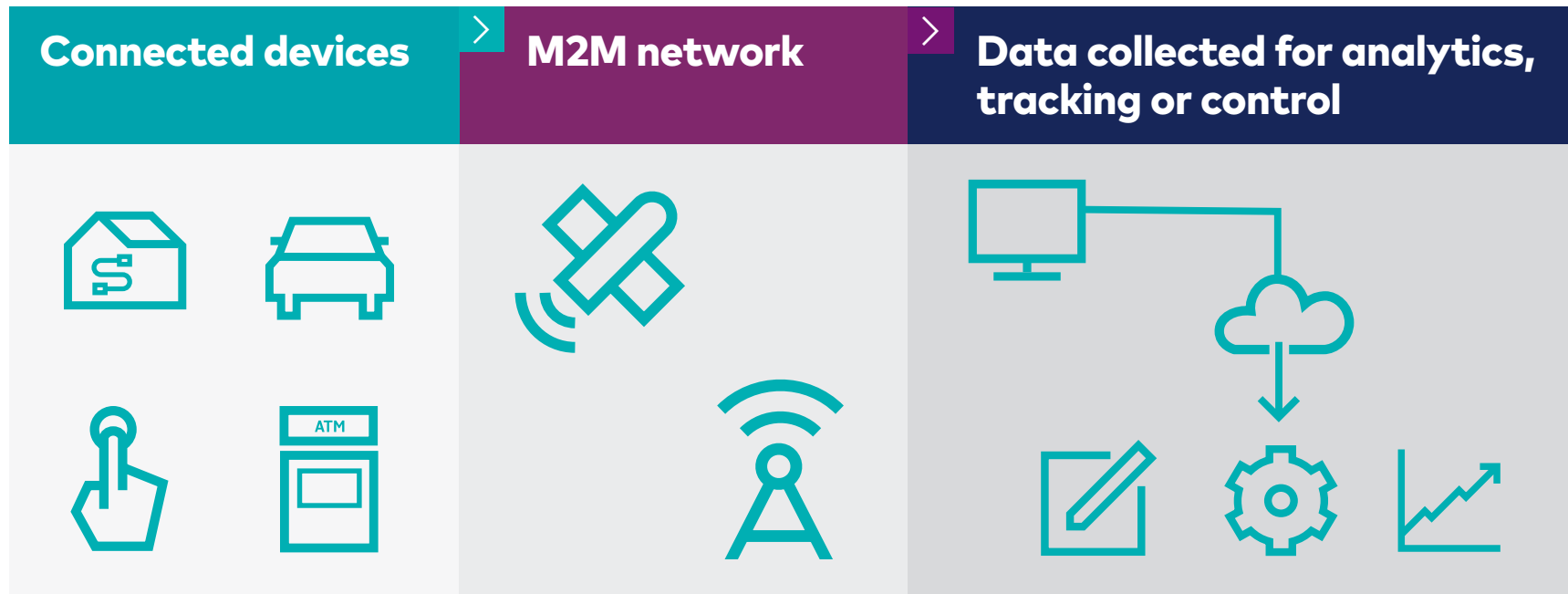
We chat with Shawn Gammel, Manager of Planning and Marketing at Optus Wholesale to unpack just what Machine to Machine Networking and Internet of Things (IoT) are and what they mean for corporates, consumers and everything in between.

IoT is the interconnected ecosystem of connected devices (things) - think cars, wearables, whitegoods, electronics, health and energy monitors, parking sensors, smart meters, digital signage etc.

M2M is the fundamental layer of network connectivity that empowers these devices to 'speak' with each other, 'talk back' to a closed network and provide information about devices' environments in real time.



Machine to machine



In heavy industry, the Industrial Internet has been using proprietary solutions and Wi-Fi for a number of years – but these applications in industrial sectors are not immediately visible to the consumer market.

Mining, agricultural, manufacturing and infrastructure businesses such as water treatment plants,

power stations, oil exploration, railways etc. have integrated complex physical machinery with sensors and software to analyse asset performance and use that data to drive cost and operational efficiencies. The retail sector has already seen some obvious manifestations becoming reality; for example connected

digital signage in a shopping mall where the sensors on the signage collect data, send it across a Wi-Fi or mobile cellular network so display advertising can be adjusted in real time.

IoT has also been a source of interest and plenty of R&D for major Tech giants like Google,

Samsung, Apple and Amazon for the past few years, IoT is on the cusp of becoming a practical reality for consumers and in everyday life– and the applications and implications are enormous.

Driving forces behind IoT

There are many reported forces which continue to drive IoT growth.

Explosion of devices

1. The proliferation of connected devices coming to market as well as the increasing amount of investment flooding into the creation of these devices
2. High global adoption of remote devices smartphones & tablets which act as the personal interfaces to control the connected devices

Investment in IoT ecosystem

1. Investment is pouring into the IoT sector as IT and consumer tech businesses create dedicated IoT divisions, incubation hubs and acquire complimentary businesses for their IoT assets
2. The continuing development of cloud computing which is required to store and process the data coming from the IoT universe

3. The size of and cost to of internet connected sensors has reduced significantly, which will fuel further sensor adoption in many IoT verticals
4. The continued growth of the app ecosystem which facilitates IoT

Network Improvements

1. IoT will be driven by continual improvement of mobile and fixed networks' coverage and speeds to enable real time data exchange
2. Expansion of the global internet footprint which will drive an expansion in device connectivity
3. The birth of Narrowband IoT- which is an enabler of Smart Cities and uses a manipulation of a radio spectrum to create low-powered data connectivity reducing consumption what have typically been power-hungry devices



The market overview

The market potential and demand for smart, connected devices is not lost on the big end of town, with heavy hitters all jostling for pole position in the IoT space. Google acquired French image recognition start-up Moodstock in July 2016 to enhance its image recognition capability for an undisclosed sum.

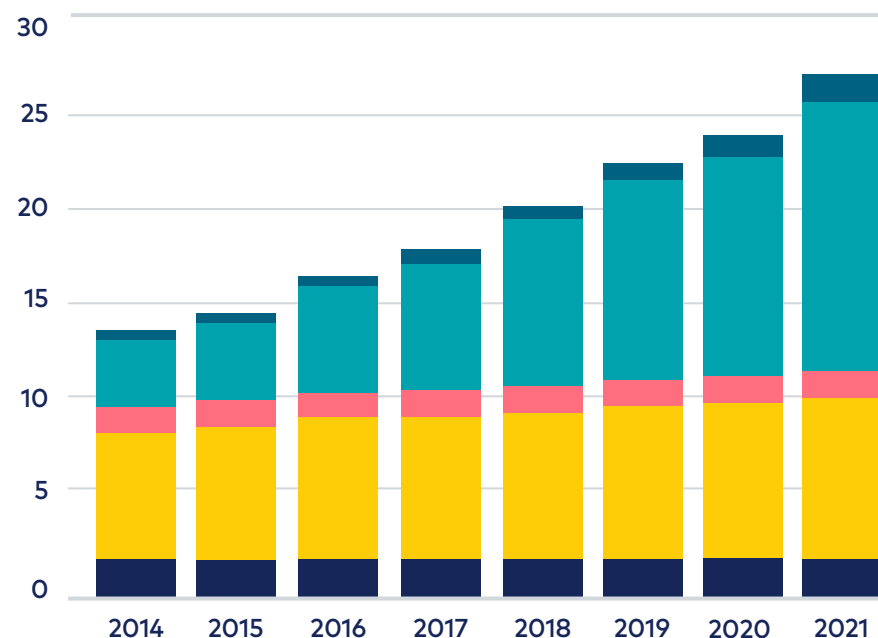
The previous month, Twitter spent AUD197 Million for AI start up Magic Pony, which specialises in machine learning. "Magic Pony's technology – based on algorithms that can understand the features of imagery – will be used to enhance our strength in live news and video" said Twitter chief executive Jack Dorsey.

Famous for its commitment to future-planning two decades ahead of the curve, Amazon set hearts racing with its prototype release of Prime Air Drones earlier this year. These are bespoke automated flying delivery vehicles which will deliver packages under 2.2kg within thirty minutes of placing an online order through Amazon.

Not to be outshone, Samsung made a market announcement that by 2020, every single Samsung product will be connected to the Internet of Things and in an open eco-system. This means that essentially, a Samsung smart device should theoretically have the capability to 'talk' to any other branded device in the marketplace.

"While the problematics around creating common 'language' conventions between product manufacturers are still yet to be determined, the solid investment in smart devices demonstrates that the merging of reality and virtual life – whereby our world is fast becoming intuitive, interactive and intelligent" says Gammel

A Global View: Connected devices (billion)



Global overview of connected devices

	15 billion	28 billion	CAGR 2015-2021
Cellular IoT	0.4	1.5	27%
Non-cellular IoT	4.2	14.2	22%
PC / laptop / tablet	1.7	1.8	1%
Mobile phones	7.1	8.6	3%
Fixed phones	1.3	1.4	0%
	2015	2021	

Source: Ericsson Mobility Report 2016

Commercial potential

The size and staggering growth of IoT has been subject to a lot of speculation across tech publication in media worldwide.

Gartner predicts that revenue from IoT products and services will exceed \$300 billion in the year 2020

In Australia, M2M is already estimated to be an AUD 350 million market. The recent Ericsson mobility report also estimated the number of cellular and non-cellular

connected devices worldwide at 4.6 billion and would reach a staggering 15.7 billion devices by 2021 with annual growth rates of above 20%.

There is no doubt that the concept of Smart Homes and Smart Cities are also no longer a fictional notion – and the potential for serious

returns cannot be overstated. According to a McKinsey Report on IoT, linking the physical and virtual world may generate up to AUD11 trillion a year in economic value by 2025. That level of value – including consumer surplus – would be equivalent to nearly 11 percent of the world economy.

"There is also the obvious concern around security and privacy of information – how it is used and contained"

Security Considerations

As more and more devices are connected, cyber security plays a critical role ensuring data is protected and used appropriately.

GE asserts that by 2030, the shift to IoT may increase the average income from twenty to thirty percent – adding enormous benefits to productivity in agriculture, infrastructure, transport and manufacturing sectors. US Academic from MIT Erik Brynjolfsson argues that overall, after considering 140 years' worth of data from knowledge-intensive sectors, technology has created more jobs than it has destroyed.

Aside from shifts in employment, there is also the obvious concern around security and privacy of information – how it is used and contained.

This will be particularly pertinent for Smart Cities – whereby public infrastructure will require solid layers of cyber security to ensure data is protected and used appropriately.

Government agencies are naturally protective and security around M2M and IoT is paramount. From a consumer perspective, privacy considerations will absolutely come into play – how will people feel about appliances observing and recording information about their behaviour? Consumer data privacy and protection will always be a major consideration and challenge for everyone in the ecosystem.

This security concern is not just limited to infrastructure, as was demonstrated last year in testing with a Jeep Cherokee. The well-publicised story published on wired.com exposed the impact of hacking technique known as 'a zero-day exploit'.

The hack in this story targeted a Jeep Cherokee and gave the attackers wireless control via the internet using software that lets the hackers send commands through the Jeep's entertainment system to its dashboard functions, steering, brakes, and transmission effectively rendering the vehicle inert, whilst driving on a freeway.

While hacking is an absolutely an early concern particular for connected cars and infrastructure assets, the expectation is that the concern will be mitigated over time through appropriate security & encryption protocols such as Blockchain and legislation.

Is IoT the real **game changer** for telco service providers?

Optus Wholesale believes M2M and IoT offers real opportunities its wholesale partners – creating potentially new traditional revenue streams to traditional mobile carriage revenue.

We are actively exploring opportunities to partner with both IoT solution vendors and end customer service providers. Optus as a carrier is undertaking trials for narrowband IoT with Southeast Water and Huawei in Melbourne, and, we will always stay close to platforms and technologies that best enable Optus to be successful in different verticals of IoT, such as vehicular telemetry, health monitoring, consumer wearables and security.

So whilst we are still in the early phases of the evolution of this ecosystem, service providers (SPs) should be excited and optimistic towards the potential for customer base growth and to diversify beyond traditional mobile or fixed telecommunications services or developing new business models for specific industries.

There are opportunities for SPs to take a slice of the home devices market, offering hardware, network access and monitoring



services. Gartner points to smart TVs, thermostats and home security systems as examples of network-connected devices in the home. In addition to exploring connectivity opportunities, SPs may also position themselves as solution architects by combining platform functionality, analytics, cloud and mobile services to collate and translate data from sensors and other devices.

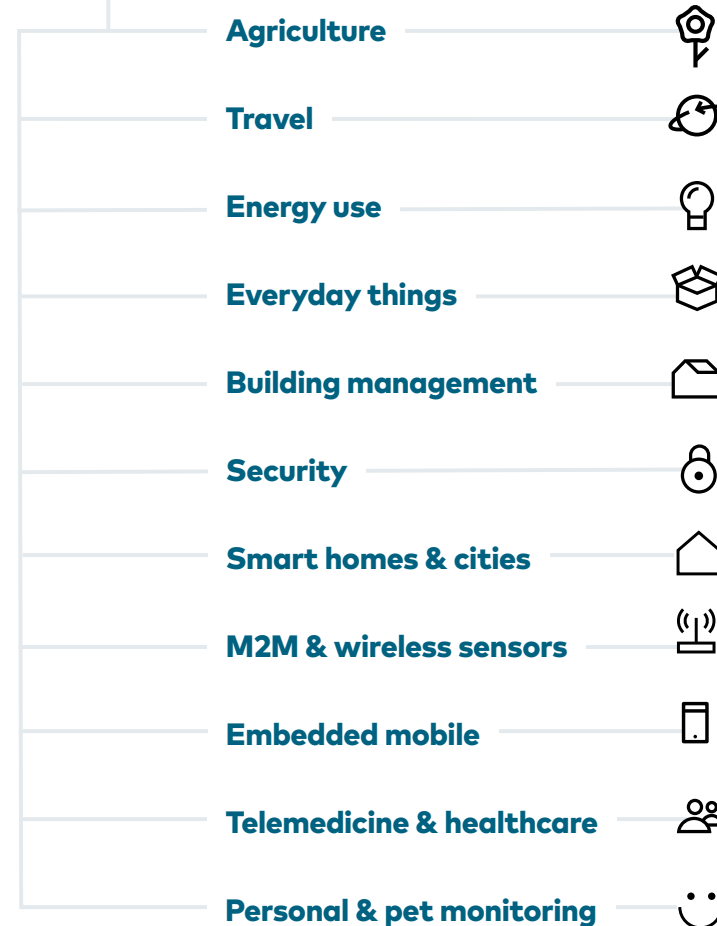
Conclusion: IoT changes the world we live in

Commercial opportunity aside, IoT will in time capture the hearts and minds of people as its presence in our daily lives expands.

Whether it is through connected clothes, smart cars, smart fridges, we will each experience the personal pleasure of more intuitive interaction with our surroundings.

"The idea of my connected doorbell triggering a video feed of the person at my front door on my phone or laptop screen even if I'm at work, or when my air-con automatically switches on in summer thirty minutes before I pull into my driveway to cool the house to my favourite temperature – this kind of intuitive automation is not only cool in its execution, but there is also a deeper exhilaration which comes with the realisation of the new, radical experience. The future is very close – and it's looking magnificent," says Gammel.

Internet of Things



Sources

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