MAKING THE CONNECTION

HARNESSING NEW TECHNOLOGIES TO DRIVE PRODUCTIVITY ACROSS THE SUPPLY CHAIN

IT'S HOW WE CONNECT

FOREWORD

Welcome to the latest Telstra report, 'MAKING THE CONNECTION: Harnessing New Technologies To Drive Productivity Across the Supply Chain'. This whitepaper reviews a number of the challenges in the Transport and Logistics industry and discusses how technology can be used to help address or negate some of these seemingly unsurmountable issues.

In this research, we conducted over 20 interviews with small and large businesses operating in the Supply Chain in Australia. The fundamental discussion point with all interviewees was the issue of productivity.

The industry, so we are told, has had zero or low productivity growth in the past five years[1]. However, many of the respondents decribes their organisations "as lean as they have ever been" and "performing at the highest level of productivity for years". These businesses reported improvements in delivery performance, warehouse management efficiencies and asset utilisation that had radically improved post GFC, and are delivering tangible benefits to stakeholders. So why the disconnect? For many respondents, it was because they were only considering productivity within their organsiation and not across the whole supply chain.

Introducing fresh ideas on how emerging technologies can be leveraged to help transport and logistics businesses address the issues facing the industry today.

In the technology world, we have seen revolutionary changes in the past two years: the explosion of smartphones and tablets, the rapid adoption of social media in Australia, the rise of the machine in Machine-to-Machine communications and the rapid adoption of Cloud computing and Big Data analytics.

At the same time, Australia's freight task is estimated to double by 2030, consumers and businesses are demanding increasing levels of service, and the Supply Chain is becoming ever more global and complex.

In this paper, we have reviewed a number of the challenges facing the industry and posed the question: How can these emerging (and in many cases consumer led) technologies be used to help address these issues? For those in the transport and logistics businesses, we hope this paper gives you fresh ideas of how to leverage these platforms. And for users of the Supply Chain, we present new thinking on the technologies that will underpin the ability to deliver a more agile and collaborative outcome.

To the many industry executives who contributed to this report, thankyou for your time, insight and inspiration.

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INTRODUCTION

TECHNOLOGY TODAY IS CONNECTING BUSINESSES AND THEIR CUSTOMERS IN WAYS UNIMAGINABLE JUST A FEW YEARS AGO.

But are companies in the Transport and Logistics (T&L) sector truly leveraging the opportunities offered by recent developments? Or are we stymied by old methods, ways of thinking and fear of the unknown? This whitepaper explores the challenges facing the sector in Australia today and the solutions offered by some smart technologies already available or on the horizon.

To road test how this paradigm for a meaner, leaner industry stacks up in today's world, we carried out a series of face-to-face interviews with some of Australia's leading players in the sector; here they share their thoughts on innovations, current investments and barriers to adoption. Contrasted against future scenarios of what might be possible and case studies from domestic and international experience, the results make fascinating reading. This whitepaper also details critical considerations for those looking to harness the power of technology for future business benefit.

Much as the telephone and radio transformed early communications, newer technologies will be the engine to power 21st century economic prosperity, productivity, competitiveness and sustainability. Innovations such as social media, smartphones and tablets, Cloud computing, Big Data and Machine-to-Machine (M2M) communications all promise scope for the T&L sector to tackle critical issues in new ways. What's more, as technology continues to evolve, the associated costs and deployment risks are declining, making it easier and less expensive for organisations of all sizes to drive efficiencies, enhance performance and become leaner and more productive.

The real question now is how these technologies can be best utilised to meet the challenges facing the T&L sector today.

CONNECTING TO TOMORROW

The Australian T&L sector is the circulatory system of our nation, generating 14.5% of Australia's GDP and providing more than one million jobs across 165,000 companies[2]. Without it, our natural resources, our agricultural produce, the goods we manufacture, and the goods we import would not reach their destinations, whether Bundaberg, Burnie or Beijing.

Just as with the circulatory system, it is the multitude of connections that make this distribution of goods possible – not only the physical infrastructure, such as road and rail, air and maritime networks, but also the technology platforms that enable the flow of supporting data. Indeed, from fixed lines to mobiles, the internet and more, technology already underpins many of the interactions between those in the T&L sector, their partners, and their customers.

Yes, we are connected, but are we making the most of what is possible today?

This question is particularly important given that transport is crucial to the efficient movement of people and goods and therefore directly affects Australia's productivity – productivity that has been on the decline in the last decade (arguably due, in part, to the need to overhaul our transportation systems).

In particular, major industry experts have identified the following challenges facing the T&L sector:

- Productivity across the Supply Chain – The Australian Logistics Council reports that the industry has had little or zero productivity growth in the past 5-10 years
- Road congestion – the avoidable economic cost of road congestion is predicted to rise to $20 billion nationally by 2020
- The ageing workforce – the industry is struggling to attract and retain the people required to support the increase in the freight task
- Lack of interoperability across the Supply Chain – this necessitates manual re-working in many cases, and results in inefficiencies and extras costs to all participants
- Complex and inconsistent compliance regimes across federal, state and local governments
- Potential 'petroleum shock' – the road transport sector consumes 90% of total petroleum production, so any rapid rise in petroleum costs due to a supply issue could cause a massive shock to the Australian economy
- Greenhouse emissions – the transport sector contributes approximately 14% of total emissions across the nation and has been the sector of fastest emissions growth in recent years

"THE REAL QUESTION NOW IS HOW THESE TECHNOLOGIES CAN BE BEST UTILISED TO MEET THE CHALLENGES FACING THE T&L SECTOR TODAY."

MEETING THE CHALLENGE

We believe that one of the answers to meeting these challenges lies in the application of innovative technologies, coupled with the rollout of industry standards and smart government policies.

We are at a unique point in time where affordable technology systems that address the needs of the T&L sector are readily available. However, the future lies not in one single platform, but in combining these technologies to deliver a complete solution. It is all about leveraging the power of smartphone apps, social networks, Machine-to-Machine communications and more – all brought together in the Cloud. And the impact of these technology platforms will be even more effective when taken up across the entire community of businesses within the Supply Chain.

Our vision is of an Australian T&L sector that uses technology to create safer workplaces, and more profitable, collaborative, agile and productive businesses.

We see a world in the near future where trucks will give real-time location and speed data to enable fatigue monitoring, driver style analysis, and better asset utilisation. And a world where proactive congestion management, appropriate road use charging and variable insurance premiums based on how you drive are the norm.

All the technology to enable this vision is here today, be it apps on a smartphone, vehicle telematics or Cloud services to support the massive data and analytics task.

Technology areas of keen current interest, and the subject of many headlines, include:

- Initiatives and tools to encourage collaboration across a diverse and fragmented industry, from the introduction of common standards to social media tools, albeit adapted for enterprise purposes – think of how Twitter could be used to send short status messages to a community, or other social media platforms to create 'circles' of customers, partners, suppliers or even competitors. As for common standards, if companies all along the Supply Chain adhered to common standards, the need to duplicate data and processes would be greatly reduced and agility, interoperability and data integrity would be greatly enhanced
- Machine-to-Machine and telemetry platforms to enable the automated flow of data between assets that have been 'lit up' by the addition of tiny computer devices, all managed from a monitoring or control centre
- Big Data processing platforms to collect, manipulate and analyse the flood of data coming in from such 'lit up' assets. (This data is known as Big Data due to its sheer volume, speed and variety). Hidden within this data lie valuable patterns and information that can enable better business decisions to be made faster . Companies such as Google and Amazon have had the power to extract such patterns and information for some time, via their own massive server farms, however, less well resourced organisations can today cheaply rent server time in the Cloud
- Cloud computing to store Big Data, and provide cost-effective access to computes and communications infrastructure, as well as software. By making these available on a pay-for-use basis, companies in the T&L sector can quickly access the technology needed to achieve strategic goals, without the expense of developing or owning it. This not only future-proofs any investment, but also frees up capital today for the all-important implementation of new initiatives that will help to further drive productivity improvements

The following sections look at these technologies in more depth. They provide examples of how these technologies are being utilised to meet the challenges facing the T&L sector today, and how they may be leveraged further in the future.

CHALLENGES AND CHOICES FACING OUR INDUSTRY TODAY

1.0 DIVERSITY AND FRAGMENTATION

ACCORDING TO THE AUSTRALIAN LOGISTICS COUNCIL, OVER 165,000 BUSINESSES ARE CURRENTLY OPERATING IN THE T&L SECTOR IN AUSTRALIA.[3] HOWEVER, THESE BUSINESSES VARY ENORMOUSLY IN SIZE AND REACH – FROM DOMINANT PLAYERS SUCH AS AUSTRALIA POST RIGHT DOWN TO RURAL FREIGHT DELIVERY SERVICES, WITH DAD DRIVING THE TRUCK AND MUM DOING THE BOOKS. OR VICE VERSA.

For example, in the $48 billion[4] road freight Industry, the top four largest companies - only account for 8.8% of market share[5]. When sea, rail and air freight are also taken into consideration, it can be seen that there is a huge diversity of players, each with their own mission, priorities, challenges, investment profile and level of technological maturity.

FUTURE DIRECTIONS: GETTING ON THE SAME PAGE

Because of the sector's diversity and fragmentation, there can be no 'one size fits all' solution to suit the specific needs of every player. However, the case for investment in technology at all levels – from a single subcontractor to a major corporation – is obvious. Without it, productivity will suffer, and Australia will inevitably decline in international competitiveness.

Whether small or large, every T&L business has an ever-expanding array of ICT options to help it become better, faster, cheaper and more efficient. On a broader scale, however, real productivity enhancements will only be realised through collaboration – that is, improving the way in which information is identified, captured and shared throughout the Supply Chain. This requires that all systems and people involved are all working from the same page.

To ensure true collaboration, technology-agnostic, industry-wide solutions are required to enhance the sector's ability to deliver predictable and reliable flows of goods and people, whether between a company and its customers, between organisations, or across an entire industry.

Such impartial, collaborative, information sharing reduces the amount of duplication, does away with the need for companies to build their own solutions, and enables customers and suppliers alike to operate within a lower cost structure.

"By having a standard operating platform and processes, we are able to implement change consistently across the business. We've workshopped our best warehouse configuration and processes and have kept the variation by customer to a minimum."
– CIO, major Australian freight company

Today, the push towards standardisation is being led by the Australian Logistics Council (ALC) and GS1 Australia (part of the not-for-profit, global GS1 organisation dedicated to standards and solutions that improve the efficiency and visibility of supply and demand chains). In 2012, the two bodies convened the ALC Supply Chain Standards Working Group. Their focus was on better aligning the T&L sector with Australian and international industry in the adoption of global standards for information gathering and dissemination, and the utilisation of new and emerging technologies. At its heart, this effort is based upon encouraging companies to build frameworks that use open, industry standards to ensure better interoperability today, and the easier integration of promising solutions in the future.

For example, there are already many companies in the Australian market that provide routine information to their transport providers. By using global standards as a basis for information exchange, such companies are better placed to share regular data such as shipment information to reduce duplication and manual processing at the various points of goods exchange.

INHIBITORS

Many T&L players today have made a significant investment in custom-built systems based upon whichever data standards and interfaces best suited their purpose at the time. Yet while these closed systems may be state-of-the-art, they are also highly individual – creating or unpicking any customer or supplier relationship is a complex and costly process. (On the plus side, once finally embedded within the business, a company's customers may be reluctant to face the expense and effort involved in leaving). T&L companies must therefore weigh the advantages of an open, standards-based approach against their existing investment in a closed system.

2.0 BETTER COLLABORATION AND COMMUNICATION

WHILE STANDARDS AND INDUSTRY BODIES HAVE THEIR PART TO PLAY IN DEVELOPING PLATFORMS AND CASCADING INFORMATION TO ORGANISATIONS, THERE IS ALSO MUCH THAT T&L COMPANIES CAN DO THEMSELVES TO BUILD A STRONG COLLABORATIVE FOUNDATION WITH OTHERS IN THE SECTOR. AND TECHNOLOGY HAS ITS PART TO PLAY HERE TOO.

FUTURE DIRECTIONS: BUILDING COMMUNITIES OF INTEREST

Of course, examples such as shared portals for real-time track and trace, or booking, have been around for some time. But recent improvements to the availability and performance of mobile networks in Australia, including the advent of 4G, have also opened the way for smart collaboration tools such as unified communications, video and web conferencing, and sophisticated messaging systems that enhance the way people and organisations communicate.

"We have deployed BYOD, and developed a range of IoS and Android apps for safety reporting. One interesting application of the technology is apps for driver safety – to capture location, direction, speed, G force events – and electronic work diaries. We have some apps for customer reporting, but it's mostly done through portals today."

– CIO major Australian freight company

Think of how social media could be used to build communities of interest for companies with a similar mission – no matter what their geographic location. How corporate blogs could be used to share insights into current challenges and solutions – either internally or with a wider audience. Or even how Twitter could be employed as a means of sharing alerts and information between companies and partners operating in the same sphere.

At its core, social media is about open communication, sharing and collaboration, and all these traits are equally critical to the success of any Supply Chain. Social media tools could be used not only to share knowledge within a company, but also for external communications with other members of the Supply Chain. Increasing visibility is where social media can add value – far beyond the sharing of links to cat videos on YouTube.

CASE STUDY: CON-WAY TWEETLOAD™

In 2010, the American firm, Con-way Multimodal, introduced Con-way TweetLoad™ – an innovative, tool that helps carriers find freight loads leveraging Twitter. By following TweetLoad on Twitter, carriers can quickly see the latest available shipments, and place bids on available loads daily.

Previously, carriers had been able to view these loads via the Con-way website, however the TweetLoad tool is designed to make life easier for carriers, updating information every 15 minutes and pushing shipment information directly and automatically to any carrier who wants it, even on their mobile devices.

By monitoring and contributing to social media, companies can not only enhance understanding of the environment across the Supply Chain, but also help prevent the escalation of brewing issues.

"As well as using social media to monitor our brand, we see it as a useful tool for building safety networks and aiding compliance. There is great scope to create a networked community around this vital issue. Other uses include electronic proof of delivery on demand, and informing us of events where there is an issue – i.e. tweets and SMSs are sent by exception."

– Head of Supply Chain for a major manufacturing company

Across in the consumer world, smartphones and tablets have revolutionised the way we communicate, buy and consume entertainment. Adoption within the Transport and Logistics business has been inconsistent to date; however, leading businesses recognise that deploying apps on these devices is a fast, effective and low-cost way of deploying business solutions within the company firewall, and also a great platform for integration with suppliers, contractors and more.

Further, many of these solutions are both mature and require little investment aside from the imagination to explore how they could be used to help reduce costs, increase operational efficiencies, improve collaboration and facilitate the flow of critical business intelligence.

There are also specific platforms on the market today to encourage collaboration, such as Whispir – a smart conversation platform that uses mobile, email, voice, social and web solutions to link staff, customers, suppliers and the wider community too, if required.

BETTER COLLABORATION AND COMMUNICATION (CONT.)

FUTURE SCENARIO: TWITTER COMMUNITY

Driving a load between Sydney and Melbourne, Jack is held up by a major road accident that has blocked both lanes of the highway. He stops his vehicle and logs onto his Twitter account from his mobile phone and quickly tweets an alert to the #updateT&Lroadfreight Twitter community. All subscribers to the site receive Jack's alert in real-time. Another driver a few kilometres behind Jack spots his alert and swiftly plans an alternative route to avoid any delay; Jack's boss receives the alert via IM on his computer at work – the delivery schedule is adjusted accordingly, and the customer informed by SMS of the likely new arrival time.

(Twitter is a free social networking and micro-blogging service that has changed the way many people communicate. Twitter allows users to send updates or 'tweets': text-based posts, up to 140 characters long, to the Twitter website via SMS from their mobile, instant messaging (IM) from their computer at home or work, or through a third-party application.)

Beyond the use of social media, Cloud computing too offers much promise as a platform to encourage collaboration and communication across the supply chain. Many companies already run departmental systems such as salesforce.com in the Cloud so that all staff in the company have the information they need at their fingertips. In much the same way, Cloud platforms could equally be used to give all parties in the supply chain visibility and access to relevant information and tools, and enable them to share services.

As well as enabling a whole community to communicate and collaborate, such a platform would also offer a point for supply chain wide command and control – essential in an increasingly global and complex sector where one incident – for example, a hold up in customs or a stock shortage – could affect many others down the line. Shared access to such information can only benefit the productivity of the community as a whole. (See also Section 7.)

INHIBITORS: ARE WE TOO OLD?

While social media platforms and other smart tools offer promising new ways to collaborate and build networks, our industry's ageing workforce may be one key factor that is inhibiting uptake to any serious extent. (The average age of an interstate linehaul driver is 57.)

Unlike those in younger generations who have grown up using Twitter and Facebook, many in the industry today are less familiar with these platforms, and have doubts about their business utility. Perhaps social media's true potential will only be realised as the industry addresses the issue of attracting and retaining a younger workforce for whom constant connection is a natural state of affairs.

Competition is another key inhibitor. According to Telstra research, some of those who are cautiously dipping a toe in the water remain concerned about the potential business impact of sharing intelligence with the world, including competitors.

"Social media is good for brand monitoring only. Our customers are businesses, and businesses don't use social media to interact with transport companies."
– CIO, major Australian freight company

3.0 THE RELENTLESS PRESSURE TO REDUCE COSTS AND IMPROVE PRODUCTIVITY

THE RISE OF THE AUSTRALIAN DOLLAR TO UNPRECEDENTED HIGHS OVER RECENT YEARS HAS HAD A MAJOR IMPACT ON THE MANUFACTURING AND RESOURCE SECTORS, WHICH TOGETHER COMPRISE 27% OF THE NATION'S MARKET FOR ROAD TRANSPORT, AND 30% OF THE MARKET FOR AIR, SEA AND RAIL FREIGHT[6]. AND WHEN THESE INDUSTRIES SUFFER, SO TOO DOES THE T&L SECTOR.

Indeed, in this turbulent post GFC market, the T&L sector has experienced a perfect storm of negativity – rising fuel prices, falling demand, higher levels of competition, and ongoing market shrinkage. Unsurprisingly, some road transport businesses have gone to the wall. Those remaining are faced with tight margins and low levels of profitability. All companies are facing the pressure to cut costs and improve productivity at the same time.

FUTURE DIRECTIONS: DOING MORE WITH LESS

Eking out value from investments – 'sweating' existing assets – is the obvious answer to driving down costs, whether it be through better managing warehouse density, intelligent use of demand planning systems or smarter route planning. For example, getting any vehicle to carry more, more often, and more efficiently.

But only by understanding how assets are currently being used is it possible to devise any step change improvement. In other words, we need to 'light up' assets so we can both track and use them more effectively. This requires not just a means of capturing and measuring their activity, but also a means of storing and farming the huge amount of data generated.

The ability for assets to talk to each other via tiny computers (also known as Machine-to-Machine communications) has, of course, been around for some decades now, and is already being used in the T&L sector to help improve fleet utilisation and visibility of assets. (Some of these solutions have been delivered via Telstra in conjunction with other partners including Trimble and Navman-Wireless.)

More recently, we've seen the advent of the Cloud (off-site data storage and other pay-for-usage services). And then there's Big Data, a term which very neatly describes the huge amount of data created by millions of 'things' all talking to each other via Machine-to-Machine communications.

These three platforms aren't brand new, but harnessed together, they offer a raft of ways in which those in the T&L sector can work their assets harder and make better business decisions, faster.

INHIBITORS

Of course, return on investment (ROI) is a critical consideration for all in the T&L sector, with road freight companies being particularly sensitive to short timeframes. And, as with any investment, there are always questions: is this the right technology? Could our investment be better applied elsewhere? How quickly will we see a return?

For those companies already committed to substantial capital expenditure on fixed assets, the thought of spending yet more on new technologies such as Machine-to-Machine and a Big Data platform will likely be met with reluctance. But it will be necessary. As is becoming increasingly apparent, the business drivers for change are powerful and dumb assets – no matter how modern – will not help you work smarter.

"For future investments, the challenge for us is the speed of investment and the time to implement. There is definitely potential for new technologies such as Cloud to help support last mile B2C deliveries."
– CIO, major freight company

4.0 BETTER ASSET UTILISATION

AS DESCRIBED IN THE 2012 BVL INTERNATIONAL WHITEPAPER: THE CLOUD – LOGISTICS FOR THE FUTURE[7], TECHNOLOGICAL INNOVATIONS SUCH AS MACHINE-TO-MACHINE COMMUNICATION WILL INCREASINGLY BECOME CRUCIAL ENABLERS FOR TOMORROW'S T&L SECTOR, WITH ANY NUMBER OF POSSIBLE APPLICATIONS.

In essence, Machine-to-Machine communication allows physical objects to generate data automatically via tiny computers that are connected to the internet, as is the case with RFID (Radio Frequency Identification Device) tagged freight.

Machine-to-Machine communication can enable assets such as vehicles and third party infrastructure like traffic lights to talk to each other – quickly, directly and without the need for human intervention hence the descriptive term 'the Internet of Things'.

Feeding data direct to an operations centre, Machine-to-Machine communication can also be used to automate processes and free up the workforce for more important tasks. Machine-to-Machine communication also facilitates the remote control and monitoring of business-critical assets, and provides timely information to aid decision making.

Exactly how any Machine-to-Machine network is set up depends on the application. For example, a monitor could trigger a switch, a meter could send data to a billing system, or equipment could be set up to send alarms or reports back to a central monitoring point.

A number of platforms exist for the transmission of such data. However mobile networks, such as the Telstra Next G® network are of particular interest, given that they are already well established, highly scalable, and increasingly being dimensioned to support more data.

"Machine-to-Machine communications is the key to the future of the business in terms of productivity measures. If we can get information back from the pallet, container, or trailer, then we can manage the asset better. We can also use data from the engine management system to proactively manage maintenance. With this data, we can avoid service failures prior to them happening. As always, though, we need to use the right technology for the right job. For example, it's more important to be able to track refrigerated containers than other assets."
– CIO, major Australian freight company

FUTURE DIRECTIONS

Into the future, Machine-to-Machine platforms could lead to possible industry-wide innovations such as the better management of congestion. However, the real value of this platform will only be realised when it is harnessed with the Cloud, and with Big Data analytics platforms that allow the intelligent application of the information collected to support informed decision making.

FUTURE SCENARIO: CONGESTION CONTROL

Road congestion is a major problem not only on the streets of Australia's capital cities, but also on our major freight corridors, and on the road and rail access points to our major ports, including Port Melbourne and Port Botany in New South Wales. However, in the future, Machine-to-Machine technologies could help control this congestion. For example, traffic lights equipped with miniature cameras and computers could feed data on traffic flows to a central monitoring system that then disperses information on congested routes to all Machine-to-Machine enabled freight vehicles in the vicinity.

INHIBITORS

For real-time congestion management to work, there needs to be a critical mass of data feeds live on the network. For this to happen, vehicles need to provide their longitude, latitude, speed and direction to the intelligent road management systems. The first major challenge is understanding how the solution will be funded: who is going to pay for what. The second major issue will be the system adopted: will this be voluntary, through legislation or encouraged through financial incentives such as reduced insurance premiums?

CASE STUDY: RFID PRODUCTIVITY ENHANCEMENTS AT PORT BOTANY

In early 2011, Sydney Ports went live with its Port Botany Landside Improvement Strategy (PBLIS). By that May, its much-anticipated truck tracking system went live. As part of this strategy, all truck carriers visiting Port Botany were required to be fitted with a Radio Frequency Identification Device (RFID) to allow Sydney Ports to capture the movements of each truck as they pass through fixed gates in the port precinct. The aim? To measure truck turnaround time from queue to gate out, and to improve the service levels of both truck carriers and stevedores at Port Botany (with financial penalties for non-compliance.)

As reported in the organisation's Annual Report, during the first 12 months of operation, truck turnaround times improved by 30% – to an average of 32 minutes a vehicle – compared with 2009 trial data. Around 95% of trucks were found to arrive within their allotted time, up from the 72% recorded in the trials. For the first time in many years, even during the peak Christmas period, no lengthy truck queues were congesting the port.

5.0 BETTER FREIGHT MANAGEMENT AND TRACKING

WHILE MACHINE-TO-MACHINE PLATFORMS ARE USED TODAY FOR TRACK AND TRACE IN THE PACKAGE DELIVERY SECTOR, ITS USE IN CONTAINER AND PALLET ASSET TRACKING IS LESS MATURE.

In Australia, for example, many carriers still rely upon dockets being signed each time a pallet is handed over to the next link in the Supply Chain. Successful field trials of RFID pallet tracking were carried out in 2007 (with involvement from Chep, Telstra and GS1); however, no way has yet been found to overcome the cost and complexity of securing the RFID device to the wooden pallet.

FUTURE DIRECTIONS: TRACKING BY TOUCH

One related technology currently exciting much interest is NFC or Near Field Communications, with optimists suggesting that NFC has the potential to deliver all the benefits that RFID initially promised, but has yet to realise.

Evolved from RFID communications technology, NFC is designed for near-to or physical touch applications. It typically works in a range of several centimetres and features a fast reading time – less than half a second – so NFC devices are usually tapped together or momentarily held near each other during a transaction – think of the chips currently used in touch-and-go credit cards and public transport smartcard systems such as Melbourne's Myki.

NFC can also be used to pair devices for wireless networking, exchange data over short distances and for authentication services. And its potential is amazing: given that many smartphones and tablets these days are NFC enabled, the technology is literally already in the hands of many in the Supply Chain. (Nine out of the 10 largest smartphone vendors currently ship NFC-enabled devices, including best-selling handsets like the Samsung Galaxy S3. NFC technology is supported on smartphone platforms such as Android, Windows Phone and BlackBerry with only Apple yet to embrace the technology for the iPhone. A forecast from Berg Insight estimates that by 2016, there will be 700 million NFC smartphones globally.[9])

There are three operating modes for NFC devices:

- Reader/writer – where an NFC device communicates with a contactless tag such as common RFID tag. This mode allows an NFC device such as a smartphone to replicate much of the functionality of dedicated RFID readers
- Peer-to-peer – where two NFC devices actively exchange data with each other. This can feature advanced cryptography to ensure data is exchanged in a very secure way
- Card emulation – where an NFC device emulates a contactless smartcard (for example allowing a smartphone to act as a replacement for contactless credit cards, transit cards and access cards)

NFC smartphones are fully-fledged members of the RFID ecosystem. They also feature large app stores, substantial processing power, an array of sophisticated features such as positioning and high definition cameras, and high-speed connectivity through pervasive mobile broadband networks such as the Telstra Next G® network. This means NFC smartphones can provide an efficient way to extend capabilities typically associated with sophisticated tracking and handling systems – such as dynamic package routing and fine-grained tracking – right out to the edge of the distribution network, and without the expense of managing lots of highly distributed, dedicated equipment. For example, a courier could simply tap an NFC smartphone to an RFID tagged package or basket at a distribution centre to acknowledge acceptance, and then again at the delivery point or point of transfer to provide real-time visibility of the location and state of the package.

Because NFC devices can also communicate with each other to exchange secure information such as digital signatures, they can play a role in reducing fraud, theft and repudiation risk across logistic networks. For example, couriers could simply tap their phone to the recipient's NFC smartphone to exchange digital signatures – creating very strong proof of acceptance.

CASE STUDY: SMART TAG

Developed by the AIOI Systems Company, Smart Tag is a business card size display that utilises the e-paper to display information, such as date, company name and logo, barcode, and product name. Through Near Field Communication (NFC), information can be read using a Sony reader/writer, AIOI reader/writer, or other read/write capable devices such as smartphones. It can also keep data displayed on its screen without any electric power.[8]

INHIBITORS

Probably the main inhibitor to implementation has been the experience of RFID in this sector. RFID has been trialed by a number of businesses over the past 10 to 15 years – the compelling business case was rarely achieved (despite the high level of publicity on the usage in companies such as Walmart). The cost and complexity of an RFID rollout along a supply chain has always been a challenge to business. So what's changed now? Because NFC will be used in the consumer world, the costs and accessibility of tags, readers and writers will be dramatically reduced – as noted above, there will be 700 million NFC-enabled smart-phones in the market by 2016.

"The key question for us is which technology to pick. Also, due to the size and complexity of our business, the big issue is around change management rather than the roll-out of the technology."

– Head of Retail Supply Chain

6.0 ADDRESSING RISING FUEL COSTS, ENVIRONMENTAL AND COMPLIANCE ISSUES

THE COST OF FUEL, THE NEED TO REDUCE OUR ENVIRONMENTAL FOOTPRINT AND MEET COMPLIANCE REQUIREMENTS ARE KEY CONCERNS FOR MANY IN THE T&L SECTOR.

Again, technology platforms offer fresh promise, with Real-Time Fleet Management (RFM) being identified as the top opportunity for companies to reduce costs and carbon emissions according to the Telstra-commissioned 2013 Climate Risk report: Using ICT to Unlock the Benefits of a Low-Carbon Economy. The report determined that minimising the distance travelled by empty freight vehicles by monitoring them to better assign cargo would not only avoid carbon emissions of 12.24 metric tonnes of CO2-e per year, but also deliver savings of $5.49 billion per year.

According to the report:

"Currently, of the distance trucks travel to deliver freight, almost one-third is driven without loads[10]. Real-Time Fleet Management (RFM) provides freight brokers with the communication and management systems they need to offer freight to empty or partially laden vehicles, increasing their average load factor. By increasing the efficiency of freight operations, RFM could reduce emissions in a sector that has undergone rapid emissions growth. Additional benefits of RFM are avoided fuel costs, and reduced capital stock required, vehicle wear, and on-road costs (such as taxation)."

On the compliance side, Australia has a complex and changing landscape, characterised by a lack of common standards and legislation between the states and territories. In all, there are 23 state and federal transport safety boards; three new national safety boards – Rails, Maritime and Heavy Vehicles – were introduced in January 2013.

For road transport, however, introduction of legislation in 2005[11] for Victoria and New South Wales has helped to harmonise requirements between the states. A key feature of the legislation is the Chain of Responsibility provision, which extends the general liability for offences to all parties involved in the consignment, packing, loading and receiving of road freight.

The laws also include improved enforcement and investigative powers, risk-based categorisation of offences (minor, substantial and severe) and a wider range of sanctions and penalties.

Initially, specific Chain of Responsibility provisions only applied to mass and dimension limits and load restraint offences. However, over time, further Chain of Responsibility provisions were drafted to include other offences such as fatigue-related breaches, vehicle standards and speeding. Compliance with these requirements – while necessary and supported by industry – adds further layers of management and operational complexity, together with associated costs.

The heavy vehicle industry will be impacted again should a Carbon Tax be implemented in mid 2014 as scheduled.

FUTURE DIRECTIONS: REMOTE MONITORING AND AUTOMATED DATA CAPTURE

RFM aside, other opportunities to reduce fuel use and costs (and thus environmental impact) exist through platforms that allow for driving style analysis and help companies meet compliance requirements. For example, driving style analysis could allow the company to reduce fuel consumption and therefore help to reduce their carbon emissions – important given the probable Carbon Tax introduction for heavy freight in 2014. Meanwhile, monitoring could also help companies meet regulatory requirements for driver fatigue management, speed control, and so on.

"Most of our challenges are on the road – our focus today is on yield or getting more out of what we have. Productivity could be improved by better information on delivery activity or the drop time between drops. Already the ability to validate driver claims based on actual data has led to improved On Road Driver Management; however, it is still difficult to compare drivers and runs due to the different profiles and changing conditions."

Australia is seen as one of the global leaders in Regulatory Telematics; Transport Certification Australia (TCA) is the government body responsible for defining the standards and monitoring compliance through the Intelligent Access Program (IAP)

This voluntary program uses the Global Navigation Satellite System (GNSS) to monitor heavy vehicles' road use, giving transport operators flexible access to the Australian road network to suit their specific business and operational needs. In return, IAP provides road agencies with confidence that heavy vehicles are complying with the agreed road access conditions.

INHIBITORS

Two key inhibitors to the uptake of safety and compliance platforms are the perceived costs of the technology and the lack of clear nation legislation.

For a number of years, the T&L sector, through the Australia Logistics Council, has lobbied for mandatory telematics compliance. In an open letter to the National Transport Commissions Nation In-vehicle Telematics Strategy, ALC together with Toll, Asciano and Linfox stated, "We believe it should be mandatory for companies to monitor fatigue and speed using telematics technology. We believe it is vital to amend the current counting of hour rules to make them nationally consistent[12]."

CASE STUDY: HOW AM I DRIVING?

A case-study published by the UK's Department of Transport provides a useful insight into the potential of vehicle and driver performance. Thorntons, a Derbyshire-based logistics company with 43 goods vehicles and 44 tractor – trailers, has been monitoring fuel use and driver behaviour.

Overall fuel consumption is tracked by a computerised fuel management system linked to the site's diesel fuel storage tanks, coupled with an intelligent driver fuel key system enabling operational staff to monitor all fuel drawn on-site. Odometer readings, which are requested by the computerised system when drivers insert their fuel key in the fuel dispenser, are verified manually against the drivers' tachograph charts.

The information from the in-cab data logger is automatically downloaded wirelessly on return to base.

Driver performance is measured by a penalty points system relative to the following pre-set parameters and is then expressed as a percentage of these:

- Idling – the time when the vehicle is stationary with the engine running is recorded. After two minutes idling time, the data logger issues an audible warning to the driver and penalty points are deducted after a total of three minutes
- Over-revving – the optimum engine speed level is within the vehicle's green band. An audible warning is given when the driver approaches the top end of the green band and points are deducted when the green band is exceeded
- Speeding – the parameter for vehicle speed is set voluntarily by Thorntons with the help of the equipment supplier at 54 mph and points are deducted when this speed is exceeded
- Harsh braking – penalty points are deducted if vehicle speed decreases faster than a given rate. The rate is set voluntarily at 11 km per hour per second (0.3g) by Thorntons with the help of the equipment supplier.

Both idling and speeding, which can easily be avoided by drivers, are penalised more heavily than over-revving and harsh braking. However in emergency situations harsh breaking is sometimes the only alternative to avoid accidents. These measures have led to demonstrable fuel usage reduction with correspondingly lower carbon emissions.

7.0 MANAGING THE DATA TSUNAMI

"THE PACE AT WHICH ADDITIONAL DATA IS GENERATED HAS CONSTANTLY INCREASED SO FAR AND IS EXPECTED TO FURTHER INCREASE. DESPITE THAT, THE AMOUNT OF 'SMART' OBJECTS GENERATING DATA IS EXPECTED TO GROW EVEN FASTER. THUS, QUESTIONS PERTAINING TO AUTOMATIC DATA STORAGE AND PROCESSING WILL LIKELY GAIN IN IMPORTANCE[13]."

Possibly the biggest challenge for businesses moving to Machine-to-Machine platforms will be how to manage and secure the tremendous amount of data generated. For example, rather than a few daily entries in a driver logbook, automated readings from an in-vehicle black box may jump to many thousands per day, month or year – a massive increase.

Data will also flow in from a range of other sources such as network sensors, video data and third party sources like Bureau of Meteorology forecasts and social networks. Big Data is today's label for these types of large and diverse data sets, and some type of platform is required to manage this data and extract business value.

FUTURE DIRECTIONS: COLLABORATIVE ANALYTICS

Such a Big Data platform will need to incorporate a range of analytics tools, capable of working with new, near real-time data, historic data, and third party data. Data will no longer be primarily contained within the one organisation as has historically been the case; instead, as we move into tomorrow's more collaborative, connected world, each player will become part of a new ecosystem where data needs to be acquired from or shared with external parties.

FUTURE SCENARIO: A FAIRER SYSTEM OF ROAD CHARGING

While a modal shift from road to rail would certainly help improve road congestion and reduce the need for new infrastructure, another option to improve our roads is to price road use correctly and transparently, so that heavy users pay their fair share towards future investments in critical road infrastructure. In such a scenario, Machine-to-Machine communications would collect the information, Cloud would store it, and Big Data platforms would allow data mining and analysis to determine who has used what, and how much they should be charged. (It should be noted that while the technology to support road charging does exist today, there are a number of major legal and political obstacles to its adoption.)

In one such possible scenario, John operates a haulage business using a fleet of trucks to move goods between regional centres and metropolitan distribution points for various big clients. Managing cash flow and tax paperwork has become easier since the introduction of the new pay-as-you-use road charging system. No more big annual rego bills on each truck. No more fuel tax reimbursement paperwork. The road charges he pays match the work coming in to the business – and that's important due to seasonal issues.

To make the change, John had a small box installed in each truck that keeps track of how, when and where they use the road. Now, each week, John gets an online bill for road usage costs for each truck in the fleet. If something doesn't look right, he can go online to review on a map all the journeys his trucks made and the charges incurred. He was a bit sceptical at first, but he admits it's now easier to work out the costs and profits for each load hauled compared with the old way of working.

For government too, the new system has its advantages. Previously, each year at budget time, state governments had to argue the case for additional road funding from collected federal fuel taxes. Damage caused by heavy trucks has been the major factor driving requests for maintenance funds. But what's been difficult is getting hard data on how trucks are using each road to justify claims at the negotiating table. Now, with the new system, state governments can generate the numbers that show the volumes and loads on each road so it's easier to show where funds are needed and why.

INHIBITORS

Issues for urgent consideration include how to store this data, how to use it, how to analyse it to more efficiently manage the Supply Chain, and how to keep it secure. (With such volumes of data being created, data loss and integrity issues present a very real risk to revenues and productivity.)

8.0 CONTAINING COSTS AND IMPROVING PRODUCTIVITY

AS A RESULT OF THE DATA TSUNAMI, MANY COMPANIES ARE NOW LOOKING CLOSELY AT CLOUD TECHNOLOGY.

For a company to build its own proprietary storage and processing capabilities, the costs would generally be considered prohibitive; in contrast, the Cloud offers a flexible, scalable way of delivering and consuming everything from infrastructure (e.g. servers to handle the data) to software updates or unified communications solutions. Instead of investing and maintaining their own ICT assets and capabilities, companies can access carrier-grade facilities, software and services – all on a pay-for-use basis. This helps to reduce operating and capital expenditures, and means that it is possible to scale up or down as required – a particularly important consideration in the highly seasonal T&L sector.

"We have huge volume differences between times of the day, days of the week and months of the year. Monday is by far our peak delivery day. Having Cloud-based solutions that are charge by transaction or use by second/minute would be a definite advantage."

– Major freight company

FUTURE DIRECTIONS:

Key benefits of Cloud computing include:

- On-demand self-service – users can sign up and receive services without the delays that characterise traditional IT
- Broad network access – the Cloud can be accessed through a range of devices: desktop, laptop, tablet, mobile, etc.
- Resource pooling – across multiple customers for greater cost-efficiency
- Rapid elasticity – allowing users to scale up or down to cope with demand peaks and troughs
- Measured service – use can be accurately metered and billed
- Geographic independence
- Predictable, non-capex costs.

Cloud computing offers two key advantages: flexibility and speed. Supply Chain partners leveraging Cloud computing will be able to adapt and respond more quickly than those using traditional siloed systems that require data duplication, do not interface easily with their partner's systems, and require costly integration.

However, not all Clouds are the same. Indeed, there are four key types of Cloud, categorised by their configuration, users and accessibility.

PUBLIC CLOUD

A Public Cloud provides a range of services to public users. A Public Cloud is usually owned by a company that specialises in Cloud services, such as Amazon or Telstra. Generally, Public Clouds are the most economical choice of Clouds as the resourcing costs are shared among the broadest base of users and is commonly known as a Utility Model. They also offer the widest range of products and services with relatively simple and inexpensive implementation. Public Clouds can be inflexible as they must provide a base level of functionality suitable for all users. This can make it inefficient to configure services to meet a single user's specific requirements.

"Cloud allows us to avoid the capital expense of running IT systems; our product slotting and demand planning software are all Cloud-based. This means our investment is reduced and is no longer on the balance sheet. Demand planning has also driven down the inventory, which is a massive benefit. Our only concerns are around holding custom, product and financial data in the Cloud, although we have not had a problem so far."

– Regional distributor

PRIVATE CLOUD

Also called 'Internal Cloud' or 'Dedicated Cloud', these are Clouds that only provide services to one organisation. A Private Cloud may be hosted and managed internally or by a third party. While a Private Cloud is highly flexible and can be adapted to meet that organisation's specific needs, it can also be more expensive than other alternatives. Because a single organisation pays for the entire service, it is also responsible for financing technology and infrastructure upgrades.

COMMUNITY CLOUD

A Community Cloud provides shared services to a community of organisations that have concerns in common – e.g. their mission, security requirements, or compliance considerations. A Community Cloud may be hosted and managed internally or by a third party. Generally, Community Clouds are more economical than Private Clouds as the resourcing costs are shared among a broader base of users than a Private Cloud. The trade-off is flexibility. The functionality of Community Clouds is determined by an agreed level and selection of services. Features that only some members require can be relatively costly to implement.

HYBRID CLOUD

A Hybrid Cloud combines the Public and Private or Community Cloud delivery models. For example, an organisation might use a Private Cloud for predictable applications but tap into a Public Cloud to cope with usage spikes or seasonal increases.

FUTURE SCENARIO: SHARING COSTS WITH COMMUNITY CLOUD

John operates a medium sized distribution business in New South Wales, and in partnership with a number of similar businesses, has invested in a Community Cloud for data storage and delivery of their software and communications services. Because the organisations have both needs and issues in common – for example, their mission, security requirements, policy and compliance needs – the Community Cloud works well for them. Not only does each member of the community only pay for what they use, because they all share the same services, they are able to keep costs down even more. As an added advantage, now that all the companies are operating from the same platforms, doing business together has never been easier.

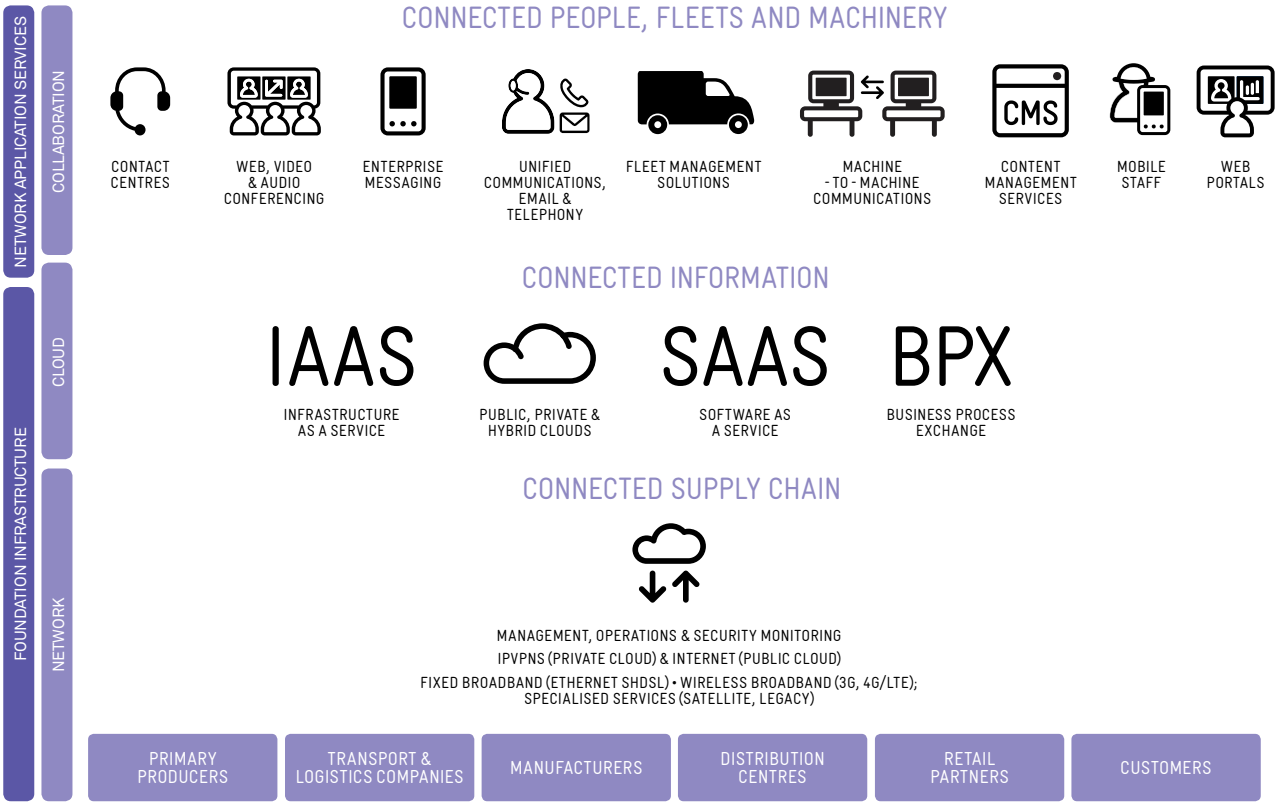
Today, in Australia, a number of vendors offer Cloud services. However, telcos offer the benefit of actually owning the networks across which the data flows. As a result, they control not only the Cloud, but also the networks, the data flows, security and so on. Telcos also have significant experience in handling large volumes of data that need to be stored securely and capable of being retrieved when required. This is likely to prove an essential consideration for transport businesses, particularly when it comes to issues relating to compliance (again, depending on evolving regulatory requirements.)

"We see Cloud providing a great way to share information with suppliers cheaply, but its potential has barely been tapped yet."

– Supply Chain Director, major national retail and services company

INHIBITORS

Cloud too, has its critics – however, as the technology matures, key concerns around security and control are dissipating. Our own Cloud offering, for example, is based on Australian data centres, fully auditable under Australian jurisdiction to comply with governance and privacy requirements. Robust security features include network-based firewalls, intrusion prevention and secure remote access – all locked down under one integrated service, while those seeking even more security can opt for a Private Cloud with ISO 27001 security accreditation.



INVITATION TO THE FUTURE

THE AUSTRALIAN T&L SECTOR IS UNDOUBTEDLY A COMPLEX ONE, AND ONLY LIKELY TO BECOME MORE SO AS TECHNOLOGIES AND SUPPLY CHAIN, RETAIL, REGULATORY AND COMPLIANCE MODELS EVOLVE.

The Australian T&L sector is undoubtedly a complex one, and only likely to become more so as technologies and Supply Chain, retail, regulatory and compliance models evolve. No one business can be expected to handle the plethora of challenges that lie ahead, or indeed to master the many domains upon which the future will be based.

The reality is that the quest for continuous productivity gains is a fundamental part of how we run our businesses. Technology has a key role to play in this journey.

We believe that technology, coupled with the aggressive adoption of standards across the industry, will have a dramatic impact on productivity, efficiencies and profitability. With collaborative platforms underpinned by common standards and purpose, Australia will be able to enjoy a customer-centric, agile and responsive Supply Chain that can face up to the challenges of the Asian century.

In this paper, we have outlined how technologies that were born in the consumer world can go a significant way to address these challenges. Furthermore, being affordable, widely accessible and designed for the mass market, these technologies now offer companies in the Supply Chain a real opportunity to exploit economies of scale.

Telstra is in the unique position of being very close to the consumer and at the same time a strategic partner to many of the enterprises that make up the Supply Chain in Australia. Our vision now is to unite the challenges of the Supply Chain with today's new and disruptive technology platforms.

And momentum is with technology change – by 2015, IDC says that you will be able to secure business services from the Cloud for any requirement – from payroll to demand planning or tracking products. There are also now almost 1.5 million[14] Apple, Windows and Android apps.

So the inhibitors for business process change are fast unravelling.

Many of the future's most significant challenges are inextricably entwined with the need for streamlined – ideally automated – information exchange: Big Data management and operational systems and processes that liberate companies to focus on their core business and competitive strategy. We understand both your market and the technologies, and we are uniquely placed to help you meet the demands of a smarter, more productive future.

While most organisations would have some experience of Telstra as Australia's premier telecommunications company, our expertise extends far beyond carriage. To support new initiatives across the transport and logistics sector, we can also draw upon proven platforms such as:

- Telstra Wireless M2M Control Centre – a sophisticated, Cloud-based platform with unique capabilities to help you deploy and manage your Telstra Wireless Machine-to-Machine services. The platform makes it easier to establish and deploy new connected device solutions on the Telstra Next G® network by providing:
  - Global visibility into all of your (SIM) services supporting Machine-to-Machine communications over Telstra's Next G® network
  - A set of self-service tools for provisioning, near real-time diagnostics, and usage controls to help drive efficiency and gain strategic insights to manage your business more effectively
  - A powerful automation engine to help you to streamline operations and scale faster.
- Telstra Cloud Computing – a secure, scalable way to support your back-end processes and infrastructure using an affordable, consumption-based pricing model
- Whispir - a clever conversation platform that uses mobile, email, voice, social and web solutions to link your staff, customers and suppliers
- Telstra Next IP® network – our fixed line network designed for 99.999% reliability that offers unprecedented speed and reach with high security
- Telstra Next G® network –Australia's largest mobile broadband network to link your people and assets across Australia. It also now has even faster speeds of 4G LTE technology in available 4G coverage areas.

Of course, there is no 'one size fits all' cookie cutter approach. All companies have different needs and strategic objectives, and all have their own specific technology or business issues to confront. What most need now is a provider who understands and has experienced the challenges of transformation, has unlocked the capabilities the T&L sector now seeks, and has invested many millions in the infrastructure and resources required to collaboratively develop solutions that deliver real results.

At Telstra, we take our leadership role very seriously, and we will continue to invest in solutions that provide the mechanism for our customers to reduce both their current and future costs, and realise productivity gains.

We welcome the opportunity to discuss how you could leverage our expertise, and invite you to talk to us about your specific requirements.

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Charlie was born in Lagos, Nigeria and educated in the UK. He has spent over 20 years in a variety of leadership roles in the express logistics sector based in Europe, Asia and, since 2004, Australia. In these roles, he has developed and deployed mobility, Supply Chain visibility and customs clearances solutions globally.

In 2012, Charlie was appointed Manufacturing Transport and Logistics Industry Executive in Telstra's Industry Development team.

Charlie holds a Bachelor of Science in Fuel and Energy Engineering from the University of Leeds.

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