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ELECTRONIC LODGEMENT

Dear Sir or Madam

Telstra Corporation Limited - Transcript from Investor Day

I attach a copy of the transcript from the Telstra Investor Day held on Thursday 23 April 2015, for release to the market.

Yours faithfully

Damien Coleman
Company Secretary

Telstra Investor Day, 23 April 2015 – Transcript

MR P. KOPANIDIS: We might make a start. Good morning everyone and welcome. I'm Peter Kopanidis, Telstra's Head of Investor Relations. On behalf of Telstra, I welcome you all here today, here in Sydney and those appearing via webcast, to our first investor day for 2015: Growth Through Network and Product Differentiation. As a symbol of respect, it is our custom at significant Telstra events to acknowledge Australia's First People. Today, therefore, I would like to acknowledge that we meet on the traditional lands of the Gadigal People of the Eora Nation, and pay my respects to elders both past and present.

Presenting today will be Warwick Bray, Group Managing Director - Products; Mike Wright, Group Managing Director - Networks; Mike Burgess, Chief Information Security Officer; and Vish Nandlall, Chief Technology Officer. After presentations from our four speakers, we will be taking questions from investors and analysts, followed by media and then industry analysts. With that, I will now hand over to our first speaker, Warwick Bray, Group Managing Director - Products. Good morning, Warwick.

MR W. BRAY: Thanks, Peter. Good morning and welcome. Our corporate strategy has three priorities, and they are to improve customer advocacy, drive value from the core, and to build new growth businesses, and what you see from the four speakers this morning will be talking about those priorities. And I will start with improving customer advocacy. Some of the notable advocacy initiatives over the last year includes, on the mobile side of things, we now have 6.7 million 4G devices, including over 1.1 million 4GX-capable devices on our network. That's important because the biggest driver of preference in mobile is the network, and it's also the biggest influence on advocacy as well.

We have a sustained program to reduce excess data charges: over the last few years we've moved from $2 a megabyte to 25 cents a megabyte, to 10 cents, to 3 cents, and we're now moving to block charging, which we're not only offering to our new customers, we're offering to the entire installed mobile base as well. Combined with that we've introduced real-time data alerts, both domestically and internationally, and introduced great value international travel passes. For our customers who enjoy having a new handset every year, we introduced the New Phone Feeling product, and we now have over 600,000 customers enjoying that. And for customers who are seeking the reassurance of having 24-hour device return and repair, we have the StayConnected product, by the way you get your data reinstated as well, and we have 600,000 customers on StayConnected. We now have 1.4 million active machine-to-machine services on our network.

On the fixed side of things, just like in mobile, the biggest influence on customer preference, and the biggest influence on advocacy, is the speed and reliability of our broadband network, and over the last couple of years we've improved the speed of 1.7 million fixed broadband customers. We've introduced a service called Platinum, which is to help our customers get the most out of their home devices. They can either do that through ringing us up or having a home visit. We've now had 130,000 customers who have enjoyed that experience. Of course, we have our Wi-Fi strategy.

We have 1100 Wi-Fi hotspots at the moment, and we've announced plans to have at least 1300 by the end of this financial year extra. And we have 1 million unique users who have used our Wi-Fi service so far since launch, and we're getting outstanding feedback from the customers about the value they place on that service.

I will move now to the financial side of things. We had an encouraging half across all of our core products, where we saw the rate of growth for mobiles and fixed data increase, and the rate of decline for fixed voice decrease. I will go into some of the underlying causes of that now.

Starting with mobile and our largest mobile product, which is postpaid handheld, we saw the rate of growth increase from 3.6 per cent to 8.3 per cent. As we previewed in our mobile investor day of a year ago, there has been a change in the composition of growth, and so ARPU, is doing a lot more of the work in growth, and SIOs are doing less of the work. And

this is a big change from three years ago where we used to grow SIOs, as declines in ARPU used to dampen the growth. ARPU is now positively contributing to that growth, and I will go into the ARPU drivers on the next slide.

On prepaid handheld: we continue to see the strong growth, and that's growth coming from data usage and growth in unique users. It reflects the popularity of our Freedom plans, with the extra data inclusions, and we're also seeing that prepaid users are using more and more data, and consequently valuing the strength of our network evermore.

On mobile broadband: what we saw was a small increase in SIOs, largely offset by a decline in ARPU. This needs some explanation. This category includes tablets, cellular gateways, dongles, and embedded laptops; it includes prepaid and postpaid, and it also includes shared data SIMs, as well as dedicated data SIMs as well. So what's going on is, we're winning share but the category itself is not growing. The reason the category is not growing at the moment is that many of the tasks that customers were doing on mobile broadband-dedicated devices, they're more doing on handheld. They're either doing it on handheld because handheld screens are bigger, or they're doing it through tethering. And so some of the weakness you're seeing in mobile broadband, the converse of that is the strength of just being through on handheld. We see an enormous opportunity in this area, and the big opportunity in the consumer side of things is to replace laptops and PCs that are in our customers' homes by connected tablets, and I will come back to that. And on the business side of things, to help our business customers become more productive, especially with their field forces and sales forces through carrying connected tablets and productivity applications, so I will be going through both of those. So it's a category that is not growing very much at the moment, but one that we still have strong hopes for.

In terms of machine to machine, we've now had two consecutive halves at 17 per cent growth. I mentioned in the last investor day that I was less than enthused about the 6.8 per cent revenue growth in first half '14, so it's encouraging to get back to the high teens. From a personal view, I really love this category, especially from the case studies and the stories that we get back from our customers about the productivity benefits that they get in many cases pretty much instantaneously, from putting in machine-to-machine solutions. Also, we were encouraged to receive in 2014 the inaugural Frost & Sullivan Asia Pacific Machine-to-Machine Service Provider of the Year Award.

So, in summary, 8.3 per cent revenue growth, which is credible for a business of around $10 billion in size.

I will go through some of the ARPU effects now.

In terms of postpaid handheld ex MRO, we've now had four consecutive halves of ARPU increase. So what influences ARPU? Well, one of the most important influences is joiners, leavers and re-contractors, so it's our joiners joining us at higher than the average ARPU, leavers leaving us at lower and our re-contractors re-contracting upwards or downwards. More and more, on top of joiners, leavers and stayers which was the main effect two or three years ago and still a very important effect, we've now got the effect of customers using more data, so going into solutions like data packs and we've also got influencing the factors I've been through before – our excess data rates we're deliberately bringing down for advocacy reasons and also international roaming prices are coming down as well.

On top of that, plans are becoming more generous in their allowances. In terms of international roaming and ETCs, on both of those there was a small downward effect. Both of those – we were very pleased about that. What I would say on international roaming, we're looking forward now because we believe that the international roaming packs are very good value, so we're looking forward to some of the elasticity effects kicking in. The other sort of new effect that we're starting to see in ARPU, of course, is the influence of our StayConnected and New Phone Feeling revenues. What we're seeing in ARPU in post paid handheld, and this is different again to the last investor day, it has been a much more equal

performance across our three main customer divisions – consumer, TB and Global Enterprise and Services.

Moving on to pre-paid ARPU – and that has also increased, and that is predominantly due to increased data usage on our pre-paid plans.

Mobile broadband ARPU – the effect that you see there is – the biggest reason for the change there is a mix effect on pre versus post paid tabular tablet, cellular, Wi-Fi and dongles and also sharing versus dedicated.

On machine to machine – this would be the ARPU that I would encourage you to look at least. Our outcome in machine to machine ARPU is almost entirely influenced by the mix of services and the industries to which we sell. So we sell to some industries and the ARPU, where we might be selling hundreds of thousands of SIMs might be in a very, very low single digits. We might sell to another industry with a quite different application like a digital sign where the ARPU might be in the 20s of dollars. So where machine to machine ARPU goes is just almost purely influenced by that mix of customers. All of the customers that I've talked about are adequately profitable, so this would be the one business where sort of subscribers times ARPU doesn't make as much sense as the others.

So if we put that all together, we're seeing our ARPU being $1.20 on average, which is one of the strongest increases for many years. So, in summary, on the financial results an encouraging half for mobile revenue growth and ARPU is playing a much bigger part in that.

Today we're not saying very much in the way of forward-looking statements, but there is this exception, so on SIOs at the moment we're not seeing anything abnormal compared to recent trends. On ARPUs, it is early days, but the recent competitive dynamics may have some impact. And keep in mind that we have previously talked about EBITDA margins around the high 30s and there's no change to that view.

Moving on now to the fixed line. Encouraging in the fixed line for both parts of fixed line business – voice and data – and encouraging on ARPU as well. So for – this is – it was the lowest rate of decline in this business we've seen for some time. Fixed voice decline continues to moderate, given increasing promotion on the benefits of the fixed line, precision below the line and successful bundling. On fixed data we've seen strong growth and that's a combination of subscriber and ARPU growth. We have seen 127,000 bundles added in the half. That's particularly driven by our entertainment bundles with the improved Foxtel offer. We're also pleased to be the first major Australian carrier to introduce an AC modem into the offer, that's AC Wi-Fi which helps our customers get Wi-Fi in ever more increasing parts of their home.

In terms of the ARPUs, on both fixed voice ARPU and fixed data ARPU – well, on fixed voice ARPU we saw a reduced rate of decline and on fixed data ARPU we saw an increase. And that's a combination of – just like in mobile – precision in our joiners, leavers and re-contractors' programmes and on the fixed data side of things, it's customers choosing to migrate to higher value plans.

That's a conclusion of the financial aspect of the core products. I will move into now some of the differentiation and product plans. And starting with mobiles. Our underlying differentiation is the network and, indeed, every financial number that you've seen on the pages that we've just been through for mobiles is hugely influenced by the quality of our network. Subscribers choose to come to us because of the quality of our network. They choose to stay with us because of the quality of our network. They choose to use more data, their business applications or consumer videos. They choose to use more data because of the quality of the network and it is fundamental to our differentiation.

What does a quality network mean? To our customers it means four characteristics. The first is that they can use their smart phones and their tablets over more square kilometres of

the country. We call that the breadth of the network. But for our customers it's also important that they get a great experience across that network and that's what we call the depth of the network benefits, and they are threefold. The first is fewer dead spots, so you can still use your applications in the base of a car park or the middle of a big building. It means more reliable speeds. What does that mean? Well, our customers – there are four things they tell us that's important about the speed of the network.

The first is how fast websites snap back for business customers, how fast their applications, particularly on their intranet snap back, video load times and video quality. And, of course, fewer dropped calls is also important as well. And they're the benefits that our customers are seeking. And when Mike goes through his section on the network, he will talk about how our whole network investment is aimed at bringing – continuing to improve those four benefits for our customers, and, indeed, the product and the marketing mix is about continuing to inform our customers of those benefits.

What about the fixed side of things? Just like in mobile, fast and reliable broadband underpins differentiation. It's the largest driver of preference and it's the largest driver of advocacy and, indeed, that is why we have invested to improve the speed of those 1.7 million lines. We have been particularly pleased to do well in some of the recent broadband quality reports. The second aspect of differentiation is very much creating Australia's largest Wi-Fi network. So from early July, our fixed broadband customers will be able to enjoy a Wi-Fi network that we're building towards having 2 million hotspots in Australia and they will be able to use their broadband allowance over those and also more than 13 million around the world.

Clear and reliable calling is our heritage, and I will be talking more about where we take that in the future on the fixed line and on mobile. Entertainment is very important to us, and that's why we have the 90 channels on Foxtel over Telstra, we offer Foxtel Go so customers can see Foxtel when they're out and about and we've recently introduced Presto and there's a lot more entertainment that we have planned over the next year or two. And, finally, customers when they want to get more out of their fixed line devices at the moment, they can ring up and use our Platinum service and we've just recently extended that to help our customers with the move process. That's our differentiation today. The way we think about continuing that differentiation in the future is as follows, and this is for the mass market.

It will always be based on world class networks, as I've defined them and that's increasingly seamless and that includes our mobile network, our fixed line networks, our Wi-Fi networks and extending to our business fixed line networks. Increasingly, at that level, it's important for us to offer security as well, and that's why on both the mobile – on both mobile services and we're introducing on our fixed line service for the mass market we have our protect plans for customers who want to protect their loved ones against inappropriate content or inappropriate people. Other aspects of security that we will be offering – my colleague Mike will be talking in two presentations from now about.

The second area we think about in differentiation is lowering customer effort. This means a number of things to us, and the first is, in any transaction that a customer wants to do with us they should be able to do easily, simply online. The second aspect of lowering customer effort is making sure that we get all of our processes right the first time, and we have a continuing effort to make sure that we do that, and the third aspect of lowering customer effort is making sure that all our customer journeys work easily and simply and clearly for our customers. As an example of that we've recently improved the process when a customer comes to the end of their pre-paid broadband allowance on a tablet works much easier for them now to recharge.

The third rung is to provide more value, and the big area that we have been focussing there on is in reducing our – what we call our run-on rates, and that's putting caps on overage usage. It's bringing the excess data rates down like I talked about. It's the real time alerts and the new travel plans, and the fourth area of differentiation that we really stand for is

device peace of mind. That's why I've introduced the Platinum service on the fixed side of things and the Stay Connected on the mobile side of things, and we have got some exciting new plans to provide even more value on device peace of mind for our customers, and it's our conviction that if we can offer these first four rungs it gives us the right to offer our customers brilliant experiences. Those brilliant experiences might be our entertainment offerings, it might be music, it might be mass market applications, mainframe mass market business customers, business productivity applications. That's the framework for how we think about things.

Here are some of the emerging opportunities that we see across fixed and mobile in the mass market, and the first is– we will always stand for a great network, but increasingly end to end experiences are important, They're the end to end experiences like the video load times for the video quality, the application loads times. We need to ensure that all customers perceive that there's a big difference on our network. This not only requires smarts in the network, but increasingly it will involve an enhanced self-assurance capability, to provide customers with simple monitoring, self diagnostics and optimisation steps across their devices and services.

The second big opportunity that we see is in the installed base of PCs and laptops. What we're seeing is with the upper end tablets they really are starting to become replacements for the PCs and the tablets, and that's a great outcome for our customers that can move – they can move from what is pretty much a static unconnected device to a much more mobile and connected device, and we are very much aiming to help our customers with that transition. So what do we need to do? We need to range the devices so more and more you will see those upper end tablets which are moving into something we call a hybrid, so you'll see more and more of those in our store, and you will see specialist plans to help manage that transition, and that was the opportunity that I talked about before in that mobile broadband segment.

The next opportunity is big changes in media consumption behaviour on the right-hand side there. So on demand streaming is becoming mainstream, and customers expect the ability to access content not just on their TV, but across tablets and mobiles at home and on the go. So we've refreshed our bundles to provide better value entertainment options. We've got Foxtel from Telstra, Foxtel Go, Presto AFL/NRL, and we've introduced 4GX and we are in the process of building the nation's largest Wi-Fi network to support that trend.

Down the bottom left one of the big things that we're seeing is that the smart home devices are becoming much smarter and much easier to use, and the ecosystems are really forming, and as a telco you really need the ecosystems there before you can offer services like this.

So what are our smart home services? They include home security, home automation, and home energy usage, and that's a direction that we will be making some announcements on in the next half.

We're also seeing technology blurring the line between fixed and mobiles and personal work life. As an example of that what we're seeing is that our consumer customers are more and more demanding the type of you see capabilities that they're used to in their work environment. They're looking to use that in mobile and fixed at home. We're very much aiming to follow that direction or lead that direction through technology such as voice over LTE and rich communication services, and Mike will be talking more about the introduction of that.And finally, of course, consumers are becoming increasingly choosey about great customer service, and that will always remain a priority for us.

So most of what I've talked about there has been in the mass market. I'm now going to talk about business customers. An important point about the mobile business in particular is that more than half of the economics of our mobile business comes from business customers defined as from single office, home office up to the largest business. So business to business is very important particularly in the mobile business. And this is the way we think

about differentiation for those customers. It always needs to be grounded on connectivity, and what our customers are demanding is the same connectivity, the same network benefits that I talked about before, but it needs to work seamlessly across mobile, fixed in all its different manifestations, Wi-Fi and advanced corporate networks.

On top of that it's really important for a telco provider to be outstanding at the proliferation of devices. We're seeing four ecosystems in the handheld and tablet areas, and we're particularly impressed across all four of the ecosystems about the advances that they've been making particularly in business to business. We also need to be offering in devices those upper end tablets or hybrids because they will coming further up the layers talking again about replacements for laptops and PCs, and finally one of the challenges and opportunities for us is to have the great machine to machine devices which are many and varied for all the verticals of machine to machine.

Building on top of that our customers are demanding that we offer what we call in aggregate platforms. Those platforms include mobile device management. So for customers with very large fleets of phones, in some cases 20 to thousands, the ability to turn on and turn off phones, to remote swipe and wipe etc. Complementing mobile device management is mobile application management. So customers can choose which of their employees, and monitor and manage which of their employees, get access to which applications and data, and then also an important platform for machine to machine is SIM management. So the customers themselves have got access to which SIMS and which are on and off depending on the device.

Now, with those first three rungs in the business to business area our customers are demanding outstanding security features, and those security features may be security in the network, security of applications, security of data and security of devices, and Mike will be talking about security in the enterprise sphere that will cover those three rungs. Just like in mass market really being outstanding at the first three levels there affords us the right to start talking to our customers about some of the application opportunities. I break that down into three areas, and the first is, our business customers are demanding mobile extensions to all of the great productivity applications that they already enjoy on their fixed line networks.

The second is the opportunity to offer the vertical applications in machine to machine, and the third is the application to make – to help our customers get their sales forces and field forces and other mobile workers even more productive, and I will be coming back to those last two in the next couple of slides.And more and more in enterprise we're being asked by our customers to help them manage all of the services below, and that's what we call managed services, and on top of that professional services which is giving advice on how to achieve the productivity advantages from everything below.

What I want to do now is talk about two of the important applications, and the first is machine to machine. In machine to machine up until about three years ago machine to machine activity was very much focused on being strong at the horizontal layer, so connectivity and SIM management. About three years ago we made the decision to push strongly into verticals. Pushing strongly into verticals means finding strong applications and systems integration partners so that we have a strong combined offering for our customers. Now, machine to machine verticals are in order. The largest remains transport logistics, and that includes fleet management, asset and trailer tracking, container management, cold chain management, and field workforce management.

The second biggest vertical is public safety and security, then energy and utilities, retail and financial services, including the very important digital signage, industrial and manufacturing, health, Smart Cities, and agriculture. In all of the above verticals we consistently offer, of course, connectivity and SIM management, and selectively we offer alongside our solution partners the full vertical solution. Typical in transport logistics, for instance, we work very closely with Navman and Securatrak.

This is a very typical case study that you see on the screen.

So there is a company called Scanvogn which supplies mobile wagons. Each of these wagons is very expensive and they include accommodation, amenities, and on-site offices to the mining industry. The challenge was to get real-time monitoring of the wagons – where it was – to understand maintenance and security needs, and to get alerts when something needed to happen. So our solution was, of course, our mobile network, our M2M control centre, and we worked alongside our partner, Gridtraq, who does vehicle tracking and fleet management. We actually introduced this as a managed service to the earlier point. Many of our customers are asking us to manage the applications that we put in.

The benefits that our customers quote back is increased security, decreased service costs, and benefits from tyre and insurance. And we got a very nice quote there about the benefits of our mobile network. Thank you for that. And so that for the machine to machine area remains a big area for focus for us. Indeed, we're going to be investing even more strongly in FY16 in our applications and sales capability for machine to machine.

And possibly an even larger opportunity than machine to machine is this whole area of connected tablets in the enterprise. What this means is that customers can get even more productive through offering their employees productivity applications on connected tablets. That may mean, in field forces, occupational health and safety applications, dynamic work allocations, access to manuals, and access to experts. For sales forces it might be access to their CRM systems, their manuals, and their inventory ordering.

Some of the solutions that we now offer are Box for online file-sharing, DocuSign for electronic signature, Canvas for creating digital forms, ARIS for mobilising sales forces and service teams, GeoOp for job dispatch and management, Shoeboxed for digital organisation of receipts, and Deputy for rostering and scheduling applications. I hope you see from all those applications, they're very much aimed at mobilising the sales force and mobilising the field force. This is an example of a field force. So Conservation Volunteers of Australia is an organisation that we worked with. They were aiming to win a tender that required remote and offsite staff training, survey capture, data collation, and information access for volunteers in the field, and they wanted to move away from their paper-based system.

Our solution was our mobile network, of course, tablets on mobile broadband, and we use the ARIS and Canvas applications, and we helped facilitate the professional service integration into their back-end systems. And the result was CVA was one of the companies awarded the tender, and their field services forces are now automated and those paper-based systems are no more.

So just to summarise, encouraging results for the half. We're continuing our efforts to improve customer advocacy, and I think about that is, removing sources of detraction and finding sources of delight for our customers, and we will continue to pursue growth through network and product differentiation. Many of the initiatives that I've talked about today are very much aimed at expanding the market as well.

So I look forward to taking questions a little bit later. And I will hand over now to Mike Wright, our Group Managing Director of Networks. He's going to talk about some of the network initiatives to deliver some of that differentiation. Thanks, Mike.

MR M. WRIGHT: Thanks, Warwick. I'm going to talk to you a little bit today about the network and how we think of it. A little bit about what we have been doing, what we will be doing, what we would like to do, and some early forward-looking thoughts as to how we see the network evolving. And of course that will blend into where Vish takes us, in terms of some of the future opportunities as to how the network is evolving as well, and Mike will talk a little bit about security. Firstly, let's just talk a little about where the network sits.

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A lot of what we do on the network, as Warwick said, is absolutely focused on delivering some of those core value propositions that are embedded in the centre of that network layer in the middle of there. It's about the customer and the wireless network and their end-user experience, and also on the fixed network. So all of our investment, all of our thinking about network evolution, is basically built on that foundation. But it's also in the context of a lot of other things happening in this world. As you can see there from an extract from a market paper on growth and data – and that example is around wireless – we're looking at an explosion in data, so everything we do in the network also has to happen in the context of how do we scale the network economically.

So a lot of what we're working on is using technology to make sure that we can scale and continue to give that great user experience in what's a very different and changing load that's going over the network. So no longer is the network built like it was some time ago, earlier in my career, where you dug a hole in the ground, you put a cable in it, and you forgot about it for 10 years. The network is now in a world of constant evolution and constant adaption, and nothing more so is driving that than what's happening in that top layer. If you think about the world of software, what's happening in Cloud, new businesses being spun up and created overnight, going into new markets, companies expanding in their reach, companies going online – that top layer on that slide is driving incredible traffic and interaction across the network. And at the bottom of that, all these new devices, whether they're new handsets, tablets, or 4K TVs – before we know it, 8K TVs – and the Internet of Things are fundamentally changing what the network has to deal with.

The Internet of Things will take the connections on the network from not millions or tens of millions, but many, many tens of millions, and worldwide billions, and that's a fundamental shift in what the network has to be able to manage. Television: high bandwidth video is fundamentally changing the traffic profile of networks. We've gone from the world of sitting in front of your screen, hunting and pecking and pulling a little web page down, to some pretty sustained high bandwidth video having to be carried across the network. So continuing a network the way it was always done isn't going to work. The network has to hyper-scale, and with that means the network has to become far more dynamic and adapt in a way it has probably never done anywhere in my career. So let me give you a bit of an insight as to how we think about it.

Three core components. There are the bits that access the network in a mobile world, and there are the bits that access the network in a fixed world, and there's a bit that goes on in the core.

The way we think of wireless has been a differentiation for quite a while, and it's about having an outstanding footprint and an outstanding user experience built on the spectrum assets that we own – 2.3 million square kilometres of coverage in Australia. That's 99.3 per cent of the population. If you also choose to count the optimisation we've done to sea, there's 1 million square kilometres of coverage off the coast of Australia, and there's – we believe – around 1 million square kilometres of coverage that's unique to Telstra. So that's the foundation of our network differentiation, and we continue to drive that through innovation, next generation technologies, and looking ahead to how do we evolve the network to carry these changing traffic patterns.

The fixed world is much the same, although in the fixed world we have to continue to deliver great user experiences on the infrastructure we own, but manage that user experience transition as we move into an NBN world. So we can't let go of it until we've made sure there has been a safe handover to those customers with that great user experience. And in that world, as Warwick said, adding value when they're in the home, when they're accessing the network, when they're using media and when they're using the applications that they want to use in the home as well, and I will talk a bit about each of these later. And at the bottom, the bit that's often not talked about is the core of the network. And the core of the network is really evolving in a way that it never has before. It's becoming far more agile, it's changing, it's having to deal with these new traffic types. So we're starting to see a world

where the core of the network is actually becoming more dynamic, a bit like the rest of the network, and I want to expand on each of these points a little bit more.

Let's start with wireless. Wireless differentiation: the oxygen of our wireless network is Spectrum, and we spend a lot of time modelling, understanding traffic trends looking into the future, and really making sure we've got the right foundation of Spectrum assets that will take us to that future. And, as you know, we've invested in both some high frequency spectrum, which is good for capacity in the network, and an optimum amount of low frequency spectrum which gives us breadth of coverage, and it gives us that depth of coverage and the reliability that Warwick talked about, and also the fewer dropouts. And indeed, we would say that we have one of the lowest voice dropout rates in the world today on that network, all built on, historically, our 3G evolution to the low frequency 850 megahertz spectrum; the work we did in that ecosystem to drive the growth of that spectrum done worldwide so we could get handsets and give customers choice; the same work we did in 2011 when we brought 4G to Australia, probably four years earlier than we would have otherwise had it, because we re-farmed our 2G spectrum; engaged in the industry; grew the 4G ecosystem – so the handsets and devices – loaded that 4G network up; and started work about four or five years ago with the regulators and with the spectrum planning authorities to create a new spectrum for Australia, and indeed, beyond Australia, called the APT700 band.

Along with the Australian regulators, one of the greatest things we think we've contributed in recent times is grow what's called the APT700 band, which comes from the closure of analogue television. And the reason that's important to start early is we need to, firstly, raise awareness and get it accepted, drive the recognition of it in the worldwide ecosystem so other countries consider it. That then makes devices available, which means we can then justify investing in networks, so it's a long ecosystem that creates a virtuous circle, and we're very pleased to see that all of our electronic devices today have got that spectrum band into it.

And not a bad outcome for a country of only 23 million people, but what we're particularly pleased with is, we believe the APT700 band will become the world's largest single frequency band for 4G in the future, as we see Latin America adopt it, as we see Europe looking to adopt part of it, and of course Asia Pacific continue to adopt it. So that foundation, and that engagement with the rest of the world, to drive this ecosystem is actually very fundamental to us being successful and, indeed, Australia being successful.

So accelerating that spectrum band has been a great outcome because now when we turn on a new 4G tower using APT 700 spectrum we immediately see 30 to 40 per cent of the traffic go to that new band. So there's nothing better than to build an asset and have it used straightaway, as opposed to when GSM first started, it stood for God Send Mobiles. Today we can turn up a new tower and actually have traffic immediately be loaded onto it and the great thing about that it's a great way to use your capital investment.

So beyond the spectrum story, Warwick talked about the user experience. And the user experience is fundamentally about network capacity and network capacity comes from the technology we use. So if lots of people in a cell want to use the network, we need to be able to sustain a high throughput in that network itself. So you've seen us very aggressively pursue the next generation of technology and I will explain a bit more about that later. We said earlier this year we would be turning on 450 megabits per second in our network. Now, they're theoretical peak speeds. So 450 megabits per second uses three carriers joined together, three 20 megahertz carriers and we have now updated that in our network as of this month so that we can start testing the devices we will be bringing to market later this year and tuning the network.

There's obviously an ongoing evolution in this world as well and I'm pleased to say as of yesterday, we've already started and uploaded into our live commercial network software that enables the testing of 600 megabits per second theoretical speeds. Now, we only starting testing yesterday, so all I can tell you today is we only got 590 megabits per second,

but we will continue to tune it and we will get there. And so that is setting up for this ongoing evolution as traffic is going to keep hitting these networks, we've got to stay ahead of the curve, so that we can absorb that traffic as it grows.

And if we can do that, we win the right, having had the network performance and capacity, to start thinking about the end to end user experience. If the network can't carry it, well, forget about trying to think about end to end user experience. Now we've started to think about how do we optimise TCP/IP flows, how do we optimise video over that network and that lets us continue to drive that value to customers so they really do value the network and they come back. Now, as the network is going to 4G and as we've already got a low voice dropout rate, we also have to think about the evolution of voice because when they invented 4G they forgot to put voice in it.

So we have had to develop a technology that runs over IP called VoLTE, or Voice over LTE. And, again, this month we've just activated it network-wide which is already over 90 per cent of the population, heading towards 94 per cent by mid-year VoLTE in our network, so that we've started internal testing with our own devices to start to tune and optimise that VoLTE, or Voice over LTE network, which will bring us to a world where we carry voice only on the 4G. When we've got enough devices penetrated, we will eventually start rolling out unique 4G coverage and we will want to be able to carry voice on it with VoLTE, but we also want to bring the next generation of multimedia calling to the network and that's enabled by VoLTE.

What VoLTE also gives us the foundation for, though, is an evolution of the network to not only making voice calling, but video. And if we are any example, inside Telstra, I rarely make a voice call any more. So we truly believe that there's an evolution there where people will want to actually connect with video as well, and we now have a foundation or capability on the network to turn that on when people want to use it. And the last step in this chain when you've got packet IP calling over the network, we're enabling Voice over Wi-Fi. So Voice over Wi-Fi will mean customers will be able to customise some of their own coverage if they live in a place and they've got a basement and they want some unique coverage as well. So that whole Voice, VoLTE, ViLTE starts to emerge this year. We start this month as we start to test and make sure it's working to our satisfaction.

The next wave, of course, and it has been very topical this week and will continue to be in fixed and wireless network is the impact of video calling over networks and – sorry, and multimedia and video watching. We already know that a large percentage of our network traffic is video, so we're looking into how we're going to make sure the network is ready for it, and I will talk about – more about that later. And, finally, we're looking at new growth opportunities, adjacencies in the wireless market, so that fundamentally underpins our wireless leadership.

This is a pair of graphs that probably only a parent can love, but it's one of my favourite sets of graphs because I think it tells the story around how we've evolved our network and why we've been so aggressive on Next Generation technology. On the right-hand side we've been tracking our unit cost per bit for nearly 10 years now and you can see what that graph shows is by adopting Next Generation technologies, we make the technology and the network more efficient. And, of course, on the other side of that curve people want to consume more data and we want to continue giving them value.

So this curve going down, with consumption of data going up, gives us a world where we can have balance, we can maintain a margin. So the importance of this graph is fundamental to our business. Not only that it's a virtuous circle because if Warwick takes great new handsets to market that use the greatest Next Generation technology, the customers get a brilliant user experience. If they get a great user experience, they love our network and they stay with us. So there's virtuous circles created by Next Generation technologies, lowering the cost per bit and giving customers a great user experience.

On the other side of that graph there's really an investment story. For over two years now, our 3G traffic has been held largely static and that's because we worked early to penetrate 4G devices, so when we spin off a new 4G tower 20 to 30 per cent of the 700 megahertz alone traffic go straight to the 4G layer and therefore we've been able to fairly well minimise our investment in 3G, which also means we haven't built a hump of investment in 3G which could potentially have been stranded when we started turning 4G on.

So there's a strategy there, tied to the Next Generation technology, the way we invest in the network, all of our growth spent on 4G, when you're on 4G you get a great user experience. So all of the growth in the last few years has really been on 4G and now 4G exceeds our 3G traffic. I can't even show you 2G on that graph and, indeed, we've announced at the end of next year we will be turning our 2G network off. Finally, in the wireless space I mentioned video. We think deeply around Next Generation technologies for video and, frankly, if we don't adopt Next Generation technologies we probably will never have a great video experience in wireless.

And one of those technologies is a new standard called LTE-Broadcast. We did the world's first demonstration of this at the MCG at the beginning of last year. We also trialled it at the Melbourne Cup, which is a pretty hard story to tell when you're overseas explaining we stop the nation for a horse race. And then we've used that technology experience to learn about and try to understand how we could use that in our network, but these technologies, just like all the work we've done on spectrum before, are only interesting if the world adopts them. So when we went to Barcelona this year, we joined up with Verizon and a few other operators. We actually started a user group for LTE-Broadcast. And we had over 100 people there. And it was actually very interesting to see the growing energy around this ecosystem. And the fundamental reason we need to get that energy is there's not much point us doing LTE-Broadcasts if the rest of the world doesn't come, because the handsets won't come.

So what we're looking to do is create that ecosystem but we can already see a simple way to activate it and from next month we will be activating LTE-Broadcasts in a number of stadiums, so that we can start trialling devices that are already on our network to understand that broadcast ecosystem. And if we're going to deal with that type of growth we would suggest that potentially 79 per cent of our video traffic – Vish has used another graph because we look at many different data points as to what video might be - but if we're going to absorb that traffic, we need these technologies.

And the exciting thing about LTE-B is its potential beyond stadiums, whether it's a golf game or an Indy race, to see what's happening with the action, but the ability to use it for things like emergency alert, the ability to use it to actually pre-cache video content and devices and, potentially, the ability to pre-load software updates and app updates. When I got back from Europe recently, I hadn't had Wi-Fi while I was away, I had one gigabit of updates waiting. If we could do those all at once in the middle of the night or at a convenient time, we can substantially change the rate at which software updates make their way in devices and fundamentally change the cost structure of that business.

So that's, if you like, the wireless world as we see it today, but that's not the only world we're working on. We're working to go on adjacencies like emergency services and mining and enterprise. So our technology we've developed that we're pretty excited about is a thing called LANES, that's LTE Advanced Network for Emergency and Enterprise Services. Now, we tested LANES last year at the G20. And LANES basically is the ability to set aside a bit of spectrum for emergency services, so that they can get high band width should an event happen that they need to get access to and manage their logistics, but also to burst into the public network when they need even higher band width.

We think this is interesting and quite important because emergency services are looking to move from a world of traditional voice push-to-talk communications to a high band width world and we all know that rolling out massive broadband networks for really just peak use is

a really difficult economic equation to balance and we believe there's a role to play for networks such as our own. And, indeed, early this year we were very pleased to win an award at the GSMA award ceremony in Barcelona for the early work we've done on LTE and the demonstrations we've done.

But it doesn't just stop for emergency services. Similar rules and requirements live in the world of mining. Now, Warwick talked about how mines are looking to embrace M2M, they're looking at telemetry. A lot of those mines need certainty around the way their applications work. If we can give them a dedicated bit of performance and bandwidth, they can have the certainty of fibre-like connectivity with wireless at a lower cost and a much quicker spin-up. So our LTE network growth into the LANES world is something we're very, very excited about and we think has a lot of potential.

But it's not just about wireless. Fixed network, as I mentioned earlier, is very much around managing that transition from the today world and continuing to absorb the growth that's hitting it with the technologies we have today, technologies like DOCSIS and ADSL are continuing to support a lot of our base. We're evolving those networks and we're transitioning to an NBN world and in that transition we're taking them from a traditional circuit and copper world to an IP voice world over IMS, and we've built a single IMS platform that's a converged platform between our fixed and wireless networks.

As we start to prepare our networks and our customers for that, we start to think about how we build the best possible gateway because we start to see the gateway to become an extension of the network itself, and a foundational enabler for the experience in the home for those next generation technologies whether it be voice, future video calling. We're embedding things like Fon in them so we're ready for our Fon Wi-Fi rollout. We're trying to make the gateways where possible future proof, so we're trying to plan for NBN compatible gateways.

Our next generation Wi-Fi 802.11AC, beamforming being embedded in the gateways are all part of creating this value add, if you like, for a customer who, if you're a NBN customer of Telstra, you will get something special, a great enduring experience and a value add, and beyond that we're trying to make the gateways in a way that they can self diagnose faults or customers can use them to diagnose faults which will ultimately lower our cost of supporting those customers as well, and set them up for the future where we see a lot of home automation and control starting to be fed through the gateways.

So we're thinking about how do we make sure this is the platform for the next generation, and indeed how do we make it a platform – once again topical this week – that is optimised for video calling and watching television. So if you think about the next generation we're trying to do in the home gateway ecosystem a bit like we would be doing in the wireless ecosystem which lowers the cost per bit, and one of those evolutions is early testing and promotion of a standard called H.265 which is a next generation compression codec for video which saves between 30 and 40 per cent of the bits. So either we can use less bits to deliver the same quality or the same bits deliver greater quality as we deliver video into the home, and we do that on the boxes we control like set top boxes.

We want to encourage the ecosystem a bit like we've been doing on wireless though when other people put set top boxes in the home, or people go and buy these little connecting round hockey puck-looking things and want to connect to their television, influence that ecosystem as well for the next generation, a bit the way we've done with wireless. So that's how we're thinking of the home evolution.

The last is how does our core technology itself evolve. Now, the core, as I've said, hasn't got a lot of attention in the past. It's perhaps not as sexy as some other technologies that are far more visible, but is actually one of the areas that is evolving the most, and this will lead into some of the discussion that Vish will give later and, of course, it's fundamental to our underlying network data security that Mike will talk about.

So firstly we continue to evolve our packet ethernet evolution in our network so that ethernet aggregation networks or the parts of our network that take our wireless network, our existing fixed network and even our connectively to NBN back into the core, and we're going into next generation versions of those, and then actually modernising those even in the world of enterprise. We're continuing to move our traffic from our traditional core to a next generation IP core that we've built that's got a lower cost of capacity and scales, and you would have seen us being one of the first customers on some of the new next generation routers that we put into our network recently. And a thing that's actually quite interesting that's changing a lot is the world of optical and a bit like I described before. It used to be you scratched a hole in the ground, you dropped an optical fibre in the ground and you forgot about it. These days with new optical technology we're generating huge bandwidth over those networks, and we're continuing to evolve our optical transition network and indeed our latest technology we managed to do the world's longest un-regenerated optical connection.

We started testing higher data speeds, but what's more interesting about the optical network is starting to participate in this software defined network layer which means instead of when a farmer digs a hole in the ground to bury a cow and cuts into that blue bit of stuff that comes out of the ground and having the network off air and having people having to repatch the network until we drive out and fix it, the optical network is becoming much more aware of the architecture as part of the upper layers and it's starting to be able to reroute itself. Combined with these huge distances we can go un-regenerated we can now actually reroute around Australia very, very quickly and more dynamically to build a more robust and greater ecosystem.

Now, the next thing that you would have heard of a lot if you've gone to any conference anywhere in the world in the last two years would be that if you could say SDN and NFV you've basically got a speaking spot. These terms as we see all new technologies go through the hype phase - we're starting to see it become reality. Software defined networking and network function virtualisation will progressively allow us to make more dynamic elements in the network. Elements that traditionally were a dedicated piece of hardware with some software running on it will start to run in a compute environment and cloud environment which means we can put them in different places of the network and spin them up and spin them down much more dynamically. So we're already starting to do early insertions of that. The end game, Vish will talk a lot more about because he's far more familiar with it, but the end game would be a far more dynamic and controlled network under software. But we're not waiting for the endgame, we're looking for strategic opportunities to insert certain functions and we're already working actually with Cisco on a project called Symphony which we announced also in Barcelona which will allow us to spin up and spin down functions between data centres for our data centre interconnect, and we're continuing to look to insertions that will create differentiation and value for our customers in that market.

I mentioned more before at the edge of the network how important media is, and once again if we don't do something about this it's going to become a pretty boring discussion. We will complain that media is hurting the network. Everybody will complain about each other. Part of the solution to this is that we look to how we carry media more efficiently, more dynamically on our network for a great user experience. That's part of the equation, and we're doing a lot of work on content delivery networks.

We already deliver content from our own media to things like Foxtel and T-Box from within the network, and we're looking at the next generation optimised media systems, CDNs transcoding that will allow us to actually move media around to where it's best placed in the network rather than the current world which is somewhat static. You sit it over there, like, putting the milk in the fridge on one side of the country and you have to always go to the fridge to get it. We see a future world where media will be placed much closer to where the end users want to consume it, and also in a format much closer to what the type of device it's going to consume it as well. And where this takes us to with this SDN and NFV world is this greater world of network virtualisation which, as I said, Vish will talk a lot more about, but

we see a world where rather than dedicated platforms across the network we will have distributed compute and in that distributed compute platforms we will be able to spin up functions as required based on traffic load dynamically and reroute traffic.

All this will lead to a more efficient network, a more dynamic network and a great user experience because we will be able to lower the latency between the end user and where the content or the compute thereafter is located relative to them, and all of that adds up to building a network that's dynamic, that's flexible, and we hope hyper-scalable and fundamentally differentiating for our customers and for us as we take all these new products and services to market.

So if I just conclude back to where we started. Everything we do is anchored on how do we create a great user experience for our customers that they value. It's all about lowering the cost of a bit, driving up the performance of the network, the end user experience the customer gets, and we're using next generation technology as much as possible to ensure that all of our investments are driving that differentiation into the future so that we have something innovative and something different to add and give to our customers that they truly value. So with that there is a lot more to the story in terms of security and in terms of the next generation of technology so I will hand over to Mike. Thank you.

MR M. BURGESS: Thank you, Mike, and good morning ladies and gentleman. Today I am going to talk to you about cyber security and managing the risk in an increasingly connected and online enabled world. Before I do that I thought I would give you a little bit about my background, not because I'm particularly important, but I think it might help frame for you where I am coming from and how we approach, or I approach this problem.

So prior to joining Telstra just over two years ago, I worked for the Defence Signals Directorate for 18 years. That agency is now known as Australian Signals Directorate. It has two roles, collection of foreign communications intelligence, and information security which is basically stopping the first thing it does happening to Australia and against our national interests.

For the last six years of the Australian Signals Directorate I was the head of cyber and information security. I was responsible for building the cyber security operation centre and operating that; giving government a comprehensive understanding of the cyber threat and a range of response options for significant cyber security events against Australia. It was in that role that my passion for dealing with the challenge of cyber security grew to the obvious next step for me of joining Telstra. For me helping Telstra protect our customer's data, keeping it safe and our network secure resulted in the obvious next step for someone who's so tragically hooked on cyber security.

So let's talk about the issue. So cyber security is a significant matter. It's an issue of global importance, and I will explain why shortly, and for Telstra in bringing that brilliant connected future for everyone, we touch the lives of almost every Australian whether it be consumer, small business, enterprise or our wholesale customers. And cyberspace, and that is the internet and everything connected to it knows no geographical boundary. So no matter where you are in the world if you're connected you face the same threat.

So everything happens quickly in cyberspace. When I hear people talking about cyber crime or cyber espionage or hacktivism I always like to remind them that cyber crime in the end is just crime. Cyber espionage in the end is just espionage. Hactivism in the end is just protest. But the one thing that makes this a far more significant issue today is increasing connectivity and rapid uptake in technology means that crime, protest, espionage and actually, let's face it, even mistakes can now happen at a pace, scale and reach that is unprecedented and that is what makes cyber security a significant issue and a matter of global importance. So at Telstra, we're well prepared to tackle this challenge head on.

The external threat. So external threat comes from individuals looking for fame or fortune; issue motivated groups looking to make a protest point by stealing information to embarrass or disrupting networks to embarrass; criminal gangs looking to make serious money; and nation states looking to steal intelligence for a tactical or strategic advantage and, even in some cases, stealing intellectual property. And much is made of the external threat today and that's fine. Less, however, is made of the internal threat and I'm not just referring to some malicious insider when I say that, I'm also talking about well intended individuals going about their day jobs, delivering excellent customer service and inadvertently putting data in harm's way.

So in Telstra, we look at both the internal and external environments to make sure we have a good handle on the threats so we can manage this risk effectively. So it feels like a day doesn't go by without an example in the press of another data breach somewhere in the world. So I will just talk about two, not to pick on these two but actually just to illustrate the point. So Anthem, a US health insurance provider in the United States, recently suffered a crime as a result of hacking. They suffered the loss of 80 million customer records and for me that's an excellent – well, not excellent but a good example of crime happening at pace and scale that's unprecedented.

Sony suffered both a hack and attack and, yes, I do differentiate between hacking and attacking. In Sony's case, they suffered the loss of sensitive corporate information, corporate emails and the loss of personal staff information through a hack. At the same time, Sony suffered an attack. Sensitive data was deleted that resulted in their third quarter financial results being delayed in their filings in February this year. You see that had a significant impact on the company. Now, today, attempted hacks to steal data, I consider a reasonably foreseeable event that will continue. The more worrying concern for me is the disruptive element as a result of hacking. Publicly, this was started to be talked about with Stuxnet in 2010, Saudi Aramco, 32,000 computers, hard drives wiped and, more recently, with the Sony example.

You can now consider disruptive events as a result of hacking also a reasonably foreseeable event. Now, those two examples I just shared with you and the many examples we hear about frequently and almost every day now, tells me that overall, collectively, we all have more to do to manage this risk more effectively. At Telstra, the protection of our customers' data and the security of our networks remains a top priority.

So we constantly assess both the internal and external environments. We constantly assess the threats so we can keep our customers' data safe and our network secure. We learn from others and we also learn from ourselves and we have a range of capabilities that help us keep our customers' data safe and our network secure and I will talk about two of those shortly.

But we don't just do this for ourselves. We offer our same services and expertise to the enterprise market so we can help our customers manage the risk effectively like we do. There are four capability pillars for our go to market in a security services portfolio offering end to end protection. We advise, we can help design, we can operate securely and we also provide a range of analytical services and, again, I will talk about one of those shortly which we do internally and actually we intend to go to market with this new one that I'm about to share with you. All of those can help our customers manage the risk effectively like Telstra manages this risk effectively.

I'm going to change tact here slightly. Cyber security is just as much a human issue as it is a technology one. That challenges some in the industry, some in the technology industry and some who use technology – in fact, most who use technology to enable their business. Thinking about cyber security as a technology caused issue addressed by technology alone will actually significantly limit your ability to manage this risk effectively. The human element is absolutely critical and it requires innovative thinking in how to address that element of cyber security and, again, I will talk about that shortly.

So, at Telstra, we have a unique and, we believe, an industry leading approach to how to manage this risk. We understand and know what our customers want. We know they want their data safe and their services secure and we understand the threats. We've developed an approach that allows our staff to understand how to think about the problem and how they can actually do their bit to help us collectively manage the threat and the risk more effectively. We refer to this as the five knows of cyber security. The first know is knowing the value of your data. Now, that's not just understanding the value of the data to your customers and the company, it's also understanding the value of your data to those who wish to do harm. They don't always overlap, so you've got to know the valuable data you have.

Once you know the value of your data, you must know who has access to it. Do you know who has access to your data? Should all of those people have access to that data? This actually does require you to look deep inside your organisation and your supply chain so you fully understand and you know who's got access to your data and you make sure that only those who need it to have access to your data. Once you've done that, you've got to know where your data is, both domestically and across the globe.

Then you've got to know who's protecting your data. So who does it fall to, to make sure your data is not lost, corrupted or destroyed? And, finally, you've got to know how well your data is protected. So would you actually know if someone was attempting to take your data from you? Critically important.

So we believe the five knows of cyber security is an effective means by which you can manage the cyber security risk from the board down. It helps our company drive how we approach the problem. We also believe it makes a positive contribution to the greater debate on how to deal with this challenge and can help others approach and manage the risk effectively, living in this increasingly connected and online enabled world. But we don't just stop there. We have introduced two new unique capabilities in addition to our existing 24x7 capabilities: discovery and influence.

So I will start with discovery. Discovery is actually data analytics by our brightest people looking for anomalous activities on our networks, either inadvertent or malicious, that if left unchecked poses significant risk. Now, most of you would know networks are just normally busy and noisy. The internet is a busy and noisy place. So, for discovery, it's understanding noisy normal and looking for the unknown. To put it in a simpler, it's actually looking for first seen problems as they occur on your network or against your value information to make sure you're dealing with those problems as they occur. Critically important. We believe our discovery capability is unique and we believe it is an effective security countermeasure that helps Telstra manage the risk effectively.

Influence. Influence for us is a cyber influence team that's aimed at helping our staff understand in their heads and their hearts what the problem is and knowing what they can do about it to make the contribution to manage this risk effectively. It's more than an effective communication campaign, even though that's an important element. It's more than awareness raising, even though that's an important element. And you remember when I said cyber security is just as much a human issue as it is a technology one. Influence plays a critical role in helping us address that aspect of cyber security with the outcome of helping us effectively manage this risk.

So why Telstra and cyber security? So we understand the threat. We believe we have an industry unique and leading approach. We understand the value of our customers' data. We understand the value of our data. The five knows of cyber security helps Telstra tackle the challenges of managing this risk. In addition to our 24x7 operational capabilities, we've introduced both discovery and influencing new capabilities to help us manage this risk more effectively. We offer the same services and expertise to market through the security services portfolio and we do believe that our industry leading approach is a network

differentiator helping us keep our customers' data safe and our network secure. Thank you. I will now hand over to Vish, who will talk to you about technology elements.

MR V. NANDLALL: Great. Thanks, Mike. My name is Vish Nandlall. I'm the Chief Technology Officer for Telstra, and I've been in the position since August of last year. Prior to that, I held a number of different CTO positions; one at Ericsson where I led the North American team, as well as with Nortel Carrier Networks. Today I'm going to talk to you about what our technology portfolio is shaping to look like over the course of the next five years. A lot of it will be foundational on some of the discussions that Warwick and Mike Wright, as well as Mike Burgess, presented to you earlier.

I always find in order to really evaluate where you should be going from a technology perspective, it's important to understand where the industry is going, and to evaluate it in that context – use that as a yardstick for, how do you find competitive advantage through a technology portfolio that gives you sustained opportunities over the course of the next five/10 years or so. So growing up in Canada your world view is literally seen through the lens of hockey. And when you look at a hockey game, the best way to win is to skate to where the puck is going. I'm going to talk a little bit about where the puck is going from the telecom perspective.

We started off in the modern era of telecoms in the early part of the millennium around the basis of competition shaped by the triple play notion, and this is about one bill, many different services, the focal point around network, and you competed based on price. Around 2007 or so with the inception of smartphones, we shifted the eras from mobile telephony to mobile compute, and the vision started to become one device, a thousand applications. The focal point became the device, and we competed based on the number of apps.

This was obviously a shift in terms of where the consumer interest was, and one of the benefits of this smartphone war was kind of a peace dividend, if you will, in terms of the types of compute and sensor capabilities that profited from economies of scale that were embedded in these smartphones. And what that has actually resulted in is a new marketplace where hardware is no longer a friction point in terms of being able to develop services. So if I wanted to develop a connected dog collar, for instance, to track my pet, I don't need to really worry about getting that sensor embedded in the dog collar or a GPS locator. That's actually pretty easy to get. If I want to get a connected car, getting an on-board diagnostic computer off of eBay costs about $10.

So hardware, whether it's a raspberry pie-type board that allows you to experiment and rapidly be able to innovate around new technologies, is no longer that limitation. And so what we've seen is this expansion of things, which is really the on-ramp into the Internet of Things. And when you have many, many things, you start to get one of the fundamental elements or DNA, if you will, to be able to predict where the industry is going. So once we use that as, let's say, the first wave or the first index into the future, the second thing you want to understand is, what are the set of capabilities that I'm going to need to have in order to support many, many things crushing into the environment. And the things that we're really worried about, or really thinking about, is how do we support the scale of network required to connect all these things? And there are three attributes that we want our network to have.

We want our network to be capital efficient. We're borrowing from technologies that came from the enterprise world.

Enterprises, typically, when they deployed an application would buy a server, and so you had this – you had this rhythm of one server per application. A technology called virtualisation came out, which was popularised by VMware, and what it allowed you to do is to move a workload from a server and consolidate applications onto one processor. And that created huge capital savings. We want to be able to take technologies like Mike talked about, network function virtualisation, and do something very similar. Be able to consolidate

network functions onto commodity-type compute engines so that we can create capitally-efficient networks moving forward as we scale up.

I think the second part is around operational efficiency. One of the things that the tech industry has really profited from is this notion of Moore's law, which gives you basically a halving in terms of the price for a bit of compute over time. This has really started to create startling efficiencies in terms of being able to reduce the cost of transport, being able to reduce the cost of providing cellular technology. But one of the things that we haven't been really able to profit from is the operational efficiencies going down. That has tended to actually increase over time.

And so, what we want to do with operationally efficient networks at scale is to be able to reduce that cost through automation. A lot of that is going to come by creating, really, a set of standardised management systems across our network. And Mike talked earlier about this notion of software-defined networks, which is really providing that consistent management layer that gives us some uniformity to apply automation across our network, and to be able to do things very rapidly at very low cost.

I think the third thing that becomes really important in terms of an attribute for a network at scale to support all these things is service agility. Now, no amount of software in the world is going to avoid having to lay out wires in order to connect. You're always going to have to do that, but service agility is really, how do I augment that wire with capabilities that are going to create more of a delightful user experience, to be able to create affinities between endpoints connected to that wire and services that that endpoint needs. For instance, if I were to connect a point-of-sales terminal into the network, I want to be able to rapidly configure it for PCI compliance so that I can get an audit trail all the way through. I want that service to be rapidly configured.

So that notion of service agility is also going to be super important when I have many, many of these endpoints, and I'm no longer just worried about providing a voice service or a text service. I'm worried about providing many different types of services. Services need to be rapidly and agilely deployed in our network.

So I take a look at those three things as, really, the foundations for what this network needs to look like over the course of the next five to 10 years. So let's step back a little bit and talk about the next five to 10 years, and what will the world look like? And this is always a bit of a perilous journey, because prediction is difficult, especially predictions about the future. But I'm going to try to look at it through the lens of the current macro trends. And the first thing that we know to be true is that 5G will be standardised.

A lot of people talk about 5G, and you will hear that it has really been overtaken by a lot of marketing hype in the industry. The reality is 5G isn't defined as yet. 5G is going to be defined by the International Telecommunications Union, or the ITU, which is an international treaty organisation. ITU will define the requirements for something called IMT-2020 in 2020. By that point we will have a yardstick that we can measure and evaluate different 5G technologies and decide what will actually comprise 5G or not.

Number 2: we know that networks are going to be optimised for different types of services and media types. Mike talked a lot about technologies like LANES, being able to deploy content delivery networks into our wireline, wireless networks to deliver better content to users. I think the natural extension of that is to create application awareness in our networks. When we think about this notion of, again, taking a look at plugging in payment card industry-compliant devices into the network you want to be able to provide a set of services behind that that follows that endpoint. If you have video content deployed in the network, I want to be able to rapidly provision a content delivery network so that the actual streaming video feed is actually being served through the point that's closest to that user. So I want the network to be much more aware about what's being plugged into it.

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The first volley in this particular journey is actually being delivered across what Telstra has called the Pacnet Enabled Network, or the PEN, which came through our acquisition of Pacnet, which is delivering a set of network intelligence that actually understands where it's being connected, so it can automatically provision bandwidths and different policies to serve that endpoint.

The third thing is that consumer devices, while it will be dominant, we're going to see a small set of data-sensing and processing devices that are going to make up a growing part of mobile and internet traffic. This is really the headline of where the Internet of Things is going. We're moving beyond just human-connected traffic – exchanging videos of your favourite cat playing a piano on YouTube to more things that are consisting of machine intelligence and data.

When I talk about machine data, I'm talking about log data, API calls. And beyond that, we're looking at instrumenting physical spaces so I can digitise it. So, for instance, a production room floor where there may be conveyor belts, and I want to monitor the wear and tear against the ball bearings so that I can be predictive in terms of how I maintain that. So this type of operational knowledge is going to start to scale as we deploy more and more of these sensors, and start to move towards this end game of the Internet of Things.

Telecom and other industries will become more platform-shaped. This is an important distinction, in terms of how economics is moving away from what I will call a push to a pull model. And it has really been driven by phenomena like developer-type regimes where I'm taking my platform capabilities as a telco and projecting things like mobile connections, projecting things like identity, into third party partners, developers, as well as mobile devices. So how can I do that effectively? How can I create those channels into these different third parties? And the way to look at it is really trying to understand where is the largest target market for developers who are going to pull capability on my platform.

The Mozilla Foundation estimated that there's probably somewhere around nine to 10 million JavaScript developers out there. They're currently not using telco platforms as part of their applications. What we typically use is the layer below that, which is a set of software architects who number around 250,000, who understand telecom architecture, and who can do design of embedded code. And then below that there are a number of developers that are actually able to design core telecom applications like voice. There's probably around 10,000. These are global numbers. So what we want to do is take that 10,000 that actually works on core telecom applications and allow them to have platforms that address these larger populations that are numbered in the tens of millions. So being able to do that gives us scale effects, and that's what we mean when we talk about platform-shaped industries. We become more software.

The last point here is that the world is going to be faster, more connected, with about a billion new participants in the global economy. And we're using this as, again, an index to understand how many more connections are we going to need to be able to support in the industry. In the fourth quarter of last year there were around 105 million net new mobile subscriptions. 25 per cent of those came from Asia Pac, and I'm not even counting China and India in that number.

So using those two – using those five, rather, events in terms of what are predictors and likely truths in terms of where the industry is going, let's try to understand what are some large trends that are going to create what I will call the engines of what telecom will look like over the course of the next five years. And the first is an idea that there's a world of things exploding with data. We've been talking about data for the past little while. IDC is projecting that the total human knowledge is going to be somewhere around 44 zettabytes. That's 44 trillion gigabytes. Today we have 4.4 zettabytes of data in all of human knowledge. So massive increases in terms of the amount of data that we're going to have to deal with.

The other thing that's happening is that the amount of data that a person is consuming and the digital stream that a person creates is growing. By 2020, we're estimating that the average person is going to be generating 1.4 megabytes of data a second. That's the kind of force multiplier that we're dealing with, and we're not just talking about people now, because we're also talking about things, and things multiply the amount of data streams phenomenally. We're talking about a projection of 50 billion connected devices by 2020, far outstripping the seven billion humans that will be populating the world. So we've got a world of things that's exploding with data. How are we going to manage that? And I will talk a little bit about the technologies behind that.

The second thing is these flexible networks connecting Clouds. One of the big phenomena has been the emergence of content from Cloud. About 90 per cent of our content today over mobile networks is originated from a Cloud. And so applications are really starting to drive networking requirements and how we configure that network. But today the networks are fairly rigid, and Clouds don't really talk to one another very well but that's the future where we're going to. What we need is to be able to create equivalence in terms of flexibility in our networks so that it meets the dynamic nature of these cloud applications.

Okay. So I want to double-click on both of those. So let's talk about a world of things exploding with data. Now, the first part that jumps to mind is the Internet of Things evolution. Warwick talked about machine to machine, and that's really where our departure point for this journey is. Machine to machine is largely characterised by, really, one device, one app. So if you go into a particular production-type facility, you might have an LPC system or a SCADA system that's connected to a particular device, and that's one application. As we move forward, what we're going to find is that one application, one device becomes a bit of a nightmare in terms of managing, both from an industry and an enterprise perspective, as well as a personal perspective. You've got a Fitbit, you've got a connected thermometer, I've got something that's monitoring my washing machine – all of these things create complexity for a given user, because you're basically trapped into three, 10, 50, 100 different silos of applications that you're managing. So the important thing here is to fade the thing into the background, and really start taking a look at the data and making sense of that data so that it can drive some knowledge and have that knowledge drive action. Now, the example here is that I'm not really worried about the parking sensor, what I really want is the outcome from that parking sensor. I want to be able to park quickly and without frustration. I want any type of service that's associated with a product, whether it's a washing machine or other to be able to interact with other services.

So what would that regime look like? If you have a learning thermometer, you want that learning thermometer to regulate temperature based on the current temperature of the house, but you also want to regulate it based on my presence. So as I enter into the house, you want it to be able to take on a particular more desirable temperature setting. You also want that thermometer to be able to interact with all these other appliances so that it understands what the power draw is from your washing machine, your fridge, your computer. I want that thermometer to be able to have a connection with my local power utility so that it can actually turn down cooling over peak hours, so that it doesn't stress the electricity grid. So really what you want is that one product to interact with all these services. You want the services to become more seamless across them, and so, really, when we talk about IoT evolution as we move into today and over the next five years, it's going to be able to create really more types of orchestration with these services across a number of different products.

I think the other piece that's really important to take a look at is the growth in video. Mike talked about the amount of video that Cisco had forecast coming up into 2020, around 70 per cent. We know that between now and 2020 there's going to be around a 10x increase in video. Video will be the dominant pool of what constitutes our traffic profile. Today it's almost over 50 per cent. So that's going to continue, and we're going to need to be able to deal with that at the network level.

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When we talk about this notion of flexible networks connected to cloud, it's really important to understand why we need more dynamic capability in the networks. We've moved from something that was pretty fixed and rigid, but the requirements are changing, and why are those requirements changing? If you looked at the internet 10 years ago, pre-Facebook and pre-Netflix, it looked very different. There was a number of backbone providers who carried all the traffic. They communicated with transit providers, who in turn communicated with access networks, who delivered content to end-users. And that was how the internet looked like.

Over the course of the past 10 years, there have been some market forces and technology changes that have dramatically altered what the internet looks like. Those market forces have been consolidations, so Google buying YouTube, Yahoo buying Flickr. But we've also seen more user-generated content appearing into the internet driven by things like ad-based advertising models.

I think the technology revolutions at the centre of this have been large internet exchange points that have been basically built and formed at the centre of the internet. This is companies like Equinix. The others are our content delivery networks, companies like Akamai, for instance, and Limewire. And there have been these huge Cloud hosting providers like Amazon. What they've created is a new centre of gravity, really, for data. So it's no longer the backbone, it's in these large hyper-scale data centres. And what has happened as a result of that transition and where data gravity has gone to, is that these large hosting providers – these large data centres, have all created direct interconnect, huge dense interconnect directly with these access networks, basically leveraging economies of scale and ripping out the transit and backbone from the internet.

The second thing that's really important to understand as a consequence of that evolution, has been how applications now get delivered to end users. Applications before used to be housed in basically servers that were owned by the content provider. If you were Netscape, for instance, you owned all the servers in the enterprise wiring closets that were distributed globally. You owned all that infrastructure, you delivered your content directly to end users. What we're finding today is that most content actually uses third party infrastructures. It's using hosting from Amazon, whether it's Netflix or others. It's using the back end of the servers from Apple so it can have access to data stores for its operational analytic data. It's using things like content delivery networks from Akamai so that it can create overlays and interconnect directly into access networks. So there's this new cyber supply chain that has emerged that requires multi cloud integration in order for an application to be delivered to an end user. And now because we've got this interaction with multiple clouds and that's driving requirements for networks, we need the network to be as flexible as those clouds will deliver an experience to the end user. And so when we look at how we achieve that, we start bringing in these concepts like Software Defined Networks and Network Function Virtualisation. What these allow us to do is to have programmatic control over those networks so that we can rapidly deploy capability that can carry that application content to end users. It's the difference, for instance, of having a connection between a public and a private cloud that's about 30 per cent utilised and almost 90 per cent utilised over peak hour to something that can smooth that traffic easily so that the application profile is running at capacity and being much more capital efficient in terms of carrying traffic between those two end points.

So I talked about these two big mega trends, these two big ideas and I want to spend a bit of time just quickly going over the enabling technologies. And we will talk about 5G first. So Mike talked a lot about the increases and capacity that we've enjoyed over the course of the last four iterations of cellular technology.

Most of the headlines have been around increases in peak speed and, certainly, 5G will take us from the theoretical maximum that LTE can eek out which is around a gigabit per second to somewhere around 10 gigabits per second. Mike is doing a great job in getting close to that one gigabit per second mark. Getting to 10 gigabits is really going to require some new

technologies but that's not all that's going to be coming in the wake of 5G. We're going to have to be able to support many more different types of applications. Not just new enterprise applications and not just video but we're going to have to be able to deal with some really ultra reliable, ultra low latency type of mission critical applications that are going to be connected into enterprise infrastructure and this is going to require being able to handle things that are sub one millisecond across our infrastructure.

You can think of someone who's trying to actively control a robot to engage in minimally invasive surgeries from urban hub to a rural site, you need to have very little latency in terms of how that control is achieved.

The second thing I think that's going to be really important is being able to connect all of these different types of sensors that are going to be connected to the network at very, very low power. These sensors when they are deployed are going to have to have battery life of 10 years plus or more. And so we need to have very energy efficient connections at scale that can manage that and so 5G are going to be able to deliver on some of these technologies that are going to support those new types of applications.

Network on demand is really something that, again, follows on the coat tails of Software Defined Networks and Network Function Virtualisation. Marc Andreessen back in 2011 talked about software eating the world and its latest appetite is the network. So what we're trying to achieve here, again, is to give programmatic control of networks. Networks have long been manually configured. As a system engineer and as an engineer, I love complexity and that's what we've kind of projected onto the networks that built and underpin what our telecom platforms are delivering. What network on demand is going to do is to deliver some of those software efficiencies that are going to give us more replicable and uniform behaviour in terms of, "How do I configure services for end users?"

So we talked about cloud. Cloud is really at the root of trying to deliver the types of operational efficiencies that we need in our core applications.

And Big Data is really going to be the ability to be able to take all this new set of operational stores and machine generated data and be able to reason against them so that I can create actionable types of activities to manage my network and make better decisions. A lot of people look at Big Data as the world's largest Excel spreadsheet and in some cases it is that. But what we want to be able to do is to be able to ask meaningful questions and get statistically relevant answers. Where is the best place to deploy my new branch office for my enterprise? Where is the best way to be able to roll my trucks so that I can be more preventative in terms of the maintenance of my infrastructure?

The last point that I want to talk about is security. When you have a lot of data and a lot of different end points, security becomes very, very important. A lot of times we've thrown two things at our security problems. One of them is encrypt everything in a second and be able to authenticate to a particular user who has access to something. What we're trying to do, moving forward, is to be able to take a much more distributed approach to how we approach security so that we don't have centralised trust which is going to create stress and a lack of scale and capacity as our network expands. We want to create more distribution at the edge of our network in terms of how do we manage security?

So we want to be able to log all the transactions, be able to put them in a public ledger so that people actually can understand that as data comes through, that data is immutable. It hasn't been attacked. And if it has been attacked, I can immediately understand because I will have consensus for a number of distributed end points in my network that tells me something happened. That will happen not just at human time but at machine time. So when Mike talked about how you get situational awareness of your network in real time, it's going to be by leveraging the scale of your network, all the different end points that are in there that are auditing all the transactions that are incoming. It's the detecting if something went wrong

and alerting you so that you can take remediation very, very quickly. What it's doing is creating a chain of custody for all of our data.

So our future vision: world of things exploding with data, flexible networks connecting clouds. What these things are driving from an economic perspective are both top and bottom lines events. On the flexible networks connecting clouds, it's being able to bring Moore's law type capabilities and efficiencies to the operating costs of our network. From a world of things exploding with data, these are new revenue opportunities at the top line of our business. It's using the developer [inaudible] economics to be able to create new services that are meeting every different type of consumer or customer need. It's being able to handle the massive crush of video data that's hitting our networks and monetising that for the benefit of Telstra. So those are my final comments, and I will now turn back over to the moderator for questions.

MR KOPANIDIS: Thank you, everyone. So we've got a couple of mikes in the room, so we will open up to analysts and investors first, if that's okay. I will get some chairs up here, as well. If you could please introduce yourself and the organisation you represent and limit your questions to sort of two at a time, that would be terrific. All right. Okay. Richard.

MR EARY: Hi, it's Richard Eary from UBS. Just a couple of questions, first of all, for Warwick. Warwick, you talked about some comments in terms of margins and ARPUs in your speech. I don't know whether you can actually expand on those comments that you made. The second one was just in terms of the presentation, I think, by the rest of the presenters in terms of the network, whether you can get a broader discussion in terms of what that means for capital intensity for the networks business going forward?

MR BRAY: Yes, thanks, Richard. So the comment on margin, we were just trying to be precise and go back to the exact comments that we previously said. And so if we went back to what the CEO and the CFO previously said, which was a discussion about margins in the high 30s. The full quote actually – they also said that we wouldn't suddenly pull a lever if we got above 40. So the comment on margins was meant to be no change, using exactly the same words.

MR EARY: So, just to elaborate, are you expecting no operating leverage as a consequence of the trends in the industry, ie, in the last set of results you saw a step up in churn for the first time in a while. Are you now saying that churn is actually increasing further and therefore that's the reason why the operating leverage is not coming through the business?

MR BRAY: So there's a number of –well, first of all, there's no change on the margin, so you implied in that question there was change in the margin, but there's no change in the margin discussion, but in terms of what is affecting the margin there is a number of forces. The first is operating leverage which, of course, is a positive. On top of that you also have implications, as we have often discussed, about re-contracting. And then on top of that we are introducing more and more value added services, such as StayConnected and New Phone Feeling that are profitable in dollar terms but aren't at the same percentage profitability as the core business. So there's a number of effects going on there, leading back to the statement that I made.

I think the second question was on churn. And in terms of churn, it was up over a point in the half that just finished. We are constantly trading off our whole marketing mix, so we aim to keep churn low, of course. We need to trade that off against other elements of our performance. I would note that churn at the half was still creditable relative to global peers for post paid handheld.

MR EARY: But does that mean churn has continued to increase as we've gone through the quarter or not?

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MR KOPANIDIS: We're not providing a trading update. Mike Wright, do you want to pick up the question on…

MR EARY: Sorry. Yes, can I just ask the question on the ARPU. You made an impact – you said that the ARPU was impacted?

MR BRAY: So the comment was –yes, the comment was it's early days in ARPU but the current competitive dynamics may have some effect on the force as we've seen before. And that's adding nothing to what you can see in stores.

MR EARY: Right. Okay.

MR KOPANIDIS: Mike Wright, do you want to pick up the one on capital intensity.

MR WRIGHT: Yes. Well, firstly, we're not making any forward-looking comments today, but what I would highlight if you look at the graphs I showed and the way we've approached network investment, for the last few years, we've largely been able to use a capacity-driven investment to drive a 4G rollout. So we would seek to use these new technologies to the best of our ability and not have to fundamentally change the settings of the business, but actually be clever about the way we spend our investment and that underpins our approach.

MR EARY: But if you look to the future and, obviously, the slides that Vish put up, do you think the business become less capital intensive as we used to – as we go to SDN networks or not?

MR WRIGHT: There's two sides of that equation. There's – SDN is really – if you look at what Vish talked about, the bigger benefits in things like SDN and NFV is they're actually the opex curve. By taking complexity out of the business, we need less hands-on in the network. And, of course, those technologies are evolving, so to sit here today with a crystal ball and make a long time – a long term projection on that, it's probably a bit beyond the scope of this discussion.

MR EARY: Okay. Thank you.

MR DIDDAMS: Good morning Justin Diddams from Citi. Maybe just a follow-on from Richard's three questions, not two.

So in the first half mobile revenues grew at nine per cent, so we're saying margins are consistent – what we're saying is the cost base is going to be growing at a – at a similar clip to keep margins flat and to come back to that re-contracting argument, does that mean iPhone 6 has seen a massive re-contracting of its existing customers in this half, therefore next half we won't see that same re-contracting momentum and therefore it's going to be choppier in terms of the margins because of that flood of re-contracting? I mean, I guess we're just trying to get to the profitability of the business.

MR BRAY: Yes. So, firstly, the statement is the same as what has been made before and then, secondly, all the effects that you talk about are important. So on the positive side, you've got operating leverage on the increase in costs side, as well as other cellular operators, one has to cope with – well, actually, one offer re-contracts and in terms of re-contracting when popular phones come out, of course, that increases the re-contracting and then there's the other effect that I talked about as well, and you put them all together and so the statement that we've made in previous results remains.

MR DIDDAMS: Okay. My second question is probably one around network. And it seems that in the mobile sector we've just recently doubled the data allowed to customers in post paid and then a number of Telstra customers are getting letters doubling their data on fixed line. It seems that data is increasingly getting commoditised or at least we're giving it away.

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My question is how complex would it be to move to a value-based pricing where you can move both on mobile and on fixed line to speeds, so if you want the platinum speed at 5G or you want the platinum data downloads for your Netflix streaming at home you pay more, if you just want simple searching, then you pay less. So is Telstra setting up to be able to change their business to a value-based pricing?

MR BRAY: So it's technically feasible to do what you say. We've got no plans to do that. And I would – the premise of your question, the giving data away, we – we're always constantly adjusting our allowances, but we don't give data away. Our belief is that we need to offer enough value to our customers, so our customers get a great experience, but also make the returns that we can re-invest in our networks.

MR DIDDAMS: And, Mike, on fixed lines, do you think we need to move to a value-based pricing from a volume-based pricing ?

MR BRAY: My comment covered both mobile and fixed.

MR DIDDAMS: Right. Okay. Thank you.

MR CHOPRA: Good morning Sameer Chopra, Bank of America Merrill Lynch. I had three questions. One is could you give us a sense around whether your competitors are making similar investments in software development networks, CDNs, etcetera. How are you seeing competitive differentiation play out as networks become more software-driven. That's the first question.

MR WRIGHT: You will have to ask our competitors that. I think what you – if you look back through the history of investment and technology, we all have a tool set to chose from and, in fact, our differentiation is largely built on how do we use that tool set. So we like to think that we're looking ahead, we're looking at the next generation of technology and we're looking at ways of using that in the most effective means. And I think if you look back six, eight, 10 years, that has played out that way and our intent is to continue to do that.

MR CHOPRA: So do you see – just a follow up. Do you see the differentiation narrowing, expanding – how are you kind of seeing things?

MR WRIGHT: Differentiation is something that's actually a moving commodity. I think if you get back to the very heart of it, we're looking to add value to customers in many different ways. One is the user experience of the network. The other one is everything that Warwick alluded to in terms of the value of the content and the user experience. So it's not something that you can actually put a measure on.

MR CHOPRA: Right. My second question is some of the new devices that you spoke about. They cost a lot more to sort of bring on to the network as well. And when you give them to customers – I was just wondering are you sensing that prices on smart phones are going up? Is the cost base on a like-for-like device going up? Was the five or the six more expensive than the iPhone 5? Is a Galaxy 5 more expensive than the 4? Are you finding that your cost structure on devices is going up?

MR BRAY: So we've seen trends over 20 years where phones have been $1000 and similar phones come down through a curve to $100 and then great new phones come in at the more expensive end of things and the curve comes down again. And so we've just seen, so I would expect the curves like that to continue and we're just at a phase in that. What matters the most to us is that we can offer a great range of devices to our customers, both consumer customers and business customers and then in terms of our economics, what's important for us is the subsidy levels. And the subsidy level is just another form of the overall way we think about providing value to customers. The way we think about that is we need to continue to put value into our packages, be that the network differentiation, be it great new services like Mobile Protect, StayConnected, New Phone Feeling – all the value we put in

there – and then we need to constantly check with our customers are we getting – do they see value at price levels and then periodically, make changes. So that's how we think about it.

MR CHOPRA: Okay. The final question is you know when new services like Netflix or Presto are offered, do you write off the cost of that six month-free, three month-free Presto against the mobile network? Is that something that will weigh on margins?

MR BRAY: So we will increasingly be offering more and more entertainment services. We see entertainment in the medium term as being – in the short term as well as being very positive for our customers and the economics are fine. They're not as wide a margin as some of our core services.

MR CHOPRA: Thanks.

MR MCLEISH: Thanks. Fraser McLeish from Credit Suisse. Just my first one. Warwick, you've had quite fundamental changes in your excess data pricing. Can you just give us an idea how material or if excess data packs are material to your post paid ARPU currently?

MR BRAY: So excess data is – I'm not sure - - -

MR MCLEISH: Sorry, data packs – data packs.

MR BRAY: Yes, so data packs and excess data are an important part of the ARPU, and so I guess under most definitions of material and the answer would be material, and so in there, the way we think about where that's going is it's a trade-off between customers enjoying more data, enjoying it for their consumer applications and video and getting great productivity out of it. So they're using more and more, and then on the other hand we are making great efforts to make it ever more affordable for them through decreasing the prices as I set out, and then also being making sure customers are in control through our real time alerts. What I would say as well is that we have had a long term strategy to try and put more and more of our revenues into annuity-style revenues. So where we have a preference which we think is great for our customers and also good for us, our preference would be that the structure would be more minimum monthly commitments and data packs and less of the per megabyte excess usage.

MR MCLEISH: Thanks. And my second one was just we've seen I guess a quite major trend from your competitors here and overseas in terms of the way mobile plans are being structured to unlimited voice and to sharing plans whether it's data sharing SIMS or handsets. You haven't kind of moved down that – I mean, I know you're offering data sharing but you charge $10 extra per SIM, and is that something you think you have to address and that's a risk going forward because it seems to me it's a pretty compelling consumer proposition, both of those things?

MR BRAY: Yes, so to the second part of the question I would phrase it as an opportunity which is the whole data sharing is all about that opportunity from the consumer side of things to use connected tablets to replace the PCs and the laptops that I was talking about before. In order to get that right our sharing propositions have got to be ever better. So I have a lot of sympathy with the direction on that. As well as the sharing proposition, of course, it's the marketing messages, and it's also having a great device range. On the other side of the question that sort of comes back to sort of how we think about value which I think I answered before.

MR MCLEISH: Well, in the unlimited voice?

MR BRAY: Yes, so we constantly check where value is and what our customers think value is and we periodically adjust our prices around that.

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MR MCLEISH: Do you think you can resist moving to unlimited voice?

MR BRAY: I think I've answered that.

MR MCLEISH: Okay. All right. Thanks.

MR WONG-PAN: Hi, Craig Wong-Pan from Deutsche Bank. I am just curious about the chart you provided on the wireless cost per bit. I'm just sort of wondering, what are some of the drivers that are driving down cost? Is it more about operational leverage or sort of fixed cost leverage or is it more about the technologies?

MR WRIGHT: It's largely the technologies. So if you look at what has happened ever since the world of 3G really the spectrum efficiency of those technologies improves. As well as if you increase the size of the pipe statistically inside the pipe you actually get a statistical gain. So what we have seen is improvement both in the context of the radio spectrum itself being used more efficiently, the size of the pipe being added to, and when you add all those things together you get a lower cost per bit.

MR WONG-PAN: And just the second question on the 2G network being turned off. I mean, is there much kind of capital savings or opex savings from that?

MR WRIGHT: The 2G network is quite old. We haven't actually invested any money in it since about 2006, I think, so, really there is some – has been some small operational savings and some recovery of spectrum.MR WONG-PAN: Thank you.

MR TONG: Raymond Tong from Goldman Sachs. Warwick, just a quick question on the post paid market. I think at the result churn was up a little bit, and I think David and Andy sort of said that it was the low end, probably the SIM only segment. Can you maybe talk about the trends there? I think during the half, this half, you sort of got a bit more aggressive in that segment. Are you seeing more sort of like a greater number of customers move SIM only at the moment, and is that impacting your ARPU that you sort of talked about before?

MR BRAY: Yes. So on that one we're not seeing a great change on the SIM only customers on either new to acquisition or recontracting. That balance has been pretty standard – sorry, pretty – not moving.

MR TONG: Right. Okay. And just a question for Mike, I mean, in terms of the investment into the mobile network and you said that you will get to 94 per cent 4G population coverage. Now, can you give a sense of how many, like the base stations that you've rolled out that have got 4GX capabilities and by mid-year what percentage of them will be sort of 700 megahertz capable?

MR WRIGHT: All I will say at the moment is it's sufficient to get to reach over 90 per cent of the population now and 94 per cent mid year, and that's driven by a combination of a coverage-driven component of rollout, but almost a self-funded component as well which is when that 3G cell gets busy we're able to use 4G investment to relieve that capacity which naturally drives a coverage footprint expansion, and as I said earlier because 20 to 30 per cent of that traffic straightaway goes to 4GX we immediately get to use that asset.

MR TONG: Thank you.

MR EARY: Hi. It's Richard Eary here again from UBS. Just two follow up questions. First of all, Warwick, you mentioned to Fraser's question about – and you talk about annuity revenues and the desire to obviously increase that percentage. Can you give us an indication in terms of what the new annuity revenue stream is today within the mobile business?

MR BRAY: I don't think we, we haven't provided a breakdown on that. It has been rising though. So if you look over four or five years it has been rising. As in – as a percentage of ARPU.

MR EARY: And is the non-recurring side significant or not?

MR BRAY: I think I gave an answer to that before that it is material.

MR EARY: And the second question just with regard to the pending launch of Google's MVNO in the US whether you had any thoughts in terms of what that means in terms of pricing structure from the US which tends to lead in terms of some of the innovations that we seen on that?

MR BRAY: What I could say is that in Australian MVNOs are a very important part of the market, and we will continue to offer MVNOs through our wholesale business and they're another form of competition and competition is great.

MR EARY: But do you think that if Google comes in and does it in terms of chasing the pricing dynamic do you think that's industry changer?

MR BRAY: I think that is more of a question for them, and we've got lots of forms of competition, and we've just sort of put out our strategy for what we are going to do to respond.

MR EARY: Okay. Thank you.

MR CHOPRA: Hi. Just a couple of follow up questions. One is with the Wi-Fi rollout when you get to about 1300 base stations can I confirm that that's about five per cent overlap with your network? What I'm trying to figure out is what's the offload you see on Wi-Fi.

MR BRAY: Okay. I think there's a wider question than that, and I think you have to take into account the radius of the base stations as well, and so I'm sort of not agreeing with the premise of the question, but in terms of the Wi-Fi network, the biggest underlying reason is our customers have told us in no uncertain terms that they want a great Wi-Fi network and that's why we're doing it. And by the way I hope for those of you who have tried the Wi-Fi network you have seen sort of our passion to make sure that the speed experience is great on our Wi-Fi network as well as on our other networks as well. We have been very mindful of shifts in customer's usage as a result of putting out a Wi-Fi network between usage on all of our networks and the Wi-Fi network. I would also sort of add that if we don't someone else will as well which also to some extent we think formulated our thinking.

MR CHOPRA: So it's not going to materially change the data demand on your mobile network?

MR BRAY: Well, we have thought about that.
We did think about that in the plan for it and that's something that we do constantly monitor.

MR WRIGHT: And I would expand on that. So the Wi-Fi network is about convenience for customers. It's not a strategy to offload the cellular network. It's an addition where people can use data in a convenient way in another place, and I guess you can do the maths Pi squared times the number of sites and you get about 50 to 100 metres out of a Wi-Fi base station and we're 2.3 million square kilometres of coverage on land. Our cellular network still fundamentally underpins our network traffic.

MR CHOPRA: And that's kind of where I got the five per cent from. The second question was about Net Promoter Scores, and I was wondering on mobiles are you seeing any changes in your Net Promoter Scores? Are they still picking up or are they static?

MR BRAY: So we will provide – so, I sort of provided an update today in some of the initiatives that we have and to continue to improve their Net Promoter Score and that was sort of in the first slide, and then also that's a lot around the lower customer effort, and we will provide more updates on that at the next half year results, full year results.

MR KOPANIDIS: I think in terms of investors and analysts that will be a wrap, and I will now hand over to Cath Harris to moderate the media questions.

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