◯ WIRELESS POLITICS II

WIRE VS WIRELESS – INTERDEPENDENCE, SYMBIOSIS AND COMPETITION, 2010

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Broadband was one of the few issues that deeply divided the major parties in the August 2010 federal election. Labor and the Coalition disagreed about how big the problem was, what was needed to fix it, and how much should be spent. Strikingly, their positions cleaved down an old fault-line. Labor planned much more wire; the Coalition emphasised a bigger role for wireless. This article examines the background to this conflict and the arguments presented in support of the Labor Government's heavy investment in fixed line infrastructure. It then indulges in a 'thought experiment' to argue the opposite case – that mobile access networks will dominate in the future so as to undermine the rationale for *subsidising* (*not* for building without subsidy if commercial investors choose to do so) some or all of the FTTP NBN. It concludes that a Government planning the biggest intervention in Australian infrastructure history might find itself with rather more competition from wireless access networks and rather less interdependence and symbiosis between wire and wireless than it hopes.

WIRE, WIRELESS AND COMPETITION

Conquering the 'tyranny of distance' may be an old and enduring theme in Australian history, but it is rare for communications or transport policy to decide federal elections. In 2010, broadband became one of the few issues where there was a deep divide between the parties. Labor and the Coalition disagreed about how big the problem was, what was needed to fix it, and how much should be spent. Strikingly, their positions cleaved down an old fault-line. Labor planned much more wire; the Coalition emphasised a bigger role for wireless.

When wireless joined wired communications in the late nineteenth century, some thought it self-evident that the new medium would eventually take over all electronic communications. Why lay wires if you could communicate as effectively, and more cheaply, without them? Wireless was modern, wires were history. But as scientists and engineers learned more about the behaviour of signals transmitted on different radio-frequencies, as industries developed to manufacture transmitters and receivers and to offer services, as users adopted or rejected the new products, costs and revenues changed, and profits and losses accrued, wires and wireless both found homes. Some were relatively stable, reflecting the nature of the service. Maritime and aeronautical communications were wireless because it was the only way to exchange messages with mobile objects. Some seemed stable for a long time, like radio and television (wireless) and the landline telephone (wire). Some were not stable at all.

'Complementary' is a misleading way to describe the relationship that evolved between wired and wireless technologies. At some times, for some services, it has been brutally competitive. There were eras of spectacular, rapid shifts in the dominant technology used for individual services. Short-wave wireless had a devastating impact on the international submarine telegraph cable business in the late 1920s and 1930s. Submarine telephone cables returned the favour from the 1950s, effectively ending the international short-wave wireless telephony business. Optical fibre

took over much long-haul carriage from microwave circuits, and international telephone traffic from satellites. Mobile voice telephony overwhelmed landlines, first in the number of subscribers, then in revenues earned.

What made those shifts happen was not cosy complementarity, some kind of inevitable relationship determined by the technologies themselves, but aggressive investment by private and public corporations with particular technical visions of the future.

THE PARTIES: LABOR

The Australian Labor Party did not set out to become the party of wire. It set out to do something about Australia's 'broadband backwater' in 2007, something bigger than what the Coalition Government was doing. Ideally, it needed to involve public investment, so as to ease the party's policy migration away from supporting full public ownership of Telstra, once the final tranche of privatisation made this position untenable. NBN Version 1, which the party took to the 2007 election, was a version of Telstra's own plan to upgrade part of its fixed line copper network to FTTN. NBN Version 2, announced in April 2009, was a turbo-charged response to the failure of NBN 1. Both plans emphasised fixed line infrastructure although NBN 2 left a large, clear role for fixed wireless and satellite to serve the 10 per cent of premises (now 7 per cent) that would not be reached by fibre.

The rhetorical emphasis was all about fixed line. Interpreting FTTN as only an interim solution, FTTP became a leap-frog straight to what finance minister Lindsay Tanner called 'the end game' (Tanner 2009) and telecoms industry analyst Paul Budde 'the final destination' (Budde 2009). Prime Minister Kevin Rudd said: 'Going beyond fibre optic to the node to fibre optic to the premises is the right way to go. It puts us in the slot when it comes to being competitive with the world economy, the 21st century' (Rudd and Swan 2009). When country independent Tony Windsor declared he would be supporting Labor to form a minority government after the August 2010 election, and broadband was one of the two issues that had made up his mind, it was because 'You do it once, you do it right and you do it with fibre'. The wireless technologies that will have to be used to deliver broadband to 7 per cent of all premises, and a much larger proportion of non-metropolitan premises (around 20 per cent in Tasmania), were not central to the political pitch.

As voters, Australians seemed to like the idea of the fixed line broadband plan, but as customers, they were increasingly drawn to mobile. The day before the government announced NBN 2, the Australian Bureau of Statistics (ABS) released data showing a fifth of all broadband subscribers at the end of 2008 were mobile subscribers (ABS 2009). The number had grown by a million over the previous year. DSL remained by far the most popular broadband access technology, but the number of subscribers had grown by only 400,000 over the same period. Stephen Bartholomeusz (2009) argued 'The shift to wireless and wireless broadband has been so abrupt and dramatic, and wireless technologies are developing at such a pace, that the eventual scale of demand for fixed-line broadband is quite uncertain'. Acknowledging the importance of mobile, the biggest stick included in the draft legislation designed to force Telstra to accept structural separation was a provision that would allow the Minister to prevent it bidding for new spectrum for wireless broadband.

By June 2010, nearly 3.5 million of the country's 9.6 million Internet subscribers – 36 per cent of all subscribers and 39 per cent of broadband subscribers – were mobile wireless subscribers. DSL had fallen to 44 per cent of all subscribers and 48 per cent of broadband subscribers. These figures do not treat as broadband subscribers those people that use powerful 'smart' mobile phones like iPhones and Blackberrys to access the Internet either directly or by tethering them to laptops, so they understate the significance already achieved by the mobile Internet. The ABS published data on this for the first time with its June 2010 Internet Activity release. Stressing that 'the data are considered to be experimental while the ABS refines its collection methodology' and advising that it be used 'with caution', ABS found 6.8 million 'mobile wireless connections via mobile handset', nearly twice the 3.5 million 'mobile connections via datacard, dongle or USB modem' included in the main collection. (ABS 2010)

THE PARTIES: COALITION

The Coalition responded with a cheaper broadband policy released shortly before the 2010 election. It emphasised a mix of technologies. There would be money for more fibre backhaul and to increase the number of households able to get better broadband via DSL or HFC, by installing extra and more modern DSLAMs in exchanges, by remediating pair gain lines and by redesigning networks in places currently served by 'remote integrated multiplexers'. There would also be a lot of money for wireless broadband, $2 billion of the $6.3 billion total for the policy. Of this, $1 billion would go to grants for wireless networks in rural and remote areas and $1 billion would go to investment in wireless networks in outer metropolitan areas, required to return 1 – 2 per cent above the long-term bond rate.

Where Labor's rhetoric emphasised fixed-line, the Coalition emphasised wireless:

> Wireless technology is now in a phase of spectacular development globally. There are many more users on wireless networks than on wireline networks internationally, and the numbers are especially large in the most rapidly growing economies of our region. The very large and growing installed base of customers served on wireless networks is one factor behind the enormous commercial potential of wireless. Another is the rapid take up of devices such as the Kindle and the iPad.

> NBN is a hugely expensive bet on a particular technology (FTTP), but it is not a bet which should be made with taxpayers' funds – especially with the surging popularity of wireless broadband. (Coalition 2010)

Explaining the policy, Opposition leader Tony Abbott said:

> I mean, all of the people who are using their Blackberrys or their iPhones for Facebook. All of the people who are sitting in cafes and hotel rooms doing their work, they're all using wireless technology and we shouldn't assume that the only way of the future is high-speed cable. (*Q&A*, ABC TV, 16 August 2010)

Minister Stephen Conroy had previously dealt with criticism of the Government's concentration on fixed-line by arguing it was equally focused on wireless. Addressing the Australian Mobile

Telecommunications Association's (AMTA) Member Networking Forum in Sydney in March 2010, he began by praising the mobile sector:

> At a time when the Global Financial Crisis has cut a swathe through most industries across the globe, it seems the wireless communications sector has hardly missed a beat. Looking to the future, in terms of demand for wireless broadband, it looks like there will be exponential growth for some years to come.

But servicing this demand, he said, '*won't just happen*'. [emphasis in original]

> We need to put in place critical pieces of national infrastructure to deliver those services and this includes both fixed and wireless infrastructure. The importance of fixed services to provide backhaul and handle very high bandwidth services is vital to the delivery and reliability of wireless services. Equally, the massive growth of mobile services will drive greater use of fixed services, particularly if the trend towards centralised processing of data occurs *in the Internet cloud*. [emphasis in original] In this way, the growth in wireless services does not have to be at the expense of fixed broadband, or vice versa. There is no reason to restrict either – they are major productivity-drivers and critical parts of the national infrastructure.

Then came the crucial language:

> At a more technical level, wireless and fixed broadband technologies are complementary. In fact, it is more than this. *Wireless and wired communications networks are interdependent and have a symbiotic relationship.* [emphasis added] The Government's massive expansion of the fixed line capacity through the National Broadband Network will dramatically increase development of wireless services. This will particularly benefit mobile broadband, through the provision of additional competitively-priced backhaul. Together, decisions on wired and wireless communications will provide the critical infrastructure that will be a cornerstone of productivity growth for decades to come. (Conroy 2010a)

The Minister announced an aggressive 126 MHz 'digital dividend' in June. This is the amount of UHF spectrum that will be freed for alternate uses once all analogue TV broadcasting ends in December 2013. 'Wireless broadband is an important complement to fixed line services, and the release of this spectrum will enhance and support the services that will be enabled by the Government's investment in the National Broadband Network,' said Conroy (2010b). The planned 126 MHz is a little more than the amount freed in the US but considerably more than the minimum 72 MHz being harmonised for mobile broadband use by the European Union. (Hart 2010; ACMA 2010b. Appendix B) It will require 'restacking' by some broadcasters, a politically sensitive process that means shifting their transmissions from existing frequencies to different ones. The aggressive digital dividend showed the Government was still serious about wireless broadband, or at least, serious about the revenues that could be received from auctioning spectrum for it.

It may just have been a product of the elevated temperature of an election campaign, but the language seemed to toughen after the Coalition's 'Plan for Real Action on Broadband' was an-

nounced. 'The Coalition's focus on wireless,' said the Minister, 'defies the advice of industry experts who agree it is a complementary technology to fibre and will not deliver the high speeds and capacity needed for the delivery of healthcare, education and business applications of the future'. (Riley 2010)

THE CASE FOR FIXED: THE NBN IMPLEMENTATION STUDY

The NBN Implementation Study conducted by McKinsey and KPMG (2010), published in May 2010, implicitly responded to criticism of the NBN's emphasis on fixed access and anticipated the political controversy that attracted so much attention during the election campaign.

It acknowledged the current decline of fixed-line markets that had been 'a ubiquitous part of the communications landscape over the twentieth century … Customers world-wide are leaving their copper-enabled PSTN services in favour of mobile and VoIP services, and DSL take-up is not yet sufficient to maintain fixed-line penetration.' Australia, where 87 per cent of household still had a fixed line in 2009, lagged the trend in developed North American and European countries, where just 50 – 60 per cent of households still had fixed lines. The Study thought 'significant declines' in fixed-line penetration were likely from this high starting point, 'irrespective of a fibre overbuild'. But it also believed that 'fixed-line demand for NBN services is likely to be strong and will underpin a revival in fixed-line demand across Australia'. (McKinsey and KPMG 2010, p 229)

There were three reasons for this. First, McKinsey and KPMG argued the fixed-line market would shift from 'voice-centric' to 'broadband-centric'. Broadband would replace voice as the 'anchor fixed-line service'. Second, they forecast continuing strength for fixed broadband in the future because of its superior performance and price/performance. Emerging services like 3D HDTV would require sustained data rates of up to 60 Mbps that could not be supported cost-effectively by mobile for large numbers of users in populated areas. 'For comparable prices, mobile operators are unlikely to deliver competitive products with current network constructs.' Third, the recent surge in wireless broadband had resulted from the 'confluence of several unique and temporary factors'. Price drops, poor fixed broadband offers ('slow, expensive and usage-constrained when compared with international peers'), and the widespread adoption of remote working in business market that had stimulated mobile broadband growth, would weaken as drivers in the future. (McKinsey and KPMG 2010, pp 229–37)

For these reasons, McKinsey and KPMG concluded demand for fixed-line services in Australia would revive. 'NBN will be Australia's future fixed-line network and will offer a step-change in performance relative to copper.' (p 229)

THE CASE FOR MOBILE

Let us engage in a thought experiment and try to make the opposite case – that mobile access networks will dominate in the future so as to undermine the rationale for *subsidising* (*not* for building without subsidy if commercial investors choose to do so) some or all of the FTTP NBN. What arguments might we mount?

First, some recent history. Over the last twenty years, the social practice of voice telephony has undergone a huge migration from fixed to mobile devices. Given the option, people chose mobility, even though it was more expensive – hugely so for local calls of all but the shortest

duration in Australia, where fixed services were untimed. The 24.22 million mobile subscriptions in Australia at 30 June 2009 comfortably exceeded the number of people in the country and is 2.3 times the number of fixed services. (ACMA 2010a) It is not inconceivable that many of the activities people want to perform online might be equally or better undertaken on a sufficiently capable mobile device, even if it is more expensive.

Next, the present. Wireless broadband is where almost all the growth in broadband subscribers is coming from now. If it is an inadequate substitute for fixed, someone is going to need to tell the customers pretty soon. By mid-2009, the majority of Australia's mobile phone users (55 per cent) had a phone 'capable of accessing 3G services such as the mobile Internet'. 3G services grew 44 per cent in 2008/09. (ACMA 2010a) Further, as the Implementation Study noted, a significant and slowly growing share of Australians now live in homes without fixed line phones. The Australian Communications and Media Authority (ACMA) (ACMA 2010a) estimated that in 2008/09 around one in ten Australians aged 14 and over did not have a fixed phone line in their home and used only mobile phone services. Unlike their parents, young adults have always had a phone bill but few have experienced a fixed-line bill. Those habits might prove hard to dislodge, especially if the first two 'temporary factors' cited by the Implementation Study prove durable (mobile price reductions; poor fixed broadband offers according to international comparisons).

Third, mobile broadband might actually be cheaper for typical usage patterns, or at least *feel* cheaper because of the pricing options offered for low-medium users or particular types of use: eg. pre-paid options (44 per cent of all mobile phone services at 30 June 2009 (ACMA 2010a)), unmetered access to the most popular content or activities (eg. social networking sites), revenue-sharing arrangements between carriers and ad-supported content providers. The fixed line NBN is offered as a route to faster, cheaper broadband, but, as Kevin Morgan argued at the CommsDay Melbourne Summit on 13 October 2010, 'I just can't see how to stick an extra $40+ billion in costs into an industry and not get higher prices'. The Implementation Study contemplates steadily increasing wholesale access prices. In the United States, where FTTP is not being deployed nationally, the biggest builder of FTTP networks so far, the east coast incumbent Verizon is, unsurprisingly, targeting the most lucrative customers. It has built in New York and Washington DC but not Baltimore. It has sold off altogether under-performing franchises in New Hampshire, Vermont and Maine. FTTP is effectively a 'Mercedes' for the well-off in well-served areas where the incumbent fears there is a real danger that another provider, particularly a cable operator, might pick them off. Elsewhere, customers will be offered the physical flexibility of good-enough wireless broadband via LTE in financially-manageable packages, a 'Toyota' product that might suit them perfectly well. Stephen Bartholomeusz (2010) argues: 'The combination of steadily tumbling prices, rising speeds and the exploding inventory of applications does provide a rather compelling argument that, if the future isn't all wireless, for a significant proportion of the market it will be a very substantial part.'

Fourth, some users are going to get wireless whether they like it or not. In Australia it is going to be 7 per cent of premises. If the Government's arguments about the essentiality of much faster broadband in the near future prove well-founded, ways are probably going to have to be found to deliver fibre-like performance off wireless infrastructure for non-metropolitan users whose interests will receive acute attention in a finely-balanced Parliament. In other countries, especially developing countries without existing landline telephone infrastructure, it will be much more

than 7 per cent. The energy of innovative practices developed there and the cost-effectiveness of the technical solutions might provide lessons for other places that started out with bandwidth expectations that could not be met with earlier generations of wireless technologies and network designs.

Fifth, investment in mobile broadband networks might take place more quickly than in politically shaped, fixed line networks. Mobile operators might prefer to put their scarce capital into infrastructure involving less-regulated network elements, and minimise their reliance on government-funded or regulated infrastructure, even while they encourage its construction as a handy alternative in less lucrative areas. In Australia, Telstra's aggressive construction of its NextG 3G network while the upgrade of its fixed access network was being negotiated with Government and the regulator seems an obvious precedent for its strategy in a world where it no longer has a fixed access network of its own, as envisaged under its heads of agreement with NBN Co.

Sixth, wireless broadband might become the Next Big Thing in the global telecoms arms race. The United States President declared in June 2010 that 'the next transformation in information technology' was beginning – 'the wireless broadband revolution'. (Obama 2010) National Economic Council director Lawrence Summers (2010) called it 'the third wave of the Internet's development'. He placed the mix of public and private initiative needed to make the most of it alongside 19th century land grants for railways and educational institutions, as an example of the long American history of 'government actions to assure the necessary foundational investments for economic growth'. Going 'All the Way' with fibre might become yesterday's passion. As so often in the past, US decisions, such as the proposed allocation of 500 MHz of spectrum for mobile and fixed wireless broadband over the next ten years, might strongly influence policy outcomes elsewhere.

Finally, mobile might attract investment, innovators and users because it seems to be where the 'cool' people are. A 2009 Pew Internet and American Life report found 'mobile connectivity is the new centerpiece of high-tech life'. (Horrigan 2009) Google's CEO Eric Schmidt told the American Society of News Editors in April 2010:

> It's important to understand that three things are coming together: the powerful mobile devices that … are paired with the tremendous performance that we can now get on computers … it is the sum of that, and the capabilities and the technologies that will exploit the sum of that, that will define the next ten or twenty years for all of us. So when I say "Internet first," I mean "mobile first."

> Now, some of the most clever engineers are working on mobile applications ahead of personal computer applications. People are literally moving to that because that's where the action is … (Garber 2010).

INTERDEPENDENCE, SYMBIOSIS, COMPETITION?

The McKinsey and KPMG Implementation Study does not shirk the awkward truth about the current decline in fixed lines in Australia and elsewhere. It may be right that 'fixed-line demand for NBN services is likely to be strong' and it does solid work explaining the forces it believes 'will underpin a revival in fixed-line demand across Australia'. But it does not hide the challenge.

The discussion in that study and above suggests three concluding observations. First, the politicisation of wire vs wireless has plainly oversimplified a complex set of issues. (Lynch 2010) Increasing integration of fixed and mobile networks and applications, especially through devices like the iPhone that can choose to use accessible WiFi networks ahead of 3G if both are available, means there is no simple contest between fixed and mobile access that will be won or lost simply by looking to consumers' innate preference for mobile or fixed locations. As has often been remarked in response to Tony Abbott's comments about iPhone and Blackberry use and Malcolm Turnbull's iPad, the fact that customers want mobility doesn't mean that some of the places they move won't be fed by fixed lines and WiFi or wireless femtocells – the home, the workplace, the café, the bar, the gym. The June 2010 ABS broadband data shows that although more than a third of broadband connections are wireless (including fixed wireless and satellite as well as mobile wireless), they accounted for less than 9 per cent of the data downloaded. (ABS 2010) The anecdotal cliché is that young users go home or to work for a fast fixed line connection to download music and movies. Mum, Dad and the boss might not see so much of them if they cut their cords too.

The home may be largely history (as Unwired CEO David Spence memorably told Liz Fell (2008) for these pages) as a site for the consumption of shared 'home' services like voice telephony, but not as a technically convenient hub for the distribution of discrete services for consumption by individuals one of several venues where they happen to spend a lot of time. The same Pew study (Horrigan 2009) that found mobile connectivity to be 'the new centerpiece of high-tech life' also found that mobile Internet access was drawing people into more frequent online use:

> The information nugget initially discovered on the handheld device might prompt a user to open the laptop at home to explore further. Conversely, the fascinating blog post discovered on the desktop at home might be pursued further on the mobile device on the train to work and then taken along new pathways once online at the office.

The report's author John Horrigan compared this to the steep increase in the use of the telephone in the 1980s produced by the take-up of answering machines: 'relatively small changes in society's technology portfolio in one area can have significant impacts in a related one. The answering machine served as an accelerant to Americans' existing calling patterns.' The finding that the mobile Internet was 'drawing people further into the digital world' was, he said, 'the cornerstone of the Pew Internet Project's second typology of information and communication technology (ICT) users'. (Horrigan 2009, p 18)

Second, the case for virtually universal fibre is really all about one thing: capacity. Even a single fibre can carry a huge amount of information and FTTP means a dedicated physical connection to the customer's premises (at least, from the kerb-side splitter in the 32-premise GPON architecture proposed in Australia) rather than shared use of spectrum. (Tucker 2010) Significant as these points are, they are engineering concepts that do not tell us the critical things that matter to customers – what user experience will be offered in typical customer set-ups and what it will cost. Further, if in-home access to the services enabled by FTTP is to be via WiFi, the apparently terminal deficiencies of wireless will be a widely shared feature of typical access to NBN-enabled services. At the CommsDay Summit in Melbourne on 13 October, NBN Co CEO Mike Quigley

cited the fact that only 3 per cent of customers taking fibre from NBN in Tasmania so far were doing any sort of internal rewiring as proof that such rewiring was not necessary for customers to receive the benefits of the NBN. Wireless can't be an intrinsically sub-standard technology up to the front door but future-proof inside it.

This greatly complicates the policy challenge beyond the delivery of Big Broadband to every door. Predicting costs and consumer behavior and the pace and nature of technological change are tasks that need to be approached with a good deal of humility. A decade ago, reviewing broadcasting regulation in Australia, the Productivity Commission (2000) and many others were highly sceptical about television broadcasters' demands for additional 7MHz channels to allow them to introduce high definition TV (HDTV). Citing a study by BDA that concluded only 5 per cent of the population were likely to purchase high definition digital television sets, the Commission concluded 'High definition TV appears to be best understood as a premium service, rather than a medium with general appeal'. (Productivity Commission (2000, pp 247–8) A decade later, it is hard to buy anything but a high definition TV receiver. Nielsen ranked Australia No 1 for HD take-up of 55 countries surveyed. (Nielsen 2010) Countries like the UK that did not incorporate HD into their original DTV plans are doing so now. Much more convincing, it seemed, was digital TV's promise of interactivity. This has developed much more slowly and not in the directions anticipated. Television broadcasters have made much more use of SMS and program websites for audience interaction. Some take from the HD experience the lesson that bandwidth demands always exceed expectations. The implication for broadband policy is that 3D will now replace HD. A different lesson from HD and interactive TV in Australia might simply be how wrong even widely shared, intuitively appealing beliefs about likely future consumer behaviour can be.

HD was chosen in Australia in part because particular corporations thought they could profit from it. TV viewers may have been pre-disposed to want better TV pictures. More likely, there was some pre-disposition that was hugely stimulated by manufacturers and retailers that promoted it. Similarly, 100 Mbps download was chosen as a target for 93 per cent of Australian premises because of a perception that people wanted better broadband without any well-argued arithmetic about the precise services that such speeds would enable. A political case could be made for much faster broadband and 100 Mbps was the current capacity of one of the most widely deployed fibre access technologies, 2.5 GHz GPON. Having chosen the goal and made capacity the central policy issue, the contest between wire and wireless was decided, because no existing wireless technology could realistically deliver that kind of consistent download speed in densely populated areas. A different goal or combination of goals could radically change the technologies capable of meeting them, as the quite different bandwidth goals chosen for areas not served by fibre demonstrate.

Third, the choice of the target and the technology, the institutions and the regulatory arrangements to deliver better broadband may have left Australia in a position where cozy complementarity between wire and wireless is the least likely outcome. The McKinsey and KPMG Study hints at this. 'For comparable prices, mobile operators are unlikely to deliver competitive products with current network constructs.' Who is thinking of current mobile network constructs? Certainly not the three mobile players in Australia, Telstra, Optus and VHA who are all trialling LTE and have the spectrum assets to deploy it even before the release of digital dividend spectrum.

Australia's new wired and wireless networks are being built through investment by private and public corporations with particular technical visions of the future. The private sector is going to be building wireless. The public sector is building fixed and regulating both. One of the crude rules of public policy is that the bigger the intervention the bigger the unanticipated consequences. A Government planning the biggest intervention in Australian infrastructure history might find itself with rather more competition and rather less interdependence and symbiosis than it hopes.

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