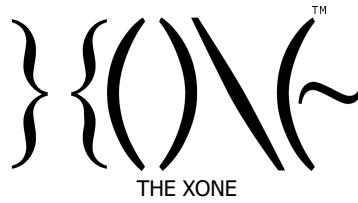


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**SUBMISSION TO
THE AUSTRALIAN HOUSE OF REPRESENTATIVES
COMMITTEE
COMMUNICATIONS, IT AND THE ARTS
POTENTIAL OF WIRELESS TECHNOLOGIES
TO PROVIDE BROADBAND COMMUNICATIONS SERVICES**

26 July 2002



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AUSTRALIAN HOUSE OF REPRESENTATIVES COMMITTEE
COMMUNICATIONS, IT AND THE ARTS
POTENTIAL OF WIRELESS TECHNOLOGIES
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1. EXECUTIVE SUMMARY

XONE is a public wireless broadband Internet access service provider. We use 802.11 technology to deliver that access. This paper addresses the terms of reference of the enquiry solely from the point of view of that market and technology.

XONE believes that 802.11 or Wi-Fi Wireless LAN technology has the ability to fundamentally improve the efficiency of Australian commerce. It will pull broadband and Internet services into small/medium businesses and reduce the amount of travelling time of mobile workers, while enabling a whole new generation of business efficiency applications. The technology also has the potential to significantly improve the efficiency of distribution of broadband and Internet services in rural and remote Australia.

The wireless LAN (WLAN) market is one of those rare opportunities that today has the exact right mix of light regulation and low barriers to entry to encourage the formation of a whole new sector servicing a whole new market in telecommunications. We refer to this market as "the last (or first) 100 meters". It perfectly complements existing segments such as DSL, switched Ethernet and mobile telephony. This view is now beginning to be held by significant players in these sectors (cf CommsDay Summit, Melbourne, June 2002) and will continue to grow in force as analysts are educated in this new sector.

Australia leads the world in the development and application of wireless technology. Radiata is a world class example of development and commercialisation of WLAN technology. The opportunity exists for Australia to lead the world in the application of wireless LAN technology. Our recent trip to northern Europe has proven that many of the things we are doing here in the application of WLAN technology also lead the world. If new entrants are given bi-partisan support and encouragement and allowed to grow and prosper, the whole nation will benefit. The market opportunity exists right now to develop a WLAN service industry that we can export to the world.

2. FRAMEWORK

XONE Pty. Limited (pronounced "zone") is a privately held Australian company that develops and provides public and semi-public broadband wireless Internet and corporate virtual private network access services for location partners from their locations. We are currently rolling out five Xones in Sydney as a "proof of business". On successful completion of this first stage, we plan to expand this to a national and then an international rollout. XONE's technology and marketing partners are Cisco Systems, Compaq, Microsoft and Intel.

XONE's service currently uses standard Internet and 802.11b or Wi-Fi technology sourced from our network partner, Cisco Systems. The next generation of the wireless technology we use will be Australian developed (by CSIRO, Radiata and Cisco) 802.11a technology. Our second generation operational systems have been sourced through our integration and platform partner, Compaq (part of the new HP). Our second generation business systems have been sourced by Xone. The key business systems are Australian developed and are



being provided by Australian software partners. The operational systems have been sourced via Compaq from Sweden, who lead the world in development of "carrier grade" Wi-Fi operational systems.

XONE is engaging with Microsoft and Intel on several fronts. Microsoft's very Wi-Fi aware XP operating system is XONE's preferred client software. It is widely distributed and supported and provides all the functionality and more that third party client Wi-Fi software addresses. We are also implementing Microsoft Passport as part of our authentication and access systems. And we are using the Microsoft .net platform for our public web site. We are engaging in joint marketing programs with Intel and Microsoft and using some of their products and programs to speed market adoption of Wi-Fi.

XONE's goal is to develop a world class, sustainable business model using Australian technology and business know-how. We are building systems and processes to do that right now. Our plan is to develop a repeatable, sustainable business model, test it in Australia and then take it to the world through our global technology partners. We are using the extensive experience of the XONE senior management team in the data communications business to take an approach that has not been taken before in this space. We believe we are very close to succeeding and this is being confirmed by feedback from the market.

3. STATE OF CURRENT AUSTRALIAN AND OVERSEAS GLOBAL ROLLOUT

3.1. AUSTRALIA

XONE is building five Xones (hot spots) in Sydney right now to prove the business and the market. This is based on our second generation of operational and billing systems. On successful completion of this first stage, we will expand this to all capital cities. We are currently engaging with venture capitalists to fund this second stage. Our rollout is targeted very precisely at our early adopter markets and locations where there is demand. We have also done some trials that suggest that the technology has application in regional areas but this is not currently part of our business plan. We are keen to find ways to incorporate it.

XONE installs a WLAN access point and other IP data network equipment in a partner's location. We also install a broadband backhaul service which connects the location to our network operations centre. These broadband "backhaul" services are currently provided by DSL and are currently sourced from Request. We have been exploring the use of switched Ethernet but so far have not been able to find a commercially viable service. We are also about to commence trials on a satellite based backhaul service which would provide excellent location independence.

We have had discussions with DoCITA and the ACA regarding the status of Wi-Fi public WLAN operators. We recognise our obligations and have internal projects to address these. We are working with Request as a potential nominated carrier partner and have already contacted the Attorney General's Department to commence the intercept project. We are also working on a carrier licence option.



We have identified two other active public WLAN service providers in Australia. These are Skynet Global and Azure. We have had good initial discussions with both of them and we are progressing discussions on roaming agreements and industry self-management. We want to implement roaming, as we have the view that every additional zone increases the value to users, regardless of owner. We fundamentally understand the need for co-operation and management of radio spectrum, cell design and planning. We are progressing this as fast as possible given our limited resources.

3.2. OVERSEAS

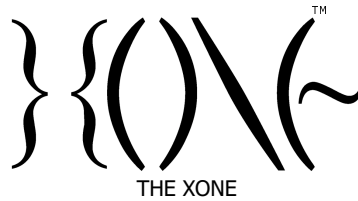
The leading overseas market in terms of end user service rollout is, in our view, the US. There are many tens, possibly hundreds of small to medium service providers servicing markets ranging from a local coffee shop to Starbucks nationally. Use of Wi-Fi technology has become mainstream in corporates and we are seeing the beginnings of aggregation and rollup plays in the service providers. Most US airports and many hotels have coverage. Technology vendors are beginning to produce "Wi-Fi in a Box" solutions and early mover carriers such as Voicestream (Deutsche Telekom/ T-Mobile) are acquiring and integrating Wi-Fi into their mobile strategies.

Europe, especially northern Europe, with its strength in mobile, is more advanced in integration of Wi-Fi with mobile and in operational support systems. Not surprisingly, these are strongly mobile centric. However, there is a strong growth of startups spinning off from the major mobile companies and developing IP centric systems. XONE is working with one of these on its operational systems.

European carriers are also leading the world in adoption and integration of Wi-Fi into their businesses. BT has announced plans for 3,000 zones across the UK by 2003, Telia of Sweden has about 400 zones in Scandinavia, T-Systems (Deutsche Telekom) has bought Mobilestar in the US and Telefonica (Spain) is believed to be preparing to enter the market with a project similar in scope to the BT project.

European rollout of public zones is mainly being lead by small, innovative WISP's. Carrier entry so far has been restricted initially to their corporate customers, with very high pricing. The wisdom of this strategy is beginning to be questioned because of their failure to address the need for development of early adopter markets and plans to bridge them to mainstream mass markets, an issue that XONE is totally focused on. As a result, the more advanced European carriers are beginning to form partnerships with innovative public WLAN service companies. This is not yet generally known due to the desire to make the services look like they are being provided by the customer's carrier. This is being achieved by "white label" neutrally branded or co-branded services. This is a model that is extremely interesting to XONE and which we are capable of delivering today, due to our technology partner relationships and our developed operational systems.

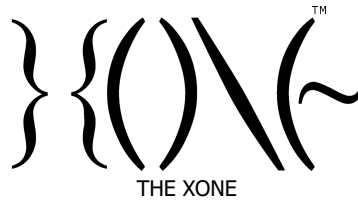
Asia has taken to Wi-Fi with its usual enthusiastic embrace, especially for mobile broadband. Singapore has many zones including Changi Airport and several hotels and shopping centres. Korea Telecom has announced plans for 10,000 zones and is incorporating them into its very sophisticated Internet strategy. Even NTT Docomo is trialling Wi-Fi.



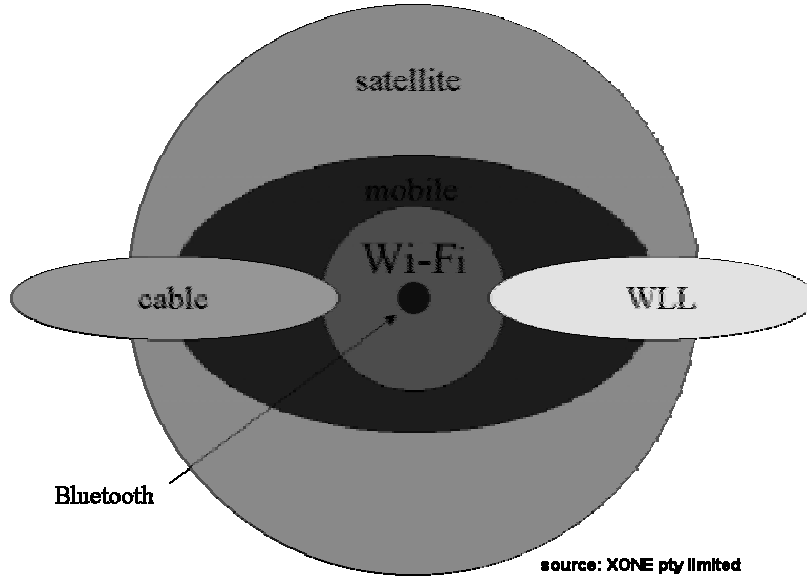
Australia has a huge opportunity right now. We are in the perfect strategic position of being able to enter the market as a fast follower. The technology is now well developed and rich, with an outstanding long term development path clearly identified. The early entrants in the US have spilled their blood and shown us at least where the bigger bear traps are. We can use our world leadership in development and application of wireless technology to create a robust and profitable industry sector that can be exported very rapidly to the world. Radiata set the new standard for commercialisation of the technology in Australia. XONE plans to set the standard for application of the technology to business benefit. All indications are that we are on the right track. With the help of the Australian government, we believe we can contribute to a new era of global success for Australian telecomm's service business.

4. RELATIONSHIP BETWEEN TECHNOLOGIES

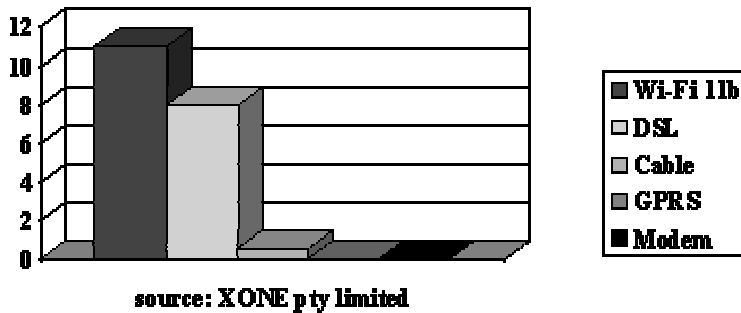
The following diagrams are intended as a pictorial representation of the relationship between WLAN and the various other technologies in the telecommunications market.



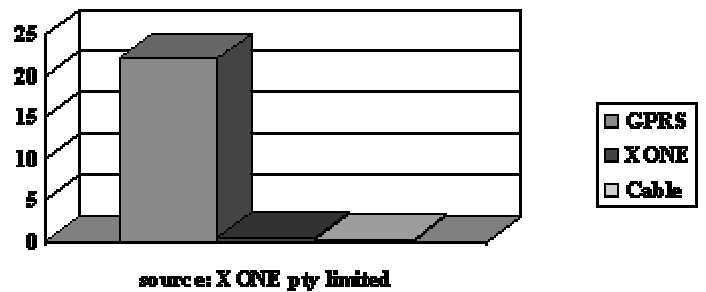
Positioning - reach

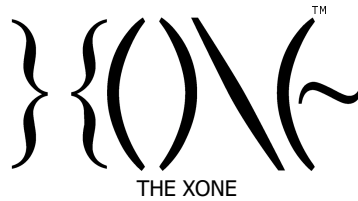


Market positioning - speed



Positioning - retail charging





5. BENEFITS AND LIMITATIONS WRT CABLE

XONE is using 802.11 technology as it was designed – as an extension of Ethernet and the Internet in a local area. Our Xones are in seated locations, mostly indoor, with a radius of approximately 30-100 meters. In this application WLAN technology has many benefits over cable. These are:

BENEFITS

- ~ Flexibility: the ability to connect anywhere without wires or sockets
- ~ Standardisation: 802.11 is a global standard. Wi-Fi cards purchase anywhere in the world work anywhere in the world on standard networks.
- ~ Speed: current generation 802.11b is faster than cable or DSL. The next generation will be much faster again and there are even faster standards in R&D now.
- ~ End to end user service: all the user needs to access XONE's service is a Wi-Fi enabled laptop. Cable and DSL require routers or switches, sockets and cables.
- ~ Purchase of broadband on a pay-as-you use basis: Xone (and all WLAN service providers we are aware of) charge by usage.

LIMITATIONS

- ~ Capacity: 802.11b is currently limited to 3 frequencies. This means that only 3 channels can be active in a given confined area (radius 100 meters) at any one time, limiting the overall throughput in that area to 3 channels of 11Mbps. Cable, especially fibre, has the capacity to multiplex many more channels to a given location. 802.11a will markedly improve this but will still be limited compared to fibre. This is why 802.11 technology is, in our view, unsuitable in its current form as a "last mile" distribution system. It requires more work on the technology and the regulation (see below under "Potential for last mile"). It is, however, perfect right now as a "last 100 meters" distribution system.
- ~ Interference: 802.11 operates in the class licenced spectrum. This spectrum is unregulated and 11b, particularly, is fairly "busy". The spectrum includes cordless telephones, microwave ovens, garage door openers and, of course, other operators. Xone is confident, however, that we can build a commercial network service in the current environment. A key enabler of that will be a co-operative industry body to manage interference. Work has commenced on forming this body. Again 802.11a will significantly improve the situation with an increased number of frequencies and less busy spectrum.

NEUTRAL

- ~ Security: while much fear, uncertainty and doubt has been spread about Wi-Fi security, Xone believes it is, in fact, a neutral issue for the following reasons: first



and foremost Wi-Fi is a layer 2 ie a link layer technology (using the OSI model), equivalent to the Ethernet protocol in corporate networks and the carrier protocol in satellite networks. Network architects have long regarded the link layer as insecure. There is nothing new in this. Being a radio network simply adds a degree of "observability". However, no network architect worth his salt would assume the link layer to be secure or even perform security at the link layer. Most network security is done at the layer above, the network layer, or even higher at the transport and session layers. Therefore the security and authentication systems that today protect corporate and public Internet networks and service providers are more than adequate. These include mechanisms such as Virtual Private Networks, Radius Access and Authentication (AAA) servers and Secure Socket Layer (SSL/https) used by banks to secure Internet banking. Xone allows, in fact encourages, everyone to come to our "front door", ie the wireless link. We want access to be as easy as possible. We secure the process from the front door onwards using standard IP carriage service provider security systems.

6. POTENTIAL FOR

6.1. LAST MILE

Xone believes that 802.11 technology has potential for last mile application, but that it needs more work on the technology, standards and regulation before it is commercially viable. The critical limiting factor is, in our view, the number of frequencies available. With only three non-interfering frequencies, use of the technology in a wider area than it was designed for, ie last mile rather than last 100 meters, has much greater potential for interference, both with itself (ie other last mile services) and with local zones ie last 100 meter services. There are also technical and standards issues that need to be addressed such as the "near far user" problem. This is where a user closer to the Access Point can monopolise the bandwidth.

6.2. RURAL AND REGIONAL

We believe 802.11 technology has huge potential for application in rural and regional Australia. Our current business model is for CBD locations only. However, in conjunction with our technology marketing partners, we are gathering information on usage and populations that will enable us to better define the minimum number and type of user community required to sustain a rural or regional Wi-Fi business. Combined with install and operational cost data refined by actual field experience, we believe we will accurately be able to develop parameters and requirements for a sustainable rural and remote business case.

This would be based on availability of traditional DSL backhaul availability. Other models such as satellite backhaul would also need to be explored. Also use of Wi-Fi in its bridging mode for point to point distribution to extend the end of the fixed backhaul link to the zone.



6.3. ENCOURAGEMENT OF APPLICATIONS

Applications sell bandwidth. This is just as true of Wi-Fi as other telecommunications services. XONE and its strategic partners view applications as the most critical part of adoption and success of Wi-Fi. Anything that can be done to encourage and support development of applications that make use of the unique benefits of 802.11 technology based services would be good for the industry. These could include:

- ~ Sponsorship of development
- ~ Funding of in-house applications such as use by mobile government workers in campus or multi-storey building environments
- ~ Funding as principal or co-funding or guaranteeing Wi-Fi application developers
- ~ Equipping of all government departments with Wi-Fi to create a market and seed demand for applications and developers

6.4. PULL THROUGH OF BROADBAND AND INTERNET, PARTICULARLY TO SMB's

It is a fact that public Wi-Fi service providers create demand for broadband in small to medium businesses because every zone requires a backhaul link from the zone to the network's operations centre. Zones are invariably in SMBs. Once installed, the SMB can then either directly or indirectly access the broadband link and the Internet. Public Wi-Fi service providers also create a secondary demand for broadband in large businesses by increasing use of broadband and easing its purchase and access, ie by allowing users to buy broadband by the minute, simply with the purchase of a \$100 Wi-Fi Network Interface Card.

7. EFFECT OF REGULATORY REGIME

7.1. SPECTRUM AND THE RADIOCOMMUNICATIONS ACT

The current spread spectrum device class licence regime is a good thing. Its simple regulation and low cost of entry encourage new service provider entrants and the creation of a whole new segment in the telecommunications industry that can demonstrably and fundamentally improve the efficiency of Australian commerce.

Anything that can be done to increase the available spectrum and therefore frequencies and therefore capacity would also be a good thing. It will remove some limitations of the technology and encourage new entrants. We acknowledge that this work would have to be done in conjunction with global standards bodies in order to create an effective global market for any new devices based on availability of new spectrum. We believe that this would be a good investment in the future of Australian and global mobile data telecommunications capability, given the grave doubts about the likely success of 3G mobile networks.

We recognise the need for a co-operative industry body to manage interference. Work has commenced on forming this body. Initial discussions have been held with the ACA, other public Wi-Fi service providers, vendors and the NSW Office of Information Technology. An



outline charter has been produced and we hope to issue invitations to the inaugural meeting in the very near future.

XONE firmly believes that any attempt to further regulate, licence or charge for the current class licence spectrum will create barriers to entry and discourage investment in this nascent industry. It would, in our view, kill the industry in Australia in this, its critical early phase.

7.2. TELECOMMUNICATIONS ACT

XONE recognises and acknowledges its responsibilities under the Act. Some of these, such as interception, we feel are appropriate for a public WLAN service provider. Some, such as Universal Service, we do not feel are as applicable. After all, we are not providing telephony services and we are, in fact, increasing the reach of broadband data and Internet. We would be happy to work with the government to define a set of obligations appropriate to public WLAN service providers.

7.3. TRADE PRACTICES

When the industry grows and reaches a stage where there is competition for locations (some time off we believe), there will be a need to manage access and interference. While this would be more appropriate to manage under our proposed industry self regulation body, there may also be a role for Trade Practices as an independent mediator in the event that the self management body cannot reach agreement within a given time to ensure fairness and the interests of the consumer.

8. RECOMMENDED ACTIONS AND CHANGES

8.1. INVESTMENT

XONE believes that the current regulatory environment is perfect for encouragement of new entrants and investment in this new segment of the telecommunications industry. Unfortunately, the same is not true of the investment environment.

The availability of professional early stage seed funding is still almost non-existent. Early stage companies (ie pre-revenue) still have to beg, borrow and mortgage to fund the early stages of their ventures, or else use "angel" investors who demand a very high price, if they can be found at all. Venture Capital is available for later stages (ie proven businesses) but the market is small and remains difficult and averse to risk. The onus remains with management of early stage businesses to create a fundamentally sound and investable business. But this is made doubly difficult when the creators of the business are faced with the double whammy of having to feed themselves as well as create a whole new enterprise in a whole new market. Government funding programs such as ITOL and NTN remain, unfortunately, too difficult to obtain.

Those who are truly committed and who have the vision and faith to see a new enterprise and a new market where few others see it will somehow succeed. But they pay a high price.



The question is, should those who are arguably building the future of Australia be given the least assistance and the hardest path to achieve that?

And to add insult to injury, the tax system hits early stage companies with a double whammy also. An emerging enterprise in Australia has only one real currency with which to attract and incent people: equity. And the current tax system reduces the value of that equity to the point that it is almost a disincentive by creating an arbitrary cash tax obligation in the year of acquisition, invariably the first year of the enterprise where the people acquiring the tax obligation are using every cent they can scrounge to build the enterprise.

8.2. RECOMMENDATIONS

There are many things the government can do to help. Here are just some of them:

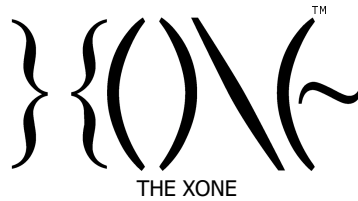
THE TOP TEN

- ~ Maintain the simplicity, low barriers to entry and low cost structure – they are encouraging investment!
- ~ Manage, don't regulate the spectrum
- ~ Assist the formation of an industry self management forum with funding and resources
- ~ Develop a set of carriage service provider obligations and a carrier licencing regime appropriate to 802.11 service providers
- ~ Keep the spectrum free of license fees
- ~ Create incentives for seed and venture capital investors
- ~ Fix the equity tax disincentives
- ~ Encourage co-operation between public WLAN service providers and carriers
- ~ Don't let carriers dominate or destroy the emerging public WLAN industry
- ~ Equip every federal and state government department with 802.11 networks, laptops and handhelds, to create and support the market

If the government just did the top ten above, we would have a booming public WLAN industry (and a few others) in less than 12 months.

Here are a few more suggestions that would ice the cake:

- ~ Sponsor public and semi-public wireless Internet services eg Universities, Exhibition spaces, etc
 - ~ Work with the states & territories to develop programs
 - ~ Continue to fund rural and regional rollout
 - ~ Link rural and regional development projects to maximise efficiency and learning and minimise risk
 - ~ Develop programs to roll out wireless Internet to schools, Universities, Tech Colleges etc (eg as Scotch College has done already)
 - ~ Expand to rural agencies
 - ~ Work with and fund remote communities to develop services eg Arnhem Land, Cape York
 - ~ Fund technical and business research to increase available capacity, robustness and reach
-) More frequencies?



-) Higher power/gain?
-) Mesh networks?
-) Hybrid business models
-) Others?

9. FUTURE TRENDS

The single biggest trend we see is the convergence of 802.11 Wi-Fi and mobile telephony. This convergence will be at platform, billing, application and whole of business levels. We believe (as do many analysts) that the convergence will happen in the handheld platforms and possibly the new emerging tablet platforms. Software is already available to turn an iPaq into a phone. Sleeves are available now that support GSM, GPRS and Wi-Fi. We have no doubt whatsoever that the next generation of handheld computers will support both GSM/GPRS and Wi-Fi. It seems highly probable that the major chip developers are working on dual standard chipsets. These are already available from boutique chip foundries. XONE has access to the technology now to roam between Wi-Fi and GPRS.

This convergence will return a measure of power to the consumer. We firmly believe that Wi-Fi equipped handhelds, tablets and laptops will eventually become as common as mobile phones. It is pretty clear that today's sophisticated consumer will use the appropriate service at the appropriate time for their need. The scenario we use to illustrate this is as follows:

When you are walking or driving down the street you will configure your handheld computer to receive messages such as appointments and phone calls. You may even use it to send or reply to a quick email text message. However, when you want to download and send your corporate email with attachments, synchronise databases and access the Internet and your corporate applications, you will find the nearest zone, sit down and have a cup of coffee, and do it at 100 times the speed for 1/100th of the cost.

How we manage this very near future scenario (less than 6 months) for the benefit of Australia is the challenge for business and government in the rest of 2002. We would be happy to help any way we can.