

OZtralia.com Broadband
built by the people for the people

Submission
to
Department of Broadband, Communications and the Digital Economy
for
National Broadband Network

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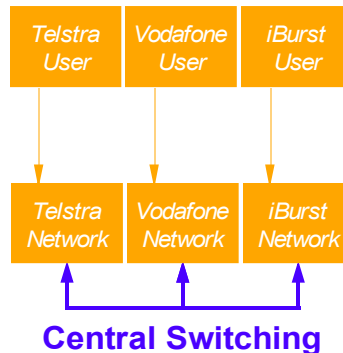
0.2 Live Version

This is a living document, the latest version, previous versions, change history and an online discussion forum are available at

<http://www.oztralia.com>

1. National Broadband Operation Problems

Poor design of the National Broadband Network will create a central switching network based on internet service providers (e.g. Telstra, Optus, Vodafone, iiNet, iBurst) **slowing performance, reducing functionality, decreasing redundancy, wasting bandwidth and creating unnecessary bottlenecks.**



Central Switching means that there is NO data path between users directly, every piece of end user information must go back to the ISP data centre in major capital cities before being delivered.

1.1 Inefficiency

Information exchanged over broadband between neighbours only 80 metres apart in Dubbo have to travel 10,000 times that distance all the way to Sydney and back. This applies to all traffic between people on DIFFERENT ISPs and even to most traffic between people with the SAME ISP.

National Broadband Network should provide direct data paths between users who are physically (and if possible logically) close to each other.

Problems like slower performance, wasted back-haul bandwidth, unnecessary bottlenecks at the centre, affects everyone - not only those in regional areas. The claim by ISPs (iiNet and Internode) that 12Mbps is being achieved now with 50% of their customers (without the need for FTTN) is NOT relevant, since customers are interested in end-to-end speed over the whole data path and NOT the speed of their ADSL modem to the nearest exchange.

1.2 Asymmetric

Central Switching allows ISPs to enforce the asymmetric nature of their service, enabling them to retain EXCLUSIVE ability to perform broadcast to the masses (e.g. IP-TV). Seeing that the asymmetric nature of PON (Passive Optical Network) is not "asymmetrical enough", fibre pioneers like Verizon FiOS even impose artificial limits by blocking port 80 to prevent customers hosting their own web sites.

National Broadband Network should provide symmetrical data paths, allowing content to be generated and distributed by all users, not just by the ISPs or established media outlets.

Innovation is about creating as well as consuming, symmetrical data paths encourages individuals OUTPUT and EXCHANGE data (from video monitoring or 3D interaction).

1.3 Monolithic

Recent advances in consumer equipment (Wi-Fi Routers, LAN Switches, Optical Bridges, High Capacity PCs) allow large high speed networks to be built across different wired (optical fibre, copper pair, coaxial cable, power line) and wireless (WiFi, WiMAX, 3G, Satellite) link technologies – resulting in massive savings, flexibility, scalability, functionality and redundancy.

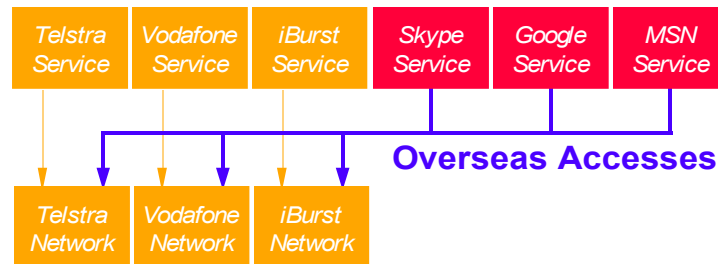
National Broadband Network should allow switches and links owned by different parties (users, ISPs, government) to work together as a synergistic whole.

A centralised monolithic broadband solution where link and switching technologies are tied together and owned by a single party will NOT deliver price points low enough for 98% coverage at minimum of 12 Mbps across Australia. Every resource available (e.g. fibre along railways, antenna coaxial for TV, more wireless spectrum, sub-loop unbundling etc.) should be considered.

As can be seen later in this submission, a Distributed Switching approach is the only way of archiving high end to end speeds, allows online innovations and at low costs.

2. National Broadband Application Problems

Poor application of the National Broadband Network will allow overseas service providers (e.g. Skype, Google, Facebook, MSN, eBay) to gain better access to more Australians **WITHOUT contributing to the costs of the network infrastructure and WITHOUT the burden of Australian regulations and taxes.**



Higher speed, lower cost and wider coverage provided by National Broadband Network give overseas service providers **INCREASED** access to the Australia market, exacerbating the following problems:

2.1 Investment

More investment in our broadband means **Skype** can generate more revenue (e.g. Voice Calls over Internet) from us without needing to build its own network and without compensating us.

Public investments in the National Broadband Network should increase the value of Australia instead of the value of overseas service providers.

Return on investment problems are not limited to phone services, it includes ANY service that generates revenue (e.g. financial fees from remote payment services, advertising fees from social web sites) **WITHOUT** paying us for our infrastructure.

2.2 Privacy

Email storage contains detailed records of every aspect of an user's life - as well as the details of the people the user communicate with. Emails should never be store on strangers' devices, even if you can trust Microsoft - can you trust individual **Hotmail** staff ?

National Broadband Network should allow improved access to private storage compared to public storage (where no Australian will know who, when, how, why people are accessing their data).

Privacy problems are not limited to email services, it includes ANY service that stores our private information (e.g. search history from search services, financial transactions from e-commerce services) **WITHOUT** giving us control of access to those information.

2.3 Policy

If having "Wiggles" videos just a few clicks away from "XXXX" videos on **You Tube** is not bad enough, having both children and adult versions of "Thomas the Tank Engine" videos on the **SAME** page must be a concern.

With increasing reliance of Australians on online services, National Broadband Network should enable Australians to set the policies of the major online services they use, instead of following the policies set by a few directors sitting in the boardrooms of overseas service providers (whose culture, priorities and interests are substantially different).

Policy problems are not limited to video services, it includes ANY services with policies (e.g. bad product refund policies for e-commerce services, copyright infringements deletion policies for social sites) that do **NOT** follow Australian law or work **AGAINST** Australian interest.

Another example using **Google**: Investment Problem (bandwidth is used for delivering ads without compensation), Privacy Problem (search history - which contains a lot of details about a user's private interest - is stored and analysed), Policy Problem (search results are based on secret policies).

All the above overseas companies mean well, are great pioneers and contributors to the world (hey, even our politicians use Facebook), but that does not mean that Australians will not be increasingly disadvantaged by them as the National Broadband Network improves Internet accesses for them.

As can be seen below, the National Broadband Network is a good opportunity to implement simple, effective and comprehensive solutions to the above broadband investment, privacy and policy problems.

3. Two Problems One Solution

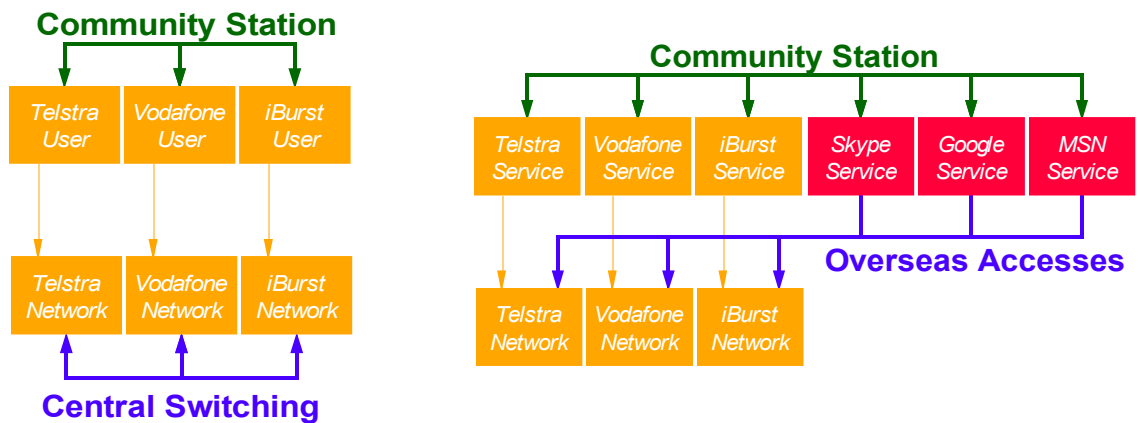
More details will be provided in the actual respond to the Request for Proposal, below are some notes on how the broadband Operation and Application problems (mentioned previously) can be resolved with the introduction of a National Broadband Network based on Community Stations.

Community Stations are software (mostly open sourced) that runs on commodity routers and computers hardware – allowing the users to take advantage of the price performance of the mass-produced PC industry. Community Stations hardware are funded by the individual communities (towns, suburbs, schools, factories, shops, offices, homes) according to their own requirements and not by the ISP or the government.

The responsibility of the National Broadband Network is only to provide stable permanent links (dark fibre, sub-loop unbundling, wireless spectrum), it is the responsibility of Community Station to provide the switching on the ends of those links using commodity hardware – according to each community's specific requirements.

Solution to Broadband Operation and Application Problems

At the broadband operation level, the Community Station acts like mobile base stations, providing wireless broadband infrastructure for direct communication between users in additional to traditional Central Switching.



Community Stations allow users within a community to creating their own symmetrical, high speed (e.g. 15Mbps), ISP independent, network infrastructure using low cost (e.g. AUD50) commodity network equipment (e.g. Wi-Fi 802.11n router). Allowing them to not only communicate directly with each other but also switch instantly between ISPs for different applications.

Each Wi-Fi router acts like a normal Wi-Fi Access Point (for user access from PCs, PDAs, Wi-Fi Phones) as well as a Wi-Fi Relay (for linking normally out of range Wi-Fi routers into a single mesh). Intelligent routing protocol allows the best path through the Wi-Fi routers to be used and handles the the addition and removal of Wi-Fi routers seamlessly.

More radios can be used to increase capacity (up to 8 extra channels) and outdoor antennas can be used to increase range (up to 10 km). Using PC hardware instead of Wi-Fi router allows the Community Station to perform tasks like caching of duplicated data requests and switching of voice and video calls within the community.

Isolated communities outside the Wi-Fi Relay range are linked together through the Internet using any technology (EPON, VDSL2, WiMAX, Satellite etc.). Multiple Internet links per community are encouraged for increased capacity and redundancy to the outside world.

Note the important point here is NOT using Community Stations to replace other Internet access technologies, but rather to aggregate the Community traffic so to increase the utilisation of each Internet link that the community has – thus reducing wastage.

At the broadband application level, the Community Station acts like application servers, providing online services to the community in addition to existing services. Community Stations allow users within a community to have their online data stored locally and set up their own policies for their services (from e-commerce to video conference, from email to calendar, from fax to SMS, from blogs to forums, from searching to back-up).

End to end speed is substantially improved since the content servers are now local within the community. Community Stations do NOT necessarily replace other Internet services (Skype, Google, eBay etc.), it can also act as a controlled access point to those external services, when required. Providing necessary logging and access control, as well as protecting the privacy of the user.

3.1 Community Station vs Base Station

Community Stations provides hardware, software, network and human resources locally, delivering Personal Services (e.g. email storage), Community Services (e.g. discussion forum) and ISP Services (e.g. Wi-Fi hot-spot) to specific communities (e.g. home, office, school, shop, factory, town etc.).

Base Station Features	Community Station Features
Data Transmission function only	Transmission, Processing and Storage functions
Communication Focus	Application Focus
Mixed IP and Non-IP converging to pure IP (WCDMA, CDMA2000 expensive, slow move to LTE, UMB)	Already pure IP
Only WiMAX is OFDMA (WCDMA, CDMA2000 expensive, slow move to LTE, UMB)	Already OFDM
Fixed features for all Users	Feature adapts to different User (e.g. family, staff, students, customers, neighbours etc.)
IPv6 added as an after-thought (expensive and slow move from IPv4 to IPv6)	Designed with IPv6 in mind (seamless integration and full compatibility with IPv4)
Fixed feature set for all Applications	Feature set adapts to different Applications (e.g. home, office, school, shop, factory, town etc.)
Low Bandwidth (WiMAX typical 15Mbps, WCDMA typical 5Mbps)	High Bandwidth (Draft 802.11n typical 60Mbps, 802.11g typical 20Mbps)
Single Network Operator Backhaul (no redundancy, no performance or pricing choices)	Multiple Network Operator Backhaul (redundancy, performance and pricing choices)
Require explicit Location and Context Mapping (longitude and latitude indicates 683 George Street Sydney)	Integrated Location and Context (access point indicates sales department, restaurant etc.)
Link Technology Dependent - one only (WCDMA, CDMA2000, WiMAX cannot be used together)	Link Technology Independent - any combination (WCDMA, 802.11n, Homeplug AV, HomePNA 3.1, VDSL2)
Data, Voice (some with Video)	Data, Voice, Fax, SMS, PABX, Text-to-Speech, Email, Forum, Video Streamer, File Server, Web Proxy, VPN etc.
No caching of data traffic with Base Station	Massive caching of data traffic within Community Station (reduce backhaul data traffic)
No local application data source within Base Station	Many local application data source within Community Station (reduce backhaul data traffic)
Base Station Costs	Community Station Costs
Coverage based on Cell Planning	Coverage based on Customer Demand
Slow Deployment by Network Operator - a few months	Fast Deployment by End User - a few days
Located on leased Real Estate	Located free on Customer Premises
Huge Spectrum License Fee	License not required
Special "telco" hardware with vendor lock-in	Commodity PC hardware with no lock-in
Network Infrastructure and User Equipment Separate (user equipment has no base station function)	Network Infrastructure and User Equipment Same (user equipment functions as base station as well)
Require spare parts contract with sole supplier	Throw away and buy any brand in local computer shop
Engineer installation and maintenance	Anyone installation and maintenance
Small range of 3G or 4G devices (handset, modem)	Large range of Wi-Fi devices (handset, computer, PDA, printer, camera, set-top box etc.)
Hardware Based (difficult upgrade and does not improve with PC industry)	Pure Software (easy upgrade and improves with PC industry)

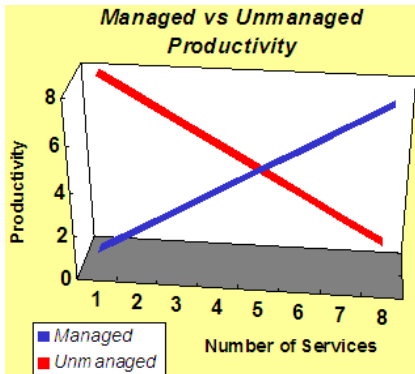
3.2 Community Station vs IMS

Community Station and IP Multimedia Subsystem (IMS) are both service delivery platforms, but IMS uses a bottom-up convergence approach (aiming at service providers) while Community Station uses a top-down management approach (aiming at end users).

Community Station extends the Network Operator's coverage onto customer sites and into customer applications by linking all the Community Stations in a country together into a single service delivery platform - with the lowest costs, widest reach, highest performance and richest functionality possible.

IMS Features	Community Station Features
Equipment Supplier Driven (Bottom-Up from Technology)	End User Driven (Top-Down from Market)
Convergence Focus (force different services to develop using common IMS)	Management Focus (use common interface into different services)
Increases Complexity (sample signaling messages: GSM 11, GPRS 91, IMS 200+)	Reduces Complexity (single standard layer isolates different signaling)
Compatible with Nothing (not even SIP for VoIP)	Compatible with Everything (SIP, IAX, Skype, MSN, Yahoo etc.)
Fight against Successes (replace Service Provider APIs with IMS)	Work with successes (use Service Providers APIs to enhance services)
Requires MANY different vendors to complete deployment (slow and expensive deciding what fits where)	Deploy everything through Community Stations (simple concept for easy delivery and maintenance)
No Solution to Phone Number to Email Address mapping	Simple Solution to Phone Number to Email Address mapping
No Concept of Peer-to-Peer architecture	Peer-to-Peer (in fact any architecture) is fully supported
No solution to Service Providers (VoIP) killing voice business	Works with Service Providers (VoIP) to expand business
No new functionalities (Multimedia over IP is ALREADY here e.g. Google, Skype)	Unlimited new functionalities (Any new services can be plugged-in e.g. Google, Skype)
Requires Service Provider to use IMS interfaces (Need to lobby individual services to change)	Use Service Providers' native interfaces (No change needed from Service Providers)
IMS is about saving the past (Network Operator doing everything)	Community Station is about creating the future (Network Operator working with others)
IMS Costs	Community Station Costs
Runs on proprietary hardware	Runs on commodity PCs
Slow Deployment - a few years	Fast Deployment - a few months
New Billing Systems, Customer Support Systems	Included Billing Systems, Customer Support Systems
Designed to replaces existing systems	Designed to work with existing systems
Expensive "telco" hardware with vendor lock in	Low cost commodity PC hardware with no lock in
Require spare parts contract with sole supplier	Throw away and buy any brand in local computer shop
Engineer installation and maintenance for everything	Engineer installation and maintenance only at the core
Marketing, Sales, Support driven by "professionals"	Marketing, Sales, Support performed by users themselves
Small range of IMS devices (none deployed - try buying an IMS handset ...)	Large range of Wi-Fi devices (handset, computer, PDA, printer, camera, set-top box etc.)
Hardware Based (difficult upgrade and does not improve with PC industry)	Pure Software (easy upgrade and improves with PC industry)

4.1 Increase User Productivity



Community Station transforms the End User communication environment from Service Centric to Management Centric, allowing them to **MIX AND MATCH THE BEST VALUE SERVICES AVAILABLE** from different Network Operators and Service Providers seamlessly according to THEIR OWN needs.

Instead of being disadvantaged, with Management, the more services the more “raw materials” there are for End Users to create better environments for themselves.

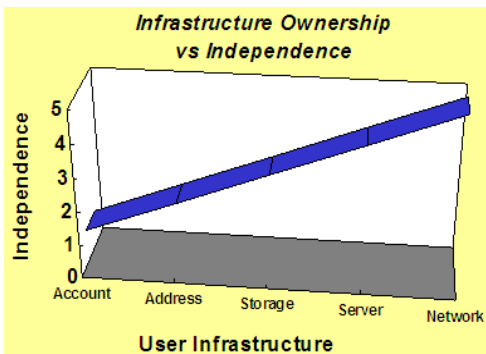
End User problem number 1. to 5. (listed in section 2.1) are solved by having a single management layer between the user and the services - reducing incompatibilities, inflexibilities and confusions. More importantly, it allows the End User to innovate easily - for the first time, new communication environments can be created by mixing and matching services instead of having to be developed by programmers.

Example: Increasing User “Text” Productivity

Community Station centrally manages the End User text communications. End Users can send text messages easily across ALL platforms (Skype, MSN, Google, Myspace, Yahoo, SMS, Email, Voice, Fax etc.) using a SINGLE program - without opening up numerous windows on their computers. As well as search and store them centrally in the user's own private storage.

Besides passive text messages, End Users can also issue the SAME commands to control the operation of DIFFERENT services e.g. a command to call a specific phone number is the SAME whether the destination is a normal phone, a SIP phone or a Skype phone. Furthermore that SAME command can be issued from ANY text medium - SMS, Email, MSN, Yahoo etc.

4.2 Increase User Independence



Community Station transforms End User communication infrastructure from supplier owned to user owned, giving them **CONTROL OF THEIR OWN COMMUNICATION ENVIRONMENTS**, achieving independence from Network Operators and Service Providers. This is particularly beneficial for government departments and corporations.

Independence gained by transmitting, processing and storing their information on their own infrastructure brings numerous benefits:

- * There is no more lock-in to a specific Network Operators and Service Providers, so the best priced offering can be used easily and changed transparently.
- * Users can set their own policies on how, when, what, who their information assets are to be handled and what information moves in and out of their communication environment.
- * Security and privacy is more easily understood and enforced if it is the user (and only the user) who is solely responsible for his or her own data.

Example: Increasing User “Search” Independence

Similar to Email (which contains a detailed record of every aspect of a user's life - as well as the details of the people the user communicate with), Search History also contains a lot of details about a user's interest over time. Community Station can keep them both on user machines - subject to user's own policy.

Community Station allows users to selectively disclose and even charge for their Search Patterns (which link on the result page was clicked on for which search term, which search term is used to further refine search results).

In fact, users can have their own “Baby Search Engines” which are linked together to perform searches for each other. They also individual control of the search result ranking process.

Community Station search engine can be layer over existing search engines seamlessly - combining the best of both world.

4.3 Demonstration

The broadband application solution part of the Community Station has been deployed in limited manner for public trials:

Australia:

Since May 2007, Australians could ring into 138813 with phones from any carrier (e.g. from land line +61 2 90112121) and have their number registered with a demo Community Station for free. Once registered they have access to all these functions instantly:

1. Email Address - <mailto:61290112121@net2max.com>
2. Instant Message Address (Jabber) - <xmpp:61290112121@net2max.com>
3. Web Chat Address - <http://webchat.net2max.com/61290112121>
4. Media Gallery Address - <http://media.net2max.com/61290112121>
5. Video Broadcast Address - <http://video.net2max.com/61290112121>
6. Remote Screen Sharing Address - <http://screen.net2max.com/61290112121>
7. White Board Address - <http://whiteboard.net2max.com/61290112121>
8. Current Location - <http://location.net2max.com/61290112121>
9. Project Manager Address - <http://project.net2max.com/61290112121>
10. Blog Address - <http://blog.net2max.com/61290112121>
11. Wiki Address - <http://wiki.net2max.com/61290112121>
12. Forum Address - <http://forum.net2max.com/61290112121>
13. Calendar Address - <http://calendar.net2max.com/61290112121>
14. Online Shop Address - <http://exchange.net2max.com/61290112121>
15. Search Engine Address - <http://search.net2max.com/61290112121>
16. Web Phone Address - <http://webphone.net2max.com/61290112121>
17. SIP Phone Number - <sip:61290112121@net2max.com>
18. Normal Phone Number - dial 61290112121
19. Normal Fax Number - dial 61290112121
20. Worldwide Toll-Free Phone Number - dial Access Numbers then enter 61290112121
21. Worldwide Toll-Free Fax Number - dial Access Numbers then enter 61290112121
22. Worldwide SMS Number - Send text with (61290112121) to SMS Numbers
23. MSN, Skype, Yahoo, QQ, AIM, ICQ - Send text with (61290112121) to Instant Message Address
24. Online Conference - <http://conference.net2max.com/61290112121>

No one else on earth can provide all of the above with a single phone call. All the above sites can also be accessed centrally at <http://net2max.com/61290112121>

Mainland China:

Since November 2007, China Mobile has been using the "Remote Screen" component of the Community Station to access customer computers.

The China Mobile site (in Chinese) is here <http://mm.bj.chinamobile.com/help.jsp>

Taiwan:

Since January 2008, the "Online Conference" component of Community Station has been used within private intranets in Taiwan.

A public version for demo (in Chinese) is here <http://conference.tw.net2max.com>

The broadband operation solution part of the Community Station is being actively developed to be deployed for public trails later this year:

Australia

3 sites in Sydney CBD and 2 sites in a Sydney suburb are being tested and prepared for one of the world's first 802.11n based outdoor network. Expected public trials will start in June 2008.

4.4 Prologue

Community Station is the only solution available to solve the broadband operation and application problems (as mentioned in the beginning of this submission).

The National Broadband Network Request for Proposal should have a well defined set of requirements on price and performance, BUT it should not be restricted to a specific technical solution. This will allow the most innovative and best technical solutions to be submitted and be evaluated.

With Australia's own CSIRO holding critical patents to the 802.11n technologies that are central to Community Station deployment, Australia has been touched by the rainbow, it is time to deploy an Australian broadband solution by the people for the people based on the people's own invention.