Australia - Powerline Broadband and PLC - Roundtable 2003

1. SYNOPSIS

Power utilities around the world are recognising the natural competitive advantage they have in telecommunications. This comes from the use of infrastructure they have in place, their systems, a strong relationship with and an understanding of a large customer base, and a core competency in network management and maintenance. It is a natural extension of business activity for a power company to enter into telecommunications. New developments in Powerline Communication (PLC) are making it possible for these utilities to enter the more lucrative broadband market. In June 2004 DCITA published their results on a national feasibility study.

2. PLC ROUNDTABLE

In September 2003 I organised a Roundtable on Powerline Broadband. While this name reflects the current market better than Powerline Communications (PLC) – developed since the late 19th century, but based on narrowband communication - the term PLC remains sticky.

First-class presentations from top experts in the broadband powerline business resulted, not only in an excellent transfer of knowledge from presenters to audience, but also in a lively discussion. A brief overview of the speakers and their key topics:

2.1 CARL GAZIA - AMBROSE DEAN

PLC offers a significant potential for power utilities to leverage their considerable distribution assets for broadband carriage. Similarly, it has the potential to offer an attractive means of in-building distribution and obviate wiring costs. Like any technology PLC will need to meet both service delivery and cost performance criteria to be effective. Carl Gazia's presentation addressed the business planning framework for PLC and builds on the experience of Ambrose Dean in supporting Western Power's Bright broadband network development.

2.2 RAY SALMON - INOVATECH

- Current PLC Situation
- PLC Advantages
- Inovatech PLC Products and Solutions
- PLC Modulation schemes
- EMC/EMI Standards
- Typical Installation Description and Results

2.3 JEFF FREY – ENERGY AUSTRALIA

Utilities have some unique advantages in delivering broadband access via power lines but competing technologies are already standardised and have a head start. Niche deployments appear to be viable in Australia from 2004 but Niche is not a natural utility position. Jeff discussed the role of the utility in the overall business model and concluded that Powerline Broadband standardisation is a prerequisite to any medium term future in the Access Market.

2.4 MEYER MUSSRY – MAIN.NET

Spoke on the commercial aspects of PLC; including a review of the Main.net's commercial/project activity today and the steps required in order to implement powerline solutions in Australia.

2.5 JUERGEN BENDER - PARSONS BRINCKERHOFF ASSOCIATES

Juergen discussed the status of PLC development around the world and some of the issues facing implementation in Australia, including regulation, network technical characteristics and industry structure.

2.6 SEW HOU HO - SKYNETGLOBAL

This presentation covered the challenges faced by service operators and how powerline technology can present a viable solution. There are issues and key functionalities typically expected of network elements including powerline devices. He covered what these are, and how powerline products meet them. In addition, he talked about W Home's experience on the use of Powerline products, some benefits to customers and operators, the challenges and the future of using powerline products for residential deployment by service operators.

2.7 CONCLUSIONS

The overwhelming conclusion was that PLC is now a reality and that the technology is usable.

The fact that SkyNetGlobal is rapidly expanding its services partly based on PLC is one of the clear indications that opportunities can be exploited right now. While this is still at present based on in-building, developments also include the external power networks. Countries such as Germany are leading the charge here, but an interesting project is also underway covering several South Pacific Islands, with Fiji as the main participant.

Main.net has more than a dozen international projects underway, demonstrating the level of maturity that is evolving in this market. Also New Zealand is well and truly underway.

In Australia the utilities haven't gone beyond a range of trials.

Two vendors presenting at the Roundtable, Main.net and Inovatech, indicated they were more than ready to start implementing some of their systems in Australia, and it appeared as though some good networking at the Roundtable might actually result in some PLC projects in Australia in the not too distant future. I will keep you posted on that.

Ray Salmon, a broadband consultant representing Inovatech at the Roundtable, had some in-depth information on the ins and outs of the technology which painted an excellent picture of the possibilities of PLC.

The feedback from the (potential) users, however, remained low-key, for a number of reasons. Without a clear international standard nobody is game enough to look at serious roll-outs. Nobody wants to build network that ends up on the scrap-heap of technologies that are going nowhere.

Furthermore, at this Roundtable also, as happened at the one on wireless broadband, nobody sees PLC as a panacea for all their problems. Like many of the other new technologies, it becomes more and more a matter of the smart integration of a range of new technologies. I predict that this will become the network operation of the future, allowing an extremely flexible, ubiquitously wired and wireless environment supporting a very large number of customer appliances. This is sometimes also described as the Internet3 environment.

As I knew that we would have some serious questions from the audience regarding the interference problems that PLC can cause, I addressed the issue upfront and a worthwhile discussion took place. The bottom line here is: yes, there will be interference, and the only way out is to sit down with those affected by it and find solutions.

The reality, however, is that if PLC becomes a viable solution many more people will be affected by blocking PLC than by protecting organisations such as amateur radio. But everyone agreed that a solution-based discussion would be the preferred way forward and the meeting offered a platform to the ACA to discuss this issue in a frank and open manner.

3. POWERLINE BROADBAND STANDARDS

At the above event there was a lot of discussion about industry standards and the vendors were falling over each other to point out that they were complying with international standards.

However, what they were actually talking about was complying with electricity standards – whereas, when we in the telco market talk about standards, we are referring to interoperability standards.

Time and time again it has been proved that new technologies have little chance of success without such interoperability standards. Where would the Internet and Wi-Fi

be, for example, without such standards? One only has to look at the mobile data market. With a dozen or so different technologies that don't work together, there is little hope that this market will ever get off the ground. SMS only took off after the telcos interconnected their systems. This is still not happening in the USA, and look at the situation there – it is no surprise that SMS is nowhere near as popular as in interconnected markets.

The same applies to Powerline Broadband. There is little or no initiative for interoperability standards here on the power grid network (the in-building PLC market is standardised in HomePlug). No matter what technological developments take place to position this technology as a potential last mile operation, without telco standards very little will happen.

The PLC vendors will have to take the lead here and I would urge them to quickly initiate an industry development aimed at such standards.

During 2003, developments in the market gives some indication that DS2 based solutions (being represented by more than 10 manufacturers world wide) are becoming the standard for the PLC based access solutions. All DS2 based solutions are interoperable and can coexist in the same power grid.

It is now the task of these manufacturers to lobby the International Powerline Forum and regulation authorities to define the standards.

4. ACA REPORT ON PLC

In September 2003 thew ACA published their initial report on PLC. The report suggest that emerging emission limits in Europe and the USA could prove unacceptable for the Australian environment.

The ACA believes that characteristics peculiar to the Australian power grid could create unacceptable levels of spectral interference, particularly in HF radio frequencies. The paper says that, while in-house powerline systems are already commercialised in Australia, last-mile broadband distribution networks could be more problematic. According to the ACA, powerline emissions are effectively cancelled when the system can supply a signal on a pair of balanced wires. But in Australia, power lines are unbalanced, which could lead to excessive emissions.

The ACA maintains that the problems are exacerbated by the extensive use of open wire aerial lines in Australia. The ACA argues that there are already many examples of interference to radio communications from power lines, typically caused by arcing switch gear, coronal discharge and discharges across dirty insulators. The emissions are strong enough to require a broadband powerline system to be licensed as a radio transmitter, the paper says. Although Europe and North America are in the process of establishing emission regimes for powerline the ACA indicates that it does not believe they can be used in Australia.

5. REACTIONS TO THE ACA REPORT AND THE ROUNDTABLE

5.1 OVER REACTION FROM ACA (RAY SALMON)

In fact unshielded twisted pair cables in buildings and VDSL over copper are also potential interferers in HF bands. The fact that the Cat 5 UTP is already widely distributed and has measured emissions 15 dB in excess of the PLC standard NB30 is a good indicator that PLC will contribute to the noise, but not especially so. If Cat 5 emits, then Telstra ULL will absolutely blast out unwanted interference.

The ACA seems a bit obsessed by the "unbalanced" nature of the Multiple Earth Neutral (MEN) power system that we use in Australia for optimal electrical safety. This is a spurious comment because:

1. Telephone lines are earth-related at the exchange via the earthed battery, so VDSL and ADSL+ technologies are also propagated on an unbalanced bearer.
2. Household mains neutrals are only earthed at the meter box, not inside the house. So in-house PLC is no more unbalanced than Telstra copper.
3. The MEN system with regular neutral-earth bonds along a distribution route, at each house meter box and every few poles, is not an efficient radiator. In fact the active and neutral are shunted by power loads and line capacitance and it may be reasonable to argue the neutral acts as a ground plane or screen in the way that a coaxial cable sheath does.

In view of the MEASURED interference from BALANCED lines being higher than the PLC systems on UNBALANCED lines, the ACA report would appear to be theoretically unsoundly based and apparently ignoring existing cable emitters while scapegoating PLC.

The proof is in the measuring. RF propagation (like lightning propagation) is a black art that must be measured, not predicted by simplistic generalisations. It is unfair to single out PLC when measured proof of existing cable systems causing higher levels of interference is obvious.

5.2 POSSIBILITIES RATHER THAN FACTS (MEYER MUSSRY)

For its part, Main.net took the position right at the outset that it would comply with standards rather than apply for exemption or special status; as a result the Main.net system complies with FCC standards part 15 covering emission levels for communications; additionally the modems comply with EN 60950, 50178 Class II, 55024, 55022 and with IP20. As a result, Main.net has been embraced in Europe (where one would expect to encounter the toughest standards).

Obviously we'll need to liaise with the ACA going forward, and I did extend an open invitation to the ACA representatives present at the round table discussion to contact me if they wanted any specific information or clarifications. I do believe we should be OK based on Main.net's approach, however."

5.3 RECONCILING DOCITA AND ACA POSITIONS (PAUL TOPFER)

I agree with the prognosis that PLC is now an established technology, which will integrate with other systems in providing broadband solutions. I also agree that the interference issues discussed will be resolved through open and constructive discussions.

During the day I discussed the ACA's impending paper with them. I indicated that our DOCITA report would be made public very soon and that we had not identified any serious technical impediments, only regulatory challenges. They did not mention the strong negative positions they were about to publish even when I suggested we take the time to ensure the two papers were reconcilable. Nevertheless they have now made their statements and I'm sure they will be challenged to defend their position and evidence. I am looking forward to progressing these issues.

5.4 TALKING TO THE ACA (JUERGEN BENDER)

Some damage has been done that's for sure. But from the reaction of the ACA and another call I got today I am getting the feeling that they do regret the publication of the report. This is good in some way because they are more than willing to cooperate now.

As a result of the Roundtable regulation authorities and utilities are now reviewing their position and that soon new developments can be expected. I will provide the ACA with the agreed measurement procedures established in Europe.

The ACA also considers encouraging the Federal Government to launch a PLC trial in the NT where the electricity grid belongs to the Federal Government. This installation could be utilized to not only set the standards for the nation but also motivate state owned utilities to be more proactive.

See also:
Australia - Multi-Utilities Markets
Australia - UtiliTel
Australia - Utilities - Major Players
USA - Multi Utilities Markets

For information relating to:
- worldwide activities in the telecommunications industry, see: *Global Overviews*;
- technical information relating to the telecommunications industry, see: *Technologies, Terminology and Glossary*.

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