

Introduction

Communications Experts Group Pty Ltd (CEG) have provided consulting services for 10 years to clients in advanced and leading edge Computer and Telecom Systems. We have supplied design and management expertise on high bandwidth (100Mbit/s) carrier fibre networks to customers in the Perth Metro area and have developed a number of State-wide (WA) networks.

As an ATUG Director, Dr Green has contact with a wide range of people in connection with Telecom issues. He has also made a number of submissions to Federal and State Inquiries on Telecom Policy.

Background

Future User Services

The Broadband network in Australia has created a number of new business models and services, despite the low the bandwidths, and unequal distribution in quality of services.

The new environment for the carriers in a more effective broadband environment should enable a wider range of services to be delivered.

These new services may be described as follows:

1. Services will be created by autonomous service providers and make cost-efficient use of the application support features provided by the operators' infrastructure to add value to those services.
2. Services will be discoverable and aggregatable; their use will be accounted for in a converged bill following any suitable charging scheme, including pre-paid, post paid, flat rate or split charging.
3. Incumbent operators will increase availability of services by entering co-operation with other service providers.
4. Users will receive increased levels of control of services and ease of use by means of personalisation. Intelligent control will be required to acquire, correlate, and infer user status from context and user profile information, to trigger actions on behalf and in the interest of the user.

Reference Diadolos Project [<http://www.ist-daidalos.org/>]

The key concept in the new Telecom environment is that the Telecom Infrastructure Company will provide backhaul links and customer connections while retailers will supply the POPs, switches and gateways to deliver the required combinations of security, personalisation and quality of services for different customers eg. Radiographer networks, ISP networks, metering and monitoring networks.

It should be noted that this new paradigm partially exists today, where ISPs buy ULL services from Telstra, buy backhaul links from other carriers and supply their own gateways, POPs and switches.

The above environment descriptions have been used to develop the more specific criteria described in this report.

Technology Background

Local Infrastructure

Experience in Australia and elsewhere has shown that approximately 80% of the cost of providing Telecom infrastructure is in the provision of “civil engineering” tasks such as trenching, laying conduits, land and buildings, power, protective infrastructure and access roads. The early construction of telecom facilities excluded re-use and sharing of resources and is one of the reasons why it is proving difficult to construct modern networks today. All proposals will have to make extensive use of existing “direct buried copper” that is in use today.

Recent developments in copper wire transmission technologies have shown that transmission rates of up to 1 Gigabit/sec can be achieved, however at short distances of less than 2 kms. The technology has been proven in trials but no standards have been developed. The value of this new technology is that the life of the copper network has been extended to allow a gradual replacement of copper cables with fibre optic cables in conduits over an extended period of time. This new technology will be referred to as Gigabit DSL or GDSL.

A Fibre to the Premises [FttP] should be the ultimate goal, however financial, practical and regulatory considerations make a Fibre to the Node [FttN] solution a desirable and feasible stepping stone to a fully developed Fibre to the User [FttU] network.

Greenfield sites should continue to be installed with conduits and fibre. Brownfield sites should be gradually replaced with either fibre or the new Gigabit ADSL technology to cater for the required bandwidths needed by modern communities, until it is possible for the copper to be replaced with fibre.

Bandwidth Requirements

In the future serial streaming services such as voice, videoconferencing, IPTV, DVD-TV, will become an integral part of the broadband services. The difficult and sometimes poor user experience of these services is due to three standards that have not been developed. While proprietary solutions have been used these are often inadequate or out of the control of the carrier providing the services, especially where there is a multi-carrier competitive environment that is proposed for Australia. Research work, tests and practical implementations have shown that it is possible to minimise the impact of these missing standards by using a customer connection bandwidth of 10Mbit/sec. Bandwidths of 5Mbit/sec have been shown to reduce the quality of a single voice service due to external events.

Community requirements continue to increase, and there will be a number of new standards relating to Streaming protocols for VoIP, IPTV and Pay-TV. To cater for these changes a review process needs to be built into the requirements for the network carrier to meet new demands. It should be noted that the legislated minimum bandwidth is still well below community needs, and has not been changed in ten years.

Draft Guidelines
Network Development Strategy
Structural Separation

The current negotiate and arbitrate model of regulating access to a monopoly carrier infrastructure has been proven to be seriously flawed. This is due to the complex “averaging” and “cost distribution” methodologies required in calculating access costs. Economic modelling theory cannot produce a stable or unique solution to the supply-demand problem that would lead to a price structure under these constraints that could be sustained through a rigorous analysis and thus defensible in a Court of Law.

See CEG Senate Submission
ECITA References Committee
The Performance of the Telecommunications Regulatory Regime Committee
Hansard 29 April 2005 p 19.
Committee Report Clause 3.53, p 53
Committee Report Clause 3.62, p 55.

Other monopoly carriers and some countries have come to the same conclusion and have either voluntarily [BT, Netherlands Telecom, etc] or by legislation forced a separation between the infrastructure and retail operations [Telecom NZ]. It should be noted that in the early stages of the 1997 Telecom Act, Structural Separation was proposed as an alternative solution due to the known complexities, and opportunities of price manipulation.

Telstra own a key section of the Telecom market, namely the CAN or copper cables from the exchange or RIM to the customers’ premises. Access to this CAN network is critical for the success of the proposed Broadband network.

It is strongly recommended that legislation be introduced to structurally separate the infrastructure and retail divisions of Telstra, with existing Telstra Shareholders having shares in both companies. This will eliminate the need for compensation payments.

The Charter for the New Telecom Infrastructure Company could contain the following:

- a) Deliver a national broadband network that offers consumers real value for money.
- b) Provide wholesale access and pricing on a transparent and equivalent level for services ranging from single links to end-to-end services.
- c) Provide equipment accommodation and support services in existing exchanges.
- d) Interconnect with other carriers’ transmission networks (to maximise the use of existing non-Telstra infrastructure).
- e) To provide PSTN and ISDN services and carrier interconnect facilities.

Comments

Item a) The proposed legislation should mandate a “Cost Calculation Model” with suitable review periods. A good starting point is the current ACCC Cost Calculation Model, as it has produced reasonable price calculations in the past.

Processes for determining annual rates of return and minimum expenditure for new and replacement infrastructure should be provided.

Item b) This is required to cater for different types of retailers eg. Specialising in “Regional Network”, “ISP network” or large National networks.

Large Federal and State Government agencies should be allowed to purchase services, provided they comply with Help Desk and Service Management Standards for connection to the Telecom Infrastructure Company.

Item c) Equitable and equivalent access to space, power and cooling in existing telephone exchanges will reduce the cost of providing different networks to give customers choice, and also eliminate the need to build cabinets on the pavements next to telephone exchanges.

Item d) There is a large quantity of existing carrier infrastructure which can be used to reduce the cost of the NGN network and the Telecom Infrastructure must be mandated to use and interconnect (on agreed commercial terms) with these services.

Item e) VoIP will replace PSTN and ISDN over a period of time, however these services should be included in the Telecom Infrastructure Company to give transparent and equivalent access.

Network Evolution

The new Gigabit DSL (GDSL) technologies will enable the existing CAN to be replaced in a gradual or incremental process over a number of years.

The advantage of this process is that the need for “Direct Buried” construction can be minimised, and the more cost effective “Fibre in Conduit” construction methodology should be used. (It should be noted the new Fibre Technologies will ultimately replace existing Fibre cables, in much the same way as existing Fibre is replacing Copper).

State Government Planning Departments and Local Government Authority should be enabled and encouraged to provide Telecom Conduit infrastructure to meet the needs of communities, in much the same way that they provide roads and other community facilities.

The Network Evolution would consist of the expansion of the existing ADSL2+ network and WiMAX radio networks to meet the goals of the new network. Where higher bandwidths are needed the new GDSL may be deployed as an interim solution.

Greenfield sites should be mandated as “fibre-in-conduit” with estate developers being required to set aside land for Telecom head-ends and retail switching systems.

Brownfield sites should be replaced with fibre-in-conduit as and when the conduit is put in place. In many cases the Telecom conduit can be installed at the same time as other infrastructure projects, thus reducing the overall cost of provision of Telecom services. The existence of conduit will significantly reduce the cost of capacity upgrades and connection of new services.

Minimum Technical Standards

The new network speed of 12Mbit/s should be mandated as the minimum speed from the network to the customer where there is no IPTV or digital TV distribution. There is significant demand for a symmetrical service for small businesses however for residential services a minimum up link of 5Mbit/s should be mandated. This will support VoIP and Video Conferencing until the new “Streaming Protocols” are developed. For networks that are offering IPTV, Digital Pay TV, DVD-TV, etc, then the minimum bandwidth should be more than 50Mbit/s.

Network Requirements

The following network requirements are based on the new Telecom environment described under Future User Services.

To achieve the level of services needed to promote new business and improve the overall level of economic activity then the existing key Telecom policy issues of “competition” and “long term interests of end users” will continue to be essential, and are implied in the clauses 1 to 4 given above.

Requirements from Clause 1 and 2

Ubiquity and Affordability

Ubiquity and Affordability have been identified as key attributes in many debates and studies and in particular to satisfy the objective of “purchasing affordable services where they are needed”.

The 98% coverage limit provides a reasonable guide on the “Ubiquity” requirement.

To enable a variety of specialist retailers, the option to purchase individual links will be critical, especially to encourage competition. This will allow retailers to construct networks to meet different needs and install the appropriate POPs, gateways or switches to deliver different services such as VoIP, metering, health monitoring, etc.

The term ubiquity includes the concept of 98% coverage of population, and it also includes the variety of protocols needed to deliver different services. In particular the impending change from the current Internet Version 4 (IPV4) protocol to the new IPV6 protocol must be supported.

Competition and Innovation

Competition and Innovation are key drivers in creating choice for end users. The new services will require retailers to install different types of gateways and switches at various points to deliver the required services that customers need. Hence the need for a clause of type d) in the Charter of the infrastructure provider.

Access Pricing and the Investment Returns

Some form of “cost calculation model” to determine access pricing will be required to calculate the cost of end-to-end services, or services made up of many component parts. The pricing model should be agreed or mandated prior to awarding the contract, and there is a strong case for the existing ACCC model to be mandated, as it has given acceptable results over a period of time.

The model should also include a minimum spend (usually a % figure) on network expansion and upgrading to insure that there is a continuous and steady migration from the existing CAN to a Fibre to the Premises network.

The Dutch Telecom Regulator overcame many access pricing issues by approving a “Cost Calculation Model” prior to issuing a carrier licence. Australia should use this successful policy approach for the new Network.

Technology Neutral

Bidders should be required to demonstrate that their proposal will be technology neutral, to enable a number of technologies to be used to deliver backhaul services and/or connect subscribers eg. ADSL2, GDSL, WiMAX, 4G, etc.

Requirements from Clause 3

The new regulatory environment should include safeguards for existing non-Telstra infrastructure by mandating access, and purchase of services from carriers to speed up the roll-out of the new network and reduce the overall costs.

Requirements from Clause 4

The charter for the Operator of the new Network should include the requirements to provide supporting services for new and evolving switching and network management systems to enable retail operators to build networks that will deliver the security and intelligent control features needed to deliver new services.

The demand for PSTN and ISDN services is still significant, and these services will continue to be purchased for the short to medium term.

Summary of Recommendations

- 1.0 Engage State Planning and Local Governments in the provision of Physical Telecom Infrastructure
- 1.1 Legislate to enable State Planning Departments and Local Governments to undertake planning and installation of telecom infrastructure such as conduits, buildings and access roads, in the same way that they currently provide roads and other community services.
- 1.2 Enable Local Governments to mandate the installation of conduit to each property for greenfield property developments.
- 1.3 Clarify the 1997 Telecom Act to enable Local Governments to supply Telecom infrastructure without being required to be registered as a carrier.

- 2.0 Structural Separation
- 2.1 Structurally separate Telstra in to two separate companies with different Boards.
- 2.2 Develop a Charter for the Network Company

- 3.0 Minimum Technical Standards
- 3.1 Specify minimum bandwidth requirements for connections in both direction including those for SME's.
- 3.2 Include a review process that will allow new criteria or changes to existing criteria to be made.
- 3.3 Require that the Network be Technology neutral.
- 3.4 Mandate Co-operation and Use of existing Telecom infrastructure owned by other carriers.

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