Submission to the Inquiry into the Structure of Telstra

TELSTRA INQUIRY

Submission No. ...41...7.........

The Secretary.
Standing Committee on Communications, Information Technology and the Arts

Subject: **Inquiry into Structure of Telstra**

Dear Sir,

The idea of separating Telstra into two organisations – one providing facilities (the core network) and the other services – is not new. It has been circulating within the industry for at least twenty years and has been suggested to Government on a number of occasions. I view it as extremely positive that the Government has now agreed to examine the idea.

My personal view is that the proposal has enormous potential benefits to all Australians with little or no "downside". However, it is said that the devil is in the details. All depends on precisely what such a separation would mean and how the new organisations would operate into the future.

The accompanying submission is made as an individual. I am a "retired" (retrenched) technical professional who has spent 36 years working in the data communications and telecommunications industries. I have no current relationship with any telecommunication-related (or computer-related) business in Australia. My only current related business interest is that I do a very small amount of overseas consulting on long-distance fibre-optic transmission   I have a small shareholding in Singtel.

sincerely,

Harry J. R. Dutton

Australian Telecommunications Industry Structure for the New Millennium

A Submission to the Enquiry on the Structure of Telstra

Harry J. R. Dutton

January 2003

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Introduction

As the committee is very well aware, the provision of an efficient, economic, universal telecommunications infrastructure is critical to the future well-being of all Australians. Key to this is ensuring that the structure of the industry is such that it is able to deliver telecommunications services at affordable prices. Telstra today dominates the industry and is likely to do so into the future in whatever form it eventually takes. Because of its dominant position, the structure of Telstra seems likely to determine the structure of the industry for the foreseeable future.

The "Core Network"

The phrase "Core Network" usually means three distinctly separate and very different types of network.

1. The "Access" Network consists of the wires and equipment, which connects users (mostly households) to the local exchange.
2. The Metropolitan (trunk) Network consists of fibres and equipment that connect exchanges together *within* a metropolitan area.
3. The "Long Distance" (trunk) network, which connects city, networks with one another.

From an economic point of view only the "Access Network" (as defined above) is a true "Natural Monopoly". However, the Metropolitan Trunk network is very similar in most characteristics.

The terms of reference of the inquiry state that the proposal is to "structurally separate Telstras "Core Network" from its other businesses...". This begs the definition of "Core Network" but seems to me to go a little further than absolutely necessary. The problem is to separate the parts, which are "natural monopoly" from the rest.

The following principles are suggested:

1. The "Core network' should *include* all physical wires and fibres which cross property boundaries or which exist on public land.
2. An exception to the above may be made for interstate trunk routes and for overseas connections (including the "tail connections" to overseas terminals). That is, interstate trunks should perhaps stay in the hands of the Service Organisation rather than the core network provider.
3. The Core Network will necessarily own some real estate (for equipment housings). It may also own current Telstra exchange buildings – space in these could be leased to Telstra and other carriers on an equal basis.
4. The "Core Network" provider should provide "clear channel", circuit switched (quasi-leased-line) services on a *non-exclusive* basis. That is the core network could provide: Optical channels (within a DWDM system), SDH channels and ATM PVC network connections.
5. The Core Network provider should provide all facilities on a leasing basis to ANYONE at the SAME price. Especially, the core network must lease "facilities" – copper wire and optical fibre – directly without the interposition of a "service" layer by the carrier. The pricing structure should be published in the form of a simple formula and MUST be the same price for everyone. This is key and critical.
6. In the future ALL licensed carriers should be allowed to install private infrastructure in competition with the "Core Network" provider.
7. All services (especially the PSTN) should be run by the "Service Provider" organisation.

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Reasons for Separation

There are a number of important reasons for separating the "Core Network" business from the "Service networks":

1. A significant part of the "Core Network" constitutes a "Natural Monopoly". Effective competition is impossible. Unless these parts of the organisation are separated the organisation will always use (misuse) its monopoly power in one part of the business to gain advantage in other parts (where there is no "natural monopoly"). We need to "level the playing field".
2. Until quite recently, telecommunications companies (primarily Telstra) could install wires in public places without hindrance or permission from local government. This has now changed and local governments have seen the opportunity to impose significant levels of bureaucracy, taxes and charges onto the industry. As a direct result, the "rule-of-thumb" cost for installing new underground cable in major metropolitan areas has increased from $60,000 per kilometer to $180,000 per kilometer. This figure makes installation of new technology on anything like a large scale, impossible. The "Core Network" provider needs to be exempt from the control of local government. It is unreasonable to allow this very important privilege to more than one organisation.
3. There is a strong need to open up potential competition from private "do-it-yourself" networks. The owner of the "Core Network" must be constrained at law to offer the same facilities at the same prices and under the same conditions to EVERYONE. This would especially include "Telstra" service networks. This point is discussed later in this paper.
4. Allied to the above point. It is suggested that the technological "leading edge" in Australia has often been occupied by private networks built by organisations for their own special needs. Without access to infrastructure an important source of technological innovation is removed. This is also discussed later.
5. Viewed as a business, the characteristics of the Core Network are very different from the characteristics of the "service networks". Separation makes business sense.
6. Such a split between the "Core Network' and the "Service Networks" could be a good basis for a compromise in the current political impasse on the "privatisation" (or "full sale") of Telstra. The "Core Network" oganisation could remain in public hands and the "Service Networks" be fully privately owned.

A "Natural Monopoly"

The provision of wire (and fibre) connections within metropolitan areas is a "natural monopoly". As a community we cannot tolerate the idea of many separate organisations digging up the roads. Further, the cost of reticulating wire or fibre to every household is so extreme as to make the idea of multiple competing networks unthinkable. It is understood that the cost of providing basic telephone infrastructure (TTP wires) to a new subdivision in Sydney or Melbourne is around $2,500 per dwelling. Further there are almost ten million of these connections currently in service. This suggests that the replacement cost of the Customer Access Network (the "CAN") would be of the order of twenty-five *billion* dollars. Thus the CAN (viewed as a single entity) is the single most valuable artifact in the country. It is also worth noting that the maintenance cost of the CAN is extremely high.

Business Characteristics

As suggested above, viewed as businesses, the characteristics of the "Core Network" and the "Service Networks" are very different.

Characteristics of the CAN Network

- Natural Monopoly
- Extremely high replacement cost
- Labour intensive operation
- The technological parts of the infrastructure experience quite slow change (accounting write-down of assets could legitimately be ten years).
- Because of its large scale the network itself is very difficult and slow to change.

Characteristics of "Service" Networks (including the PSTN)

- Each service network is essentially separate from each other network
- Networks vary in scope and cost
- Technology change is very rapid (accounting write-down of equipment should be less than four years).
- Network Operation and Maintenance is "knowledge-intensive" rather than "labour-intensive"

For business reasons it makes sense for these businesses to be separate.

End-User Access to "Facilities" rather than "Services"

As suggested earlier, one of the most important benefits to flow from the separation of Telstra into two separate entities would be the access of end-users to "facilities" in the core network. That is, end users should have the ability to rent lines (real physical wires or fibres) and "clear channels" (digital point-to-point connections) directly from the core network provider. This enables a form of competition that is often overlooked by economists – the competition from "do-it-yourself". It can be argued that **this form of competition has been the most significant and effective form of competition in the history of Data Communications in Australia.**

Learning from History

In the early 1980's Telstra (then Telecom Australia) introduced the first fully commercial public data network in Australia. Named "Austpac" this network used the newly developed public data networking interface standard called "X.25".

In retrospect, while technically excellent, Austpac was a failure. Large organisations throughout Australia opted to buy "leased lines" from Telecom and build their own private data networks. While there were many reasons for this, the prime reason was the very high price of the Austpac service. Throughout its life, the primary traffic carried by Austpac was Telecom/Telstra internal traffic. The fact is that large business organisations in general do NOT want to build their own networks. They would much rather buy the service from someone else. But unless the price is within reason they will do whatever is necessary (including "doing-it-themselves") to obtain an appropriate service at an affordable price.

The presence of this ("do-it-yourself") form of competition (or potential competition) puts a price "cap" on what carriers are able to charge and forces even a monopoly carrier to be efficient. **But this kind of competition is not possible unless a user can get access to a "leased line" type of connection at a fair price.**

The Issue in 2003

In 2003, while the Internet gets the Lyons share of publicity, the technical 'leading edge" of data networks is in "Storage Area Networks" (SANs). SANs are very high-speed networks that interconnect a group of computer processors (usually "servers" or "mainframes") with each other and with their storage devices. SANs can be geographically quite large sometimes reaching to 100 kilometers or so in diameter. Another closely related but technically very different application is the interconnection of LANs in multiple locations with one another.

Large organisations such as Government Departments usually have multiple locations (buildings or campuses) where significant numbers of people are employed. There is a growing need to interconnect these locations at very high speed.

When they need to build SANs or to interconnect high-speed LANs, organisations in most other advanced countries simply call their carrier and order Optical Fibre connections between locations. Billing is per strand/per kilometer/per month. The organisation then builds their own SAN or inter-connected LAN. Not so in Australia. As a matter of corporate policy, neither Telstra nor Optus will lease Optical Fibre.[1] Both organisations insist that if they are to support the users application they want to provide a "service" and not a "facility". This means that the carrier (Telstra or Optus) insists on owning the customer premises equipment AND performing the management of the system. More importantly, they insist on charging *for the service NOT for the facilities*. For example, if a fibre is installed between two locations, the carrier will charge for the amount of data carried (or for the number of channels carried). Charging is specifically NOT related to cost but rather related to how much the "service" is worth to the end user. Most economists would label this practice as "monopoly pricing".

A relevant example from the 1990's was the Telstra "DataVault" service. DataVault enabled users of large mainframes to connect pairs of sites together using dedicated optical fibre. In provisioning this "service" Telstra installed dedicated optical fibres between customer sites BUT it placed a *code and protocol sensitive repeater* into the link as it transited the local exchange. This repeater provided NO technical function to the end user of the "service". Its purpose was simply to *prevent* the user from making any other use of the dedicated optical fibre connection.

Technology Development

It should be understood that, in history, the leading edge of data network development has been occupied by large organisations solving their own problems well ahead of any commercial service availability.

- In the 1960's the Banks and the Airlines built their own data networks using "bare copper" wires leased from Telecom Australia. These organisations purchased equipment (such as modems) to interface directly to Telecom's wire. In the early 1970's, Telecom introduced the "Datel" service and insisted on selling these connections as a "service". It then withdrew from customers the ability to lease "bare wires". Customers, after pioneering the technology, were constrained to purchase it from Telecom AFTER it became profitable.
- In the 1980's, many large customers built their own data networks (as discussed above). In the 1990's there has been a consistent pressure from carriers to "force" customers to buy network services from them rather than to build their own.

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[1] There are some exceptions here for special circumstances but this is true for 99% or customers.

- The development of leading edge "Storage Area Networks" is today being significantly impeded by the refusal of Telstra (and other carriers) to lease Optical Fibre.

The Economics of a "Shared Network"

It should be noted that in the last few years the basic economics underlying the concept of the public, packet-switched, data network has changed. In many situations the economics are now marginal.

Data networks are usually built for two reasons:
1. To provide simple any-to-any access between a number of end-user sites
2. To share expensive network infrastructure between many users to reduce the total cost.

However, there are many situations where the above reasons do not apply:
1. Where there are a small number (say less than 10) of end-user sites.
2. Where end-user sites are geographically distant from other (unrelated) end-users. Sharing infrastructure is not possible when there is nobody to share with.
3. Where data flow is predominantly between one (or two) central site(s) and the other users.
4. Where strict security requirements dictate central management of data flows.

At the time that the earliest data communications networks were conceived, "trunk" links were very expensive, very slow and highly UNreliable. The sharing of network infrastructure made very good economic sense because of these transmission characteristics. Today's Optical Fibre transmission is very low-cost (in terms of cost per bit per second), extremely fast and highly reliable. The economics of networking have changed. In today's world where a user has a relatively few (perhaps less than 20) locations and relatively heavy traffic (such as in a SAN or networked LAN) packet networking (X.25, IP, ATM...) is not economically competitive with simple, synchronous, "clear channel" connection (such as SDH). Thus it may make sense for end-users to lease SDH or ATM connections from the "Core Network" and build private IP (Internet Protocol) or LAN networks themselves.

Of course, every organisation today requires connection to the Internet but this is usually done at one or two points and requires very high security.

Future Technical Direction

While nobody can accurately foresee the future it seems clear that over the next twenty or so years there will be a major change in telecommunication infrastructure. This will be necessary to support new broadband services. While we don not know the future in detail we can make a few good guesses at the general structure of the future network.

1. The days of the suburban "telephone exchange" are numbered. Today, a small number (less than 500) of very large exchanges service the bulk of the population. In the future it seems likely that we will have a very much larger number of much smaller exchanges situated much closer to the end-users than today. Perhaps in small "cabinets" on every street corner.
2. As today, wires (or fires) will connect users radically to these small mini-exchanges.

To do this will require massive investment and can be expedited by an organisation that is specialised to the task.

Conclusion

The question of separating Telstra's "Core Network" away from its Service Provision is key and critical to Australias future.

In this brief paper it is argued that the idea is a very good one. It is seen as critical that facilities (wires, fibres and dedicated channels) be leased to everyone (even private individuals) on the same terms and at the same price.

It is beleved that this would ensure a virbant, innovative and competitive industry for many years to come.

Appendix: Personal Professional Background

The author of this submission is Mr. Harry J. R. Dutton.

Until recently, Harry Dutton was a "Principal Consultant" consultant with Optus based in Sydney. In a 36-year career (32 of them with IBM) working in the technical aspects of Data Communications and Telecommunications Systems, he performed a varying range of roles centred on the Technical Support of new products being introduced into the market.

Harry began his career (in 1967) as a programmer and system designer on custom development of data communications equipment for large corporate accounts. In 1974 he was assigned to the IBM development laboratory in Raleigh NC to work on the first IBM SNA products. In 1981 he returned to IBM Raleigh for 4 years as Project Leader for the International Technical Support of Communication Standards. In 1985 he was appointed an IBM International Consultant on High-Speed Communications. In this role he worked on ISDN, High-Speed LANs and ATM. In the early 1990's he held a number of product management positions in IBM Network Systems Hardware Division. In the late 1990's he re-joined the IBM International Technical Support Centre in Raleigh, NC as Project Leader in Optical Communications. In 1999, Harry reluctantly left IBM when IBM closed down its Networking Hardware Division.

Over many years Harry represented IBM at several International Standards bodies: The ATM Forum, ISO and the IEEE. Over his career Harry wrote 19 books in the field of Data Communication and Telecommunications and has presented at over 100 international conferences. He is a graduate of the University of NSW and a member of both the IEEE and the Australian Computer Society.