

## Please hold for your connection

**Australia's national broadband network (NBN) is a government-funded next-generation access network that's intended to provide broadband over a passive optical network to 93% of homes and businesses. Rob Nicholls illustrates the importance of competitive analysis in determining the number and location of the new network's 'points of interconnection' (POIs).<sup>1</sup>**

The NBN will replace Telstra's existing fixed-line copper-based access network. Like New Zealand's ultra-fast broadband (UFB) network, it will be structurally separate from the retailers who provide broadband local access ('last mile' services) to end users.

### **You're breaking up on me**

A key assumption underpinning the NBN is that the 'last mile' is a natural monopoly – that is, it would be wasteful of resources to have more than one network providing services to Australian businesses and households (at least in non-metropolitan areas). However, as Figure 1 shows, the 'last mile' is only one component of broadband infrastructure. At the local level, it provides the link by which an end user connects to the service provider at a local POI. The service provider will typically have a 'point of presence' (PoP) in each capital city. This means that each POI may be networked via multiple 'transmission' cables. The service providers interconnect with each other to make up the domestic internet; they also acquire international capacity, which links them to the global internet. Whereas the 'last mile' might be a natural monopoly, it is quite feasible and common for there to be (oligopolistic) competition in the provision of transmission services.

Under the 'local loop unbundling' access regulations that govern Telstra's copper access network, local telephone exchanges effectively served as either actual or potential POIs. Telstra's competitors could lease the 'last mile' to serve individual customers (including installing equipment on the exchanges to provide differentiated services if they so wished) and either lease the transmission capacity provided by Telstra or lay their own cables to the exchange in order to carry traffic to their PoPs and the internet. When three or more operators were providing cables into an exchange, it was deemed that sufficient competition had emerged and Telstra was no longer required by regulation to provide 'domestic transmission capacity services' (DTCS) in that location. While competition was limited in regional areas, DTCS was able to be deregulated in many metropolitan areas and capital-regional routes where real competition had emerged.

### **Please check that number**

Given the imminent replacement of copper 'last mile' services with fibre-optic NBN connections, the government asked the Australian Competition and Consumer Commission (ACCC) to recommend the optimal number and location of POIs for the new network. This was an important design issue, with significant economic and competitive consequences.

NBN Co, the company building and operating the NBN, favoured a centralised model with 14 POIs in five locations: four in Sydney, four in Melbourne, and two in each of Perth, Adelaide and Brisbane. This configuration facilitated the political requirement for universal national pricing of wholesale services and lower entry costs for retailers. However, Telstra, SingTel Optus and other existing service providers who had already invested in transmission capacity under the copper access regime favoured a more distributed POI model. As it already had fibre linking its existing exchanges, Telstra's

---

<sup>1</sup> This article is based on R Nicholls (2011) *"Please hold for your connection": determining points of interconnection for open access broadband* presented at the International Telecommunications Society's Asia-Pacific Conference in Taipei, Taiwan, 26-28 June 2011.

management proposed instead that there be 800 POIs. In order to avoid both the stranding of their existing investments and inefficient overbuilding of Telstra infrastructure, existing transmission providers also favoured a distributed system (but with many fewer POIs than Telstra's 800).

The ACCC, like New Zealand's Commerce Commission, is required to make its recommendations based on an assessment of the 'long-term interest of end users' (LTIE). Broadly, this interest is pursued via three objectives: promoting competition; achieving any-to-any connectivity in relation to carriage services that involve communication between end users; and encouraging economically efficient use of (and economically efficient investment in) infrastructure. In applying these objectives, 'long term' has an economic meaning, derived by balancing the flow of costs and benefits to end users over time in relation to the objectives. The analysis also assumes that economic efficiency has the three components of productive efficiency, allocative efficiency and dynamic efficiency. In many cases, LTIE may be promoted through achievement of two or all three elements simultaneously; in other cases, there may be some trade-off between the elements that must be considered.

### **And the regulator said ...**

In applying these objectives to the POI question, the ACCC was required to make an assessment of a technological issue: that is, where the boundary of the natural monopoly lay within the NBN. If this had been a completely new network, with no existing infrastructure used, the number of POIs could be determined optimally using technological cost models (usually termed 'scorched earth', as all existing assets are considered redundant). However, as NBN Co and Telstra had entered into an agreement where existing Telstra exchange space, ducts and lead-ins would be utilised in the roll-out of the new network, the cost modelling had to take into account the existing network architecture and investments in transmission assets. The ACCC's analysis was therefore based on a 'scorched node' approach: the replacement of existing technologies (copper) with optimal technologies that are able to deliver functionally equivalent services (fibre) while still using the optimal transmission technologies that connect to these nodes, with some existing nodes being shifted (or concentrated) if it leads to improved efficiency.

The ACCC concluded that the LTIE would be best achieved by a semi-distributed POI structure. The centralised POI structure favoured by NBN Co was likely to have a detrimental effect on competition in the transmission markets, as existing competition would be reduced and existing infrastructure would be bypassed. By contrast, a semi-distributed model would preserve existing competition and allow for future development as the NBN was deployed. However, the ACCC's approach here differed from that used to determine the locations at which DTCS could be deregulated when actual competition had emerged. The POIs had to be determined so that the potential for the development of future competition in transmission services was maximised. This led to the development of a set of 'competition criteria' that recognised the greater risks from placing a POI in a location which disrupts or displaces existing competitive markets (compared with the risks of placing it in a location where competitive outcomes were expected, but not yet realised).

The competition criteria were that the POIs should be located where:

- it is technically feasible to allow interconnection (this is usually at the fibre exchange for each locality)
- there are, within a nominated distance from the site, at least two optical fibres that connect the site to an optical fibre network (which in turn is connected to a capital city) *and* that deliver wholesale transmission services to service providers who wish to connect to the NBN at that location.

These criteria were then developed into a practical set of 'planning rules' to identify feasible and optimal POIs. The first assumption was that existing Telstra exchanges

would be used if at all possible, with new facilities being constructed (or 'virtual interconnection' being facilitated) if the existing exchanges were unsuitable. The second assumption was in determining whether a particular route was, or would be likely to become, competitive: the ACCC considered that competition would be feasible in metropolitan areas serving 80,000 premises and in outer metropolitan and regional areas serving 100,000 premises.

Applying the criteria and planning rules led to the ACCC recommending 120 POIs located across the country. Following consultation with interested stakeholders (including NBN Co and existing providers), it was proposed that five POIs be relocated, two new POIs be added, and one consolidated – leading to a final proposal for 121 POIs. While there may still be some movement in the location of the POIs, the number has now been settled.

### **Putting you through now**

The principled analytical framework provided by the LTIE allowed pragmatic and original advice to be provided to the government on an important network design element of the NBN. The process shows that competition agencies can play a constructive role in the optimal design of new government-funded networks which affect the viability of investments made by private-sector industry participants.

**Rob Nicholls** is General Manager of the Convergence and Mobility Branch of the Communications Group at the ACCC

Figure 1

