Silobreakers – Efficient, observable operations have been added to nbn's need to build at speed

An interview with Richard Kendall, the Executive General Manager of Architecture at nbn Co

Richard Kendall, the Executive General Manager of Architecture at nbn, a wholesale broadband network for Australia, is in a different position from most telecom provider architects in three important aspects. First, the company is exclusively a wholesale provider. Second, it was set up by the Australian government to provide equitable access to broadband, available throughout Australia. Finally, nbn has been in existence since 2009 and therefore it doesn't suffer from the same legacy technology challenges faced by longer-established operators.

Those differences, while significant, don't mean nbn is insulated from the same transformational challenges and constraints encountered by its peers. In fact, the pressure placed on it from the start for rapid network rollout resulted in a deliberate structure which was optimized for rolling out infrastructure but which presents challenges when trying to adapt to support delivery of modernized services.

Balancing build and operate

"Originally we were consciously set up to hit rollout dates but we're graduating from being the company that was established to hit the launch date and moving into a company that is able both to build the network and operate it very efficiently," Kendall confirms, pointing out that nbn carries over 80% of Australia's internet traffic and supports the needs of more than 20 million people. "We're credited with being one of the things that got Australia through COVID by enabling working from home and supporting access to crucial online services."

The nature of Australia also presents challenges for telecom operators. "We're a small country in terms of population but big in geography, with more than seven million square kilometers to cover," he adds.

That means connecting large urban centers with dense populations as well as vast rural areas that are sparsely populated. Recognition of this led to a change in nbn's approach to network rollout relatively early in its life, when the then government decided the original aim of 93% nationwide fiber coverage was too costly and nbn would instead utilize multiple fixed-line technologies. It now uses seven different access technologies to support 8.6 million active services.

Not an average telco

The shift to multiple access technologies added complexity to the network's design and crystallized nbn's role in Australian communications. "We're not an average telco," says Kendall. "Our model has to balance our social purpose with the demands of being a commercial business. We are elevating

Australia through digital technology but, at the same time, we have to generate a return to fund continual reinvestment in our network."

Kendall cites F. Scott Fitzgerald, stating that nbn is able to "hold two opposing ideas in the mind at the same time, and still retain the ability to function." That has enabled it to accommodate multiple technologies alongside its social and commercial imperatives. Today, nbn has, among others, fixed wireless access (FWA) technology alongside fiber-to-the-home (FTTH) and fibre-to-the-node (FTTN) operating behind the pre-existing copper network. In addition, the company operates a cable network, which was originally acquired mainly from Telstra.

nbn therefore pivoted from building exclusively fibre infrastructure to operating three different fixed-line technologies in a relatively short period of time. The build-out phase was

completed just before 2020, and the company has now shifted its focus to upgrading the fixed-line network and overbuilding copper with fiber. It is closing in on completing its one millionth flip from copper to fibre.

On the FWA front, nbn has upgraded to a 2.6 GHz spectrum with Ericsson to create a network covering 345,000 square kilometers. This project, which uses 4G and 5G cellular technologies, is delivering higher speeds to up to 800,000 homes.

A further technology is satellite, which is particularly useful for covering remote parts of Australia. nbn launched its geostationary Earth orbit (GEO) satellites many years ago and more recently has agreed a deal with Amazon Kuiper to convert to low Earth orbit (LEO) constellations.

Improved visibility

With this infrastructure base in place, Kendall is focusing on gaining visibility into end-to-end processes with the ultimate goal of enabling greater observability to support retail service providers as they deliver more complex services to their end customers. "Over the years, whenever we've tried to simplify, we have often ended up merely shifting complexity to the left or right. That just moves complexity, so we need to understand all the data from across the business and how it relates to each other to achieve true simplicity," he explains. "Accessing data in assurance or fulfilment and addressing how they relate is a significant challenge."

The history of nbn is part of the challenge. "By telco standards we're quite simple because we're fairly young, we've remained disciplined, and we've never bought anyone,

but we ended up suffering the tyranny of the use case," Kendall adds. "When you are trying to do something for the cheapest price, you end up with narrower functionality that can't generalize. nbn was built for the specific purpose of providing cost-effective connectivity to Australians, and now it needs to support the nation's evolving digital needs, but what looks simple from a business point of view, can be hard to change in technology."

That involves accelerated convergence of IT and telecom, augmented with AI to reduce friction. "The Network and IT departments has always had a complicated relationship in telcos, with each group not really understanding the other," Kendall says, adding "I started my career as a telecom engineer before moving into IT, so I see both sides. The nature of the current evolution is that there is a lot less emphasis on physical resources, and the virtualization that IT went through has resulted in the development of many techniques that can be applied to the network."

"You do have to be cautious, though," he adds. "The attitude in software has been increasingly to 'move fast and break things', but the reality is that you can't do that when you are responsible for a network that handles critical traffic for millions of people."

Automation and autonomy

Automation and autonomous network technologies are often seen as a means for telcos to reset their cost bases, but Kendall wants to focus on use cases that deliver value to nbn. "Autonomous networks as developed

so far don't suit our needs because we operate a large passive network," he says. "While the market catches up with the needs of fixed-line providers, we're more focused on using telemetry to avoid rolling many trucks when we see many service incidents and instead roll one truck to fix the underlying issue."

"I'm fond of saying we provide a layer 2 ethernet service to our retail service-provider customers and, if we were part of these service providers, we'd be just the resource layer in their network," he adds. "For me, one of the biggest challenges we face is how do we make the layers that sit above our network as transparent and thin as possible so our customers can get observability. The model I aspire to is AWS's, where they don't have a large assurance function because, when things go wrong, it's typically due to a customer's actions rather than a failure of their own service. How we give that same level of feedback and transparency to our customers is a challenge I want to address."

One of the key learnings Kendall has encountered in automating across siloes is that the knowledge in people's heads is very important. The context of each person and their knowledge combine to create organizational knowledge. "This is why we are working on building our Enterprise Knowledge Graph, which is a tool for encoding concepts, knowledge and relationships for our network resources and services in a machine-readable form to support scaled automation," Kendall explains. "One of our NOC engineers once said to me that, when nbn started, everybody could sit in a single room, and we could just walk over to each other and ask questions. That's obviously unfeasible at our scale today, and tools like this are the way we can use data to break down siloes in the organization."

Breaking siloes ultimately leads to a unified technology function but getting there is a significant journey, as Kendall acknowledges: "It would be wonderful to be in a situation where we effectively have no distinction between telecom and IT technology, and we have a single unified technology function to enable our business to run. That's definitely an objective. We can then allow products to be built on top of technology and operations via configuration of composable components and services."

"I don't think this is rocket science, but the idea of having technology resources that are able to compose and configure new services in an automated way is appealing," he says. "If we were able to do that, organizational boundaries would become a lot less important."