Case Study

PROJECT OVERVIEW

- Point-to-point 1.25Gbps free space optics wireless link
- Molex's Canobeam solution
- Supports a 200 building campus data recovery system

Australian National University trials Free Space Optics technology

As one of the world's most highly regarded research universities the Australian National University (ANU) prides itself in leading the way with trialing and implementing the latest technologies across its Canberra campus to improve the ANU's services.

When Molex first approached the ANU to propose that they trial their Canobeam™ Free Space Optics (FSO) solution, the ANU recognised this as a great opportunity to test this technology at their participation in the Australian 2007 IPv6 Summit with the view to implementing a 1Gbps disaster recovery strategy to replace its current 100 Mbps microwave radio based strategy.

"When Molex first approached us to trial their Canobeam system we recognised the IPv6 Summit: IPv6 at Work* as the ideal opportunity" states Craig Shoard, Systems Manager – Communications Infrastructure, Networks & Communications Division of Information, ANU.

He continues: "Upon recommendation from Molex we had changed to using their pre-terminated fibre solutions, which had really improved our ability to update and manage our network. When they recommended the Canobeam to us, we were happy to trial it and saw its long term potential as a possible data recovery system."

The Project

In support of the IPv6 Summit, the ANU were responsible for implementing a wireless link from their campus based network infrastructure to the venue of the conference, the Rydges hotel in central Canberra. The link was to provide bandwidth to all the participants whilst also supporting video conferencing between Australia and Japan.

At the 2006 summit the ANU had implemented a 5 GHz point-to-point microware radio link operating at 100Mbps. However, the 2007 requirement for the conference meant that GigE capacity was required from a location with line-of-sight view of the ANU.

The ANU set up a 300m point-to-point link using two Canobeam MFSO-130 units, designed to provide transmission speeds of 1.25Gbps. The wireless connection was tested by sending both IP version 4 (IPv4) and IP version 6 (IPv6) traffic over the link. The results of each test were assessed to record average data transmission speeds and to ensure that the solution could support the summits requirements.

To determine the mounting point of each unit the ANU's Network team used Google earth to provide a bird's eye view of the university. This enabled the team to review potential mounting points across the campus and accurately measure point-to-point distances, whilst assessing any line-of-sight hazards that could affect the clarity of the signal.

Once the mounting positions were determined the team installed an outdoor power point and a fibre link at each position enabling them to patch directly into the ANU's network backbone.

Dave Hardwick, ICN Technical Support Officer, ANU says "overall we found the Canobeam extremely easy to set up. The auto-alignment feature made establishing a link an extremely straightforward process and the robust design of the unit provided great stability. The capability to connect each unit directly into our fibre backbone meant, on average, it took us as little as thirty minutes to establish a working connection."

Andrew Howard, Advanced Communications Research, Networks & Communications Division of Information, ANU added "Once we established the wireless link the connection was tested to support IPv4 and IPv6 data transfer speeds. The results showed that the Canobeam units had no problems supporting this and on average provided a data transfer speed of 800 to 900Mbps, a huge improvement on our past solution."

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The Future

Due to the success of the Canobeam solution in supporting the IPv6 Summit, the ANU identified it as an ideal upgrade option for its disaster recovery system to support the 1Gbps capacity requirement during any loss of optical fibre interconnectivity between buildings on its campus. The system can be deployed within an hour and restore full service capability.

Occupying over 145 hectares, the ANU campus consists of over 200 buildings that are supported by a five node network infrastructure, with a centrally located computer room. At present 95% of the ANU's buildings are wired with an Enhanced Category 5 system, with all new building being upgraded to a Category 6 horizontal solution – there are approximately 40,000 data outlets across the campus. The Core Network is highly meshed and there are no single points of failure on the optical fibre cabling interconnecting Core Nodes. The same is true for the Distribution Nodes and major building on the Edge network. However, there are many small buildings distributed widely across the Acton campus which are connected via a single optical fibre cable.

"While some of the buildings have only single fibre cable connection to the Network a rapid response strategy is required to restore network connectivity. There are some 16,000 staff and students who rely on network access on a daily basis. Having data recovery equipment that is easily deployable is always paramount in our thoughts." says Craig

Using the same design and installation techniques that supported the IPv6 Summit the ANU has mapped out various mounting points and alignment angles throughout the campus, no more than 300m apart, and have updated their specification to ensure that all new buildings include a power point and fibre outlet on the roof.

With a network that is heavily dependant on fibre optic distribution the ANU is planning to invest in additional units, confident that with the ease of installation and alignment, they can establish a backbone connection anywhere within the campus in a 1 hour time frame and with confidence that deployment would take no more than 30 minutes. Additionally, the pre-arranged mounting points will also continue to provide opportunities to support future conferences outside and within the ANU's campus.

Craig concluded "the free space optics system provides great insurance for the ANU. The 1Gbps speeds that the Canobeam offers means that, in the event of failure, we can continue to deliver a full service. Also, with FSO technology requiring no licensing there are no ongoing costs or fees to consider."

"Considering the mounting network that we are putting in place and the efficiency with which we can set-up individual links at each point, the solution has provided great flexibility and guarantees performance for our future."

* The IPv6 Summit was held on 19-21 November 2007. IPv6 is short for "Internet Protocol Version 6". IPv6 is the "next generation" protocol designed by the Internet Engineering Task Force to replace the current version Internet Protocol, IP Version 4 ("IPv4").

Most of today's internet uses IPv4, which is now nearly twenty years old. IPv4 has been remarkably resilient in spite of its age, but it is beginning to have problems. Most importantly, there is a growing shortage of IPv4 addresses, which are needed by all new machines added to the Internet.

The IPv6 Summits are run to investigate the business benefit for implementation of IPv6 and over two days International and Australian experts give presentations to address IPv6 in action.

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