

All systems go

A newly installed 10G copper cabling system delivers maximum network performance and future proofing against a systems breakdown, writes Joanna Gerantidis.

Curtin University of Technology is Western Australia's largest university with more than 39,000 students. Its \$22 million data centre, located at the main campus in Bentley, 6km south of Perth, serves all seven Curtin campuses.

As with any data centre, it serves as the network core, so when the environmental monitoring units (EMU) started reporting increased high temperature warnings within the server cabinets, operations manager Terry Wilson, and senior systems engineer, Ron Patterson, took action. The pair

concluded that the problems were due to a build up of under floor cabling that was restricting airflow and reducing ventilation efficiencies in the cabinets.

In order to avoid overheating which would effectively compromise the servers and place the data centre under unnecessary duress, a solution had to be identified and rolled out within a short time frame of less than three months.

It was decided that the under floor cabling had to be removed and replaced by an overhead infrastructure system. This

would require setting up a complete parallel network until cut over had been completed, but would clearly deliver the most effective solution to ensure business continuity.

The project, therefore, represented a perfect opportunity to upgrade the data centre to be '10G ready' by installing a 10G compliant copper cabling system. According to Ron, with 10GbE UTP cabling being relatively new technology, it was easy to recognise that the 10G system was the solution for the university.

"The cabling used for the 10G system is different from other technologies such as fibre solutions and Cat 7. Fibre doesn't scale, and to install that level of fibre to provide multiple connections to every cabinet in your data centre would be horrendous.

"Cat 7 on the other hand doesn't retrofit with any existing infrastructures. Therefore copper tends to be more flexible and can be used for lower bandwidth technology if you want a modem link and serial link placed into one of your cabinets. With 10G you can actually use your standard patch leads to provide lower bandwidth links, whereas a Cat 7 type solution would require you to replace all your patch links," Ron says.

The significant budget for the project was approved and the tender invitation issued to Panduit who, according to Ron, delivered a professional, comprehensive response to the tender because of the company's attention to the specific requirements of the university.

"Panduit demonstrated a precise and integrated data centre solution that specifically addressed Curtin's needs. They also stock the largest range of products in the industry, were able to demonstrate their ability to fully provision the project,



The installation of 10G at Curtin University, WA, was through the deployment of cable rack spacers mounted on ladder trays to provide a clear and manageable path for permanent horizontal copper cabling. Inset: 10G is a relatively new product, different from other technologies such as fibre and Cat 7, and the Curtin university installation is one of the first of its kind in Australasia.



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and their 10G application certification offered the university a significant degree of comfort."

Throughout the project, Panduit worked closely with other leading providers, including strategic alliance partners Cisco, APC and local infrastructure installers, Datatel. Education services manager for Datatel, Paul Wilson, says that the sheer magnitude of the installation was both exciting and overwhelming.

"10G is a relatively new product and the Curtin University installation is one of the first of its kind in Australasia. We were entering an area of unknowns both in design and implementation that required a steadfast commitment towards the scale and deadline."

West Australian account manager for Panduit, Michael Dyer explains that the 10G system provides unrivaled access and therefore made it the best choice for a data centre of this magnitude.

"The 10G system was preferred because of its ability to avoid bottlenecking and its high speed links. It is relatively cheaper than other systems that operate at that bandwidth."

Overhead cabling was deployed through a system incorporating a ladder tray above all racks and cabinets.

Cable rack spacers mounted on the ladder tray provided a clear and manageable path for permanent horizontal copper cabling.

The integrated and balanced end-to-end 10G system is fully compliant with the IEEE 802.3an-2006 10GBASE-T Standard.

The entire system was designed from the ground up to strict material and design specifications to deliver true 10G performance and limit alien crosstalk.

"Fibre optic cabling already existed within the Data Centre," explains Michael. "Panduit supplied a fibre patch runner solution, which was mounted below the ladder to provide a dedicated path for fibre optic cabling between switches and cabinets.

"High density racking and cable management systems were used in the main connections within the smallest possible footprint while also accommodating Cisco core switching and the resulting density of patching cables in the same frame." Paul adds: "Alien crosstalk is the main electrical parameter limiting the performance of a structured cabling system when applied to 10G transmission lines. The installation of the cable spacers allowed the performance of the cables to remain uncompromised."

Ron says design was vital: "One of the key things after you determine whether or not you want to put that level of bandwidth in is to make sure that your design is thoroughly worked out. The time frame was imperative. Datatel had to work around a live site where everything continued to run.

There were some interesting things that needed to be overcome. For example the installers couldn't produce any dust or drill holes where they could drop iron filings down inside the cabinets, which could have spelled disaster for the overall system.

The installed infrastructure was tested, and a 100% pass rate was achieved including the specified additional 'headroom' for all 1392 permanent links in the data centre.

"The university is not running any 10G on copper as a service yet, because the chip set for that technology has just been manufactured. The installation was more about providing an infrastructure into the future rather than necessarily for immediate 10G use," says Ron. "Possibly, within the next 12 months there will be servers coming out with network interface cards (NIC) in them that will provide a base for a full network protocol stack, allowing communication among groups of computers on the same LAN and large scale network communications through routable protocols, such as IP"



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