

Gunma University Provides First Japanese University FTTD Network. Assured 1Gbps per Room Now Available Using Transition Networks Media Converters



Gunma University is located on the northern boundary of Japan's Kanto Plain, approximately 100 km northwest of Tokyo with a current enrollment of 6,680 students, including 263 international students.

Gunma University was founded as a national university on May 31, 1949. It was created from the amalgamation of several educational institutions, including Maebashi Medical College, Kiryu Technical College, Gunma Normal School and Gunma Youth Normal School. From these institutions, the Faculty of Medicine, Faculty of Engineering, and Faculty of Education were formed. Since its inception, the university has strived to foster distinguished physicians, engineers, and teachers. With science and technology as a focus, the university has made great contributions to the development of postwar Japan

Restructuring the Gunma University Internal LAN

The National University Corporation Gunma University's Aramaki Campus restructured their internal LAN into an FTTD (fiber-to-the-desktop) network in March 2010. The sponsors for restructuring the network and introducing FTTD into each classroom are Associate Professor Hiroshi Ueda from the Library and Information Technology Center and Technical Support Specialist Mr. Hisao Ida. Associate Professor Ueda and Mr. Ida recognized the current and future benefits of the FTTD network for their students and both supervised the restructuring of the Gunma network.

"After looking at examples of other universities that adopted a shared fiber optic network, I understood these were excellent networks. In the last 10 years, the speed of the network that a terminal can use has gone from 100Mbps to 1Gbps, a significant increase in data traffic of 10 times. Considering this fact, and thinking long term, the LAN also needed to be restructured in way that handles the demand for future speed increases. A FTTD infrastructure can be adapted to speed increases just by changing the devices used, so this was the network we decided to introduce for the benefit of our students and the benefit of our network," explained Associate Professor Ueda.

Reasons for Introducing a New FTTD Network

A primary reason for implementing an FTTD network was the desire to save IT management time and resources during the network's desired long lifespan. Prior to the introduction of the FTTD network, the internal LAN at Gunma University was in an extended tree structure, with multiple levels of L2 switches connected to a center switch managed from a server room. This network was not without its problems and the idea behind the restructuring of the LAN was to resolve these issues. "The main challenge with the old network was the number of individual devices required. In each building across our sizable campus are L2 switches, where we often placed one on each floor. When a malfunction occurred it took a significant amount of time to locate the point at failure" related Mr. Ida. "Along with resolving this issue, the need to design a future-proof cabling infrastructure was an important factor in the decision to adopt FTTD."

“This is the first FTTD network in Japan that can assure 1Gbps right to the core. I believe it to be a truly revolutionary internal network. ”

Associate Professor Ueda



M/G E-PSW-LX-01

Industry
Education

Application
Fiber to the Desk (FTTD)

Business Challenge
Restructure extended-tree network infrastructure to improve access throughout university campus, while reducing IT time maintaining network and isolating a failure in hundreds of devices.

Solution
Implemented a simple star-structure, all-fiber infrastructure, which supports greater transmission distances from a core switch to each networked desktop on the campus. This provides faster network speeds and also significantly reduces the time required for system management and trouble shooting. The FTTD network is so successful, it will be implemented on additional Gunma University campuses.

- Benefits**
- Space saving design
 - Rate Conversion from 10/100/1000Base-T devices to 1 Gig Ethernet network
 - Auto-Negotiation
 - Link Pass Through
 - Automatic Link Restoration

Benefits after Implementation

A simple star-structured network reduces the burden on both IT managers and network users. The FTTD network now implemented at Gunma University is a home-runned star structure, using direct optic fiber connections to each building from a core switch. A media converter is placed at the remote end of the optical fiber, in each room, and can connect to the terminals via a short UTP cable. Media Converters allowed the university to experience the benefits offered by fiber cabling without modifying the hardware build into the end work stations. Additionally, the utilization of a star shaped network has greatly reduced the burden on system management at Gunma University. "It goes without saying that our response to a malfunction has been improved, and the time needed for a staff member to locate the source of the malfunction within the campus has also been reduced. We recently decided that the business section would move to a different building. Under the old network this would have required all of the network settings to be altered, but after the change to the new FTTD network, that cumbersome requirement is removed," said Mr. Ida.

From the perspective of a user, the network is also extremely easy and effective to use. "Wherever you are in the campus, you can access and use the printer in your own room simply by plugging in a LAN cable. This is extremely convenient. In a university like ours, a single department may sometimes use rooms in several different buildings and the inconvenience of returning to one's office to print is now removed," said Associate Professor Ueda.



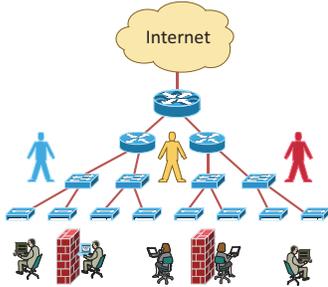
Why Transition Networks Media Converters Were Used in Gunma University's FTTD Network

Media converters selected for the FTTD network use 10/100/1000 Ethernet speeds which allow for the support a wide variety of users' machines. In the creation of the FTTD network, the media converters used by Gunma University are 10/100/1000Base-T to 1000Base-LX converters; model number M/G E-PSW-LX-01, manufactured by Transition Networks of Minnetonka, MN, USA. Associate Professor Ueda says the characteristics of this product that appealed the most were the compact body, the 10/100/1000 support and fan-less design. "In order to support the wide variety of devices used by our large number of staff and students, a media converter with 10/100/1000 support was an essential selection criteria. We also placed heavy focus on the media converter not having a fan, as fans are a source of frequent malfunctions. This keeps the device quiet and limits unwanted noise in a classroom during lectures. The fact that connecting a supported device provides each room with an assured 1Gbps speed also a huge impact. This is the first FTTD network in Japan that can assure 1Gbps right to the core. I believe it to be a truly revolutionary internal network," said Associate Professor Ueda.

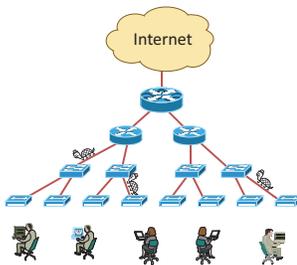
Gunma University implemented the FTTD network over a year ago and there have been no issues with the operation of the media converters in the new network. Due to the success of the FTTD network implementation on the Aramaki Campus, Gunma University now plans to restructure the LANs of their other three campuses in the same way.



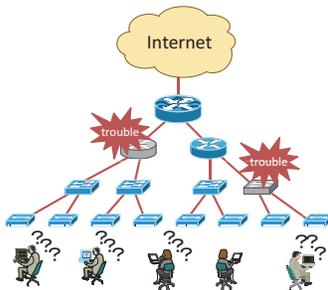
Problem 1 of 3 prior to FTDD network.
Use split up by each department.



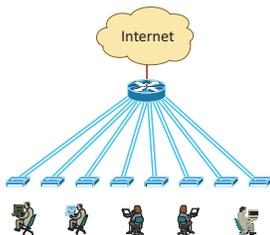
Problem 2 of 3 prior to FTDD network.
A slow network based on sharing rather than a dedicated connection.



Problem 3 of 3 prior to FTDD network.
Heightened risk of malfunction due to number of network devices.



The new FTDD network



The FTDD network of Gunma University achieved the goal of saving IT time and resources during the management of the network and it also reached the goal of developing a future proof network ensuring a long service life. This FTDD network approach was successful for Gunma University and is definitely an alternative worth considering for the future of any organization's LAN.

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Specifications for Transition Networks Media Converter M/GE-PSW-LX-01

Standards:	IEEE 802.3
Port:	10/100/1000 BASE-T(RJ-45) [100 m/328 ft.] to 1000BASE-LX 1310nm single mode (SC) [10km/6.2 mi.]
Link budget:	7.0 dB
Dimensions:	Width: 1.8" [46 mm] Depth: 3.3" [85 mm] Height: 0.9" [22 mm]
Power:	External AC/DC required; 12 VDC
Operating environment:	Operating temperature 0°C – 50°C [32°F – 122°F], operating humidity 5% – 95% (no condensation)
Packaged weight:	2 lbs. [0.90 kg]
Regulatory compliance:	FCC Class A, CISPR22/EN55022 Class A EN55024, CE Standard
Warranty:	Comprehensive 5 years

