



Customer

India's oldest philanthropic organization Tata Trusts (Under the RailWire free rural internet project to enable high speed WiFi in 4791 railway stations)

Challenge

Customer needs an efficient solution that can

- Rugged & proven in challenging outdoor/rural environment
- Offers nested protection scheme for media (fiber) failures
- Easily fan out & introduce new services in extended perimeter range (km)
- Upgrade to new technologies Scale to higher capacities
- Significantly reduce capital and operating expenditure

Solution

- TJ1400-OLT - A cost effective, small form factor GPON OLT supporting multiple service interfaces and technologies
- TJ2100N - Solar powered, industrial grade ONT with PoE+ support
- TejNMS Network Management Suite



Tata Trusts selects Tejas Networks for one of the world's largest public WiFi rollouts in rural and sub-urban India

As part of Indian Railways' RailWire initiative to bridge the digital divide between urban and rural areas in the country, RailTel in partnership with Tata Trusts, a leading non-profit organization, and Tejas Networks implemented a high-speed wireless broadband solution at 4000+ railway stations across the country. The high-speed WiFi network has enabled a large section of India's rural and sub-urban population to experience the tangible benefits of high-speed, reliable and affordable wireless internet for the first time. Besides delivering fast Wi-Fi connectivity at stations, Indian Railways can monetize the high-performance, resilient, carrier-grade infrastructure being created to deliver several profitable services to homes, retailers, institutions and enterprises in the vicinity of railway stations through incremental investments. The network was built using advanced GPON and Carrier Ethernet products from Tejas Networks.

Challenges faced

The main challenge was to provide reliable bandwidth connectivity to thousands of remote stations to backhaul the WiFi and other traffic. The solution should be simple, cost-effective yet robust & scalable that can be easily replicated across all railway stations. The solution should handle these complexities along with capabilities to easily introduce new services, upgrade to new technologies or scale to higher capacities.

Tejas Networks Solution

Tejas is the supplier of GPON-based optical access equipment for this project. Tejas Networks role was to supply, install, commission and maintain its state-of-the-art TJ1400-1 GPON OLTs (Optical Line Terminals) and Carrier Ethernet switching

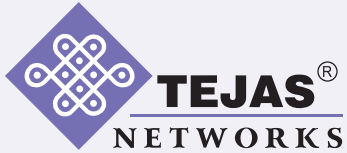
equipment along with industrial-grade TJ2100N GPON ONTs (Optical Node Terminal) for delivering high-speed Internet services.

- TJ1400-1 OLT is one of the densest GPON realizations (compact 1RU platform having 8 x2.5 GPON Ports) in the market today in a small form factor with myriad service interfaces and multiple technology options for cost-effective traffic backhaul.
- TJ2100N is a versatile ONT product that is available in ruggedized, portable enclosures for remote installation in railway stations and can also be solar powered in power constrained environments. The industrial grade ONT with POE+ can support

remote WiFi APs with complete isolation from power transients for the unique railway platform environment.

- GPON network as a whole can be monitored and centrally managed through a network management system. The network operator can configure and bring up a service within minutes, sitting hundreds of kilometers away, without having to visit the railway station for day-to-day operational activities.

One TJ-1400-1 OLT was placed at each railway station and would connect to multiple TJ2100ONT using splitters. TJ2100N-ONT can deliver a wide range of services – Station WiFi, Residential Broadband, 4G/5G backhaul, surveillance and enterprise connectivity.



Results

- Over 4000 railway stations covered in a record time of 150 days
- Network accessed by 15 million users, consuming over 10PB of data every month.

“Tejas implemented a state-of-the-art 10 Gbps Carrier Ethernet network across all the stations that is resilient to fiber cuts. Tejas deployed its converged optical access/edge products that seamlessly integrate Carrier Ethernet backhaul with optical broadband access (GPON OLT) to achieve a cost-effective rollout. Our industrial grade ONTs provide a robust outdoor solution integrating PoE technology to seamlessly support numerous peripheral devices such as WiFi access points and video surveillance cameras..”

**-Kumar Sivarajan, CTO,
Tejas Networks**

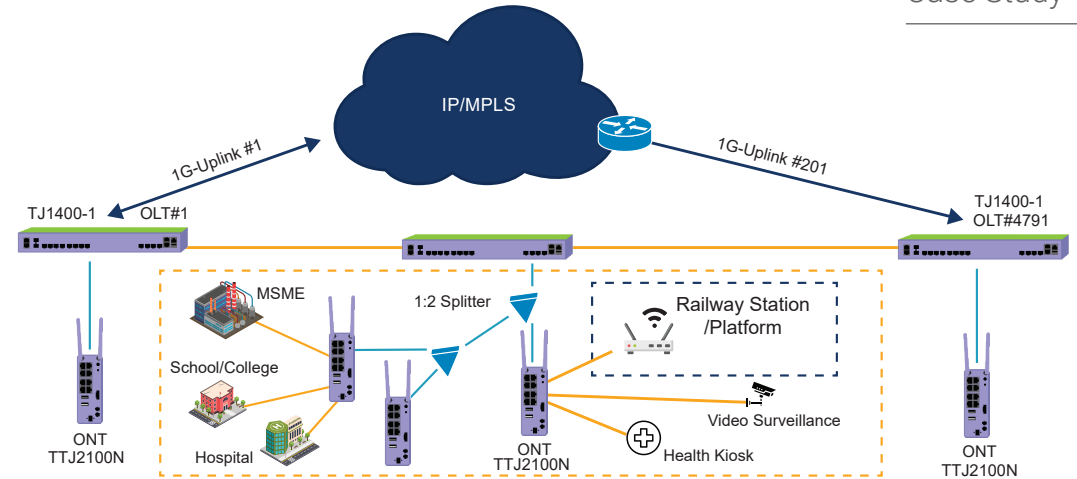
Why Tejas Networks

After evaluation of multiple alternatives, the Customer selected Tejas’ GPON and Carrier Ethernet product family as the best fit. The key features of Tejas solution are:

Multilevel Protection: Tejas GPON solution supports multi-level protection for fiber cuts, splitter damage, ONT and OLT port failures in milliseconds. It uses an open ring ERPS solution for OLT protection and enables 50 ms switching on access (OLT) domain. It provides effective isolation between Access (OLT) and MPLS domains and has no interoperability issues. It provides a resilient network architecture with no dependency on ONT capabilities.

Flexible, Scalable Backhaul: Tejas GPON solution uses a programmable Software-defined Hardware to work across legacy, current and emerging technologies and interfaces. The GPON hardware can be seamlessly upgraded to high-speed xPON standards such as XGS-PON and NG-PON2 through simple software updates.

Comprehensive OAMP Functions: Tejas GPON product supports advanced fault, alarm and performance management complemented by a powerful visual interface for alarm notifications, fault localization and SLA reporting developed using modern web technologies.



Power savings: TJ2100N can be solar powered and is available for installation in railway stations with erratic power supply in easily portable, ruggedized enclosures with batteries, solar panels and charging units. TJ2100N ONT supports Reverse PoE (RPoE) for corridor/basement installations (Ports 1 to 4), where power points could be scarce. Using RPoE, ONTs can be powered from Subscriber power supply.

Future Ready Products: TJ1400-1 OLT can be upgraded to advanced, emerging, high-capacity NG-PON technologies through a simple software upgrade. This will enable TJ1400-1 OLT to be used for emerging applications beyond home broadband including high-speed business connectivity (> 10 Gbps) and 4G/5G mobile backhaul.

Environmental impact: TJ1400-1 OLT has designed in many power saving features to

lower the carbon footprint of the product. TJ1400 is designed using new generation FPGAs for reducing static power, and clock enable/gating logic to reduce dynamic power in FPGAs.

Results

Tata Trusts has partnered with Tejas Networks to provide one of the world’s largest GPON based railway WiFi deployment across 4791 stations in B, C, D and E categories . Currently the network is being used for providing WiFi services at railway stations but the same network can support a variety of applications such as telemedicine, e-education, online banking, e-commerce, surveillance, enterprise connectivity, 4G/5G backhaul and e-governance services thus realizing the vision of Digital India.

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