B&B ELECTRONICS

Telecommunications

CASE STUDY

Telecommunications Services Delivered Over a Multi-service Platform

Major cable network operator uses modular FiberLinX-II intelligent media converters and modular T1/E1 extenders from B&B Electronics to cost effectively deliver broadband services to business customers.

The Challenge

As people require more bandwidth to download video and programming entertainment from the Internet, large cable companies rely on the delivery of broadband services for a greater share of their revenue. In addition, tablets, smart phones and laptops have un-tethered customers from their TVs but they still need access to Internet services. "Bandwidth" is the key word here because, without it, providers have no hope of competing in the marketplace.

A major cable system operator and long-time B&B Electronics' customer has been a pioneer in the delivery of broadband services. It has successfully grown its business into a full-service, facilities-based provider of communications solutions for residential and commercial customers. The operator spent millions of dollars to deploy its network, which was primarily a copper/coaxial network to residential locations. As fiber optics became available, the cable company invested heavily to run fiber optic cabling for newer residential complexes and to commercial locations. The cable company understood the core advantages of fiber for its capability of covering long distances for connectivity and its bandwidth capacity, up to 10 Gigabit (10G).

With the fiber cable in place, the cable operator is able to capitalize on the convergence of data, video and voice (referred to as "triple play") over Ethernet technology. Ethernet equipment, being relatively inexpensive and easy to use, allowed the cable company to offering their own competitive services. Delivering the same triple play services over coax was expensive, yet could not support the bandwidth demands. For the cable operator to be competitive, they knew they needed to keep their prices low, which made the cost of the service delivery equipment a major consideration.

While the greatest growth in service demand has been for Ethernet, many business customers still required a traditional T1 connection. A T1 service is carried over legacy solid copper phone wire (CAT3), and has a range of about 12,000 ft (3.5 km). It is still widely deployed due to existing cabling, and is often used to support legacy PBX applications or cellular backhaul timing requirements. While T1 is rapidly becoming extinct from a standpoint of new installations, as businesses will migrate to Ethernet, T1 to fiber conversion is still a required solution. It made sense to find a way to deliver T1s over fiber.

The Solution

Network engineers from the cable operator started discussions with B&B Electronics to find a solution which would allow the operator to deliver a mixture of T1 and Ethernet services over fiber, without a costly investment in high end switches. B&B Electronics has been a pioneer in media conversion, having released the first SNMP managed media converter in the mid-90s. B&B Electronics offers a variety of modular media converters and other devices designed to allow fiber demarcation and extension of traditional T1 services over fiber.

The cable operator also needed devices that would allow the scalability of bandwidth services to sell to their customers, as well as management of the Host and Remote units, management segregation from data services, and of course, over fiber. B&B Electronics recommended two solutions: the iMcV-FiberLinX-II intelligent demarcation module, and the iMcV-T1/E1 module.

The iMcV-FiberLinX-II, a 10/100Mbps managed media converter, provides Host/Remote or stand-alone capability over a copper-to-fiber connection. The cable company knew they needed managed equipment, but many of the current managed devices available in the marketplace were large, complex switches that offered the kind of functionality they needed. As a cost-effective device, the iMcV-FiberLinX-II offers advanced features including traffic prioritization, bandwidth, VLAN tagging, and it supports some MEF standards making this a convenient demarcation point for the operator's business customers. In addition, this equipment provides the ability to isolate management traffic from customer traffic in a secure manner. The iMcV-FiberLinX-II

management system can operate under an IP-less condition when using an SNMP Management Module installed in an iMediaChassis series. This conserves IP addresses but, more importantly, reduces the overhead required to manage large quantities of IP addresses in a dynamic environment. With managed equipment, which is designed to identify and isolate network issues quickly, the operator would reduce the number of truck rolls and would spend less time troubleshooting problems.

The iMcV-T1/E1 module takes a T1 or E1 signal through a standard RJ-48 connector and extends it over single-mode or multi-mode fiber. The T1 signal now can travel up to 120 km from the cable company's central office to the customer premises, where the signal is converted back to copper. The units must be installed in pairs, as they handle the T1 signal in a proprietary fashion over the fiber. The iMcV-T1-Mux/4 module was also an option, as it offers four T1 lines on one module, along with an Ethernet port and redundant fiber ports. Since the operator has a large customer base, they needed a way to deploy and mount a large number of the modules. The operator was able to take advantage of an array of B&B Electronic's chassis, both managed and unmanaged, to provide a solution for each unique application.

The cable company has been able to expand their revenue base by offering more services, due to the flexibility of the products and dynamic features provided by B&B Electronics. With their eye on the future, new emerging technologies allow a continuing dialog with B&B Electronics for new or improved solutions.

Customer A · *Customer B* · *Central Office* · *Customer C* · *SM Fiber*
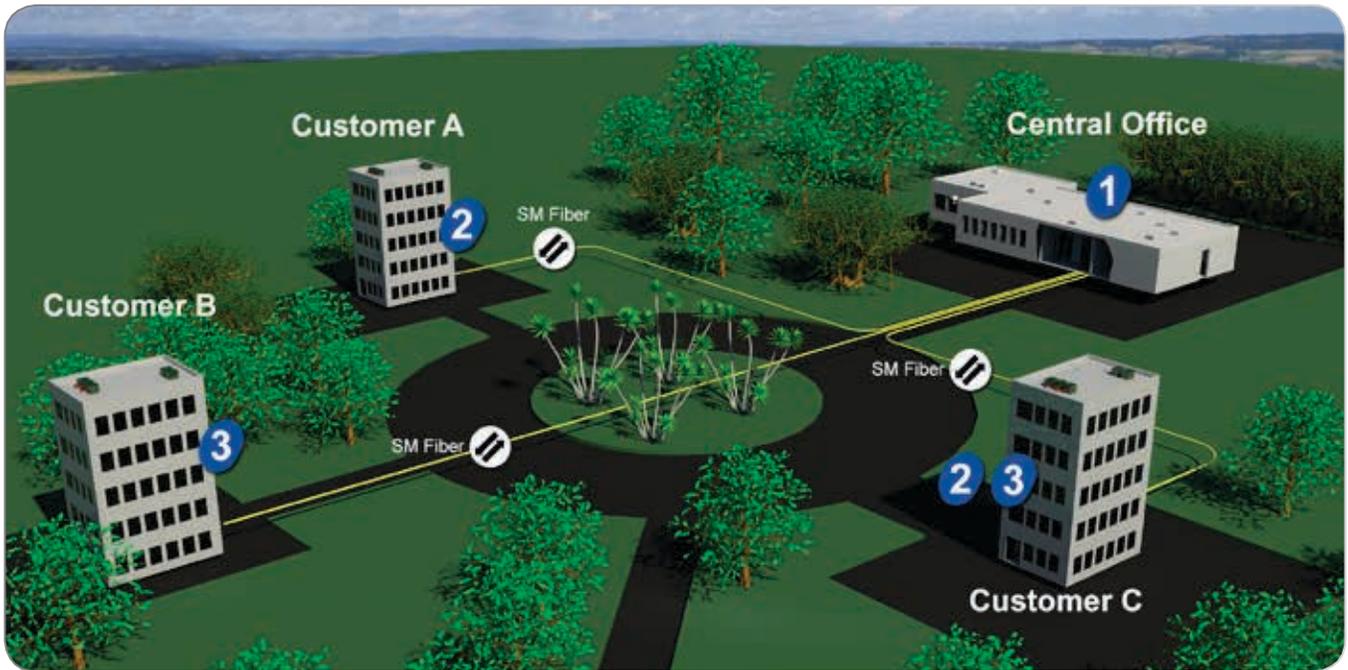
The Products - "iMcV" series Modular Media Converters

1 SNMP Manageable Chassis
Model iMediaChassis/20

1 *SNMP Manageable Chassis*
- with iMcV-T1/E1/J1 & iMcV-FiberLinx-II installed
  - 20-slot cassis supporting low to high density deployment
  - Install wide varieties of media conversion and optical demarcation modules
  - SNMP management using optional SNMP management module
  - 19" Rack or rack shelf mountable
  - Dual (redundant) AC or DC and AC/DC power supplies and fans

2 *LineTerm Media Converter - connected to PBX system*
  - Operates at (T1/J1 1.544 Mbps) and (E1 2.048 Mbps)
  - Conduct Loopback tests, monitor/manage units via GUI-based iView2
  - Remote unit supports secure, out-of-band management
  - Available for multi-mode, single-mode, or single-strand fiber
  - Layer 1 modules
  - Supports fiber and copper remote loopback control Transmit Data Source diagnostic tool sends data as unframed all-ones, an alternating ones and zeros pattern, or a Pseudorandom Bit Sequence (PRBS). Built-in PRBS signal detector makes testing easy.
  - LED display for monitoring of line diagnostics

2 Line Term Media Converter
Model IE-iMcV-T1/E1/J1

3 Managed Demarcation Module
Model iMcV-FiberLinX-II

3 *10/100 Mbps Managed Optical Demarcation Module*
  - Q-in-Q Extra/Tagging
  - SNMP Manageable
  - OAM 802.3ag/ah (Operation, Administration & Management)
  - Per-port bi-directional Bandwidth control
  - Features powerful LinkLoss, FiberAlert and loopback troubleshooting
  - All management traffic remains isolated from the remote LAN

About Carrier Ethernet

With the growth of Ethernet services, there is a demand for standardization of delivering these types of services. The MEF (Metro Ethernet Forum) was established to address this issue and has defined Carrier Ethernet as a standard. What does Carrier Ethernet define? It is all about provisioning service management, reliability, scalability, standardization, and QoS services through any number of service operators from point A to point B. An emerging standard, Carrier Ethernet will facilitate how Ethernet services are implemented and improve the experience for the subscriber, service provider and carrier.

About B&B Electronics

B&B Electronics provides M2M device connectivity solutions for wireless and wired networks using cellular, WiFi, Ethernet, USB, fiber and serial technologies. Specializing in data communication solutions at the network's "edge", the company is known globally for easy-to-use, rugged and reliable products, plus complimentary knowledgeable technical support and responsive customer service.

In recent years, B&B Electronics recognized opportunities to expand and extend network solutions by acquiring industrial-grade cellular routers; wireless embedded OEM modules, bridges, and gateways; plus industrial fiber media conversion and optical access solutions.

A leading manufacturer, B&B Electronics delivers excellence in product quality, customer satisfaction and value. The company is ISO 9001:2008 registered. All products are RoHS and REACH compliant, Made in the USA, and carry limited lifetime warranty (SFP products, 1-year warranty).

Founded in 1981, B&B Electronics is headquartered in Ottawa, Illinois USA with offices in California, Ireland and the Czech Republic.
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