Technology Solution Guide

Omnitron Systems

Deploying Omnitron PoE Fiber Switches and Media Converters with Aruba Wireless Access Points

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Introduction

This document describes the Omnitron products that are interoperable with Aruba wireless products, and is intended to supplement Aruba and Omnitron product documentation.

Please contact the Aruba Partner Solution Engineering team at pse@arubanetworks.com should additional information be required.

Omnitron Systems is an Approved Aruba Technology Partner

Omnitron Systems has joined the ArubaEdge Partner Program and created value added solutions to extend the reach to PoE-powered Aruba wireless access points with fiber optic cabling.
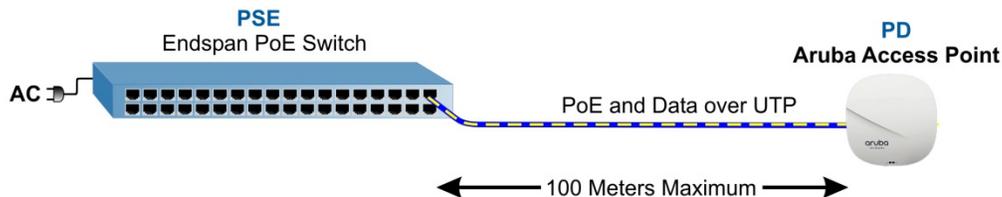
Omnitron PoE fiber switches and media converters are field-tested and fully interoperable with Aruba wireless access points.

Solution Components
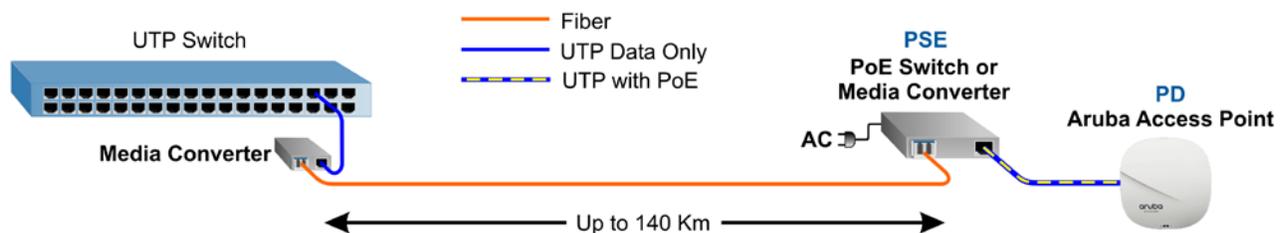
Overcome the Copper Network Distance Challenge

The maximum reach of Power-over-Ethernet is 100 meters using Ethernet on unshielded twisted pair (UTP) LAN cabling. This distance limitation challenges wireless network engineers to find alternate solutions when PoE Powered Devices (PD) must be located more than 100 meters from the Ethernet Power Source Equipment (PSE).

PSE
Endspan PoE Switch

PD
Aruba Access Point

AC

PoE and Data over UTP

100 Meters Maximum

How to Deploy Omnitron PoE Fiber Switches and Media Converters

Fiber optic cables are commonly deployed to overcome the distance and bandwidth limitations of copper UTP cable. Omnitron PoE fiber switches and media converters are installed at the remote end of the fiber run near an AC or DC power source, where they convert the fiber to copper, and function as a PSE to send DC power to the PD over the UTP cabling. Omnitron PoE media converters and switches function as PoE mini-switches, and deliver 15W, 30W and up to a maximum of 60W..

UTP Switch

Fiber
UTP Data Only
UTP with PoE

PSE
PoE Switch or
Media Converter

PD
Aruba Access Point

AC

Media Converter

Up to 140 Km

PoE Media Converters and Switches Product Overview

- **Extend distances with fiber and provide PoE power**
- **PoE (15W), PoE+ (30W), and High-Power PoE (60W)**
- **IEEE Standards Compliant**
- **Compact and cost-effective**
- **Temperature hardened for outdoor deployments**
- **Gigabit data rates**

OmniConverter® PoE Media Converters

OmniConverter multi-port media converters support IEEE 802.3af PoE (15.4W), IEEE 802.3at PoE+ (30W) and High-Power PoE (60W). OmniConverter media converters are available with DC power via terminal connectors or external 100 to 240V AC power adapters. They can be installed on any flat surface with integrated wall-mount brackets, or DIN-rail mounted using an optional DIN-rail mounting kit.

- Supports PoE, PoE+ and 60W High-Power PoE

- 1 or 2 fiber ports, and 1 or 2 RJ-45 ports

- Supports fixed-fiber connectors or SFP transceivers

- Unmanaged devices with DIP-Switch configuration

- Easy to install

- Temperature hardened for outdoor deployments

- AC or DC power options

OmniConverter /S models feature one or two RJ-45 ports, one or two fiber ports, and provide advanced features that can be configured with DIP-switches.

FPoE/S and FPoE+/S are Fast Ethernet media converters that provide PoE or PoE+.

GPoE/S, GPoE+/S and GHPoE/S are Gigabit media converters that provide PoE, PoE+ or High-Power PoE (60W).

OmniConverter /SE models support one or two RJ-45 ports, and one fiber port. The /SE models provide a low-cost alternative for applications that do not require advanced features or two fiber ports. There are no DIP-switches for simple, plug-and-play installation.

FPoE/SE and FPoE+/SE are cost-effective Fast Ethernet media converters that provide PoE or PoE+.

GPoE/SE and GPoE+/SE are cost-effective Gigabit Ethernet media converters that provide PoE or PoE+.

Up to three OmniConverter media converters can be mounted on a 1U 19" rack-mount shelf.

OmniConverter® PoE Switches

OmniConverter Compact PoE Fiber Switches support one or two 1000BASE-X fiber ports, and four or eight 10/100/1000BASE-T RJ-45 copper ports with Power over Ethernet.

The **OmniConverter GPoE+/M** and the **OmniConverter GHPoE/M** can be managed via a Web interface, Telnet or Serial Console interface. IP-based web management can be accessed through any of the RJ-45 or fiber ports. SNMPv1/v2c management is also available for real-time alarm notifications.

The **OmniConverter GPoE+/Sx** and the **OmniConverter GHPoE/S** are unmanaged PoE fiber switches with advanced features that can be configured with DIP-switches.

- GPoE+ modules Support PoE and PoE+

- GHPoE models support PoE, PoE+, and High-Power PoE

- 1 or 2 fiber ports, and 4 or 8 RJ-45 ports (HPoE models feature 4 RJ-45 ports)

- AC or DC powered

- Supports hardened temperature operating range of -40° to 75° C

RuggedNet® Industrial PoE Switches

RuggedNet Industrial PoE Switches are multi-port ruggedized and temperature-hardened Ethernet switches that support one or two 1000BASE-X fiber ports, and four or eight 10/100/1000BASE-T RJ-45 copper ports with Power over Ethernet (PoE, PoE+ and 60W HPoE). RuggedNet compact fiber switches extend network distances with fiber optic cabling and deliver power to the Powered Devices (PDs) through the RJ45 ports.

The **RuggedNet GPoE+/Mi** and the **RuggedNet GHPoE/Mi** can be managed via a Web interface, Telnet or Serial Console interface. IP-based web management can be accessed through any of the RJ-45 or fiber ports. SNMPv1/v2c management is also available for real-time alarm notifications.

The **RuggedNet GPoE+/Si** and the **RuggedNet GHPoE/S** are unmanaged PoE fiber switches with advanced features that can be configured with DIP-switches.

- GPoE+ modules support PoE and PoE+

- GHPoE models support PoE, PoE+, and High-Power PoE

- 1 or 2 fiber port, and 4 or 8 RJ-45 port models (HPoE models feature 4 RJ-45 ports)

- Single or Dual DC power options

- Supports hardened temperature operating range of -40° to 75° C

Management and Advanced Switch Functions

Managed products include the OmniConverter GPoE+/M, the OmniConverter GHPoE/M, the industrial RuggedNet GPoE+/Mi and the RuggedNet GHPoE/Mi. Omnitron's managed PoE fiber switches can be configured with DIP-switches, or through web browser, Telnet or serial console management interfaces. The IP-based web and Telnet management can be accessed through any of the Ethernet RJ-45 or fiber ports and facilitates the configuration and real-time operation monitoring of the PoE fiber switch.
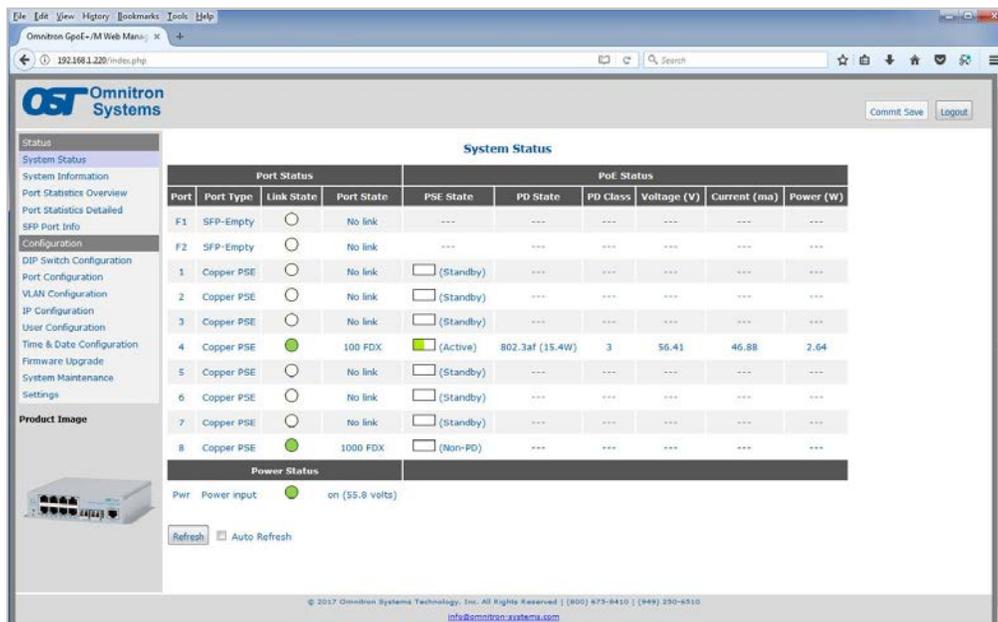
IP-based web management provides remote management of the OmniConverter and RuggedNet PoE fiber switches using any standard web browser, and provides the ability to remotely monitor status and configure hardware/software parameters.

The management software provides intuitive and easy-to-navigate menu-driven options for Configuration and Status monitoring.

Status

- System Status
- System Information
- Port Statistics Overview
- Port Statistic Detailed
- SFP Port Information statistics
- Contact Closure

Configuration

- DIP-switch Configuration
- Port Configuration
- VLAN Configuration
- IP Configuration
- Time & Date Configuration
- Firmware Update
- System Maintenance

SNMPv1/v2c management is also available for real-time alarm and trap notifications using Omnitron's NetOutlook® SNMP Network Management Software.

Dual Device Mode

For secure applications requiring two separate network domains over fiber runs to the same location and independent connectivity to the Powered Devices, OmniConverter and RuggedNet PoE fiber switches can be configured in Dual Device Mode.

Dual Device Mode provides separate and independent data traffic paths between the two fiber links and four or eight RJ-45 ports. In this example, the green lines represent a surveillance network and the purple lines represent a separate and independent wireless network.
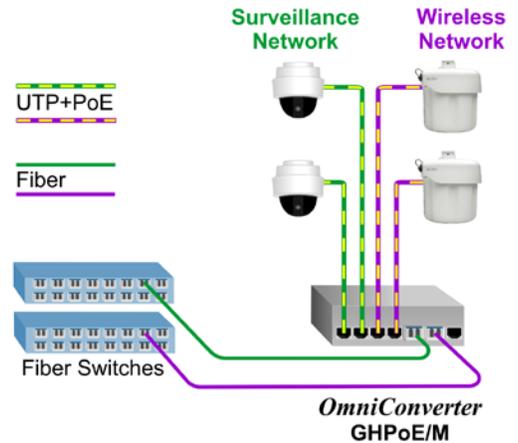

Remote PoE Power Access point Reset

OmniConverter and RuggedNet PoE fiber switches feature a remote PoE power reset function that allows access points to be power-cycled and reset remotely to save time and expense by eliminating the need to dispatch manpower to remote access point sites.

In this example, PoE power reset is activated by disconnecting the fiber from an unmanaged OmniConverter PoE switch. On a managed OmniConverter PoE Switch, PoE power reset can be activated with management software on a per-port basis, so if only one access point freezes, it can be reset and the other access points continue to operate.

Managed OmniConverter and RuggedNet switches also feature a heartbeat signal that will periodically ping the attached PD. On a loss of connectivity to the PD, the Omnitron PoE fiber switch can automatically power cycle or shutdown the PD.
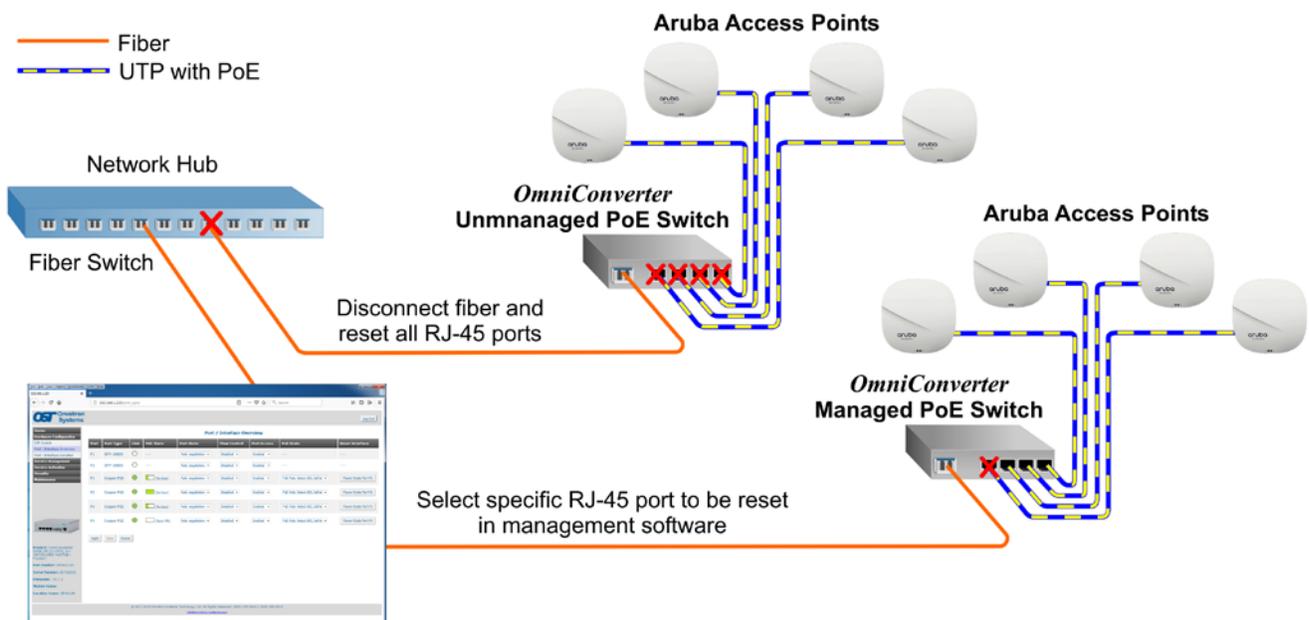
Deployment Scenarios

Omnitron PoE media converters and compact PoE fiber switches are multi-port devices that are available with up to eight RJ-45 ports that can deliver different power levels per port, and one or two fiber ports that support multiple network architectures.

Power up to 8 Access Points

- RuggedNet Industrial PoE Fiber Switches can power four or eight Powered Devices (PDs)

- OmniConverter PoE Fiber Switches can power four or eight PDs

- OmniConverter PoE Media Converters can power one or two PDs
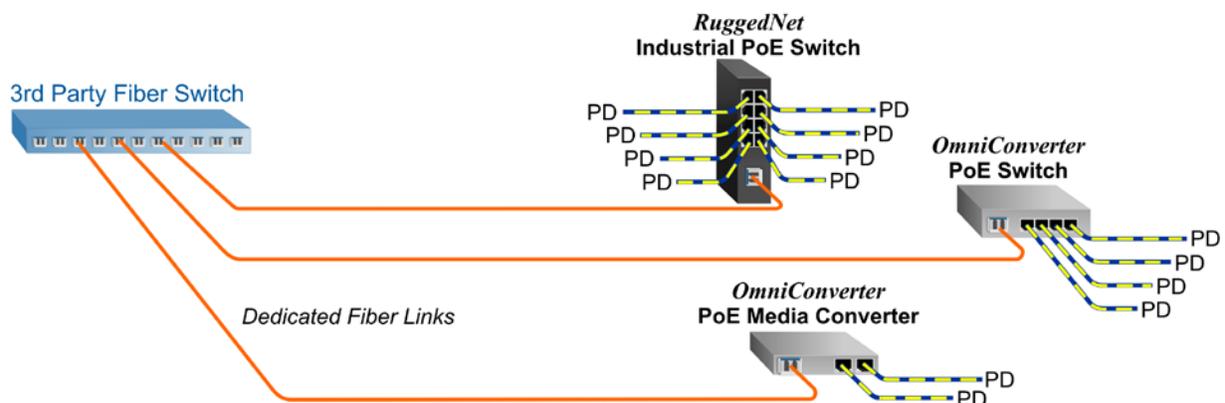
Power Devices with Different PoE Power Levels

Omnitron PoE media converters and compact fiber switches support PoE (15W), PoE+ (30W), and High-Power PoE (60W). Each RJ-45 port can deliver a different PoE power level based on the power requirement of the connected PD. This enables powering multiple devices such as access points and cameras with different PoE power requirements, all from one compact and cost-effective device.

Omnitron PoE media converters and compact fiber switches automatically detect the PoE power requirements of the connected devices and supplies the correct amount of power to each.
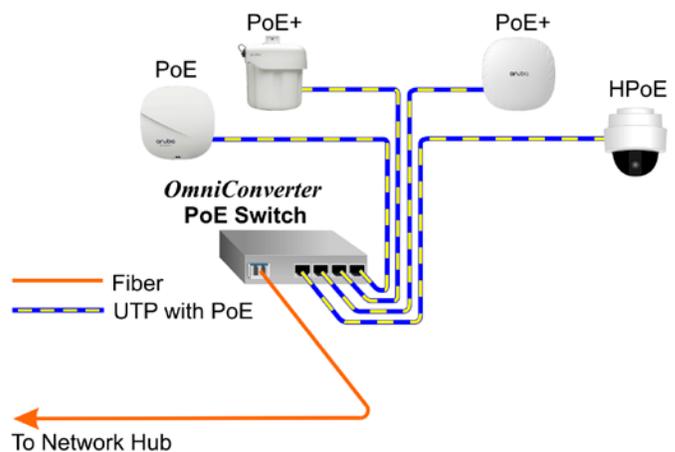
The IEEE standards for 802.3at (PoE+) and 802.3bt (high-power PoE) are backwards compatible, so ports with high power capabilities can also power devices with lower power requirements.

Point-to-Point Fiber Network Architecture

A point-to-point architecture uses dedicated fiber links, and is best suited for applications where the Ethernet switch resides in a control room, or central wiring closet, and the fiber connections are deployed in a star topology.
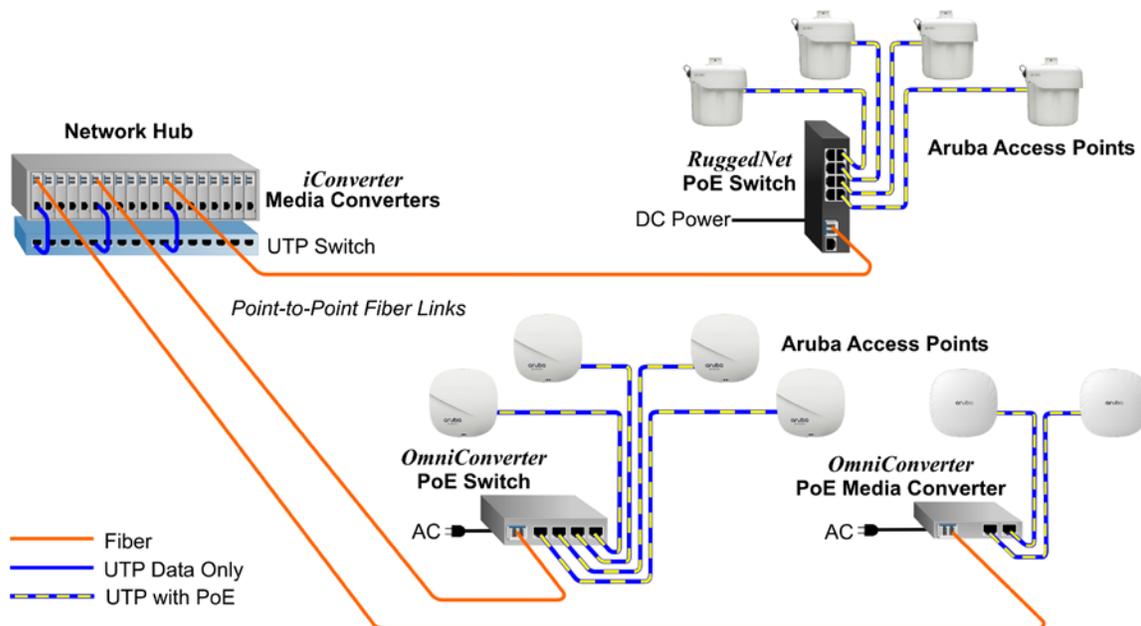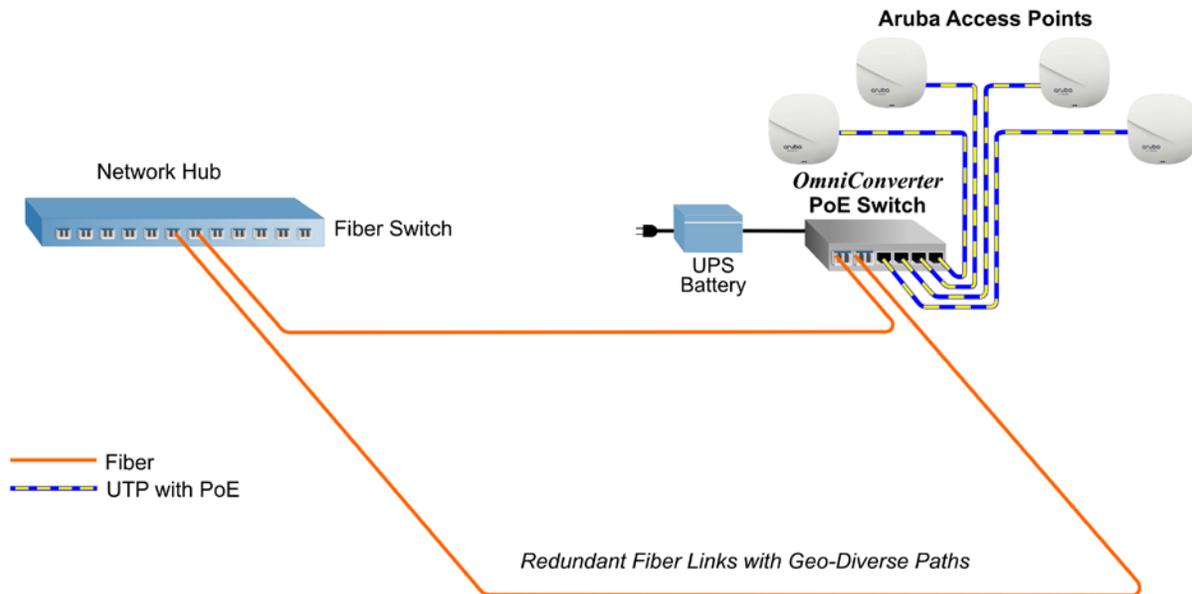

In this application, Aruba access points are deployed at locations up to 140 kilometers away from the network hub. Fiber is distributed from a copper Ethernet switch in the hub location using a high-density chassis of iConverter® media converters that provide reliable fiber connectivity and preserve the investment in the existing switch equipment.

The dedicated fiber links are run to the remote locations where:

- A DC powered RuggedNet PoE Fiber Switch provides data and power to four (up to eight) Aruba access points.
- An AC powered OmniConverter PoE Fiber Switch provides data and power to four (up to eight) Aruba access points.
- An AC powered OmniConverter PoE Media Converter provides data and power to two Aruba access points.

Redundant Fiber Network Architecture

Redundant fiber architecture uses two fiber links that are deployed in high-security applications that need mission-critical network uptime. One fiber link is the active primary link that carries the data traffic, and the other is in standby mode. In the event of a failure in the primary fiber link, the traffic is switched to the standby fiber link. Typically, the two fibers are routed in "geo-diverse" paths that are widely separated so that a physical disturbance to one cable will not affect the other.

Aruba Access Points

Network Hub

Fiber Switch

OmniConverter
PoE Switch

UPS
Battery

Fiber
UTP with PoE

*Redundant Fiber Links with Geo-Diverse Paths*

In this application, four Aruba access points are deployed in a high-security complex. Redundant fiber links are distributed from a fiber switch in a network hub location.

The redundant fiber links are run to an OmniConverter PoE Fiber Switch with two fiber ports that is powered by a UPS for battery back-up power. In the event a fiber link is cut and power is shut off, the OmniConverter switches traffic to the standby fiber in less than 50ms, and the access point will continue to send wireless data over the standby fiber link to the network hub.

OmniConverter PoE Switches, PoE Media Converters and RuggedNet Industrial PoE Switches are available with two fiber ports that support redundant fiber uplinks with sub-50ms restoration in the event of a fiber failure.

Daisy Chain Fiber Network Architecture

Daisy Chain fiber deployments preserve fiber infrastructure by connecting multiple access points in a linear bus topology. This architecture can be implemented along border fences, streets and highways, subways, rail lines and pipelines.
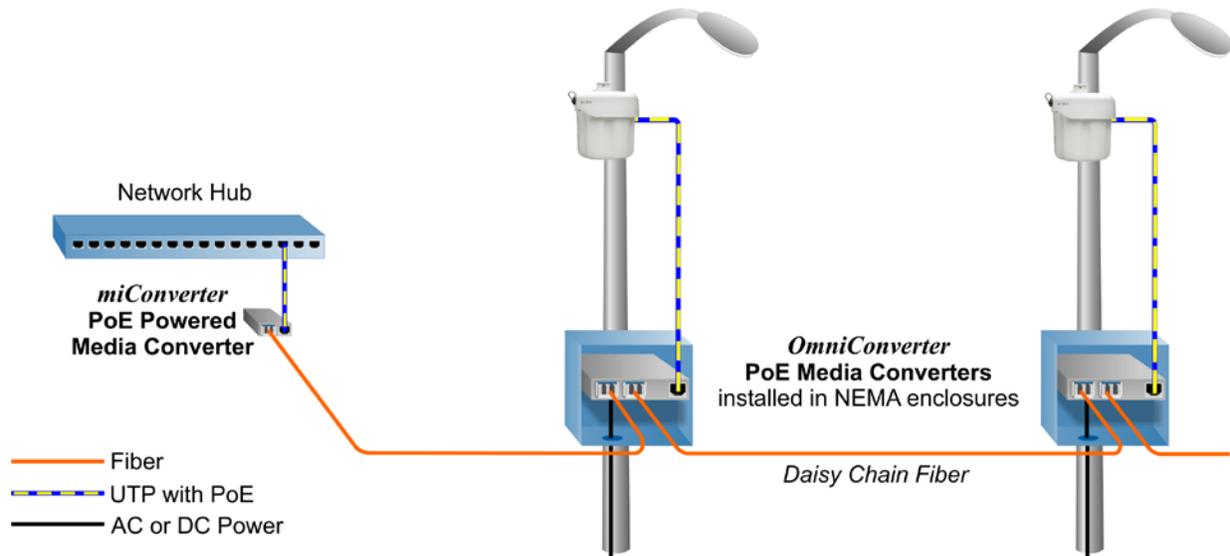
In this application, Aruba access points are deployed on light poles along a city street. At the network hub, fiber is distributed from a PoE switch using a miConverter PoE powered media converter that draws power from the PoE switch and eliminates the need for a separate power cable and adapter.

The fiber is run to the first OmniConverter media converter with two fiber ports. One fiber port is the fiber uplink, and the other fiber port is the fiber downlink that connects to the next OmniConverter media converter in the daisy chain. Each OmniConverter provides data and power to an Aruba access point; eliminating two separate PoE midspan/power injectors typically required at each light pole.

The number of access points on the daisy chain is limited by the aggregate bandwidth of all the access points.

Contact Omnitron Systems Today for more Information

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