

Application Note Avoiding Network Downtime Caused by Fibre Cuts Gigabit Wireless Networks



About Wireless Excellence

Founded in 1996 and with headquarters in Oxford UK, Wireless Excellence Limited is a leading designer and supplier of outdoor and indoor Broadband Wireless communication products.

With a complete range of solutions including Radio, Microwave, Millimeter-Wave, Free Space Optics, WiFi and 4G/5G/LTE, customers in over 80 countries have chosen Wireless Excellence as the "one stop shop" solution of choice for dependable wireless networking.

Fibre Cut? The Real Cost is Huge – How to solve using Gigabit Wireless

Worried about a possible Fibre Cut? You should be!

Though fibre is perceived as a “perfect” media, fibre is fragile and repairs take many hours, days or weeks requiring specialist skills and equipment. Consider a Gigabit Wireless resilience strategy for your fibre network to avoid downtime, unproductivity and loss of business for clients. Today’s wireless is fast - up to 10Gbps - and highly reliable.

A huge proportion of corporate LAN connections, campus sites, Internet and LTE backhaul is done over fibre optic cable.

Many customers and operators perceive fibre optics as a preferred option for communications across campus sites, streets, cities, across countries and internationally.

But while fibre optic cabling is traditionally seen as the safer option, that may be a misconception. When installed correctly, fibre optics is the “perfect” media, transmitting Gigabits per second of data without interruption. However, any disruption to the fragile fibre causes data outages which take days or weeks to locate and repair. The armoured covering around the fibre cable may keep it safe from rodents but is no protection against mechanical diggers, street works and other forms of disruption.

According to data from the Federal Communications Commission, about a quarter of all network outages that happened between 1993 and 2001 were from cables being cut. Regardless of how the fibre cut occurred, such outages can be particularly damaging.



How easy is it to repair a fibre cut?

Fibre is not a “self healing” media: skilled teams with specialist fibre-splicing and terminating equipment are required to repair a broken fibre connection. Most data communication engineers do not have this equipment or training on using them.

Fibre repair is a specialist business and getting trained people and splicing equipment to site costs time and money.

Factoring the anticipated cost of a fibre repair into a budget for “downtime” and “unproductivity” for corporates – and missing SLA’s for uptime for Service Providers – is a serious issue, including business continuity planning. For rural areas, access to sites can be limited, with some locations limited by poor weather, and for islands sometimes only with infrequent access by sea or air.

Common causes of fibre cut outages

As these instances show, there are many different ways in which fibre optic cabling can be disrupted:

By vandalism

This type of fibre cut outage has been worryingly common of late. According to CNN, there have been 11 separate incidents involving the cutting of fibre optic cable in the Bay Area since July 2015. The FBI noted that there have been more than 12 in the region since January, and that it’s been hard to stop in part because there is so much critical cabling in the area and because cables are typically clearly marked, The Wall Street Journal reported. Authorities noted that these incidents show no sign of slowing down either, as they don’t have a clear suspects or motive at this time. The Journal also noted that some instances of fibre optic-related downtime are not due to vandalism, but rather someone trying to steal metal. [video news report here](#) from San Joaquin in USA.



By accident

This is perhaps one of the most common causes of fibre cuts, but nevertheless they are just as damaging. In one example a 75-year-old woman in the country of Georgia was digging in a field when she accidentally severed a fibre optic cable, in an article in The Guardian. As a result of the mishap, close to 90 percent of Armenia and parts of Azerbaijan and Georgia were completely without Internet for five plus hours.

By force of nature

Tornadoes, hurricanes, earthquakes and other major natural disasters all have the potential to cut or entirely destroy fibre optic cabling. Other seemingly more benign forces of nature can also cripple connectivity, as Level 3 reported that 28 percent of all damages it sustained to its infrastructure in 2010 were caused by squirrels. In some locations, fibre installations are run on overhead “catenary wires” which render them at risk of outage with overhead activity and weather.



Calculating the impact of a fibre outage

In some of these fibre cut outage incidents, the fallout can be relatively minor. A cut that occurs in the middle of the night on a redundant line can be easy enough to deal with, with service providers sometimes able to reroute traffic in the interim. Unfortunately however, such incidents often lead to much bigger problems for end users. For example, a cut fibre optic cable in northern Arizona in April caused many thousands of people and businesses to go about 15 hours with telephone and Internet service. This meant many shops had to either close or resort to manual tracking, and that personal Internet usage grinded to a halt, The Associated Press reported. More importantly, 911 emergency communications were disrupted in the incident.



It's not just a hassle for end users, as cut fibre can severely impact public health when emergency services like police departments, fire stations and EMTs can't take and receive calls. Plus, such incidents are very costly for service providers, forced to repair expensive infrastructure. They can also lead to canceled service, as customers become irate at service providers for failing to provide reliable connectivity at all times.

What's the solution to fibre cut outages?

One easy way to avoid the problems related to cut fibre is to consider a wireless alternative to fibre as a resilient path. Using both fibre and wireless gives perfect network resilience. For example, if there is a disruption to the fibre optics at street level, the wireless links are up on rooftop level do not suffer – and vice versa. In one real-world example, after a cable outage caused residents of Washington state's San Juan Islands to go without telephone, Internet and cell service for 10 days in 2013, CenturyLink installed a wireless mobile backhaul to reconnect service to customers.

By opting for a solution like a Gigabit Wireless Microwave, MMW, Free Space Optics or MIMO OFDM Radio, service providers gain a wireless alternative to cabling that is just as robust and fast as fibre, with real-world capacities up to 10Gbps. With the Gigabit Wireless link in place as main link or resilient backup, risk of fibre cuts and damage to optic cabling is less disruptive to end users and operators.



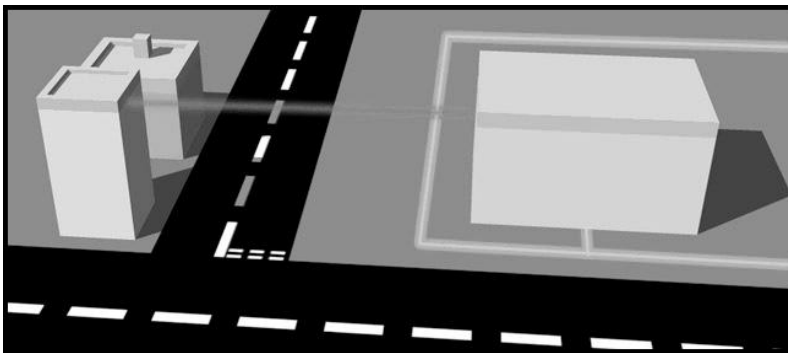
The Solution to avoiding Network Outage due to Fibre Cuts

A CableFree wireless solution offers the following features and benefits:

High Performance	Gigabit Ethernet (1.25Gbps) using FSO, 6Gbps using Microwave, 10Gbps+ using MMW, 550Mbps using Radio
Rapid installation:	3 hours achievable, 15 minutes temporary
Highly reliable:	99.999% availability achievable
License-free Operation:	No fees to pay on license free bands
No monthly rental fee:	Low maintenance solution
Diverse technology options:	Complete range of FSO, Broadband Radio, Microwave, MMW, WiFi
Fully manageable:	Advanced software tools
Resilient solutions:	1+1 Hybrid FSO+RF resilient link options
Highly Secure:	Proven inherently secure technologies
Low Total-Cost-of-Ownership (TCO):	Moveable asset
Safe & Environmentally friendly:	Low disruption during installation

CableFree products are field-proven, with thousands of deployments in over 80 countries since 1997. Excellence in performance and reliability are not sacrificed in providing highly competitive priced solutions together with a comprehensive range of support services.

Application Diagram



CableFree Wireless links are deployed on rooftop or tower locations between buildings or sites.

Network connections (Gigabit or 10Gbps Ethernet, E1/T1, video, voice) connect to the wireless units which can be mounted on tripods, rooftops, towers, poles or behind windows.

For permanent installation a site survey is recommended before installation, to determine suitable mounting points, location of cable runs etc. Installation involves physically mounting the equipment, aligning it, connecting data and power circuits and commissioning.

Recommended Products

CableFree Access FSO	FSO Connectivity up to 155Mbps, range up to 4km
CableFree Gigabit FSO	FSO Gigabit Ethernet and Fibre Channel up to 2km
CableFree AC-MIMO	Radio links up to 550Mbps, range up to 40km
CableFree MW	Licensed Microwave links up to 6Gbps, range up to 100km
CableFree MMW	60/70GHz Millimeter Wave links up to 10Gbps+, range up to 10km

For More Information

Please contact Wireless Excellence Ltd for information on the complete range of CableFree products and services

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