

ROUTE DIVERSITY FOR ISLANDS

SES Networks' Diverse Route and Fiber Restoration Solution

On 1 February, 2017 an undersea fiber cable connecting Madagascar to continental Africa was cut. A fully diverse route over a satellite-enabled network guaranteed service and continuous low latency. The dynamic network could rapidly add capacity, covering lost bandwidth until the fiber cable was repaired ensuring customer experience and revenue protection.



The island nation of Madagascar lies to the South East of continental Africa, and relies on internet connectivity over the Eastern Africa Submarine Cable System (EASSy) line, which periodically experiences cuts and other forms of disruption (Figure 1). And the frequency of cuts to underground fiber lines across the island is actually even greater. These cuts cause immediate and sustained connectivity issues for both Internet Service Providers (ISPs) and Mobile Network Operators (MNOs) across the country.

While underwater cables seem to be well protected — and the companies that install them go to great lengths to make sure they are — a variety of issues can affect them, and regularly do around the African coast. For example, a ship dropping anchor off Mombasa, Kenya cut the internet to six African countries recently, an outage that took three weeks to repair. In the meantime, customers in those countries had to use degraded connectivity, struggling to complete the most basic online activities.



Figure 1 Photo of undersea fiber cables susceptible to natural and man-made forces. Courtesy of Pakistan Bee.

BENEFITS OF FIBER

Fiber, of course, is the ideal way to transfer large amounts of data, both in country and internationally. In both throughput and latency fiber is unparalleled in terms of its ability to provide customers high performance fixed and mobility service.

However, if there is one downside to fiber (aside from the inability to connect moving vessels in the ocean and air), it's the fact that it is fixed in the ground. Fiber is susceptible to cuts, both purposeful and accidental, and other disruptions. Interruptions on fiber are inevitable, so a true diversity solution is required for high availability.

In Madagascar, consumers found in this instance that fiber was quite susceptible to problems, which could not quickly be resolved. So until the repairs were completed, the only backup solution was satellite. Until the not-too-distant-past, satellite networks were simply incapable of serving as an adequate redundancy option for fiber; the available systems were not capable of comparable throughputs, and the signal latency frustrated internet users while rendering many applications completely unusable. In short, satellite was not a co-equal alternative to fiber.

That all changed in September 2014, however, when the O3b Medium Earth Orbit (MEO), High Throughput Satellite (HTS) system came online. For the first time, customers connected via satellite could experience internet performance very similar to that of fiber connections, in both throughput and latency.

SES Networks is transforming communities across Africa, and around the world" said Carole Kamaitha, VP, Sales Africa, of SES Networks. "It used to be that countries without access to fiber had to suffer with inferior internet, but SES has provided fiber-like connectivity to everyone who wants it through our O3b MEO fleet. And we've seen that even fiber is not an absolute guarantee of good connectivity. Every company needs to consider what happens to their customers if the fiber goes dark."

THE MADAGASCAR CUT

On Madagascar, the February 2017 fiber outage impacted customers of several major ISPs around the country. But Gulfsat, using a combination of fiber and SES Networks' resilient O3b MEO-enabled satellite network infrastructure, seamlessly switched all of its international internet traffic over to SES Networks when the fiber line went out.

The SES Networks solution offers minimal points of failure,



and no points of failure overlapping fiber.

Figure 2

Traceroute Data for TELMA Global Net (37054)

"Gulfsat was very happy to have the SES Networks connection in place so our customers did not suffer the way others in Madagascar did," said Damien de Lamberterie, General Manager of Gulfsat Madagascar.

"With the combination of always-on connectivity, a diverse route, and the ability to rapidly increase capacity in case of a fiber outage, Gulfsat has clearly deployed the best possible backup solution available — the O3b MEO solution."

With SES Networks' O3b MEO connection, Gulfsat's customers continued to surf the web, use online applications, and be productive. Their competitors — in a state of near panic — feverishly tried to find some option to get their customers back online. Without traffic flowing, these other ISPs and MNOs couldn't allow web surfing, video streaming, online gaming, or use of any cloud-based and mobile applications.

The company managing the fiber cable worked 24 hours a day, seven days a week to repair the connection, yet the total repair time was well over two weeks. With equipment being flown in from other cities and the difficulty in accessing the cut, the fix was finally completed until after 15 February, by which time major hardships had been experienced by over three million internet and mobile subscribers across the island.

SATELLITE + FIBER = 100% CONFIDENCE

Telecommunications companies around the world that use SES Networks multi-orbit high-performance satellite system for service assurance on fiber routes have true business continuity and automated disaster recovery capabilities so business is never interrupted. Satellite has come of age now being capable of: 1) providing full redundancy for a primary fiber connection, 2) being configured as a hybrid fiber/satellite connectivity solution, or 3) dynamically and intelligently routing network traffic based on pre-defined Quality of Service (QoS) levels. QoS levels can be customized to define which application and network traffic takes priority in the event of congestion or an outage.

One company taking advantage of such a setup is the American Samoa Telecommunications Authority (ASTCA). They have found this to be the ideal setup for American Samoa for a variety of reasons.

"ASTCA uses both fiber connections and the O3b MEO connection, which provides us essentially the same performance as fiber but over satellite," said Alex Sene, Jr., CEO of ASTCA. "This gives us the best of both worlds — we get great performance for voice and data knowing that any natural or man-made event will not cause us to lose our internet entirely."

SD-WAN - APPROACHING 100% UPTIME

Software Defined Wide Area Networking (SD-WAN) is the ultimate solution for providing substantial insurance against any outage, providing network availability as close to 100% as possible. SD-WAN implementation delivers multiple secured and encrypted data tunnels across both fiber and satellite, providing a robust and diverse network architecture. In the event any path is disrupted, a controller coordinates all traffic, prioritising the most important data.

As an example, as part of a robust SD-WAN implementation, an ISP servicing an island nation is connected by a submarine fiber line, as well as by a satellite link over the SES Networks' O3b MEO network. If the fiber cable was somehow cut, traffic would be intelligently and automatically switched over to the fiber-performance MEO satellite link. At the same time, an additional C-band GEO link would switch on to replace some of the capacity lost from the fiber connection, and the controller would push traffic that is lower priority and non latency-sensitive over this connection. SD-WAN architecture provides the highest level of assurance that a service provider's network will always be available — no matter what happens.

CONCLUSION

Service providers of both fixed line and mobile data and communication services around the world can no longer rely solely on a single route for their traffic, as the data travelling over their network is vital to public safety, education, commerce, and the overall well-being of their end-customers. High performance satellite solutions such as those provided via SES Networks multi-orbit satellite and terrestrial network solutions.



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