Remote Fiber Testing and Monitoring (RFTM)

EXFO

New opportunities, new challenges in building out and turning up fiber networks

To deliver the bandwidth required to meet the network densification and backhaul requirements of 5G mobile networks, the ongoing need for digital transformation of network infrastructure and to effectively respond to lasting changes in consumer behavior (i.e., remote working, remote learning, video streaming) in the wake of the pandemic of 2020-2021, communication service providers are deploying fiber networks (FTTx, PONx) on a massive scale.

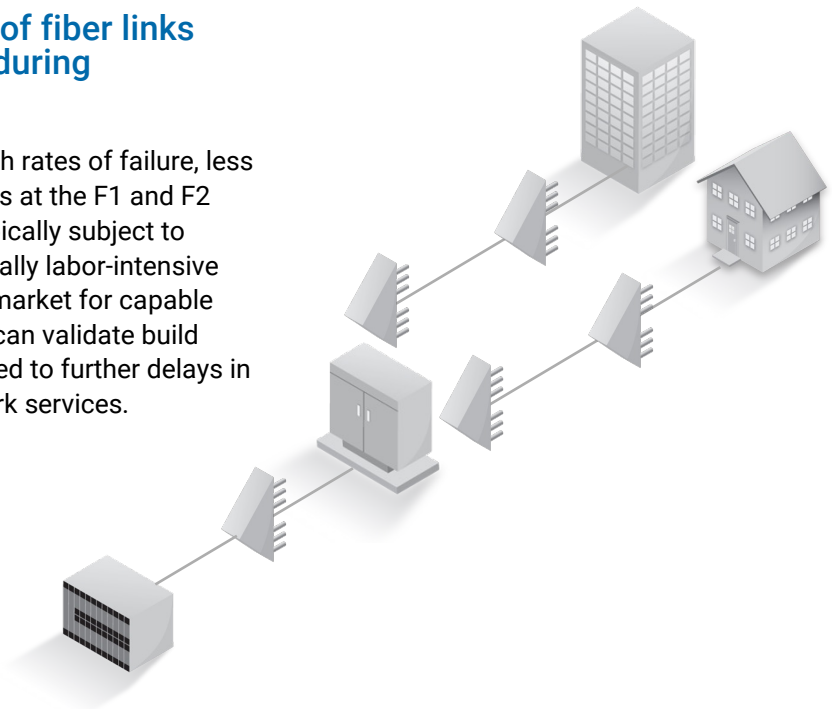
Delayed by the pandemic, many service providers are racing to catch up with previously announced projects for nation-wide fiber deployments, buoyed by new demands from all levels of government for super-fast network access for all.

The challenge for many service providers is maintaining the pace of network buildouts and turn-ups at scale. This is particularly difficult when laying fiber is already fraught with difficulties, with the percentage of initial fiber failures often measured in double digits.

10% or more of fiber links typically fail during construction

Despite these high rates of failure, less than 1/8th of links at the F1 and F2 segments are typically subject to testing, a historically labor-intensive process. A tight market for capable technicians that can validate build quality has also led to further delays in turning up network services.

These defective links require expensive truck rolls, re-work and additional testing, increasing OPEX costs, delaying the monetization of new infrastructure and ultimately impacting profitability and the ability to fund new network investment.



Building quality into fiber network deployments

Test early, test often to accelerate build-out and turn-up

There's another way to construct fiber networks that accelerates build-out, provides reliability at all stages of deployment, reduces the need for truck rolls and re-work and delivers paying customers sooner. It's an approach that enables service providers and their contractors to get it right the first time, a proven approach to improving the bottom line, and it reduces the need for highly qualified personnel.

This approach to deploying a fiber network involves testing 100% of the links at each segment, reducing defective links by an order of magnitude as well as virtually eliminating unnecessary movement of assets and personnel.

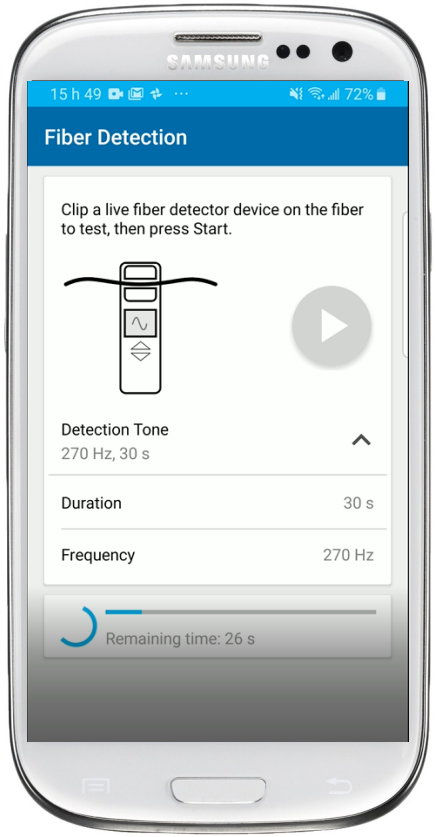
By integrating testing during build-outs, service providers build quality into the build process and the end results, delivering reliability up and down the line, from contractor to customer.

Through a combination of automated and on-demand testing, leveraging low-cost optical hardware, smartphones and mobile applications, service providers can test all their fiber links while delivering network build-outs faster than before.

More effective testing results in faster network build-outs

Thanks to such testing, service providers can compress build time, eliminate unnecessary re-work, turn up network service earlier and get paying customers sooner.

Extensive testing at all steps in the network path offers peace of mind, enabling service providers to audit the work of their contractors as work progresses. A centralized dashboard for test results provides a one-stop view of contractor progress, link status and work to come.



Remote Fiber Testing and Monitoring (RFTM)

RFTM is the remote fiber testing system that enables testing at all phases of network deployment. It provides end-to-end link testing and diagnostics for any type of fiber network, including mobile backhaul and passive optical networks in a FTTx context, whether P2P or P2MP.

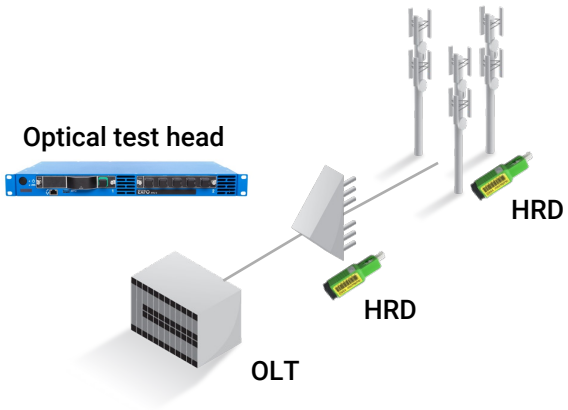
Automated tests are orchestrated at scale via a cloud-native application server. These tests are executed via the remote test units (for P2P and PON) that leverage EXFO's state of the art OTDR technology and its innovative, proprietary iOLM™ algorithms.

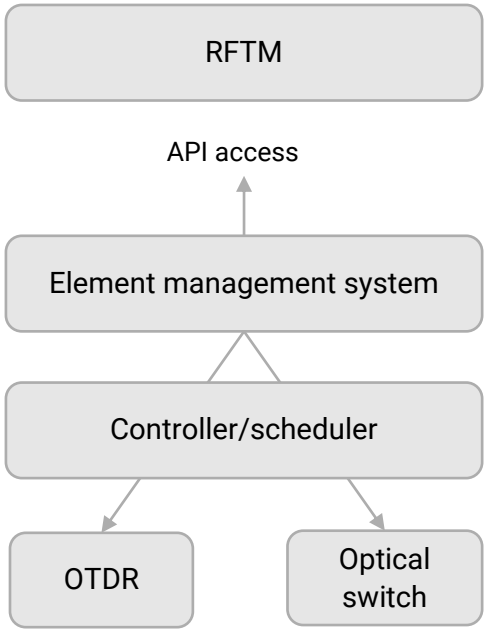
No complex field test equipment is required for manual testing with RFTM. Instead, field technicians use the mobile application running on a smart phone paired with a high reflectance demarcation (HRD) filter device to remotely trigger OTDR tests.

From end-to-end link loss measurements to link continuity, OTDR link quality check is done at the touch of a button with end-to-end loss available for users on the spot.

Nova Fiber benefits

- Higher quality fiber deployments
- Lower fiber build-out costs
- Significant reduction in truck rolls
- Reduced need for handheld OTDR devices
- Faster customer installs





RFTM: going beyond testing to monitoring and troubleshooting fiber networks

In addition to end-to-end link testing and diagnostics, RFTM provides proactive monitoring and extensive support for troubleshooting P2P and P2MP fiber connections.

The same software platform that provides a centralized repository of test results also maintains records of baseline performance for each fiber.

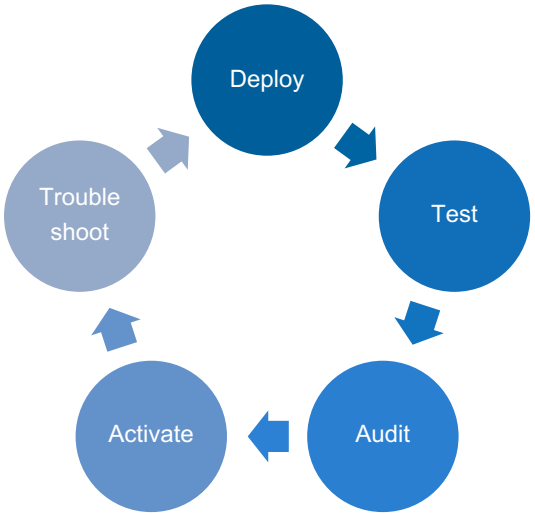
When test results diverge from the baseline by a set amount, RFTM calculates the signal loss and the distance of the impairment. This information is correlated with geolocation data to pinpoint the fault. RFTM leverages information about slack loops, splices, poles, and floor plates to provide full field accuracy.

By monitoring a single fiber per cable, RFTM can detect up to 100% of cable outage events, such as a full cable cut.

Detection of partial cuts can also be improved by RFTM monitoring as little as one fiber per cable. Real-world experience with RFTM and partial cable cuts has shown 80% sudden fault detection probability with one location fiber per cable and 95% coverage with one location fiber per bundle.

RFTM helps operators deploy, audit, activate and troubleshoot fiber optic links remotely across the network lifecycle

RFTM is based on micro-services and features well-documented APIs for integration with other OSS/BSS applications as well as with other EXFO solutions such as SensAI.



Case study:
Tier 1 network deploys fiber on a national scale

As part of its industry-leading Fibre First programme for the UK, Openreach has committed to delivering 25 million homes passed with fiber to the premises by the mid-to-late 2020s.

After 5 years of work, Openreach had deployed 4.5 million homes passed. It wanted to complete the next 20 million homes passed in the same period of time, a monumental task.

Key to the financial success of this initiative is delivering live service and generating revenue at the same time as deployment ramps up. This requires flawless execution, with extremely low defect rates, to ensure that customer activations go right the first time.

To achieve its aggressive goals, Openreach turned to thousands of contractors to build out and turn up the network. However, in moving to a contractor model, Openreach lost visibility of progress in deploying the network and had to rely on others for quality control.

Possessing varying levels of technical expertise, contracting technicians required a solution that was simple and straightforward to use. Nova Fiber's smartphone-based application for on-demand fiber testing fit the bill.

Defect rates are expected to fall from low double digits to low single digits

Thanks to proactive testing with RFTM, Openreach expects to achieve defect levels of less than 1% and reduce the need for costly truck rolls as it meets its target of 75,000 homes passed per week.

Openreach intends to use RFTM for its ongoing fiber monitoring needs as well. RFTM's centralized reporting capability will let Openreach view build-out progress in real time.

As a result of adopting RFTM, Openreach can more confidently deliver "right first time" fiber installations, measure its progress in real-time and make projections about future results.

openreach

This year, our build has been gathering pace and momentum, and we're determined to match that rapid speed of deployment with the highest standards of build quality and customer service.

EXFO will help us get there.

As a long-term Openreach partner, EXFO was selected thanks to its proven ability to provide fast, automated qualification of fibre builds, and for its unique iOLM™ OTDR technology.

Peter Bell,
Director, Network Technology
Openreach

Glossary

CSP	communications service providers
FTMS	fiber test management system
FTTx	fiber to the premise
FTTP	fiber to the premise
HRD	high reflectance demarcation
iOLM™	intelligent optical link mapper
OTDR	optical time domain reflectometer
P2MP	point to multi-point
P2P	point to point
PNF	physical network function
QoE	quality of experience
QoS	quality of service
SLA	service level agreement
SP	service provider

EXFO corporate headquarters

400 Godin Avenue, Quebec City (Quebec) G1M 2K2 CANADA
T +1 418 683-0211

Toll-free (USA and Canada)
1 800 663-3936

info@EXFO.com
EXFO.com