Securing optical network physical layer with Fiber Monitoring and Management

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EXFO

Remote and Centralized OTDR Testing Challenges

How can I know if the fiber network is available?

How can I repair fiber faults faster to satisfy these SLAs?

Can I use and improve my current investments?

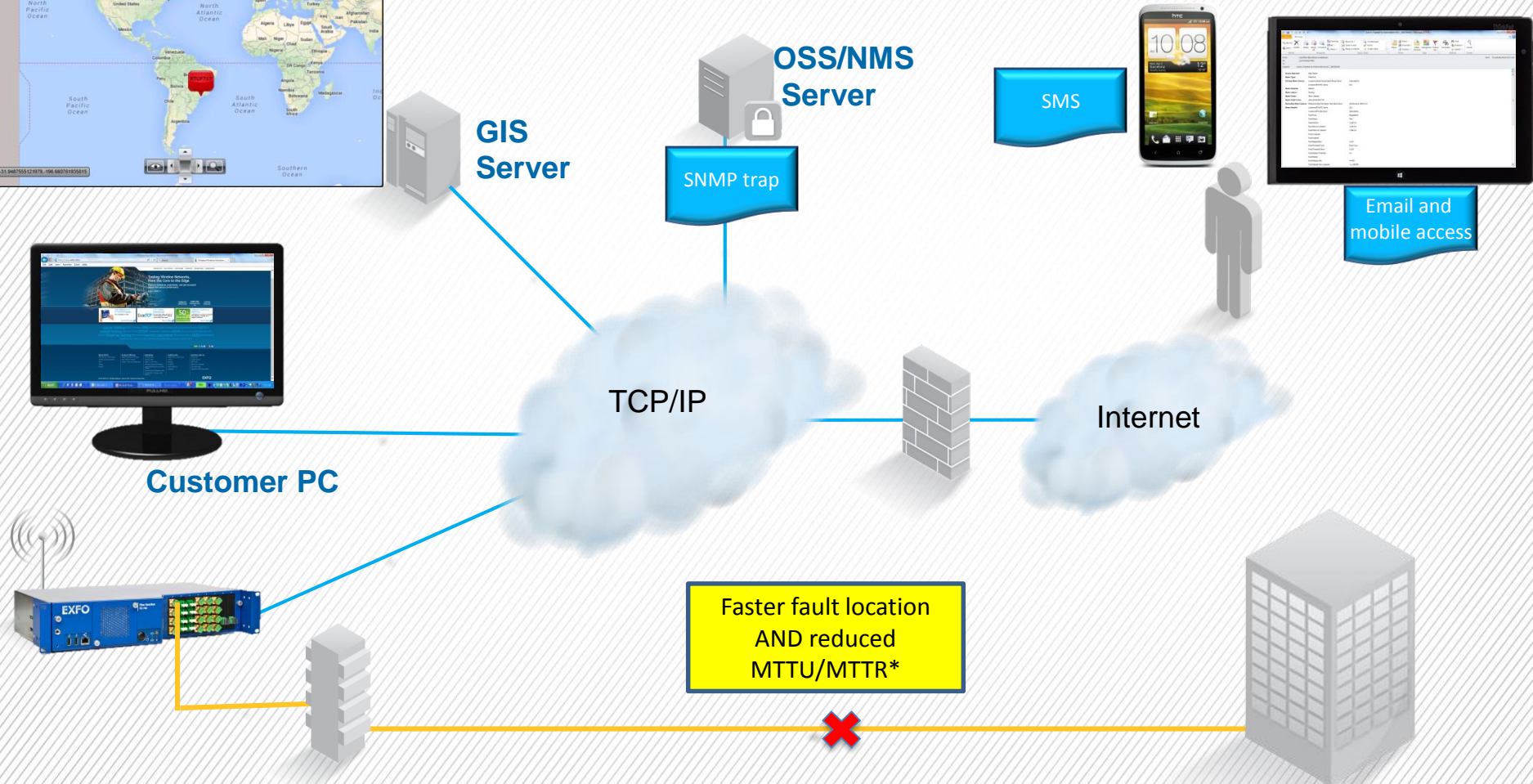Can I seamlessly integrate a new RFTS solution?

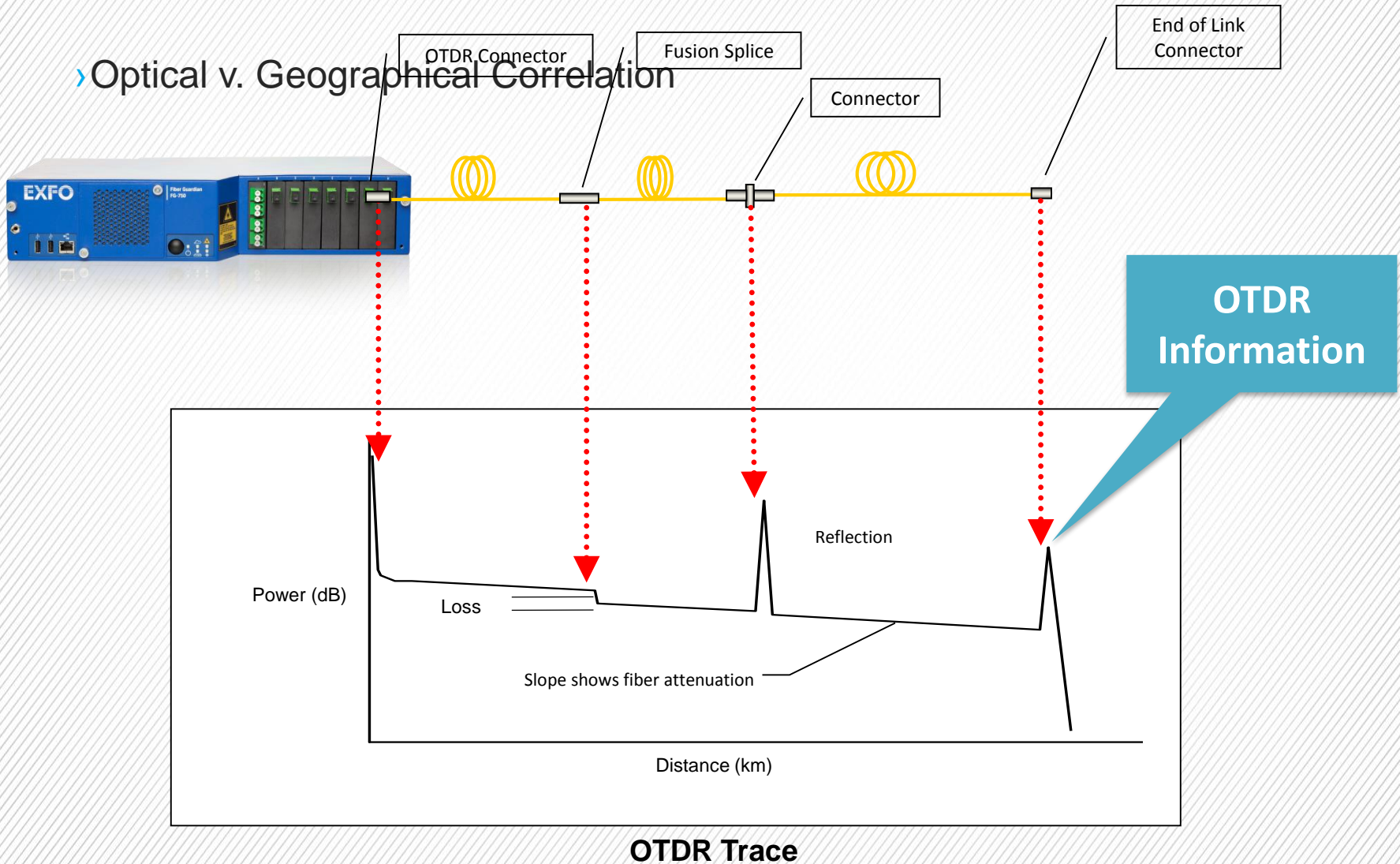# Remote and Centralized OTDR Testing Challenges

Fault-on-Map Application

Leverage third-party investments such as OSS/NMS applications, cell phones, mobile devices, etc.
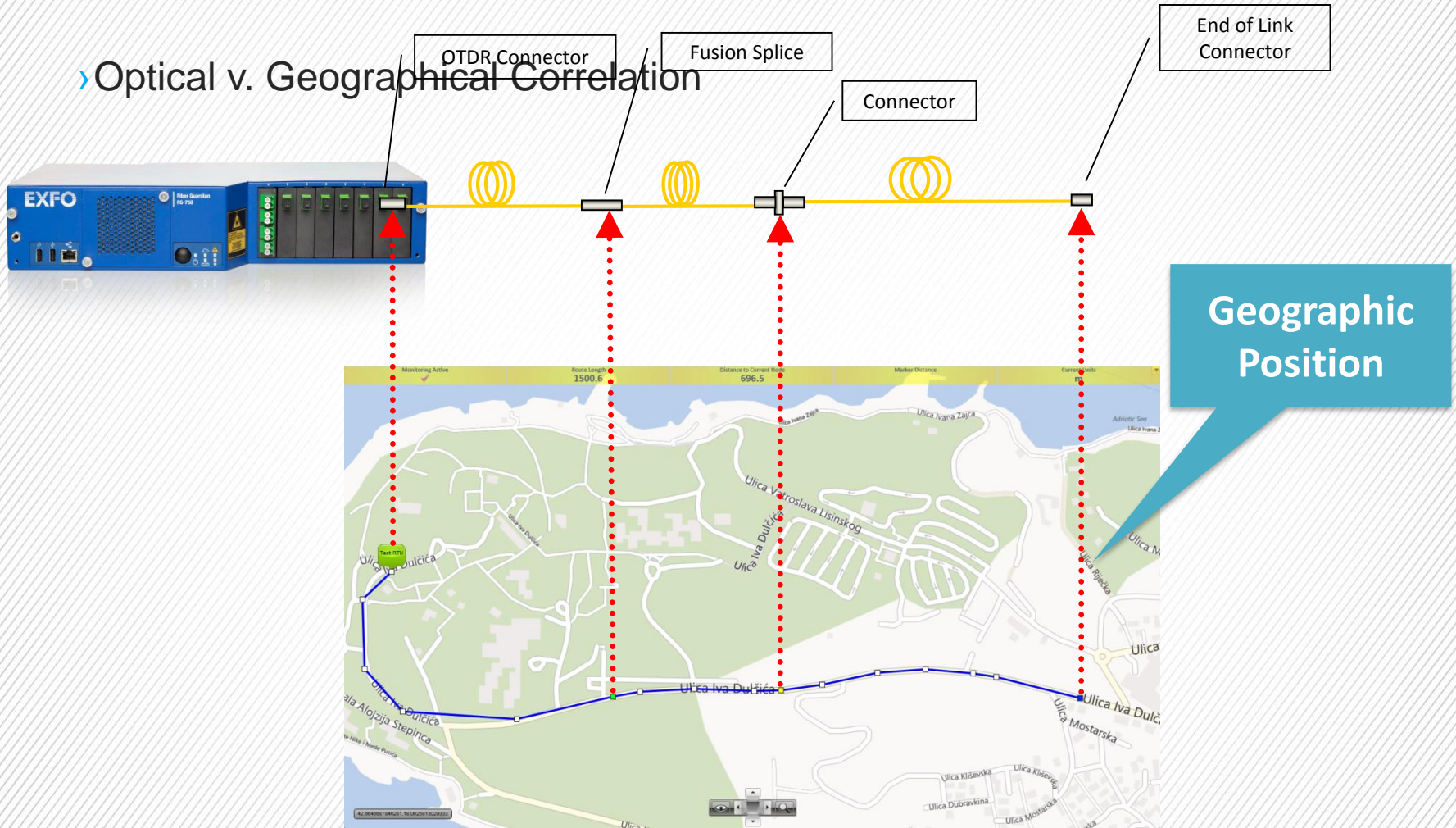
field.engineer@home.com

GIS Server

OSS/NMS Server

SMS

SNMP trap

Email and mobile access

TCP/IP

Internet

Customer PC

Faster fault location AND reduced MTTU/MTTR*

Faster Fault Location AND Reduced MTTU/MTTR

› Optical v. Geographical Correlation

OTDR Connector

Fusion Splice

Connector

End of Link Connector

OTDR Information

Power (dB)

Loss

Reflection

Slope shows fiber attenuation

Distance (km)

OTDR Trace

Faster Fault Location AND Reduced MTTU/MTTR

› Optical v. Geographical Correlation

OTDR Connector

Fusion Splice

Connector

End of Link Connector

Geographic Position

Fiber Test Insight
(Fault-on-map application)

Faster Fault Location AND Reduced MTTU/MTTR

> Mapping the Current Fault

You can see the optical distance

This marker shows where the fault is

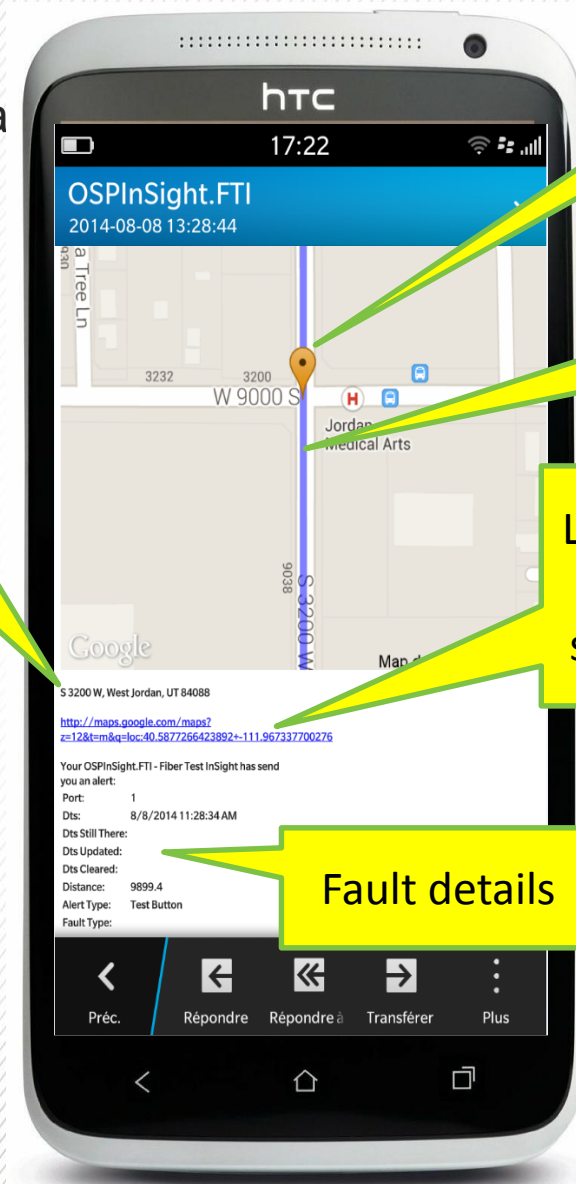Click Map
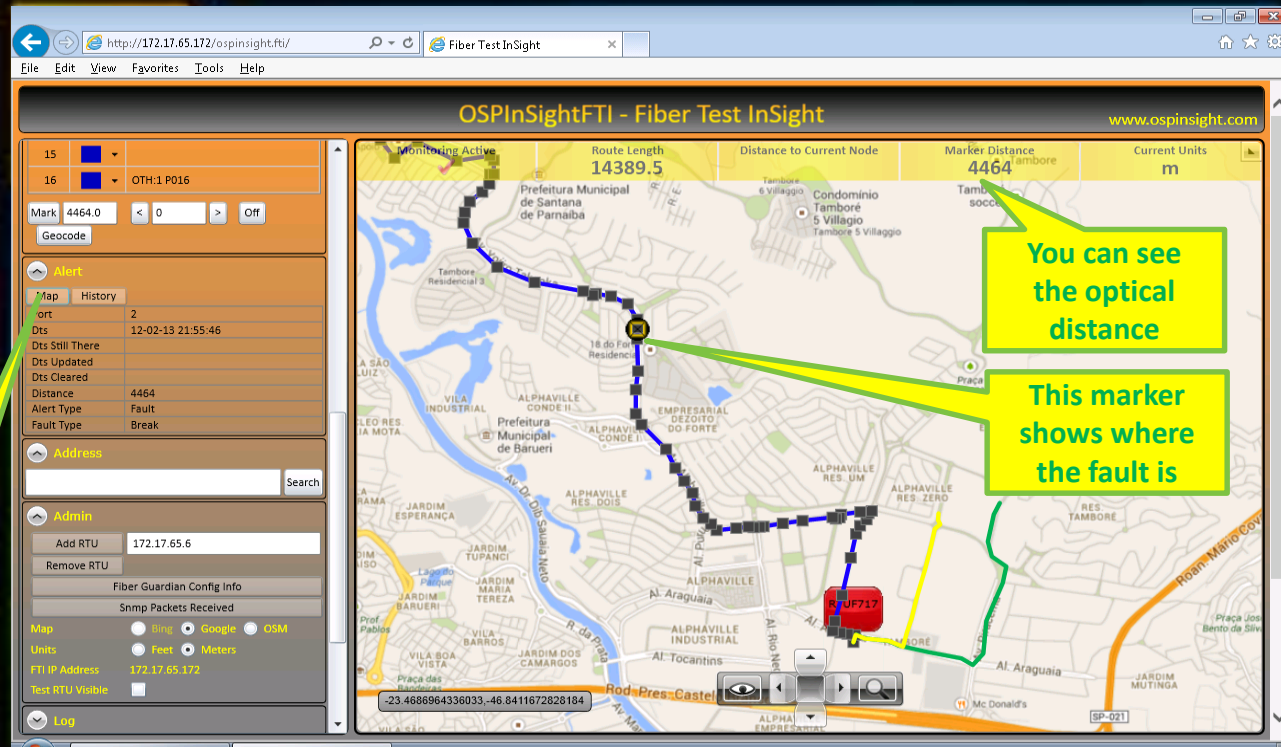
Fiber Guardian

› Advanced Email with Fa

Failure

Fiber Route

Reversed geo-coded address

Link to google maps for smartphones

Fault details

Auto-Provisioning

› Two clicks-of-the-mouse and all routes are provisioned…

1. Click Detect

Fiber Fault Thresholds

› Set optimal fault detection thresholds even though everything is…
   not static and not perfect !

Event #3

Event # 12
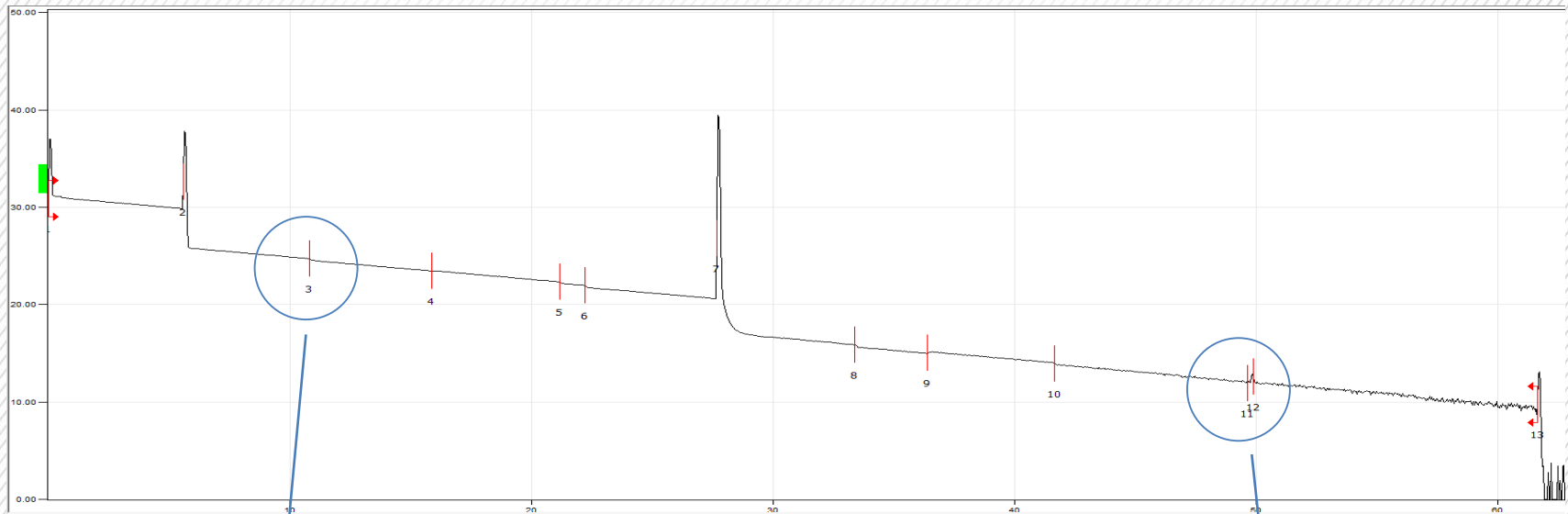
Fiber Fault Thresholds

› **Optimized automatic thresholds** applied to each and every monitored link.

› **Attenuation changes** resulting from seasonal, environmental and mechanical variations **are considered.**

› **No false alarms** due to misconfigured thresholds.

From Fiber Guardian

Add
another
FG

Add routes
to monitor

e topology

**OSS
Server**

TCP/IP

Internet

field.engineer@home.com

Add
another
FG

FTI Application

Technician

NQMS*fiber*

vanced GIS capabilities

OSS Server

field.engineer@home.com

TCP/IP

Internet

NQMS*fiber* EMS

Migrate to an advanced GIS application

Or integrate to your current GIS application

OSPInsight Edit/View

Technician
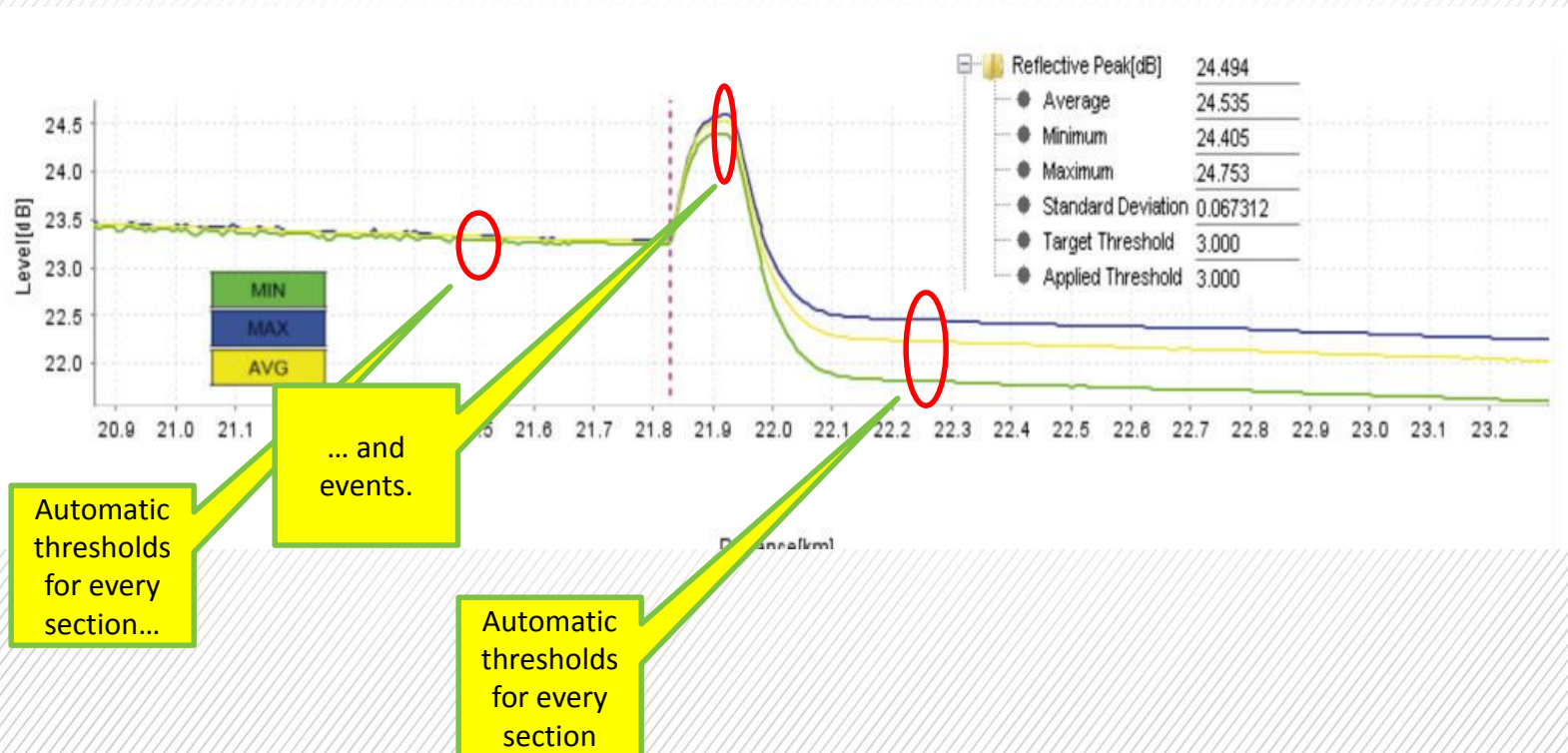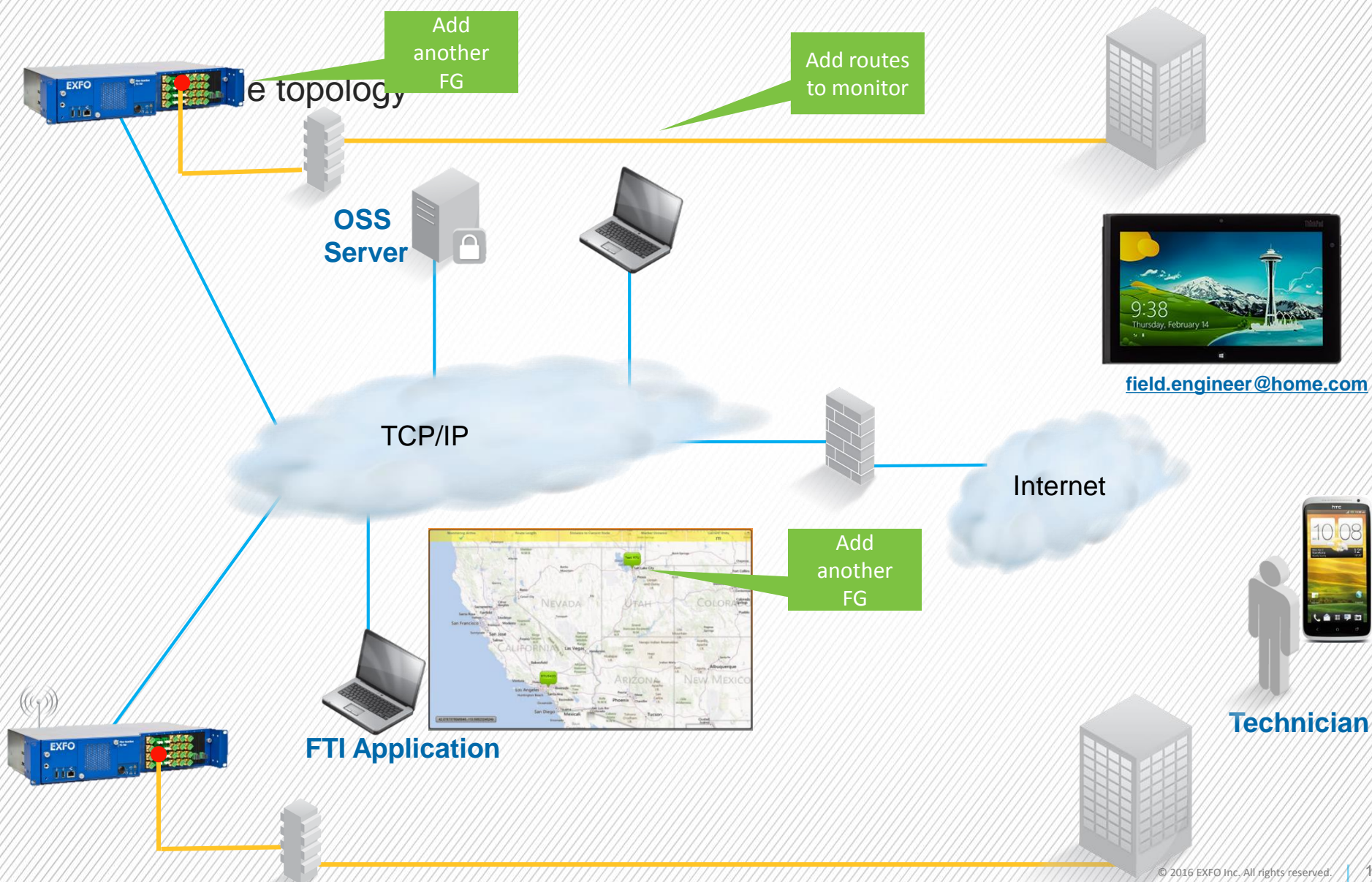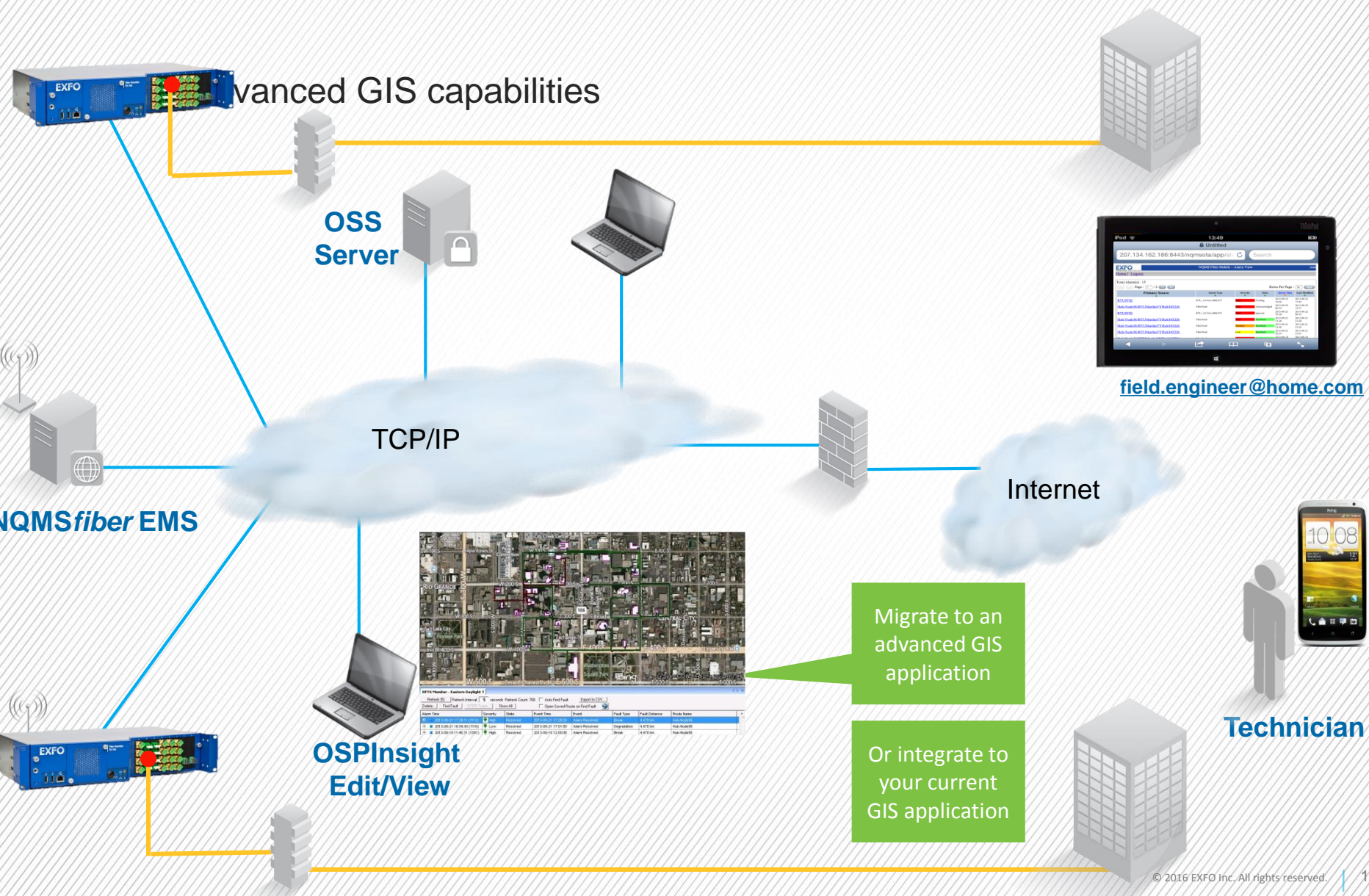
"Total Control" of Your Network

Functions

GIS/NMS Integration

SNMP/
Web Services

Your trouble ticket management system
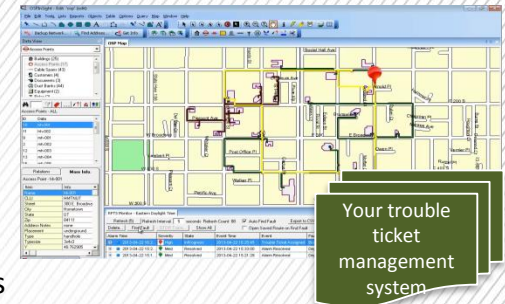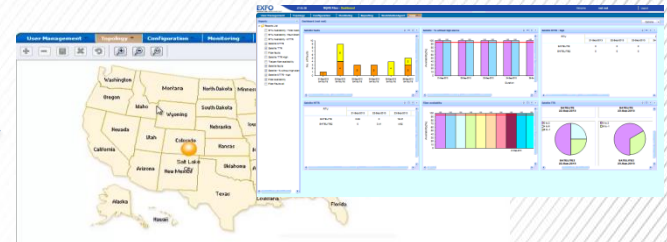
Centralized operation - alarm management, reports & executive views

http://

Fault-on-map capabilities
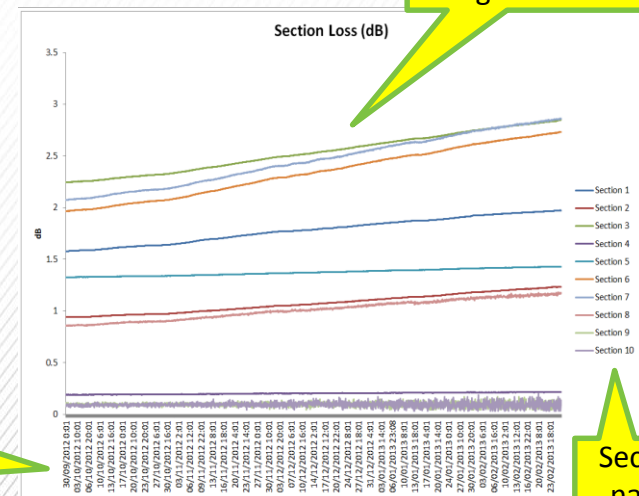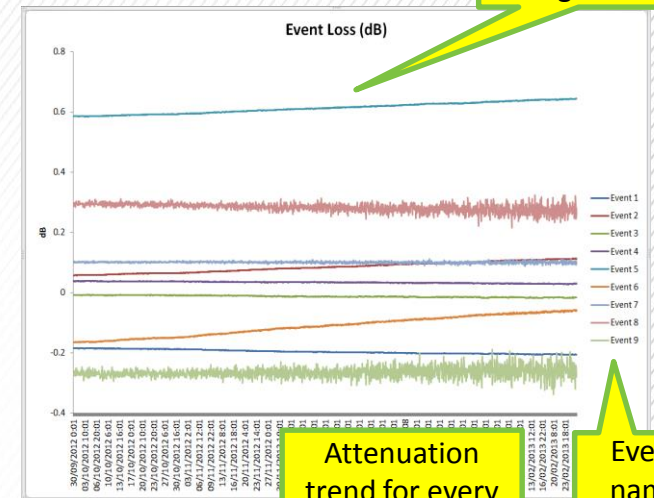
SNMP/
Web Services

Stand-alone unit
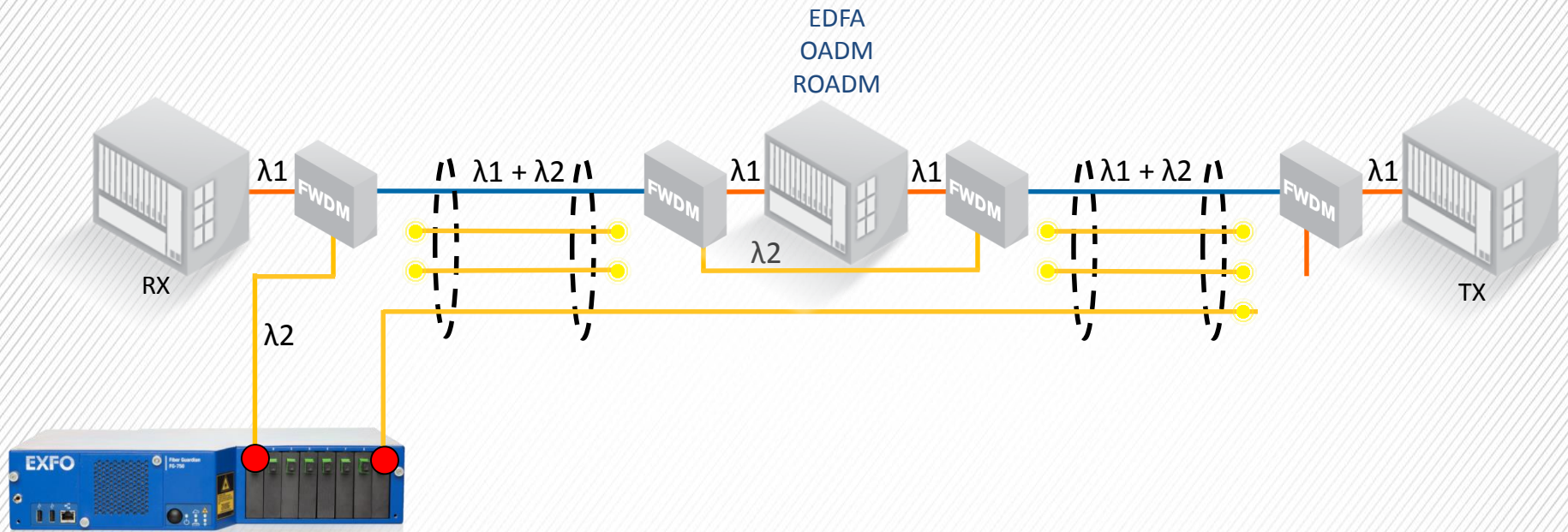1 per critical area

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Monitoring capacity

Attenuation Trend Reports

› Reports on each fiber

› **Make proactive business-planning decisions for outside plant (OSP)** based on a regular, automated collection of fiber-optic "cable" attenuation data over an extended period.

› **Recognize trends along the entire "cable"** as well as specific sections and/or events along the fiber.

› **Obtain impact analysis** of environmental and mechanical factors in the network, such as seasonal changes, humidity, storms, temperature, etc.

Attenuation trend for every single event

Event Loss (dB)

Attenuation trend for every single section

Event name ID

Section Loss (dB)

Report period time

Section name ID

Monitoring Scenarios

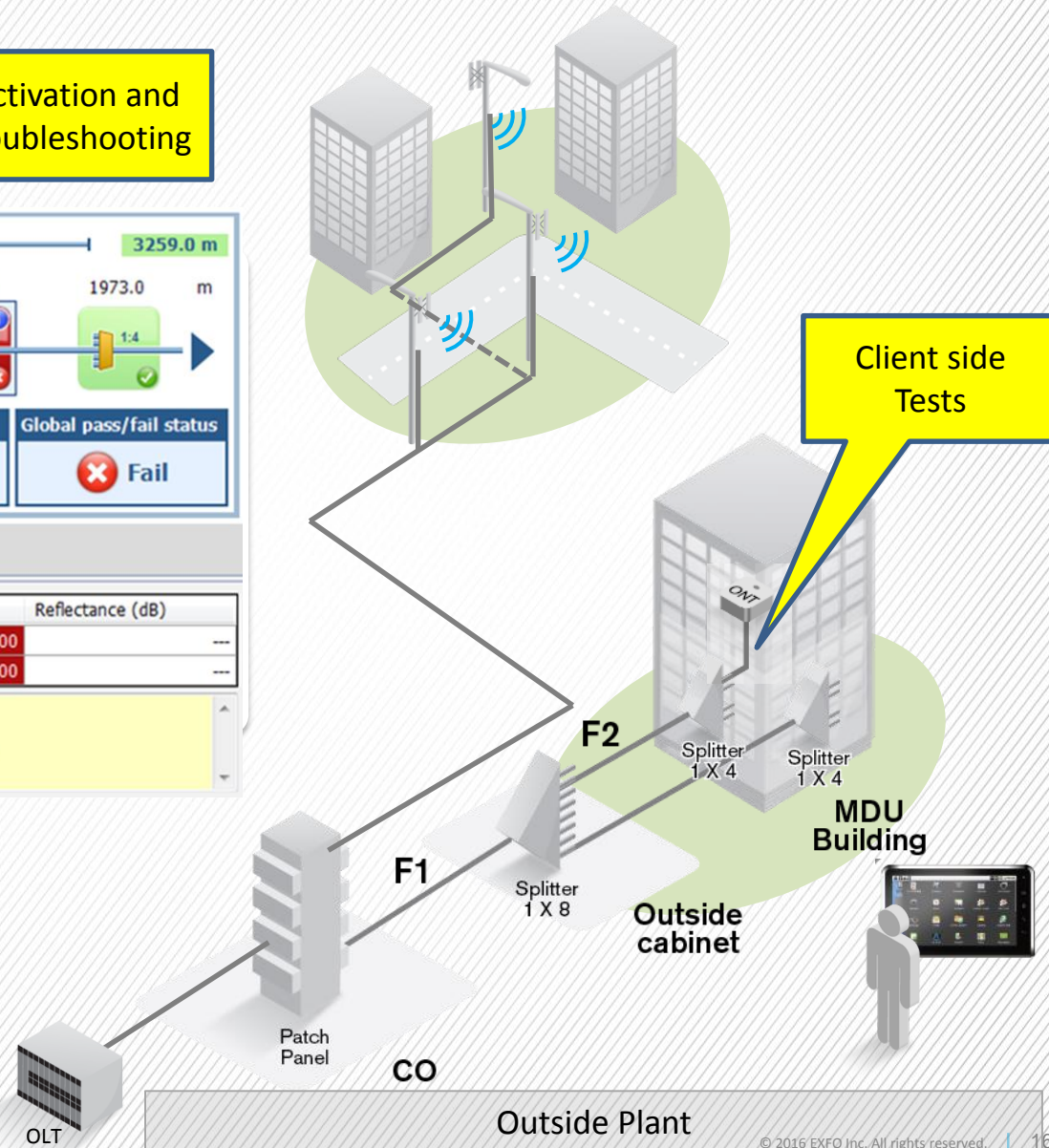Both Active (In-Service) and Passive (Dark) Fibre Monitoring
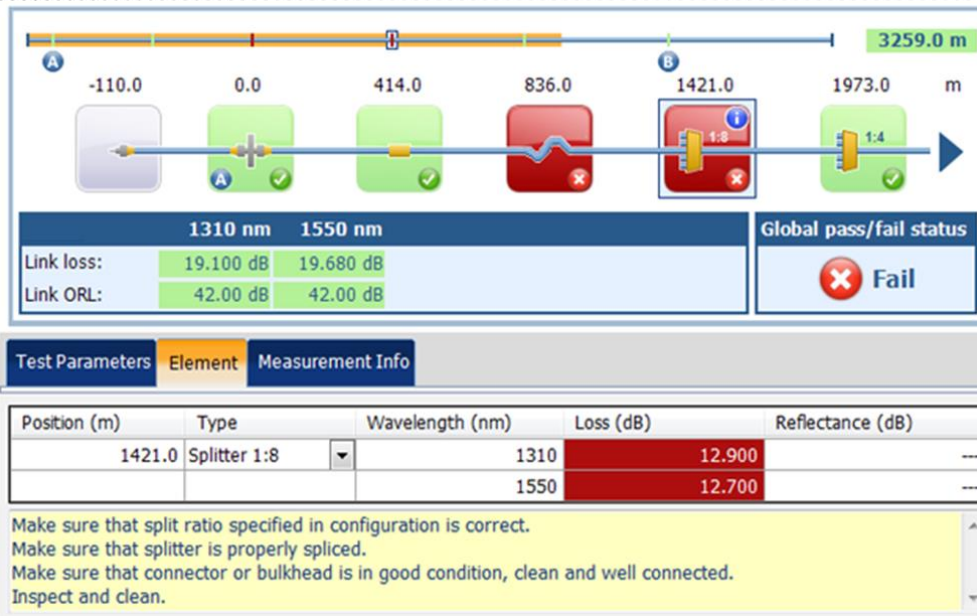

- All testing will be in a 'round robin' sequence
- Priority can be given to specific ports if required
- 1650nm/1625nm or CWDM testing now supported

FTTH Challenges

FTTH Construction → FTTH Certification → Activation and troubleshooting

Client side Tests

MDU Building

F1

F2

Splitter 1 X 8

Splitter 1 X 4

Splitter 1 X 4

Outside cabinet

Patch Panel

CO

OLT

Outside Plant

FTTH Challenges

How I can know if the problem is the ONT or fiber?
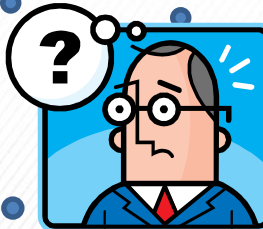
Can I test PON network from central office?

How I can know where is the fault?

What if the fiber is stolen?

How I can prevent faults by periodic degradations of the network?

Can I rely on ONTs status to tell if they have an optical fiber defect?

LinkAware ?

› Optical loss/reflectance profile determined with best combination of pulse width, from two or more consecutive OTDR acquisitions

› Maximizes the OTDR performance over the entire line

› No user intervention needed, allows for 100% test automation
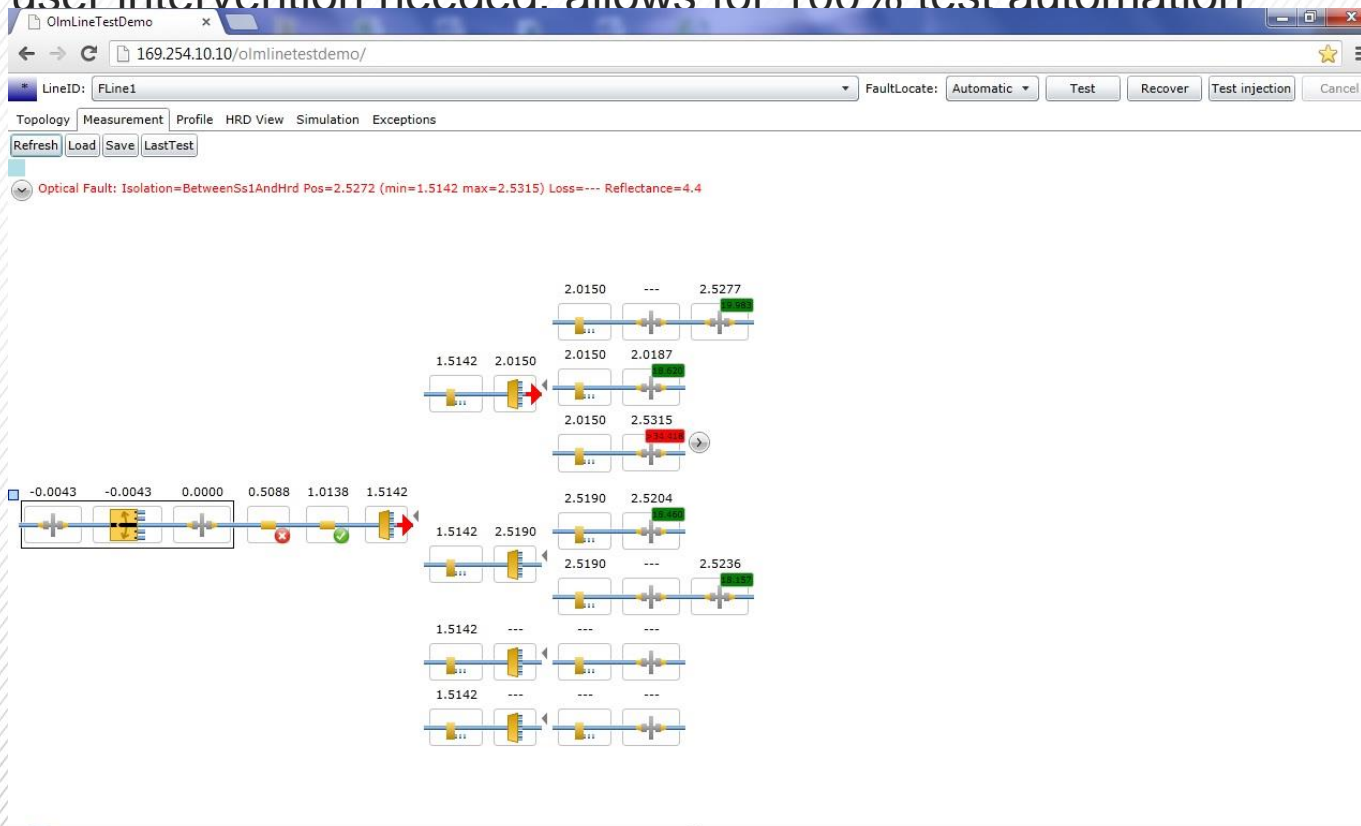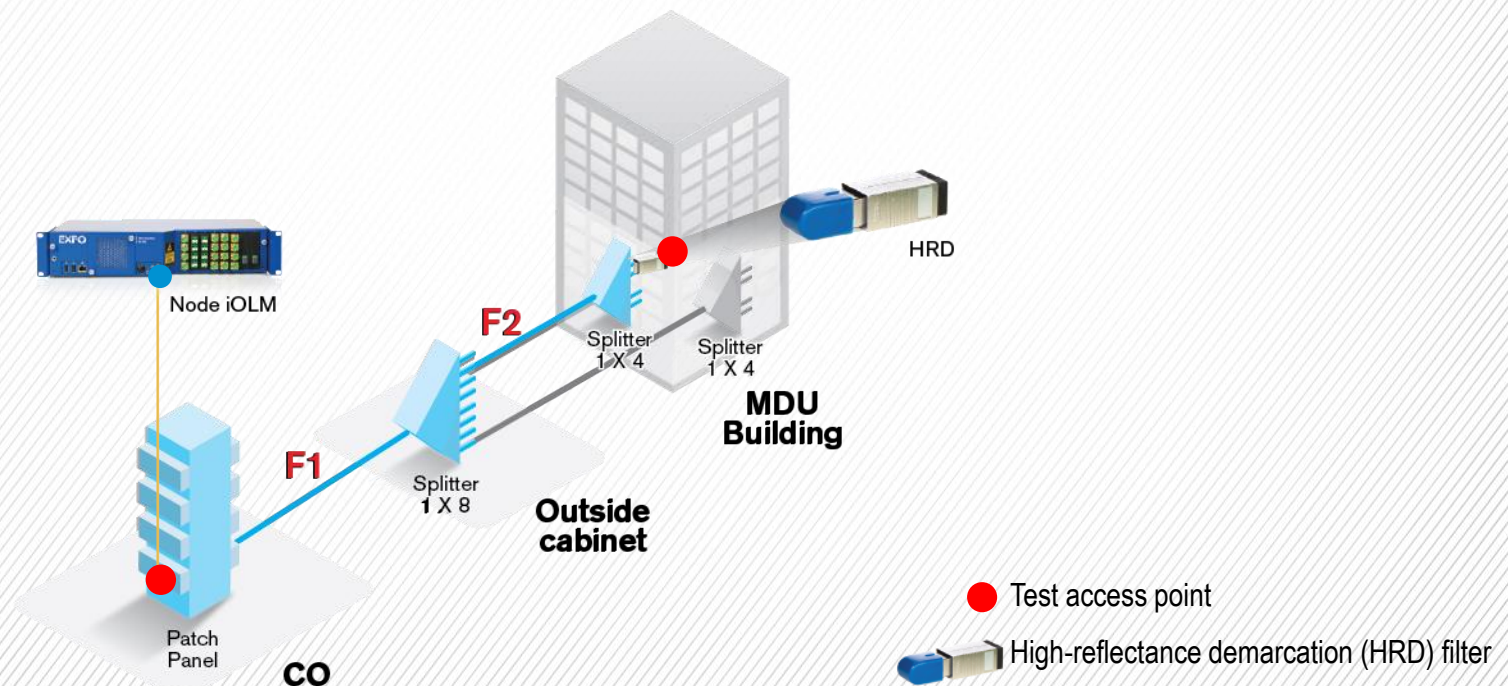
EXFO solution

Simplification and Automation

Highly reflective termination filter (HRD)
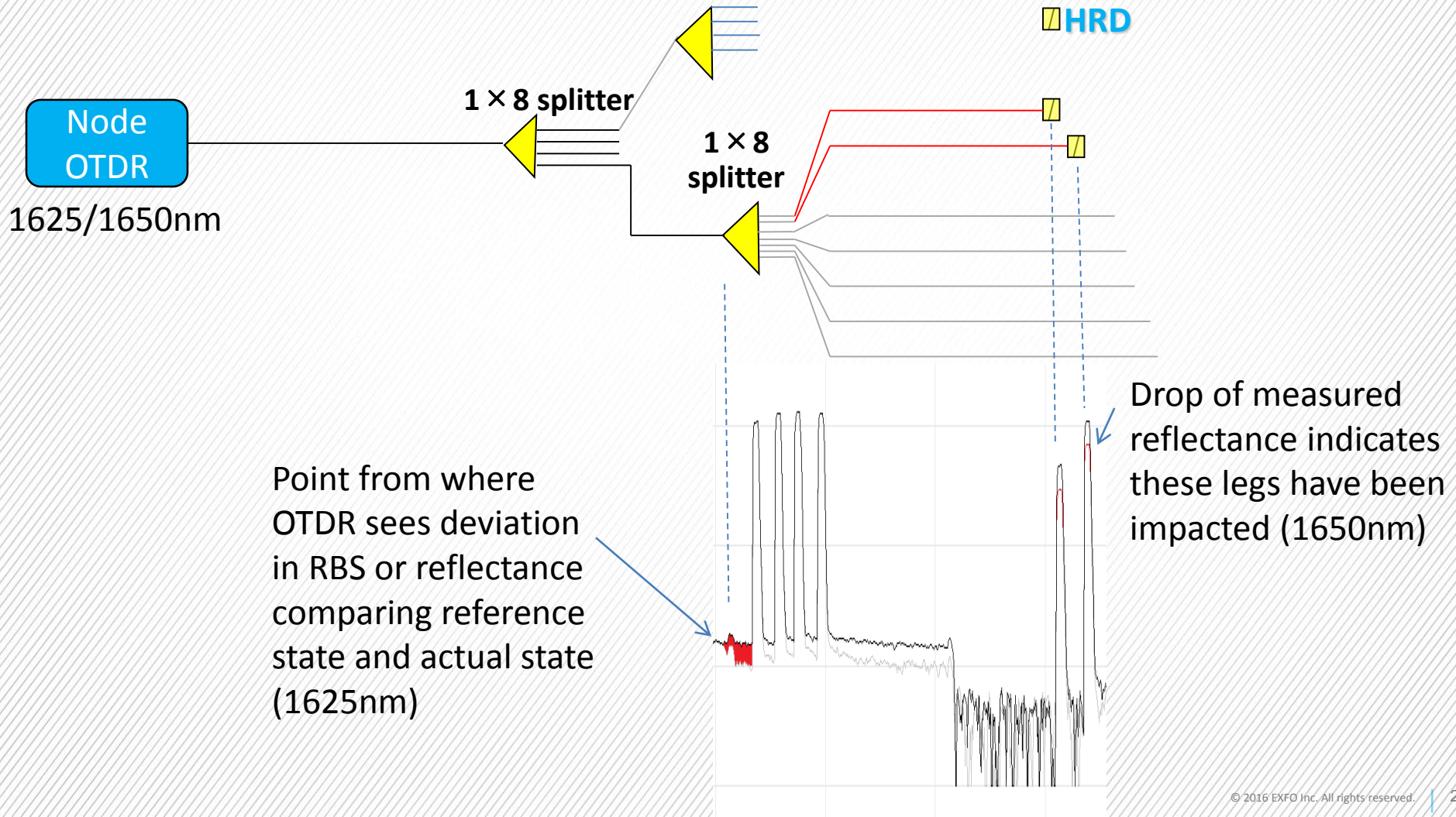
Any level operator can test

On demand and remote

Out-of-band (1650 nm) so that the same solution can be used for in-service testing and monitoring

● Test access point

High-reflectance demarcation (HRD) filter

Demark, isolate, and find fault

One does it all

Node
OTDR

1625/1650nm

1 × 8 splitter

1 × 8 splitter

HRD

Point from where OTDR sees deviation in RBS or reflectance comparing reference state and actual state (1625nm)

Drop of measured reflectance indicates these legs have been impacted (1650nm)

CO-Based OTDR "Monitoring"

NMS

GIS

EMS

TCP/IP

RFTS

RFTS without filters

RFTS with broadband reflective filter

ONT 1 ONT 2 ONT 3

OLT

WDM

Patch Panel

CO

Embedded OTDR

F1

F2

Splitter 1 X 8

Splitter 1 X 4

Splitter 1 X 4

Outside cabinet

MDU Building

ONT

High Reflectance Demarcation (HRD)

Broadband reflectors

Questions ?