End-to-End Network Assessment

Centralized, seamlessly integrated and complete.

MOBILE BACKHAUL

EXFO

gain real-time insight into network and service performance

MIGRATION TO ETHERNET IS INEVITABLE
Are you ready?

With new bandwidth-intensive applications being deployed every day, service providers are increasingly seeking cost-effective, yet reliable IP/Ethernet-centric backhaul solutions to support future bandwidth requirements and subscriber growth, while securing their long-term investments.

As the backhaul network infrastructure evolves to support packet-based transmission, mobile operators face numerous challenges, resulting from the shift from managing network performance to managing service performance. Testing the network with a simple ping is no longer an option: in addition to assessing the network's performance, operators now must constantly validate and measure key performance indicators on a per-service basis.

Mobile service providers therefore need to gain real-time, end-to-end insight into network and service performance. At the same time, they must find new ways to reduce OPEX and CAPEX while increasing revenues, which is why a centralized and scalable service assurance solution becomes essential for delivering best-in-class services and experience to the ever-increasing mass of wireless subscribers.

cost of not migrating:
30 times more
in service charges

FULL SERVICE LIFECYCLE SOLUTION:
Centralized, seamlessly integrated and complete

Automated testing and live service monitoring –
EXFO's backhaul solution directly serves the purpose

Why? Because it seamlessly integrates into the operator's OSS system, delivering the performance and flexibility to remotely carry out both automated testing and live service monitoring throughout the entire network. The operator can therefore collect key performance indicators (KPIs) and continuously assess service quality from the IP/MPLS core all the way through to the base transceiver station.

a unique solution for complete backhaul network testing and monitoring

Accurate testing, 24/7 service assurance

EXFO's centralized test and monitoring offering combines platform-based physical/transport test modules and the Brix System in a 24/7 service assurance solution that is both vendor- and network-neutral. With this solution, operators can not only enhance and optimize the performance of their networks, but also proactively recognize and address a potential disruption before it affects service. The end result: increased customer satisfaction, reduced churn, and slashed test and maintenance expenses.

EXFO's backhaul assessment solution enables network operators to remotely turn up, troubleshoot and validate new services across the entire network, while minimizing truck rolls and resource allocations.

Vikas Arora
CHIEF TECHNOLOGY OFFICER,
EXFO

Integration into any OSS system: seamless
Enjoy the performance and flexibility of a solution comprised of vendor/network-neutral elements.

Real-time testing: on-demand/automated
Whatever the testing mode, get detailed, yet simple reports.

Key performance indicators: configurable
Set up your own KPIs, and continuously measure service quality from the IP/MPLS core all the way through to the base transceiver station.

Network deployment: cost-effective
Deploy next-generation infrastructures more cost-effectively than ever, using a single test and service assurance solution.

OPEX and CAPEX: minimized
Conduct testing and monitoring from a centralized, remote station and minimize on-site human intervention, thus reducing all-around costs.

Customer satisfaction: optimized
Proactively monitor the network and address potential issues before they affect service quality.

MOBILE BACKHAUL ASSESSMENT THROUGHOUT THE NETWORK LIFECYCLE

1 CONSTRUCTION

- Characterize physical connections
- Validate link performance
- Ensure clean connections

2 SERVICE TURN-UP AND BURN-IN

- Perform wire-speed service validation through EtherSAM testing (ITU-T Y.1564) or RFC 2544
- Validate proper service configuration/provisioning (i.e., VLAN and class of service)
- Define a consistent procedure to activate services quickly and efficiently
- Archive test results for reporting and future referencing purposes

3 SERVICE MONITORING

- 24 x 7 measurements of key performance indicators (KPIs) for deployed services
- Metrics gathered via OAM-compliant Ethernet devices (IEEE 802.1ag and Y.1731)
- Alerts/alarms to report service degradations and initiate the service troubleshooting process
- Aggregation and analysis of KPIs for historical and near real-time reports
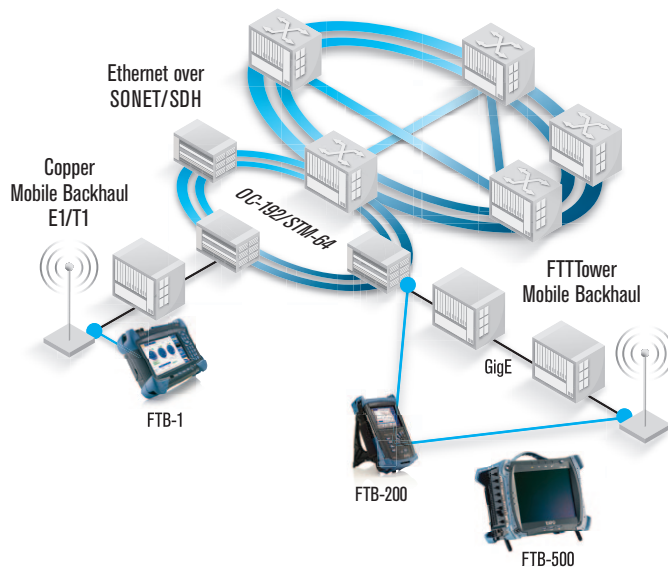
4 SERVICE TROUBLESHOOTING

- Service degradation troubleshooting triggered by performance monitoring system
- Tests from the MSC to the tower, leveraging Ethernet OAM standards to test and interrogate remote devices
- Dispatch technician with portable device to perform additional troubleshooting

1 CONSTRUCTION

Before turning up new services, technicians must characterize the physical link that connects the base transceiver station to the network. In most legacy networks, the physical link is made of copper; in new 3G/4G deployments, fiber is becoming the preferred medium. In either case, EXFO's physical-layer test instruments enable technicians to efficiently and thoroughly characterize the link and ensure it will perform as expected.

Ethernet over SONET/SDH

Copper Mobile Backhaul E1/T1

OC-192/STM-64

FTTTower Mobile Backhaul

GigE

FTB-1

FTB-200

FTB-500

Copper pair characterization
- Locate physical-layer faults
- Qualify the copper local loop

FTTTower characterization
- Bidirectional OTDR testing
- Link loss and return loss measurement
- WDM channel qualification (OSA)
- Connector cleanliness validation

key benefits
physical-layer testing

Minimizing OPEX and CAPEX through…

- Less troubleshooting
- Less truck rolls
- Faster service deployment
- Greater resource efficiency
- One platform housing multiple test modules

Optimizing customer satisfaction thanks to…

- Enhanced network reliability
- Elimination of potential service disruptions

service turn-up

The turn-up phase is when carriers and service providers test and validate the service configuration/provisioning (i.e., VLAN and class of service). This is also where EXFO's test and monitoring solutions come into play, allowing for accurate, efficient assessment of all SLA-related key performance indicators, as well as service quality certification on legacy T1/E1 links/circuits and next-generation IP/Ethernet technologies.

With EXFO's comprehensive testing solution, operators can remotely or locally verify the configuration and performance of backhaul connections with line-rate test traffic by running the new standards-based EtherSAM (Ethernet service activation methodology) tests or RFC 2544 benchmark tests.
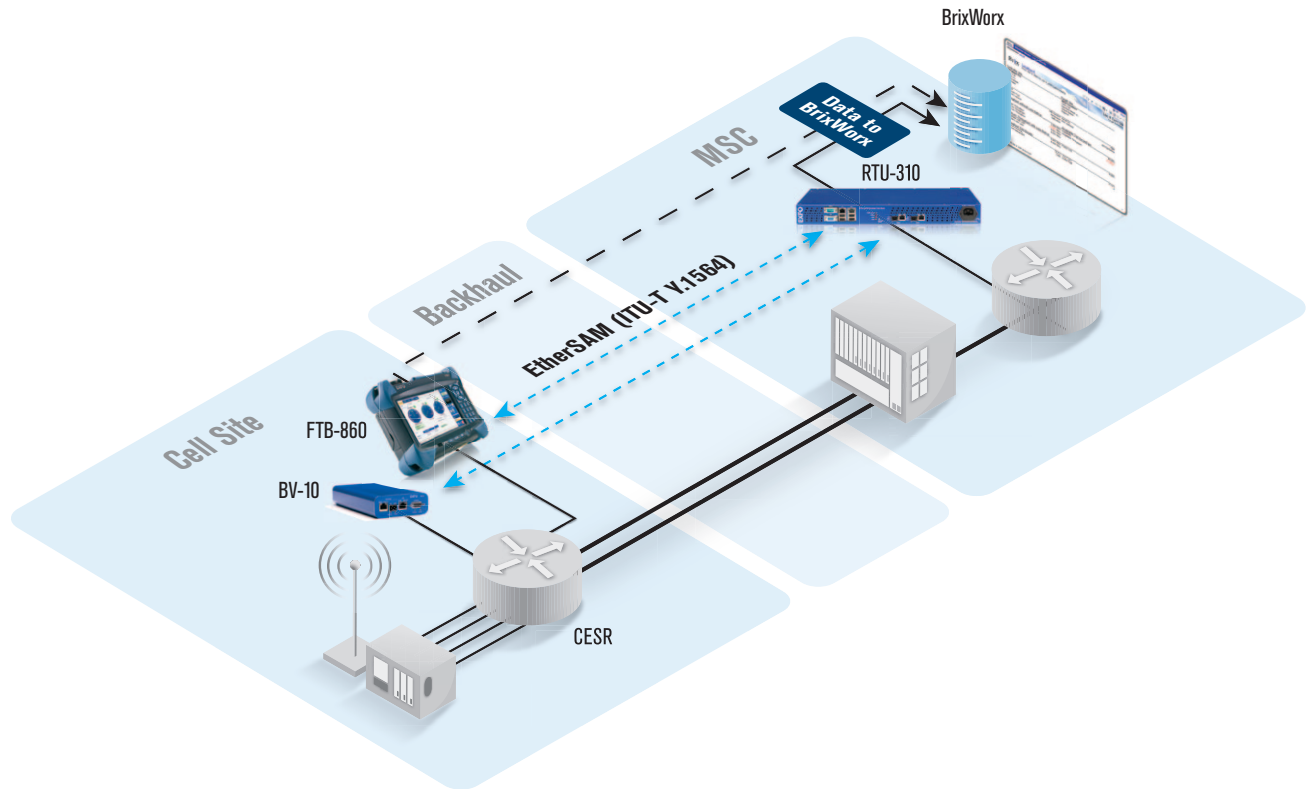
EtherSAM

The new standard in Ethernet service testing

Based on the ITU-T Y.1564 standard

- Complete SLA validation with a single test
- Eight-times-faster deployment
- 100% first-time-right service activation

[**With the possibility to test either from the cell tower or from the NOC to remote handheld test sets or performance endpoints, operators can speed up service deployment while avoiding unnecessary truck rolls.**]

Claudio Mazzuca
DIRECTOR – PRODUCT LINE MANAGEMENT, TRANSPORT AND DATACOM BUSINESS UNIT

BURN-IN

Cell Site · FTB-860 · BV-10 · CESR · Backhaul · EtherSAM (ITU-T Y.1564) · MSC · Data to BrixWorx · RTU-310 · BrixWorx

key benefits

service turn-up and burn-in testing

Minimizing OPEX and CAPEX through…

- Less troubleshooting and truck rolls
- Faster, more reliable service deployment
- Greater resource efficiency
- Consistent, remotely controlled tests
- Leveraging OAM-compliant (802.1ag/Y17.31) demarcation devices

Optimizing customer satisfaction thanks to…

- Proven compliance to service-level agreements
- Enhanced network performance and reliability
- Elimination of potential service disruptions
- Highly cost-effective solution for complete network visibility

service
burn-in

Before mission-critical applications start running, a 24-to-72-hour burn-in testing period is required. The goal: evaluate how the service performs in real-life conditions, and ensure that intermittent anomalies are identified.

In order to validate SLA conformity and network configuration, Brix Verifiers can simultaneously test at hundreds of cell sites, by remotely measuring (at the CESR or performance endpoint) key performance indicators against Ethernet OAM standards (802.1ag/Y.1731).

Test results are stored into BrixWorx for SLA-compliance tracking and reporting, creating key historical service baselining information.
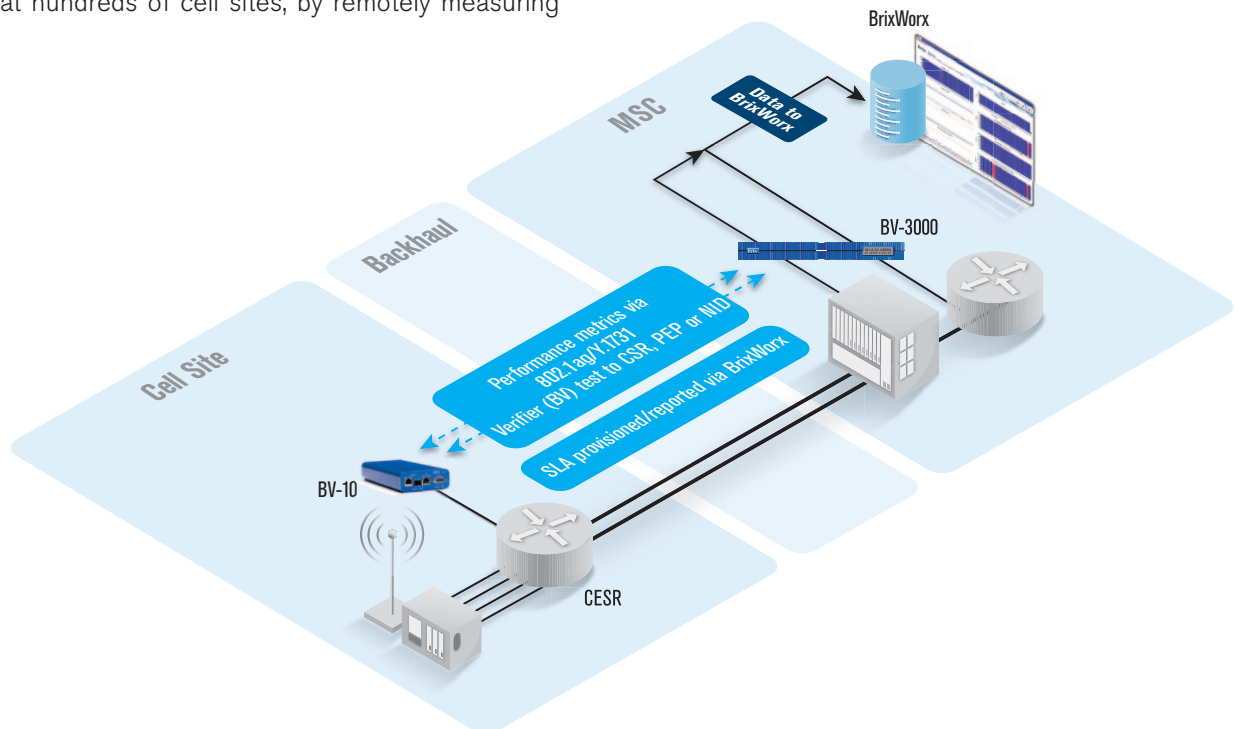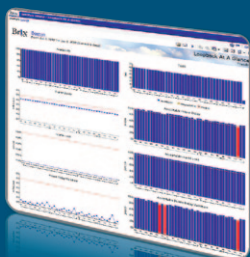
service birth certificate

Turn-up and burn-in test results are combined in a concise performance report—the service birth certificate—that validates if circuits are performing according to SLA parameters. The service birth certificate can also serve as a sign-off with the end user, as well as a baseline for future performance validation and comparisons.

BIRTH CERTIFICATE

TURN-UP RESULTS + **BURN-IN RESULTS** =

3 SERVICE MONITORING

From new service rollouts to 24/7/365 monitoring, the BrixNGN converged service assurance software suite conducts standards-based (802.1ag and Y1731) active testing to collect KPIs and continually measure service performance across all VLANs and all classes of service. Thanks to BrixNGN's multiple reports and comprehensive drill-down capabilities, all levels of users can monitor service quality and performance on a daily basis.

The BrixWorx correlation and analysis software engine

To prevent degradation and ensure optimal quality of service, BrixWorx automatically launches periodic tests from an MSC to all MSC-served cell sites through the CESR and/or performance endpoints. The collected data is stored, and then aggregated and analyzed to generate service-level alarms when thresholds are violated. BrixWorx also allows for quick pinpointing of possible problem causes, enabling operators to efficiently and rapidly address the situation without deploying unnecessary resources to the site.

[
Because EXFO's service assurance solution is highly scalable and vendor-neutral, operators can efficiently test any 802.1ag/Y.1731-compliant unit, without human intervention.
]

Kaynam Hedayat
CTO AND SR. DIRECTOR –
PRODUCT LINE MANAGEMENT,
EXFO SERVICE ASSURANCE
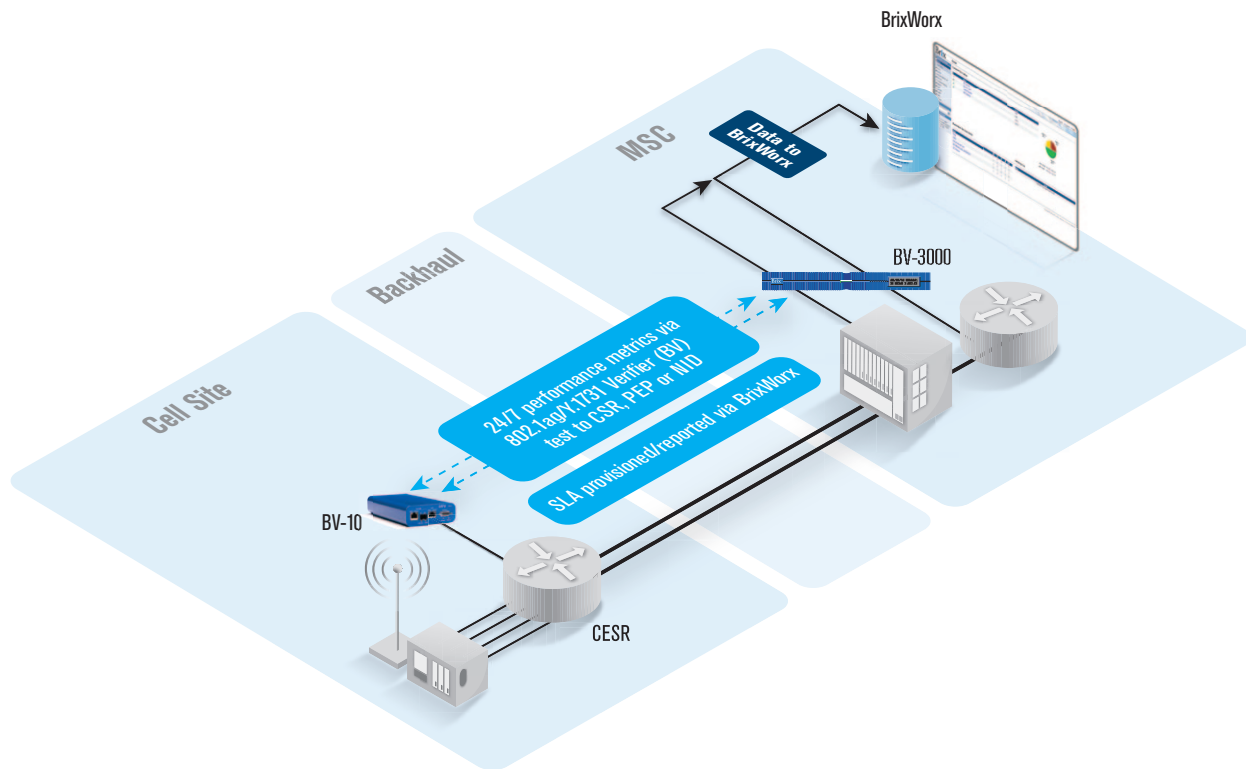
With its open architecture, BrixWorx offers seamless OSS integration via standards-based APIs, enabling operators to deploy heterogeneous networks comprised of standards-based devices without having to incur additional upgrade costs or buy additional test and monitoring instruments.

key benefits

24/7/365
service assurance

Minimizing OPEX and CAPEX through…

- Continuous preventive assessment, enabling small issues to be addressed before they become bigger
- More reliable service and business operations
- Less truck rolls
- One centralized solution
- Leveraging OAM-compliant (802.1ag/Y17.31) demarcation devices

Optimizing customer satisfaction thanks to…

- Proven compliance to service-level agreements
- Enhanced network reliability
- Optimized quality of experience

4 SERVICE

Troubleshooting begins when anomalies are detected during the monitoring phase. Thanks to real-time actionable information, operators can remotely launch performance metrics tests from the verifier to the performance endpoint, improving the mean time to repair (MTTR) by segmenting the network and quickly isolating problems—a proactive approach to service assurance.

For advanced troubleshooting requirements, multistream traffic can be generated at wire speed from the RTU-310 to the performance endpoint or to a handheld tester, ensuring accurate and fast problem resolution.
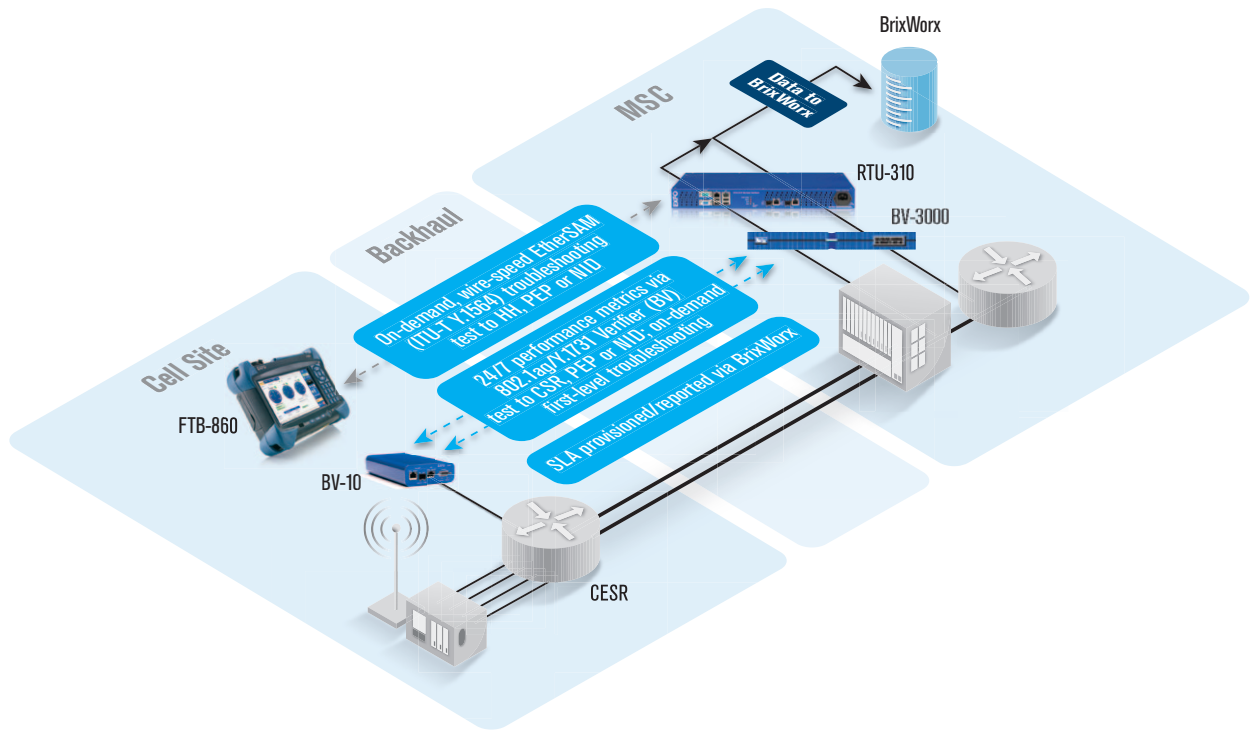
Test results, which provide accurate performance validation, are stored into BrixWorx for future reference.

[
With performance data collecting and fault pinpointing all centralized and integrated in the OSS, operators can sustain network reliability while minimizing truck rolls.
]

Bruno Giguère
MEMBER OF TECHNICAL STAFF,
EXFO

TROUBLESHOOTING

Cell Site

Backhaul

MSC

BrixWorx

Data to BrixWorx

RTU-310

BV-3000

FTB-860

BV-10

CESR

On-demand, wire-speed EtherSAM (ITU-T Y.1564) troubleshooting test to HH, PEP or NID

24/7 performance metrics via 802.1ag/Y.1731 Verifier (BV) test to CSR, PEP or NID; on-demand first-level troubleshooting

SLA provisioned/reported via BrixWorx

key
benefits   service troubleshooting

Minimizing OPEX and CAPEX through…

- Reduced MTTR and service restoration

- Centralized pinpointing of problems,
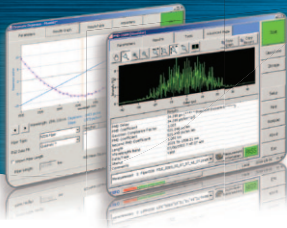 minimizing time in the field and reducing truck rolls

Optimizing customer satisfaction thanks to…

- Minimized downtime

- Enhanced service reliability

- Optimized quality of experience

EXFO'S BACKHAUL TEST AND MONITORING SOLUTION:

At the mobile switching center (MSC)

### Ethernet Performance Monitoring Software
BrixNGN and BrixWorx

- Design for multiplay platform support
- Proven scalability to 1000+ test probes
- On demand or scheduled test routines
- 24/7 performance monitoring
- Compliance with Ethernet OAM standards (802.lag and Y.1731)
- Multivendor support, including NIDs
- Northbound integration with NMS/OSS systems

Performance Endpoint Unit
BV-10

- Complete network visibility for turning up, troubleshooting and monitoring mobile backhaul, carrier Ethernet and PTN networks
- Simple and remote management for zero-truck-roll network maintenance
- Completely standards-based, supporting Ethernet OAM, with 802.1ag and Y.1731 message response as a performance endpoint, as well as TWAMP (RFC 5357)
- Full-line-rate loopback from layer 2 up to layer 4, with rates of 10/100/1000 Mbit/s

Gigabit Ethernet Service Assurance Probe
Brix 3000 Verifier
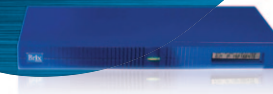
- Active probe for carrier Ethernet and IP/MPLS networks
- Optical or copper GigE interface
- Patented HW timestamp technology
- Support for NTP, CDMA and GPS timing modules
- Lights-out management with autodiscovery
- NEBS-certified

IP Services Test Head
RTU-310

EtherSAM

- Complete EtherSAM™ (ITU-T Y.1564) test suite
- Full wire-speed RFC 2544 support for all rates
- Bidirectional test results
- Multistream QoS testing and advanced analysis
- Stand-alone or centralized BrixNGN support
- 10 GigE version available
- NEBS-certified

KEY PRODUCTS

Handheld OTDR
AXS-110

- Singlemode, multimode or all-fiber models

- Event dead zone as low as 0.8 m, for easy location and characterization of all events

- Multiple options, including power meter, visual fault locator (VFL), fiber inspection probe, printer and IP testing

- Fault Finder mode, for quick identification/location of fiber breaks

- Smart software option providing pass/fail status at all wavelengths, as well as span loss, ORL, fiber length and macrobend locations in a single window

Handheld DS1/DS3/ Ethernet Tester
AXS-200/855

- Industry's first all-in-one handheld solution for dual T1, DS3, and Ethernet testing—no need for module swapping

- Fully featured DS1/DS3 tester supporting comprehensive BERT and ITU-T G.821/G.826/M.2100 measurements

- Full interworking with existing DS1/DS3 test install plants; optional ISDN PRI

Ethernet Testers
FTB-860 NetBlazer Series

- Comprehensive, yet simple test suites to quickly and easily turn up, validate and troubleshoot Ethernet services, with full EtherSAM capabilities, from 10 Mbit/s to 10 Gbit/s

- Accelerate Ethernet service activation with bidirectional EtherSAM (Y.1564) and RFC 2544 test suites, multistream traffic generation, Through mode and bit-error-rate (BER) testing

- Unprecedented configuration simplicity with hybrid touchscreen/ keypad navigation and data entry

- Simplify reporting with integrated Wi-Fi and Bluetooth connectivity capabilities

Compact Multiservice Field Platform
FTB-200

EtherSAM

- SONET/SDH testing from DS1 to OC-192; Ethernet testing from 10 Mbit/s to 10 Gbit/s

- Houses OLTS, OTDR (SM and MM), CD/PMD and OSA test modules

- Options include fiber inspection probe (FIP), power meter, and visual fault locator (VFL)

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EXFO's
backhaul test
and monitoring
solution

THE MOST ADVANCED AND SCALABLE IN THE INDUSTRY

- **Complete assessment** from turn-up through to operational monitoring and troubleshooting

- Full EtherSAM™ (ITU-T Y.1564) and RFC 2544 testing, with asymmetrical test results ensuring accurate provisioning and enabling **complete SLA validation with a single test, for fast optimization of the quality of service**

- Most scalable service burn-in test solution with **simultaneous tests at hundreds of cell sites**, for faster turn-up

- **Advanced data analysis and correlation** of turn-up and burn-in tests to baseline service and streamline troubleshooting operations

- **Most scalable 24/7 operational monitoring solution** with simultaneous testing at thousands of cell sites

- **Full compliance with Ethernet OAM standards** (802.1ag, and Y.1731) for interoperability with install base

- **Truly vendor-neutral solution**

- BrixWorx APIs allow **seamless data integration** (for SLA validation) and **integration with existing and future OSS**

A NEW GLOBAL FORCE
in Wireless Testing and Service Assurance

EXFO has acquired NetHawk, a leader in protocol analysis
and network simulation for 3G and LTE/4G networks.

Contact us for brand new, refurbished and used EXFO Equipment

EXFO