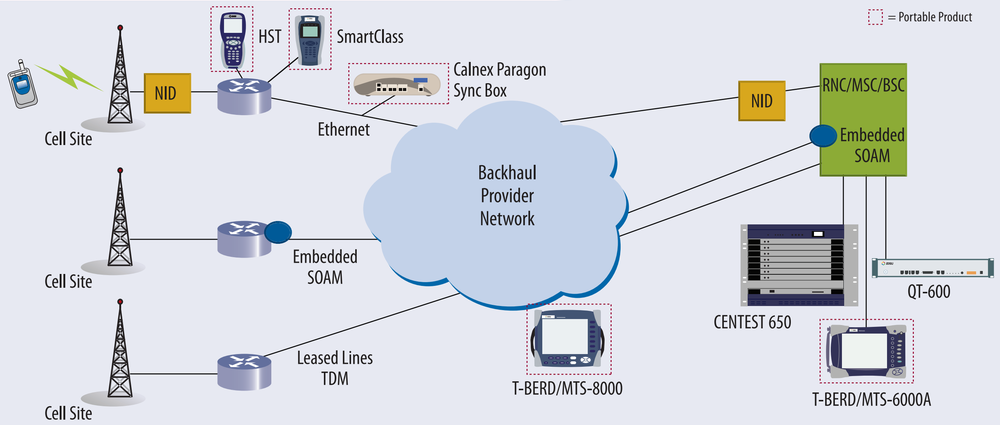
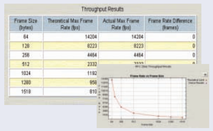
Assuring Mobile Backhaul Evolution from TDM to Ethernet

Mobile Backhaul Reference Architecture



End-to-End Service Life Cycle Management

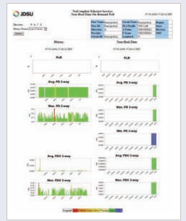
Service Turn-up Acceptance



RFC-2544 Throughput Results
- Circuit provisioning verification and burn-in
- RFC-2544 intrusive testing

System NetAnalyst, QT-600, Centest 650
Portables T-BERD/MTS-8000, T-BERD/MTS-6000A, SmartClass, HST-3000

Test and Troubleshooting



Near Real-Time Tool
- Fault Isolation via sectionalization, connectivity testing and monitoring

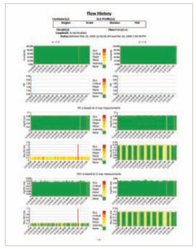
System NetAnalyst, QT-600, Centest 650, NetOptimize
Portables T-BERD/MTS-8000, T-BERD/MTS-6000A, SmartClass, HST-3000

Service Performance Monitoring

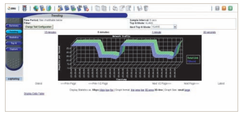
Service/Network Performance Monitoring and SLA Conformance Reporting
- Active Traffic Monitoring (802.1ag/Y.1731)
- Network Element PM statistics
- Correlation of network and service PM to identify poor or degrading service
- SLA management across a diversity of providers

System NetOptimize & EtherNID

Service Assurance



NetOptimize™ Performance Management
OSS that provides data collection, processing, analysis, and reporting to support performance management and capacity planning.



NetAnalyst™ Test and Troubleshooting
Client/server test management OSS software that controls remote test probes/units to test the entire network. Enables test automation and provides a secure, managed platform for centralized testing of private line, xDSL and Ethernet business class and backhaul services.

SmartClass ADSL/E1 and Ethernet Testers
SmartClass handheld test tools that combine intelligence, power, and portability required to deliver triple-play services. Economical, yet easy-to-use handheld point solutions suitable for tier-1 field technicians.

QT-600 Ethernet Probe
The JDSU QT-600 is a carrier-grade, scalable, Ethernet probe that delivers the test and troubleshooting capabilities required to deploy Ethernet with confidence. An integral component of the JDSU NetComplete® Service Assurance Solution, it reduces operations costs with its streamlined service turn-up process and rapid segmentation abilities that quickly identify the source of the problem. The QT-600 validates Ethernet services are turned up according to service level agreements (SLAs) optimizing long-term burn-in testing from a centralized location; trouble-shoots and sectionalizes issues with Ethernet services using ping, trace route, RFC2544, and 802.1ag standard testing and monitors network traffic, performs top N analysis, captures traffic, and applies filters/triggers to drill down into data and troubleshoot problems.

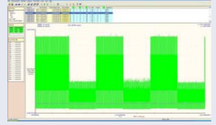
HST-3000
Lightweight, rugged, and battery-operated, the HST-3000 cost-effectively scales to provide an all-in-one solution for field installation, maintenance, and troubleshooting of VoIP, IPTV and Web applications over metro and access networks including IPTV, xDSL, copper, T1/E1, fiber, and Ethernet.

CENTEST 650
Centralized test system providing multiple simultaneous tests from a single equipment shelf for DS3, DS1, and DS0 service rates.

EtherNID™ Ethernet Demarcation Device
The EtherNID demarcation unit provides end-to-end OAM that enables assured high performance SLAs backed by in-service RFC-2544 and intelligent loopback testing.

T-BERD®/MTS-6000A and -8000 Optical Test Platform
The T-BERD/MTS optical platforms are central office and field-scalable for both installation and maintenance, and are the industry's most innovative and cost-effective test solutions for netro networks. A single transport module provides an integrated solution for Ethernet, SONET, SDH, PDH, and T-carrier networks. Optical modules allow thorough testing of short-haul, long-haul, FTTx, CWDM, and DWDM networks up to 10G.

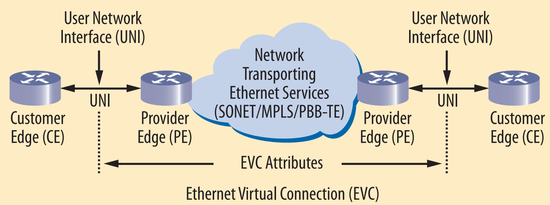
Lab and Deployment

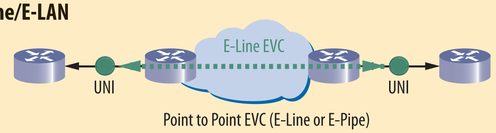


Paragon Sync and Packet Delay Variation Profile
The Paragon Sync enables users to prove the performance of Sync over Packet systems for deployment in the real world including SyncE, CES, Pseudowire, 1588v2 (PTP) and NTP. It generates Packet Delay Variation (PDV) profiles and tests that the Sync can be recovered under real network conditions. These profiles can be captured from real networks or can be from the standards (e.g. G.8261)

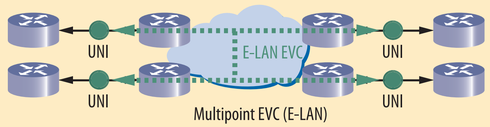
Technology

Ethernet Services: UNI/EVC, E-Line/E-LAN

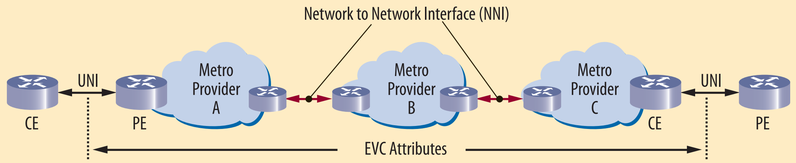


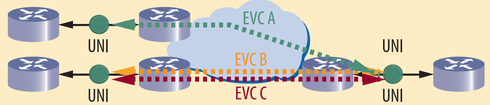


Typical for circuit emulation or other high QoS services



Typical for enterprise office connectivity





Typical for mobile backhaul or branch office/head office services

Standards & Specifications

Standards	Title	Key Elements
RFC-2544	Benchmarking Methodology for Network Interconnect Devices	Intrusive measure of throughput, latency, frame loss, back to back
IEEE 802.3ah	Link Level OAM - "Ethernet in the First Mile "	Dying gasp
IEEE 802.1ag	Connectivity Fault Management	Continuity Check Messages, Link Trace Message/Reply, Loop back Messages
IEEE 1588v2	Precision Timing Protocol (PTP)	Precise synchronization of clocks in measurement a network
ITU-T G.8261	Timing and Synchronization Aspects in Packet Networks	Network limits of jitter and wander
ITU Y.1731	OAM functions and mechanisms for Ethernet based networks	Frame Delay , Frame Delay Variation, Frame Loss Rate

MEF Technical Specifications			
MEF 2	Requirements and Framework for Ethernet Service Protection	MEF 15	Requirements for Management of Metro Ethernet Phase 1 Network Elements
MEF 3	Circuit Emulation Service Definitions, Framework and Requirements in Metro Ethernet Networks	MEF 16	Ethernet Local Management Interface
MEF 4	Metro Ethernet Network Architecture Framework Part 1: Generic Framework	MEF 17	Service OAM Framework and Requirements
MEF 6.1	Metro Ethernet Services Definitions Phase 2	MEF 18	Abstract Test Suite for Circuit Emulation Services
MEF 7	EMS-NMS Information Model	MEF 19	Abstract Test Suite for UNI Type 1
MEF 8	Implementation Agreement for the Emulation of PDH Circuits over Metro Ethernet Networks	MEF 20	UNI Type 2 Implementation Agreement
MEF 9	Abstract Test Suite for Ethernet Services at the UNI	MEF 21	Abstract Test Suite for UNI Type 2 Part 1 Link OAM
MEF 10.2	MEF 10.2 Ethernet Services Attributes Phase 2	MEF 22	Mobile Backhaul Implementation Agreement
MEF 11	User Network Interface (UNI) Requirements and Framework	MEF 23	Class of Service Phase 1 Implementation Agreement
MEF 12	Metro Ethernet Network Architecture Framework Part 2: Ethernet Services Layer	MEF 24	Abstract Test Suite for UNI Type 2 Part 2 E-LMI
MEF 13	User Network Interface (UNI) Type 1 Implementation Agreement	MEF 25	Abstract Test Suite for UNI Type 2 Part 3 Service OAM
MEF 14	Abstract Test Suite for Traffic Management Phase 1		

Note: MEF 1 and MEF 5 were superseded by MEF 10. MEF 6.1 supersedes MEF 6. MEF 10.2 supercedes MEF 10.1.1 MEF 10.1.1 supercedes MEF 10.1 MEF 10.1 Supersedes MEF 10.

To learn more, visit www.jdsu.com/test

Note: Specifications, terms, and conditions are subject to change without notice.
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