

# Spirent TestCenter™

## MPLS-TP Base Package

The MPLS-TP Base Package enables Network Equipment Manufacturers, Service Providers and large Enterprises to quickly evaluate and troubleshoot MPLS-TP functionality. The package provides support for testing connection setup, forwarding, OAM, and protection switching capabilities of MPLS-TP enabled LSRs as specified by the MPLS-TP IETF drafts and RFCs. By combining MPLS-TP, Carrier Ethernet, 1588v2 and Synchronous Ethernet packages, the Spirent TestCenter system provides the industry's most complete solution for testing converged mobile backhaul networks and devices.

### Applications

- MPLS-TP and PWE3 compliance, performance, and interoperability testing for mobile backhaul and seamless MPLS applications
- Spirent TestCenter supports configuration of both static and control-plane signaled MPLS-TP connections. This capability enables testing of MPLS-TP nodes operating in both non-IP (static, element-management driven) and IP/MPLS environments
- The MPLS-TP Base package supports both single and multisegment MPLS-TP topologies—enabling intra and inter AS provider testing and interoperability testing of both MPLS-TP and IP/MPLS domains
  - Emulate thousands of x2 connections of an LTE backhaul on one Spirent TestCenter port using multi-segment pseudowires
- Emulate thousands of P2P MPLS-TP connections between cell site routers and Provider Edge routers in a 2G/3G backhaul
- Emulate MPLS pseudowires to test Seamless MPLS procedures between IP DSLAMs and Provider Edge routers in a residential backhaul
- Test the TDM-like OAM capabilities of your MPLS-TP domain by using a number of OAM tools. Spirent TestCenter™ supports both BFD/LSP Ping and Y:1731-based OAM procedures for testing LSRs and switches
  - Using the optional Spirent Anue 3500 network emulator, generate inline signal fail or signal degrade conditions for OAM failure testing
- Test the TDM-like redundancy capabilities of your MPLS-TP domain
  - Using the pseudowire redundancy features of Spirent TestCenter, trigger pseudowire failures and test the switchover of user-plane traffic to a backup pseudowire in your DUT
  - Using redundancy testing capabilities of Spirent TestCenter, trigger failures and test the switchover of user plane traffic from primary to backup LSPs or pseudowires in your DUT
  - Measure the switchover time for user traffic from primary to backup LSPs or pseudowires after occurrence of failure conditions
- MPLS-TP Base Package is an integrated component of Spirent TestCenter. It can be combined with Unicast Routing, MPLS Technologies, Access, Timing, and Carrier Ethernet Base packages to enable end-to-end testing of real-world networks
  - Use topology emulation capabilities of Spirent TestCenter to provide control-plane over MPLS emulation with stateful or stateless data-plane traffic
  - The protocols that can be tested over MPLS include DHCP, IGMP/MLD, HTTP, FTP, and SIP data-plane traffic
  - Test the DUT's ability to provide QoS to user data carried by MPLS-TP pseudowires, in adherence to SLAs.

## Features & benefits

### Provisioning MPLS-TP

- Spirent TestCenter allows creation of static MPLS-TP connections. Creating a static MPLS-TP connection on an emulated PE involves configuration of incoming and outgoing labels, a destination MAC address, and LSP/PW Source & Destination IDs
  - This capability allows testing of MPLS-TP transport nodes that are not capable of IP/MPLS control plane signaling
  - An easy-to-use MPLS-TP wizard drastically reduces chances of user-error when creating 1000s of MPLS-TP connections and makes the provisioning tasks less tedious
- Spirent Test Center also allows creation of bi-directional LSPs & PWs using GMPLS & LDP (RFC 4447) signaling procedures
  - Enables testing of MPLS-TP nodes in an IP/MPLS domain

### MPLS-TP OAM procedures

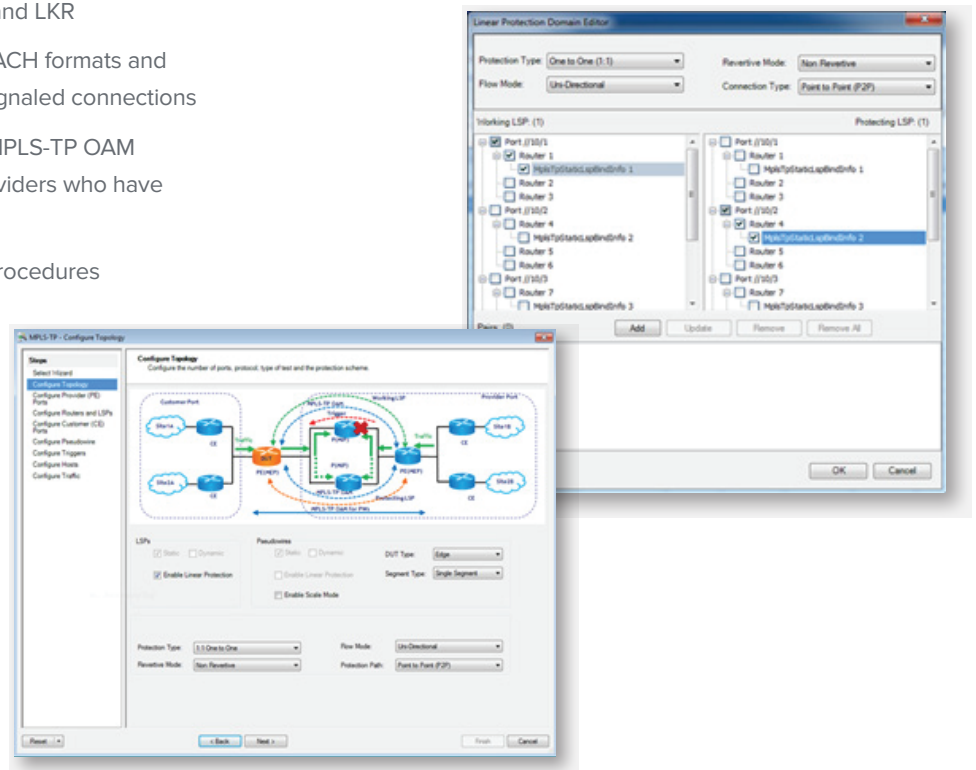
- Supports BFD OAM procedures on static and control plane signaled MPLS-TP connections, enabling vendors and service providers who have deployed BFD based OAM on their DUTs
  - BFD CC & CV messages encapsulated in UDP/IP, PW-ACH or GAL/GACH formats
  - Support for BFD over VCCV (FEC 128 & FEC 129 LDP signaling mode)
  - Support for Fault OAM such as AIS, RDI, LDI and LKR
  - Extended LSP Ping and Traceroute in GAL/GACH formats and supported on both static and control plane signaled connections
- Supports Y.1731 Ethernet OAM procedures on MPLS-TP OAM connections, enabling vendors and service providers who have deployed Y.1731 based OAM on their DUTs
  - Test CC, AIS, LCK, LM, DM (2 way) and CSF procedures

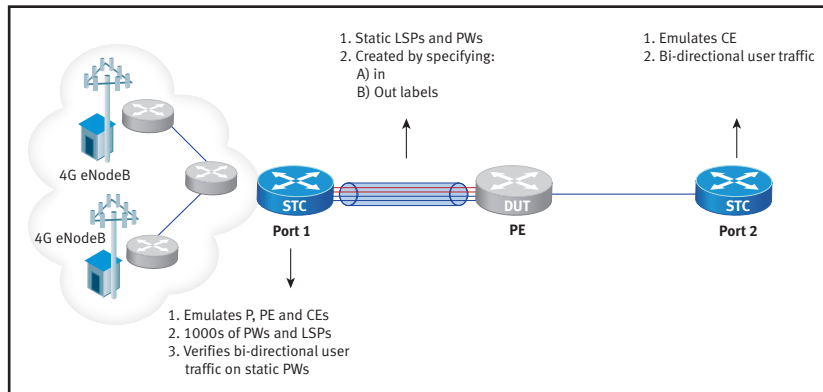
### MPLS-TP Linear Protection

- Spirent TestCenter allows creation of thousands of primary and backup LSPs on a) one STC port or b) across multiple STC ports (multi-homing scenarios)
  - Primary and backup LSPs can be easily created using MPLSTP wizard
  - BFD OAM can be enabled on the primary and backup LSPs
  - Failure switchover is triggered by injecting AIS from STC toward the DUT or by stopping BFD on the STC
  - Users can easily compute the time needed by the DUT to switch user traffic to backup LSP after failure is injected

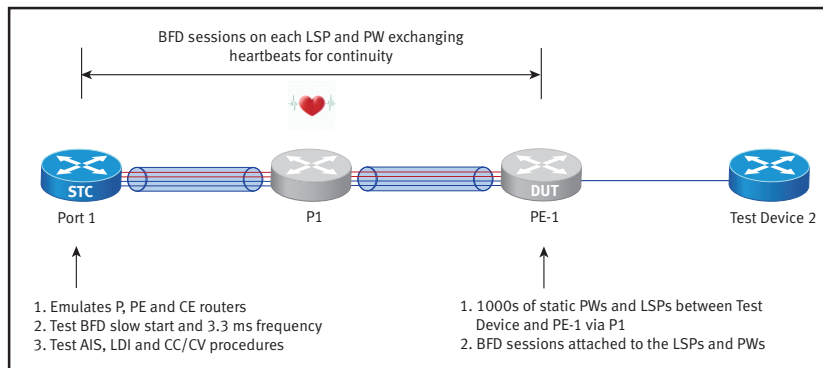
### Seamless MPLS and pseudowire redundancy

- Spirent TestCenter supports Seamless MPLS procedures, enabling vendors and Service Providers to extend MPLS all the way to access nodes and IP DSLAMs
  - Supports LDP Downstream on Demand procedures
  - Allows provisioning of 1000s of primary and backup pseudowires to test redundancy procedures
  - Injects failures on primary pseudowire and validates the DUT's ability to switchover traffic to backup pseudowire upon failure detection

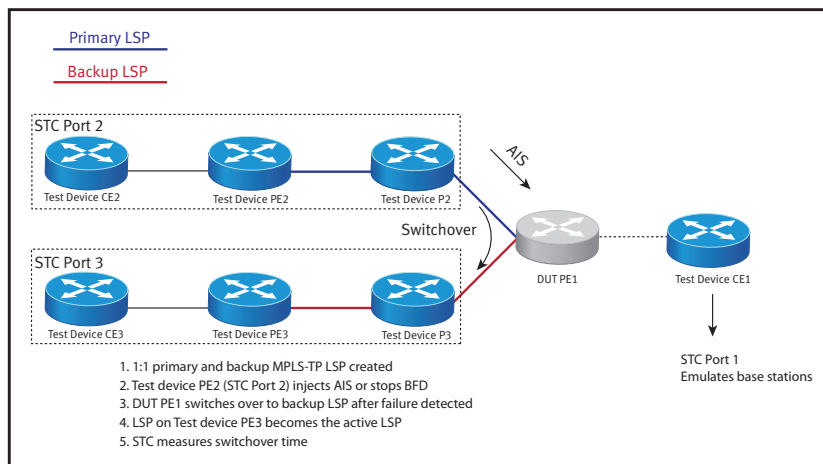




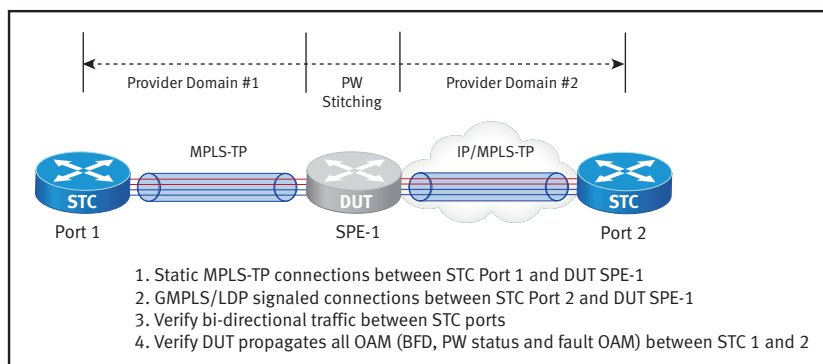
Testing static MPLS-TP connections



Testing BDF OAM on MPLS-TP



Testing Linear Protection on MPLS-TP



Testing MPLS-TP and IP/MPLS interoperability

## Spirent Services

Spirent Global Services provides a variety of professional services, support services and education services—all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services website at [www.spirent.com](http://www.spirent.com) or contact your Spirent sales representative.

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### Technical specifications

#### MPLS-TP static connections configuration

- Connection type (LSP or PW)
- Source and destination global ID
- PW source & destination node ID
- LSP source & destination node ID
- PW source and destination attachment circuit ID
- LSP source and destination tunnel number
- Incoming label
- Outgoing label
- PW VCCV configuration
- LSP ID
- Enable control word
- Fault OAM configuration

#### MPLS-TP BFD configuration

- Enable BFD
- Enable GAL/GACH encapsulation
- Encapsulation (Raw or UDP)
- CC/CV
- TLVs for CV message
- BFD My Discriminator

#### MPLS-TP Y.1731 configuration

- Y.1731 ME level
- Y.1731 ICC formatted string
- MEP ID
- Initial TST sequence number
- Y.1731 AIS, CC, LCK and CSF period
- Y.1731 static incoming and outgoing label
- Enable DM/LM/LB response
- DMM/DMR delay
- LB/LM/DM priority
- CC/AIS/LCK/CSF priority
- Support for configurable MPLS TTL and EXP bits on inner and outer labels

#### MPLS-TP Control plane configuration (LDP/RSVP/GMPLS)

- Similar to IP/MPLS

#### MPLS-TP results (LDP/RSVP/BFD/GMPLS)

- Similar to IP/MPLS

#### MPLS-TP results (LSP/Y.1731 OAM)

- TX AIS/LDI/LKR count
- RX AIS/LDI/LKR count
- TX AIS/LDI/LKR timestamp
- RX AIS/LDI/LKR timestamp
- Latest TX/RX fault type
- CC TX/RX state
- MEPs
- Unexpected MEG IDs/ME Levels/Timeouts
- Bad CC RX count
- Dropped Packet count

### Ordering information

Description	Part number
MPLS-TP Test Package B	BPK-1160B
MPLS-TP Performance Monitoring Base Package	BPK-1192A
MPLS-TP Protection Switching Base Package	BPK-1191A

#### Associated MBH packages

Synchronous Ethernet Base Package	BPK-1180A
IEEE-1588v2 Timing and Synchronization Base Package	BPK-1155A
802.1AG/Y.1731 EOAM Fault Management Base Package A/B	BPK-1059A/B
Y.1731 EOAM Performance Monitoring Base Package A	BPK-1150A
Unicast Routing Base Package A/B	BPK-1004A/B
MPLS/LDP/RSVP-TE Base Package A/B	BPK-1006A/B