

Spirent TestCenter™

Segment Routing Emulation

Features

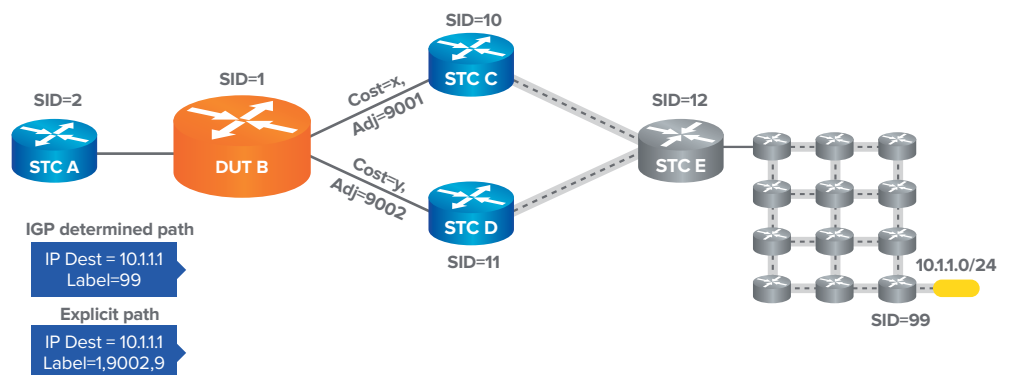
- Support for interactive commands to age or advertise segment routing information
- Easy automation for complex test scenarios using interactive Segment Routing commands available in Command Sequencer
- Support for auto generating segment routing objects and TLVs in the IGP protocol wizards
- Support for OSPF, ISIS, and BGP extensions for Segment Routing
- Data plane traffic binding with segment routing control plane
- Support for 1G, 2.5G, 5G, 10G, 25G, 40G, 50G and 100G interfaces
- Wireshark dissector support for Segment Routing objects and TLVs
- Support for LAN Adj SID
- ISIS Mapping server TLV
- Support for SR with 20 Label stack with SR MPLS table
- SR support for L2VPN (VPLS, VPWS(martini) and L3VPN (6PE/6VPE) wizards
- ISIS SR for IPv6 – TE for IPv6 and Traffic binding for IPv6

Segment Routing is based on source routing. The key motivation behind segment routing is to reduce the complexity that exists in today's network nodes due to MPLS control plane. Segment Routing obviates the need for MPLS control plane by using IGP protocols such as OSPF, ISIS, and BGP to distribute the forwarding labels or segment IDs. As a result only the ingress node needs to maintain the state for the traffic flows but the MPLS forwarding plane can be re-used for forwarding traffic using segment routing labels.

Since the forwarding state of the traffic flow is in the segment routing header of the packet, it paves the way for network programmability or SDN functionality with less disruptive changes to the existing network. Policies may be defined administratively at the ingress node or dynamically using a centralized SDN controller.

Spirent's Segment Routing Emulation provides the ability to emulate Segment Routing and enables functional, scalability, performance and interoperability testing of the Segment Routing protocol. The solution supports OSPF, ISIS, and BGP extensions for Segment Routing that enables the user to build IGP topology and test traffic forwarding using Segment Routing labels.

Segment Routing is an evolutionary approach towards SDN and reducing complexity in the existing network nodes, in addition to testing the scalability, functionality, performance of the protocol implementation, it is important to verify the interoperation between SR and non-SR capable network nodes.



Segment routing: IGP topology

Applications

- Service Providers and Enterprises can test their Segment Routing implementations and help them transition to the new paradigm of Software-Defined Networking (SDN)
- Verify control plane topology setup using Segment Routing
- Test Load balancing using anycast segments and ECMP
- Test traffic isolation for VPN over Segment Routing
- Verify interworking of SR and non-SR capable devices
- Scalability testing for maximum number of segments per node and benchmarking number of VRFs, PEs for VPN over SR test scenarios
- Verify fast re-route using LFA (Loop Free Alternate)
- Measure convergence and reversion time on node or link failure

Requirements

Minimum PC, UNIX, or Linux requirements by system size

- For Small Port System (2-25 ports) Minimum Requirement—2.4 GHz Intel™ Pentium 4 processor (or equivalent), 512 MB RAM and 10 GB of free disk space Recommended System – Intel Core™ 2 Duo E6300 processor (or equivalent), 2 GB of free RAM, and 10 GB of free disk space
- For Medium Port System (26-75 ports) Minimum Requirement—3 GHz Intel Pentium 4 processor (or equivalent), 2 GB of free RAM, 15 GB of free disk space Recommended System—Intel Core 2 Duo E6400 processor (or equivalent), 4GB free RAM, 100 GB of free disk space
- For Large System (76 ports and above) Minimum Requirement—Intel Core 2 Duo E6400 processor (or equivalent), 3 GB free RAM, 100 GB free space on hard drive Recommended System—Intel Core 2 Duo E6600 processor (or equivalent), 4 GB of RAM, 100 GB of free disk space

Spirent TestCenter hardware requirements

- Pentium® or greater PC running Windows® XP Professional SP2 with mouse/color monitor required for GUI operation (See Minimum PC Requirements section)
- One Ethernet cable and one 10/100/1000 Mbps Ethernet card installed in the PC, a SPT-N4U Chassis and Controller, SPT-N11U Chassis and Controller
- Operating system languages supported: English, French, German, Italian, Japanese, Korean and Chinese (traditional and simplified)
- Operating systems supported: Windows XP SP2, Windows 2003 Server (32 bit), RedHat EL3 and EL5, Solaris 8.0 and 10.0
- At least one installed Spirent TestCenter CM, FX, MX, FX-2, MX-2, STC Virtual or STC Anywhere

Spirent TestCenter software requirements

- BPK-1001A, Packet Generator and Analyzer Base Package

May Require additional packages

- BPK-1004A/B Unicast Routing
- BPK-1006A/B MPLS base package

Technical specifications

Segment Routing Parameters *OSPF parameters for Segment Routing*

Opaque/SR Router Info LSA

- Algorithm TLV
- SID label range TLV – Label base and label range

Opaque/SR ext prefix LSA

- Prefix SID TLV flags
- Prefix SID multi-topology ID
- Prefix SID range size
- Prefix SID label index

Opaque/SR ext link LSA

- Link attribute – Link type, Link ID, Link data
- Link LSA flags
- Multi-topology ID
- SID label

ISIS parameters for Segment Routing

Capability TLV

- Flags – IPv4/IPv6
- SID label base
- SID label range
- Reachability algorithm

Prefix SID TLV

- Prefix SID flags
- Prefix SID label index
- Prefix SID algorithm
- SID label binding TLV
- ERO object
- SID label

Adj-SID TLV

- Adj-TLV flags
- SID label

Segment Routing Results

OSPF Segment Routing results

- Tx Opaque/SR router info LSA count
- Rx Opaque/SR router info LSA count
- Tx Opaque/SR extended prefix LSA count
- Rx Opaque/SR extended prefix LSA count
- Tx Opaque/SR extended link LSA count
- Rx Opaque/SR extended link LSA count

Supported Standards/ Specifications

- ISIS Segment Routing Extensions
<http://tools.ietf.org/html/draft-ietf-isis-segment-routing-extensions-03>
- OSPF Segment Routing Extensions
<http://tools.ietf.org/html/draft-psenak-ospf-segment-routing-extensions-05>
- ISIS IPv6 TE RFC 6119
<https://tools.ietf.org/html/rfc6119>

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 or contact your Spirent sales representative.

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Technical specifications

Ordering information	OSPFv2 Segment Routing Emulation Base Package	BPK-1317A
	ISIS Segment Routing Emulation Base Package	BPK-1318A
	BGP Segment Routing Emulation Base Package	BPK-1329A
	Segment Routing (BGP, OSPF and ISIS) Emulation Package	SPK-1131A
	Virtual OSPFv2 Segment Routing Emulation Base Package	v-BPK-1317A
	Virtual ISIS Segment Routing Emulation Base Package	v-BPK-1318A
	Virtual BGP Segment Routing Emulation Base Package	v-BPK-1329A
	Virtual Segment Routing (BGP, OSPF and ISIS) Emulation Package	v-SPK-1131A
	Related	BGP Flow Spec
BGP Flow Spec IPv6		BPK-1335
BGP Link State		BPK-1321
EVPN Emulation		BPK-1311A
FCoE/DCBX Emulation		BPK-1081A
LISP Emulation		BPK-1181A
OpenFlow Compliance Test Suite		VCS-KIT-01-1Y
OpenFlow Controller Emulation		BPK-1193A
OpenFlow Switch Emulation		BPK-1195A
PCE-P Client Emulation		BPK-1316
PCE-P Controller Emulation		BPK-1315
SPB Emulation		BPK-1182A
TRILL Emulation		BPK-1187A
VXLAN Emulation		BPK-1310A