TestCenter

BGP-LS Test Solution

The BGP-LS test solution provides the ability to emulate BGP-LS protocol and enables functional, scalability, performance and interoperability testing of BGP-LS implementation. BGP-LS is the only test solution in the industry for testing BGP-LS. The BGP-LS test solution in combination with PCEP and segment routing test solutions allows testing complex user scenarios and provide the capability to create comprehensive test scenarios for SP-SDN domain.

BGP-LS becomes important when LSP paths cross multiple routing domains or when IGP routing information is required by external entities such as ALTO or PCE servers for optimized path computation. In both these scenarios IGP protocols are unsuitable for distributing the routing information (including traffic engineering information) appropriately. Recent adoption of SP-SDN protocols has fueled the BGP-LS deployment and hence the need to test scalability and performance of BGP-LS in scenarios where BGP-LS implementations interoperate or co-exist with other SP-SDN protocols such as PCEP and segment routing.

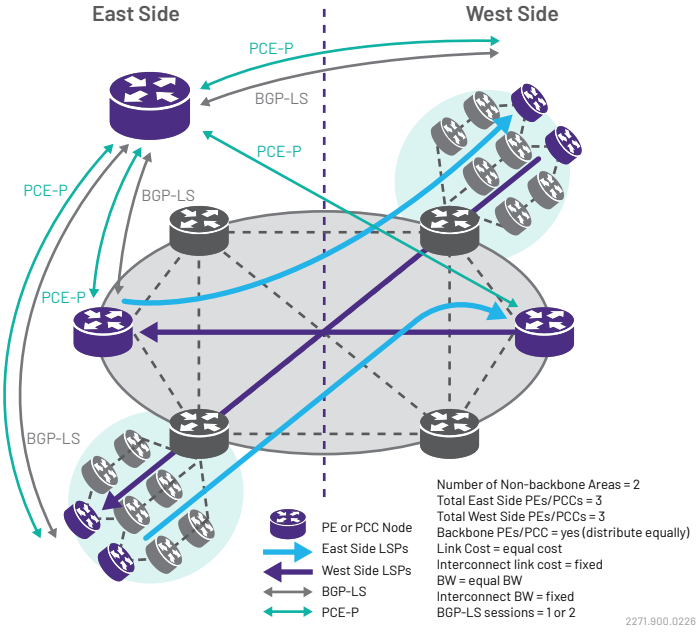


Figure 1: Multi-area BGP-LS Test Topology

IGP is great for link state distribution within a routing domain or an autonomous system but for link state distribution across routing domains or to an external entity such as a ALTO or a PCE server EGP is required. BGP-LS provide such capability at high scale by carrying the link state information from IGP protocols as part of BGP protocol messages.

Applications

- Service Providers, NEMs and Enterprises can test their BGP-LS implementations and help them transition to the new paradigm of Software-Defined Networking (SDN)
- Test PCE's performance and scale limits for learn the IGP topology including building the TED
- Test BGP-LS route reflector performance and scalability
- Test BGP-LS router's ability to correctly summarize large scale multi-node IGP topologies to PCE controller
- Test BGP-LS router's ability to carry segment routing information
- Test BGP-LS router performance
- PCE performance
  - LSP setup rate with PCE or BGP RR
  - Verify PCE ability to compute end-to-end path across multiple domains
  - Measure time to propagate IGP topology and related TE information
  - Measure time to optimize LSP after network change

Features

- Support for emulation of complex IGP topologies using OSPF or ISIS behind the BGP-LS emulated router
- Advertise multi-domain or multi-area topologies using OSPF or ISIS via BGP-LS
- Support for BGP router reflector mode and BGP client mode for BGP-LS emulation
- Ease of configuring large-scale test topologies for BGP-LS via the BGP wizard
- Link state NLRI for link, node, IPv4/IPv6 prefix
- Support for specifying TE parameters for OSPF and ISIS
- BGP capability support for VPN and non-VPN AFI types
- Ability to peer with multiple IPv4 or IPv6 BGP-LS routers at the same time
- Support for BGP-LS interactive commands such as withdraw or re-advertise link state NLRI
- BGP community and extended community support
- Easy automation for complex test scenarios using interactive BGP-LS commands available in Command Sequencer
- Negative testing—Unknown messages, Illegal PDUs and TLVs
- Generate Error Conditions
- Wireshark dissector support for BGP-LS messages

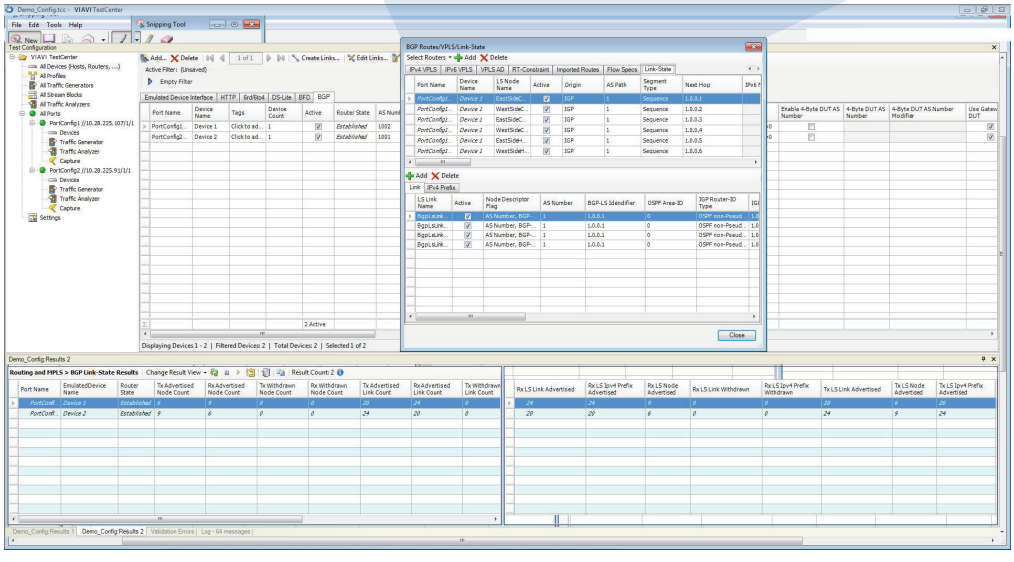


Figure 2: BGP-LS Configuration on TestCenter

Requirements

TestCenter software requirements

- BPK-1001A, Packet Generator and Analyzer Base Package
- BPK-1004A/B Unicast Routing
- BPK-1315A PCE Emulation Test Package (optional)
- BPK-1316A PCC Emulation Test Package (optional)

Technical Specifications

Depending on whether there is hardware or software involved, the specifications listed will vary slightly.

BGP-LS Parameters		BGP-LS Results
BGP Route Node Parameters • BGP-LS Node Descriptor • BGP-LS Identifier • IGP Router-ID Type • IGP Router ID • BGP-LS Node Attributes • Segment Routing Parameters BGP Route IPv4 Prefix Parameters • LS Prefix Descriptor Flag • IGP Route Type • LS Prefix Attribute Flag • Segment Routing Parameters - SR Prefix SID Flags - Algorithm - SID/Label/Index	BGP Route Link State Parameters • BGP-LS Identifier • Node descriptor flag • IGP Router-ID Type • Link Descriptors • Link Attribute Flag • Local IPv4 Router ID • Remote IPv4 Router ID • IGP Metric TLV Type • IGP Metric Value • TE-Link Metric Type • Link Protection Type • Segment Routing Parameters - SR Adj SID Flags - Weight - SID/Label	• Tx Advertised Node Count • Rx Advertised Node Count • Tx Withdrawn Node Count • Rx Withdrawn Node Count • Tx Advertised Link Count • Rx Advertised Link Count • Tx Withdrawn Link Count • Rx Withdrawn Link Count • Tx Advertised IPv4 Prefix Count • Rx Advertised IPv4 Prefix Count • Tx Withdrawn IPv4 Prefix Count • Rx Withdrawn IPv4 Prefix Count • Rx LS Link Advertised • Rx LS IPv4 Prefix Advertised • Rx LS Node Advertised • Rx LS Link Withdrawn • Rx LS IPv4 Prefix Withdrawn • Rx LS Node Withdrawn • Tx LS Link Advertised • Tx LS IPv4 Prefix Advertised • Tx LS Node Advertised • Tx LS Link Withdrawn • Tx LS IPv4 Prefix Withdrawn • Tx LS Node Withdrawn

Standards/Specifications

- “North-Bound Distribution of Link-State and TE Information using BGP” draft-ietf-idr-ls-distribution-0
- “BGP Link-State extensions for Segment Routing” draft-gredler-idr-bgp-ls-segment-routing-extension-02

Ordering Information

Product Number	Description
BPK—1321A	BGP-LS Emulation
v-BPK—1321A	BGP-LS Emulation (Virtual)

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