

# SPIRENT TESTCENTER

## UNICAST ROUTING BASE PACKAGE—OSPF PROTOCOL

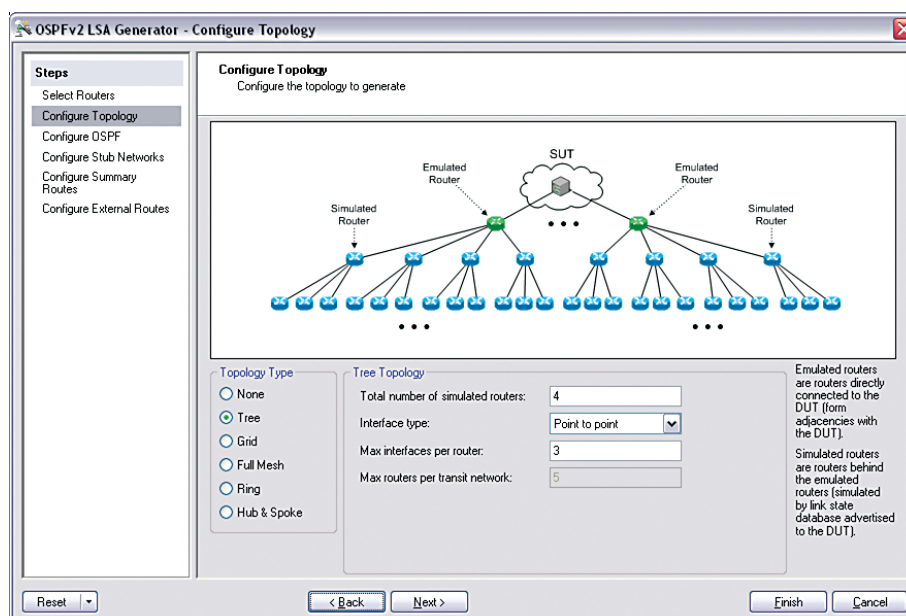
The Unicast Routing Base Package is a Spirent TestCenter™ component that enables network equipment manufacturers, service providers and large enterprises to quickly evaluate and troubleshoot routing functionality, performance and scalability of any routing device or network

### APPLICATIONS

- Set up large, multi-area OSPF network topologies and increase the test scale by adding ports with hundreds of OSPF routers and thousands of LSAs
- Test IPv4 and IPv6 hybrid networks concurrently
- Evaluate router performance under typical or extreme traffic load conditions for minutes, hours, days or weeks of testing
- Simulate realistic network stress
- Test network availability routing features with Integrated support for OSPF with Graceful Restart and BFD

Spirent TestCenter’s Unicast Routing Base Packages supports both versions of OSPF and integrates them with BGP, IS-IS and RIP to emulated real-world network topologies. Combine the Unicast Routing Base Package with the MPLS or Multicast base packages to test an infinite variety of realistic network topologies.

This package is an integrated component of Spirent TestCenter and works with other Spirent TestCenter components providing concurrent support for all key network protocols including MPLS, BFD, QoS, Multicast, and wire-rate IPv4 and IPv6 data-plane traffic.



## FEATURES & BENEFITS

- Run multiple protocols concurrently on each port to test scalability and protocol functionality in the same test
- Quickly build hundreds or thousands of emulated routers with any combination of LSAs with the Router Wizard and LSA Generator
- Quickly create custom OSPF topologies and all associated LSAs
- Simulate real network conditions and see results on demand any time during a test without starting and stopping the protocols or traffic
- Monitor the affects of router configurations upon traffic and QoS classes in real time
- Quickly build traffic between traffic endpoints behind emulated routers, integrating traffic with routing
- View routes advertised by the OSPFv2 neighbor router per emulated router and optionally save the routes to a file (txt or csv) for later analysis with the View Routes command
- Configure routers with customized timers, OSPF options, DR election settings, network types and TE parameters—enables functional testing

## TECHNICAL SPECIFICATIONS FOR OSPF

- OSPF LSA generator to quickly configures complex topologies including: tree, grid, full-mesh, ring or hub-and-spoke networks with multiple areas
- Topology support for regular areas, stub areas, NSSA, NSSA totally stubby areas, and totally stubby areas over native, broadcast, point-to-point networks or virtual links
- OSPFv2 LSA Types: Router, Network, Area Summary, AS Summary, AS External, NSSA External and Opaque (TE) types 9-11
- OSPFv3 LSA Types: Router, Network, Inter-Area-Prefix, Inter-Area-Router, AS-External, Link, Intra-Area-Prefix and NSSA External
- Support for dual-stack IPv4 and IPv6 in all routing emulation and traffic generation allows users to test the migration of routed networks from IPv4 to IPv6 under realistic deployment scenarios
- OSPFv2 and OSPFv3 support IPv4 and IPv6 testing
- Scale to hundreds of OSPF adjacencies per port and advertise thousands of LSAs
- Support for P2MP-TE node capabilities exchanging using Opaque LSAs
- Support for unreliable delivery (disabling LSA acknowledgement messages)
- Support for LSA throttling by disabling State Machine Maximum Load
- Router and neighbor states are displayed per emulated router
- Support for DR/BDR elections on broadcast media
- Activate, deactivate and reactivate OSPF routers and LSAs to build scalability tests that add objects over time
- Router Configuration Options per emulated router: Instance ID, area ID, network type, enable BFD, router priority, interface ID, interface cost, TE parameters, router options, simple and MD-5 keyed authentication, Graceful Restart (type, restart timer, reason, and strict helper mode), State Machine Maximum Load, Hello Interval, Router Dead Interval, LSA Refresh Time and Flood Delay timers
- OSPF Graceful Restart for RFC 3623 and Cisco-compatible link-local signaling with support for RFC specified restart reasons: unknown, software, reload/upgrade or switch
- OSPF LSA options include: router type, router options bits, age, sequence numbers, good or bad checksums, and associated link and router data per LSA type with associated values and metrics
- Create numerous different OSPF topologies (tree, grid, full mesh, ring, and hub and spoke) with customizations available for each type of topology and options to create numbered or unnumbered interfaces, specify router IDs, and interface addresses for simulated routers
- Interactive and Command Sequencer OSPFv2 events include: Start or Stop OSPFv2, Establish OSPFv2, Advertise OSPFv2, Stop or Resume Hellos, Shutdown or Restore Router, Age Router, Network, Summary, External, ASBR, or TE LSA, Remove Router or Network LSA Link, Readvertise LSA, Perform Graceful Restart, Restart Router and View Routes
- Interactive and Command Sequencer OSPFv3 events include: Start or Stop OSPFv3, Establish OSPFv3, Advertise OSPFv3, Stop or Resume Hellos, Shutdown or Restore Router, Remove Interface, Remove Router ID, Age Router, Network, Intra-Area Prefix, Inter-Area Router or Prefix, Link, External and Readvertise LSA
- Interactive commands to Stop and Start individual emulated routers send diagnostic commands and start and stop sending control-plane messages
- Interactive commands to flap (withdraw or age-out, and readvertise) individual LSAs or LSA blocks or by user-defined route type
- Integrated with both versions of OSPF and BFD for convergence and scalability testing include interactive BFD commands: Admin Up or Down, Stop and Resume PDUs, Enable or Disable Demand Mode, Initiate Poll, and Set Diagnostic State and per router BFD results
- Create custom OSPF Database Description, Hello, Link State Acknowledgement, Link State Request, Link State Update, and Unknown packets for functional protocol testing
- Detailed per-router OSPFv2 protocol and state counters including: router state (Not Started, Loopback, Waiting, PtP,

DR/Other, and Backup DR), Neighbor State (Not Started, Down, Attempt, Init, 2-Way, Exstart, Exchange, Loading, and Full), RX/TX Hello, RX/TX DD, RX/TX Router LSA, RX/TX Network LSA, RX/TX Summary LSA, RX/TX ASBR Summary LSA, RX/TX AS External LSA, RX/TX NSSA LSA, RX/TX TE LSA, RX/TX Request and RX/TX Ack

- Detailed per-router OSPFv3 protocol and state counters including: router state (Not Started, Loopback, Waiting, PtP, DR/Other, and Backup DR), Neighbor State (Not Started, Down, Attempt, Init, 2-Way, Exstart, Exchange, Loading, and Full), RX/TX Hello, RX/TX DD, RX/TX Router LSA, RX/TX Network LSA, RX/TX Intra-Area Prefix LSA, RX/TX Inter-Area Prefix LSA, RX/TX Inter-Area Router LSA, RX/TX AS External Summary LSA, RX/TX Link LSA, RX/TX NSSA LSA, RX/TX Ack, RX/TX Request and RX/TX Update
- Per test, port, and router OSPFv2 protocol and LSA summaries for each OSPFv2 LSA type include: Number of OSPFv2 ports per test, Number of OSPFv2 routers per test, Number of active OSPFv2 routers per port and test, Number of Router, Network, Summary, ASBR Summary, External/NSSA and Opaque LSAs configured
- Per test, port, and router OSPFv3 protocol and LSA summaries for each OSPFv3 LSA type include: Number of OSPFv3 ports per test, Number of OSPFv3 routers per test, Number of active OSPFv3 routers per port and test, Number of Router, Network, Inter-Area Prefix, Inter-Area Router, AS External, NSSA, Link and Intra-Area Prefix LSAs configured
- Summary statistics for the number of OSPF routers in the following states Up, Down, No OSPF, Loopback, Waiting, Point-to-Point, DR Other, Backup and DR
- Use the Command Sequencer and real-time graphs to view device performance while simulating router failures and link failures
- Integrated support for OSPFv2 and OSPFv3 protocol conformance testing with the BPK-1024A Conformance Application Base Package and the TPK-1015 for OSPFv2 and TPK-0017 for OSPFv3 testing
- Log the real-time exchange of control-plane messages; view OSPF events in real time, seeing messages sent from the Spirent TestCenter port, or as received from the DUT
- Integrated IPv4 or IPv6 data-plane traffic enables users to send, receive, inspect and accumulate statistics at wire-rate. This allows users to test data-plane router convergence and network high availability features like BFD and Graceful Restart
- Support for bi-directional capture and real-time decoder (BPK-1029A) with OSPF protocol ladder diagrams; view protocols as they occur
- Support for Ethernet, ATM and SONET media types and all associated encapsulations allow testing test over any supported media and encapsulation
- Support for L2TP and GRE tunneling on a per router basis allows testing over any supported tunnel mode

## SUPPORTED MODULES/PLATFORMS

- Supports all Spirent TestCenter test modules and personality cards
- Series 2000 modules provide higher performance than Series 1000 modules; contact your Spirent representative for details
- BPK-1004A/B supports all Spirent TestCenter test modules and personality cards. BPK-1004B should be used with Series 2000 test modules

## SYSTEM 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), 4 GB 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

- One Ethernet cable and one 10/100/1000Mbps Ethernet card installed in the PC A SPT-2000A Spirent 2U Chassis and Controller, SPT-5000A Spirent 5U Chassis and Controller or SPT-9000A Spirent 9U 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
- Pentium® or greater PC running Windows® XP Professional SP2 with mouse/color monitor required for GUI operation (See Minimum PC Requirements section)
- BPK-1001A/B required for packet generator/analyzer features
- BPK-1024A required for Conformance Testing
- BPK-1029A required for real-time capture/decode feature
- BPK-1066A required for BFD protocol testingBPK-1006A/B required for MPLS testing
- TPK-1015 required for OSPFv2 protocol conformance testing
- TPK-1017 required for OSPFv3 protocol conformance testing
- WAN-2003A and SFP-4002A personality module required for ATM testing

**ORDERING INFORMATION**

- Part numbers ending in “A” indicate the standard performance version; those ending “B” indicate the high performance version
- **Unicast Routing Base Package A**—Supports up to 10 emulated routers per port: BPK-1004A
- **Unicast Routing Base Package B**—Supports up to the maximum supported emulated routers per port: BPK-1004B

**RELATED STANDARDS:**

- Draft-ietf-bfd-v4v6-1hop-06.txt—Describes BFD operation for single hop protocols
- Draft-nguyen-ospf-ospf-lls-04—OSPF Link-local Signaling
- RFC 2328—Describes OSPF Version 2
- RFC 2370—OSPF Opaque LSA Option
- RFC 2740—OSPF Version 3 (for IPv6)
- RFC 3101—OSPF NSSA Option RFC 3623— Graceful OSPF Restart
- RFC 3630—Describes traffic engineering extensions to OSPF Version 2
- RFC 4811—OSPF Out-of-band LSDB Resynchronization
- RFC 4812—OSPF Restart Signaling
- RFC 4970—Extension to OSPF for Advertising Optional Router Capabilities

**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 Web site at [www.spirentcom.com/gs](http://www.spirentcom.com/gs) or contact your Spirent sales representative.

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