Spirent TestCenter
Unicast Routing Base Package

Product Overview

The Unicast Routing Base Package is a Spirent TestCenter System component that enables network equipment manufacturers, service providers and large enterprises to quickly evaluate and troubleshoot the routing functionality, performance and scalability of any routing-enabled device or network. Spirent TestCenter also has a Multicast Routing Base Package.

The Unicast Routing Base Package helps users address the challenge of quickly verifying basic routing functionality and then verifying complex features and applications for enterprise, metro and core routers. This package includes IPv4 and IPv6 interior and exterior gateway routing protocols: RIPv1/v2, RIPng, OSPFv2/v3, IS-IS, IS-ISv6, BGP-4 and BGP+; it can emulate a variety of realistic and worst-case conditions and provide benchmark measurements. Users are able to expose the true performance of a router by stress testing the routing software, the data forwarding hardware, and the overall system architecture under both static and dynamic routing conditions.

Because it is an integrated component of Spirent TestCenter, this package can work together with other TestCenter components to deliver easy, consistent Tcl support for all key metropolitan and enterprise protocols, including spanning tree, VLAN, DHCP, QoS, multicast, IPv4/IPv6 and routing. TestCenter includes RFC-based benchmarking methodologies for Layer 2 and Layer 3. Each TestCenter module supports multiple users and hot swapping.

Applications

Spirent TestCenter customers can use the Unicast Routing Base Package to evaluate key performance parameters of routers or networks under typical or extreme traffic load conditions for minutes, hours, and days. They can quickly set up large RIP, OSPF, IS-IS or BGP network emulations on all ports with data plane traffic going to each network advertised from all transmitting ports. Using the Flap Schedule and real-time graphs with integrated events, they can evaluate key performance parameters of routers or networks as they respond to common undesirable network events on the control plane.

The Unicast Routing Base Package can serve to qualify routers during development, quality assurance, and final regression testing, to re-qualify routers after software or firmware upgrades and to perform comparative analysis of routers during vendor selection.

Benefits

- *Improve product/service reliability*–Scalability of protocol emulation and the ability to concurrently run multiple protocols enable the user to emulate very large, realistic networks and find issues in the lab before a service is deployed
- *Reduce cost*–Comprehensive protocol support allows the user to test with a single platform and single application
- *Increase productivity*–Reduce the learning curve with an easy-to-use GUI incorporating logical layout, configuration wizards and configurable views for setup and results
- *Reduce time to test*–Test and configuration wizards allow quick setup; capture functionality, protocol messaging and live status views support easy troubleshooting without leaving the application environment—even in large scale test configurations
- *Real-world network emulation*–Emulate multiple protocols and schedule real-time events to perform negative and long-term stability testing
- *Security verification*–Authentication mechanism support for major protocols allows users to verify the security and evaluate the performance and behavior of their routers in realistic configurations

GET IT DONE FASTER WITH
Spirent TestCenter

- Support for all major unicast routing protocols
- OSPF Topology Editor for simplified visualization and configuration
- Integrated Flap Schedule allows for fail-over and convergence testing over short or extended times
- Integrated performance and functional test modes
- Dual stack IPv4 and IPv6
- Mix L2, L3, unicast, multicast, QoS and routing traffic
- Real-time results
- Easy and full-featured Tcl automation
- Multi-user and hot-swappable interface modules

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Component

- *Testing the transition*–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

- System ID and circuit ID of each emulated router
- Link metrics per level
- Narrow, wide, or narrow/wide metric modes
- Hello interval, flood delay, LSP refresh timer, and retransmit interval

Key RIP Features

- Support for RIPv1, RIPv2, and RIPng
- Emulates hundreds of routers and generates hundreds of thousands of routes per port
- Route generator allows for simple creation of large routing tables to user defined route prefix length profile distributions
- VLAN ID or VLAN stack per emulated RIP router
- Destination addresses: broadcast, multicast, and unicast
- Update interval
- Max jitter value
- Edit route parameters including: route tag, next hop and hop count
- Support for simple or MD5 authentication
- Traffic wizard builds data streams to and from all of the emulated routes
- Configure routes per update
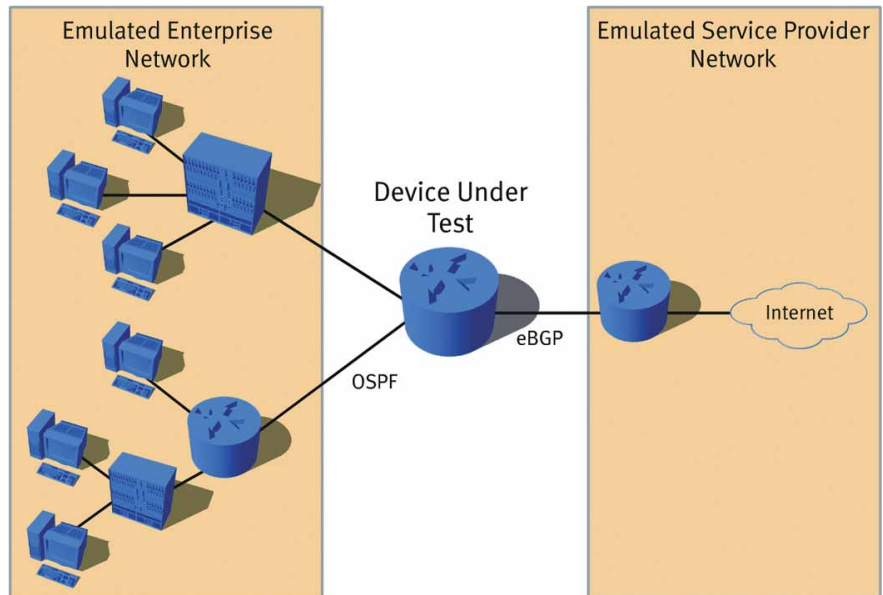- Event log displays exchange of protocol messaging

Key OSPF Features

- Advanced OSPF LSA generator to configure complex topologies
- Full featured topology viewer and editor
- Support for LSA types 1 – 10
- Hundreds of OSPF adjacencies per port
- Thousands of LSAs per emulated router
- VLAN ID or VLAN stack per OSPF adjacency
- Emulated adjacencies can be DR, BDR, or None
- Configure area ID and router ID
- Edit cost, MTU, and hello interval
- Router priority and options
- Router dead interval/retransmit interval
- LSA refresh time/flood delay
- Support for simple or MD5 authentication
- Event log displays exchange of protocol messaging

Key IS-IS Features

- IS-ISv4/v6 hundreds of adjacencies per port
- Millions of routes
- Emulates Level 1, Level 2, or Level 1/Level 2 routers
- LSP generator to quickly build complex LSP database
- Supports multiple areas per emulated router

Emulated Enterprise Network

Device Under Test

OSPF

eBGP

Internet

Emulated Service Provider Network

- VLAN ID or VLAN stack per ISIS adjacency
- Event log displays exchange of protocol messaging
- Support for traffic engineering extensions
- Configure LSP options including
    - System ID of the originating router
    - Pseudo-node ID of the designated IS
    - Age, lifetime, sequence number, overload bit, and attached bit
    - Good or bad checksum
    - Number of neighbors
    - Neighbor ID, pseudo-node ID, and standard and wide metrics for each neighbor link
    - Supports the following traffic engineering extensions: local and remote IP addresses, administrative group, maximum/reservable/unreserved bandwidth
- Route blocks may be assigned to an LSP with the following fields
    - IPv4 or IPv6 routes
    - Number of routes, start IP address, and increment value for block
    - Internal or external routes
    - Up/Down bit
    - Narrow and wide metrics
    - Can copy/paste and duplicate one or more LSPs/links

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Key BGP Features

- Millions of routes
- Route generator to quickly build large complicated routing table with Internet Prefix Length Distribution
- Confederations and route reflectors are supported
- All common attributes are configurable
- BGP graceful restart support

BGP Session Features:

- More than 1000 BGP peer sessions per port
- VLAN ID or VLAN stack per peer
- E-BGP, I-BGP, route reflector and confederation sessions are supported
- AS numbers are configurable
- Multi-hop sessions are supported with unique gateways
- TTL is configurable per session
- QoS is configurable for all BGP sessions
- Stagger start on sessions is configurable
- Each session can optionally only listen for starts
- Hold timer and keep alive timers are configurable
- Address Family Indicator (AFI) is configurable
- Routes per update are configurable
- Inter-update delay is configurable

BGP Route Block Options:

- Can copy/paste and duplicate one or more route blocks
- Prefix length
- Number of routes
- Start route IP address
- Increment value for IP address range
- Mandatory attributes
- Optional attributes

Related RFCs, Drafts and Standards

RFC 1058 – Describes RIP Version 1
RFC 2453 – Describes RIP Version 2
RFC 2080 – RIPng for IPv6
RFC 1587 – Describes the OSPF NSSA option
RFC 2328 – Describes OSPF Version 2
RFC 2329 – OSPF Standardization Report
RFC 2740 – OSPF Version 3 (for IPv6)
SO/IEC 10589 – Base IS-IS specification
RFC 1195 – Integrated IS-IS
draft-ietf-isis-traffic-xx – Describes traffic engineering

extensions for IS-IS
draft-ietf-isis-ipv6-xx – Describes the use of IS-IS for IPv6 routing
RFC 1771 – Describes BGP4, the current version of BGP
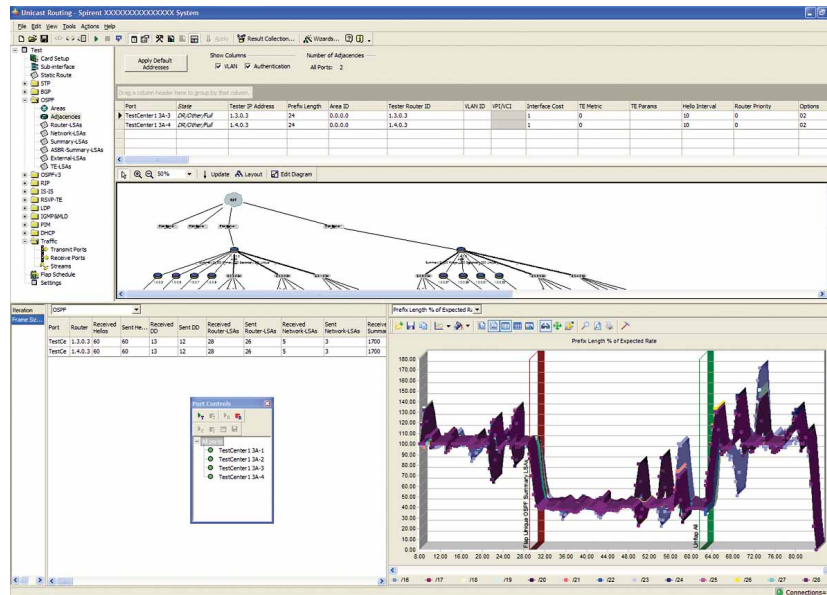RFC 1997 – Describes BGP4 communities
RFC 2796 – Describes BGP4 route reflection
RFC 2842 – Describes BGP4 capabilities advertisement
RFC 3065 – Describes BGP4 autonomous systems confederations
RFC 2545 – BGP+ (for IPv6)

Test Results

The Unicast Routing Base package provides provides both real-time results and final test results using spreadsheets and graphical formats. These results can be exported in comma separated value (.CSV) file format or HTML for spreadsheet or browser-based analysis and reporting.

Real-time test results

These results can be displayed by port, by stream, by predefined tracking options (including prefix length, VPN, ToS, protocol and destination TCP/UDP port) or by user-defined groups.

- Receive frame rate graph
- Percentage of expected frame rate graph
- Average latency graph
- Detailed counters with min/ave/max latency and in/out of sequence
- Status for each emulated protocol session
- Detailed counters for each emulated protocol session
- Event log to provide detailed protocol messaging for user selected ports and protocols
- Control plane capture and export to protocol decoder enables detailed troubleshooting and analysis without interrupting the test

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Final test results

- Final receive frame rate graph from the beginning of the iteration to the end
- Final average latency graph from the beginning of the iteration to the end
- Per-stream frame analysis including frames sent, received, and lost, as well as stray frames and latency
- Final detailed port counters
- Final TX/RX statistics including TX/RX frame count, lost frames, % lost, min/ave/max latency, in/out of sequence
- Final latency distribution
- All graphs have flap events integrated
- Capture and export to decoder functionality

Flap Schedule

- Create up to 64 steps with configurable time delays
- Flap through all the steps once or continuously cycle
- Each step can have multiple events
- Events include a combination of physical, protocol, and traffic conditions such as link down / up, traffic on/off, or simulating route flapping via a route withdraw and subsequent re-advertisement

Supported Modules

Module	Description
CPR-1001A	10/100/1000 Copper RJ-45, 8 Port
EDM-1001A	10/100/1000 Dual Media, 4 Port
FBR-1001A	1G Fiber SFP, 8 Port
XFP-1001A	10G XFP, 1 Port
CPR-2001A	10/100/1000 Copper RJ-45, 8 Port
EDM-2001A	10/100/1000 Dual Media, 4 Port
FBR-2001A	1G Fiber SFP, 8 Port
CPR-2002A	10/100 Copper RJ-45, 8 Port
XFP-2001A	10G XFP, 1 Port

Requirements

- An SPT-2000A Spirent 2U chassis and controller or SPT-5000A Spirent 5U chassis and controller with the appropriate hardware modules
- Pentium™ or greater PC running Windows® 2000 SP4 or XP SP1/1A/2 with mouse/color monitor required for GUI operation
- For automation operation: Pentium™ or greater PC running Windows® 2000 SP4 or XP SP1/1A/2, Red Hat Enterprise Workstation Linux 3.0 or SUN Solaris 7.0/8.0

Ordering Information

BPK-1004A	Unicast Routing Base Package A
BPK-1004B	Unicast Routing Base Package B

Other related Spirent TestCenter software

BPK-1001A	Packet Generator and Analyzer Base Package
BPK-1002A	STP/RSTP/PVST+ Base Package
BPK-1003A	IGMP/MLD Host ID Multicast Base Package
BPK-1005A/1005B	Multicast Routing Base Package
BPK-1006A/1006B	MPLS/LDP/RSVP-TE Base Package

Part numbers ending in "A" indicate a limited-performance version; those ending in "B" indicate the full performance version.

Spirent Global 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.spirentcom.com/gs or contact your Spirent sales representative.

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