

Spirent

LAG Emulation



LAG Emulation base package provides the ability to aggregate Spirent TestCenter ports and enables functionality, scalability and redundancy testing of control and data plane over a LAG. Spirent LAG Emulation is the only test solution in the industry that allows defining the traffic distribution on the aggregated test port using a predefined algorithm and user defined load balancing attributes. This ability to define the load balancing behavior of the aggregated TestCenter ports enables the user to create end-to-end real-world LAG test topology in a lab environment.

Applications

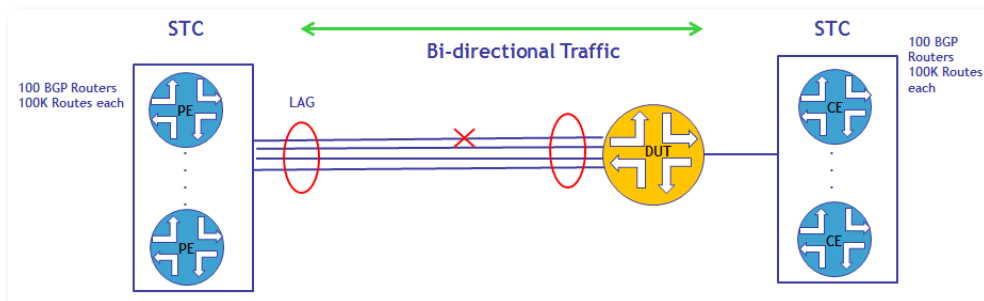
- Offering can be used by NEMs, service providers, data center and enterprise customers for testing control plane and data plane scalability, redundancy and load balancing over LAG
- Realism—Ability to emulate end user test traffic, plus control plane topology emulation plus LAG emulation
- Test link failure protection over LAG
- Test multi-home or node failure protection test scenarios using Multi-Chassis LAG (MC-LAG)
- Test load balancing capability for control plane and data plane over LAG
- LAG emulation can be combined with other control plane protocol emulations such as MPLS, unicast routing and access protocols to create complex real world test scenarios in a lab environment
- Support for stateful and stateless traffic over LAG
- Verify QoS for link bundles on the ingress as well as egress side
- Hashing or load balancing criteria for the test port can be specified using the following parameters
 - ▶ Layer 2 packets (Ethernet, VLAN, MPLS Headers),
 - ▶ Layer 3 packets (Ethernet, VLAN, MPLS, IPv4, IPv6, TCP, UDP)
- Support for active or stand-by ports in a MC-LAG configuration
- Capture and traffic analysis both at the LAG test port and individual port level
- Link aggregation Wizard for ease of use
- Traffic configuration at LAG port level
- Make dynamic runtime changes to LACP parameters, traffic configuration and other control plane protocols running over LAG
- Control plane and data plane switch-over to the alternate port of the LAG on primary port or link failure
- Support for convergence measurement over LAG

Features & Benefits

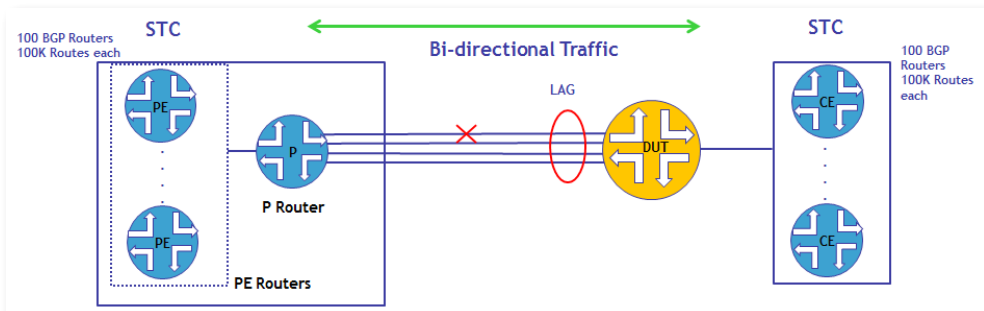
- Easily configure complex test topologies over LAG port using Topology Emulation over LAG
- Topology emulation over LAG
- Define the load balancing or traffic distribution behavior for the test port using round robin or hashing.
- Round robin—Uniformly distribute control plane and data plane packets across all ports in the LAG.
- Layer 2 or Layer 3 Hashing—Load balance control plane sessions based on the specified hashing criteria.
- Support for 1G and 10G interfaces
- Support for extensive LACP result statistics
- Automation support for LACP via Command Sequencer and Scripting API
- LAG support for the following control plane protocols
 - ▶ Learning (ARP/ND)
 - ▶ Routing (OSPF, ISIS, BGP)
 - ▶ Multicast (IGMP, MLD, PIM)
 - ▶ Access (PPPoE, DHCP, L2TP)
 - ▶ ALP (HTTP, FTP), MPLS (LDP, RSVP)

The screenshot displays the Spirent TestCenter interface for LAG emulation. The top section shows the configuration of an emulated device interface (LAG1 and LAG2) with details like device name, host, and IP addresses. Below this, there are three monitoring panels: 'Access > DHCPv6PD > DHCPv6PD Results', 'Access > PPPoE > PPPoE Results', and 'Streams > Detailed Stream Results'. The 'Streams' panel includes a table with columns for Name, Tx Port, Rx Port, and Tx/Rx Counts. A 'Port Traffic and Counters' panel on the right features a gauge for 'Aggregate Port L1 Tx Rate'.

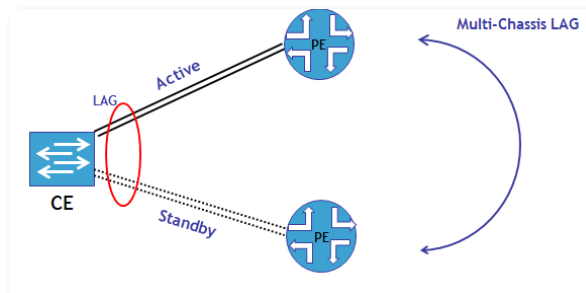
Name	Tx Port	Rx Port	Aggregated Rx Port Count	Tx Count (Frames)	Rx Count (Frames)	Tx Rate (bps)
StreamBlock #-2065276	LAG1	LAG2	2	246,182	226,224	389,320
StreamBlock #-2065277	LAG1	LAG2	2	246,182	246,394	395,120



LAG Resilience Test (Link flap)



Topology Emulation over LAG



Multi-Chassis LAG

- ▶ MPLS VPNs (L2VPN, L3VPN, VPLS, MVPN)
- ▶ STP- MSTP, RSTP, PTP (1588)

processor (or equivalent), 4 GB of RAM, 100 GB of free disk space

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

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 mX-10G, fX-2 40G-Qx or CM-1G test module

Spirent TestCenter software requirements

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

Technical Specifications

LAG Configuration Parameters	<ul style="list-style-type: none"> • Transmit algorithm—Round robin, hashing • Hash Fields for Layer 2 Packets <ul style="list-style-type: none"> ▶ Ethernet Header ▶ VLAN Header ▶ MPLS Header 	<ul style="list-style-type: none"> • Hash Fields for Layer 3 Packets <ul style="list-style-type: none"> ▶ Ethernet Header ▶ VLAN Header ▶ MPLS Header ▶ IPv4 Header ▶ IPv6 Header ▶ TCP Header ▶ UDP Header 	<ul style="list-style-type: none"> • LACP Configuration Parameters <ul style="list-style-type: none"> ▶ Actor System Id ▶ Actor System Priority ▶ Port MAC Address ▶ Actor Port ▶ Actor Port Priority ▶ Actor Key ▶ LACP Timeout - Short, Long ▶ LACP Activity— Active, Passive
LACP Results	<ul style="list-style-type: none"> • Actor State • Partner State • LACP State • Actor Operational Key • Actor System Id • Actor Port 	<ul style="list-style-type: none"> • Partner Operational Key • Partner System Id • Partner Port • Partner System Priority • Partner Port Priority • Partner Collector Max Delay • LACP PDU's Sent 	<ul style="list-style-type: none"> • LACP PDU's Received • Marker PDU's Sent • Marker PDU's Received • Marker Response PDU's Sent • Marker Response PDU's Received
Traffic Results	<ul style="list-style-type: none"> • Basic Traffic Results, Detailed Stream Results, Streamblock Results at an aggregated port and individual port level 		
Control Plane Results	<ul style="list-style-type: none"> • Control plane results at an aggregated port and individual port level 		

Ordering Information

Description	Part Number
LAG Emulation Base Package (Requires BPK-1015A)	BPK-1312A
LAG Emulation Base Package – 1 year subscription	BPK-1313A-1YR
Associated Packages	
LACP Emulation Base Package	BPK-1015A
Link Aggregation (LAG) Test Solution	SPK-1200

Ordering Information

Due to the wide range of available system configurations, please contact your regional Spirent sales representative for detailed ordering information.

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.spirent.com/gs or contact your Spirent sales representative.

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