



# Spirent TestCenter STP/RSTP/PVST+ Base Package

## Product Overview

The STP/RSTP/PVST+ Base Package is a Spirent TestCenter System component that helps network equipment manufacturers, large enterprises, and Metro Ethernet service providers quickly evaluate and troubleshoot spanning tree behavior and performance of devices, enterprise networks and Metro Ethernet networks.

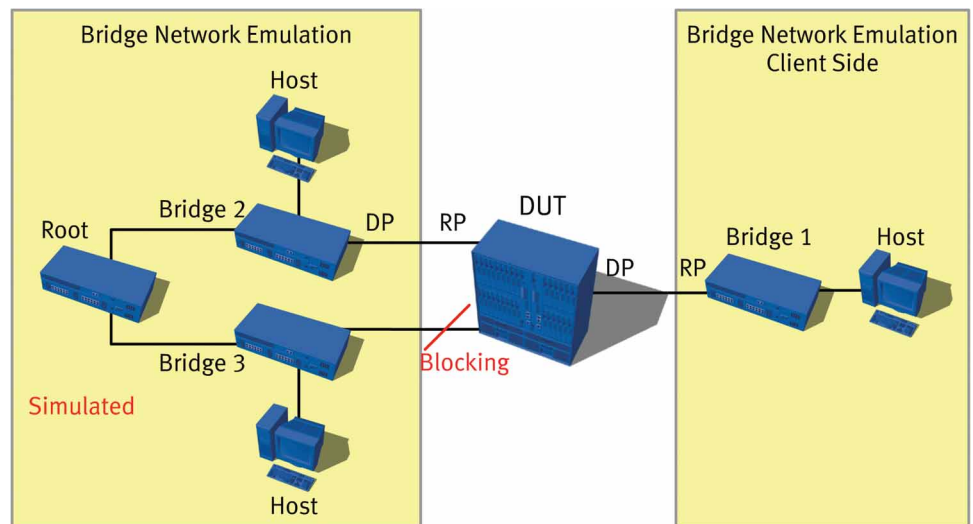
This package emulates the Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree (PVST+) and Rapid Per-VLAN Spanning Tree (RPVST+).

Underlying protocols such as STP/RSTP and PVST+/RPVST can affect performance of a network—especially networks carrying delay-sensitive traffic such as VoIP and video. This package enables users to evaluate the impact that different versions of spanning tree have on convergence times, forwarding performance and overall reliability. While the appropriate protocol messaging is emulated, Layer 2 data traffic can also be generated to verify the device under test's port state and corresponding data forwarding performance under a variety of transient and steady-state 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

The Spirent TestCenter STP/RSTP/PVST+ Base Package can be used to evaluate the functionality of spanning tree implementations in bridges, switches and routers. It can evaluate key performance characteristics under typical or extreme traffic load conditions for minutes, hours, and days with concurrent spanning tree messaging. If you need to determine the scalability and reliability of a spanning tree design or implementation, this package can provide the information you need without the resource and time commitments of system deployment.



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## GET IT DONE FASTER WITH Spirent TestCenter

- True spanning tree, rapid spanning tree, and per-VLAN spanning tree protocol state machines
- Observe spanning tree fail-over times in a variety of configurations
- Integrated performance and functional test modes
- Mix L2, L3, unicast, multicast, QoS and routing traffic
- Real-time results
- Easy, full-featured Tcl automation
- Multi-user and hot-swappable interface modules

Enterprises and service providers can obtain detailed, objective performance information on vendor offerings, and equipment manufacturers can streamline product development cycles by testing with the STP/RSTP/PVST+ Base Package. Service providers who offer spanning tree solutions to multiple customers in a converged environment can use the product to anticipate potential cross-impact. This package can also provide a comparative analysis of the performance of different versions of spanning tree, and test the interoperability of mixed-version environments.

### Benefits

- *Improve product/service reliability*—Users are able to verify and troubleshoot functionality of basic protocol behavior and negative behavior, and then progress to scalability of protocol emulation of very large networks, enabling users to find issues in the lab before a service is deployed
- *Reduce cost*—The package’s comprehensive protocol support allows the user to test with a single platform and single application
- *Increase productivity*—Reduce your learning curve with an easy-to-use GUI and configurable views for setup and results
- *Reduce time to test*—Significantly improve time to run through test cases while generating repeatable, reliable results
- *Real-world network emulation*—Emulate multiple protocols and schedule real-time protocol events

### Key Features

- Only true stack-based solution for Spanning Tree, Rapid Spanning Tree and Per VLAN Spanning Tree
- Allows spanning tree versions to be run concurrently with each other and with other protocols to test behavior in a realistic system environment
- Simulates millions of unique Layer 2 hosts to populate the DUT’s MAC address table
- Provides real-time statistics and graphical result screen presentation to support accurate characterization of transient conditions
- Control plane capture of transmitted and received protocol messaging, including export to protocol decoder for detailed troubleshooting and analysis
- Tests with Layer 2 and Layer 3 broadcast, unicast and multicast traffic
- Integrated Layer 2 traffic wizard

### STP/RSTP Features

- Emulate multiple bridges on a single LAN segment
- Root bridge emulation
- Non-root bridge emulation
- Topology simulation emulating a root bridge behind a non-root bridge
- Test and verify root bridge election

- Verify the device under test’s (DUT) capability to process BPDUs
- Modify and test changing timing parameters including: Hello Time, Max Age, Forward Delay and Hold Count
- Stop transmitting BPDUs to verify that the DUT recovers and begins to transmit BPDUs
- Monitor BPDU exchange with real-time Event Log
- Port state emulation
- Port role emulation
- Test the Spanning Tree Algorithm (STA)
- Simulate topology changes to verify redundant paths
- Verify STP/RSTP convergence
- Emulate RSTP point-to-point link type for full duplex Ethernet
- Test RSTP’s backwards compatibility with STP

### PVST+/RPVST+ Features

- Enables testing of hundreds of STP/RSTP instances per VLAN
- Runs over 802.1Q trunks
- Supports emulation of PVST+ and RPVST+
- Supports MAC address reduction feature
- Supports trunk and access emulation
- Configurable Ethertype
- Displays elected root bridge ID and designated bridge ID for each instance

### Related Standards

- IEEE 802.1D, Spanning Tree Protocol
- IEEE 802.1W, Rapid Spanning Tree Protocol
- IEEE 802.1Q, VLAN Trunking

### Test Results

The Spanning Tree Base package 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
- Detailed STP/RSTP and PVST+/RPVST+ protocol counters
- Event log with detailed user selectable protocol messaging
- Control plane capture functionality for transmit and receive
- Transmit and receive BPDU flag values
- Emulated port state and port role

### 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
- Per-stream latency distribution
- Final detailed port counters
- Final TX/RX statistics including TX/RX frame count, lost frames, % lost, min/ave/max latency, in/out of sequence
- All graphs have flap events integrated

### 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: IBM or compatible Pentium™ 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-1002A** STP/RSTP/PVST+Base Package

#### Other related Spirent TestCenter software:

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

**BPK-1003A** IGMP/MLD Host IP Multicast Base Package

**BPK-1004A/1004B** Unicast Routing 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](http://www.spirentcom.com/gs) or contact your Spirent sales representative.

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