

# This Former Spirent Business is Now Part of VIAVI

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# Spirent AION

## TSN Core Protocols Bundle

### Overview

**Spirent AION** is a flexible delivery platform that enables users to achieve improved deployment and provisioning for all their cloud and network testing needs. It is designed to deliver ultimate flexibility in how Spirent TestCenter platforms are purchased and utilized.

The extended platform combines a wealth of industry-leading test solutions with a flexible licensing architecture to support a wide range of next-generation solution-based domain applications.

AION offers a centralized management hub to help leverage software and hardware functionalities across all lab users and locations for a simplified management and decision-making process:

- **Flexible purchasing options** available via subscription, consumption-based, and perpetual plans, with the ability to license different bandwidth, scale, and protocol bundles.
- **Flexible deployment options** offered include cloud-delivery, on-prem, and laptop-hosted licensing services.

Enhanced user serviceability delivers always-on platform services from auto-discovery and inventory management to user and workspace administration, notifications, and log aggregation.

### TSN Core Protocols Bundle

Time-Sensitive Networking (TSN) is a collection of Ethernet standards introduced by IEEE 802.1 group, defining mechanisms for deterministic communication over wired Ethernet links enabling guaranteed packet transport with bounded and low latency, low packet delay variation, and extremely low packet loss.

Computer networks have traditionally been optimized for “best effort delivery”. For special cases, when critical information was being transported, custom tools and protocols were designed and dedicated networks were built to meet the specific needs in domains like Industrial Automation, Automotive or Aerospace Networks.

TSN introduces mechanisms to manage critical and non-critical data flows that share the same network infrastructure. Overall system costs are reduced through the convergence of different traffic classes on a single network infrastructure. Hardware and maintenance costs are lowered by the need for fewer devices and cables for networking.

For all the reason above, TSN is currently being widely adopted as a key technology in several different markets.

- **Realistic stateful protocol emulation** to exercise protocol state machines
- **Realistic emulation of a TSN or a mixed (TSN and non-TSN capable) Ethernet network** with multiple connections, endpoints, domains and different traffic profiles
- **Intelligent Results™** allow users to quickly confirm positive results and identify problematic areas
- **Real-time traffic and protocol controls** enable the tester to validate and troubleshoot problems by altering the test configuration while the test is running
- **Real-time results views** allow the user to see how the network responds to changes in specific test conditions without having to stop the test and save the results



### TSN for Automotive In-Vehicle Networks

The car of the future will be a data center on wheels. ADAS and higher levels of autonomous driving are requiring an ever-increasing volume of data. At the same time, the E/E architecture is evolving from a domain-based design towards a zonal based design and central compute. TSN plays a key role in this transformation.

### TSN for Industrial Automation and Industry 4.0

A new wave of Industrial Revolution is currently underway, with hyper connectivity at its core, alongside 5G, cloud technology, big data, machine learning, and artificial intelligence. Cyber-physical systems, and smart machines with the ability to analyze and diagnose themselves without the need for human intervention are defining Industry 4.0. TSN plays a key role in the development and evolution of Industry 4.0. by enabling open data exchange between operations and Enterprise.

### TSN for Fronthaul Traffic

IEEE 802.1CM and CMde leverage TSN features to provide deterministic transport of 4G CPRI and 5G eCPRI streams over Ethernet networks by controlling traffic scheduling, timing synchronization and system reliability.

### TSN for Aerospace Networks

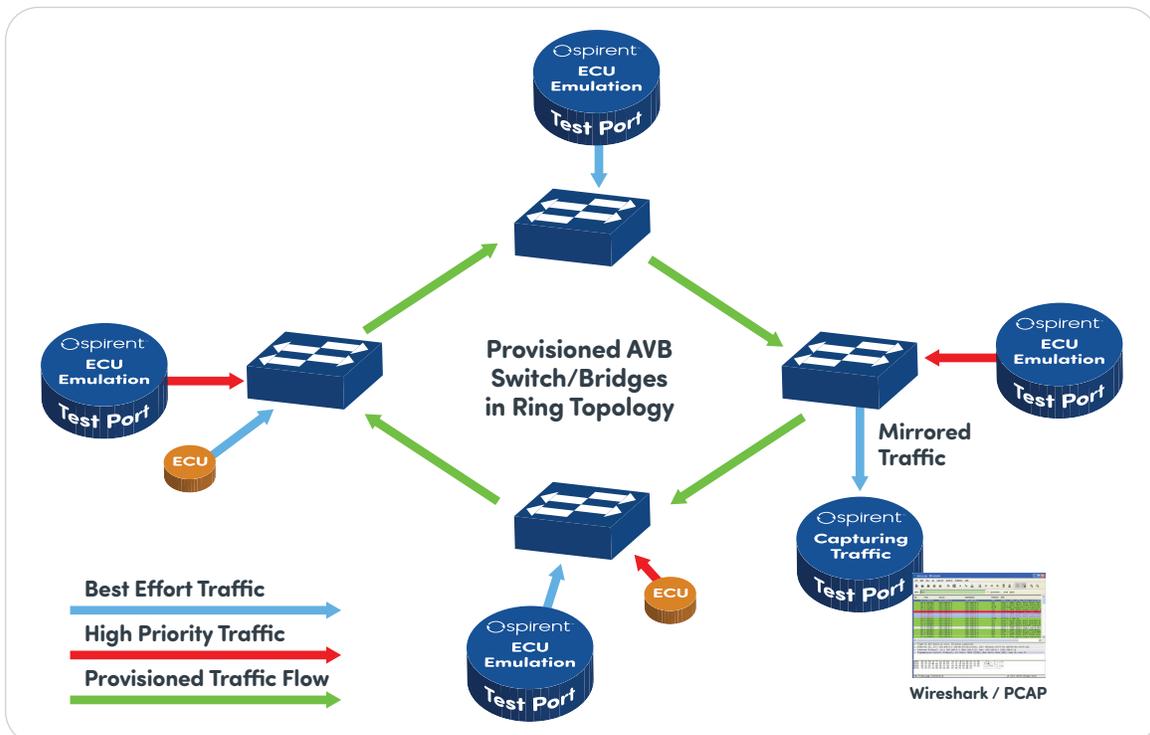
For Aerospace networks, TSN lowers the lifecycle cost, broadens industry support and suppliers, as well as enables higher bandwidth and network convergence.

The Spirent TSN Test Solutions offer a complete set of tools to achieve conformance and performance testing in a single hardware platform over variety of interfaces and speeds.

TSN test solutions allow silicon and network equipment manufacturers, system integrators, automotive OEMs and their suppliers, military and civil aircraft manufactures and many others to ensure functionality and performance objectives in the following areas:

- R&D testing involving technology feasibility studies and performance modeling
- Device and protocol functional testing
- Conformance and certification testing
- Device, sub-system, or services performance characterization, scalability and availability
- Stress testing requiring higher device and traffic emulation scaling capability as well as higher physical interface connection
- Negative testing to characterize the system resilience

TSN Core Protocols Bundle is an integrated component of Spirent TestCenter and works with other TestCenter components and other AION Bundles.



### Features and Benefits

- Full TSN emulation of multiple talker or listeners on each port
- A comprehensive set of TSN standards supported (please refer to the TSN Standard Coverage table on next page)
- True Preemption support allowing creation and scheduling of real preempted segments along with Express traffic at line rate
- Standard specific wizards and result view allow easy to use and quick configuration and analysis possible
- Mixed TSN and non-TSN traffic generation capability on each port
- Highly scalable test topology with precise and consistent timing across the ports regardless of the scale
- TSN specific metrics and statistics measurements
- Highly accurate and precise timing measurements
- Verification of precise synchronization and presentation time
- Support for different Ethernet media types and speeds (10M to 400G)
- Real-time capture and analysis capabilities
- Full protocol decode in Wireshark

### The Spirent Advantage

- Easy to use TSN wizards and result views
- The only True Preemption support available allowing creation and scheduling of real preempted segments along with Express traffic at line rate
- Highly capable and accurate traffic generation and analysis
- Highly accurate timing and synchronization measurement (best in class)
- Multi-faceted solution for L2-3 conformance/performance, L4-7 and vulnerability testing in one platform
- Conformance, performance and functional testing in one platform
- Support on all types of interfaces including 100BASE-T1 & 1000BASE-T1
- Support across all speeds from 10M to 400GbE
- Solutions in portable, desktop and rack-mount form factor
- Expandable and scalable test setups



## Technical Specifications

Parameter	Description
<b>Standards</b>	
IEEE 802.1Qat-2010	Stream Reservation Protocol (SRP)
IEEE 802.1Qav-2009	Forwarding and Queuing for Time-Sensitive Streams (FQTSS) / Credit Based Shaping (CBS)
IEEE 802.1Qbv-2015	Enhancements for Scheduled Traffic / Time Aware Shaping (TAS)
IEEE 802.1Qcr-2020	Asynchronous Traffic Shaping (ATS)
IEEE 802.1Qch-2017	Cyclic Queuing and Forwarding (CQF)
IEEE 1722-2016	Layer 2 TRANSPORT PROTOCOL FOR TIME-SENSITIVE STREAMS
IEEE 1733-2011	Layer 3 TRANSPORT PROTOCOL FOR TIME-SENSITIVE STREAMS
IEEE 802.1Qci-2017	Per-Stream Filtering and Policing (PSFP)
IEEE 802.3br-2016	Interspersing Express Traffic
IEEE 802.1Qbu-2016	Frame preemption
IEEE 802.1CB-2017	Frame Replication and Elimination for Seamless Redundancy (FRER)
IEEE 802.1CBdb	FRER Extended Stream Identification Functions
IEEE 802.1Qcc-2018	Stream Reservation Protocol (SRP) Enhancements and Performance Improvements
IEEE 802.1Qcp-2018	YANG Data Model
IEEE 802.1CBcv	FRER YANG Data Model and MIB Module
IEEE 802.1Qcw	YANG Data Models for Scheduled Traffic, Frame Preemption, and Per-Stream Filtering and Policing
<b>TSN for Automotive In- Vehicle Networks</b>	
IEEE 802.1DG	TSN Profile for Automotive In-Vehicle Ethernet Communications
Avnu	Automotive Ethernet AVB Functional and Interoperability Specification Revision 1.6
<b>TSN for Industrial Automation</b>	
IEC/IEEE 60802	TSN Profile for Industrial Automation
3GPP 24.535	5G System (5GS); Device-Side Time Sensitive Networking (TSN) Translator (DS-TT) to Network-Side TSN Translator (NW-TT) protocol aspects
<b>TSN for Fronthaul Traffic</b>	
IEEE 802.1CM-2018	Time-Sensitive Networking for Fronthaul
IEEE 802.1CMde-2020	Enhancements to Fronthaul Profiles
<b>TSN for Aerospace Networks</b>	
IEEE 802.1DP	TSN Profile for Aerospace Onboard Ethernet Communications
SAE AS6509	Converged Aerospace Integrated Network
SAE AS6675	Aerospace TSN Profile

## Ordering Information

Product Number	Description
AON-PB-TSN-CORE	TSN Core Protocols Bundle (requires TSN Time Sync Bundle)
AON-PB-TSN-TIME	TSN Time Sync Bundle

### About Spirent Communications

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks. We help bring clarity to increasingly complex technological and business challenges. Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled. For more information visit: [www.spirent.com](http://www.spirent.com)

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