



PULSensorTM 4000

Data Sheet

ACTIVE NETWORK AND SERVICE TESTING AT SCALE

The PULSensor 4000 is a high-capacity network performance testing probe part of the Creanord PULSureTM network and service performance monitoring solution. With PULSure the service provider will gain and maintain a holistic visibility and control across their multi-vendor network quality and state.

PULSensor 4000 focuses on a high volume of network connectivity measurements at Ethernet, IP and TCP/UDP layers, which build the foundation for majority of services. Typical metrics in measurement scope are latency, jitter, packet loss and throughput. With the same PULSensor 4000 probe and PULSure solution the service provider can go beyond the network monitoring and test user experience and application performance as well.

PULSensor 4000 supports network testing in different phases of the service lifecycle from service activation to continuous monitoring, reporting and troubleshooting. With a broad set of Service Activation Tests (SAT) including Y.1564, RFC2544 and RFC6349 the service provider can properly and on different levels verify the service performance in the service turn-up phase. Once service is activated the PULSensor 4000 can start continuous measurements, typically based on TWAMP or Creanord's advanced Net Precision, which provides a constant and accurate visibility to the network and services.

Highlights

- High 10GE and 1GE interface density with flexible port use in compact 1U form factor
- Hardware timestamping providing reliable measurements even at 1us accuracy
- Superior scalability to 15 000 test targets
- Optimized operational workflows via PULScore management and reporting system

PULSensor tests are configured and activated via PULScore™, which is the centralized management and reporting tool part of the PULSure solution. Via PULScore the service provider can efficiently monitor the network and service quality in real-time, detect and locate possible issues and generate reports.

PULSensor 4000 builds on a modern architecture and highly accurate hardware timestamping, which provide superior scalability and flexibility for long term use. In addition to the high number of 10GE and 1GE ports in the basic configuration the port expansion slots may be later utilized to support further growth.

The combination of broad range of active testing and measurement capabilities, high performance and versatile interface mix makes the PULSensor 4000 a perfect fit especially to mobile backhaul and enterprise service performance monitoring from a centralized location. However, the PULSensor 4000 fits well to any other location and use case within the service provider network where active and accurate network monitoring with scale is needed.



Specifications

Characteristic	Details
Interfaces	<ul style="list-style-type: none">• 4 x 10GE (SFP+) and 10 x 1GE (RJ45) Ports (WAN/LAN)• 2 x Internal Test Ports (Switch Connected 10GE-KR)• 1GE (RJ45) Management Interface (Copper)• Supported SFP types: MM, SM, SFS, CWDM, DWDM, Copper• 1 x RS232 (RJ45) Console, 2 x USB 3.0• Expansion slot for additional interface module
Physical size	H: 44 mm; W: 426 mm; D: 410 mm Weight 5.46 kg
Power consumption	Typical 50W Max 125W (without PoE)
Architecture	<ul style="list-style-type: none">• Quad-Core Intel® Xeon® CPU 16 GB RAM• 250GB Solid State Memory• 2 x 10GE-KR Internal Test Ports with Hardware Timestamp Engine• Port Director enabled 4 x SFP+ WAN and 10 x RJ45 LAN Physical Ports• uBMC Remote Management with Dying Gasp
Performance	15k Test Targets

Active testing and monitoring

Measurement	Key Performance Indicators (KPIs)	Unique features
NetPrecision	One-way measurements for: Delay, Delay Variation, Packet Loss; Two-way measurements: Delay, Delay Variation, Packet Loss; etc.	Probe to probe measurement. 1 us accuracy, and down to 1 ms sampling. Provisioned with intuitive Test Topology Designer suite or API
TWAMP	One-way measurements for: Delay, Delay Variation, Packet Loss; Two-way measurements: Delay, Delay Variation, Packet Loss; etc.	1 us accuracy in timestamping, and down to 1 ms sampling. Peak-to-Peak IPDV, custom percentiles. Full API support

UDP Echo	Two-way measurements: Delay, Delay Variation, Packet Loss; etc.	1 us accuracy in timestamping, and down to 1 ms sampling. Peak-to-Peak IPDV, custom percentiles. Full API support
Ethernet OAM Y.1731 / 802.1ag	DM, SLM, ETH-LB	1 us accuracy in timestamping, and down to 1 ms sampling. Full API support
Ping (ICMP)	Two-way measurements: Delay, Delay Variation, Packet Loss; etc.	Down to 1 ms sampling. Percentiles. Full API support

Infrastructure and User Experience Testing

Measurement	Key Performance Indicators (KPIs)	Unique features
Infrastructure testing	TCP connect time, DHCP handshake time and attempts, DNS resolution time, Web page download time	Ability to augment the network performance monitoring to infrastructure service assurance with the same probes and unified operational processes
Web App testing	Web page download time, number of login times, customized user journey	Ability to measure user experience of web applications using the same probe and unified operational processes

System Acceptance Testing, Troubleshooting

Measurement	Key Performance Indicators (KPIs)	Unique features
RFC2544 L2 and L3 testing	Bandwidth, Two-way Delay, Two-way Delay Variation, Packet Loss	1 us accuracy in timestamping. Testing up to 10G, and up to 12 individual targets within a test. Full API support
Y.1564 L2 and L3 testing	Bandwidth, Two-way Delay, Two-way Delay Variation, Packet Loss	1 us accuracy in timestamping. Testing up to 10G, and up to 12 individual targets within a test. CBS and EBS burst testing. Full API support
RFC6349 TCP testing	One way TCP Throughput, Transfer Time Ratio, Buffer Delay	1M+ connections. A rich set of TCP optimization features. Full API support
iPerf3	TCP, UDP, SCTP throughput	Easy to use GUI in PULScore for testing

Passive monitoring

Measurement	Key Performance Indicators (KPIs)	Unique features
eXtended SNMP polling	Polling of any OID like bandwidth utilization, CPU temperature, etc.	Distributed and flexible. High frequency polling. Math functions. Full API support

Standards

Standard	
RFC5357	TWAMP Control Client TWAMP appendix 1 "TWAMP light"
RFC6349	TCP Throughput
ITU-T Y.1564	Service Activation Testing
ITU-T Y.1731/802.1ag	Ethernet Loop-back (ETH-LB)
ITU-T Y.1731	Frame Delay Measurement (ETH-DM), Synthetic Loss Measurement (ETH-SLM)
RFC862	UDP Echo
RFC792	Internet Control Message Protocol (ICMP)
IEEE1588v2	Precision Time Protocol (PTP)
RFC958	Network Time Protocol (NTP)
RFC2544	Network Throughput Benchmarking
RFC2865	RADIUS Authentication
RFC4511	LDAP Authentication

Product variants

Model	Details	Part #
PULSensor 4000	Advanced Probe 4 x 10GE (SFP+) WAN Ports 10 x 1GE (RJ45) LAN Ports 2 x 10GE-KR CPU Connected Internal Switch Test Ports 10/100/1000BaseT RJ45 Management Port Internal AC/DC (100-240VAC) power supply	CN4K7400
PULSensor 4000/D	Advanced Probe 4 x 10GE (SFP+) WAN Ports 10 x 1GE (RJ45) LAN Ports 2 x 10GE-KR CPU Connected Internal Switch Test Ports 10/100/1000BaseT RJ45 Management Port Internal Dual Feed -48VDC power supply	CN4K7401

About Creanord

Creanord designs and delivers network performance quality solutions that build confidence and readiness for communications service providers to create and sell services with service level agreements (SLAs) and quality guarantees.

Creanord PULSure™ is a design framework used for network performance and experience-tracking to customer-specific needs at a fraction of the cost, time and effort of conventional systems. The PULSure solution enables you to set, offer and track network experience-based SLAs and key performance indicators (KPIs) with superior accuracy, giving you insights about the metrics such as speed, latency, jitter, and availability that go far beyond those reported by conventional systems. With the PULSure the service provider gains and preserves end-to-end situational awareness, performance visibility and control needed to automate, continuously optimize network performance and prevent negative impacts, to meet the most demanding service needs.

Already since 2000 Creanord has served customers globally, operating the most demanding networks and connectivity applications. Please visit creanord.com for more information.

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