



PULSensorTM Virtual

Data Sheet

DETERMINISTIC PERFORMANCE FOR VIRTUALIZED NETWORKS

Ongoing transition from traditional hardware installations to cloud environment has increased demand for software-based products which could share a common, virtualized server platform and scale flexibly. PULSensor Virtual are Creanord's software-based performance measurement probes, which technically and economically fit to any service provider use case where performance assurance and virtualization are required.

The PULSensor Virtual portfolio features the same market leading performance monitoring and SLA management technology as is used across all PULSensor physical Appliances. Creanord PULScore is used to manage all PULSensors and a rich sortiment of the measurement capabilities they support, and provides a clear visibility to raw telemetry and analytics, both in real-time and for historical data and reports.

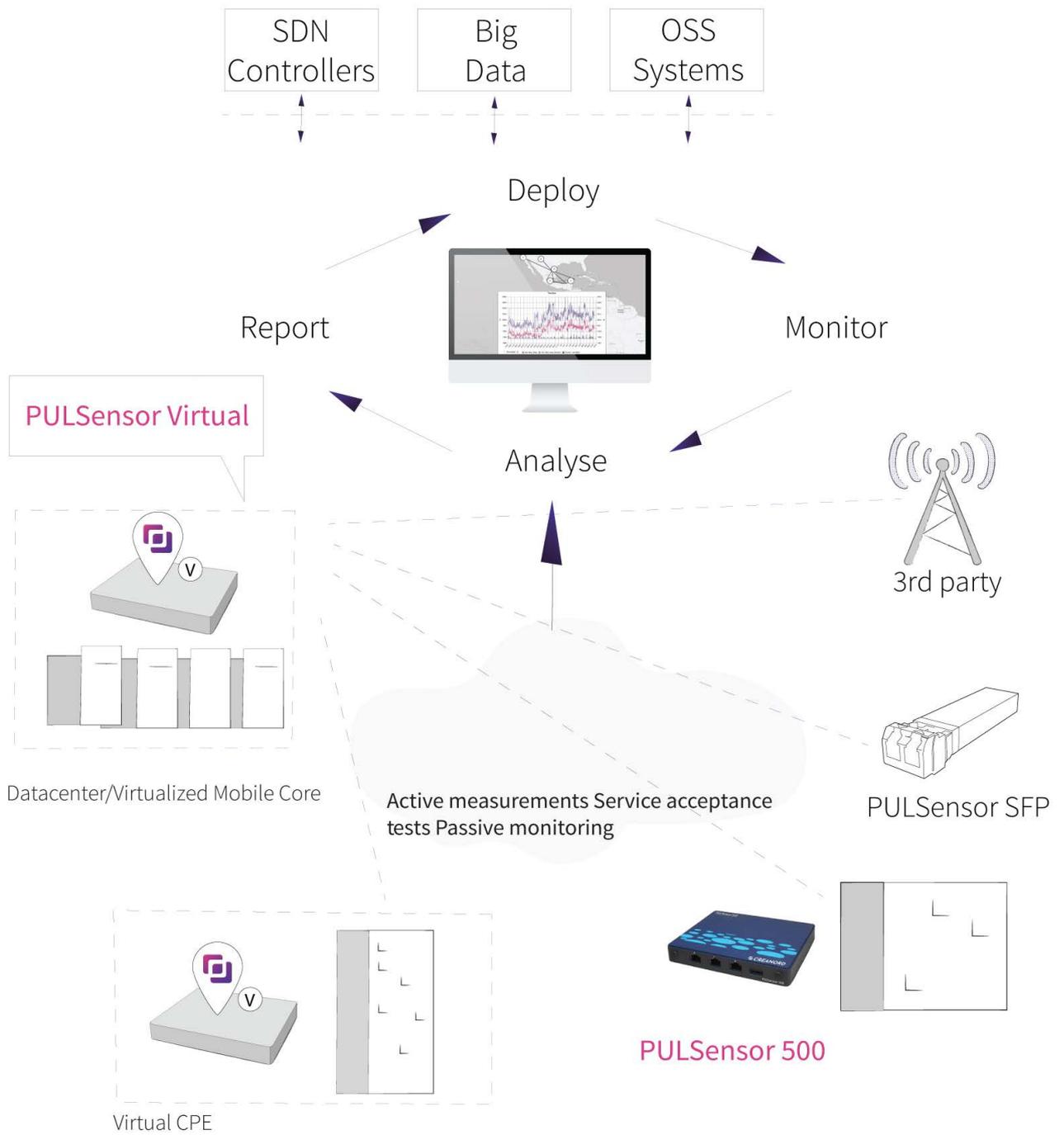
Today, the most common deployments for the PULSensor Virtual are in data centers of different sizes, which provide data warehousing and content, or run mobile core applications or business services. In these use cases the PULSensor Virtual are mainly being used to measure and monitor the connectivity between the data centers themselves, and towards the access locations, like mobile

Highlights

1. Precise microsecond level measurements and granular reporting
2. Broad set of measurement types including service activation tests and active and passive continuous measurements
3. Multiple sizing variants from uCPE to highly scalable central site probes to cater for any use case
4. Support for all most popular hypervisor platforms
5. Docker containerized probe for integration with different white-box appliances

base stations or business customers, and they can be deployed on the very same virtualized platform with all the other applications running in the data centers. On the other hand, the PULSensor Virtual are increasingly being used within data centers to monitor interconnectivity between chained VNFs, providing performance visibility also inside the virtualized infrastructure. Another popular application for the PULSensor Virtual is a virtual CPE (vCPE), which may be a white box type appliance located at the customer premises or in a small data center nearby. With the PULSensor Virtual and PULScore the service provider can effortlessly and in a centralized fashion remotely test and report on service connectivity and behavior of all services throughout their complete lifecycle including service activation, continuous monitoring, troubleshooting, and periodical reporting. Alerts upon threshold violations can be instantly fed via REST API to Controllers and Orchestrators, which are used to automate operations according to the defined rules and configurations.

Superior scalability, measurement accuracy, reporting granularity and full focus on performance monitoring make Creanord a safe and long-term choice for any service provider. Measurement accuracy combined with a broad set of standards-based measurements ranging from L2 and L3 to application level testing complemented with Creanord state-of-the-art NetPrecision test suite give service provider a comprehensive visibility to network quality and any degradation impact on customer services. Creanord's long-term co-operation with Intel has been a key for achieving a distinguished quality and scale lead in both virtual and physical PULSensors. Since sizing requirements vary between use cases, the PULSensor Virtual is available in several different variants, which can be on-boarded on all commonly used virtualization platforms and beyond.



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 (RFC 5357)	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
TCP Connect	TCP connect, DNS resolution time	Includes DNS measurement. Full API support

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 (dependent on the vProbe variant). A rich set of TCP optimization features. Full API support

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

	PULSensor Virtual 100	PULSensor Virtual 200	PULSensor Virtual 500	PULSensor Virtual 4000
Number of measurement sessions	50	100	500	15000
HW timestamping*	No	No	Yes	Yes
Active testing	Yes	Yes	Yes	Yes
eXtended SNMP polling	Yes	Yes	Yes	Yes
RFC 6349*	No	No	1G	1G / 10G / 100G (lab PoC)
RFC2544/ * Y.1564	No	No	1G	1G / 10G
PULSensor 200 SFP management	Yes	Yes	Yes	Yes

Installation requirements / recommendations

	PULSensor Virtual 100	PULSensor Virtual 200	PULSensor Virtual 500	PULSensor Virtual 4000
Platform**	Docker Container	OpenStack KVM VMware Microsoft Azure AWS Google Cloud	OpenStack KVM VMware Microsoft Azure AWS Google Cloud	OpenStack KVM VMware Microsoft Azure AWS Google Cloud
vCPU	Shared	2	4	8 / 8+
RAM	256 MB	1 GB	8 GB	8 / 8+ GB
Storage	500 MB	2.6 GB	2.6 GB	2.6 GB

Network adapter/ driver		Virtual e1000 driver for test port	Intel e1000 driver or dedicated 1 GE NIC for test port(s)	Intel e1000 driver or dedicated 1 / 10 / 100 GE NIC for test port(s)
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* Requires a specific NIC type. Contact Creanord sales for more details.

** Contact Creanord sales for additional platform support.

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.

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