Solution for *IP Core Monitoring*

Key Benefits

☐ Market leading measure-ment accuracy and reporting granularity

▽ Clear representation of measurement data for differ-ent use cases

○ Broad range of probes to meet different scale and instal-lation needs

☐ Intelligent tools to speed-up troubleshooting process

▽ Transparent visibility to customers with automated reports

Core monitoring must not be an afterthought

IP core network is a central, very high-capacity communication facility operated by a service provider between various sub-networks. Use of cloud services and bandwidth-hungry applications from distant loca-tions has exploded causing increased need for core network capacity - and there is no end to that in sight. Compared to access networks the total number of connections in core is less, but the individual pipes are thick. In core 400 Gigabit Ethernet interface speeds are common today while 800 GE and 1.6 TE interfaces are in the horizon. Advanced channel-ing technologies on fiber supercharge network are used to meet grow-ing bandwidth demand. While these technology developments are welcome to support growth, they also set challenges and risks for operations. What if you lost even one of these high capacity connec-tions, or even suffered just from degraded performance? This would have an immediate impact to a vast amount of services and end-cus-tomers.

IP core infrastructure is often a basis for high-capacity wholesale connectivity, which builds a critical foundation for the wholesale customer services. Therefore, the SLA expectations are extremely tight involving significant penalties related to SLA breaches.

The above challenges set the network performance monitoring require-ments in IP core into a new level. Service providers' priority should be to provide lossless connectivity at high speed and high performance even during the network changes, which represent clear inflection points and bring risks to the overall quality. Whatever happens you need to be on top of your network status.

Creanord puts you on a driver`s seat

As a function, network performance monitoring is a no brainer for service providers. However, the main challenge remains with the monitoring inaccuracy, which has become a real issue with growing capacities and new applications. When the collected information is too coarse, the visibility to network gets practically lost and it is the end-customers who realize the network problems first.

For service providers Creanord performance and SLA monitoring solution provides the needed visibility to the core network of any scale. It delivers upfront the big picture of the network status and intuitive tools to quickly drill-in to areas of concern. As a service provider, you can change your operations from reactive fire-fighting into proactive mode and fix issues before they affect your customers.
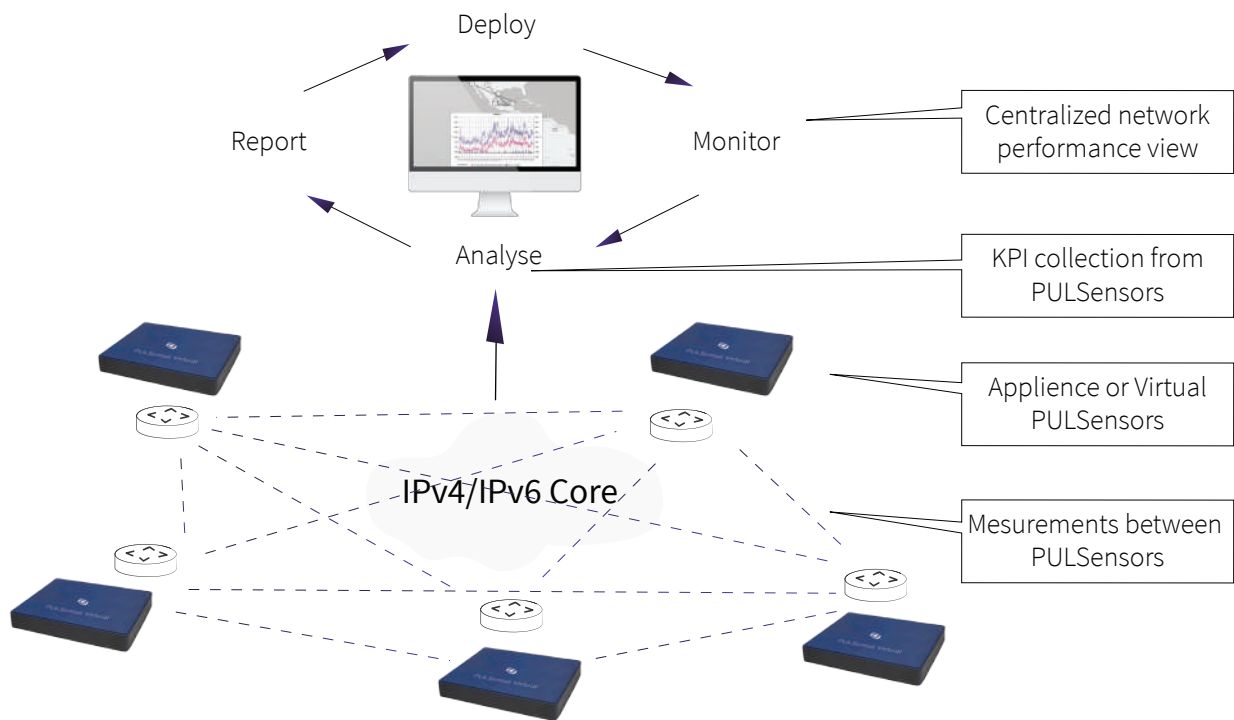

Figure 1 Creanord solution for IP Core monitoring

The Creanord's solution for Core Network Monitoring contains the following components:

- PULSensors executing the probe-to-probe measurements according to configuration

- PULScore storing, analyzing and displaying measurement data from the probes and alerting on threshold violations

PULSensor measurement probes, physical and virtual, range from small to large scale models. This way the same technology can be flexibly deployed to sites with different scale and installation needs. Probes are deployed into all locations against which accurate monitoring and testing is required, applicable in core edge locations and possibly also in selected core locations.

PULScore unifies the performance monitoring and SLA management across the core independent of network vendor mix. It contains valuable tools to streamlining operations across the whole service lifecycle – from deployment to monitoring and reporting as well as troubleshooting. Via PULScore REST APIs measurement data, raw and analytics altogether alerts can be fed to other systems, for instance, to enable automation. The Creanord solution can also be used with KAFKA, which enables scalable use of real-time streaming data by multiple systems.

Rapid deployment and risk-free service roll-outs

Core network topology is often a mesh where a number of routers on the edge connect to each other. Creating a measurement topology for this is a tedious task due to a huge amount of connections, which multiplies when additional quality classes shall be measured between end-points. Setting all up takes time and effort in the beginning, but also when network grows or there is a need to add measurements for new quality classes.

With the Creanord solution all the above is an effortless task in any topology – whether it is mesh, ring or hub-and-spoke topology. PULScore provisions the measurement connections automatically after user has selected the target topology and desired areas from the network view. This results not only to the instant deployment, but is also a recipe to correct configurations. Augmenting performance measurement to new quality levels is not only operationally easy, but also economically-straightforward with no premium and license limitations.
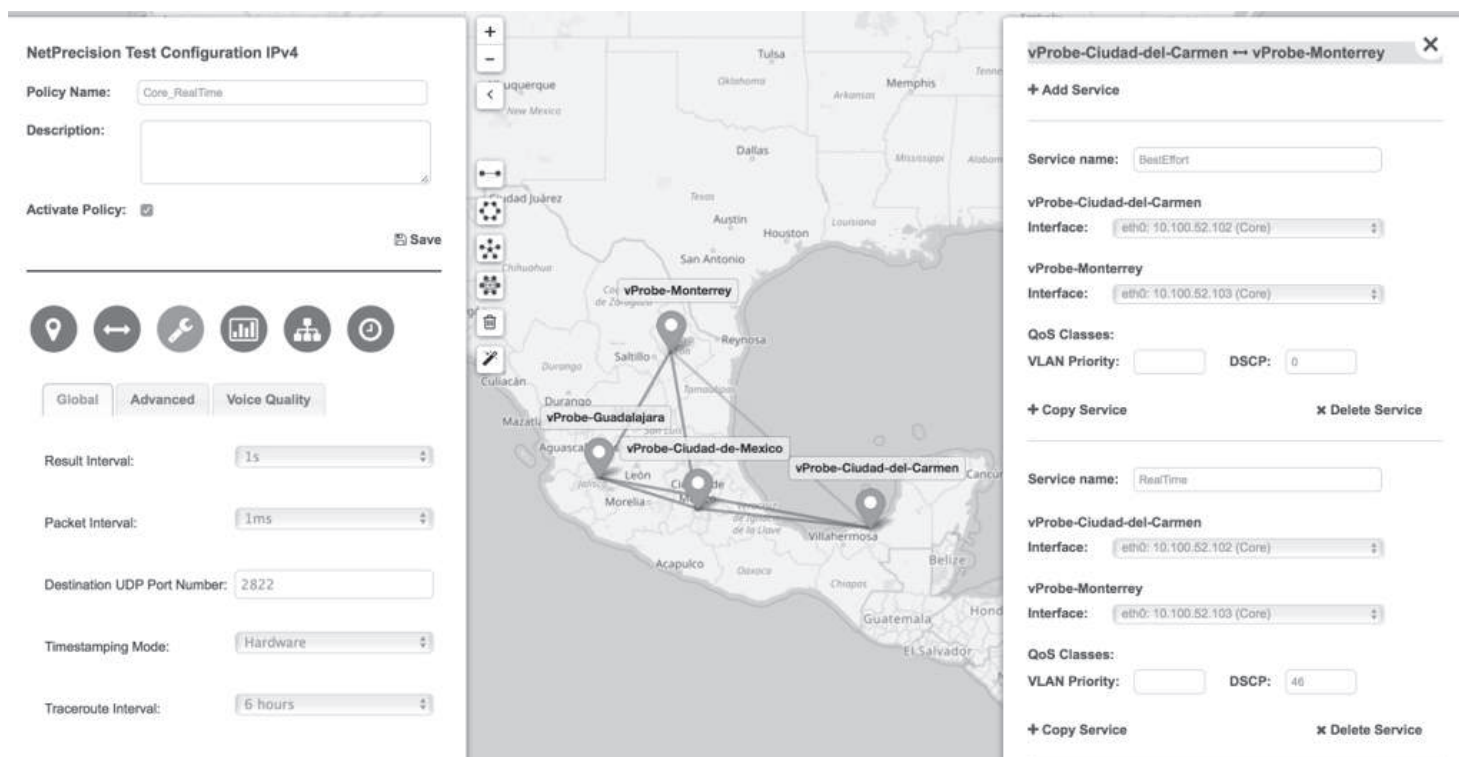
Picture 2: Choose the end-points and define the measurement topology – let the tool provision

Once the measurements are provisioned, the next logical step is to verify that services work as expected, before they are handed off to the customer. The Creanord solution offers multiple alternatives to do the service acceptance testing including:

⊘ Simple performance testing based on RFC 2544, which tests maximum Ethernet or IP throughput rates with different frame sizes

- ⬙ More advanced Ethernet service level testing based ITU-T Y.1564 including multiple QoS metrics per service flow

- ⬙ Market leading TCP level testing based on RFC 6349 providing further information that relates to application performance

Using PULScore the service provider can initiate all these tests easily and study the results from informative and well-structured reports. The combination of the above mentioned tests gives confidence on the service quality prior to customer involvement.

New norm to measurement accuracy

Measurement accuracy is getting more and more crucial every day since the connection speeds are high and growing. Microsecond level performance reporting accuracy is not just 'a nice to have' capability, but a real necessity with 5G where many applications fail to work, if 1ms delay is surpassed.

Use case examples of these services falling into ultra-reliable low latency communications (URLLC) category are tactile internet, smart manufacturing, autonomous monitoring and vehicle-to-anything communications. This is a major change from 4G networks where network delay of 10ms and more was still acceptable. In case the measurement accuracy is the same or worse than the application requirement, you fail to see performance relevant for the application.

Moreover, transition to SDN/NFV enabled network automation and closed-loop operations mandate extreme accuracy and reliability from the network performance management systems. When the system points even small anomalies in real-time, it gives service provider a possibility to act on them fast.

Creanord's NetPrecision technology makes it possible to measure end-to-end packet loss, latency and jitter very precisely, not only as two-way measurements, but also as one-way. Sampling rates of even down to 1ms enable to identify microbursts which are typically not visible to today's performance management systems.

However, these bursts may already degrade performance of certain services or at least be a symptom of a severe issue. Another important factor with NetPrecision is hardware timestamping, which entails a microsecond accuracy to measurements.

Making the data usable for the business

Performance monitoring and SLA systems collect a vast amount of data from the network. This information becomes redundant in case it is not analyzed and presented in an informative way. PULScore makes sense out of this data in multiple ways giving the right information to different users and process stages so that resource utilization is always optimal and more operations can be done during the business hours.

For example, network changes including software or hardware upgrades and configuration changes are business as usual for service providers. On top of these there are also unexpected events, which impact network operations. EchoVault provides one single graph to follow the entire network performance status at any point of time. This network level performance figure and the trend it shows can be the very first indicator of possible problems to prepare for. Alternatively, it gives a permit to focus on other tasks.

The network elements, especially in core networks are dispersed and separated with long distances. PULScore-shows the locations and topology in a map with high-level status of individual locations and interconnections. More details on selected locations or links are conveniently presented on the map view.
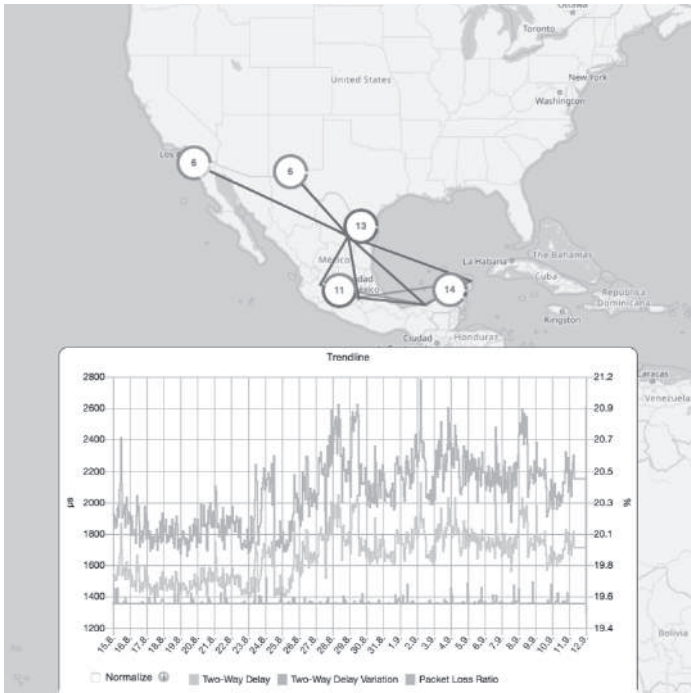
Figure 3 Clear visibility to network level performance trendline and individual measurements

Comprehensive toolset to fast problem discovery and resolutions

It is always best to prevent network disasters, especially the major ones. But IP networks are complex and problems are inevitable. Therefore, building the readiness to avoid and mitigate customer service related issues and acting on problems with the right priority, speed and resourcing are important objectives for any service provider.

PULScore presents a dashboard view per region or customer, which helps service provider to act on any issues based on the customer importance and organizational responsibilities. Whenever issues emerge, the operator can drill down from dashboard into relevant measurements and get more details. PULScore implements multiple customer-driven features to speed-up the troubleshooting process such as:

- Segmented view which breaks the monitored connection into two or more individually tested and monitored sections

- Traceroute augmentation to NetPrecision measurements, which can be run periodically or triggered by a threshold violation

- Intelligence to test connections with multiple members such as link aggregation and multipath routing

- Ability to add arbitrary metadata to connection measurements and use that data in filtering the results

With this toolset and features, service providers can quickly trace the problem, identify the root cause and focus on fixing it. In the best case, thanks to constant and granular visibility to the network performance these problems are never even noticed by the customer.

Witnessing the service quality with automatic reportings

Customers expect regular reporting as an evidence of how a service provider has succeeded to meet the SLA and related metrics. Report creation and delivery are an important part of the service providers' processes. Accurate customer reporting or even on-line visibility of service quality is a powerful way for service providers to build confidence to its services and differentiate from competitors.

EchoVault makes the whole reporting process extremely easy for the service provider. Instead of gathering and massaging the desired measurement data manually, the service provider can get a periodic report from Echo-Vault automatically. This excel-based reporting is configurable and may contain customer logos as part of the layout. Every time a report is generated, it will go through an approval process during which the service provider can internally review the report and do possible edits or commenting before approving it to email or upload delivery to the customer.

Going beyond the automated periodic reporting, the service provider may grant to a specific customer an on-line visibility to its services. Through PULScore portal, the customer can at any time see the service status and quality of own connections. Again, for the service provider this Portal option is ready to use and easy to complement with a customer logo.

CREANORD

on the pulse of networks

WHY Us?

Specialized in network connectivity performance and SLA management - Creanord helps service providers and alike operate their network with complete visibility and uses the service quality as a competitive asset. With Creanord solution you can discover the pulse of your networks and build the confidence to sell, deliver and use the services to your customers.

At Creanord we believe in the Five V's, which sets us apart
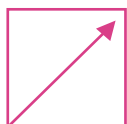
Volume
Scales to hundreds of thousands of measured connections
Kafka API for big data
Great economical fit to growing performance monitoring needs
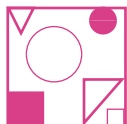
Variety
Compatible today with 3G, 4G and 5G application requirements
Broad range of physical and virtual measurement probes
Diverse data categorization options including arbitrary metadata

Velocity
Rapid deployment with point-and-click provisioning
Real-time measurement data for SDN/NFV automated operations
Automated SLA reporting with built-in approval process

Veracity
Microsecond accuracy in measurements
Granular reporting through down to millisecond sampling rate
Versatile testing options at L2, L3 and L4-L7
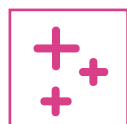
Value
Measurement and analytics as a package
Cost predictability with no hidden costs
Reliable data from top down enabling proactive and efficient operations

Stellar product technology and customer first-thinking combined with flexible operations makes Creanord your business partner of choice..