VIAVI

xSIGHT™ Monitoring Capabilities — Data Access

Viavi Solutions™ leverages leading-edge technology to provide simple integration of data sources into a single platform with many viewing and management options.

Today, the approach to monitoring networks requires a major overhaul. Control-plane traffic volume has grown exponentially with the advent of 4G, along with user-plane traffic that now also needs to be analyzed. Against this dramatically changed backdrop, traditional monitoring methods will not economically scale because they involve: 1) capturing every traffic packet of interest; 2) correlating all packets to individual flows upfront and building a data record for every flow; and, 3) using external data representations (XDRs) to calculate per-flow KPIs and correlated messages for transaction tracing. Because these workflows generate so many KPIs, it is difficult to identify any key trends and issues and have visibility as to where they fit within the network.

A great analytics solution begins with effective and simple data capturing. In turn, data capture is made possible by an efficient monitoring approach. xSIGHT provides flexible, ubiquitous monitoring solutions for today's continuously expanding networks. From network probes to data collection agents and virtual probes, Viavi capitalizes on leading-edge technology to provide simple integration of data sources into a single platform with many viewing and management options.

xSIGHT Monitoring is the data access layer of the xSIGHT real-time intelligence platform (Figure 1) and works in conjunction with xSIGHT portal and analytics applications to provide the industry's most effective approach to customer experience assurance (CEA).
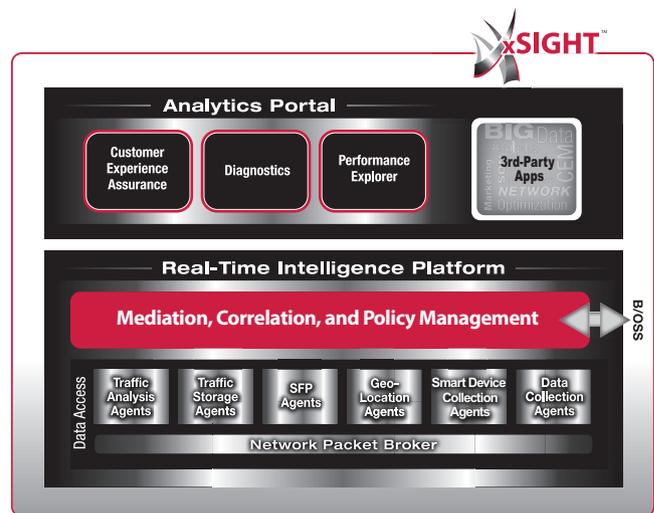

Figure 1. xSIGHT architecture

A New Approach

xSIGHT breaks away from the traditional methodology for monitoring. It fundamentally changes how network analytics are generated and CEA is done. It proves that a new strategy works for today's larger-volume networks—where big data prevails, multiple technologies coexist, and there are countries with 100% user penetration. This new level of user traffic cannot be analyzed on a single call-by-call basis and therefore, information must be understood at a higher level in order to be efficiently managed.

Traditional solutions use both KPI generation and protocol transaction tracing processes that are based on building data records upfront for every flow. This has the following disadvantages:

- For KPI generation, while a lot of the data within each record is used, there is a huge number of KPIs that scales alongside the vast number of flow records but at a faster rate; for every flow record, there are N number of KPIs

- All traffic is treated equally; it is stored and treated in the same fashion, making identifying useful insight difficult as well as storage intensive

- For protocol transaction tracing, since <0.1 percent of calls and sessions are ever traced, correlating every call or session upfront equates to a lot of wasted processing and storage

If network information is continually stored and managed at an individual flow level, a compounding issue will begin to occur. Capturing this information takes time, as does creating the associated flow records and XDRs. Sorting records is also very time and process intensive, and finally, when it is necessary to retrieve the information, the search time can literally add up to hours. This scalability issue compounds as the network grows. To keep up with expanding data, it is also necessary to add hardware and processing power to store and manage the growing database. The problem is that as providers add monitoring capability, the traffic continues to grow, requiring even more monitoring equipment.

xSIGHT enables a high-level monitoring strategy that provides visibility into 100% of the network and incorporates a model that lets network providers turn the high-level picture into a more granular one, as needed. The information gathered and presented can then be refined or abstracted in the areas of interest.

Streamlined, Value-Based Monitoring

This approach separates analytics, KPI generation, and protocol tracing processes. They are no longer treated as equals, and each can be streamlined. For KPI generation, moving to a time-based process significantly reduces the number of KPIs with no reduction in visibility. A traffic value-based process, with a variable level of KPI detail, translates to variable processing and storage consumption, no longer tied to each call/data flow. For protocol transaction tracing, correlating calls to sessions is performed only on demand.

xSIGHT reduces the number of records by as much as 75:1 and turns them into meaningful information at the monitoring layer. Significantly reducing the number of records generates numerous benefits:

- Reduced CapEx — requires less hardware and disk space to store the continually growing mountain of records

- Reduced footprint — requires less rack space, less power, and fewer HVAC expenditures

- Lower total cost of ownership — provides faster and more relevant search results; and, the time spent by personnel who analyze this data daily (customer care, capacity planning, network operations, optimization and CTO) will be more meaningful and useful

- Faster time to market — quickly and efficiently identifies large issues as well as specific pockets of problems, allowing quick and easy tracking of limited deployments in test markets throughout the network

- Reduced churn — proactively and quickly identifies issues and reduces overall time to resolution

SMARTmetrics™

How is it possible to reduce the number of records kept by as much as a 75:1 ratio and still keep meaningful information? This can't be done by simply reducing monitoring to statistically significant samples of network traffic. Sampling traffic may be useful in limited cases, but as a general approach it leaves blind spots in network health and can drop significant information, especially when it comes to troubleshooting issues.

In today's LTE environments, with literally thousands of transactions per user possible in just a few minutes, it is no longer useful to simply record these transactions and subsequently generate millions of XDRs for later analysis. Less than 0.1 percent of XDRs are ever analyzed or even looked at after capture and creation. This methodology creates an artificial need to store millions of records daily using commensurate amounts of hardware and software. In addition, there is a need to manage all of this data, typically via a complex structure of databases, reports, alarms and teams that receive daily, weekly, and monthly updates that they can analyze and interpret—or ignore. All of the effort put into supporting this system creates a haystack in which to search for a needle.

There is a better way. A holistic approach with meaningful analytics requires a fundamental change in the information that is collected from the network and the way in which it is collected. By generating Synchronized, Meaningful, Adaptive, Real-Time Metrics, or SMARTmetrics, xSIGHT can reduce the number of transactions recorded and increase the significance of these data points.

SMARTmetrics solves the problem of millions of XDRs with a novel approach to traffic data collection. This method creates an instant view of all network traffic and transactions that take place in the network. Instead of recording all individual flows for every user, xSIGHT immediately turns the information collected into metadata, which summarizes the number and nature of these transactions so that it is no longer a mountain of information with countless reports that need to be extracted and cross-referenced. Instead, the metadata is immediately useful, viewable, and it delivers digestible information that can be easily observed and interpreted on a daily basis to support everything from troubleshooting to marketing efforts.

Traditional vs xSIGHT Workflows

Two processes coexist in an xSIGHT workflow: monitoring/troubleshooting and troubleshooting only. Data is no longer treated equally and can be processed as much as is required for the task. KPIs are built immediately to a pre-defined granularity.

Traditional solutions: data-heavy, generic analytic view

xSIGHT solutions: heightened visibility with distinct analytics, real-time data used as needed
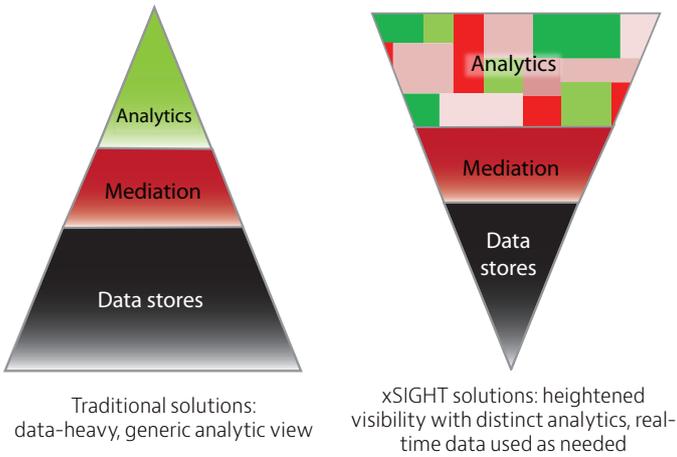
Figure 2. Traditional vs. xSIGHT analytics

xSIGHT produces an analytics record of network activity at a specific time period instead of creating a record for every flow generated on the network. Using this method, the amount of information that needs to be stored is greatly reduced and the resulting analytics create a network profile that provides more actionable information than traditional XDR generation. This provides new, useful insight into the service provider network environment. And, it delivers incredible flexibility and ROI to the monitoring investment which can now be leveraged across multiple applications and departments, not just the

NOC. For example, providers can capture and summarize MOS scores instantly at an eNodeB level, providing visibility into the quality of the calls for a specific eNodeB. Immediately, a user can turn around and look at the same MOS scores by device type, providing an entirely new dimension to analyze in terms of handset quality which, in turn, may lead to unearthing other issues or efficiencies.

Below is a sample of the type of data metrics that can be collected via the xSIGHT monitoring layer:

Time IMSI	CellID IMEI	IP Adr	TCP	Win size	Delay	Load Time	TTL	Xtransmits	Throughput
			UDP	Packet loss	Jitter	Throughput	VoLTE MOS	Delay	Etc.

These records are then fed upstream to xSIGHT's intelligent mediation layer and subsequently to an application portal.

With the xSIGHT approach, what would have been 3 billion records daily can be turned into 200 million. In addition, these records are decoupled from traffic growth, which means an additional flow record does not automatically equate to a new record for xSIGHT. Only high-level categories such as cells, customer groups, or micro services would drive a growth in the number of records, preventing the cost of the network monitoring hardware and software from growing hand-in-hand with traffic flows.

Meta Categories

Meta categories are another example of a sharp decrease in the number of records required to generate a complete picture of network health. Storing information based on a predefined level of granularity summarizes all transactions into higher-level categories and lets a user make intelligent decisions about which services are having issues and to what extent.

The type of service and the user population impacted are both strong determinants on how and when resources should be deployed to address irregularities. According to JD Powers and Associates, maintaining business customer satisfaction can lead to triple the return of a non-business customer: "Among business customers who experience network connection issues, the percentage of those who will most likely switch providers in the next 12 months is nearly three times higher than the study average (27% vs. 10%, respectively)."

The way a service provider approaches CEA can very positively impacted by taking a top-down, proactive approach when the right workflow is used.

Optimized Workflow

Gathering metrics to generate higher-level statistics is the first step in achieving a more effective method of CEA. To leverage these statistics fully, a simpler workflow is needed so that all workgroups within the service provider organization can benefit. xSIGHT generates real-time feeds into its CEA application and provides an intuitive workflow that can be used to troubleshoot or generate reports for any level of the organization.

A workflow that can drill down to the root cause with half-a-dozen mouse clicks provides significant ease-of-use. Starting with a call trace is the most complicated way to solve a problem. Instead, the xSIGHT workflow provides context and impact upfront and then lets a user drill down into a detailed call flow as needed.

Troubleshooting

In addition to high-level analytics information, service providers can have access to full troubleshooting capabilities by saving user-plane and control-plane data in raw formats for short periods of time, such as 7 – 30 days. Providers can access this information as needed, when needed, and it is no longer necessary to turn every call into an individual XDR that has a <.01 percent chance of ever being retrieved—troubleshooting records should be accessed only on an as-needed basis.
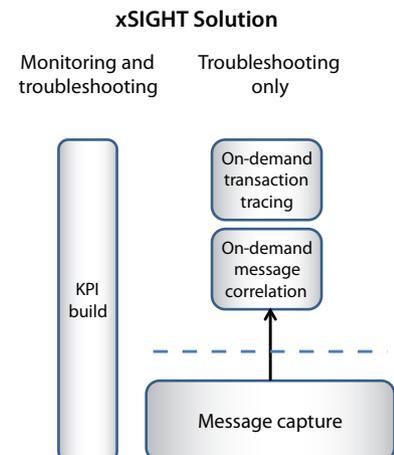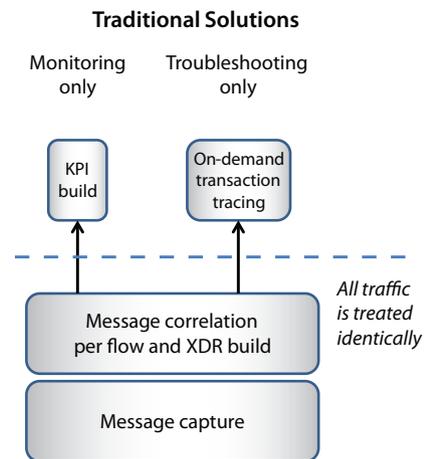
The ability to capture line-rate traffic for a fixed period of time, and then make the entire call available on demand, dramatically speeds problem resolution. xSIGHT makes this possible with a powerful indexing capability that lets you search data stores in a matter of seconds. Initial results for searches are available instantly, and full calls can be retrieved in minutes. xSIGHT rewinds time, making problem recreation a thing of the past.

Summary

With this new, ground-breaking methodology, the xSIGHT monitoring platform represents a best-in-class solution for monitoring today's networks, starting at the foundation layer with data collection and SMARTmetrics. Once these metrics are collected, they enable KPIs and a high-level view of the network that are much more descriptive than what traditional monitoring solutions provide. Combined with a simple-to-implement mediation platform and an intuitive workflow which focuses on summary analytics, xSIGHT is the best way to provide CEA in any network environment.

With traditional methods, mass amounts of data stores are required and slowly filtered up to an analytics layer which then provides hundreds or thousands of KPIs left up to individual users to interpret and put into context.

With the xSIGHT workflow, issues are viewed from the top down with the impact on the network clearly defined upfront. The workflow also provides the ability to drill down for specific troubleshooting options.

Traditional Solutions

Monitoring only   Troubleshooting only

KPI build

On-demand transaction tracing

All traffic is treated identically

Message correlation per flow and XDR build

Message capture

xSIGHT Solution

Monitoring and troubleshooting   Troubleshooting only

KPI build

On-demand transaction tracing

On-demand message correlation

Message capture