Network Analytics

Sandvine's Network Analytics is the first and only true analytics product purpose-built for converged-access communications service providers (CSPs). By deploying Network Analytics, any provider, regardless of the combinations of access technologies in place, can immediately:

- Discover a depth and breadth of insight not available from any other solution
- Improve business performance by optimizing capital investments
- Lessen risk, by making decisions in a completely informed context

Service providers frequently cite challenges posed by rapidly-changing subscriber behavior and the varied adoption of new consumer devices. Sometimes, the data needed to make an informed decision exists, but is spread between so many systems that the manual consolidation effort is daunting, resulting in decisions that are based on assumptions rather than observed facts.

With Network Analytics, your business analysts gain access to information and data never before possible, and without all the expensive hassles of manual collection and aggregation. You are able to leverage disconnected, but related, information sources – particularly advanced measurements from your own network – to gain a complete context for business decisions. Ultimately, this knowledge empowers you to predict tomorrow and act today.

KEY BENEFITS

Gain depth and breadth of insight – from aggregate, network-wide key performance indicators to granular location- and device-specific measurements that deliver:

- Improved business performance by increasing returns, optimizing the value of investments, and preventing avoidable losses
- Managed risk with informed decisions that provide full context, including projections of the future based on the observed past – knowing is a safer strategy than guessing
- Increased revenue potential by gaining unique insight into segmented subscriber behavior, application adoption, and device penetration
- Reduced effort and expenses associated with manually gathering data and preparing status reports and presentations

FOCUSED DASHBOARDS FOR FOCUSED ANALYSIS

Network Summary Dashboard

Use the Network Summary Dashboard to monitor overall network developments and track your organization's key performance indicators

Real-Time Entertainment Dashboard

Let the Real-Time Entertainment Dashboard show you metrics that matter, including video views, duration, and video quality of experience (QoE)

Traffic Management Dashboard

Plan your congestion management policies based on the granular insight provided by the Traffic Management Dashboard, then view the positive impact

Usage Management Dashboard

Dive into the segmentation provided by the Usage Management Dashboard to identify opportunities to launch new services

IPv6 Transition Dashboard

Investigate the ongoing adoption of IPv6 on your network with the IPv6 Transition Dashboard, gaining insight into the applications and devices driving the trends

Routing Efficiency Dashboard

Control network costs and build business cases for capital projects using the Routing Efficiency Dashboard to gain a complete understanding of interconnect relationships

Device Insights Dashboard

Gain insight into how devices are being used across the network for customer segmentation and data-driven service innovation using the Device Insights Dashboard

Built on Sandvine's Traffic Classification

Capacity Planning Dashboard

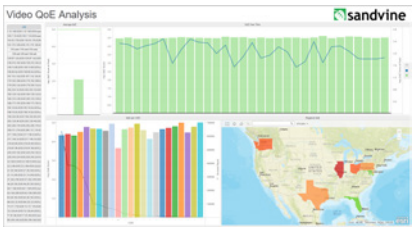
Gain insight into your Traffic Management deployment to manage congested resources and measure overall business benefit with the Capacity Planning Dashboard

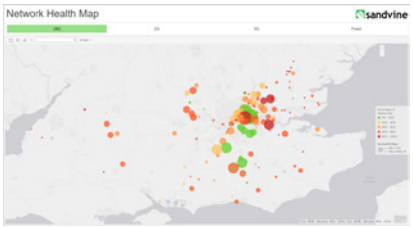
Sandvine's traffic classification technology extends beyond bytes and protocols by delivering metrics that matter, like event-counting, time-based measurements (e.g., round-trip time and video duration), and calculation of per-video and interim quality of experience scores. These measurements, many of which are uniquely provided by Sandvine, provide the data on which Network Analytics applies its processing algorithms.

KEY FEATURES OF NETWORK ANALYTICS

Network Analytics is a true network business intelligence solution, and offers an array of features that maximize actionable insight without imposing complicated operational requirements:

- Trend identification and projection, based on the measured past
- Support for custom visualizations and dashboards
- Export and save data from any chart displayed as a .PNG or .CSV file for post-processing
- Open API to an integrated data warehouse, for data import and export flexibility
- Powerful extract, transform and load (ETL) process
- Reusable data model and simple user interface enable custom report creation and modification
- Easily deployed on any spec-compliant, third-party server





FLEXPANELS

The Insights You Need, In Vivid Detail, Shareable With Your Teams.

FlexPanels represents the next generation of purpose-built analytics for CSPs. This new technology enables a brand new way to explore, visualize, and share critical network data.

Many solutions on the market today offer operators a fixed view of their data. They define what should be seen, when, and in what form. So if you have a score for your network and want to change that view, you are out of luck. With FlexPanels, you can customize any dashboard to suit your needs, and build views that are as unique as your network. Built on top of Sandvine's unique data foundation, operators have unparalleled access to analyze datasets in Network Analytics.

The Insights You Need

FlexPanels allows easy access to important data. With full self-service data models, you can explore your network to solve problems and spot opportunities. With drag-and-drop rapid dashboard creation, even users without a background in data analysis can build the perfect view into their data.

In Vivid Detail

FlexPanels introduces a new library of visualization options, so you can pick the view that's best for your data and your goals. Plus, the options are always growing, thanks to a community of open source visualization builders.

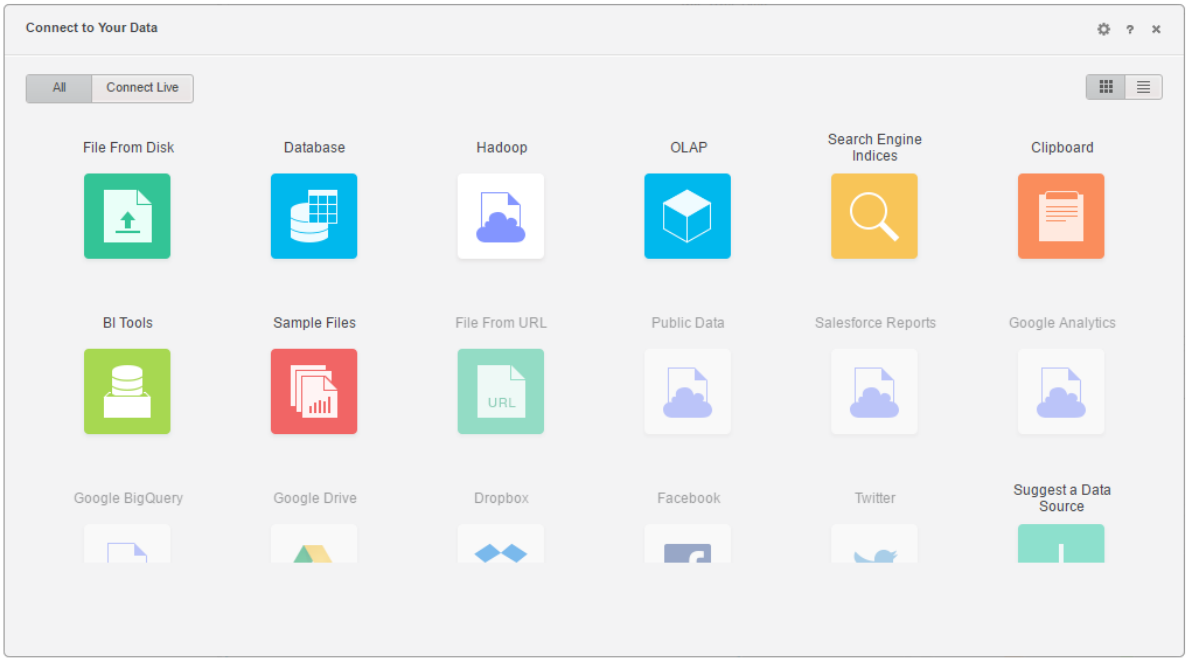
Shareable With Your Teams

Sharing important insights in Network Analytics has never been easier. FlexPanels dashboards can provide a window into your data, without exposing the full data foundation and editing capabilities. That means you can build exclusive live views for other teams, embed dashboards into portals, and even create role-based accounts for people to build their own dashboards.

BIG DATA'S LITTLE BROTHER

With FlexPanels, you can join data from other systems with data within Network Analytics to unlock new perspectives. Exporting data from multiple data sources and manually joining it in tools like Excel is both time consuming and error-prone. FlexPanels allows direct access to a massive variety of databases, including Hadoop, so you can link datasets for analysis.

Figure 1



Self-Service Data Models

Network Analytics data is preconfigured to be easily used and accessible. That means you don't need to be a data scientist to understand valuable network data.

Data Exploration

True analytics means being able to solve problems and discover opportunities. FlexPanels lets you dive deeply into your data, all in an easy-to-use drag-and-drop interface.

Limitless Visualizations

FlexPanels introduces a new library of visualization options so you can pick the view that's best for your data and your goals. Plus, the options are always growing, thanks to a community of open source visualization builders.

Simple, Safe Sharing

Sharing insights has never been easier. Build custom views for other people and teams, without allowing them full control. You can even embed views via iframes to power company dashboards and portals.

Data Import

FlexPanels allows direct access to a massive variety of databases, including Hadoop, so you can visually link datasets for analysis.

Dashboard Import

Share your FlexPanel dashboard creations on Sandbox, Sandvine's online user community. If you see a dashboard someone else has built, import it into your own Network Analytics to see your own data.

NETWORK SUMMARY DASHBOARD

Use the Network Summary Dashboard to monitor overall network developments, track your organization's key performance indicators (KPIs), and initiate action.

Included with all Network Analytics deployments, the Network Summary Dashboard offers screens for a wide variety of functional roles, ranging from Marketing to Engineering, and for different levels of the organization. Whether the user is an operations analyst who wants to find performance outliers, or an executive interested only in aggregate KPIs, the Network Summary Dashboard is a one-stop destination for anyone who needs to stay on top of network developments.

Network Summary Home

Monitor your network's key performance metrics at an aggregate level, and track the network's top applications, websites, and video providers.

Network News Analyzer

Personalize the Network News events that appear on the Network Summary screen by configuring basic rules and thresholds.

Regional Analysis

Explore regional variations and identify performance outliers by contrasting metrics across regions, and drilling through three levels of network hierarchy.

Subscriber Analysis

Better understand how usage varies between similar subscriber groups by comparing subscriber behavior between all your service plans.

Application Type Analysis

Determine the applications and services that are driving network usage, first by application type, and then by drilling into the Application Analysis screen.

Handset Analysis

Mobile operators can examine the relationship between devices and subscriber usage to determine the network impact of different handsets.

Access Type Analysis

Converged access operators can contrast key metrics between different access technologies.

Dynamic Analysis

Discover hidden relationships between variables by visually exploring your network data using an interactive heatmap analysis tool.

Dynamic Analysis by Application Type

Create custom analysis reports that break down Application Type by factors such as service plan and geography.

Dynamic Analysis by Application

Create custom analysis reports that examine applications by factors like service plan and geography.

REAL-TIME ENTERTAINMENT DASHBOARD

Real-Time Entertainment will soon be the largest source of traffic on all consumer networks, regardless of access technology, and the Real-Time Entertainment dashboard sheds a revealing light on the characteristics that are unique to video and audio traffic. As these applications grow as a percentage of total traffic, it is critical that network operators understand and measure the subscriber experience.

Included with all Network Analytics deployments, the Real-Time Entertainment Dashboard shows you metrics that matter, including number of views, media duration, and quality of experience (QoE), revealing measurement-based insight not possible with any other solution.

Engineering Summary

View a high-level scorecard showing key metrics like quality of experience, number of media views, media duration, and peak period consumption.

Quality of Experience Analysis

Examine quality scores and the contributory factors, understand how quality varies over an average day, and view quality distribution histograms.

Plan Analysis and Calculator

Explore potential service plan options based on per-month usage, per-video charging, and per-minute billing based on your network's measured usage.

Over-the-Top Video Adoption and Revenue

Quantify the average revenue from users (ARFU) that over-the-top providers are receiving from your subscriber base, and monitor adoption rates.

Dynamic Analysis

Discover hidden relationships between variables by visually exploring your network data using an interactive heatmap analysis tool.

DEVICE INSIGHTS DASHBOARD

With more than 3.2 billion mobile subscribers around the globe, almost half of the world's population uses mobile communications. The number of people using multiple devices or SIM cards is also expected to increase rapidly from the almost 7 billion SIM-enabled connections recorded in 2013. One main catalyst for this growth is emerging markets, where each day someone connects to the Internet for the first time, and most often their first experience of the Internet is happening on a mobile device.

To prepare networks for future data demands, the growth of mobile subscribers, and to ensure that revenue is aligned to this growth, operators need dynamic insight into the devices and applications that are driving demand on the network to protect subscriber quality of experience (QoE) and develop services that subscribers will value in the future.

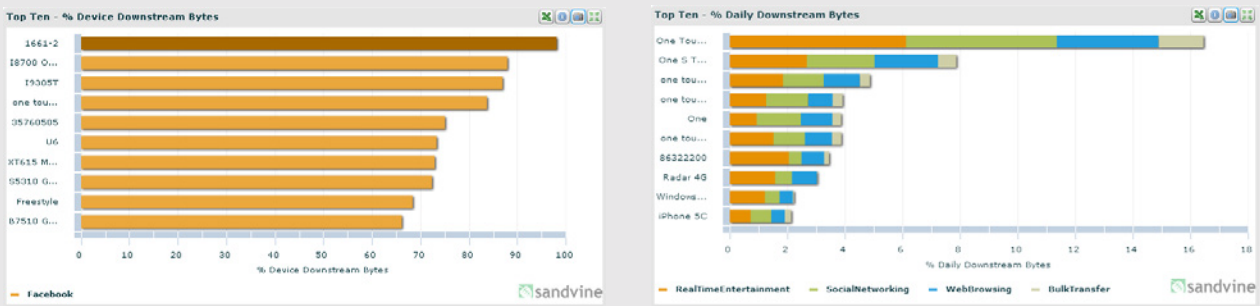
Device Summary

Compare and contrast performance metrics of the top devices on the network by manufacturer, operating system, and radio capability.

Application Analysis

Segment your subscribers more accurately with a complete understanding of the applications that are driving demand on the network, unique by manufacturer with handset-level granularity.

Figure 2



Using the available drop-down menus or the device navigation tree, refining your analysis by Manufacturer, Operating System, or Radio Capability is only a few mouse clicks away. A built-in quick search field enables you to type a few characters of text to return related devices – perfect if you're trying to get a quick and very specific answer to a very focused, device-related question.

The Application Analysis screen provides insight into trends of top applications by manufacturer, with granularity into top devices by a single application. Top application categories reveal how usage patterns can vary widely by device and manufacturer, and analysis can be further refined for increased subscriber segmentation accuracy, while enabling marketing users to spot third-party partnership and promotional opportunities that were previously hidden.

ROUTING EFFICIENCY DASHBOARD

Control network costs and build business cases for capital projects using the Routing Efficiency Dashboard to manage routing paths, identify high quality Autonomous Systems (AS), and gain a complete understanding of interconnect relationships.

Included within Sandvine's Network Analytics base deployments, the Routing Efficiency Dashboard provides analytics based on the Border Gateway Protocol (BGP) – used by networks to establish routing between one another. With visibility into network routing behaviors, communications service providers (CSPs) can create more efficient interconnect relationships that improve overall network quality and reduce transit costs.

Many operators provision their network based on either peak period traffic volume or a measure of per-subscriber bandwidth at peak times. To meet network demands and deliver content to subscribers efficiently and at the lowest cost, operators create transit links and interconnect relationships with other CSPs.

These relationships carry operational costs for providers defined by Peak Rate upstream and downstream as well as total traffic sent across international and domestic routing links.

Routing Analysis

Compare and contrast performance measurements on the network by Autonomous System (AS) including Origin AS, First-Hop AS, and Second-Hop AS.

Application Analysis

Understand the impact of application traffic across Autonomous Systems (AS), including Origin AS, First-Hop AS, and Second-Hop AS.

CAPACITY PLANNING DASHBOARD

The combination of increasing subscriber bandwidth demands and the operation of multiple access networks simultaneously makes meeting current and future bandwidth requirements a complex and challenging proposition for network engineering, operations, and access network provisioning teams.

Further complicating capacity planning decisions is that additional capacity is often added to the network based on an estimation of peak bandwidth demands, or a measure of the number of subscribers at peak without consideration for the percentage of time a resource spends in a congested state, the level of quality that a resource is delivering, or what potential savings exist on the network from deferring an upgrade decision that doesn't impact subscriber QoE.

The Capacity Planning Dashboard provides network-wide views with location-level granularity into key business metrics (Quality Score, % of Time Congested, Deferral Period, Days to Upgrade, etc.) of congested resources across the network.

Location Level-1

Examine resources utilization and congestion, and monitor a watch list of heavily-loaded Level-1 locations (e.g., BRAS, RNC, etc.)

Location Level-2

Examine resources utilization and congestion, and monitor a watch list of heavily-loaded Level-2 locations (e.g., DSLAM, Cell ID, etc.)

IPV6 TRANSITION DASHBOARD

With the IPv6 Transition Dashboard, communications service providers (CSPs) can monitor the growth of IP addressing technologies on the network, and increase the accuracy of infrastructure planning activities with incredible breadth and depth of insight into the application types, applications, and devices that are powering IPv6 adoption on the network.

Included within Sandvine's Network Analytics base deployments, the IPv6 Transition Dashboard provides extreme granularity of insight, powerful out-of-the-box measurements, and forecasting capabilities to analyze IPv6 adoption trends by device, application, and application type.

Summary

Highlights the ratio of IPv6 traffic compared to traffic from other IP technologies for all application types across the network, presented through Bubble and Trend Charts and also a network topology drill-down menu.

Application Type

Shows the ratio of IPv6 traffic compared to other IP technologies for selected categories of application traffic such as Real-Time Entertainment or Social Networking.

Application

Presents the ratio of IPv6 traffic compared to other IP technologies for the top individual applications across the network such as YouTube, Netflix, or Facebook.

Device

Displays the ratio of IPv6 traffic to other IP technologies for the top devices across the network such as Game Consoles, Tablets, Smartphones, and Computers.

As the roll out of IPv6 by content provider continues to broaden, the overall share of native IPv6 traffic on broadband networks also increases. For example, when Netflix implemented IPv6 in 2012, their share of native IPv6 traffic on a North American Fixed Access network more than doubled in less than two weeks.

These differences underscore the need for clear visibility into the application types, applications, and devices powering the adoption of IPv6 in order to accurately plan and accommodate for this growth, which only the Network Analytics IPv6 Transition Dashboard can deliver.

TRAFFIC MANAGEMENT DASHBOARD

Plan your congestion management policies and optimally prioritize your capital investments based on the granular insight provided by the Traffic Management Dashboard, then quantifiably demonstrate the positive impacts of your decisions.

The Traffic Management Dashboard focuses on optimizing network performance and capacity planning by letting Cable Internet providers monitor network resources for the telltale signs of congestion. Detailed measurements monitor the frequency and prevalence of congestion on a per-QAM level, letting you focus capital spending where it will provide the largest return.

Resource Analysis

Examine resource utilization and congestion network-wide to spot emerging problems, and monitor a watch list of heavily-loaded network elements.

Network Analysis

Quantify the operational impact of network congestion by investigating detailed element utilization metrics.

Fairshare Analysis

Audit your Sandvine Fairshare deployment to understand the frequency and widespread positive impact of subscriber management events.

Subscriber Persona
Identify the usage profile of your most profitable subscribers and discover the factors behind subscriber consumption.

Capacity Planning Calculator
Project capacity requirements to explore the return on investment of traffic management, using your own network data and financial modeling.

USAGE MANAGEMENT DASHBOARD

Understand how your service plans are performing at a network and business level using the detailed analysis provided by the Usage Management Dashboard. Use the same data to identify behavioral segments that justify the creation of new revenue-generating service plans.

The Usage Management Dashboard is closely integrated with Sandvine's Usage Management product, and provides insight into subscriber consumption and its relationship to usage quotas and other service plan characteristics. By understanding how existing services are being used, operators can optimize these service plans and identify new opportunities.

Engineering Summary
View data consumption statistics including overage, top-ups, and zero-rating, segmented by service plan and plotted and projected over time.

Service Analysis
Measure the performance of each service plan based on key metrics broken down by region, differentiating between local subscribers and roaming users.

Quota Profile
Assess the effectiveness of each subscription quota limit by examining the rate at which different subscriber groups consume quota.

Subscriber Profile
Understand why some subscribers consume more data than others by exploring different behavioral segments.

Marketing Summary
Gain a network-wide view of the business performance of your service plans, including revenue breakdowns by subscription, top-up, and overage.

Regional Analysis
Identify your most popular and profitable region and service plan combinations, and determine what makes each region unique.

Service Planning Calculator
Explore the potential of new billing and quota thresholds by performing scenario analysis using your own network data and service plans.

Dynamic Analysis
Discover hidden relationships between variables by visually exploring your network data using an interactive heatmap analysis tool.

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ABOUT SANDVINE

Sandvine helps organizations run world-class networks with Active Network Intelligence, leveraging machine learning analytics and closed-loop automation to identify and adapt to network behavior in real-time. With Sandvine, organizations have the power of a highly automated platform from a single vendor that delivers a deep understanding of their network data to drive faster, better decisions. For more information, visit **sandvine.com** or follow Sandvine on Twitter at **@Sandvine.**

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