



## Traffic Explorer



*Harnessing the Intelligence of IP*

Traffic Explorer™ combines two previously distinct management technologies – route analytics and traffic flow analysis – to deliver the first integrated, real-time view of network-wide routing and traffic behavior. This groundbreaking tool helps the world's largest enterprises, service providers, government and educational institutions to operate, troubleshoot, plan and optimize their networks with unprecedented accuracy and speed. For the first time, network engineers and operators are able to view complex IP networks as integrated systems rather than collections of discrete devices and links, enabling them to maximize IT efficiency and productivity while reducing the capital and operational expenses required to maintain top network application and service quality.

### Unprecedented Network-Wide Visibility

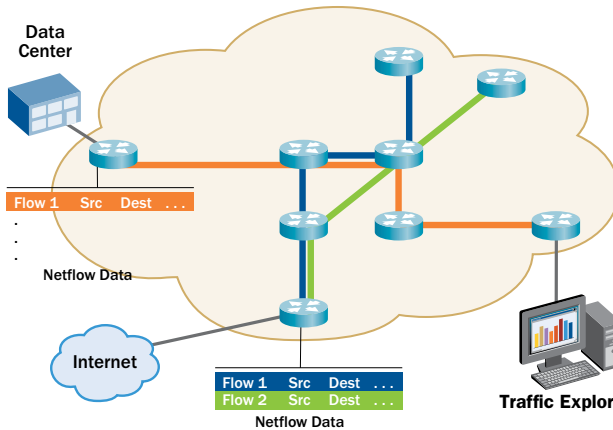
While many traffic flow analysis products claim to provide “network-wide” visibility, in reality they deliver only a link-by-link view of traffic statistics on a small subset of the network. Without a network-wide view of traffic flows, along with an understanding of the dynamic impact of routing changes or failures on traffic, engineers are limited to manually correlating and interpreting disparate link traffic statistics, SNMP device polling data, router command-line output and log files to construct even a rough picture of network state. This greatly limits their ability to rapidly determine the root cause of problems, optimize network operation, or effectively analyze and plan for network change and growth.

Traffic Explorer uniquely delivers on the promise of network-wide traffic flow analysis, providing visibility into traffic flowing over every link in the network. Traffic Explorer leverages the real-time network topology intelligence of Route Explorer™, the industry's leading route analysis platform, to extend traditional traffic analysis beyond interface-centric reporting, providing end-to-end visibility of all traffic network-wide, but without requiring broad deployment of probes or the overhead associated with polling-based techniques. Engineers are able to interact with an “as-running” model of their network, where actual traffic flow information is dynamically overlaid on a real-time, layer-3 topology map. Traffic Explorer's comprehensive view of network-wide traffic gives network engineers and operators an unmatched picture of real-time network-wide behavior, while delivering significant bottom-line benefits to any organization.

### Traffic Explorer Benefits

- Comprehensive view of end-to-end traffic flows over every link enables network-wide congestion detection, capacity planning and traffic analyses
- Integrated route analysis technology shows impact of routing changes or failures on network-wide traffic, speeding problem detection and diagnosis
- On-line modeling using actual network topology and traffic loads helps avoid unnecessary link upgrades, maximizes asset utilization and enables accurate network planning and optimization
- Correlation of traffic and routing data facilitates cost-saving peering/transit analyses, valuable network data mining and flexible group-based usage monitoring
- What-if routing analyses combined with historical traffic matrix allows modeling of new application deployments or traffic growth, network failure planning and traffic engineering to assess and remove capacity constraints
- Small deployment footprint, minimal network load and continuous auto-discovery delivers fast time-to-value and low management overhead

## How Traffic Explorer Works



- Collects Netflow data exported from routers at key traffic sources (e.g. data center(s), internet gateways, WAN links)
- Computes traffic flows across network topology using routing data from Route Explorer
- Displays, reports and enables modeling based on actual network-wide routing and traffic data, including application and Class of Service (CoS) details



*Traffic Summary: Traffic Explorer's summary report provides an overview of key traffic data including a list of all routing events showing the impact on traffic, network-wide link utilizations and BGP-related traffic statistics*



*Detailed Flow Analysis: Traffic Explorer provides at-a-glance and detailed views of overall traffic volumes, application distribution, top talkers and listeners, as well as traffic volumes of user-defined groups and by Class of Service (CoS)*

## Superior Root Cause Analysis

Traffic Explorer's topology-based approach goes beyond traditional traffic analysis tools, helping engineers to quickly diagnose network problems and perform sophisticated root cause analysis. Since Traffic Explorer knows the actual routed path through the network for every flow, operators can quickly focus their attention on suspect devices or links, rapidly pinpointing the cause of poorly performing applications. Traffic Explorer also shows the impact of routing changes or failures, as they happen, on network-wide traffic, highlighting traffic shifts that often result in network hot spots and impact application performance.

Conventional traffic analysis tools can detect sudden increases in link utilization on monitored links, but are unable to determine whether the increase is due to new traffic loads on the network, or the impact of a failure or change somewhere else in the network that caused traffic to be re-routed over the congested link. Traffic Explorer not only answers this question for every link, but also shows the impact of every routing change on network-wide traffic by application and CoS, including the per-link change in traffic volume and the number of hops affected. This information helps operators prioritize their response to those situations with the greatest traffic volumes above or below user specified thresholds. This information helps operators prioritize their response to those situations with the greatest impact on services. Traffic Explorer can even send alerts whenever routing changes impact traffic volumes beyond user specified thresholds, letting engineers know immediately what happened, where it happened and what traffic was affected.

## Accurately Model Changes on the "As-Running" Network

Traffic Explorer's "what-if" analysis features deliver the industry's most accurate network modeling solution, enabling engineers to easily predict the impact of network changes, whether resolving immediate issues or performing long-term planning. Existing modeling tools work off-line, using "snapshots" of previously captured network topology that quickly become outdated, along with manually entered traffic loads that are at best, crude approximations of actual network traffic. The inaccurate nature of these models limits their utility to long-term planning. By contrast, Traffic Explorer lets engineers model changes on the "as running" network, using the actual routed topology and traffic loads, either at the current time or from historical data.

Traffic Explorer lets engineers simulate a broad range of network changes, such as adding or failing routers, interfaces and peerings; adding or moving prefixes; adjusting IGP metrics, BGP configurations or link capacities; or simulating changes in traffic loads or new application deployments. Planning with an accurate, up-to-date network model lets architects see the real impact of their changes before implementing, and prevents surprises afterwards, thereby reducing time-to-deploy and avoiding unexpected problems. IT organizations can effortlessly maintain accurate network documentation, whether for regulatory compliance requirements or as part of their best practice processes.

## Globally Optimize for Better Performance and Lower Cost

Traffic Explorer's unique capabilities give network managers new options for dealing with problems, such as congested links, while delivering a strong return-on-investment. Other traffic analysis solutions provide no insight on network traffic beyond the congested link, and can only suggest actions such as stopping unwanted traffic, rescheduling times when offending applications are run or adjusting priority schemes on the router. This limited, link-centric view is like managing the network with tunnel-vision, and results in local optimizations that often aren't the best course of action.

Traffic Explorer's integrated view of network-wide routing and link utilizations lets engineers explore a variety of options, such as modeling changes that re-route some traffic flows away from the congested link. In many cases, engineers can easily resolve congestion problems without the time delay and cost involved in upgrading link capacity. Traffic Explorer can similarly help network managers engineer traffic paths to avoid performance problems or SLA violations during peak traffic loads. The ability to optimize globally across the entire network makes it possible for IT organizations to maximize network asset utilization and service availability, while reducing capital expenditures.

## Predict and Plan for Network-wide Capacity Requirements

Traffic Explorer gives network managers the information they need to accurately predict and plan for future capacity needs across their entire network. Engineers can view and analyze historical traffic trends by volume or utilization, including breakdowns by application and Class of Service on every link in the network, as well as by exit routers or Nexthop address.

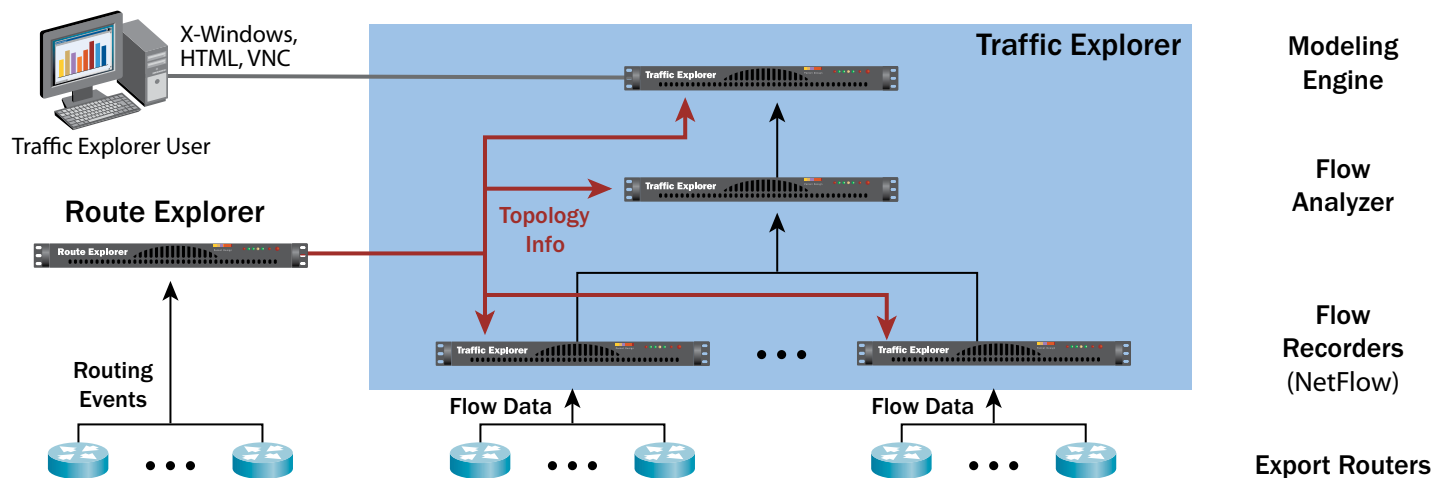
Going well beyond the typical link-based traffic statistics provided by other tools, Traffic Explorer lets engineers analyze and manipulate a network-wide traffic matrix, showing traffic volumes between every source/destination pair in the network. Detailed capacity projections can be accomplished by exporting the full traffic matrix to a spreadsheet, adjusting any source/destination traffic volume based on internal initiatives or forecasted loads, and then importing the updated matrix to see the impact on network-wide link utilizations.

New application deployments can be accurately "tested" on the as-running network, before they are deployed, by adding expected traffic loads to existing traffic volumes, and viewing the resulting traffic load on every link. Engineers can quickly identify potential hot spots by application or Class of Service, and determine whether traffic can be re-routed around the congested links, saving unnecessary bandwidth upgrades, or whether additional capacity is required.



*Topology View: Traffic Explorer's interactive topology map combines real-time routing information from Route Explorer with traffic flow data to provide an integrated, dynamic view of network-wide traffic and routing*

## Traffic Explorer Architecture





*Routing and Traffic Planning: Traffic Explorer's on-line modeling tools let engineers simulate additions, changes or failures to the network's actual routing or traffic, providing unmatched accuracy for predicting, planning and analyzing network behavior*



*History Navigator: Traffic Explorer lets engineers analyze traffic trends on any link, simulate traffic growth or network changes for capacity planning, as well as review historical traffic and routing events to troubleshoot intermittent or past problems*

## Valuable Peering Analysis and Modeling

Optimizing peering and transit arrangements can significantly reduce service provider operating costs. Traffic Explorer arms engineers with the most complete set of capabilities including the ability to monitor peering or transit traffic to ensure it is within contracted ranges, as well as analyze, identify and justify new peering relationships. Whether moving traffic from paid transit to settlement-free peering, or balancing between multiple transit providers, Traffic Explorer provides the information operators need to optimize their peering traffic and maximize their bottom line.

Traffic Explorer is unique in its ability to not only monitor and analyze peering traffic, but also accurately model changes to the network, allowing engineers to understand the impact on peering or transit traffic before implementing any changes. BGP configurations can be modified to move traffic between existing and potential neighbor providers, showing how actual traffic loads would be affected. New peering relationships can be simulated, allowing operators to see the impact on traffic across their entire network. Since Traffic Explorer understands full end-to-end routing (both IGP and BGP), service providers can even determine the impact on peering and transit traffic when making unrelated changes to the core of their network.

## Don't Just Respond to Problems – Prevent Them

Traffic Explorer lets engineers easily perform failure impact analyses, showing them how their network would respond in various situations. Simulating link or router failures and seeing the impact on network-wide traffic across all links is as easy as clicking on the interactive topology map. Operators can not only confirm network redundancy, but also predict link loads under different, even cascading, failure scenarios.

If backup routes are non-existent, or not as desired, Traffic Explorer lets you easily model changes to the routed network so you can maintain correct operation when things fail, and ensure ongoing service delivery. Traffic Explorer's accurate understanding of network-wide routing and traffic provides valuable insight into potential problems, helping to prevent service outages and maximize IT preparedness.

## Flexible Network Usage Accounting

Many IT organizations monitor the usage of shared network infrastructure by internal groups for planning or charge-back purposes. Traffic Explorer allows network managers to define traffic groups based on network addresses, protocol, port #, or Class of Service, which can represent users, applications, departments or even specific servers, and monitor and apportion network usage by each group. Aggregate traffic usage by group can be viewed directly, as well as exported to external programs such as a spreadsheet or billing application.

## Minimize a Top Source of Network Problems – Routine Maintenance

Studies show that configuration mistakes made during routine maintenance are a major cause of network service disruptions and downtime. Traffic Explorer provides network engineers with accurate network routing and traffic information, enabling streamlined and trouble-free maintenance activities.

Network managers are able to understand the impact of removing a link or router from service before taking any action, accurately predict the result of changes to router configurations, compare and document network conditions before and after implementing changes, and verify correct network operations after completing the maintenance activity, rather than relying on users' complaints for the first indication of trouble.

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