

DATA SHEET

Route Explorer

Route Explorer®, an industry-leading IP route analysis system, is designed for network engineers and operators managing today's complex, mission-critical enterprise and service provider networks.

It provides visibility into the dynamic routing operation of the entire network, enabling fast identification and resolution of difficult-to-diagnose network problems, effective and trouble-free network maintenance, and the ability to easily and accurately plan for network changes and optimization.

IP Route Analysis – A necessity for today's mission-critical networks

IP networks are dynamic, with the inherent intelligence of IP automatically re-routing traffic when problems occur. Before Route Explorer, network engineers and operators had no way to gain visibility into real-time network-wide routing behavior.

Without the ability to visualize, monitor, analyze, and model changes to the logical—or Layer 3—operation of an IP network, pinpointing and correcting problems, performing maintenance updates, or planning network upgrades is a tedious, manually-intensive and error-prone effort for routing experts. This results in unforeseen downtime, excessive operational costs, time-consuming problem resolution, and lost productivity.

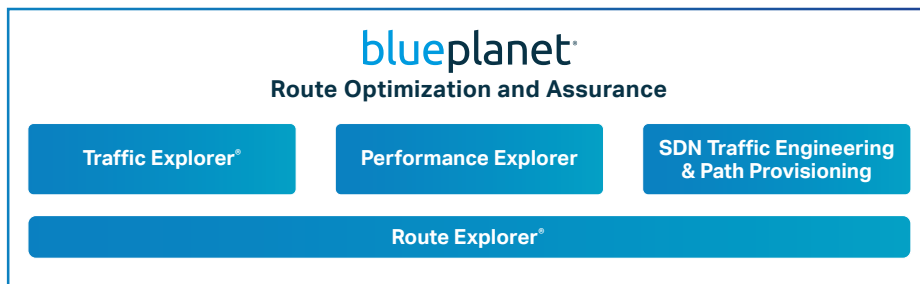


Figure 1. Route Explorer is a foundational product within the Blue Planet Route Optimization and Assurance (ROA) family. It is available standalone or in conjunction with other ROA products.

Features and Benefits

- Increases network service availability and customer satisfaction by rapidly identifying and diagnosing IP routing faults, anomalies and loss of redundancy.
- Lowers MTTR and improves operations and engineering productivity by speeding identification of complex IP network problems.
- Eliminates finger pointing over SLA disputes with real-time and historical views of Layer 2 and Layer 3 VPN routing changes.
- Simulates planned network changes to understand their impact before maintenance windows to avoid unintended consequences.
- Brings up new customers and services faster with fewer issues by modeling them accurately beforehand on the current network topology.
- Visualizes BGP routing to understand and optimize peering relationships.
- Uses what-if routing simulations for error-free traffic engineering.
- Boosts network quality by proactively auditing network-wide routing operations and identifying suboptimal conditions that could affect traffic delivery.
- Achieves a rapid ROI with a small deployment footprint, easy configuration, and low management overhead.

Route Explorer – See the network as the network sees itself

Route Explorer leverages the intelligence of the IP control plane to let network engineers and operators visualize and understand the dynamic operation of the network as never before. By monitoring the routing protocols that direct the flow of traffic throughout the network, Route Explorer constructs the routers' view of the network, computing and displaying topology changes and routes in real time. Loss of IP-layer connectivity is immediately detected and alerts can be sent to a management console so that corrective action can be taken. Routing instabilities or changes that go unnoticed by conventional SNMP-based management systems, but which impact network availability and performance, are visible within seconds, leading to early detection or prevention of service outages and reduced time-to-repair.

Since Route Explorer does not forward any traffic, it is neither a bottleneck nor a failure point, and places virtually no load on the network infrastructure while scaling to any network size. Route Explorer is easily installed in just hours, providing an extremely rapid time-to-value.

Real-time monitoring and analysis of complex IP networks

Route Explorer is the only IP route analysis system to support all of the popular routing protocols used in today's service provider and enterprise networks. With a single Route Explorer physical or virtual system, network engineers can view the real-time routing structure of their entire network as a seamless topology map, even when the network is running multiple protocols, spans multiple domains or Autonomous Systems (AS), or utilizes static routes that are not injected into routing protocols. Route Explorer scales to the largest networks with thousands of routers and multiple copies of the Internet routing table.

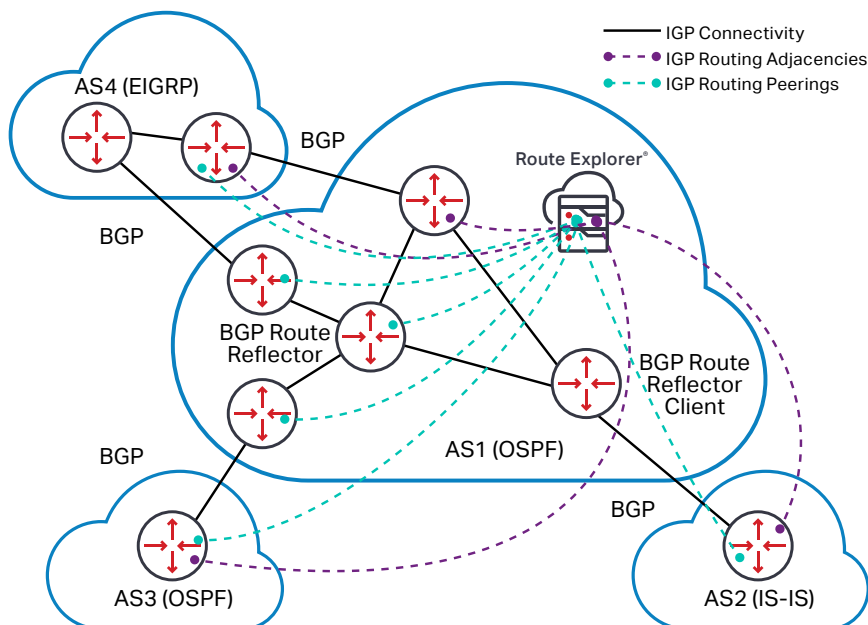


Figure 2. A single Route Explorer physical or virtual appliance can concurrently monitor and analyze complex IP networks running OSPF, IS-IS, EIGRP, and BGP routing protocols across multiple autonomous systems

Highlights

Real-time IP network visualization and monitoring

- Computes and displays a real-time routing topology map, including end-to-end paths, links and routed prefixes
- Supports OSPF, IS-IS, EIGRP, BGP, and static routing; RSVP-TE, SR-TE, L2VPN, L3VPN, and Multicast support are available with add-on modules

Detect, analyze, and diagnose Layer 3 problems

- Detects routing problems that cannot be found by SNMP management tools
- Records a complete, rewindable routing event history for faster troubleshooting

Comprehensive user-defined alerts and reports

- Monitors and alerts on changes to key routed paths and prefixes; sends alerts via email, SNMP traps or Syslog messages
- Generates detailed reports on vital routing health metrics such as flapping routes, large-scale changes in Internet route tables, and link state changes
- Proactively audits routing health through the comprehensive 'path reports' feature

Model failures and changes on the as-running network

- Engineers can simulate changes to the 'as-running' network to determine exactly how the network will respond to planned changes or potential failures
- Routing changes can be modeled to optimize for network redundancy, disaster recovery, or network upgrades

Easy installation, scalable, and network-friendly

- Installs in hours, provides network-wide visibility in minutes, and requires no costly software customization, leading to rapid time to value and a very low TCO
- Places virtually no load on the network, enabling unlimited scalability

Customizable dashboards and drill-in workflows promote proactive service assurance

Customizable dashboards give operations staff at-a-glance visibility into key metrics, such as up/down routers (based on their interfaces' ability to forward packets), up/down links, up/down prefixes (IPv4 and IPv6), and prefix events, so they can be more proactive in maintaining service levels. Unlike traditional tools, all events are recorded in real time, not just

via SNMP. An easy look-up facility enables network team members to quickly view the primary and secondary paths between any source and destination (e.g. router id, customer name or location, or target domain name) for rapid triage of reported service issues. They can drill in to view a mini-map of the selected path with hop-by-hop performance metrics and other contextual analytics to determine if traffic is experiencing out of baseline latency, routing instabilities, or outages.

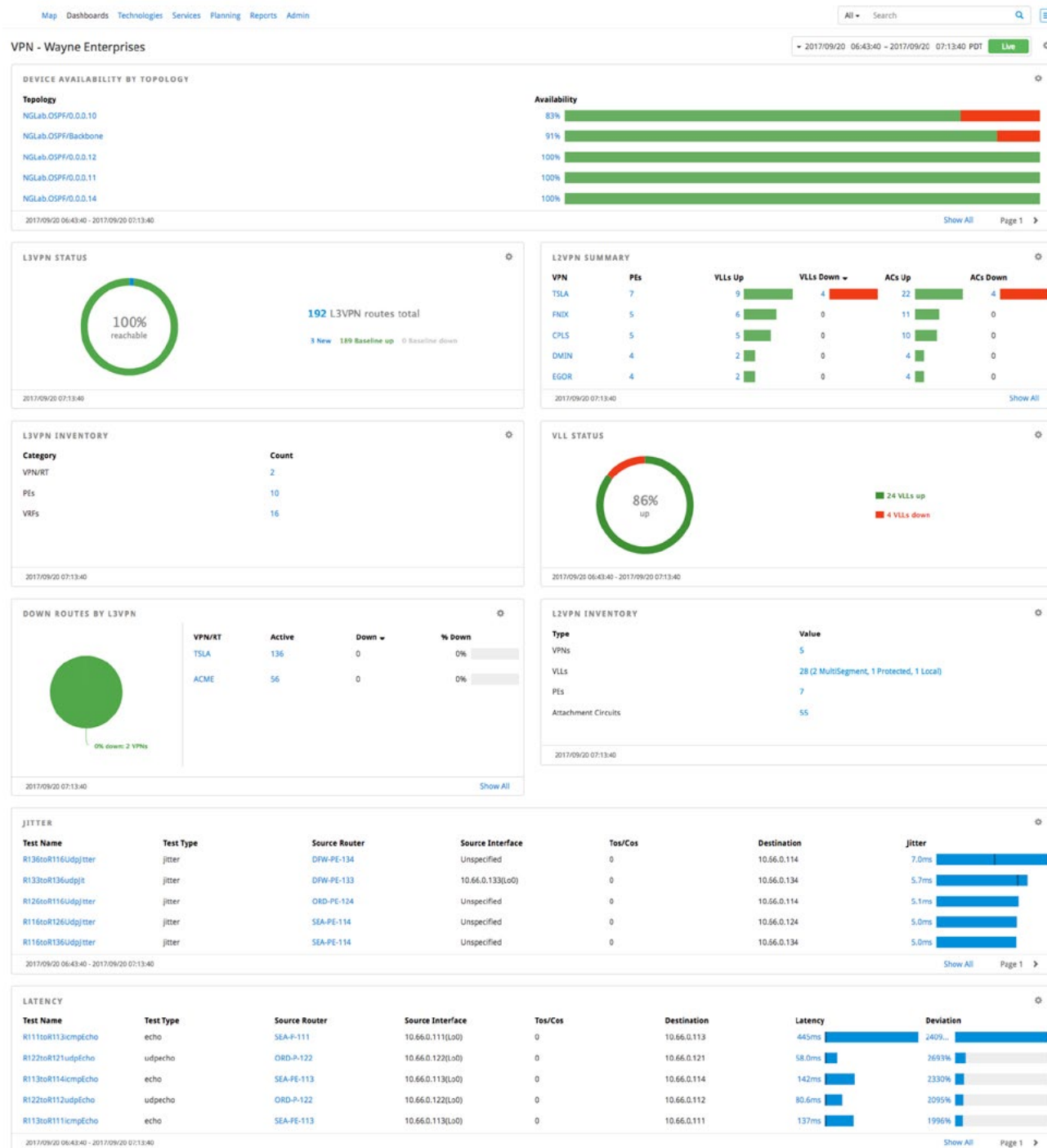


Figure 3. Route Explorer's customizable dashboards provide network teams with at-a-glance, real-time visibility into metrics that are most important to them, helping technicians quickly identify possible failures and anomalies and proactively manage their network

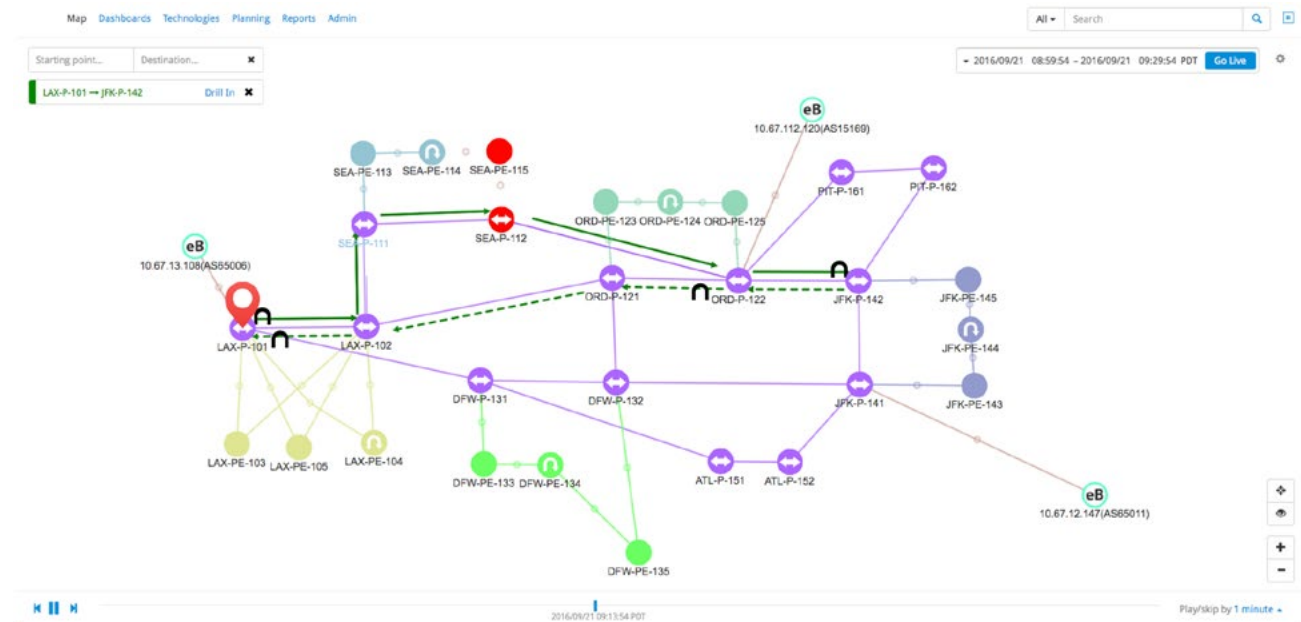


Figure 4. Route Explorer can rewind the network events to a past moment in time when a problem was occurring. As the specific time period is selected, the contextual data in the charts below is updated. Engineers can then drill-down for details to examine the state of the entire network's routing at the moment when service traffic was affected

Troubleshooting with a 'network DVR' dramatically lowers operations costs

Network operators and engineers know that a minority of complex network problems tend to have the heaviest impact on overall MTTR, while managers know that these problems drive up operating expenses and lower responsiveness to end-users. Route Explorer provides a unique, network-wide history of all routing changes which helps engineers and operators get to the bottom of these costly problems. It records all routing events and provides rewind and replay capabilities for any point in time. Users can view routing behavior across the whole network or just for selected paths between endpoints, including overlay services such as L2/L3VPNs and TE tunnels. Intermittent, hard to detect problems can be quickly identified and the root cause diagnosed.

Comprehensive reports and diagnostic help in isolating problems and viewing trends

Flexible reports can be generated for any historical time period, providing an overall understanding of network performance while allowing quick isolation of potential problem areas. In many instances, network problems can be averted and

resolved due to early awareness of anomalies. Data from reports can be useful in network maintenance and planning to understand trends, plan for network changes and growth, and verify changes made during scheduled maintenance. In addition, Route Explorer offers detailed diagnostic tools to drill down into specific routing conditions and determine root causes.

Sample IP Routing Analysis Reports

- Routing status
- Routing stability
- Routing comparison
- Path reports
- Routing Information Base (RIB) browser
- RIB comparison

Sample Diagnostic Tools

- BGP root cause analysis
- BGP routing visualization
- Routing time comparison
- Prefix diagnostics
- Event analysis

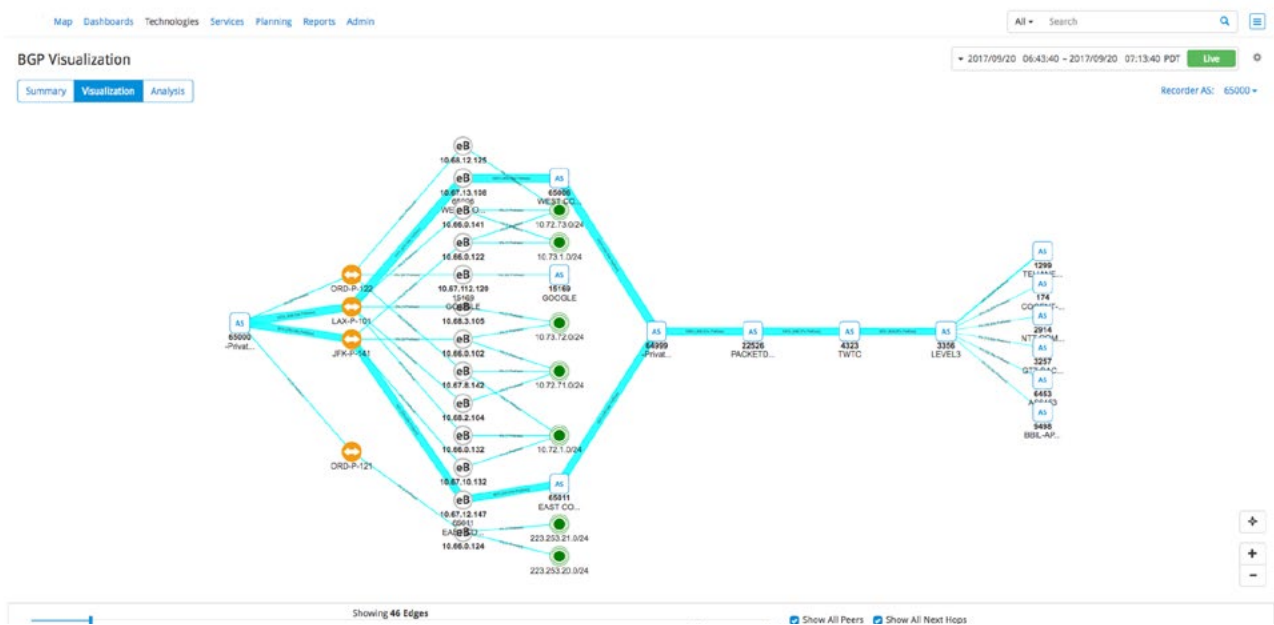


Figure 5. Route Explorer's BGP RIB Visualization provides a visual representation of the BGP Routing RIB, allowing engineering and peering analysts to understand BGP routing behavior in the network, assess routing policies and peering, and make informed peering decisions

Accurately model changes on the 'as-running' network

A large percentage of network outages are caused by misconfigurations. Route Explorer allows engineers to model network changes before they are implemented, preventing outages from simple misconfigurations and even from network architecture errors that only become apparent when routing is altered. Engineers can simulate a broad range of changes, such as adding or failing routers, interfaces, and peerings; adding or moving prefixes; and adjusting IGP metrics or

BGP configurations. Critical initiatives such as data center migrations/consolidations, disaster recovery planning, change validation testing, or failure impact and redundancy analysis can be easily and accurately performed. Since Route Explorer automatically updates the network topology map through continuous routing protocol recording, there is no work needed to maintain or update the model, making modeling easy and fast enough to use on an everyday basis.

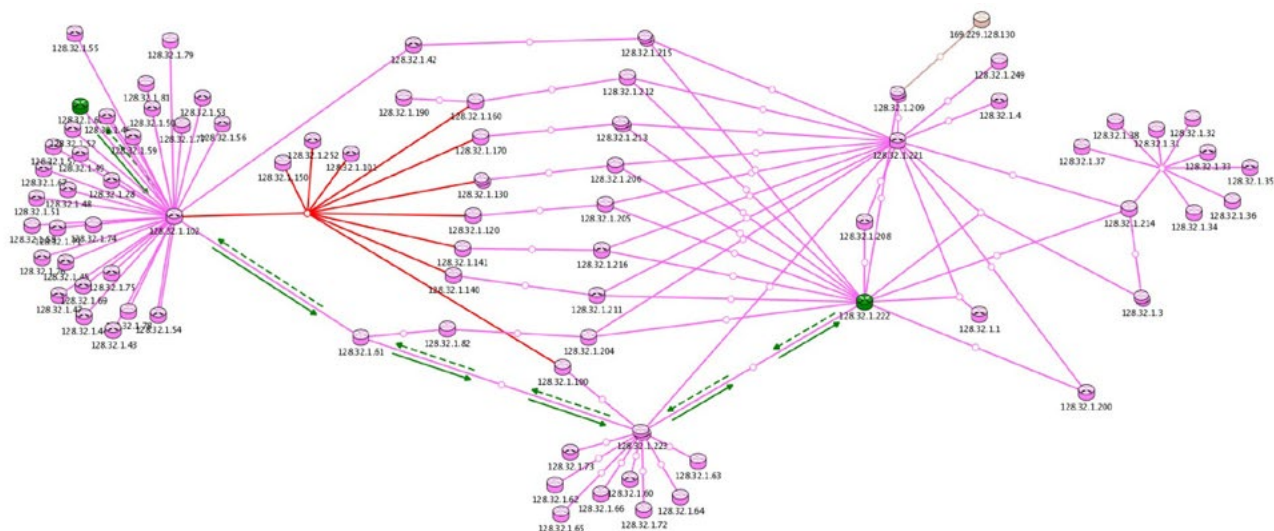
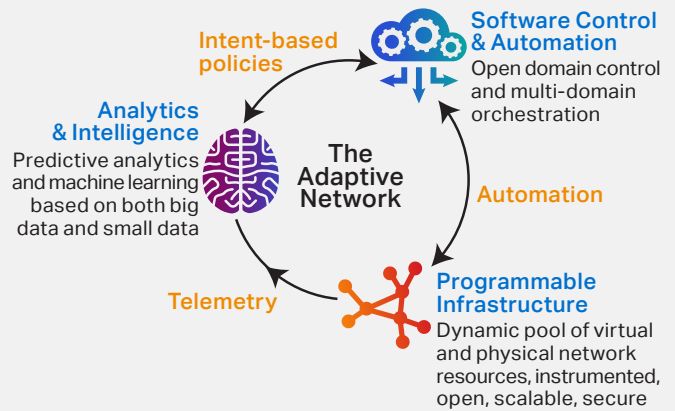


Figure 6. Route Explorer allows engineers to model network changes, such as adding a new routed peering, then understand the network-wide impact. In this case, engineers can easily see how a critical route will be affected

The Adaptive Network

The Adaptive Network is Ciena's vision of a new target end-state for network providers. Utilizing automation guided by analytics and intent-based policies, the Adaptive Network rapidly scales, self-configures, and self-optimizes by constantly assessing network pressures and demands. The Adaptive Network is built upon three foundational elements: Programmable Infrastructure, Analytics & Intelligence, and Software Control & Automation. The Blue Planet Route Optimization and Assurance products, including Route Explorer, play a key role within Software Control & Automation.



Alerts provide real-time awareness of potentially critical problems

Route Explorer provides a range of alerts that can be enabled selectively, allowing for monitoring of specific routing events or problem areas and early notification of potential failures. Alert notifications can be viewed on the Route Explorer console, sent to an SNMP-based network management system, or recorded to Syslog, for consolidated problem reporting and management.

Sample Alerts

- Path change
- BGP AS path change
- Prefix state change
- Router state change
- IGP adjacency state change
- BGP AS path redundancy
- BGP prefix flood
- BGP prefix drought

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