

## Harnessing the Intelligence of IP

Route Explorer is an IP route analysis system that provides network-wide visibility and analysis of routing operations. It is the only IP route analysis system that supports all of the popular routing protocols (OSPF, IS-IS, EIGRP and BGP) used in today's complex service provider and enterprise networks. It uniquely provides a single, unified view of network routing across:

- IGP protocols
- AS or BGP boundaries

Leveraging its comprehensive routing information base and route analytics, Route Explorer delivers unmatched troubleshooting and diagnostic capabilities, saving hours in problem identification and resolution time. It is also an invaluable tool for planning network maintenance and growth by reducing potential problems due to misconfigurations, and improving the understanding of how the routed network will react to changes – before they are made.

### IGP Route Analytics

Route Explorer provides the ability to analyze real-time and historical routing events. The real-time Layer 3 topology map and online monitor provide an accurate view of current network status making it easy to see the as-running network and any changes as they occur. This provides early visibility into problems such as link failures or configuration errors. Route Explorer's alerts enable ongoing monitoring and analysis of network events and immediate notification of problems and failures in the network. Many of these problems, such as flapping routes or failed redundant links, might otherwise go undetected by polling-based network management systems while still impacting network performance and availability.

Route Explorer's history navigator enables intuitive viewing of historical routing events. Various views (topology map, event activity graphs, reports, correlation with external time series data) allow easy pinpointing of problems plus users have the ability to easily drill-down further for more granular information. Route Explorer's comprehensive view of network-wide routing activity dramatically reduces the time to diagnose and troubleshoot network problems.

Route Explorer's RIB (Routing Information Base) browser provides a summary snapshot of the network-wide routing table. This replaces the time consuming task of logging in to multiple routers or digging through Syslog to obtain this data. In addition, Route Explorer provides the ability to view a summary of changes to the routing table between two points in time, quickly identifying a routing instability or router misconfigurations.

### BGP Route Analytics

For BGP, Route Explorer provides extensive real-time and historical router event monitoring and analysis for troubleshooting networks using BGP connections. This includes:

- Enterprises that have multiple ASs connected together via BGP or that use BGP for multi-homed Internet connectivity
- Service provider networks with BGP connections to peer and customer networks

Detection of routing instabilities in BGP traditionally takes place after a problem has arisen. Awareness of a problem typically

occurs as a result of customer complaints about poor network performance or inability to reach certain prefixes. Diagnosing BGP routing instabilities is extremely time-consuming requiring in-depth knowledge, access to many routers, and good timing. Route Explorer simplifies and reduces time spent in detection and diagnosis of BGP routing instabilities.

Route Explorer provides powerful interactive analysis capabilities for analyzing the BGP routing in your network. By participating in your BPG "full-mesh" or peering with multiple route reflectors, it is able to collect detailed BGP route information from many iBPG and eBGP peers and maintain the network-wide BGP routing table. Some of the capabilities of Route Explorer's RIB Browser include:

- Auditing the application of routing policy throughout your network by monitoring the proper use of LOCAL-PREF and MED attributes
- Verification that your neighbors are sending the proper BGP "Communities"
- Detection of routing instabilities such as "MED oscillations"
- Verification that the best exit routes to your peers or transit providers are in use
- Verification of route redundancy between ASes or to the Internet



RIB Filter Analysis allows you to drill down to see each of the individual route changes

Route Explorer's RIB "Before-And-After" analysis highlights changes in routing from one point in time to another, including detailed distribution of changes by peer, next hop, attributes and communities, enabling rapid determination of the root cause of a problem or possible policy violations.

Until Route Explorer, network engineers have not had this level of visibility and analysis into the state of BGP routing available at their fingertips. The typical tools used to analyze BGP routing behavior have been CLI access in the routers and "show ip bgp...". This method of gathering information and analyzing data is extremely time consuming and tedious, taking hours to detect and diagnose problems. Route Explorer changes this, simplifying BGP analysis and reducing time spent to pinpoint and diagnose problems, improving network availability and performance.

# Route Explorer™ IGP/BGP Route Analytics

## Reports

Route Explorer's web-based reports can be generated for any historical time period enabling overall understanding of network performance and quick identification of potential problem areas. In many instances, network problems can be averted or quickly isolated 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. The breadth of Route Explorer reports ranges from overall network health to reports that provide analysis of individual routing protocols.



Allows pinpointing of source router, interface, and last state and time of flap so the problem can be quickly addressed.



Activity Summary Reports shows BGP activity

### IGP REPORTS

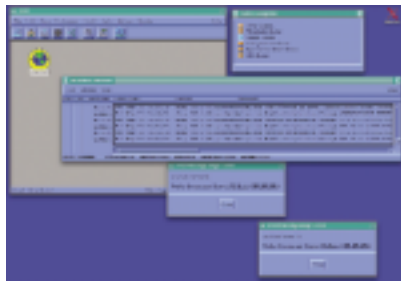
- Network Events Summary
- Flapping Links
- Changed Link Metrics
- Network Churn
- Prefix List
- Prefix Origination Changes
- Prefixes From Multiple Sources
- Withdrawn Prefixes
- New Prefixes
- New Links and Routers

### BGP REPORTS

- Activity Summary
- Activity by AS
- Activity by Peer
- Route Flap
- Prefix Event Detail
- Route Distribution Detail
- Redundancy by Prefix
- AS Reachability
- Baseline AS Reachability
- Prefix Reachability

## Alerts

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



HP OpenView Alert for Prefix Origination Change

### IGP ALERTS

- Adjacency Lost or Flapping
- Route Flap
- Routing Link Flap
- Route Origination Change
- Prefix Change or Flapping
- Any Routing Event
- Excessive Routing Events
- Route Explorer Peering Change

### BGP ALERTS

- Excessive Route Flaps
- Lost AS Reachability
- Lost Redundancy
- Prefix Flood Alert
- Prefix Drought Alert

## Queries

Route Explorer has an integrated API that allows in-house tools and 3rd party applications to access key network event and topology data based upon Route Explorer's real-time and historical network view. The Route Explorer API utilizes an XML RPC as the interface to other applications.