LiveAction: GUI-Based Management and Visualization for Cisco Intelligent WAN

Overview

Cisco® Intelligent WAN (IWAN) delivers an uncompromised user experience over any connection, whether that connection is Multiprotocol Label Switching (MPLS) or Internet. By unifying the logical infrastructure of multiple connections that span diverse carriers and link types, customers get more net bandwidth through the same physical connections. Cisco® Intelligent WAN (IWAN) protects performance-sensitive applications from brownouts and blackouts, provides active-active load balancing for applications securely and reliability, and improves application performance, while reducing significant WAN costs. LiveAction is recommended by Cisco as the only IWAN Management platform that provides users with GUI-based management for Cisco IWAN path control and application performance optimization.

LiveAction is an application-aware network management software with quality-of-service (QoS) control, designed to simplify network management. LiveAction features an innovative visual display, real-time big data analytics, and deep control of routers and switches for unparalleled ease of network administration.

At a high level, LiveAction has the following **See-Point-Click-Fix** features:

- **See:** Visualization:
  - Visualize real-time end-to-end network traffic
  - Examine historical QoS, flow, routing, and IP service-level agreement (IP SLA) data
- **Point:** Decision making:
  - Analyze hop-by-hop path, devices, interfaces, and queues
  - Locate and troubleshoot problems
- **Click:** Control
  - Enable and deploy QoS, Network-Based Application Recognition (NBAR), Flexible NetFlow (FNF), Cisco Application Visibility and Control (AVC), and Cisco Medianet
  - Create IP SLA probes and Media Services Interface (MSI) endpoints
- **Fix:** Improve
  - Edit QoS policies, access control list (ACL), Policy Based Routing (PBR), and IP SLA

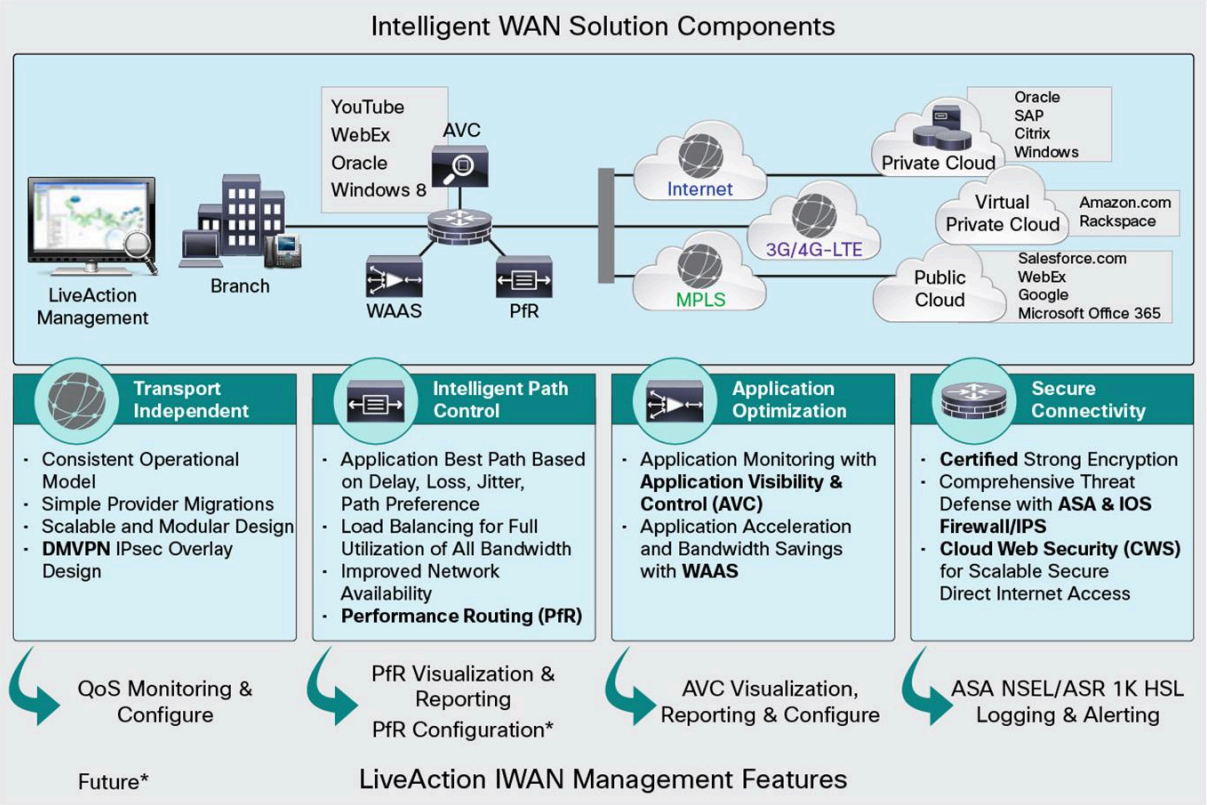
LiveAction is the Cisco recommended management platform for IWAN. It provides GUI-based management and situational awareness for intelligent path control and application performance optimization. LiveAction latest release, 4.1, provides support for Performance Routing V3. Specifically, LiveAction offers the following IWAN management functions:

- Real-time and historical graphical displays of Cisco Performance Routing (PfR) intelligent path changes
- PfR configuration to groups of devices

- AVC visualization, reporting, and configuration
- Application-aware QoS monitoring and control to optimize application performance
- PfR dashboard and overall network health status

Figure 1 depicts Cisco IWAN and LiveAction IWAN management solution components.

Figure 1. Cisco IWAN and LiveAction IWAN Management



Solution Benefits

LiveAction provides customers the following IWAN management benefits:

- Savings in time and money
  - Accelerated IWAN troubleshooting through dashboard, visual displays and situational awareness
  - Faster, more intuitive, and less error-prone configuration and provisioning
- Wider IWAN adoption
  - Demonstrate Cisco IWAN value to internal and external customers with visualization
  - Bridge the management gap for an end-to-end IWAN solution
- Increased productivity
  - Gain deep understanding of application traffic with end-to-end flow visibility
  - Find and fix problems faster with graphical QoS control and bulk configuration
  - Provide robust IWAN reporting
- Ease of operations

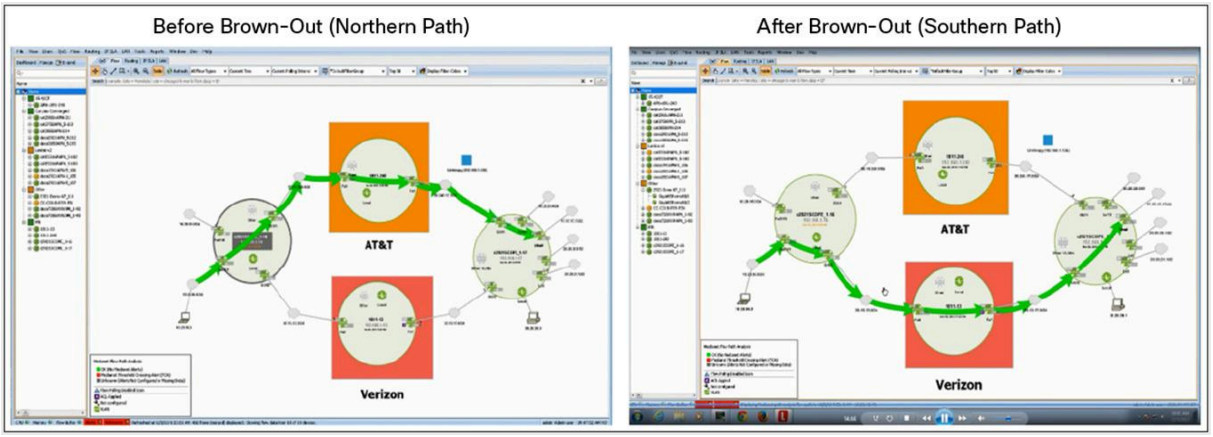
- Clear visualization of path changes
- Intuitive GUI for faster deployment, configuration, monitoring, and troubleshooting

Use Case 1: Visualizing Application Path Changes

You can enable IWAN on the Cisco Integrated Services Router Application Experience (ISR-AX) and Cisco ASR 1000 Series Aggregation Services Router Application Experience platforms (ASR-AX), which offer intelligent path control (PfR), security (firewall, IP Security [IPsec], and Secure Sockets Layer VPN [SSL VPN]), and application services (AVC, which provides per-application traffic volumes, performance metrics, and QoS) at a lower cost. The PfR component of an IWAN can select the best path for each application based upon advanced criteria such as reachability, delay, loss, jitter, and mean opinion score (MOS). PfR improves application availability by dynamically detecting and routing around network problems such as black holes and brown-outs that traditional IP routing may not detect. Furthermore, the intelligent load-balancing capability of PfR can optimize path selection based on link use or circuit pricing.

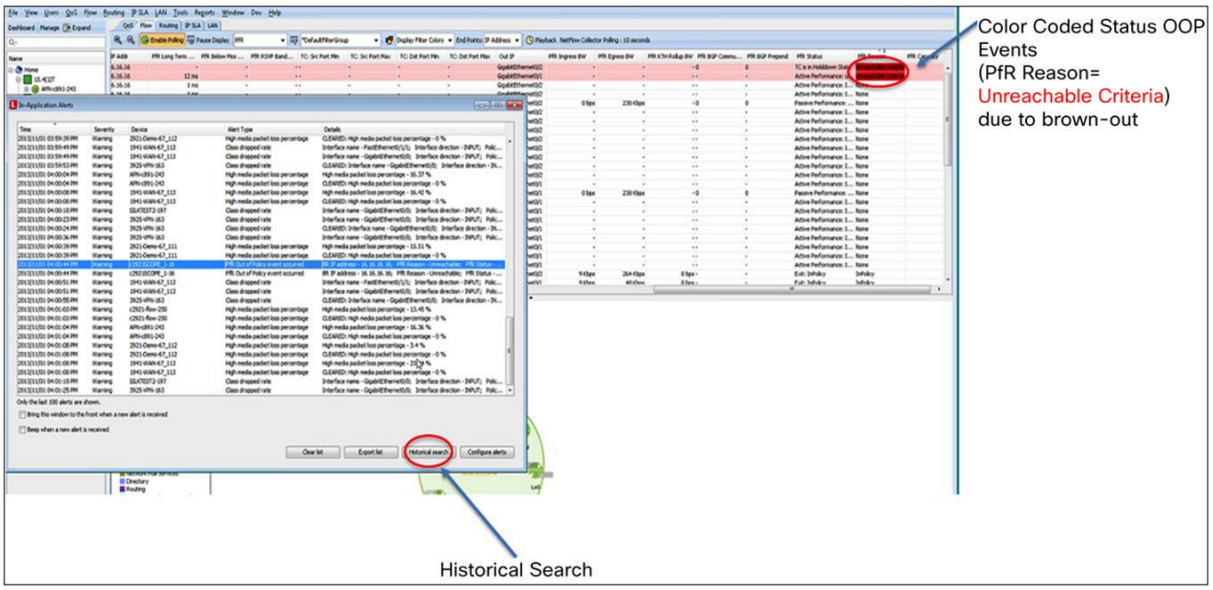
To complement IWAN, LiveAction visualizes application paths “before and after” path changes from PfR, so customers can verify that key application paths are being adjusted as needed. In particular, when PfR makes a path change to protect the applications during an out-of-policy (OOP) condition, LiveAction renders the end-to-end path changes graphically from the branch-office master controller (MC) or border router (BR) through the service provider(s) to the data center where the applications reside, providing more meaningful and actionable information than the standard PfR command-line interface (CLI) outputs. In the example shown in Figure 2, a brown-out caused an “unreachable criteria” OOP condition, which prompted PfR to select an alternate path. You can easily see how the blue flows for the application were moved from the upper (AT&T) path to the lower (Verizon) path.

Figure 2. LiveAction Visualization of PfR Path Changes



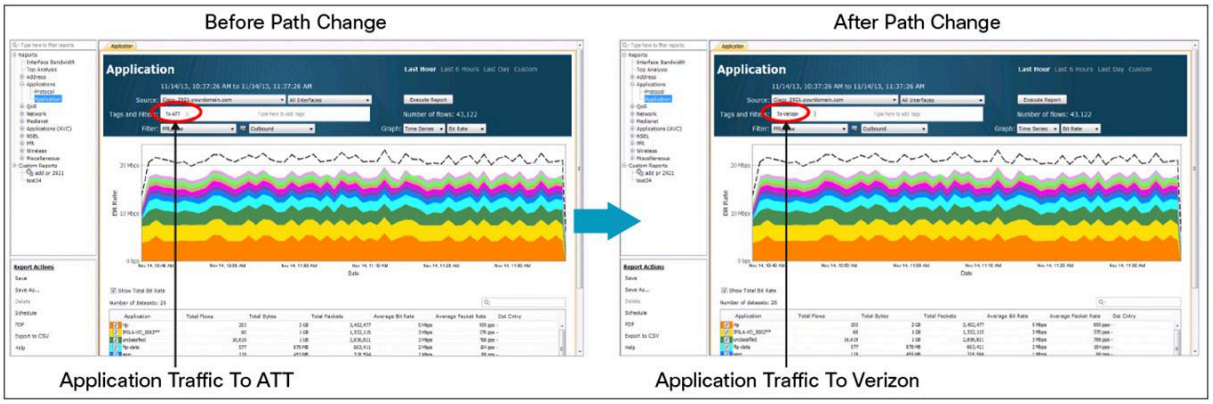
In addition to visually displaying the path changes, LiveAction generates threshold crossing alerts (TCAs) for the unreachable criteria OOP condition that triggered the changes, and for easy troubleshooting, color codes these alerts “Red” based on preconfigured thresholds that have been exceeded. In this example, Figure 3 shows the OOP events in the alert and device views.

Figure 3. Out-of-Policy Threshold Crossing Alerts



Another important point that customers want to understand is what applications were moved by the PfR-managed traffic. LiveAction can provide application traffic usage per interface. With an option to filter traffic by applications, classes, or prefixes, LiveAction can report that after the path change, the associated application traffic going through ATT is now shown going through Verizon (Figure 4).

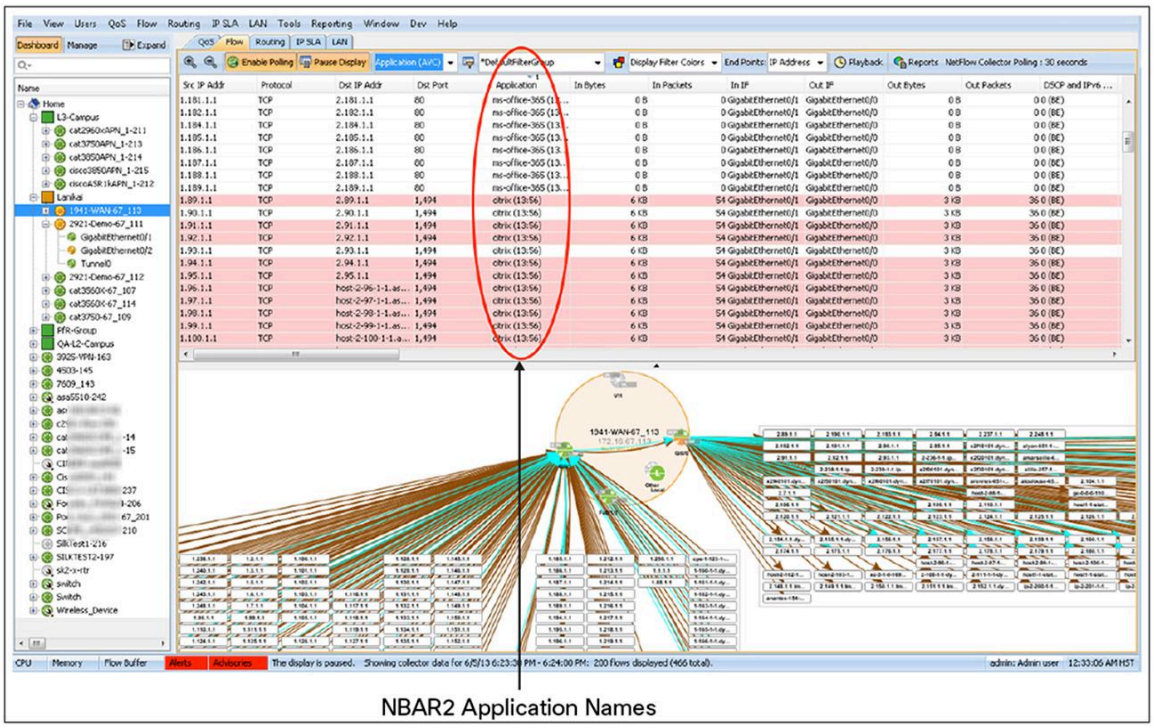
Figure 4. Application Traffic Being Moved



Use Case 2: Taking Advantage of NBAR2 and QoS Control

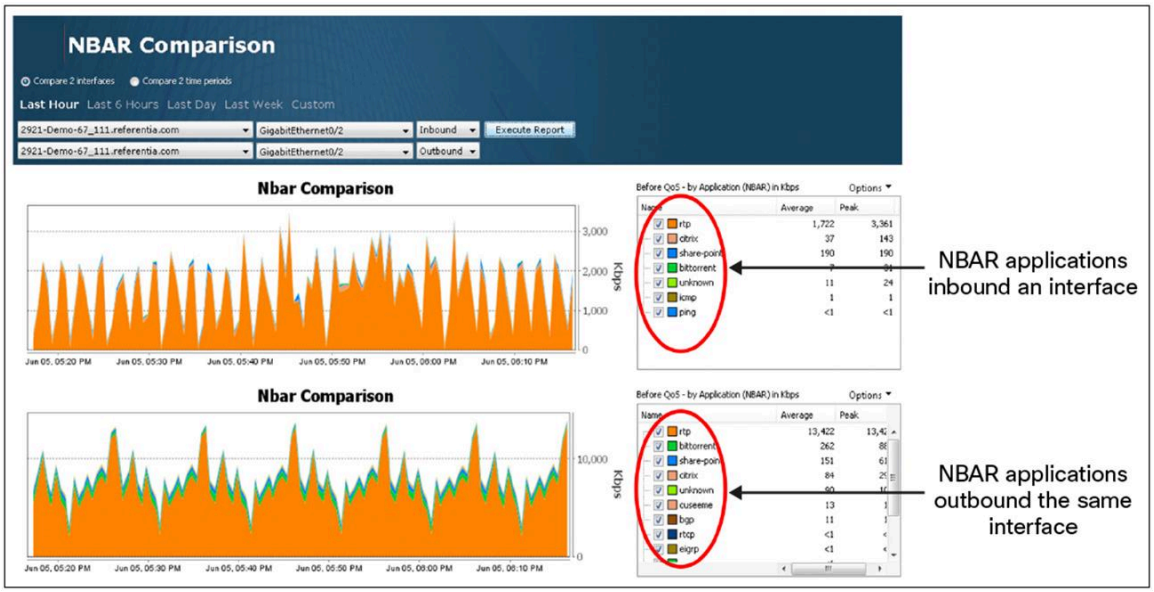
LiveAction provides AVC flow visualization, robust AVC reporting, and full NBAR2 QoS control to optimize application performance. Figure 5 shows the LiveAction display of NBAR2 applications and associated AVC metrics such as application, server, and network response times. This graphical representation can greatly assist in troubleshooting efforts.

Figure 5. LiveAction AVC Flow Visualization



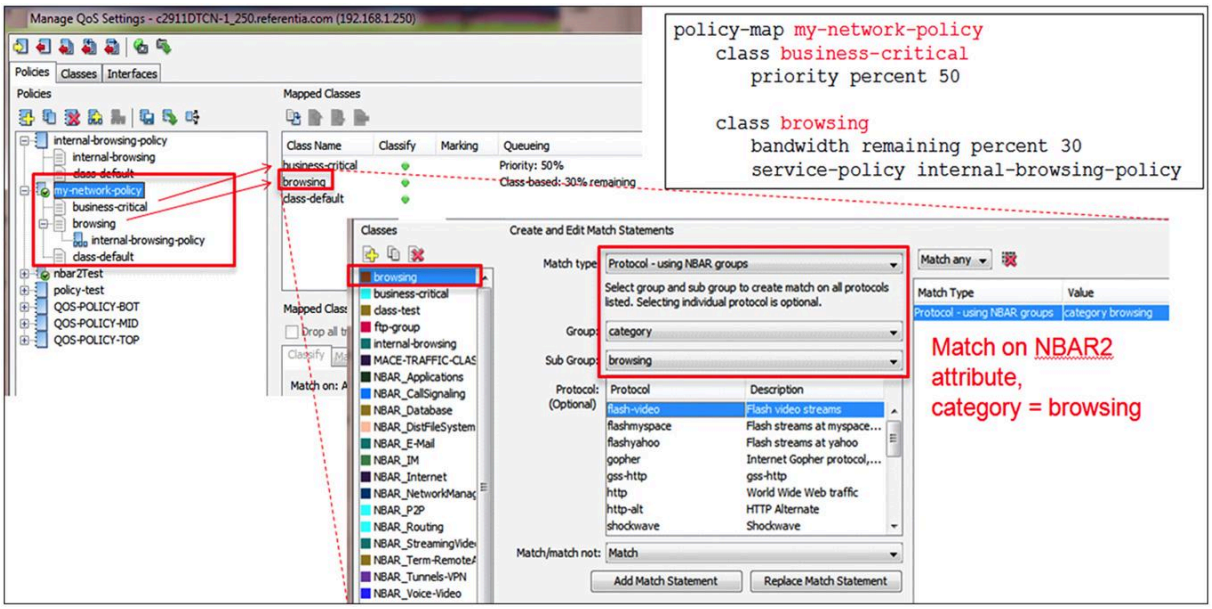
A LiveAction NBAR Comparison report enables network administrators to understand what application traffic is incoming to or outgoing from an interface and how much bandwidth, thus providing useful knowledge for QoS shaping and trending. In the example shown in Figure 6, LiveAction recognizes the NBAR2 applications coming in and going out on the same interface, enabling users to understand what applications traverse various devices in the networks.

Figure 6. NBAR Application Traffic Comparison



LiveAction allows full NBAR2 QoS control on Cisco routers both on a per-application level and at the higher group level. Thus, network engineers can take advantage of the Cisco NBAR2 grouping feature and LiveAction QoS graphical configurator to vastly reduce the complexity and verbosity of the router configuration. In the example shown in Figure 7, simply selecting the “browsing” category enables you to include applications such as flash-video, flashyahoo, http, shockwave, and others.

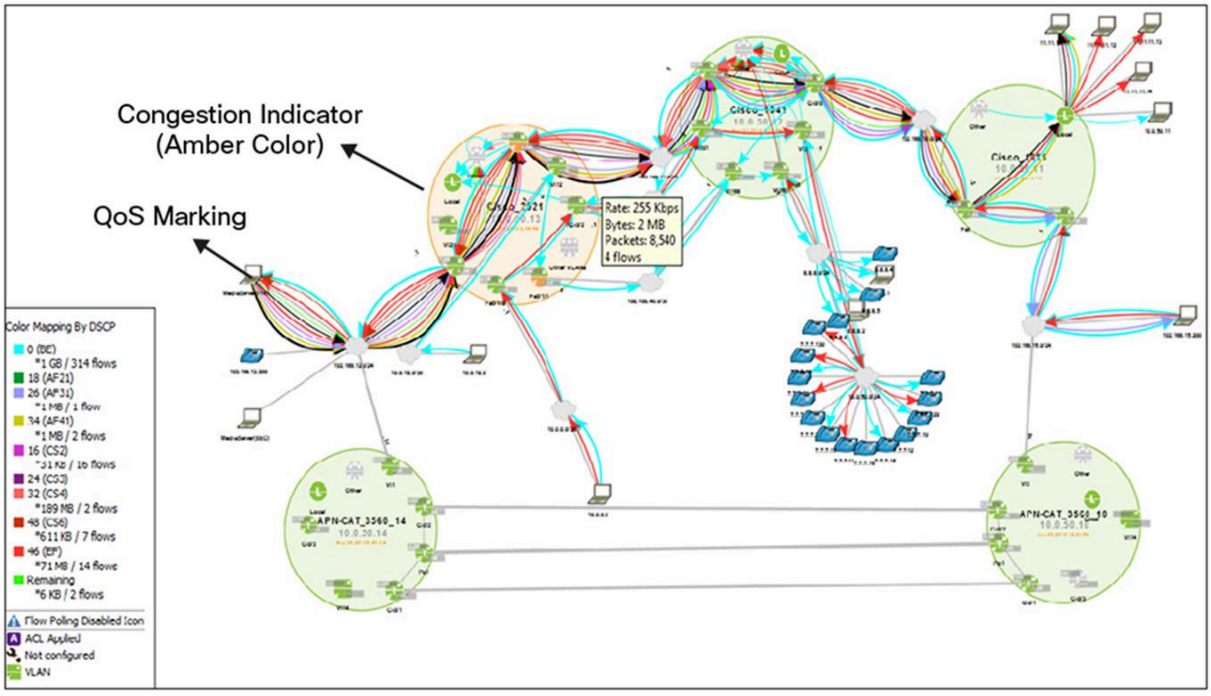
Figure 7. NBAR QoS Control



Use Case 3: QoS Monitoring and Configuration

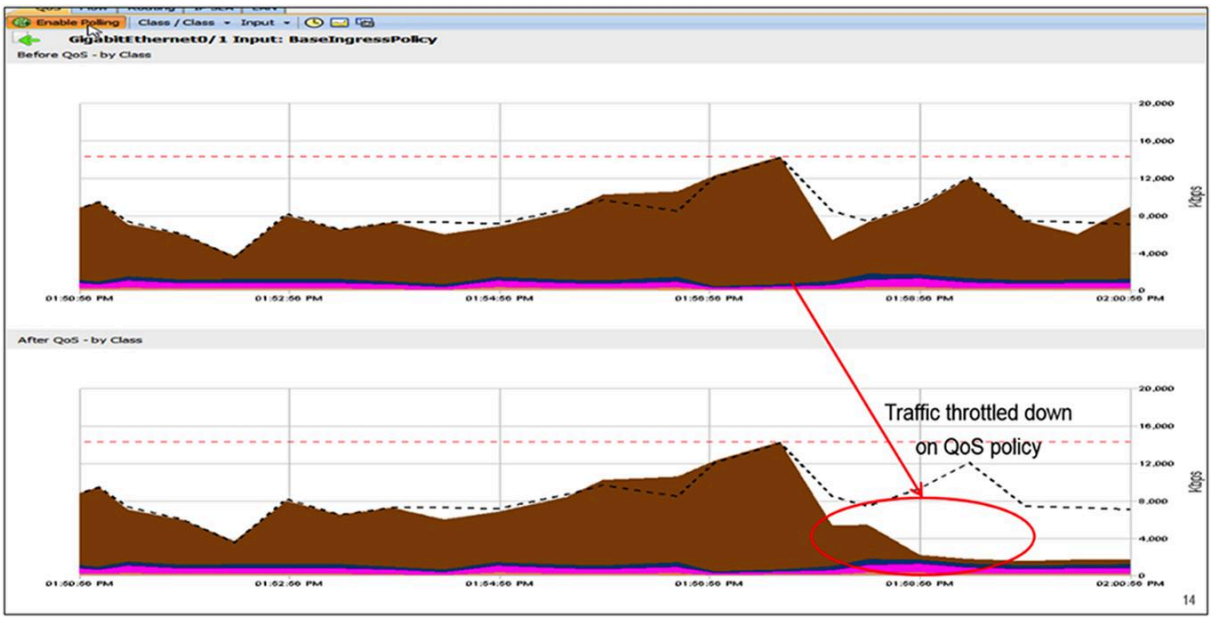
Part of understanding and improving application performance is the ability to efficiently monitor and configure QoS. With AVC flow and class-based QoS (CBQoS) monitoring, LiveAction tracks NBAR2 applications and QoS per-class performance and provides extensive analyses, making it easy for IT engineers to fully understand QoS behaviors on their networks. With congestion indicator visualization and color-coded status, LiveAction offers proactive QoS monitoring that detects and alerts on critical policy drops before problems are reported by end users, as shown in Figure 8.

Figure 8. QoS Monitoring and Visualization



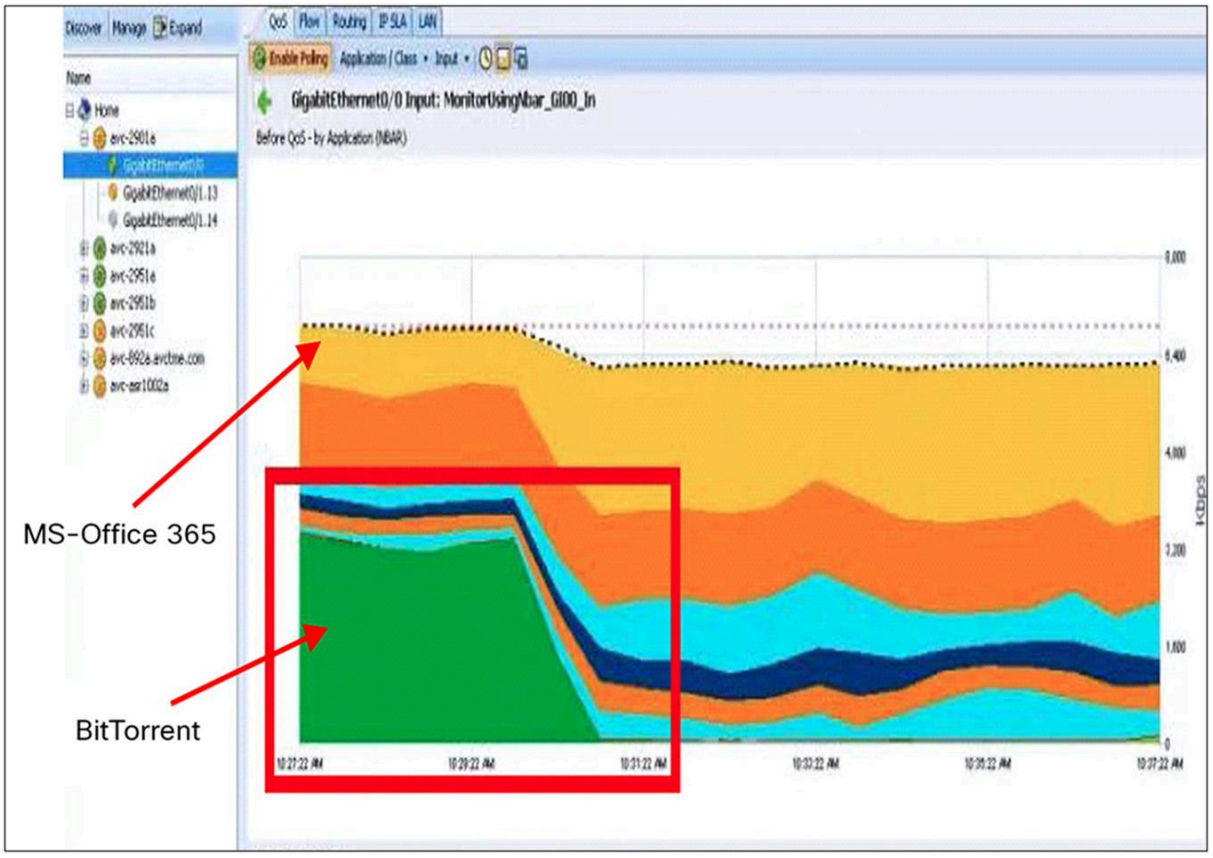
The real-time QoS graphical reporting of LiveAction at intervals as short as 10 seconds enables quick validation of policy changes. For example, in Figure 9, after a policy is applied to police the interactive video traffic to 512 kbps, the LiveAction graphical display of QoS information allows network administrators to monitor the class and see how the policy has taken effect. As the figure shows, the traffic was throttled down as intended.

Figure 9. Impact of QoS Policy



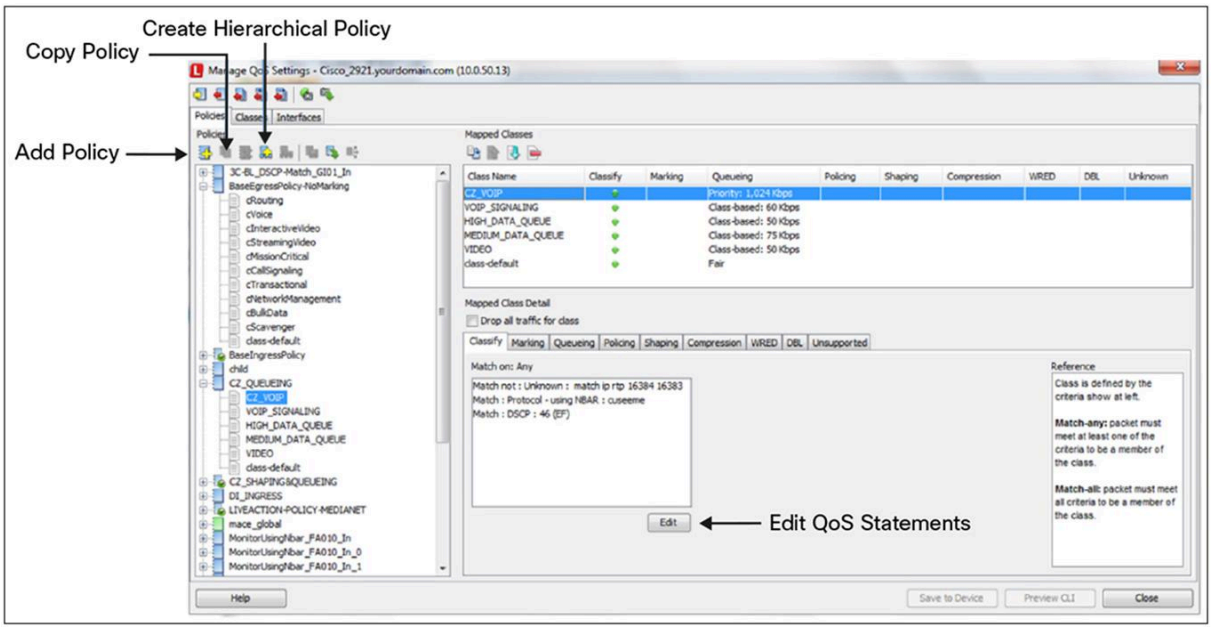
In the example shown in Figure 10, the LiveAction QoS control feature resolves a problem where BitTorrent slows down Microsoft Office 365 performance. By policing BitTorrent traffic through the LiveAction QoS GUI interface, you can instantly validate the performance of MS Office 365, which was restored to a favorable level as shown in the figure.

Figure 10. BitTorrent Traffic Throttled Down for MS Office 365



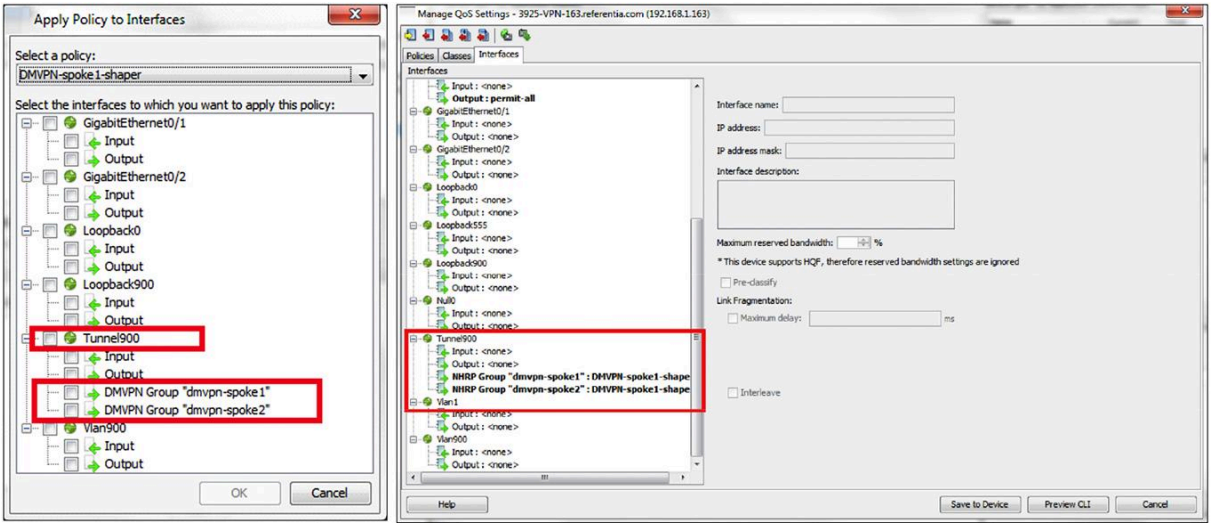
LiveAction graphical QoS configurator and management empower IT engineers of all experience levels to create, edit, and implement highly effective QoS policies on live networks with complete ease and confidence. LiveAction has deep QoS expertise built in based on extensive research of the features, functions, and idiosyncrasies of Cisco devices. With LiveAction, you can create QoS configurations from the beginning or by using Cisco best practice templates with hundreds of device-specific rules and guidelines. After you create QoS policies, you can deploy them immediately or schedule their deployment on multiple devices or interfaces. Figure 11 shows an example of the LiveAction graphical QoS configurator.

Figure 11. QoS Graphical Configurator



For example, with LiveAction you can create and manage QoS policies for Dynamic Multipoint VPN (DMVPN) tunnel endpoints and then apply them to tunnel interfaces. You can then assign each policy to the desired Next-Hop Routing Protocol (NHRP) tunnel interface (Figure 12).

Figure 12. DMVPN QoS Configuration



Use Case 4: PfR Dashboard and Network Health Status

LiveAction provides PfR dashboard and network health status for IWAN management, including but not limited to:

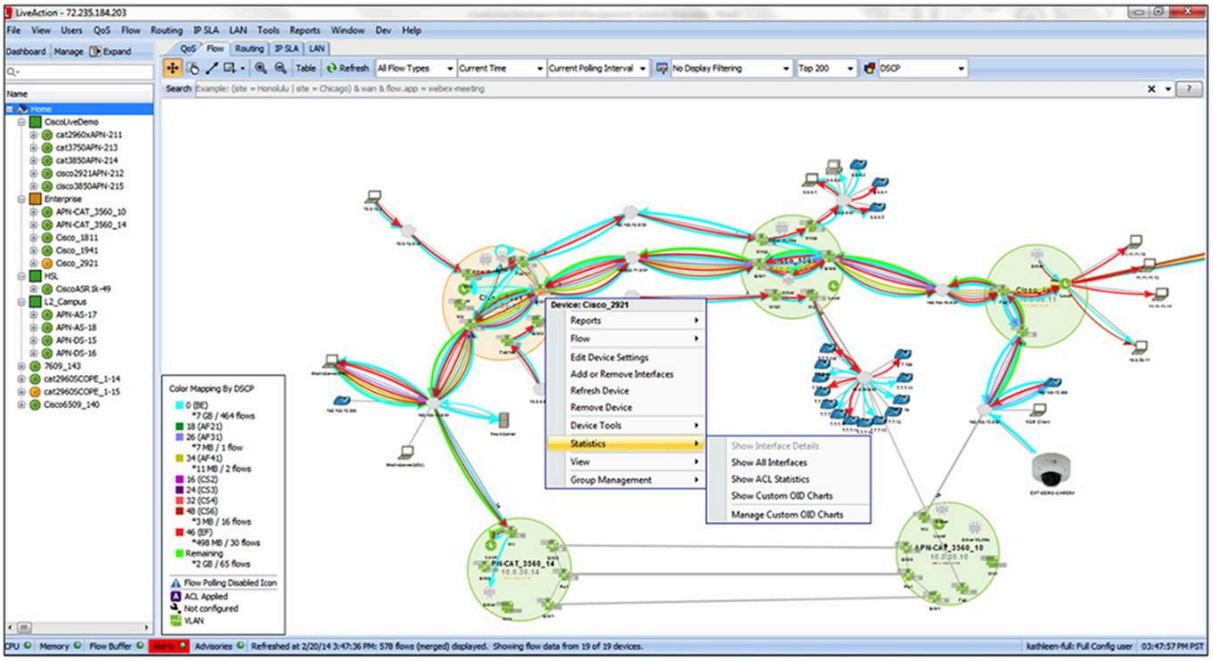
- PfR Dashboard: Quick glance and trending of how PfR performs in re-routing traffic or protecting applications. Figure 13 shows what conditiions contribute the most to PfR route changes (delay, packet loss,

jitter, reachability) over time by service provider, by site, and by application. Application groups are defined within LiveAction to for easy reporting by application names instead of DSCPs.

Figure 13 – PfR Dashboard

- Network discovery and network topology: LiveAction discovers devices and draws them on the topology map. This topology is also interactive in that network administrators can perform commands or take actions (such as creating an ACL off a flow) by right-clicking on that topology. This interactive topology is at the core of the LiveAction intuitive **See-Point-Click-Fix** user interface model.
- End-to-end flow visualization: LiveAction visualizes the end-to-end flows and imposes them on the network topology to help network administrators graphically understand traffic pattern, bandwidth consumption, priority setting, and other performance conditions (Figure 13).

Figure 13. End-to-End Flow Visualization



Network-wide audits of QoS policies: With a single click of a button, LiveAction generates a policy and performance audit report analyzing QoS configurations for errors and performance problems and details this information in an easy-to-navigate report. This report shows everything you need to know about your QoS policies in great detail, including configuration settings, performance problems, drops, and policy errors (Figure 14).

Figure 14. QoS Policy and Performance Audit Report

- Network monitoring using NetFlow, Internet Protocol Flow Information Export (IPFIX), Simple Network Management Protocol (SNMP), IP SLA, routing, and LAN statistics.
- Threshold crossing alert (TCA) processing: User-defined thresholds can be configured such that LiveAction generates TCAs to warn network administrators of impending performance problems.
- Dashboard: LiveAction features system, flow, QoS, and IP SLA dashboards to provide at-a-glance status for top application performance; site performance; networking device CPU and memory usage; link usage; interface up/down; and top QoS conditions on interfaces, links, and Layer 2 devices (drops and congestions).
- Routing visualization: LiveAction provides real-time routing layer visualizations and path debugging tools for Cisco networks. In addition, the policy-based routing editor of the module provides a high degree of traffic engineering for managing policy-specific forwarding paths.

Use Case 5: Cisco ASA and Cisco ASR 1000 Security Event Reporting

Cisco ASA Network Security Event Logging Processing

Cisco ASA Network Security Event Logging (NSEL) event information indicates when flows are created, deleted, or denied by an ACL. Combined with geographical information, LiveAction provides real-time views of flows going through an ASA with country information. The flows are graphically traced from specific inside, outside, and demilitarized zone (DMZ) interfaces for easier response and understanding.

Cisco ASR 1000 High-Speed Logging Event Processing

The Cisco ASR 1000 Zone-Based Firewall writes high-speed logging (HSL) records through NetFlow Version 9 when sessions are created and torn down. Capturing these HSL flows, LiveAction visualizes audit, alert, drop, and

event notifications. LiveAction also provides visual displays of HSL events on the topology map, device views, and historical playback. This interactive view allows you to create ACLs directly from the HSL flow.

For more information about Cisco IWAN and LiveAction IWAN management, please visit: http://www.cisco.com/go/iwan, http://www.liveaction.com/solutions/iwan, and http://www.liveaction.com/solutionsplus/iwan.

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