nGenius Integrated Agent for Cisco Integrated Services Router

Intelligent data source for the nGenius Service Assurance Solution enables cost-effective visibility into network and application performance in branch office environments

Highlights

- Simplifies and consolidates deployment of service assurance capabilities in the branch office
- Tracks user experience and application and network performance
- Real-time application performance and response time metrics help predict and prevent service delivery degradations
- Accelerates problem resolution to minimize the impact of branch office network and application degradations
- Easily integrates with Cisco® Integrated Services Router to lower the cost of branch office service assurance

nGenius Integrated Agent

The nGenius® Integrated Agent software is self-contained virtualized probe software that is integrated and deployed within a third-party network device to provide high-definition, packet-flow visibility at logical network boundaries. With the identical functionality of a hardware-base nGenius Probe, the nGenius Integrated Agent provides scalable packet-based monitoring and analysis of traffic traversing the network to feed valuable service delivery metrics to the nGenius Performance Manager, part of the nGenius Service Assurance Solution. Optimized for deployment in the branch office and at the network edge, nGenius Integrated Agent provides always-on, granular visibility into LAN and WAN environments, generating rich metadata on key performance metrics such as traffic, application and service utilization, conversations, error conditions, resource utilization, response time, and many others.

Deployed as part of a pervasive instrumentation strategy, the nGenius Integrated Agent removes the barriers to achieving visibility in more places by cost-effectively extending this visibility closer to the user. Each nGenius Integrated Agent instance appears to the nGenius Performance Manager as any other probe device would, enabling the IT organization to track service delivery from the data center to the desktop over the WAN to the branch office. The nGenius Performance Manager combines metrics from the nGenius Integrated Agent with other distributed nGenius hardware and software-based intelligent data sources to create the nGenius Service Assurance Solution, enabling the IT organization to achieve an unmatched global perspective of their service delivery network to enable the user experience, greater business value, and simplify the end-to-end management.

The nGenius Integrated Agent delivers:

Network visibility
Key network metrics, such as traffic, application and service utilization, conversations, error conditions, resource utilization, and response time on physical and virtual links

Application recognition and monitoring
Tracks voice, Web, custom and well known applications and services in order to provide an all-encompassing view of the landscape, including all branches

Key Performance Indicators
Real-time visibility into the health of applications and services from a user experience perspective using advanced metrics, such as response times, errors, and packet loss/jitter

Convergence management
View voice, video, and data metrics together to achieve an end-to-end view of the service delivery network's performance

Alarming and event notification
Provides real-time notifications for threshold violations, as well as, power alarms with millisecond resolution to quickly detect and begin investigating the root cause of complex service delivery issues

On-demand packet capture
Supports local packet capture enabling deep packet analysis to identify the root cause of difficult performance issues more easily

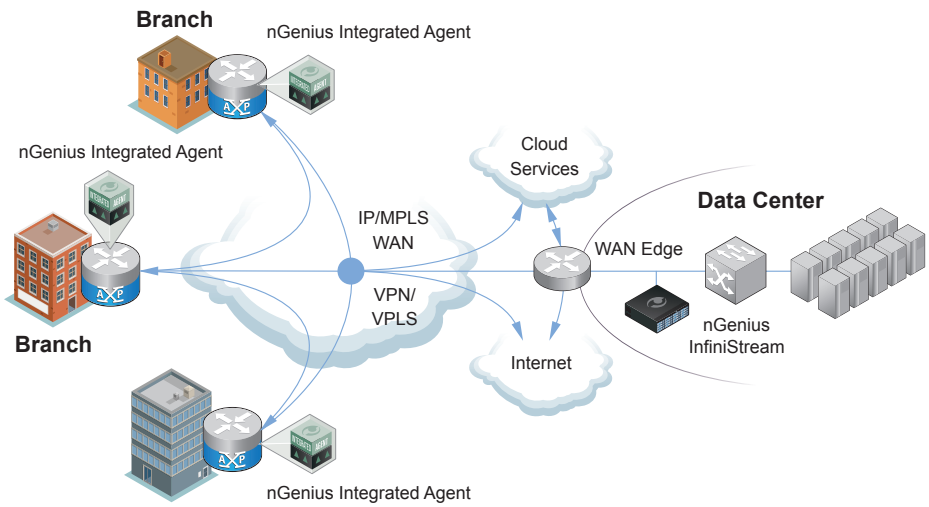

Figure 1. Instrumenting nGenius Integrated Agent at branch locations facilitates monitoring end-to-end as well as site-to-site.

Powerful Packet-Based Metadata

All nGenius intelligent data sources leverage a common metadata framework called Common Data Model (CDM) architecture. CDM is a NetScout technology innovation that creates a common set of statistics and metrics across multiple data sources to derive seamless traffic intelligence regardless of interface type. The CDM architecture allows packet-flow data from disparate network technologies, regardless of the location to be integrated into a common repository for consistent analysis, views, and reports. CDM provides detailed information for emerging technologies, such as virtualized environments, and policy-based configurations, including VoIP, MPLS, QoS, VPNs, and Cisco NetFlow.

nGenius Integrated Agent for Cisco Integrated Service Routers

The nGenius Integrated Agent for Cisco Integrated Services Router (ISR) cost-effectively brings always-on, end-to-end service assurance to the branch office. With nGenius Integrated Agent, IT organizations gain real-time visibility and comprehensive reporting for branch office traffic to reveal how remote network resources are being utilized, how applications and services are behaving, and how remote users are experiencing the services being delivered. As a result, IT staff has consistent and unified insight into the branch office environment in the same manner, and with the same granularity, as the data center and campus network. The joint Cisco and NetScout solution makes managing today's borderless enterprise easier by enabling a truly unified view of the global service delivery environment to assure all users have a consistent experience regardless of location.

Leveraging the powerful services virtualization capabilities of the Cisco Application Extension Platform (AXP), organizations gain the benefits of unified service delivery management without increasing the hardware footprint and complexity in the branch. This reduces the cost of operations by freeing up valuable rack space, reducing management complexities, simplifying remote location asset management, and reducing power consumption. Consequently, this enables IT staff to architect a comprehensive unified service delivery management strategy that can scale to cope with current and future demands from a widening array of services and applications while further extending their view of network and application performance.

Key benefits of integration into Cisco ISR platforms include:

- Real-time operational status with intelligent early warning of emerging performance issues in the branch office
- Consistent and unified end-to-end visibility from the data center to the branch office to assure business service continuity
- Granular, always-on view into service consumption, network and application performance, and remote user experience helps to optimize the WAN and branch office network for peak performance and efficiency
- Local visibility simplifies and speeds remote troubleshooting minimizing need for technician dispatch and dramatically reducing problem resolution time
- Enables improved operational efficiency and reduced management complexity and cost of branch office service assurance

Integration with Cisco Integrated Services Routers

The nGenius Integrated Agent software is seamlessly deployed within Cisco 2800 and 3800 Series ISR and the Cisco 2900 and 3900 Series ISR Generation 2 using the Cisco AXP and a Cisco Service

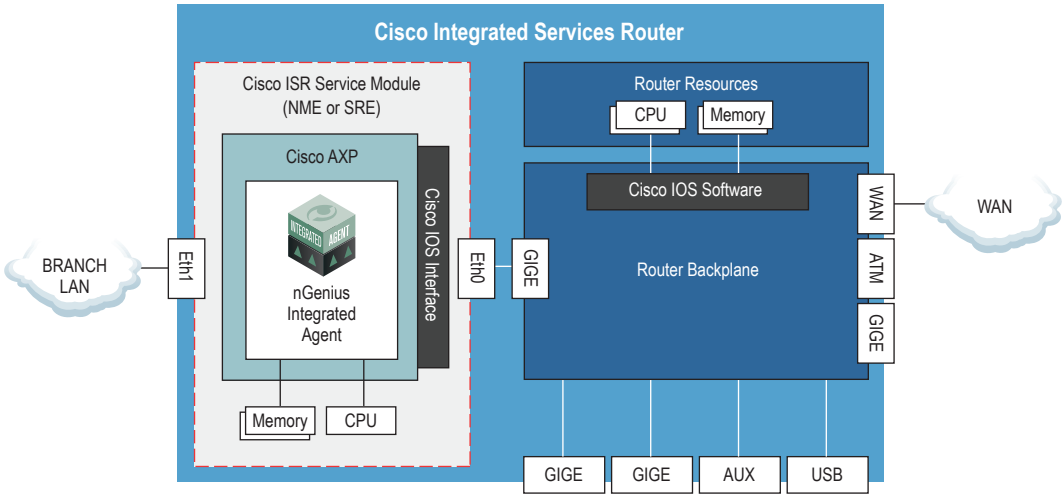

Figure 2. The router backplane interface (Eth0) is used to continuously monitor traffic destined for the WAN while the external AXP interface (Eth1) is used to continuously monitor traffic of the branch LAN.

Module. Cisco AXP provides a standards-based Linux® environment that hosts and integrates the nGenius Integrated Agent software within the Cisco ISR platform. The Cisco AXP hosting environment provides dedicated infrastructure to securely install, host and manage the nGenius Integrated Agent software. The Cisco Service Module provides dedicated processing and interface capabilities into network traffic independently of the host router resources. This independence helps ensure maximum concurrent routing and application performance while reducing physical footprint, lowering power consumption, and consolidating management. Depending on the chosen service module and Cisco ISR, the nGenius Integrated Agent software can be installed locally or remotely, enabling a high degree of flexibility to allow the IT organization to quickly deploy extended monitoring to virtually any branch office location.

The nGenius Integrated Agent runs in a virtual application instance on the AXP module within the Cisco ISR and leverages the Cisco packet API to collect and process network traffic on both the router backplane and an external Gigabit Ethernet interface. Typically the router backplane interface is used to continuously monitor the traffic to and from the WAN while the external Gigabit interface is typically used for local LAN based traffic monitoring and troubleshooting activities, see Figure 2. The metadata derived from these packet-flows is leveraged by the nGenius Performance Manager for real-time analysis and reporting.

Key Capabilities

Automatic Recognition and Monitoring of Applications

Support for a variety of application types, including:

- Well-known and derivatives of well-known applications
- User-defined and custom-developed applications
- Peer-to-peer applications
- Web-based applications and URLs

On-Demand Packet Analysis

- Short-term packet capture (up to 1 GB of data)
- Packet capture may be triggered manually or based upon a specific event or alarm

Response Time Analysis and Key Performance Indicators

- Based upon packet loss, inter-packet delay, client and server errors, and timeouts
- Passive application responsiveness measurements for virtually all application and service types
- One-minute granularity for average response time, number of active sessions, number of successful transactions, and number of server error types
- 15-minute granularity for maximum and average response time per client/server pair, total number of transactions, number of successful transactions, TCP connect time, number of active sessions, total packet loss, responses time distribution, number of timeouts, number of retries, and application payload

Convergence Management Metrics

- Volume, utilization, host, and conversation details for RTP Voice and Video protocols
- Application-layer details for call set-up protocols, such as SIP, H.323, Q.931, and MGCP, plus Cisco's SCCP and Avaya's H.323 extensions
- VoIP quality metrics: jitter, call set-up time, packet loss, incomplete and failed calls
- IP addresses, phone extensions, and connect times
- Packet-level visibility and decode of voice protocols
- Voice configuration data including Codec, dialing plan, and QoS assignments

Network Management Metrics

- TCP, HTTP and server-specific performance, and error conditions
- Percent Utilization and Packet/Byte Counts for: link, host, host group, applications, conversations

Alarming and Event Identification

- Define alarms for link utilization, application utilization, application response time, application availability
- Burst Alarms at millisecond resolution
- "Power Alarms" highlight root cause by gathering top users and applications automatically at violation time for segments exceeding utilization, responsiveness, and availability thresholds
- Supports rising, falling, and time-over-threshold templates

Data Granularity

- 15-second real-time views with 1-second peaks
- 1-minute historically logged data for all application, hosts, and conversation flows

nGenius Performance Manager

- nGenius Integrated Agent requires nGenius Performance Manager Workgroup or Enterprise for reporting and viewing.
- nGenius Performance Manager v4.7

Cisco IOS® Software version

- Cisco IOS software release 12.4(24)T2, 15.0(1)M or higher

Cisco AXP Software

- AXP software version 1.5.3 or higher

Cisco Integrated Services Router Requirements

The nGenius Integrated Agent is supported on the Cisco Integrated Services Router and the Cisco Integrated Services Router Generation 2 series. The agent software is deployed on a Cisco enhanced network module (NME) or Services Ready Engine (SRE) Service Module in conjunction with the Cisco AXP software.

	Cisco ISR Models									
AXP Model Number	2811	2821	2851	3825	3845	2911	2921	2951	3925	3945
NME-APPRE-502-K9	•	•	•	•	•					
NME-APPRE-522-K9				•	•					
SM-SRE-700-K9						•	•	•	•	•
SM-SRE-900-K9						•	•	•	•	•

Figure 3. Supported AXP models for Cisco ISR models

Notes:

- Performance levels will vary depending host network equipment environment and performance characteristics
- For complete compatibility and system requirements, refer to related Cisco documentation

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