



nGENIUS | INFINISTREAM®

Highlights

- Intelligent deep packet capture and analysis for mobile, wireless and fixed multi-service IP networks
- High-speed stream-to-disk of packets for granular post-event analysis
- Extended Data Record (xDR) technology—distributed, efficient session specific metadata
- Smart Recording and Data Mining (SRDM)—intelligent data reduction and storage optimization technology
- Voice quality monitoring for mobile and fixed networks
- Statistical analysis and performance monitoring based on an advanced, scalable framework for calculating packet/flow-based statistics
- Supports multiple network domains or tiers from the data center to core to access
- Operates standalone or as the foundational data source for the nGenius Service Assurance Solution

Dedicated Deep Packet Capture and Analysis Appliances

The nGenius® InfiniStream® appliances are intelligent, passive devices that can non-intrusively monitor key links in an operator's service delivery network without impacting customer traffic. They are deployed in a distributed fashion but operate in a unified manner to provide end-to-end performance visibility of mobile, wireline and wireless IP networks. The nGenius InfiniStream appliances utilize advanced deep packet capture and analysis technology with unsurpassed traffic scalability and stream-to-disk storage. They provide the real-time and historical analysis needed to support rapid problem isolation and user experience management in modern IP service delivery networks.

The nGenius InfiniStream appliance exploits the most important source of network and application performance data: the packet. Used standalone or as the foundation for the nGenius Service Assurance Solution, nGenius InfiniStream appliances provide the rich source of packet-level intelligence necessary to help solve complex service-affecting problems on a network-wide, multi-domain, multi-tier basis.

Recommended applications for nGenius InfiniStream appliances include:

- Rapid, proactive identification of application and network performance issues
- Remote, real time and historical packet capture and protocol analysis
- Service and application statistics reporting
- New service and network testing and implementation
- Real-time voice quality monitoring
- Intelligent data source for supporting third-party customer experience management, fault management and performance management applications

Intelligent Data Source

The nGenius InfiniStream appliance is first and foremost an intelligent data source and provides valuable information for various assurance and business intelligence processes across multiple service provider organizations. The appliance generates high definition, packet-flow information based on actual customer and network control traffic. In addition, Extended Data Records (xDRs) are generated and stored for multiple protocols at critical interfaces in service provider environments. The xDRs are generated on a real-time basis and contain rich metadata per application session including performance metrics, subscriber information, error events and elements traversed. Actual customer packets are also collected, indexed and stored for future reference for use in workflows requiring packet-level and protocol-level visibility.

The nGenius Service Assurance Solution can leverage data from distributed nGenius InfiniStream appliances deployed throughout the network through the following products:

nGenius Service Delivery Manager uses the key performance indicators (KPIs) and xDRs generated by the nGenius InfiniStream appliances to provide the following: early warning notification of end-to-end service performance problems, visibility by business unit or geographic region, threat detection, anomalous service behavior detection, and evidentiary and contextual information surrounding event alarms.

nGenius Performance Manager provides advanced visualization of performance information based on the data captured and processed at the distributed nGenius InfiniStream appliances for an end-to-end view of network and service health. Other features that leverage the data captured by the nGenius InfiniStream appliances include event alarms, planning and optimization, work flows and service and policy validation.

nGenius Subscriber Intelligence uses xDRs to provide multi-protocol, multi-hop, multi-tier core-to-access views of data and control plane sessions. In addition, nGenius Subscriber Intelligence leverages the rich metadata captured by xDR technology to expose detailed information on subscribers, handsets, response time, error codes and network path on a per-session basis.

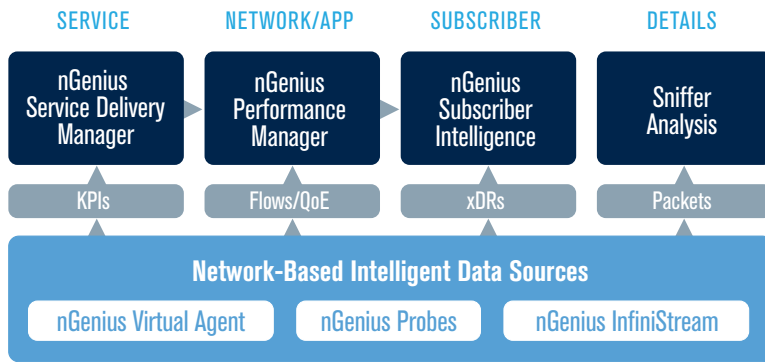


Figure 1: The nGenius InfiniStream appliances are the primary data source of the nGenius Service Assurance Solution

Sniffer Analysis (standalone mode)

Sniffer® Analysis works with the nGenius InfiniStream appliance in standalone mode, providing sophisticated forensic analysis without the need for additional equipment or centralized monitoring consoles. nGenius InfiniStream appliances include the direct-connect InfiniStream Console to summarize packet data and serve as a platform from which to mine data from the extensive packet storage available on the individual appliances. Sniffer Analysis simplifies troubleshooting issues and helps speed root cause, leveraging back-in-time analysis on the retrieved data by automatically identifying and decoding a wide array of applications. For detailed packet analysis requirements, Sniffer decodes and experts are readily available. Sniffer Analysis is perfect for solving intermittent problems or any time forensic analysis is required.

How It Works

The nGenius InfiniStream appliance combines the benefits of sophisticated statistical monitoring and packet capture technologies into a single robust database appliance. Using patented streaming methods, the nGenius InfiniStream appliances capture packets off the wire and record them to disk for storage and future analysis. The nGenius InfiniStream appliance maximizes storage capabilities using algorithms that balance overall drive storage with quick retrieval and resilience. As the packets are being stored, statistics are also gathered on individual communication flows by the NetScout® Common Data Module (CDM) architecture. This CDM technology provides a consistent format against which data is accumulated from various network types into a common repository that includes everything from response time-based statistics to policy-

based configurations for VoIP, MPLS, QoS, and VPNs. The combination of high-level statistics with deep packet storage is a powerful solution, providing statistical analysis for reporting and initial drill down while reserving the packets for in-depth problem resolution and service analysis.

The nGenius InfiniStream appliance also classifies all packets and flows, generates statistical data and processes control and data plane sessions into xDRs. These xDRs are used by nGenius Subscriber Intelligence, nGenius Performance Manager and nGenius Service Delivery Manager to provide distributions on error or response codes for failed applications, early warning indication of problems and rapid analysis of subscriber, service and network performance issues within modern IP service delivery networks.

The nGenius InfiniStream appliances, along with other intelligent data sources such as nGenius Probes, nGenius Virtual Agents and nGenius Integrated Agents, are strategically distributed throughout a service provider's network, and provide the nGenius Service Assurance Solution with the highly granular, sub-second, end-to-end "packet-flow" and session-level performance data necessary to properly monitor and manage mobile, wireless and fixed IP networks.

This ability to generate the high-level statistics, performance metadata and xDRs in real-time, then retain the packets for in-depth problem analysis and resolution makes the nGenius Service Assurance Solution one of the most feature-rich and powerful solutions for monitoring IP multi-service networks on the market today.

Features

Broad Storage Capabilities

Configured in a variety of rack-mounted chassis options, storage capabilities range from 500 GB to 96 TB. Chassis options vary from 1RU appliances to larger systems. Minimizing footprint requirements is important in service provider central offices, hubs and data centers where space is an issue. nGenius InfiniStream appliances help operators better manage footprint impact with one of the industry's most scalable intelligent data capture devices. The modular, expandable Genius InfiniStream 7900 Series compresses 96TB of storage into only 9 RUs of rack space.

Remote Management

nGenius Service Assurance appliances are designed for deployment across the multiple tiers and multiple hops within the service provider's network. As such, remote management capabilities are available both in-band and out-of-band for most models.

Interfaces and Speeds

More than two dozen models are available to accommodate deployments across the modern IP network. Monitoring speeds range from 10base-T, to Fast Ethernet, to high-speed 10-GbE interfaces. Port densities are available in 2-port, 4-port, and 8-port configurations.

Flexible Mining

Sophisticated indexing provides for flexible data mining to quickly retrieve the right information when it is required.

Data Optimization

The NetScout Smart Recording and Data Mining (SRDM) technology enables the user to selectively record and store all or just a portion of the packets of interest, thus extending the amount of data that can be recorded and the length of time data is available for retrieval. SRDM is available on a per-application basis and can be configured via nGenius Performance Manager.

Hardened and Secure

The nGenius InfiniStream appliance runs on a hardened Linux® operating system custom-built for secured operation. All access is password protected.

Voice Quality Monitoring

Real-time, highly accurate voice quality monitoring and reporting is provided by leveraging Telchemy® VQmon® algorithms and the unique architecture and highly scalable processing capabilities of the nGenius InfiniStream appliance. Included are the following features:

- MOS and R Factor (ITU G.107 E-Model) voice session quality scores tested for compliance with ITU-T P.564
- Packet loss and jitter statistics
- Support for a wide range of industry-standard and proprietary codecs used in fixed and mobile environments

NetScout voice quality monitoring capabilities help operators assure user experience in IMS, VoIP and 3GPP R4+ environments.

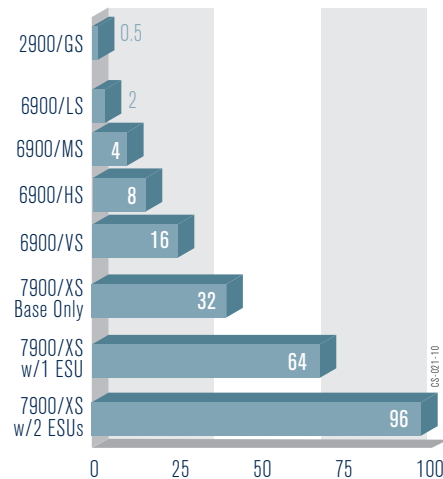


Figure 2: nGenius InfiniStream appliances are available in a wide variety of storage options up to 96 TB

Supported Protocols and Interfaces

nGenius InfiniStream appliance supports a wide array of protocol decodes. In addition, many of the of protocols and interfaces listed are also supported with CDM based packet flow KPIs as well as xDRs:

- All networks—mobile, fixed, cable, wireless: DNS, DNS-NAPTR, DNS-SRV, DHCP, RADIUS, Diameter, HTTP, SIP, SIP-T, RTP, RTCP, FRP, POP3, SMTP, SIGTRAN - SCTP, M3UA, ISUP, WAP, BCMCS, SMP, PPP, WSP
- Mobile networks: GPRS/UMTS: GTP-C, GTP-U, GMM, SM, BSSGP, RANAP; CDMA2000: GRE, MIP; WiMAX WSP; LTE/EPC: X2AP, GTPv2, S1AP, PMIPv4/PMIPv6, EPS-Mobility, Management, EPS-Session Management

- Supported interfaces: GPRS-UMTS: Gb/IP, IuPS/IP, Gn, Gi, Gp, AAA, Direct Tunnel; CDMA2000: A12, A10, A11, Pi; LTE/EPC: X2,S1, S3, S4, S11, S5, S6a, S8, SGi

The nGenius InfiniStream Appliances Available in Three Product Lines

All nGenius InfiniStream appliances share a common foundation of proven technology including packet-flow-based CDM monitoring, continuous data packet capture and analysis, xDR generation and storage, high capacity packet storage and Sniffer Analysis. Three product lines are available to meet the traffic processing and storage requirements of today’s modern IP service delivery networks: the nGenius InfiniStream 2900 Series, 6900 Series and 7900 Series.

The nGenius InfiniStream 2900 Series



nGenius InfiniStream 2900 Series appliance is a space-optimized, lower storage capacity device developed to expand deep packet capture and analysis capabilities to areas of the network previously underserved, ignored or deemed cost prohibitive. At only 1RU in height, this small-footprint device is perfectly suited for access portions of the network or where traffic volumes are lighter. The nGenius InfiniStream 2900 Series is designed for operators that want to extend xDR and packet flow-based visibility at more points in the network and take advantage of the return on investment from faster problem identification, isolation and resolution only afforded by ubiquitous, real-time coverage of the nGenius InfiniStream appliance.

Specific functionalities of the nGenius InfiniStream 2900 Series include:

- 500 GB of storage capacity for packet capture
- Complete integration with nGenius Performance Manager and the rest of the nGenius Service Assurance Solution
- Small-footprint (1RU), low-power consumption

The nGenius InfiniStream 6900 Series



nGenius InfiniStream 6900 Series appliance continues to lead the industry in deep packet capture and analysis-enabled devices. With robust performance, storage capacity and resiliency, the nGenius InfiniStream 6900 Series appliances are deployed at service aggregation points such as the core, data center server farms and other high-capacity distribution points.

Specific functionalities of the nGenius InfiniStream 6900 Series include:

- Robust storage capacity options up to 16 TB
- High performance and fast packet processing
- High port density, with broad range of link interfaces/speeds
- Support for high-capacity links up to 10 GbE
- AC/DC options, redundant power & RAID drives for “always-on” operation
- Hot-swappable drives and power supplies

The nGenius InfiniStream 7900 Series



The nGenius InfiniStream 7900 Series appliance is unique to the industry with its deep packet capture and analysis capabilities, modularity, extensive storage options (32 TB to 96 TB) and small form factor (3RU to 9RU max). With even greater performance and storage capacity than the 6900 series, nGenius InfiniStream 7900 Series appliance is designed for major data centers, mobile and fixed core network locations and other sites that have high traffic volumes and vast storage needs. The nGenius InfiniStream 7900 Series is uniquely positioned to help service providers deploy and manage next-generation IP converged networks and LTE/EPC architectures.

Specific functionalities of the nGenius InfiniStream 7900 Series include:

- Robust storage capacity options starting at 32 TB and field-expandable to 96 TB
- High performance and fast packet processing
- Optimized for 10 GbE interfaces
- AC/DC options, redundant power & RAID drives for “always-on” operation
- Hot-swappable drives and power supplies

Advanced Time Synchronization

- Network Time Protocol (NTP) can be used to synchronize the clocks of the computers and appliances within IP networks. Because the nGenius InfiniStream appliance time-stamps the packets as they are captured, accurate timing is important. For situations requiring more accurate time stamping, NetScout provides the following options to synchronize timing closer than that obtained by NTP alone:

IEEE 1588 Precision Time Protocol

- Precision Time Protocol (PTP) provides a standards-based clock synchronization accuracy in the microsecond range. PTPv1 is a more accurate alternative to the NTP protocol by supporting 25-45 microsecond accuracy compared to the 1 to 10 millisecond accuracy in NTP. PTPv1 provides cost-effective, improved accuracy that supports carrier IP transformation initiatives as they migrate away from TDM-based clock distribution or if a GPS clock source is not available, or if a more affordable solution is desired as compared to GPS.

nGenius Time Synchronization Adapter

- The nGenius Time Synchronization Adapter leverages the precise clock times of Global Positioning Systems (GPS) and then uses satellite triangulation from multiple geosynchronous satellites to determine the accurate terrestrial location of the appliance to determine the travel signal distance. The accuracy of the adapter is superior to other methods because the UTC time comes directly from multiple satellites and is then adjusted for distance. The adapter includes its own power source and requires an external GPS antenna/receiver. As many as four nGenius InfiniStream appliances can connect to a single adapter using the supplied connector cables, thereby coordinating timings across appliances. The nGenius Time Synchronization Adapter supports all nGenius InfiniStream appliances.

TECHNICAL SPECIFICATIONS BY SERIES AND CHASSIS TYPE

nGenius InfiniStream 2900 Series Product Specifications Fast/Gigabit Ethernet:

For Models: 2906/GS, 2910/GS, and 2916/GS

	Specifications	Additional Information
Rack Unit	1 Server Rack Unit (1RU)	
Weight	25lbs. (11.34kg)	
Dimensions	Chassis: 24"D x 17"W x 1.72"H (60.96cm x 43.18cm x 4.37cm)	
Side Rails	Rack mount slide rails included (4 post)	2-post rails optional
Capture Ports		
2906/GS	2 x 10/100/1000 Base-T	
2916/GS	4 x 10/100/1000 Base-T	
2910/GS	4 x SFP	
Capture Store	GS model - 500 GB	
Management Port	2 x RJ45	
Console Port	DB9M	
Embedded Linux OS Support	Separate flash drive dedicated to OS	
Power Rating	100-240VAC, 50/60Hz, 400W supply, (6A at 100VAC, 3A at 240VAC),	
Optional DC Power	Not available	
Max Power Consumption	1.2A, 130 W, 444 BTU/hr	
Environmental Specifications	Operating Temperature: 41° to 104°F (10° to 40°C) Operating Humidity: 5% - 80% (non-condensing)	
Regulatory and Agency Approvals	Regulatory Model Number: AQU, FCC Class A, CE Mark (EN 55022 Class A, EN 55024, EN 61000-3-2, EN 61000-3-2), VCCI (Japan) Class A, UL 60950-1 CAN/GSA C22.2 No. 60950, EN 60950, CB Report, UL-GS (DEMKO)	

nGenius InfiniStream 6900 Series Product Specifications Fast/Gigabit Ethernet:

For Models: 6910/LS, 6910/MS, 6910/HS, 6910/VS, 6916/LS, 6916/MS, 6980/LS, 6980/HS, 6980/VS, 6986/LS, 6986/HS, and 6986/VS

	Specifications
Rack Unit	3 Server Rack Unit (3RU)
Weight	77lbs. (35kg)
Dimensions	Chassis: 30.5"D x 19"W x 5.25"H (77.4cm x 48.3cm x 13cm)
Side Rails	Rack mount slide rails included
Capture Ports / Model	
6910/XX	4 x SFP Available in /LS, /MS, /HS, /VS configurations.
6916/XX	4 x 10/100/1000 Base-T Available in /LS, /MS configuration.
6980/XX	8 x SFP – Available in /LS, /MS, /HS, /VS configurations.
6986 /XX	8 x 10/100/1000 Base-T – Available in /LS, /HS, /VS configurations.
Capture Store	LS model - 2 TB, MS model - 4 TB, HS model - 8 TB, VS model -16 TB
Management Port	RJ45
Console Port	DB9M
Embedded Linux OS Support	Two (2) separate drives dedicated to OS
Power Rating	100-240VAC, 60/60Hz, 800W, 12-6A (x2), 1+1 Hot-swappable, redundant power
Optional DC Power	-48VDC, 800W, 15A (x2), 1+1 Hot-Swappable Power Supply
Max Power Consumption (AC)	4.1A, 448W, 1529 BTU/Hr (total, across power supplies)
Max Power Consumption (DC)	9A, 450 W, 1536 BTU/hr (total across power supplies)
Environmental Specifications	Operating Temperature: 50° to 95°F (10° to 35°C) Operating Humidity: 8% - 85% (non-condensing)
Regulatory and Agency Approvals	Regulatory Model Number: AFM3U2, FCC Part 15 Class A, CE Mark (EN 55022 Class A, EN 55024, EN 61000-3-2, EN 61000-3-2), VCCI (Japan) Class A, NOM (Mexico), UL 60950-1 CAN/CSA C22.2

nGenius InfiniStream 6900 Series Product Specifications 10 Gigabit Ethernet:

For Models: 6990/MS, 6990/HS, 6990/VS, 6995/MS, 6995/HS, and 6995/VS

	Specifications
Rack Unit	3 Server Rack Unit (3RU)
Weight	77lbs. (35kg)
Dimensions	Chassis: 30.5"D x 19"W x 5.25"H (77.4cm x 48.3cm x 13cm)
Side Rails	Rack mount slide rails included
Capture Ports	
6990/XX	2 x XFP - Available in /MS, /HS, VS configurations.
6995/XX	4 x XFP - Available in /MS, /HS, VS configurations.
Capture Store	MS model - 4 TB, HS model - 8 TB, VS model -16 TB
Management Port	RJ45
Console Port	DB9M
Embedded Linux OS Support	Two separate drives dedicated to OS
Power Rating	100-240VAC, 50/60Hz, 750W (12A at 100VAC, 6A at 240VAC) 1+1 Hot-swappable, redundant power
Optional DC Power	-48VDC, 800W, 15A (x2), 1+1 Hot-swappable, redundant power
Max Power Consumption (AC)	5A, 534 W, 1822 BTU/hr (total, across power supplies)
Max Power Consumption (DC)	10.5A, 504 W, 1720 BTU/hr (total across power supplies)
Environmental Specifications	Operating Temperature: 50° to 95°F (10° to 35°C) Operating Humidity: 8% - 85% (non-condensing)
Regulatory and Agency Approvals	Regulatory Model Number: AFM3U2, FCC Class A, CE Mark (EN 55022 Class A, EN 55024, EN 61000-3-2, EN 61000-3-2), VCCI (Japan) Class A, NOM (Mexico), UL 60950-1 CAN/CSA C22.2 No. 60950, EN 60950, CB Report, UL-GS (DEMKO)

nGenius InfiniStream 7900 Series Product Specifications 10 Gigabit Ethernet:

For Models: 7990/XS, 7995/XS, and 7900-ESU-XS

Specifications	
7900 Series Base Unit	
Rack Unit	3 Server Rack Unit (3RU)
Weight	78.8 lbs. (35.74kg)
Dimensions	Chassis: 25.5"D x 17.2"W x 5.2H (64.8cm x 43.7cm x 13.2cm)
Side Rails	Rack mount slide rails included
Capture Ports / Model	
7990//XS	2 x XFP
7995//XS	4 x XFP
Capture Store	32TB Storage (on Base Unit)
Management Port	RJ45
Console Port	DB9M
Embedded Linux OS Support	Separate 32 GB SSD drive dedicated to OS
Power Rating	100-240VAC, 50/60Hz, 900W (12A at 100VAC, 4A at 240VAC) Hot-swappable, redundant power
Optional DC Power	-48VDC, 1000W, 24A (x2), Hot-swappable, redundant power
Max Power Consumption (AC)	5.5A, 620 W, 2116 BTU/hr (total, across power supplies)
Max Power Consumption (DC)	13A, 624 W, 2130 BTU/hr (total across power supplies)
Environmental Specifications	Operating Temperature: 50° to 95°F (10° to 35°C) Operating Humidity: 8% - 90% (non-condensing)
Regulatory and Agency Approvals	Regulatory Model Number: V3, FCC Part 15 Class A, CE Mark (EN 55022 Class A, EN 55024, EN 61000-3-2, EN 61000-3-2), VCCI (Japan) Class A, UL 60950-1 CAN/CSA C22.2 No. 60950, IEC 60950-1, EN 60950-1, CB Report, UL-GS (DEMKO)

Specifications	
Optional 7900 Series Extended Storage Unit (ESU) (1 or 2 may be attached to a single base unit)	
Rack Unit	3 Server Rack Unit (3RU)
Weight	70.35 lbs. (31.91kg)
Dimensions	Chassis: 25.5"D x 17.2"W x 5.2H (64.8cm x 43.7cm x 13.2cm)
Side Rails	Rack mount slide rails included
Capture Store	32 TB Storage (per ESU)
Power Rating	100-240VAC, 50/60Hz, 900W (12A at 100VAC, 4A at 240VAC) Hot-swappable, redundant power
Optional DC Power	-48VDC, 1000W, 24A (x2), Hot-swappable, redundant power
Max Power Consumption (AC)	2A, 235W, 802 BTU/hr (total, across power supplies)
Max Power Consumption (DC)	5A, 240W, 819 BTU/hr (total across power supplies)
Environmental Specifications	Operating Temperature: 50° to 95°F (10° to 35°C) Operating Humidity: 8% - 90% (non-condensing)
Regulatory and Agency Approvals	Regulatory Model Number: V3, FCC Part 15 Class A, CE Mark (EN 55022 Class A, EN 55024, EN 61000-3-2, EN 61000-3-2), VCCI (Japan) Class A, UL 60950-1 CAN/CSA C22.2 No. 60950, IEC 60950-1, EN 60950-1, CB Report, UL-GS (DEMKO)



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