Cisco NAM 2200 Series Appliances 4.2

The network is the foundation for application delivery. Next-generation networks need to meet the growing challenge of effectively delivering applications and services in complex IT environments, where reliable application performance is vital to business success. New applications need to be successfully deployed. Network resources need to be available and used wisely. Performance degradations need to be identified and resolved before they affect business.

The Cisco® Network Analysis Module (NAM) provides unparalleled visibility into how your network is performing and how your users experience the delivery of applications and services to help you understand and improve application performance. The broad portfolio of Cisco NAMs, which encompasses integrated services modules, self-contained appliances, and now virtual service blades, arms you with what you need to manage performance from the branch to the data center.

Product Overview

Introduced in NAM 4.0, the Cisco NAM 2200 Series Appliances offer next-generation performance, superior scalability, and maximum deployment flexibility to deliver exceptional performance monitoring throughout your Cisco network.

The design of the Cisco NAM 2200 Series Appliances is founded on the Cisco Common Appliance Model, Cisco's computing-optimized platform, and includes purpose-built hardware to maximize packet processing in high-speed networking environments. The results are robust appliances that provide granular traffic analysis, rich application performance measurements, comprehensive voice quality of experience monitoring, and deep insightful packet captures.

Figure 1. Cisco NAM 2220 Appliance

Cisco offers two appliances models, the Cisco NAM 2220 Appliance and the Cisco NAM 2204 Appliance. The Cisco NAM 2220 Appliance includes two 10 Gigabit Ethernet monitoring interfaces and six 146 GB Serial Attached SCSI (SAS) hard disk drives with RAID for multiservices monitoring in high-speed, high-density environments (Figure 1). The Cisco NAM 2220 comes with an option for redundant power. To extend uptime, both the hard disk drives and the power supplies are hot-swappable.

The Cisco NAM 2204 includes four 1 Gigabit Ethernet monitoring interfaces and two 250 GB Serial Advanced Technology Attachment (SATA) hard disk drives to meet diverse performance analysis needs in scalable multigigabit switching and routing deployments (Figure 2).

Figure 2. Cisco NAM 2204 Appliance

The Cisco NAM 2200 Series Appliances also include the embedded, web-based Traffic Analyzer GUI, which provides quick access to both configuration menus and easy-to-read performance reports (Figure 3). The GUI can be accessed from any desktop, eliminating the need to send personnel to remote sites or haul large amounts of data to the central site. To enhance security, role-based access can be assigned and web browser access can be secured with up to 256-bit encryption.

Figure 3.   Web-Based Performance Monitoring with the Embedded Cisco NAM Traffic Analyzer
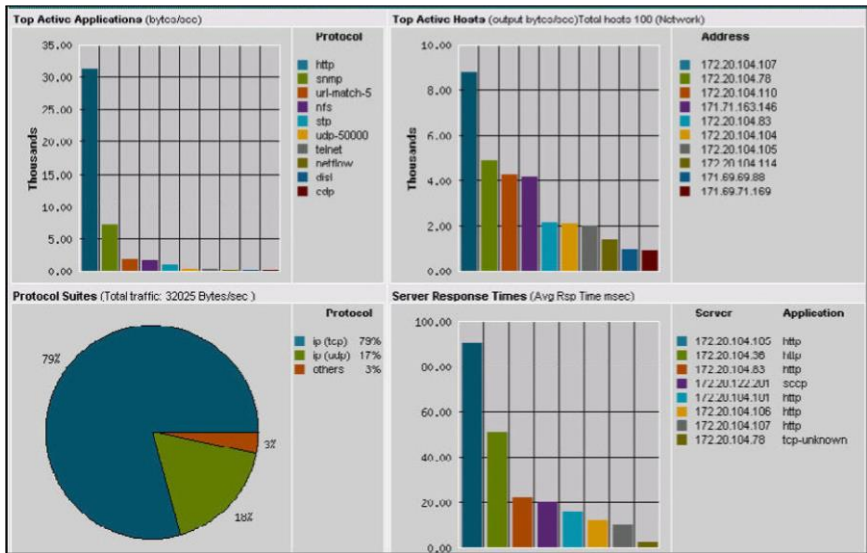
Features and Benefits

Improve the Delivery of Applications and Services with Intelligent Application Performance

The Cisco NAM 2200 Series Appliances deliver comprehensive intelligent application performance (IAP) measurements to accurately assess the end-user experience. The Cisco NAMs analyze TCP-based client/server requests and acknowledgements to provide transaction-aware response time statistics such as client delay, server delay, network delay, transaction times, and connection status. This data can help you isolate application problems to the network or to the server. It can also help you quickly diagnose the root cause of the delay and thus resolve the problem while minimizing end-user impact.

Figure 4 displays an application response time report for an HTTP application. The report shows how addressing an overloaded server improved the responsiveness of the application.

**Figure 4.**   Troubleshooting Application Response Time with IAP

IAP can assist busy IT staff in troubleshooting application performance problems, analyzing application behavior and trends for capacity planning, identifying application consolidation opportunities, defining and helping ensure service levels, and performing pre- and postdeployment monitoring of application optimization and acceleration services.

Gain Visibility into WAN-Optimized Networks with IAP

Cisco Wide Area Application Services (WAAS) is a powerful application acceleration and WAN optimization solution that optimizes the performance of TCP-based applications operating in a WAN environment. The optimization allows IT organizations to consolidate costly branch-office servers and storage in centrally managed data centers and to deploy new applications directly from the data center while offering LAN-like application performance for any employee, regardless of location.

In a WAAS deployment traffic is intercepted by the Wide-Area Application Engine (WAE) devices as an essential part of the optimization process. Traditional monitoring solutions lack the intelligence to understand how this process affects the application flows, thus providing measurements that fail to represent true response time, data transfer time, and other critical performance information. As a complementary component of the Cisco WAAS solution, the Cisco NAM Appliances use the instrumentation built into the WAE devices to gather flow data to accurately quantify the end-to-end application performance improvements, as is demonstrated in Figures 5 and 6.

Figure 5.   Using the Instrumentation in Cisco WAE Devices to Accurately Measure Application Latency
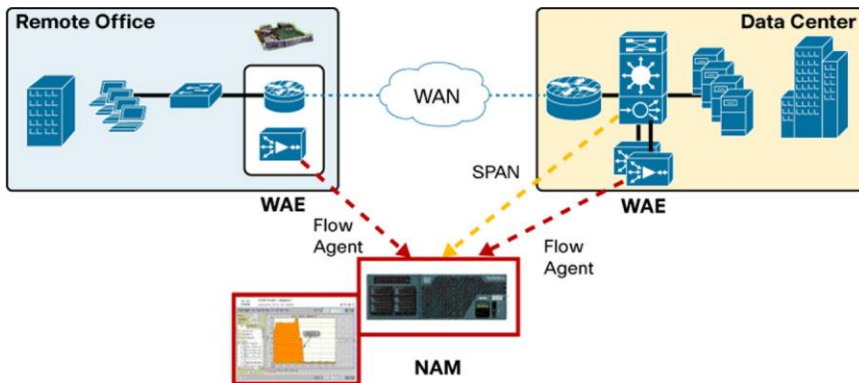
Additionally, the Cisco NAM Appliances can help assess which applications would benefit the most from deploying WAAS and can provide real-time visibility of ongoing optimization improvements.

**Figure 6.**   Viewing Application Performance Improvements of a Cisco WAAS Optimization
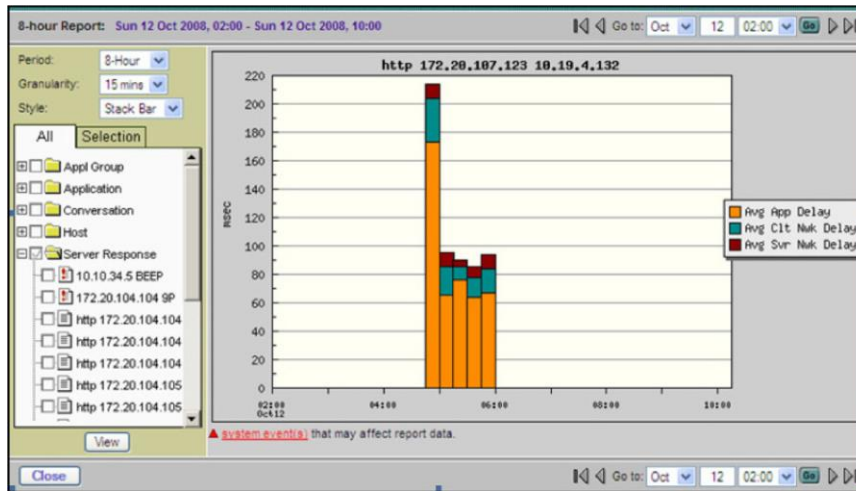
Monitor the Virtualized Data Center

The Cisco® Nexus 1000V is a Cisco-developed server virtualization switching architecture for VMware ESX environments. The Nexus 1000V helps enable policy-based virtual machine (VM) connectivity, mobility of security and network properties, and a nondisruptive operational model for both server and network administrators. Offering a set of network features, management tools, and diagnostic capabilities consistent with the customer's existing physical Cisco network infrastructure and enhanced for the virtual world, the Nexus 1000V allows customers to accelerate their adoption of VMs throughout the unification and simplification of the physical and virtual networks.

With NAM 4.2, the Cisco NAM Appliances extend into the virtual networking layer, simplifying manageability of Cisco Nexus 1000V Switch environments by offering visibility into the VM network including interactions across virtual machines and virtual interfaces. The Cisco NAM Appliances provide combined network and application performance analytics that are essential in addressing service delivery challenges in the virtualized data center. The Cisco NAM Appliances can:

- Monitor the network and VMs uninterrupted by VMotion operations
- Analyze network usage behavior by applications, hosts/VMs, conversations, and VLANs to identify bottlenecks that may impact performance and availability
- Troubleshoot performance issues with extended visibility into VM-to-VM traffic, virtual interface statistics (Figure 7), and transaction response times
- Assess impact on network behavior due to changes such as VM migration, dynamic resource allocation, and port profile updates
- Improve the efficiency of the virtual infrastructure and distributed application components with comprehensive traffic analysis

Figure 7. Single-Screen View of Traffic Utilization from Both Physical and Virtual Interfaces
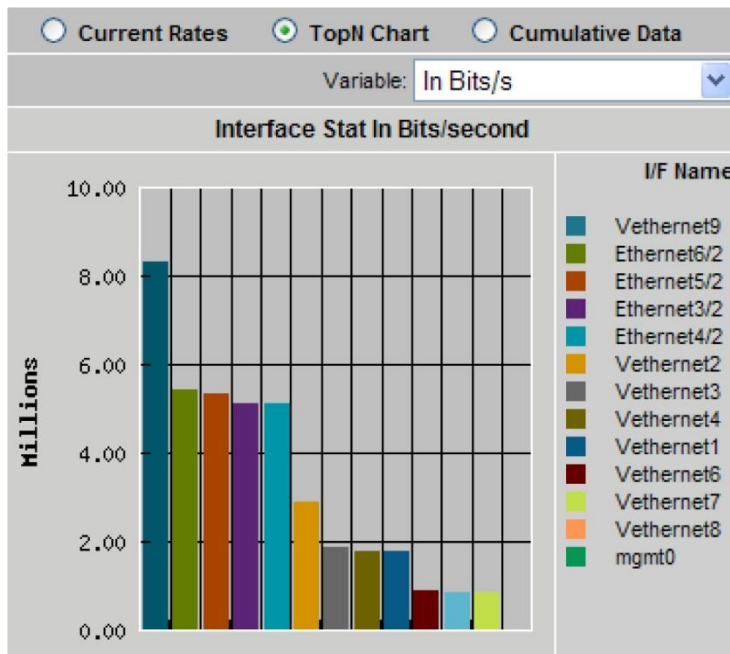

Enrich Voice Quality with Superior Voice-Quality Monitoring

Voice traffic demands stringent availability and performance requirements. It is extremely sensitive to a number of parameters such as packet loss and jitter that do not affect transactional applications in the same way. Users expect near 100 percent uptime. The Cisco NAM Appliances can analyze voice streams in real time to provide critical performance information, including Mean Opinion Score (MOS), jitter, and packet loss, to increase your agility in identifying and resolving voice degradation issues. And complementing monitoring of voice streams, the Cisco NAMs can also monitor call signaling to derive important measurements like delays in call processing. For enterprisewide voice management, the Cisco NAM Appliances integrate with the Cisco Unified Communications Management Suite of products to help you define and enforce end-to-end service-level objectives to assure the consistent and optimized delivery of voice services.

Figure 8 presents a last 60-minute view of voice quality for active calls. The NAMs allow filtering of the data by quality grade (Poor, Fair, Good, and Excellent) to help enable you to quickly identify anomalous behavior.

Figure 8. Monitoring Voice Quality (MOS) for Active Calls
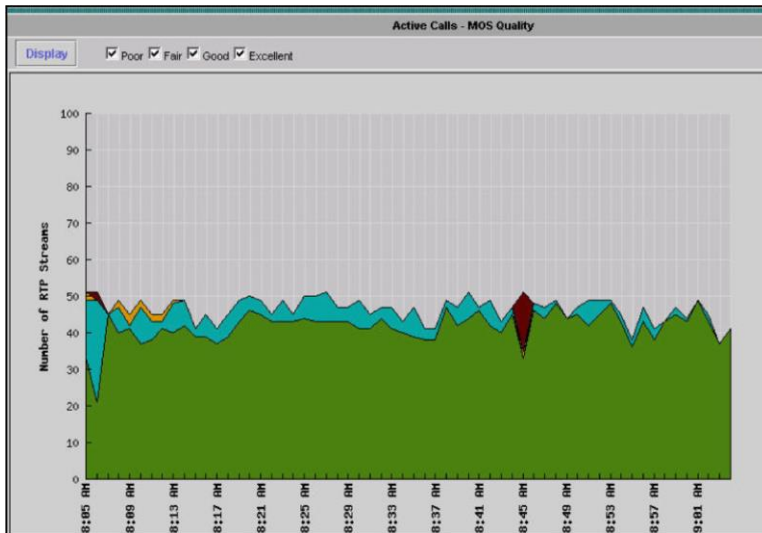

Monitor Network and Application Usage Using Flow-Based Analytics

One of the cornerstones of the Cisco NAM Appliances is their ability to look inside the live packet to gather information on applications, hosts, and conversations. Understanding which applications, hosts, and conversations are consuming bandwidth and by how much can help you proactively spot bottlenecks before they affect availability and performance. It can also help you improve the consistency and quality of both individual and overall network services since these metrics reveal usage patterns for users as well as for router and switch, interface, server, and application resources.

Besides delivering a real-time snapshot of bandwidth usage and consumption, the Cisco NAM Appliances also deliver a continuous historical view of how the bandwidth was used so you can quickly decide when and where to make changes in network resources including applying Cisco acceleration and control mechanisms (Figure 9). Data can also be collected over a select period of time and then analyzed after the event to discover when an anomaly has occurred so it can be immediately resolved.

Figure 9. Highly Granular Analysis of RTP Traffic on the Network
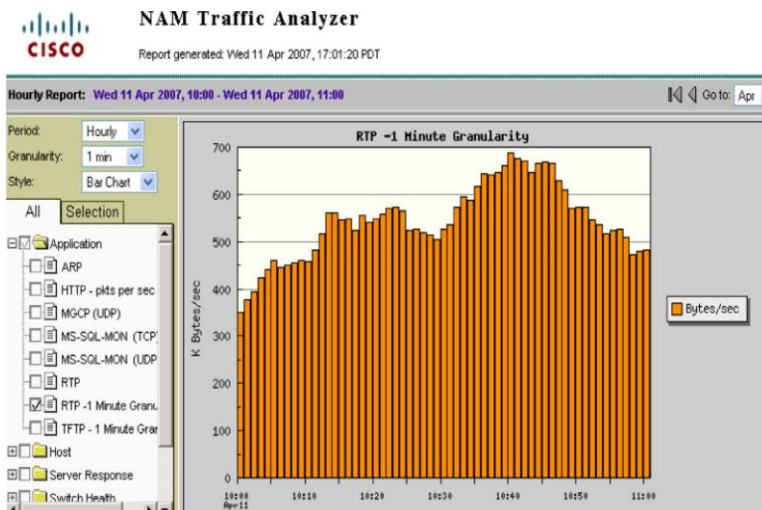
Simplify Problem Detection and Resolution with Deep, Insightful Packet Analysis

With the high performance Cisco NAM Appliances, you can set thresholds and alarms on various network parameters such as increased utilization, severe application response delays, and voice quality degradation and be alerted to potential problems. When one or more potential problem areas are identified, the packet can be automatically captured and decoded to help resolve the problem. Optionally, you can continuously capture packets to observe the conditions that were present when a problem occurred. Captures can be performed using a web browser from any desktop, and decodes can be viewed through the Traffic Analyzer GUI while the data is still being captured. The capture and decode capability of the Cisco NAM Appliances provides depth and insight into data analysis using trigger-based captures, filters, decodes, and a capture analysis toolset to quickly pinpoint and resolve problem areas (Figure 10).

Figure 10. Capturing and Decoding Packets with Cisco NAM

Analyze Quality of Service Using Differentiated Services Monitoring

The Cisco NAM Appliances support both the planning and management of quality of service deployments for voice, video, and other critical IP-based services. It supports the Differentiated Services Monitoring (DSMON) MIB, which monitors traffic by differentiated services code point (DSCP) allocations defined by quality of service (QoS) policies. Using the Cisco NAM DiffServ monitoring capabilities, you can identify applications, hosts, and conversations participating in each grouping of DiffServ classes (Figure 11). You can use this information to validate and tune planning assumptions and QoS allocations and to detect incorrectly marked or unauthorized traffic.

Figure 11. Analyzing QoS Using DSMON
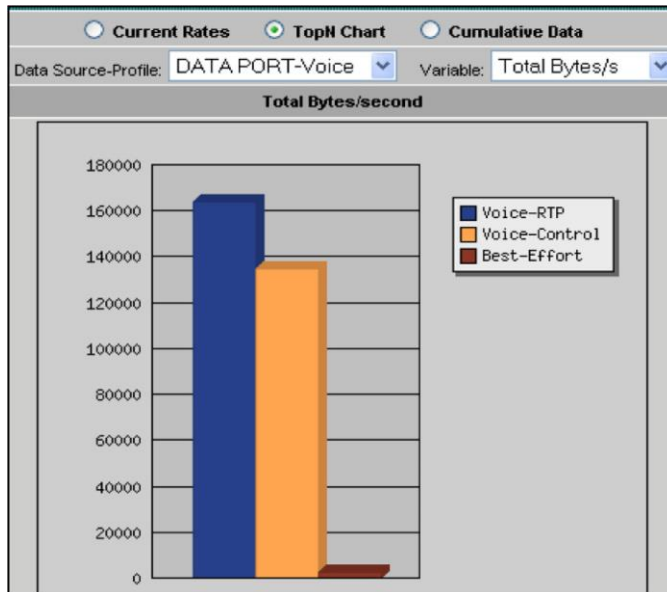
Bring It All Together Your Way

As flexible advanced Cisco instrumentation, the Cisco NAMs can export computed NAM data to third-party and homegrown applications to meet end-to-end performance reporting needs. The application performance overview provided by these reporting applications can complement the granular performance visibility offered by Cisco NAMs to help enable you to monitor how applications are being delivered enterprisewide, yet isolate and resolve delivery problems proactively and promptly at their source.

Deployment

Deployment Flexibility

The Cisco NAM 2200 Series Appliances are dedicated performance monitoring instrumentation that connect to the Switched Port Analyzer (SPAN) ports of a switch using copper or fiber interface adapters. They can also connect to critical network links using third-party passive inline taps. They can be deployed in multiple places in the network and complement Cisco NAM blades to provide extensive network visibility.

The Cisco NAM Appliances can be deployed at LAN aggregation points, for example, in the campus core and distribution layers, for always-on performance management; at services points, for example, in data centers or Cisco Unified Communications Manager clusters in IP telephony networks, where assuring application delivery is critical; and in important access points, close to servers, key clients, in IP phone closets, where troubleshooting is essential. They can also be deployed at WAN edges.

Figure 12 highlights the deployment of the Cisco NAM 2200 Series Appliance along with the Cisco Catalyst® 6500 Series NAM and the Cisco Branch Routers Series NAM to provide visibility within the borderless network.

Figure 12. Deploying Cisco NAMs Provides Network and Application Intelligence in the Cisco Borderless Network
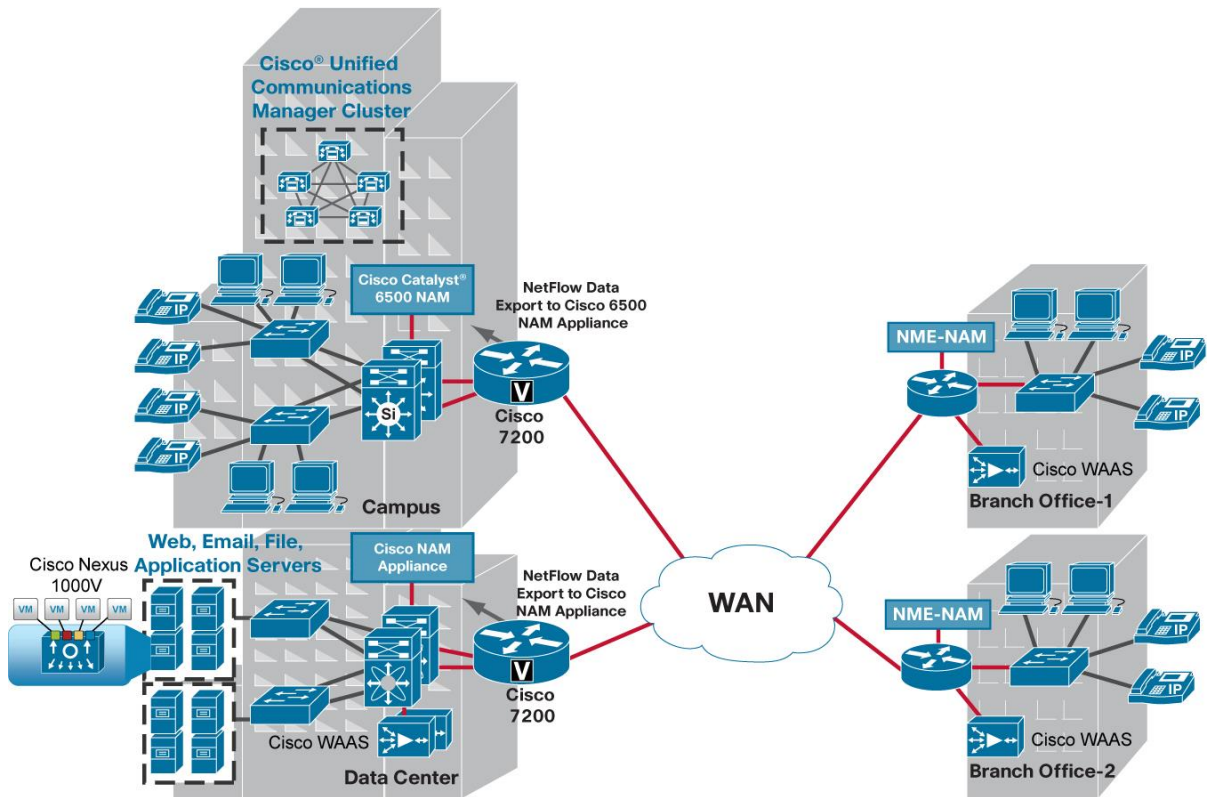
Cisco Instrumentation Simplifies Application Visibility

Cisco NAM 2200 Series Appliances use a rich set of Cisco infrastructure features to collect network and application traffic. Using the SPAN feature, Cisco NAMs can monitor traffic from physical ports, virtual LANs (VLANs), or Cisco EtherChannel connections. Using VLAN access control list (VACL)-based captures, traffic can be filtered before it is sent to Cisco NAMs to support the selective monitoring of large amounts of traffic or the gathering of traffic from WAN interfaces. Using NetFlow Data Export (NDE), the Cisco NAMs can provide analysis of real-time and historical traffic usage to obtain a broad view of how the network is performing. They can also use the Remote SPAN (RSPAN) or Encapsulated Remote SPAN (ERSPAN) features of the devices to extend troubleshooting to remote parts of the network. By using the instrumentation built into the Cisco infrastructure, the Cisco NAM Appliances offer more ways to see and understand what's happening on your network.

Product Specifications

Table 1 provides the specifications for the Cisco NAM 2200 Series Appliances.

Table 1. Cisco NAM 2200 Series Appliances Specifications

NAM 2204 Feature	Description
Chassis	1-rack unit (RU) with four-post rack mounting
Processor	Intel E6400 Core 2 Duo
Memory	8 GB SDRAM
Hard disk drive	Two 250 GB SATA server grade
Monitoring ports	Four 1 Gb 10/100/1000BASE-T RJ45 or four 1 Gb SFP including 1000BASE-T, SX LC connector, and LX LC connector
Management port	10/100/1000 RJ-45
Physical dimensions	Dimensions (H x W x D): 1.7 x 17.0 x 20 inches (4.3 x 43.2 x 50.8 centimeters); depth is without bezel or mounting hardware

NAM 2204 Feature	Description
Power consumption	350W (maximum output, power supply rating)
Heat dissipation	1660 BTU/hour
Weight	35.0 lb (15.9 kg)
Operating environment	Operating temperature: 50 to 95ºF (10 to 35ºC) Nonoperating and storage temperature: -40 to 158ºF (-40 to 70ºC) Nonoperating relative humidity: 95% noncondensing at +35ºC Operating and nonoperating altitude: 2000m at 40ºC
NAM 2220 Feature	**Description**
Chassis	2 RU with four-post rack mounting
Processor	Two Intel Xeon E5440 Quad Core
Memory	16 GB SDRAM
Hard disk drive	Six 146 GB SAS, hot swappable, RAID1 on two operating system drives
Monitoring ports	Two 10 Gb XFP including 10 Gb 850 nm SR and 10 Gb 1310 nm LR
Management port	10/100/1000 RJ45
Physical dimensions	Dimensions (H x W x D): 3.54 x 17.0 x 20 inches (8.8 x 43.2 x 50.8 centimeters); depth is without bezel or mounting hardware
Power consumption	600W (maximum output power, power supply rating)
Heat dissipation	1200 BTU/hour
Weight	44.7 lb (20.3 kg)
Operating environment	Operating temperature: 50 to 95ºF (10 to 35ºC) Nonoperating and storage temperature: -40 to 158ºF (-40 to 70ºC) Nonoperating relative humidity: 50-90% noncondensing at +35ºC Operating and nonoperating altitude: 3000m at 40ºC

All NAM Appliances	Description
Tested platforms	Tested with Catalyst 4500 Series, Catalyst 6500 Series, Cisco 7600 Series, and Nexus 7000 Series. Please read the NAM 4.2 Release Notes for any limitations that may apply.
Supported topologies and data sources	LAN: SPAN, RSPAN, VACL-based captures, NetFlow (versions 1, 5, 6, 7, 8, and 9) WAN: NetFlow (versions 1, 5, 6, 7, 8, and 9) from local and remote devices, VACL-based captures for FlexWAN/Optical Service Module (OSM)/SPA interfaces (Cisco IOS® Software only)
Supported interfaces	HTTP/HTTPS with embedded web-based Cisco NAM Traffic Analyzer Simple Network Management Protocol Version 1 (SNMPv1) and v2c, with standards-based applications
NAM Traffic Analyzer	Embedded in Cisco NAM Software 4.2 Web-based: Requires Microsoft Internet Explorer 7.0 or Firefox 3.0; supports both English and Japanese versions of browsers Supports Secure Sockets Layer (SSL) security with up to 256-bit encryption Role-based user authorization and authentication locally or using TACACS+
MIBs	The Cisco NAMs are standards compliant and support Remote Monitoring (RMON) and RMON2 MIBs, as well as several extensions. Major MIB groups supported in the Cisco NAMs are: ● MIB-II (RFC 1213) - All groups except Exterior Gateway Protocol (EGP) and transmission ● RMON (RFC 2819) ● RMON2 (RFC 2021) ● SMON (RFC 2613) - DatasourceCaps and smonStats ● DSMON (RFC 3287) ● HC-RMON (RFC 3273) ● Application Response Time

All NAM Appliances	Description
Protocols	Cisco NAM provides RMON2 statistics on hundreds of unique protocols, including those defined in RFC 2896 and several Cisco proprietary protocols. Cisco NAM automatically detects unknown protocols. Users have flexibility to customize the protocol directory by defining protocols on a single port or on a range of ports. Protocols supported include (this list is not all-inclusive): • TCP and User Datagram Protocol (UDP) over IP including IPv6 • HTTP and HTTPS • Voice over IP (VoIP) including Skinny Client Control Protocol (SCCP), Real-Time Protocol/Real-Time Control Protocol (RTP/RTCP), Media Gateway Control Protocol (MGCP), and Session Initiation Protocol (SIP) • SigTran and Mobile IP protocols including GPRS Tunneling Protocol (GTP) • Storage area network (SAN) protocols including Fibre Channel over TCP/IP • AppleTalk, DECnet, Novell, Microsoft • Database protocols, including Oracle and Sybase • Peer-to-peer protocols such as Gnutella, Fasttrack, and winmix • Bridge and router protocols • Cisco proprietary protocols • Unknown protocols by TCP/UDP ports, Remote Procedure Call (RPC) program numbers, and so on
Approvals and compliance	Regulatory: • CE Marking (89/366/EEC and 2006/95/EC) Safety: • UL 60950-1 • CAN/CSA-C22.2 No. 60950-1 • EN60950-1 • IEC 60950-1 • AS/NZS 60950-1 EMC: • 47CFR part 15 Class A (FCC regulations) • AS/NZS CISPR22 Class A • CNS13438 Class A • EN55022 Class A • ICES003 Class A • VCCI Class A • EN50082-1 • EN61000-6-1 • EN55024 • EN61000-3-2 • EN61000-3-3 • CISPR2

Ordering Information

Table 2 provides ordering information for Cisco NAM 2200 Series Appliances. To place an order, visit the Cisco Ordering Homepage.

Table 2.   Ordering Information for Cisco NAM 2200 Series Appliances

Part Number	Cisco NAM 2204-RJ45 Appliance
NAM2204-RJ45	Cisco NAM 2204 Appliance, four 1 Gb Ethernet, RJ45
NAM-APPL-SW-4.2	Cisco NAM Software 4.2
NAM2204-RAILS=	Rail Kit Four Post Spare
NAM2204-BRKTS=	Rail Kit Two Post Spare
Part Number	**Cisco NAM 2204-SFP Appliance**
NAM2204-SFP	Cisco NAM 2204 Appliance, four 1 Gb Ethernet, SFP
GLC-T(=)	1000BASE-T SFP (Spare)
GLC-SX-MM(=)	GE SFP, LC Connector SX Transceiver (Spare)
GLC-LH-SM(=)	GE SFP, LC Connector LX/LH Transceiver (Spare)

NAM-APPL-SW-4.2	Cisco NAM Software 4.2
NAM2204-RAILS=	Rail Kit Four Post Spare
NAM2204-BRKTS=	Rail Kit Two Post Spare
Part Number	**Cisco NAM 2220 Appliance**
NAM2220	Cisco NAM 2220 Appliance, two 10 Gb Ethernet
NAM2220-HDD-6X146G	Hard Disk Drive, six 146 GB
NAM2220-DIMM-16GB	RAM DIMM, 16 GB
NAM2220-AC-PS(=)	AC Power Supply (Spare)
XFP-10GBASE-SR(=)	XFP, 10 GE, Short Range (Spare)
XFP-10GBASE-LR(=)	XFP, 10 GE, Long Range (Spare)
NAM-APPL-SW-4.2	Cisco NAM Software 4.2
NAM2220-RAILS=	Rail Kit Four Post Spare
NAM2220-BRKTS=	Rail Kit Two Post Spare

Service and Support

Using the Cisco Lifecycle Services approach, Cisco and its partners provide a broad portfolio of end-to-end services and support that can help increase your network's business value and return on investment. This approach defines the minimum set of activities needed, by technology and by network complexity, to help you successfully deploy and operate Cisco technologies and optimize their performance throughout the lifecycle of your network.

For More Information

For more information about Cisco NAM 2200 Series Appliances, visit http://www.cisco.com/go/nam, contact your local account representative, or email the Cisco NAM product marketing group at nam-info@cisco.com.

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