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WHITE PAPER

WXC CENTRAL MANAGEMENT SYSTEM FOR WXC SERIES APPLICATION ACCELERATION PLATFORMS

Simplifying WAN Optimization Configuration, Management, Monitoring, and Reporting Using WXC CMS

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Executive Summary

The Juniper Networks® WXC Central Management System simplifies configuration, management, monitoring, and reporting for Juniper Networks WXC Series Application Acceleration Platforms. Using WXC CMS, enterprises can easily create and maintain optimal conditions for applications traveling over wide area networks. This technical white paper gives IT administrators an overview of the features and capabilities of WXC CMS.

Introduction

WXC CMS is part of the Juniper Networks WXC Series Framework, a unique architecture that ensures superior application performance over wide area networks (WANs). The specific attributes of the WXC Framework are designed to overcome the bandwidth, latency, congestion, and manageability issues that impede application performance over WANs.

The Juniper Networks WXC Central Management System, one of the solutions that comprise the WXC Framework, provides easy yet extensive central configuration, management, monitoring, and reporting for distributed WXC Series platforms. WXC CMS also offers granular control over all the WXC Series Framework attributes, allowing enterprises to implement their business policies using network-wide parameters.

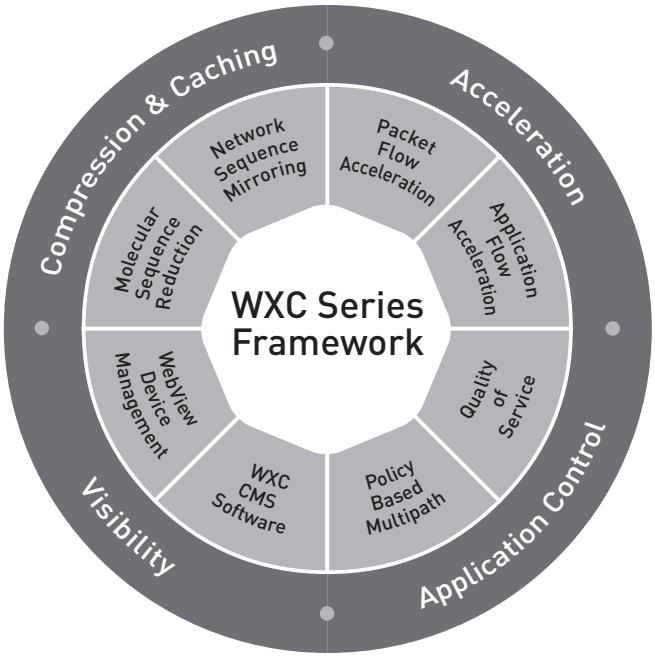


Figure 1: The WXC Series framework

One of the most critical issues in WAN optimization is visibility into an enterprise's distributed networks and applications. All too often, IT departments lack usable, cost-effective tools needed to understand the traffic traversing the WAN. WXC CMS supplies detailed information on WAN and application performance, including fully customized reports and views that users can create based on their particular needs.

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Understanding WXC CMS

WXC CMS, which manages up to 2,000 WXC Series Application Acceleration Platforms, dramatically reduces the time it takes to configure and deploy WXC Series platforms distributed throughout enterprise networks. It also offers unprecedented control over traffic traversing the WAN. Using WXC CMS, IT administrators can efficiently tune elements within the WXC Series Framework to maximize application performance.

Using sophisticated monitoring tools, WXC CMS tracks the efficiency of each element of the WXC Series Framework. It enables IT administrators to manage WAN capacity, allocate bandwidth, prioritize applications, and even customize the mix of reports they view through a personalized management portal. The software can generate up to 36 different reports, helping IT administrators quickly pinpoint anomalies in the network, determine whether the WAN is responsible for application performance problems, and troubleshoot problems that have historically been tough to diagnose given the lack of WAN insights.

The WXC CMS user interface is the CMS console, an intuitive web-based GUI. Up to 50 simultaneous IT administrators can securely access the CMS Web console via a secure HTTP session. User accounts and passwords, as well as access control lists, control access to the CMS Web console; users can be configured as administrators, read/write users, or read-only users. The software also supports user groups; users gain tiered access only to those WXC Series devices associated with their group.

WXC CMS is compatible with multiple versions of the WXC Series operating system (WXOS) software; IT administrators can use WXC CMS to manage a heterogeneous mix of WXC Series devices running different versions of the WXOS software. WXC CMS runs on Microsoft Windows 2000 and 2003 servers and can be accessed securely from any browser connection via HTTPS. Communication between WXC Series devices and the WXC CMS server is securely transmitted.

Overview of the Benefits of WXC CMS

WXC CMS provides the following benefits for enterprises using WXC Series platforms to optimize their WANs:

- Provides insightful, customizable views into WAN applications and performance
- Identifies and solves issues quickly through extensive monitoring and reporting
- Allows for secure and granular access control
- Simplifies configuration of dozens or hundreds of devices
- Simplifies device deployment by automating configuration delivery, license management, management schedules, and software upgrades

Configuring WXC Series Framework Features using WXC CMS

All WXC Series devices ship with WXC Series Framework capabilities already enabled. WXC CMS comes preconfigured to optimize dozens of commonly used business applications, including

- Packaged business applications such as SAP and Oracle
- Groupware applications such as Microsoft Exchange and Lotus Notes
- File services applications such as Microsoft file services
- Terminal access applications such as Citrix and Microsoft Terminal Services
- E-mail protocols such as SMTP and POP
- Internet applications such as FTP and HTTP
- Database applications such as SQL server and Sybase

However, every network and enterprise has different needs and many IT administrators customize their WAN optimization techniques. Using WXC CMS, enterprises can further tune the WXC Framework features, described in detail below, on the WXC Series to optimize performance for their users, WAN conditions, and specific application mix.

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Molecular Sequence Reduction and Network Sequence Caching

The Molecular Sequence Reduction (MSR) and Network Sequence Caching technologies are preconfigured in WXC Series devices to compress business-critical application traffic, including web applications, ERP applications such as SAP and Oracle, VoIP, and database applications. Enterprises can use these settings to extend these compression benefits to in-house applications. For commonly accessed files, the pre-synch feature in Sequence Caching can send a file in advance to dictionaries on WXC Series devices so that the first time a user requests that file, access will be instantaneous.

Packet Flow Acceleration

The Packet Flow Acceleration (PFA) feature is designed to reduce the impact that latency has on TCP-based applications. It is most effective on high-bandwidth, high-latency links. In a couple quick screen clicks, IT administrators can define which applications should use PFA and which of its features to apply to each application. Active Flow Pipelining, a feature within PFA, accelerates applications such as CAD/CAM file sharing, source control replication, and FTP. Another PFA feature, Forward Error Correction, replaces dropped packets with recovery packets that accompany each transmission. It is useful on lossy links such as satellite connections, since it eliminates the need to retransmit data. A third PFA feature, Fast Connection Setup, speeds up short-lived transactions such as HTTP.

Application Flow Acceleration

Many applications, such as Microsoft Exchange, Microsoft File Services, and web-based applications, were not designed for wide-area links. The Application Flow Acceleration (AppFlow) technology accelerates these applications' underlying protocols, dramatically improving their response times over WAN links. For example, the Messaging Application Programming Interface (MAPI) and Common Internet File System (CIFS) protocols send data in small blocks and require an acknowledgement before sending subsequent blocks. HTTP requests web objects one at a time, requiring many round-trip times (RTTs) to complete a single transaction or to load a single web page. The AppFlow technology accelerates these protocols by pipelining the data blocks and web objects, sending as many in quick succession as needed to fill the available WAN capacity. As a result, AppFlow delivers a three- to 50-fold improvement in application performance.

Quality of Service

Quality of service (QoS) is a bandwidth management technology that enables enterprises to deliver consistent service levels to business-critical applications while ensuring that less important traffic still gets delivered. On the WXC Series, QoS is configured via an easy-to-use wizard tool in WXC CMS. IT administrators can define which applications take precedence, and set minimum and maximum bandwidth-allocation levels by application. Administrators can set different QoS policies for different times of day—to accelerate nightly backups, for example—or for different locations, such as a group of branch offices reliant on SAP vs. another group that needs to prioritize a certain web-based application. WXC CMS also makes it easy to interoperate with other QoS requirements; it can set or preserve TOS/DSCP values for an MPLS network running QoS, for example.

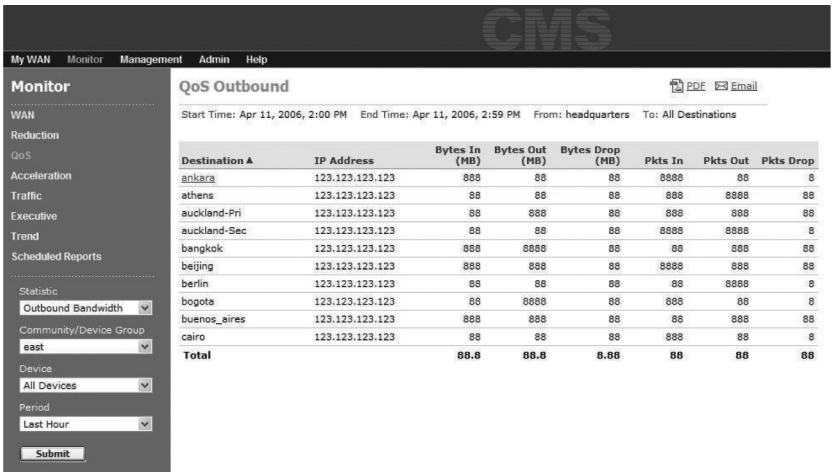


Figure 2: GUI-based wizards in WXC CMS make it easy for IT to prioritize applications and set inbound and outbound QoS parameters.

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Policy-Based Multipath

In locations with multiple WAN links, Policy-Based Multipath allows IT administrators to define path-selection policies based on individual applications in locations where more than one path is available. Administrators can set acceptable levels of latency and loss for each path and then define the action the WXC Series device should take when thresholds are exceeded. Based on their application-aware policies, WXC Series devices can divert traffic to the alternate link if the primary one is degraded or unavailable, divert traffic only if the link fails, or never divert the traffic from the primary path.

Other WXC CMS Features

WXC CMS also makes it easy for IT administrators to define the appropriate authorization, authentication and accounting (AAA) or IPsec settings on WXC Series devices.

Monitoring and Reporting using WXC CMS

The real power of WXC CMS lies in its centralized monitoring and reporting capabilities. The software generates up to 36 different reports that provide unified visibility into enterprise WXC Series platforms, WAN links, and applications. IT administrators can customize the number, views and delivery of reports to suit their needs. For example, reports can be published as Adobe PDFs and automatically delivered via email to a predefined set of users on a one-time or recurring basis. IT administrators can even customize the email copy that accompanies the attached report.

Table 1: Types of tools and reports offered by WXC CMS

REPORT	BENEFITS
WAN performance reports	Provide detailed, real-time visibility into WAN loss, latency, and availability
Executive reports	Provide at-a-glance summary
Top talker reports	Offer insight into popularity of applications by user and group
WXC Series Framework feature reports	Detail optimization improvements enabled by compression, caching, acceleration, and QoS
Trend Reports	Help optimize network resources and plan for future growth

WXC CMS Monitoring Tools

Device View

A series of page views provide at-a-glance summaries of all or a subset of deployed WXC Series devices. The device-management page, for example, provides a complete view of all active devices, their current status, which features are enabled on each, and whether any system errors have occurred. This at-a-glance inventory management and status check greatly simplifies routine administration and troubleshooting tasks, providing a snapshot of reachability and other WAN metrics.

Data Collection

To provide quick access to all reports, WXC CMS performs automatic polling of key performance and application statistics. This data is stored in a relational database, providing a lasting repository of information that IT administrators can use for troubleshooting and long-term capacity planning.

"My WAN"

"My WAN" is a management portal that lets IT administrators create customized views of an Executive report depicting the health and performance of all WXC Series devices. "My WAN" gives IT administrators at-a-glance, real-time feedback on WAN performance improvements or areas of concern, which helps IT administrators make informed decisions about further tuning their networks.

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WAN Diagnostic Tools

In addition to the reports available in the "My WAN" portal, WXC CMS provides other key WAN diagnostic tools and reports using standards-based management protocols and report structures. These standards allow IT administrators to export report data via SNMP or Cisco NetFlow to third-party tools for additional analysis.

- WXC CMS Event Management Console and email gateway provides a summary of error conditions or significant events occurring on multiple WXC Series platforms, enabling IT administrators to proactively find and resolve network problems. Using the email gateway, the system can be configured to automatically send email alerts when system and performance events are detected.
- Secure Packet Capture is a troubleshooting tool that can gather data on a problematic link or site.
- Ping, traceroute, and centralized CLI access are basic tools used for troubleshooting.
- System and control logs help diagnose various network or device errors.
- Packet size distribution provide information that helps IT administrators analyze and tune various WAN settings.

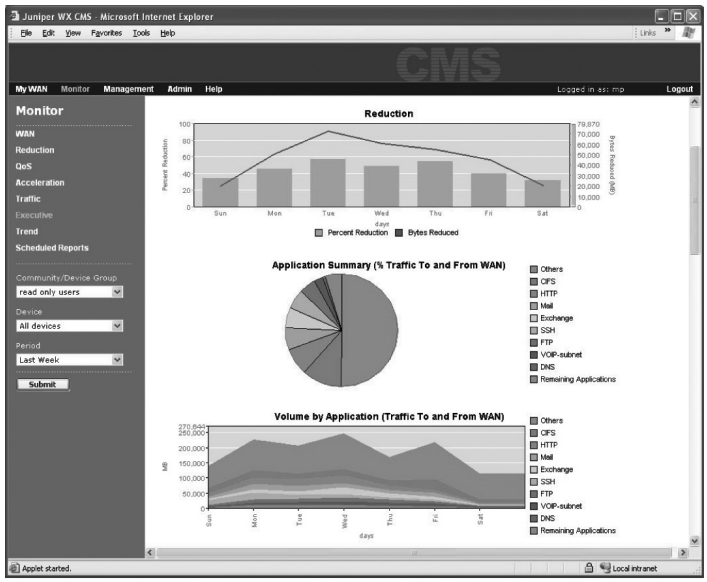


Figure 3: Executive Summary reports provide an at-a-glance view of key traffic, performance, and reduction results.

Executive Summary Reports

The WXC CMS Executive Summary reports provide at-a-glance views of key traffic, performance, and reduction results. The views and information contained in Executive Summary reports are fully customize using the "My WAN" WAN optimization management and monitoring portal. The "My WAN" tool lets users customize their view into the performance metrics of devices and sites they want to focus on – including application mix, bandwidth consumption, and performance. This enables quick diagnosis and troubleshooting of any problem that may arise.

Top Talker Reports

Top Talker reports show the largest flows, by user, device, and subnet. Enterprises can use this information to optimize or troubleshoot particular network areas or applications. For instance, a Top Talker report might reveal a commonly-used application not yet specified as a separate application type. IT administrators could then define this application separately to gain better insight into the overall reduction results, reducing the traffic counted in the "other" section of the application pie chart. In addition, IT administrators can export Top Talker data via NetFlow records to third-party analysis tools.

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WXC Series Framework Feature Reports

In addition to the system views, WXC CMS provides detailed reports measuring the effectiveness of the WXC Series Framework features enabled over enterprise WAN links.

- Reduction Reports show the highest and lowest traffic reduction results, displayed by application or device, or the compression results of MSR and Sequence Caching.
- Acceleration Reports display the highest and lowest application acceleration numbers, presented by application or device, and illustrate the impact of PFA and AppFlow. Application acceleration summary reports bring together all optimization metrics for application traffic between two locations, so administrators don't need to access reports from two devices between two locations.
- QoS Reports show both total and dropped traffic by device or by application.
- Application Mix Reports show the mix of applications consuming traffic across the WAN.

Trend Reports

Without the right information, it's difficult to analyze the impact a new application is having on the network, or perform WAN capacity planning. Trend reports in WXC CMS provide performance projections for a selected device and allow IT administrators to proactively plan for future growth.

IT administrators can create projections for any future time period based on past performance in any selected date range. WXC CMS can generate the following trend reports:

- WAN throughput to and from the WAN for one or all WXC Series platforms in the same community.
- Application traffic volume to one or all WXC Series platforms in the same community (for one or all applications).
- QoS traffic class tracks throughput to a specific remote WXC Series platforms.
- WAN latency to a specific remote WXC Series platforms.
- WAN loss (probe loss) to a specific remote WXC Series platforms.

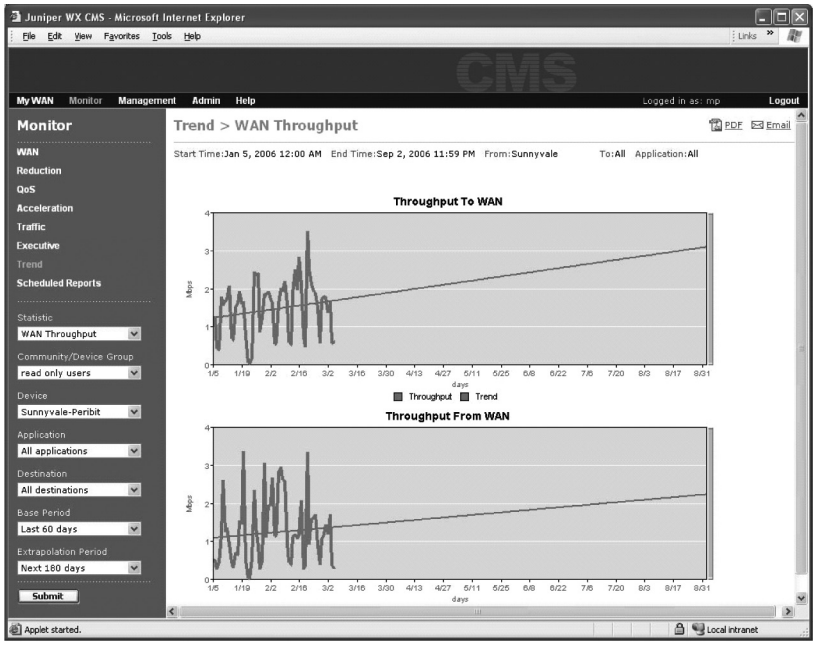


Figure 4: Trend reports can be generated by WAN throughput, application traffic volume, QoS traffic class, WAN latency or WAN loss.

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Granular Access Control

Using WXC CMS, IT administrators can provide tiered access privileges and granular access control to administrators. With devices to be segmented into groups for configuration, access control and reporting purposes. IT administrators can customize what management functions administrators can access, which configurations they can view, and which devices they can access. WXC CMS ships with predefined user roles, but new user roles can be created and customized as needed. Predefined role-based views enable the administrator to segment data views on a per-user basis, allowing both a management view and a "read-only" view of WAN and application performance for users. WXC CMS also supports the Microsoft Active Directory Schema for remote authentication and authorization. Leveraging this feature allows IT to ensure that authorizations in Active Directory/LDAP are used to enforce tiered access to WXC CMS functionalities.

Using WXC CMS to Configure Devices and Automate Deployment

WXC CMS greatly simplifies the tasks associated with configuring and administering a large WXC Series deployment.

Configuring WXC Series Platforms using WXC CMS

WXC CMS contains a number of features that save considerable time when configuring WXC Series devices. The software allows network managers to centrally configure settings for some, many, or all WXC Series platforms in an enterprise. Managers can define both global and partial configurations, which can be applied to any number of platforms. For example, a global configuration can set the majority of parameters on a group of WXC Series platforms, and then partial configurations can add to or override settings in the global configuration. Administrators can also create a device configuration and publish that configuration to single or multiple device groups. The software allows administrators to easily compare, in a graphical format, the configuration files of any two selected WXC Series devices and highlights where the configuration files differ.

A single device can store multiple configurations. WXC CMS can back up and store configurations of all WXC Series devices, and can roll back to a previous configuration easily. The task scheduling capability in WXC CMS allows network managers to schedule tasks for an entire community or device group. IT simply adds tasks to a predefined device group and all scheduled tasks will be executed, eliminating the need to manually schedule ongoing tasks when new WXC Series devices are added to the network. Managers can also use the task scheduling tool to schedule a one-time future task, such as rollout of a new configuration on a specific Saturday when the WAN will be less busy.

With WXC CMS, administrators can schedule key upgrades, management tasks, and updates to all devices at once.

Automating Deployment of WXC Series Devices

WXC CMS can automate that deployment of remote WXC Series devices, saving time and eliminating service calls to locations where no IT staff is present.

Using WXC CMS, IT can automate configuration of remote WXC Series devices, greatly simplifying the setup of tens or hundreds of distributed devices. IT can also use WXC CMS to automate license management, simplifying administration of a large WXC Series deployment.

Once configurations are created, IT administrators create deployment groups, which specify a collection of devices that will receive similar configurations. For example, IT might define one deployment group for a set of branch offices where SAP is the primary application, and another deployment group for devices that will reside in data centers. Next, IT administrators define the device-specific parameters for the remote WXC Series devices, such as their IP addresses.

Personnel at remote sites simply connect the WXC Series device to electrical power and the network; the rest of the configuration is automatic. The remote device boots up, requests an address via DHCP, performs a domain lookup to communicate with the WXC CMS server, gets its image and configuration from that server, and begins operation. WXC CMS recognizes the subnet from which a device is registering and uses that information to assign it the correct pre-set address, default gateway, time zone, and license speed.

To further simplify setup, WXC CMS also automates license management. IT administrators simply enter licenses into the WXC CMS, and the software allocates them appropriately.

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Summary

WXC CMS is a powerful, intuitive solution for centrally managing WXC Series platforms distributed throughout the enterprise. A suite of preset configuration tools simplify configuration and automate deployment, allowing enterprises to optimize their WAN resources quickly and efficiently. The software also offers all the tools and reports needed to easily view, compare, control, and troubleshoot large deployments of WXC Series platforms.

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