MEDIA FLOW

MEDIA FLOW CONTROLLER SOFTWARE AND VXA SERIES HARDWARE

Product Overview

Consumers today expect all types of content to be available at any time and on any device. This shift in consumer demand means that network service providers and content providers alike require an innovative approach to new media content delivery. For all involved in the content delivery ecosystem, it is critical to be able to deliver rich media content to all connected devices with improved efficiency, increased scale, and superior economics.

Juniper Networks Media Flow is the industry's only purpose-built new media content delivery and caching solution. The Media Flow product portfolio combines groundbreaking media delivery software with high-performance, carrier-class Juniper platforms to enable scalable and efficient content delivery over a single, converged infrastructure.

Product Description

Evolving viewing habits are changing the way content is delivered. Consumers increasingly use a variety of devices (mobile devices, PCs, TVs) to access content whenever they want, and from any location. This means that the Internet is increasingly the delivery mechanism for all types of content—over-the-top content as well as licensed content and premium offerings.

For both network service providers and content publishers, this shift in viewing habits presents a number of challenges. Rich media content delivered over the Internet consumes a tremendous amount of bandwidth, creating bottlenecks from the access network, to the core, to the data center. Network service providers are seeking ways to efficiently deliver this content—both to drive down transit costs and to improve long-term network scalability—while at the same time striving to introduce exciting new services that capitalize on these trends. Content publishers and distributors also face scaling and operational issues in the data center, which is driven by a combination of high capacity demands and a proliferation of delivery servers to match the plethora of video and Web protocols, and are similarly looking for more extensible, scalable, and profitable ways to deliver content to consumers with a superior quality of experience.

Juniper Networks® Media Flow portfolio offers advanced software and hardware specifically designed to address the challenges of rich media delivery for wireline and wireless network operators, content providers and content delivery networks (CDNs). Media Flow is a converged content delivery and caching solution that dramatically improves the performance of rich media delivery by leveraging unique innovations such as hierarchical caching, superior media-aware intelligence as well an open platform upon which other delivery applications can leverage massive MFC cache scalability.

Network service providers can use Media Flow to store and deliver content closer to subscribers, reducing transit traffic throughout the network and driving down costs. Media Flow intelligently aligns content caching, distribution, and delivery with network operators' existing network resources, laying a strong foundation for many innovative new content-based services.

Media Flow can also be deployed by content providers as a highly extensible and scalable, next-generation origin cache to consolidate servers delivering content with multiple protocols, reduce the cost of storage, and dramatically reduce footprint and power consumption in the data center.

Architecture and Key Components

The foundation of the Media Flow portfolio is Media Flow Controller, an innovative software platform that optimizes content delivery for performance, efficiency, and viewing experience. The family also includes the Juniper Networks VXA Series Media Flow Engines, a family of high-performance caching hardware platforms purpose-built to host Media Flow Controller software. Additionally, Media Flow Publisher and Media Flow Activate applications are included in the Media Flow portfolio.

Media Flow Controller

Media Flow Controller is a next-generation content delivery engine that enables customers to reduce costs and improve the profitability of delivering rich media content, while also improving quality of experience for consumers. A groundbreaking software architecture enables Media Flow Controller to maximize system and disk performance to deliver unmatched throughput, session density, and storage scaling. In addition, Media Flow Controller optimizes the efficiency of cache storage with hierarchical caching—a unique innovation which intelligently aligns the requirements of content with the memory type in which it is stored. Media Flow Controller is an extensible software platform which allows a variety of applications that deliver content over multiple protocols to leverage the scalability. These applications enable delivery of Flash and Windows Media today, with limitless possibilities in the future.

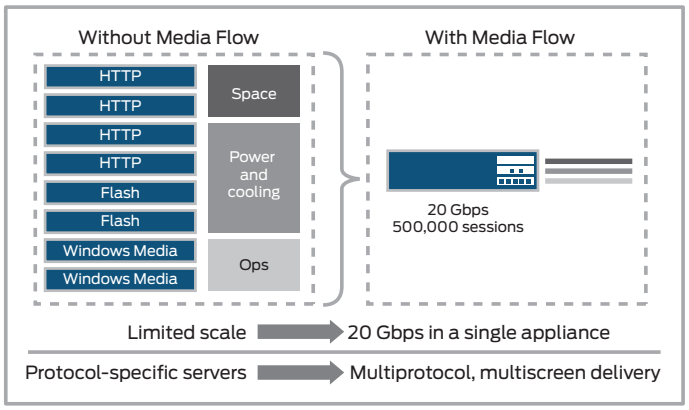


Figure 1: Media Flow lowers costs by reducing the number of servers (and switch interfaces) required to deliver content in multiple formats to multiple devices.

Media Flow Controller delivers flexible support for virtually all popular content formats and protocols—including native support for HTTP, Real-Time Streaming Protocol (RTSP), Real-Time Messaging Protocol (RTMP) streaming through Adobe Flash Media Server, and Windows Media through Windows Media Services software—which eliminates the cost and complexity of deploying and maintaining multiple servers for specific content formats or media types. For content owners and CDNs, Media Flow simplifies the deployment of Apple HTTP Dynamic Streaming and Silverlight by pre-positioning or fetching multi-bitrate unsegmented files for on-the-fly segmentation and delivery.

The combination of superior scale, performance, and converged multiscreen, multiprotocol delivery enables customers to dramatically reduce the servers and equipment required to deliver content. This results in lower operational and capital expenses, as well as a powerful efficiency advantage.

Media Flow Controller is a Junos Ready Software application that can be deployed on industry-standard x86-64 servers, or purchased preinstalled on the VXA Series Media Flow Engine. The ability to configure Media Flow Controller on either generally available servers or the purpose-built VXA Series provides the flexibility to meet a broad range of business and technical requirements.

VXA Series Media Flow Engines

VXA Series Media Flow Engines are a portfolio of purpose-built caching hardware platforms designed to enhance the performance of the Media Flow Controller software. The VXA Series simplifies the deployment of Media Flow by allowing customers to purchase and deploy a complete, prepackaged content delivery and caching solution. The combination of VXA Series and Media Flow Controller offers predictable performance and superior reliability, as it simplifies maintenance, upgrades, and sparing.

The VXA Series is available in three configurations, offering flexible, integrated storage. The VXA Series delivers performance ranging from 1 to 20 Gbps and can be flexibly configured with up to 7 TB of cache, leveraging a variety of RAM, solid-state drive (SSD), Serial Advanced Technology Attachment (SATA), and Serial Attached SCSI (SAS) technologies. The VXA Series provides network connectivity via a flexible combination of 1GbE and 10GbE interfaces.

Adaptive Streaming with Media Flow Publisher

Juniper Networks Media Flow Publisher is an optional application that enables the Juniper Networks Media Flow Solution to perform adaptive stream segmentation, stream packaging, metadata publishing, and adaptive stream format translation. Media Flow Publisher enables network operators and content providers to leverage their existing TV and video encoding infrastructure for adaptive stream production, eliminating the need for specialized encoders and servers. With Media Flow Publisher, customers can more rapidly and cost-effectively introduce new services that capitalize on delivering content to multiple screens.

Deploying Media Flow with Media Flow Activate

Juniper Networks Junos® Space with Media Flow Activate accelerates deployment of Media Flow products by providing a simple Web browser-based graphical user interface for device configuration, rapid service creation, and service provisioning. Media Flow Activate runs on the Junos Space platform, which provides a consistent management environment across the Juniper portfolio. With easy to use templates and the ability to centrally manage a large-scale deployment, Media Flow Activate dramatically speeds the activation of new devices, content delivery services, and customers.

Table 1: VXA Series Configurations

	VXA1002	VXA2002 (NEBS-COMPLIANT)	VXA2010 (NEBS-COMPLIANT)
Maximum throughput*	2 Gbps	2 Gbps**	20 Gbps
RAM	8 GB	36 GB	36 GB
Base storage	2 TB	2 TB**	7 TB
Maximum sessions*	10,000	500,000	500,000

* Actual performance can vary based on factors such as deployment scenarios, object mix, and cache hit ratio.
** Base configuration. VXA2002 throughput and storage can be expanded with additional licenses and drives.

Features and Benefits

FEATURE	DESCRIPTION	BENEFITS
High-performance and scale	Unique software architecture that maximizes the performance of available hardware	• Delivers up to 10 times more media per server than traditional caches—providing 70% or greater reduction in server hardware CapEx and OpEx • Provides throughput capacity that scales linearly with increases in available memory and disk space
Extensible software architecture	Media Flow Controller's open and extensible software architecture easily accommodates future applications and capabilities	• Ability to adapt and grow to future requirements to ensure investment protection and longevity
CDN ready	Wide range of features required to support CDN services, such as fine-grained per-tenant control, cache pinning and an interface designed for automatic provisioning	• CDN services offered to content publishers can improve quality of experience • Enables new services and business models
Converged multiprotocol, multi-format delivery	Ability to support all content formats and protocols from a single server	• Reduces costs by eliminating protocol-specific servers and infrastructure • Provides a single, converged delivery infrastructure
Platform flexibility	Available in multiple form factors, including software-only, and carrier-class VXA Series platforms.	• Customizable for a broad range of deployments • Offers NEBS-compliant options
Carrier-class hardware	VXA Series appliances that host Media Flow Controller on high availability, reliable hardware	• Complete solution optimized for high availability (HA) and reliability
Juniper advantage	Tight alignment with Juniper routing and switching infrastructure and Juniper Networks Junos Space	• Enables a comprehensive solution of best-in-class network, applications, and management elements
Deep media intelligence	The ability to distinguish between content types and objects in order to understand their unique requirements, and to store, distribute, and deliver the content based on those requirements	• Enables intelligent, content-aware decisions • Dynamically adapts to changing content delivery requirements • Provides the foundation for hierarchical caching
Hierarchical cache storage	Creates a hierarchical caching solution that can dynamically shift content between storage tiers	• Stores content efficiently in appropriate storage tier, according to object type and user demand • Enables flexible capacity and configuration planning based on unique content requirements
Adaptive bit rate streaming	Comprehensive support for delivering different bit rates of media depending on variations in the network	• Ensures a TV-like viewing experience even as network conditions fluctuate • Increases viewer loyalty and retention
Flexible deployment options	Can be deployed in multiple modes such as transparent or reverse proxy—to support multiple business models	• Meets a wide variety of business and technical needs • Can be deployed as an origin cache, an edge cache, and as part of a comprehensive CDN

VXA1002

VXA2002

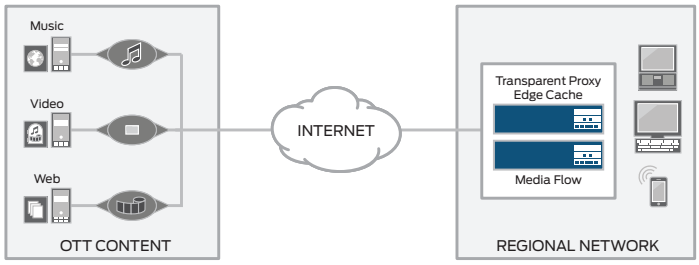
VXA2010

Applications

Media Flow can be deployed by network service providers, CDNs, and content publishers and distributors to improve the efficiency of content delivery, as well as to enable new services. Several examples are detailed below.

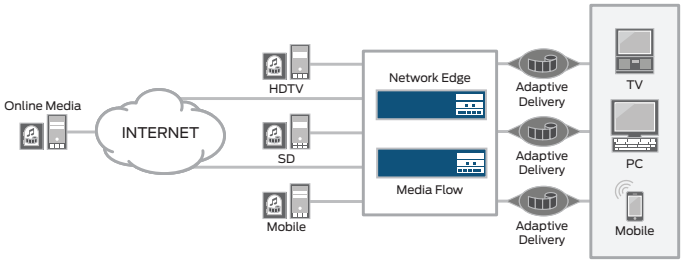
Network Optimization

Network operators can use Media Flow's transparent caching functionality, which is fully Digital Millennium Act (DMCA)-compliant, to optimize their networks and reduce transit traffic. In this scenario, Media Flow is deployed at the network edge and transparently caches popular content, serving subsequent content requests locally. This improves efficiency, protects network resources, and reduces costs.



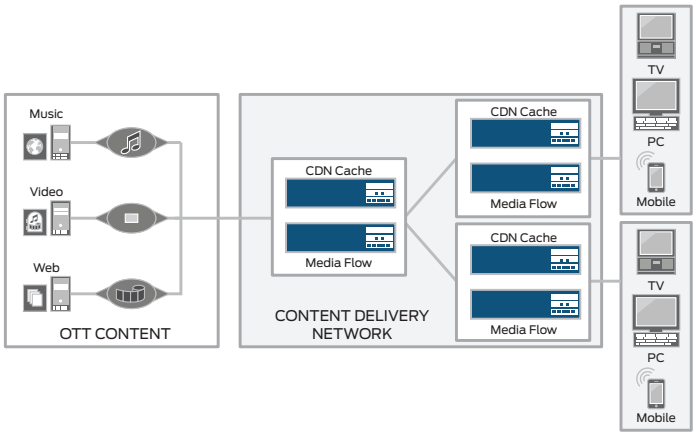
Multiscreen Content Delivery

Media Flow can also be used as the foundation for exciting new content-based services, such as "TV everywhere" and video delivery to multiple devices. Media Flow Controller creates new multiscreen service and revenue opportunities by efficiently delivering content to virtually all types of devices, while ensuring a superior viewing experience.



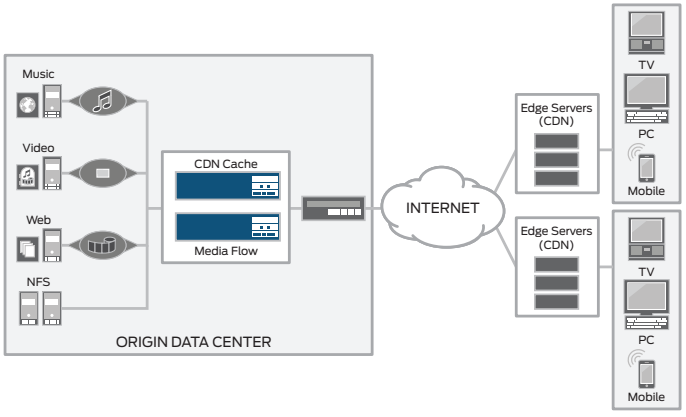
CDN Services

Media Flow is ideal for those who operate a CDN, including dedicated CDN providers. Existing CDN providers can increase performance and reduce costs with Media Flow. And providers looking to expand their service portfolio or improve application performance can use Media Flow as the foundation for new CDN services or a private CDN.



Origin Acceleration

Content publishers and distributors can leverage Media Flow to improve the efficiency of their origin data centers. Using Media Flow as a next-generation origin cache can improve efficiency and performance by as much as 10 times, enabling a significant reduction in servers and switch interfaces, and reducing related space and power costs.



Specifications

Media Flow Controller

Hardware requirements	• VXA Series Media Flow Engine • x86-64 requirements: 4 GB RAM (R-Proxy), 72 GB RAM (T-Proxy), LSI 2008-based disk controller, Intel 82599-based 10GbE (optional, only if 10GbE required), 8x1 TB SAS Drives (T-Proxy) 4x1 TB SAS Drives (R-Proxy)
Media delivery protocols	HTTP, RTSP, Real-Time Transport Protocol (RTP), RTMP, RTMP Tunneled (RTMPT), and Encrypted RTMP (RTMPE), Windows Media
Origin server interfaces	HTTP and Network File System (NFS)
Pre-positioning interfaces	HTTP and FTP
Live media ingest	HTTP and RTSP
Storage types	SSD, SAS, SATA, and NFS
Cached media	Rich content such as Web pages, thumbnails, ring tones, videos, and software install packages
Codecs	• Standard video codecs such as MPEG-1, MPEG-2, H.263, H.264/MPEG-4 AVC, VP6, and VC1 • Widely used audio codecs, including MP3 and Advanced Audio Coding (AAC)
Media containers	Popular media formats including FLV, MP4, MOV, MPG, WMV, F4V, F4P, ASF, Third-Generation Partnership Project (3GPP), and 3GPP2
Media players	Adobe Flash, Silverlight, QuickTime/iTunes, Windows Media Player, RealPlayer, and Move Media Player
Adaptive streaming	Apple iPhone Streaming, Microsoft Smooth Streaming, Move Adaptive Streaming, Adobe Dynamic RTMP, and Juniper SmoothFlow
Origin failover	Origin escalation that distributes content fetch requests across multiple origin servers for load balancing and failover
Operational modes	Transparent proxy (DMCA-compliant); reverse proxy; partially transparent

Management

Management tools	• CLI and browser-based GUI for configuration, monitoring, troubleshooting, and system maintenance • Media Flow Activate enables centralized management of Media Flow Controllers for service configuration and provisioning. Refer the Media Flow Activate datasheet for information
Management interfaces	• SNMP (v2) for alarm notification (traps) and exporting configuration and availability data to leading third-party management systems such as HP OpenView and IBM Tivoli
Logs	• Access logs in W3C Extended Log File Format with support for customizing the fields to be logged • Syslogs for system and network level eventsand error logs for troubleshooting
Admin authentication	RADIUS, TACACS+, and local database
SNMP MIBs	• NET-SNMP (includes host resources, interface, IP, network service MIBs) • Enterprise-MIBs for service related counters and alarms e.g. cache hit ratio, number of concurrent connections, and protocol response code counters

VXA Series Media Flow Engines

	VXA1002	VXA2002	VXA2010
Network interfaces	4 x 1GbE	4 x 1GbE	4 x 1GbE 2 x 10GbE
Interface expansion	N/A	2 slots	1 slot
RAM	8 GB	36 GB	36 GB
Default storage configuration	2 TB	2 TB	7 TB
Base storage configuration	4 x 500 GB SATA	4 x 500 GB SAS	14 x 500 GB SAS 2 x 64 GB SSD
Storage options	SATA/SSD	SAS /SATA/SSD	SAS /SATA/SSD
Maximum sessions*	10,000	500,000	500,000
Processor	Quad-core	Dual quad-core	Dual quad-core
Dimensions (W x H x D)	17.72 x 1.75 x 17.26 in (45 x 4.45 x 43.84 cm)	17.72 x 3.5 x 24.13 in (45 x 8.8 x 61.3 cm)	17.72 x 3.5 x 24.13 in (45 x 8.8 x 61.3 cm)
Power	AC	1 + 1 redundant DC (default); AC option	1 + 1 redundant DC (default); AC option

*Actual performance can vary based on factors such as deployment scenarios, object mix, and cache hit ratio.

Juniper Networks Services and Support

Juniper Networks is the leader in performance-enabling services that are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to maximize operational efficiency while reducing costs and minimizing risk, achieving a faster time to value for your network. Juniper Networks ensures operational excellence by optimizing the network to maintain required levels of performance, reliability, and availability. For more details, please visit **www.juniper.net/us/en/products-services.**

Ordering Information

VXA Series Media Flow Engines

HARDWARE MODEL NUMBER	DESCRIPTION
VXA1002-JMF*	2 Gbps VXA1002 Juniper Media Flow Engine
VXA2002-JMF*	2 Gbps VXA2002 Juniper Media Flow Engine
VXA2010-JMF*	10 Gbps VXA2010 Juniper Media Flow Engine

Media Flow Controller Software

PART NUMBER	DESCRIPTION
S-JMF2BAS100MBPS-SW	Basic Media Flow Controller 100 Mbps + up to 1 TB storage; HTTP delivery only
VXA-JMF2BAS-RTU	Basic Media Flow Controller: 1 Gbps + up to 1 TB storage (purchase to use on VXA Series)
VXA-JMF2ADV-RTU	Advanced Media Flow Controller: 1 Gbps + up to 1 TB storage + RTSP (purchase to use on VXA Series)
S-JMF2ADV-SW	Advanced Media Flow Controller: 1 Gbps + up to 1 TB storage + RTSP (purchase to use on generic x86-64 hardware)
S-JMF2BAS-SW	Basic Media Flow Controller: 1 Gbps + up to 1 TB storage (purchase to use on generic x86-64 hardware)
S-JMFFMS-SW	FMS license with 2 Gbps connector
S-JMFCACHE-LTU	Media Flow excess cache capacity per TB

*Requires the purchase of both the VXA Series hardware and one of the above Media Flow Controller software licenses.

VXA Series Media Flow Engine Field Replaceable Units (FRUs)

HARDWARE MODEL NUMBER	DESCRIPTION
SAS300HDD	VXA Series 300 GB SAS 10,000 rpm 3.4 ms
SATA500HD	VXA Series 500 GB SATA 7,000 rpm 8.5 ms
SSD64GHDD	VXA Series 64 GB SSD SLC SATA
UNIV-500G-25-SAS-HDD	500 GB SAS 10,000 rpm 3.4 ms
1GEIOC	VXA Series 4 x 1GbE I/O Card (IOC)
10GEIO	VXA Series 2 x 10GbE IOC
UNIV-PS-560W-AC	VXA2000 AC power supply

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at **www.juniper.net**.

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