



# Beautifully Engineered for the Fast Lane

Cisco ASR 9000 Series Aggregation Services Router



welcome to  
the human network.



Something truly beautiful has arrived at the edge of your network.

## Beautifully Engineered for the Fast Lane

It's not just another aggregation router. The Cisco® ASR 9000 Series Aggregation Services Router has been beautifully engineered to provide a Carrier Ethernet foundation for video service delivery. This platform is engineered to address the massive surges in video traffic that are flooding IP networks, and unlike many of today's aggregation edge products, it is designed to meet the bandwidth challenges of the future.



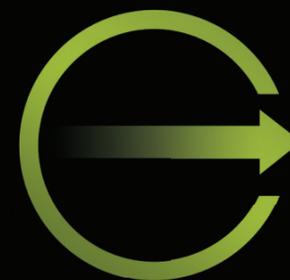
Massive bandwidth growth has the potential to create bottlenecks at the aggregation edge, especially for service providers that must aggressively design their networks to meet increasingly complex video and content-rich service transport requirements. The challenges of visual networking require massive capacity in a world where video truly changes everything—again.

The Cisco ASR 9000 Series is purpose-built to manage the demands of visual networking at the aggregation edge, and can accommodate decades of change in traffic patterns. Its efficient design reduces power consumption and facilitates content delivery from the network edge.

## When is Enough Enough?

Many infrastructure suppliers are readying new best-in-class additions to their aggregation edge portfolios. 100 Gigabit Ethernet-per-slot systems are just arriving on the market, but is this truly enough capacity? Can these systems manage the sheer volume of video traffic that is funneling through provider networks?

Were these systems truly built with an eye focused on what's ahead?



## Safeguard Your Future

An ever-growing wave of video traffic cascading through provider networks shows no signs of slowing. Focusing on the near-term means you could easily miss what's just on the horizon, and significantly impact your profit line. So how do you safeguard your future when deciding what network equipment to purchase?



The Cisco Visual Networking Index (VNI) uses data that is cooperatively sourced from service provider networks worldwide. It's real data that allows for leading-edge analysis, thought leadership, and informed decision making on infrastructure design. It's there to help us all understand what's coming.

Cisco VNI results strongly suggest that by 2012 more than 50 percent of network traffic will be video-based. North America's video traffic alone is already 70 times greater than what the entire US Internet backbone generated in 2000; worldwide video traffic in 2012 is estimated to be 390 times that amount.

There is more where that came from. TelePresence, IPTV, Web 2.0, and other video-based services will gain mass-market acceptance. And unimagined video services and new connected home devices will fuel even more traffic growth.

The iPhone and video-aware smart devices along with mobile laptop cards are causing huge spikes in mobile video traffic. These are triggering a 4G and Long Term Evolution (LTE) wave that will push mobile video to a compounded annual growth rate (CAGR) of 125 percent by 2012.

All these trends will continue to surge traffic and shift capacity requirements from gigabytes to terabytes. Just how much can your aggregation router handle?

## Enormous Capacity, Lower Power

An aggregation edge router with unsurpassed scalability plays a significant role in providing an end-to-end solution for efficient service delivery.

Equally important is ensuring such an edge router is power-efficient, space-efficient, and reliable enough to maintain nonstop video and content-rich service delivery from the network edge.



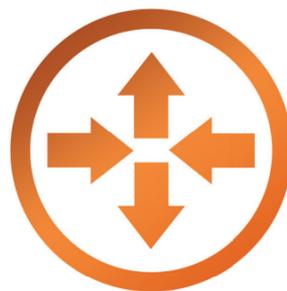
The Cisco ASR 9000 Series offers up to 400 gigabits-per-slot of capacity for up to 6.4 terabits of total capacity. That's six times what comparable systems are offering. Many service providers already need this capacity, and for those who don't, the future is rapidly approaching.

The router comes in a 10-slot configuration and a more compact 6-slot configuration that is ideal for environments that require high capacity but have limited space.

The Cisco ASR 9000 Series also complements the Cisco CRS-1 Carrier Routing System, Cisco 7600 Series and XR 12000 Series Routers by offering the same integrated IP-over-DWDM capabilities. Cisco is one of the only vendors that can provide core-to-aggregation IPoDWDM efficiency by integrating optical transponders, extending the network reach and simplifying typologies while reducing service calls and other operating costs for service providers.

## Cisco IOS XR Software Arrives at the Edge

The Cisco IOS® XR operating system was specifically designed to meet the high-availability and resiliency needs of service providers, and currently maintains nonstop operation in more than 200 service provider networks worldwide.



Video services cannot withstand service interruption. It simply ruins the experience. An underlying network OS must provide continuous systems operation, high availability, and in-service upgrade while simultaneously offering the distributed scale to support business and residential services. Video and other multimedia services, broadband and mobile backhaul—all running in parallel—result in combinations of “any-play” services that require new levels of scale and reliability at the edge. Cisco IOS XR Software meets these challenges.

Cisco IOS XR Software has arrived at the aggregation edge. With the Cisco ASR 9000 Series, the edge gains a robust and service-tested operating environment that meets the reliability and performance requirements for a nonstop video experience.

## Facilitating a Nonstop Video Experience

A fundamental design principal for the Cisco ASR 9000 Series was to create a Carrier Ethernet foundation for visual networking service delivery to IP-enabled TVs, laptops, PCs, and video-aware mobile devices.



The aggregation edge, more than ever, is an essential network insertion point for content delivery. Networked video must support the consumer pull-down effect—video services and choices from anywhere to any screen.

Capacity and scale are a big part of the solution. But in today's world of ubiquitous video, consumers can pull video off the Internet whenever they want it. YouTube, time-shifted television, and video on demand (VoD) are increasingly moving toward “at-will” viewing by consumers.

To enable a content-on-demand delivery system, service providers must deploy advanced IP-based content streaming, caching, and error correction capabilities. Their networks must also be flexible enough to accommodate revenue models that support local ad insertion.

## Innovative Content Delivery System

The Cisco Advanced Video Services Module (AVSM) is a major innovation enabling terabytes of streaming capacity at the aggregation edge while simultaneously offering content caching, ad insertion, fast channel change, and error correction all on a single blade that simply slides into the Cisco ASR 9000 Series.



The AVSM is a technological achievement that eliminates the need for standalone content delivery network elements. And a blade-based content delivery system inherits all the high-availability characteristics of the router itself, truly optimizing the network insertion point for advanced content services and moving the content sourcing closer to the consumer. Moreover, it simplifies the network by further eliminating network elements, thereby reducing configuration, troubleshooting, maintenance, and power-consumption issues.

Fast channel change and onboard error correction capability for both unicast and multicast video traffic help ensure that errors can be detected by any set-top box (STB) and retransmitted within milliseconds to maintain a transparent visual experience. Whenever errors cannot be transparently repaired, an error-detection alert is forwarded to troubleshooters so they can instantly initiate repair. Post-repair notifications are sent to consumers, thereby reducing call center escalations.

## Efficiency in Mobile Networks

Gone are the days when the price-per-bit profit equation was as simple as increasing the price of a voice minute to cover new backhaul costs. Laptop cards and advanced mobile devices such as the iPhone have disrupted historical pricing models. Unlimited broadband has arrived with the 3–4G network, but charging for data or video on a per-minute basis is neither practical nor desirable for such services. Profitability now depends more on decreasing costs than on increasing prices.



As mobile operators seek greater efficiency from their backhaul networks, the Cisco ASR 9000 Series brings six times the capacity of competing products to Carrier Ethernet backhaul.

Moreover, every Cisco ASR 9000 line card is Synchronous Ethernet (SyncE)-ready, which means that it automatically works with cell site routers, avoiding the need to dedicate slots for additional synchronization cards. Service providers can increase the overall slot efficiency of the aggregation router when all line cards are SyncE-ready.

## Power and Capacity to Spare

Imagine an aggregation router so intelligently engineered that it scales up your power consumption only when you scale up your capacity. The Cisco ASR 9000 Series consumes only the power needed to support the configuration demands of the system. In simple terms—less capacity means less power consumption.

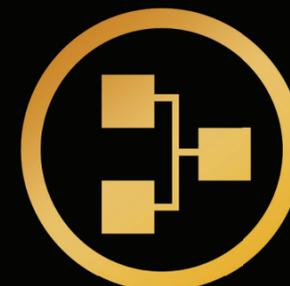


Modular power supplies are brought online only as capacity is increased, differing from competitive solutions that consume power at the maximum level the day they are turned on. Low-noise and low-power fans are integrated into the system and side-to-back airflow makes the 6-slot Cisco ASR 9000 Series capable of further reducing heat dissipation and power consumption in space-constrained facilities.

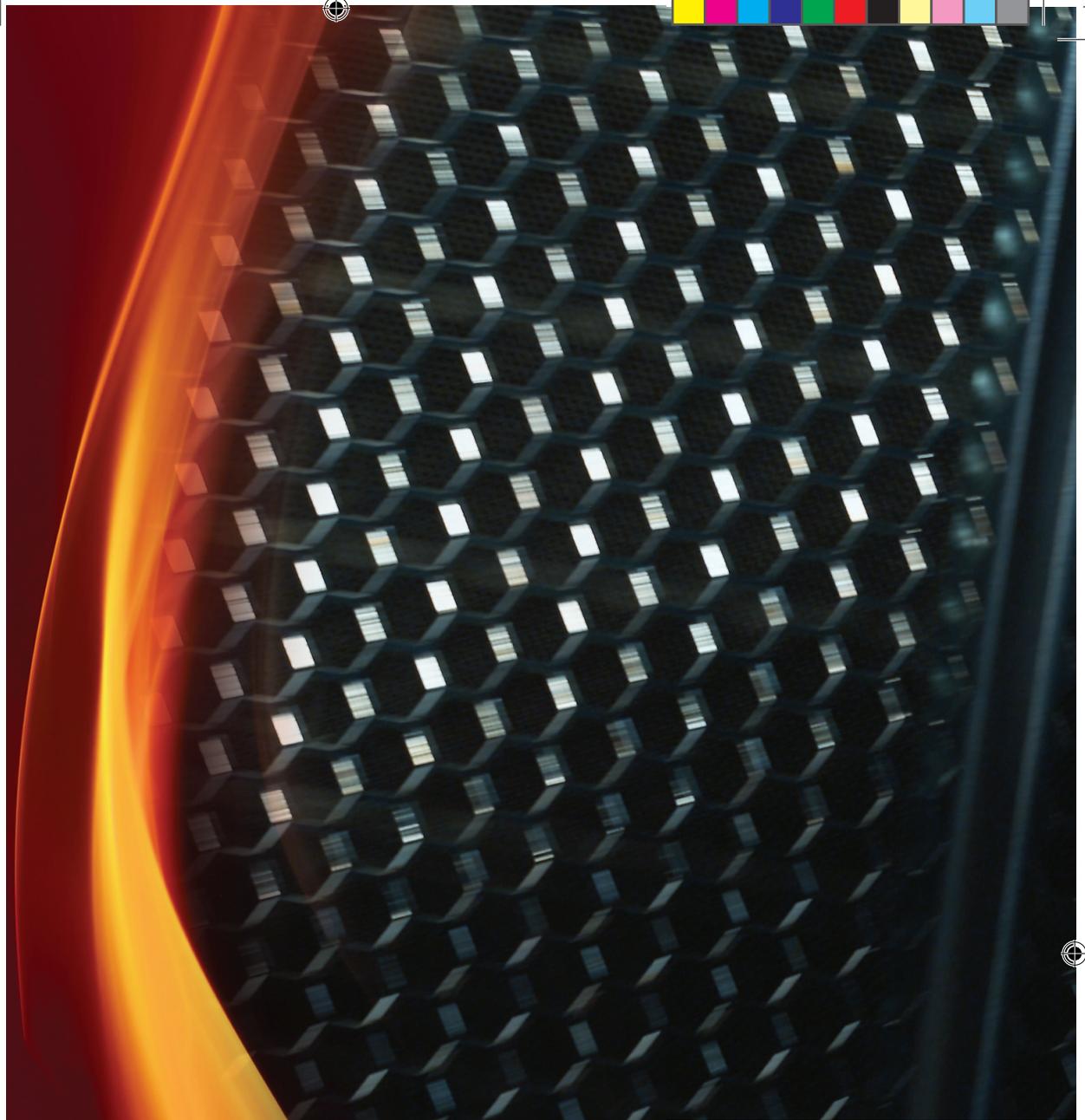
What's truly remarkable is that the Cisco ASR 9000 Series scales to 6.4 terabits of capacity without increasing the system's maximum rate of power consumption. The chassis is designed to cool and the backplane to power 400 gigabits per slot the day the system arrives, helping enable service providers to manage their operating costs with capacity and power to spare.

## A New Carrier Ethernet Flagship Arrives at the Edge

Innovation from the core to the edge of the network has been the hallmark of Cisco's router development. The Cisco CRS-1 brought previously unseen levels of performance and scale to the network core. And with the introduction of the Cisco ASR 1000 Series Aggregation Services Router, Cisco took innovation to the edge with the most compact and powerful router in its class.



This tradition continues as Cisco brings unsurpassed scale and capacity to the network edge with its newest high-end router. It changes the profit equation with new levels of efficiency. The Cisco ASR 9000 has been designed to offer advanced subscriber management and QuantumFlow processor-based security and video services on an extensible Carrier Ethernet platform. The Cisco ASR 9000 Series Aggregation Services Router, beautifully engineered for what lies ahead.



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