



Cisco End-to-End Solutions for IPTV

## Introduction

The media services landscape is changing dramatically. The days of delivering voice, video, and data services as distinct offerings—with each delivered over its own network, accessed using its own device, and billed as a single subscription—are over. Today, customers demand the ability to access all types of content across all types of devices and expect a consistent, high-quality experience across all environments.

Service providers are striving to deliver a versatile media experience that conforms to customers' lifestyles. However, to achieve this vision, they must transform from traditional providers of access-based services into all-inclusive “experience providers” that can offer voice, video, data, and mobility—or “quad-play”—services anywhere, anytime.

At the core of the experience provider transformation is the ability to successfully deliver video entertainment over IP networks. Today's experience providers must deliver stunning picture quality and optimal service reliability, as well as a variety of next-generation video services. Successful delivery of rich media encompasses three tightly linked video delivery segments, each uniquely influencing the overall video experience.

- Define the video experience: First, service providers have to define the experience, which differentiates them from competitors. Defining the video experience encompasses many dimensions, for example, standard and high-definition content; choice of compression techniques; and variety of next-generation video services such as interactivity, video on demand (VoD), network PVR (nPVR), and targeted ad insertion.



Carriers need solutions for acquiring, processing, encoding, and managing video content effectively, as well as broad expertise to help ensure that analog, digital, and IP technologies closely interoperate to deliver best-in-class video experience.

The Scientific Atlanta Video Headend and Cisco® Content Delivery System (CDS) are crucial pieces of a solution that enables service providers to define the experience.

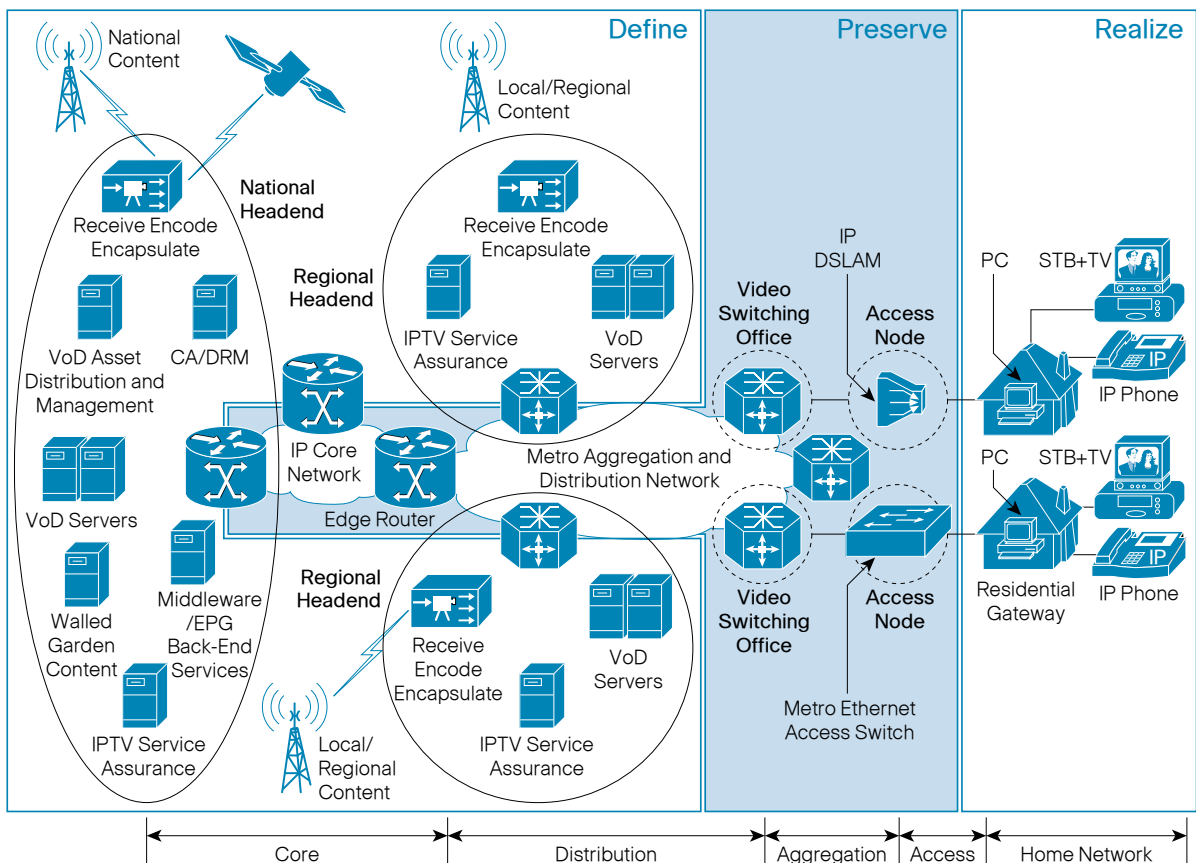
- *Preserve* the video experience: Next, video experience needs to be preserved as video traffic is transported across an IP infrastructure. Service providers need an intelligent, video-aware, carrier-class IP network that can effectively preserve the video content and the experience all the way from the headend to the end-consumer device. The Layer 3-based, content-aware, intelligent Cisco IP Next-Generation Network (NGN) ServiceFlex architecture offers superior video-to-network linkages, such as Visual Quality Experience (VQE), Video Admission Control (VAC), and scalable multicast performance to preserve the video experience.
- *Realize* the video experience: An outstanding video experience requires state-of-the-art solutions in the customer home to decode, decrypt, share, and display the content the way it was intended. The home networks and end-consumer devices are the consumer's gateway not only for video content, but also to realize the delivery of integrated media experiences. Scientific Atlanta and Linksys® provide innovative products and technologies to meet the growing expectations of media consumers.

Historically, most video technology suppliers have been able to address only a subset of these requirements. Cisco can provide a comprehensive, fully integrated solution that extends across all of them (Figure 1). Scientific Atlanta, now part of Cisco, has provided industry-leading video solutions for more than 55 years, serving the world's largest and most successful video networks. Cisco pioneered IP video delivery, and the Cisco IP NGN provides the ideal entertainment-grade convergence platform for protecting and distributing quad-play and IPTV services. Combined with state-of-the-art Linksys solutions for the home, Cisco can offer carriers superior expertise to deliver every aspect of the complete multimedia experience.

Together, the Cisco IP DNA combined with Scientific Atlanta's video DNA and the Linksys home networking DNA provide a comprehensive, fully integrated solution that extends across define, preserve, and realize domains. The Cisco IPTV solution delivers the next-generation media services and a comprehensive solution available today that addresses carriers' end-to-end requirements.

The complete Cisco IPTV solution provides a rich media delivery infrastructure that extends from the video headend through the intelligent, video-aware service network and all the way to the customer home.

Figure 1. Cisco End-to-End IPTV Solution with Define-Preserve-Realize Domains



### Define the Video Experience: The Video Headend and Content Delivery System

The define portion of the video experience encompasses the Scientific Atlanta IPTV Video Headend and Cisco Content Delivery System.

The Scientific Atlanta headend solution, based on over 5 decades of experience building the world's leading video networks, provides the full range of video acquisition and processing options, best-in-class MPEG-2 and MPEG-4/AVC video encoding, and full integration with the Microsoft IPTV solution and other third-party middleware systems. Cisco delivers a carrier-class, highly scalable, integrated, proven, turn-key IPTV video headend system with a single-screen heterogeneous management system, ROSA, that enables differentiated IPTV service with better video quality at the lower bit rate.

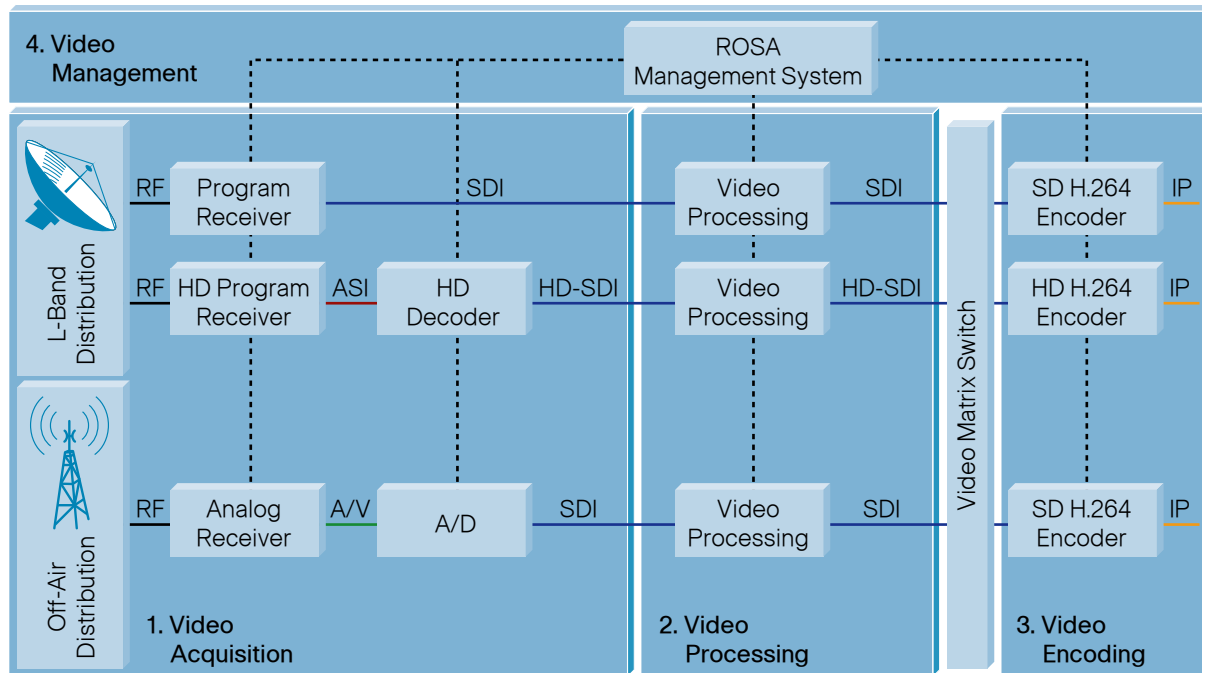
Defining an outstanding video experience also means extending the core headend components with the Cisco Content Delivery System (CDS), which delivers customized and personalized on-demand functionality through next-generation network-based video-on-demand (VoD), time-shifted content, network-based personal video recorder (nPVR), targeted ad insertion, and other advanced interactive video services.

## The Scientific Atlanta IPTV Video Headend

The IPTV headend solution consists of four major building blocks (Figure 2):

1. Video Acquisition
2. Video Processing
3. Video Encoding
4. Video Management

Figure 2. IPTV Headend Building Blocks



1. Video acquisition is a highly customizable part of the headend requiring intelligent design with many tradeoffs (redundancy options, muxing capabilities, dish implementation, etc.). The goal is to collect and convert radio frequency (RF) video from a wide range of sources, including satellite, off-air, fiber, and other digital and analog sources using a wide range of C-band and Ku-band satellite receivers, off-air receivers into serial digital interface (SDI) signal, and the IRD D9844/D9850 family of integrated receiver/decoder (IRD) solutions. The acquisition segment is designed with appropriate redundancy and backup / fail-over capabilities needed to satisfy the service provider's uptime goals.

Cisco offers superior expertise for optimized design and implementation of video acquisition with hundreds of digital headends in the U.S. and over thousand of headends with tens of thousands uplink channels worldwide.

2. Video processing is driven by the increasing demand to support growing complexity and scale of video applications. Multiscreen video require transcoding/transrating functionality, targeted ad-insertion, and nPVR and the trick-play ("Pause, FF, Play, etc.") functionality significantly drive scalability and real-time video processing requirements.

Scientific Atlanta Digital Content Manager (DCM) Model D9900 is a compact MPEG processing platform with massive processing power, which can process thousands of video streams simultaneously, including digital program insertion (DPI).

The DCM provides essential functionality, in both standard definition (SD) and high definition (HD), such as grooming and remultiplexing as well as advanced capabilities, such as transrating, statistical multiplexing and rate limiting. The DCM also supports next-generation video applications, including on-demand digital services, local program and advertising insertion, and tools to more effectively process video and conserve bandwidth.

3. Video encoding presents unique challenges to wireline providers as they require advanced encoding—MPEG4 AVC (H.264) for access bandwidth efficiency, better video quality, and to differentiate IPTV services.

Quality of encoding is the key differentiator of the IPTV headend. High Definition (HD) MPEG-4/AVC experience is driven by customer demand for popular, high definition, high-intensity video content (sport events, music videos, car racing, etc.) and is extremely sensitive to the quality of encoders.

Efficiency of encoding is the most important attribute of MPEG-4/AVC for bandwidth efficiency while preserving the video quality. An extensive MPEG-4 tool set implementation helps to increase the efficiency and flexibility of MPEG-4/AVC encoding, which is far more complex than MPEG-2.

Cisco offers better video quality at a lower bit rate using the most advanced and flexible platform, including single-slice encoders for differentiated high-quality video, bandwidth efficiency with PreSight*Plus*, and industry-leading encoders with the most extensive MPEG-4/AVC tool set implementation.

Cisco is the company with core internal competency and expertise in encoding algorithms, with inversions in MPEG-4 as well as significant MPEG-2 intellectual property.



Scientific Atlanta is the industry leader in video encoding with a complete family of MPEG encoders, including an award-winning MPEG-4/AVC encoder:

- D9054 MPEG-4/AVC HD Encoder: This high-definition encoder encodes analog or serial digital interface (SDI) signals in real time to MPEG-4. The encoder outputs IP multicast or unicast, and supports all popular audio formats with a broad range of bit rates.
  - D9034 MPEG-4/AVC SD Encoder: This solution applies the same audio and video transmission capabilities as the D9054 for standard-definition signals.
4. Video management: Comprehensive and widely deployed video headend management system with “one screen”—single system to monitor/manage the entire IPTV headend, including support for third-party equipment. It also provides remote management of hubs for OpEx savings with lights-out operations. All of video and transmission devices that are incorporated in the IPTV headend can be monitored, accessed, configured and controlled with Scientific Atlanta’s ROSA Network Management System (NMS).

ROSA MNS is deployed in more than 1,500 networks worldwide, monitors and controls every active device provided by Scientific Atlanta and third party devices in a carrier’s video acquisition, encoding, and transmission network system. The solution provides sophisticated, standards-based management capabilities and features at every network location, from the super headend to the video hub office.

### The Cisco Content Delivery System

Consumer expectations are evolving and changing the way they consume and interact with entertainment-grade content. Consumer demands are driving technology transformation with the rise of personalized and interactive media services as well as a requirement for access to any content, at any time, on any device, at any location. Personalization, localization, and on-demand access to information and entertainment are becoming a key competitive differentiators for service providers and the way to increase ARPU and customer loyalty. Delivery of “Anything on Demand” has become an important revenue opportunity for service providers.

The Cisco Content Delivery System (CDS) provides an intelligent, network-based platform for supporting video ingest, storage, content distribution, personalization, and streaming functions, allowing carriers to deliver customized, interactive, and local content. The solution can support the full range of next-generation video entertainment applications, including:

- VoD
- Near VoD (nVOD)
- Network Digital Video Recorder (nDVR)
- TV time-shifting

- Personalized ad insertion
- Delivery of the Public Access, Education, and Government (PEG) channels

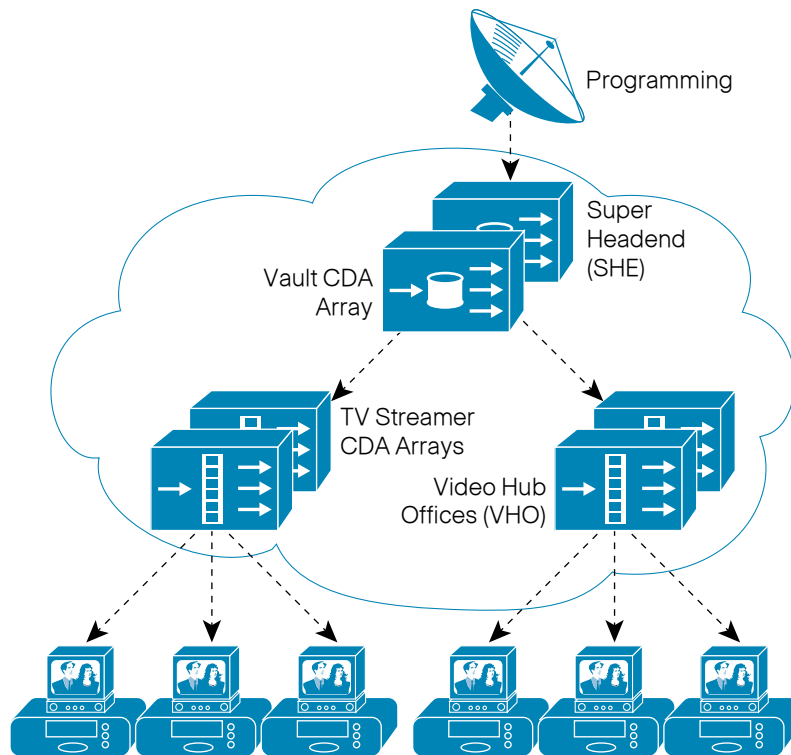
The Cisco CDS consists of networked Content Delivery Engines (CDEs) that implement content ingest, storage, distribution, personalization, and streaming functionality. These functions are grouped into the following primary Content Delivery Applications (CDAs) (Figure 3):

- Vault CDA: Video ingest and resilient, shared storage
- TV Streamer CDA: Personalization and streaming within managed networks to set-top boxes and televisions attached to telco and cable networks
- PlayOut CDA: Video storage and multicast streaming for scheduled or looping content delivery

The Cisco CDS transcends existing VOD devices by delivering a network-based architecture that enables service providers to deliver to their subscribers the next generation of personalized entertainment. These advanced services are deliverable across the growing portfolio of heterogeneous devices, including television, personal computers, and mobile handsets.

By deploying Cisco CDS, service providers are able to boost customer satisfaction, increase ARPU, and reduce turnover while achieving unprecedented operational efficiencies and low total cost of ownership (TCO).

Figure 3. IPTV Headend Building Blocks





## The Cisco Approach to Middleware and Digital Rights Management/ Conditional Access

To deliver a satisfying video experience, not only must carriers provide compelling content, but the content must be complemented with the interactivity and personalization that users demand, such as in-home content sharing, VoD, DVR, and caller ID. Middleware is the key enabler of IPTV services and provides a competitive advantage in differentiation of the IPTV versus existing video services.

Cisco IPTV and Quad-Play networks can support a multiple DRM services enabling carriers to provide the full range of video content customers expect, while helping ensure that video can be delivered securely and that intellectual property can be protected throughout the service network.

### Summary of Cisco Differentiators for “Define Video Experience”

- Award-winning MPEG-4/AVC encoders producing better video quality at lower bandwidth
- Superior headend scalability supporting millions of subscribers and flexibility to add new applications without a need for a comprehensive upgrade
- Carrier-class headend reliability option with five nines (99.999%) uptime
- Superior manageability of heterogeneous headend components, including the 3rd party solutions, from one screen
- Multidimensional scalability of Cisco Content Delivery System
- Nonstop Cisco Content Delivery System service availability by virtue of resilient design and auto failover capability
- Unprecedented Cisco Content Delivery System performance with multi-Gigabits per second (Gbps) streaming bandwidth
- Significantly lower Cisco Content Delivery System Total Cost of Ownership (TCO) with nonstop service availability, intelligent caching, and easy deployment

## Preserve the Video Experience: Cisco Intelligent IP Network Infrastructure

The video experience created in the IPTV Headend and Content Delivery System, which serve as the point of origin for a next-generation video offering, must be preserved as it is transported across a network infrastructure.

IP infrastructure must incorporate “video-aware” intelligence to distinguish video traffic from other types of data and handle it accordingly. IP infrastructure must also provide operational simplicity, scalability to millions of subscribers, and a range of video specific capabilities, including support for rapid channel change times and admission control mechanisms to protect the video experience against oversubscription. Finally, these networks must support Quality of Service (QoS) and security on an end-to-end basis.

The Cisco IP Next-Generation Network (IP NGN) provides an ideal platform for preserving video services in IPTV and Quad-Play networks. This open, standards-based architecture combines superior video-to-network linkages, high availability, video-aware intelligence, and the scalability and flexibility to accommodate new services as they evolve. A true multiservice convergence platform, the Cisco IP NGN allows carriers to converge entertainment and business-grade services onto a common infrastructure and to deliver a multitude of services to any market, over any IP-based high-speed access technology.

### The Cisco ServiceFlex Architecture

To provide a successful and differentiated video experience, carriers must be able to deliver the full range of interactive, customized, and on-demand as well as broadcast services that subscribers expect. Cisco offers an industry-leading IPTV network solution that uses ServiceFlex, which employs service separation to optimize video transport in Quad-Play networks and efficiently deliver a broad range of next-generation video services (Figure 4).

In the past, video networks provided basic switched video transport at Layer 1 or Layer 2 and all services (voice, video, data, and mobility) were treated the same way. Alternatively, the Cisco ServiceFlex Architecture employs Layer 3 IP routing intelligence. As a result, a Cisco IP NGN can identify and separate data and video traffic, and employ IP multicast and resiliency techniques to provide more efficient, cost-effective video delivery. The Cisco ServiceFlex architecture lets carriers:

- Enhance network efficiency: The Cisco ServiceFlex architecture utilizes enhanced dynamic IP multicasting of live TV and PPV, minimizing the bandwidth required to serve customers and support source redundancy.

Figure 4. ServiceFlex Transports IPTV Services at Layer 3

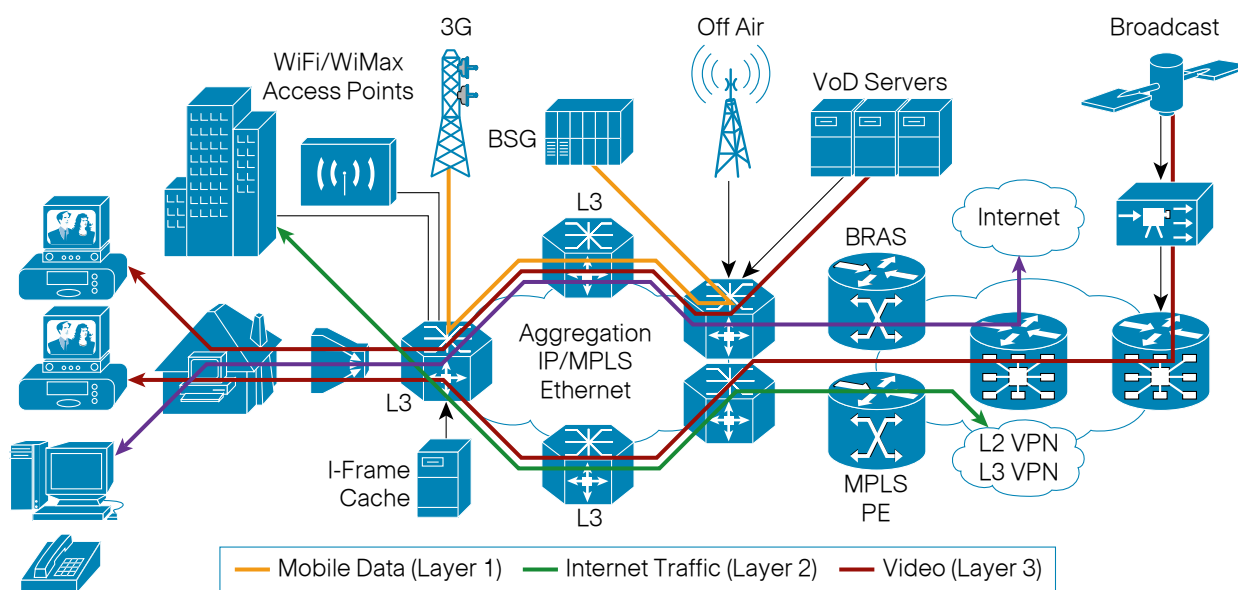
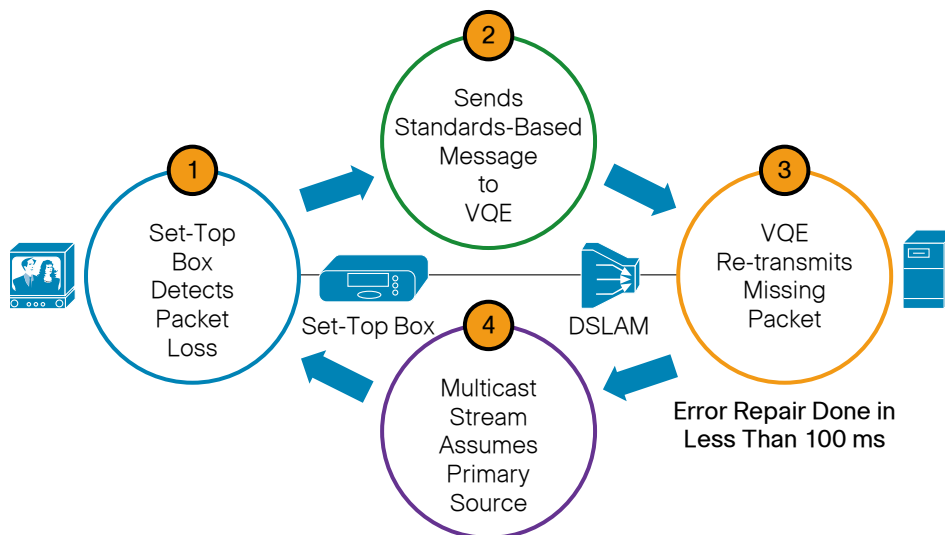


Figure 5. VQE Protects IPTV Quality of Experience



- Lower operational costs: IP multicast supports point-to-multipoint distribution and is simpler to provision than a conventional Layer-2, tunnel-based mesh approach.
- Deliver consistent network resiliency: The Cisco ServiceFlex architecture employs advanced Layer-3 distribution and network convergence techniques to provide sub-second recovery in response to any network outage conditions, including link, node, and source failures.

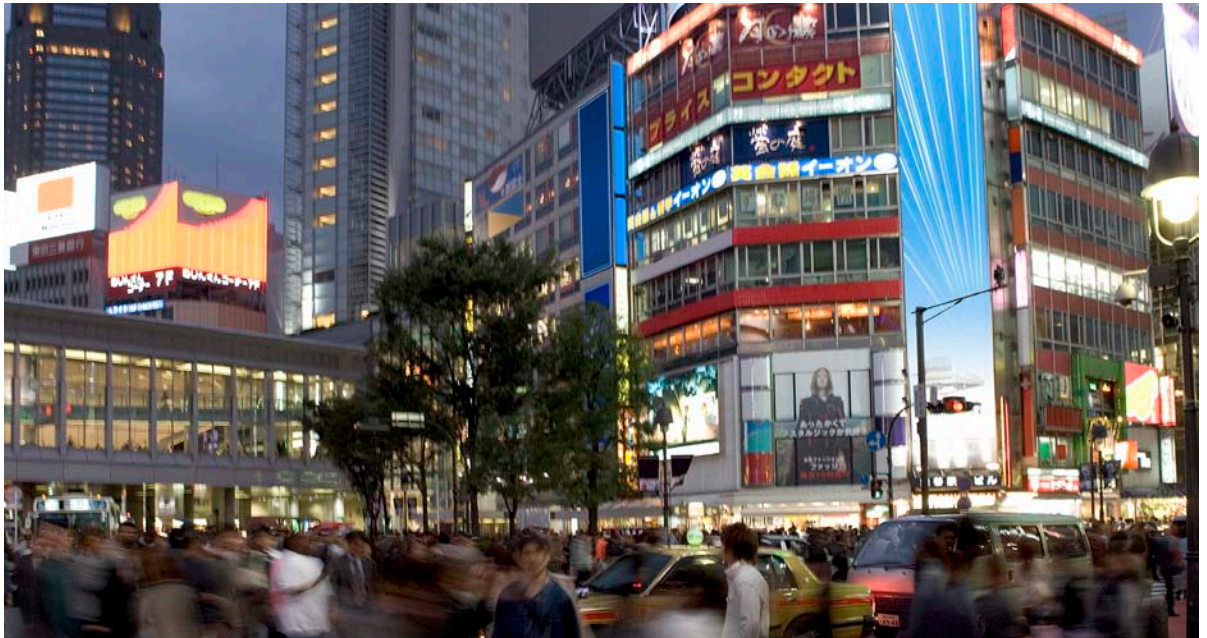
Ultimately, a Cisco IP NGN employing the Cisco ServiceFlex architecture lets carriers provision video more intelligently and efficiently, and deliver a superior customer experience.

### Cisco Visual Quality Experience (VQE) Technology

To meet customer expectations and industry standards for video quality, carriers must build a network that minimizes packet loss and video distortions. Cisco Visual Quality of Experience (VQE) technology provides a range of capabilities to help carriers address the underlying issues that contribute to packet loss and enhance the overall quality of the video experience (Figure 5).

- Protects against congestion: Without effective tools to predict and control the amount of VoD traffic in the network, carriers may have oversubscribed their network so there is not enough bandwidth to meet peak usage rates, resulting in network congestion and loss of quality. Cisco VQE technology includes integrated Video Admission Control (VAC) capabilities, which doesn't allow too many streams to be established when video demand oversubscribes the network resource.

With integrated VAC, VoD servers communicate directly with network elements to police the new session requests and protect service quality. Cisco VAC technology can differentiate between paid VoD, free VoD, specific high-demand broadcast channels, and many other variables, giving carriers enhanced choice and control over the IPTV experience.



- Repairs bit errors: One of the most significant challenges for IPTV providers delivering video to subscribers over conventional subscriber access lines (such as DSL) is the bit errors rate, which is typically in the order of  $10^{-5}$ . In fact, the impact of DSL bit errors on video quality can typically far exceed the combined effect of all other network outages. A single bit error in a full-length IP packet results in corruption of seven MPEG packets carried inside that IP packet.

Cisco VQE technology provides an intelligent link between the video network and the subscriber's STB to deliver standards-based video packet retransmission and forward error concealment capabilities to address bit errors before they can impact the video experience.

- Improves channel change time (CCT): VQE helps accelerate the process that takes place between the instant of leaving the currently watched program and that of start displaying scenes of the new channel on the TV set. The resultant optimized process has the extraordinary effect of moving the experience level on channel change from merely "responsive" to really "interactive". Cisco VQE technology uses a variant of standard RTP retransmission and industry-leading video stream processing to accelerate the time it takes a STB to receive the I-frame from the new channel tuned to as well as fill its jitter buffer.
- Provides comprehensive video monitoring and reporting: Cisco VQE technology includes tools to monitor the quality of the video experience on a per-subscriber basis, allowing carriers to address many issues before they impact subscribers, and to reduce costly truck rolls to respond to service calls.

## Cisco Solutions for IP Core, Distribution, Aggregation, and Edge Networks

Delivering an exceptional video experience requires effective solutions for distribution, aggregation, and edge networks, as well as video-optimized core network platforms. It is within these network segments that carriers most require integrated intelligence, scalability, granular manageability, and resiliency to provide the high-quality media experience that customers expect.

A superior video experience drives the requirements for the network core, which is the first ingestion point for the entire national IPTV content through the Super Headend (SHE) and demands a supremely scalable, versatile, and manageable solution to ingest the multi-terabits-per-second of bandwidth. As the first carrier-class routing solution to easily scale up to 92-Terabits per second (Tbps), the Cisco CRS-1 Carrier Routing System provides an ideal foundation for IPTV and Quad-Play networks. The Cisco CRS-1 supports delivery of multiple services over a common network infrastructure, and offers a new class of entertainment-grade network routing by providing:

- **Cisco Service Separation Architecture:** The Cisco CRS-1 architecture supports total separation of traffic and network operations on a per-service or per-customer basis. Also, by employing service separation, carriers can test, deploy, and implement a comprehensive offering of converged services, while helping ensure compliance with customer service-level agreements (SLAs). Service separation helps ensure that new services such as IPTV can be added to the network without impacting other services, thereby increasing overall availability.
- **Scalable IP Multicast Capabilities:** The CRS-1 was built from ground up to deliver efficient, wire-rate multicast and unicast traffic for video networks. The CRS-1 employs advanced Cisco IP multicast techniques, including multicast in the switch fabric itself to efficiently replicate video traffic and support the massive scale that is required in large core IPTV and Quad-Play networks.
- **IP-over-Dense Wavelength Division Multiplexing (IP-over-DWDM):** The Cisco CRS-1 simplifies the core network architecture by converging optical and IP transport services. The solution offers integrated DWDM transponder functionality at both 40-Gigabits per second (Gbps) and 10-Gbps, significantly reducing OpEx and CapEx enabling cost-effective IPTV services.

Cisco offers a suite of intelligent distribution/aggregation and edge solutions to help service providers meet these demands and to deliver IPTV services more efficiently and cost-effectively. These solutions include:

- **Cisco 7600 Series Routers:** The industry's premier Ethernet aggregation platform provides advanced IP multicast capabilities, high-availability features, and robust network and application security required for IPTV. Also included are enhanced dynamic IP multicasting and broadband source redundancy of live TV, PPV, and VoD, which minimized the bandwidth needed to serve customers and support source redundancy, thus helping to ensure a quality of service. In addition, Cisco introduced Source Specific Multicasting (SSM), which helps enable Layer 2 customer equipment to interwork with Layer 3 signaling and is more resilient to distributed denial-of-service (DDoS) attacks than Any Source Multicast.

- Cisco Catalyst® 3750 Metro Series Switches: These platforms are ideal for carriers seeking to deliver business services such as Layer 2, Layer 3, and Multi-Protocol Label Switching (MPLS) virtual private networks (VPNs) in a variety of bandwidths, with a variety of SLAs.
- Cisco ME 3400 Series Ethernet Access Switches: Purpose-built for service provider Ethernet access, the customer-located Cisco ME 3400 Series is the access switch optimized for delivering both Quad-Play and business VPN services.
- Cisco ONS 15454 Multiservice Transport Platform (MSTP): This industry-leading DWDM platform allows carriers to support multiple 10-Gbps point-to-point links, making it ideal for IPTV deployments. The platform also includes 10-Gigabit optical transponders and industry-leading Cisco reconfigurable optical add-drop multiplexing (ROADM) technology.



### The Cisco Service Exchange Framework (SEF)

A key component of the comprehensive Cisco IP NGN quad-play solution is the Cisco Service Exchange Framework (SEF), which helps service providers optimize the end-user experience through distributed network intelligence and service control technologies. The Cisco SEF manages service coordination, allowing service providers to monitor subscribers and applications, apply policy triggers, and enforce policies.

The Cisco SEF provides an essential platform to help service providers control the quality of IPTV and to add new value-added services to personalize the video experience. For example, the Cisco SEF allows carriers to support parental control, self-subscription, video bandwidth on demand, and content filtering services, as well as services such as caller ID on TV screens and service mobility that enrich users' convenience.

### Network Management and Operations

Delivering a comprehensive Quad-Play experience requires more than an innovative network infrastructure. Carriers also need intelligent tools to manage, monitor, and optimize service delivery across the end-to-end service network. Cisco management systems simplify network operations and management by automating many configurations and provisioning functions in Quad-Play networks. Cisco management solutions integrate easily with carriers' existing management applications and Business Support System (BSS)/Operational Support System (OSS) technologies.

## The Cisco Active Network Abstraction (ANA)

With a regional or national footprint and potentially millions of subscribers, large-scale service provider networks present some of the most complex environments in the world. Effectively managing and monitoring such environments demand global-scale network management tools. With Cisco ANA software, Cisco provides a radical new approach for managing service provider networks. Cisco ANA creates a virtualized, service-oriented network model that reflects the near real-time state of every network element and maintains an end-to-end view of the entire network regardless of vendor or technology. It meets service provider demands for service-level management systems that truly reduce complexity and costs.

### Summary of Cisco Differentiators for “Preserve Video Experience”

- Consistent network resiliency using advanced Layer 3 distribution and network convergence techniques, which provide sub-second recovery in response to any network outage conditions, including link, node, and source failures
- Lower operational costs with point-to-multipoint distribution, which is simpler to provision than a conventional Layer-2, tunnel-based mesh approach
- Enhanced network efficiency with dynamic IP multicasting of live TV, minimizing the bandwidth required to serve customers and support source redundancy
- Protection against congestion with VAC capabilities, that don't allow too many streams to be established when video demand oversubscribes the network resource
- Repair of bit errors with Cisco VQE technology, which provides an intelligent link between the video network and the subscriber's STB to deliver standards-based video packet retransmission and forward error concealment capabilities to address bit errors before they can impact the video experience
- Improvement of Channel Change Time (CCT) with VQE, which helps to accelerate the channel change from merely “responsive” to truly “interactive”
- Comprehensive video monitoring and reporting with Cisco VQE technology, which includes tools to monitor the quality of the video experience on a per-subscriber basis





### Realize the Video Experience: The Consumer Home

Scientific Atlanta and Linksys provide innovative products and technologies to meet the growing expectations of media consumers and help ensure that the video experience is fully realized. These solutions deliver easy access to multiple forms of content on multiple devices, both in the home and on the go.

### Linksys Home Gateways and Consumer Devices

Customers increasingly want the ability to access content on PCs, TVs, and other devices throughout the home. However, they do not want to invest in and install a thicket of new wires and connections for each home device. Linksys, a division of Cisco, provides home networking solutions that allow customers to easily deploy the comprehensive home media experience they demand.

With Linksys products, customers can surf the Web, enjoy multiple streams of HD video, listen to digital music collections, and make Internet phone calls—all at the same time. Meanwhile, the solutions offer service providers new opportunities to increase the total addressable market of consumer services and solutions.

### Scientific Atlanta Set-Top Boxes

For the experience provider, the set-top box is the consumer's gateway the delivery of integrated media experiences. To fill this role, however, set-top boxes must be easily upgradeable to provide continuous enhancements to the customer experience over several years, and must support robust remote management capabilities.



Scientific Atlanta offers a comprehensive series of IPTV set-tops that deliver a wide range of possibilities from standard-definition models to sophisticated media center gateways with services including:

- High-Definition Television (HDTV)
- Digital Video Recorder (DVR)
- Multi-Room DVR (MR-DVR)
- Electronic Programming Guide (EPG)
- Video-on-Demand (VoD)
- Fast channel change
- Web-based applications
- Games
- Multiple Picture-in-Picture (PIP) images on one screen

Scientific Atlanta, with over 35 years of world-class set-top box expertise, delivers IPTV services via a complete family of open, flexible, and powerful IPTV STBs, which facilitate seamless integration of the Cisco set-top boxes into an end-to-end software IPTV ecosystem. Scientific Atlanta IPTV set-tops support open middleware platform, enabling service providers to have a high degree of control, creativity and differentiation in solution development.

The portfolio of SA set-top boxes includes:



**IPN330HD**

A high-definition platform with a single video stream output



**IPN430MC**

A media center (MC) with digital video recorder (DVR) and SD or HD functionality, and a single video stream output



**IPN603MCG**

A media center gateway (MCG) with DVR and SD or HD functionality, and three video streams for distribution of content to multiple TVs

Cisco differentiates the IPTV services through implementation of the latest technology, including:

- System on Chip (SoC): To lower the risk and provide flexibility for features, to enable volume growth
- Hardware MPEG decoding: To free up CPU cycles to concurrently perform a number of functions, such as HD recording and trick play to create a unique and new IPTV experience
- Integrated IP-over-Coax: Using HPNA 3 protocol, which enables networking of STBs over existing coax wiring

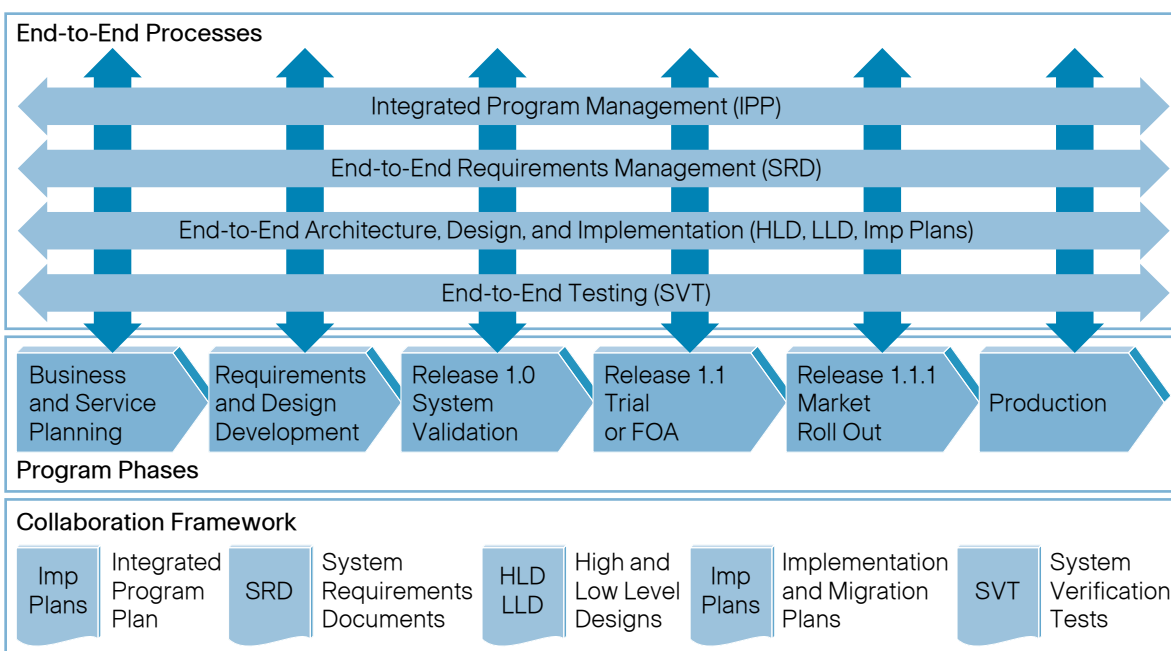
- Two-stage Boot Loader: To provide flexibility and easy switching to different software platforms while minimizing OpEx required for set-top box upgrades

### Cisco Lifecycle Services

One of the biggest challenges service providers face today in deploying IPTV is the end-to-end integration of multiple network elements, including video headend, middleware, IP transport, distribution, set-top box, and OSS/BSS solutions. Together, Cisco and Scientific Atlanta can offer carriers extensive real-world experience planning, designing, implementing, operating and optimizing IPTV networks.

Cisco provides a cost-effective IPTV System Integration (SI) methodology, which is flexible to respond to each SP's distinct business strategy and unique requirements. A phased approach that is easily adaptable to a customer's go-to-market plan includes an end-to-end program with a range of services from planning to deployment (Figure 6).

Figure 6. IPTV Collaboration Framework



The phased Cisco approach for IPTV deployment includes a well defined deliverables at the conclusion of each step:

- Business and Service Planning: Developing and evaluation of business cases, planning service portfolios, and investigation of architectures and approaches.
- Requirements and Design Development: Developing and documenting requirements, network and system architectures and jointly planning an integration and implementation program. Optionally perform Proof-of-Concept (PoC) at Cisco labs or customer facility.
- System Validation (Release 1.0): Performing and validating system integration, document designs and developing deployment plans and templates.
- First-Office-Application (FOA) Trial (Release 1.1): Deploying, testing, and operating a limited trial, completing any deferred integration and operationalization, finalizing production designs, plans, and templates.
- Market Rollout (Release 1.1.1): Executing any required infrastructure upgrades or migrations, deploying video solution and perform acceptance tests executing any required subscriber migrations.
- Production: Operating markets and performing optimization.

The overall Cisco IPTV SI methodology is focused on delivering a reliable and high-quality interactive video experience and effective management of a large number of stakeholders, partners, and third parties involved in IPTV system integration.

### Summary of Cisco Differentiators for “Realize Video Experience”

- Implementation of latest technology, including System on Chip (SoC), MPEG decode in hardware, integrated IP-over-coax, innovative two-stage boot loader
- Flexible STB hardware architecture allowing integration of multiple DRM and CA as well as middleware solutions
- Over three decades of engineering excellence with design, testing and manufacturing with real-world, large-scale deployment with global footprint
- In-depth understanding of consumer, which translates into profitable implementation of advanced features
- Comprehensive system integration methodology to deliver a reliable and high-quality interactive video experience

## The Experience Provider IPTV Solution from Cisco: The Better Way

Today's service providers are striving to deliver a high-quality, highly personalized, and interactive media experience to their subscribers. Cisco offers a comprehensive solution that extends across all aspects of defining, protecting, and realizing the next-generation entertainment experience. With a Cisco end-to-end IPTV service providers can deliver subscriber services, more efficiently, reliably, and cost-effectively than ever before.

Cisco and Scientific Atlanta have deployed and are now deploying some of the largest IPTV networks in the world, including the world's first high-definition IPTV service. Drawing on scalable, intelligent Cisco and Scientific Atlanta technologies, carriers can implement a true end-to-end architecture, and a smarter way to deliver next-generation IPTV services.



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