Cisco Media-Optimized Technologies for the medianet Age: Accelerating the Transformation from Service Provider to Experience Provider

Introduction

What is the next major technology innovation that will reshape the service provider industry? What will happen when the line between TV entertainment and the Internet disappears? And, how will service providers transform a service model that was designed for static, one-way video delivery into a platform for delivering rich personal, social, and interactive media experiences? Analysts can debate these questions, but service providers must answer them -- and answer them now.

Here is what service providers know: The basic delivery of TV services is no longer enough. Today's consumers want a richer, higher-quality media experience, and they want access to more kinds of content than ever before. They want to enjoy the same kind interactivity, personalization, mobility, and control that they have come to expect from the Internet with their video entertainment. And they want the ability to access any type of content they choose, whenever and wherever they choose, over a variety of devices and screens.

Delivering the "Connected Life" can be challenging. It requires a world of new technological capabilities, and a re-imagining of the service network to accommodate exponential growth in video traffic. But those service providers that can meet these challenges -- that can make the transition from conventional service provider to next-generation "experience provider" -- stand to grow market share, increase average revenue per user (ARPU), improve customer loyalty, and stand out from their competitors.

To unleash a new generation of customer experiences and previously unimagined revenue models, service providers need to evolve their network to become a medianet -- an intelligent network that is optimized for rich media. Delivering an end-to-end media-optimized network is the driving force behind the entire Cisco® video strategy. Cisco offers the broadest and deepest video portfolio in the industry, encompassing intelligent technologies in the home, the business, and the service provider network that work in harmony to deliver a more visual, social, and personal experience for customers. At the same time, by improving the efficiency and scalability of service delivery, Cisco can help service providers accelerate the rollout of new services to multiple markets simultaneously, tap new revenue streams, and successfully navigate a challenging economic environment.

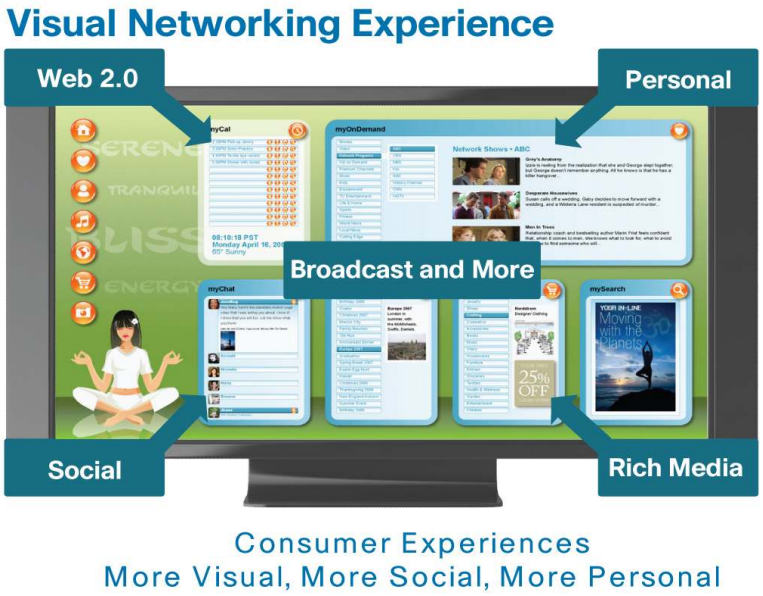
This paper highlights the extraordinary capabilities and efficiencies that service providers can realize using medianet-optimized Cisco technologies. With Cisco solutions, service providers can build an intelligent infrastructure that optimizes the customer experience and the scalability of rich media services, especially video, throughout the service provider network, across businesses, and inside the customer home.

A New Generation of Media Challenges

As service providers strive to meet evolving customer demands, they are challenged to adapt to several overriding trends:

- **Explosive growth in video traffic:** According to a recent Cisco Visual Networking Index Study, global IP traffic will reach 44 exabytes (10^{18}) per month by 2012 -- more than six times the total traffic in 2007 -- with video being the dominant driver of growth. The same study estimates that video will account for nearly 90 percent of all consumer IP traffic in 2012.
- **Expanding sources of content:** The paradigm of the past, in which content was created by major studios and delivered on a one-way basis to consumers, is over. Professionally developed content from major distributors will continue to have large audiences, but smaller-scale, semi-professional producers developing content for niche audiences will play a much larger role in consumer entertainment. Customers are also demanding more foreign-language content, such as Indian customers wanting “Bollywood” movies and Latino customers wanting Spanish-language programming. A service provider’s ability to deliver this “long-tail” content, international programming, and other niche content will be a key competitive differentiator.
- **Rise of number and type of end devices:** Today’s customers may be accessing video via a multitude of devices -- standard-definition (SD) or high-definition (HD) TVs, personal computers, gaming consoles, or smartphones and portable media devices. Attempting to deliver media to each of these formats from separate content stores, over separate infrastructures, adds extraordinary complexity and costs. Service providers need mechanisms to efficiently serve all of these end devices with a single medianet.
- **Rise of user-generated video:** The cost of video production and editing tools continues to drop, making video creation and distribution capabilities available to the masses. As more video consumers become video creators, operators can expect user-generated content (UGC) to make up a significant amount of their overall video traffic. Service providers will need new tools to integrate, catalog, and distribute such content to subscribers.
- **Demand for more social and interactive experiences:** Viewers are already engaged in rich social networking and interactive content sharing on the Internet. Now, service providers must bring those same “Web 2.0” capabilities to the TV, bringing personalized home pages, sites like MySpace and Flickr, and RSS feeds and Web content into the TV experience. Operators that can deliver these capabilities will not only gain subscribers and customer loyalty; they will unlock a new world of advertising and supplemental revenue opportunities (Figure 1).
- **Demand for greater mobility and control:** Customers want video content that adapts to their own lives and schedules. They want to watch whatever they want, whenever they want, wherever and however they choose. That means the ability to record and share programs over the network, to access time-shift services such as “look-back” and “start over,” and to extend media content across multiple screens (TV, PC, mobile device), even within a single session.

Figure 1. Delivering a Next-Generation Media Experience

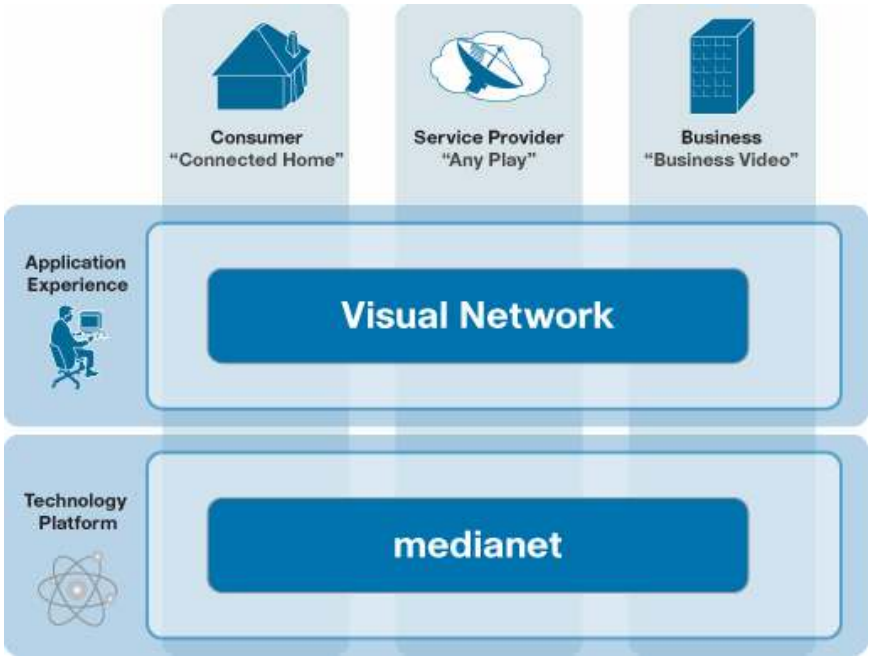


Service providers may recognize these trends, but building a network that can actually ensure and scale the consumer experience is another matter. To truly deliver the visual, social, and personalized media experience that customers demand, service providers need a broad range of new capabilities. They need a media-aware network that can manage unprecedented new content on an unprecedented scale.

Tomorrow's medianet Technologies Today

Cisco offers comprehensive medianet technologies that encompass solutions for the home, the business, and the service provider network, all working together to deliver a more visual, social, and personal experience to end users (Figure 2). This strategy supports and optimizes all segments of the service provider industry, from telcos and cable operators to satellite providers to the broadcasters.

Figure 2. A Comprehensive medianet Strategy

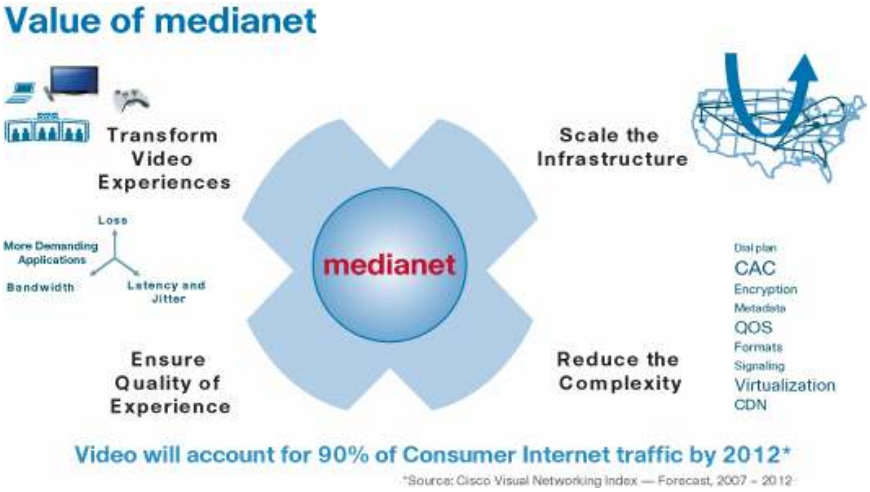


Unlike today's media services paradigm, in which disparate media types exist in segmented silos, a medianet built on a Cisco IP Next-Generation Network (IP NGN) delivers all types of media with a single end-to-end architecture. And, it enhances all three layers of the network:

- The application layer, by supporting rich, interactive media applications
- The services layer, by optimizing media delivery and control
- The network layer, by incorporating media-aware intelligence throughout the infrastructure

Ultimately, this approach provides unprecedented scalability and efficiency for service providers, allowing them to deliver extraordinary customer experiences, accelerate the rollout of new services to all markets, and stay a step ahead of competitors -- even as media services become more complex and demanding (Figure 3).

Figure 3. Value of medianet-Optimized Cisco Technologies



By building a medianet with Cisco solutions, service providers can:

- **Transform Video Experiences:** With medianet-optimized Cisco technologies, service providers can unleash unprecedented content, personalization, interactivity, and user control. They can differentiate their service by delivering a consistent user experience across multiple screens and shaping the experience around the user's life and preferences.
- **Scale the Infrastructure:** A medianet accelerates and optimizes the distribution of all media types with a single infrastructure. It increases service velocity and supports the rollout of new services to multiple markets simultaneously, or to national and transnational audiences.
- **Ensure Quality of Experience:** Cisco media-aware technologies provide a high-performance, highly resilient IP network foundation to meet even the most demanding latency and packet loss requirements of next-generation video services. They support a media experience that is of such exceptional quality that over-the-top (OTT) content providers and enterprises using medianet communications will want to partner to ensure that level of quality for their content.
- **Reduce Complexity:** A medianet collapses previously segmented operations, dramatically simplifying the network. It virtualizes content, infrastructure, and services across the environment, and allows service providers to reduce network complexity even as they add new services.

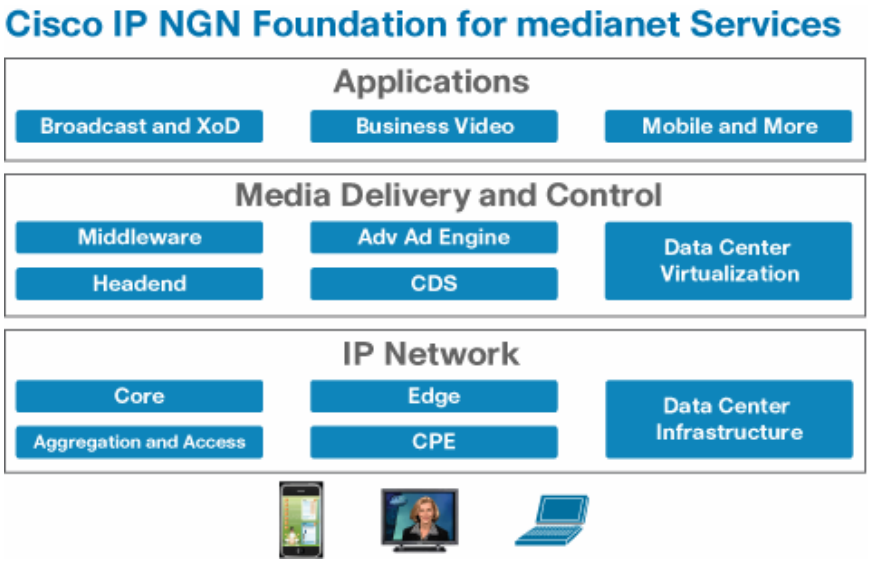
In addition, a medianet-optimized Cisco network helps service providers:

- **Sustain new revenue streams and business models:** Cisco can deliver medianet technologies that support rich content marketplaces, transaction-based services, and revenue-sharing with content providers, enabling new business models beyond basic subscription services and new opportunities for advanced targeted and personalized advertising.

- **Successfully navigate challenging economic conditions:** A medianet-optimized Cisco network collapses operational silos and supports much more efficient, scalable service delivery, helping service providers reduce both capital expenditures (CapEx) and operational expenditures (OpEx). At the same time, a medianet supports new business relationships and revenue models, and drives increased customer adoption of advanced media services.

Other technology vendors can address some of a service provider's medianet requirements. Only Cisco can offer an end-to-end medianet solution encompassing next-generation video head-ends, service provider data centers, comprehensive media distribution and contribution network solutions, and the largest family of set-top boxes (STBs) and home networking solutions in the industry (Figure 4). Only Cisco can converge all of these solutions into a single, harmonious IP architecture that extends media-aware intelligence from end to end and accelerates the delivery of rich media services across all markets.

Figure 4. A Comprehensive Cisco Portfolio of medianet Solutions



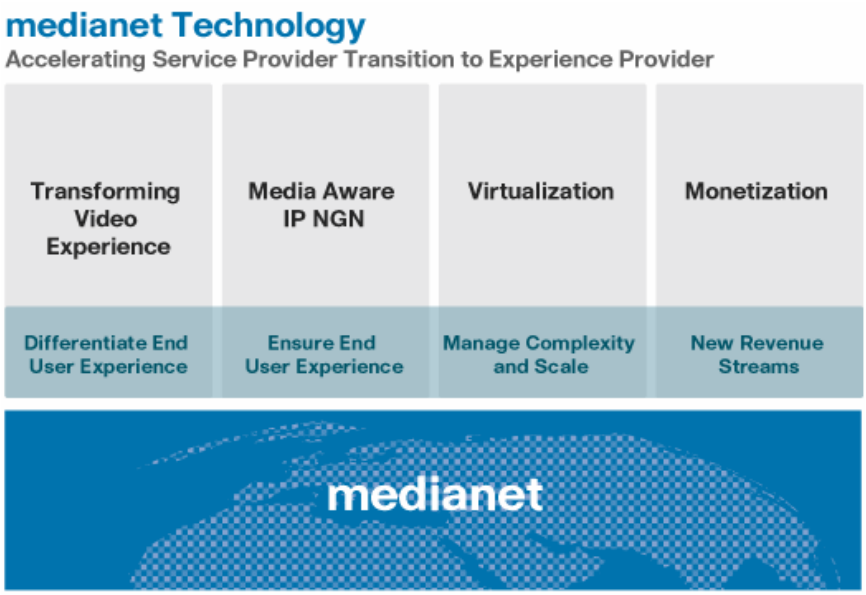
Building Blocks of a medianet Strategy

A next-generation medianet strategy encompasses four overarching pillars (Figure 5):

- Transforming video experiences to enhance and differentiate the user experience
- A media-aware IP network to deliver outstanding quality of experience (QoE)
- Virtualization capabilities to manage extraordinary complexity and scale
- Monetization through the expansion of existing business models and the creation of new ones

Cisco offers the broadest, deepest portfolio of medianet solutions in the industry to address each of these requirements.

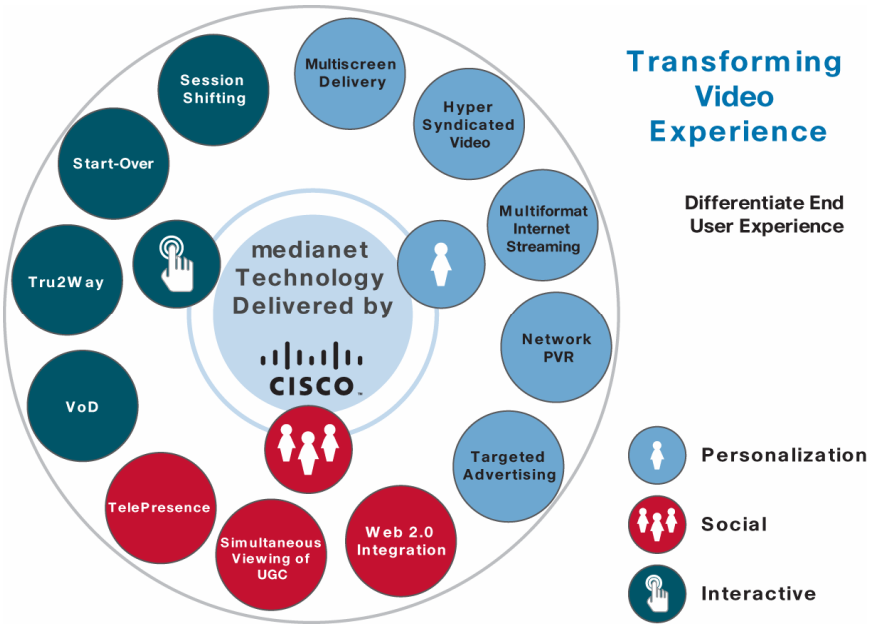
Figure 5. Four Pillars of the Cisco Service Provider medianet Strategy



Transforming Video Experiences

To increase market share and improve customer loyalty, service providers must be able to offer a media experience that is a clear step beyond what competitors can provide. The key to differentiating services is the ability to deliver rich social, interactive, and personalized media experiences. Cisco can provide a broader, deeper portfolio of medianet-enabled solutions than any other technology provider to help service providers shatter the conventional video model and deliver a new generation of media services (Figure 6).

Figure 6. Transforming Video Experiences



With medianet-optimized Cisco solutions, service providers can deliver the future of personal, social, and interactive media experiences for consumers and business customers right now. Examples include:

Personal

- **Multi-format Internet streaming:** Differentiate the media experience by making content available anywhere, on any device. Let subscribers stream video using Adobe Flash, Microsoft Windows Media Player, Apple Quicktime, and other Internet media formats.
- **Hyper-syndicated video:** Expand the boundaries of media personalization by letting customers create virtual channels based on their own interests and preferences. Whether they want to see the local football team or a popular movie star, give customers the ability to access virtually unlimited long-tail and Internet video content on the subject of their choice right on their TV.
- **Advanced advertising:** Use the same content personalization capabilities to tailor ad insertions and deliver advertising that is more relevant to each customer's unique needs and interests -- and more profitable for the service provider.

Social

- **Web 2.0 integration:** Bring the Web experience to the customer living room with personalized home pages that display RSS feeds, weather and stock information, and even updates on connected friends and family members, every time the subscriber turns on the TV. Integrate social networking services like MySpace and Flickr across the TV, PC, and mobile device screens to let customers connect and communicate in previously unimaginable ways.
- **User-generated content:** Differentiate the media experience by extending it to more aspects of customers' lives. Let customers easily share photos, videos, and other personal content with friends and family, and make it easy to transfer content between PC, mobile device, and TV.
- **TelePresence:** Give enterprise customers the ability to have unique, "in-person" video experiences across thousands of miles. Provide fully life-like video, audio, and environments that allow remote participants to interact and collaborate like never before, while reducing travel expenses.

Interactive

- **Time-shifting:** Differentiate the media experience by letting customers pause, rewind, and fast-forward video they are watching -- even if they don't have a digital video recorder (DVR). Provide "startover" and "lookback" services that let customers who tune into the middle of a program restart it from the beginning, and adapt the media experience to their lives, instead of the other way around.
- **Network PVR:** Provide a richer experience and new revenue opportunities by letting customers record programs onto personal storage space on the network. Eliminate the need to continually maintain and update DVRs, and give customers greater flexibility to share saved content across devices.
- **Session-shifting:** Offer a media experience that adapts to your customers' lives by letting them view content over multiple devices during a single session. For example, let customers begin watching a movie on the train on their way to work using a handheld

device, continue watching it on their office PC during lunch, and finish the movie at home on their HDTV.

- **tru2way™ digital cable services:** Deliver interactive program guides, ads, games, chat, Web browsing, and shopping capabilities that provide a more dynamic and compelling media experience.

This is just a sample of the extraordinary services and applications that service providers can deliver right now with medianet-optimized Cisco technologies. By delivering these and other advanced medianet services, service providers can give customers more content, customization, and control than ever before. Ultimately, they can fundamentally transform the video experience and create a more competitive and profitable service offering.

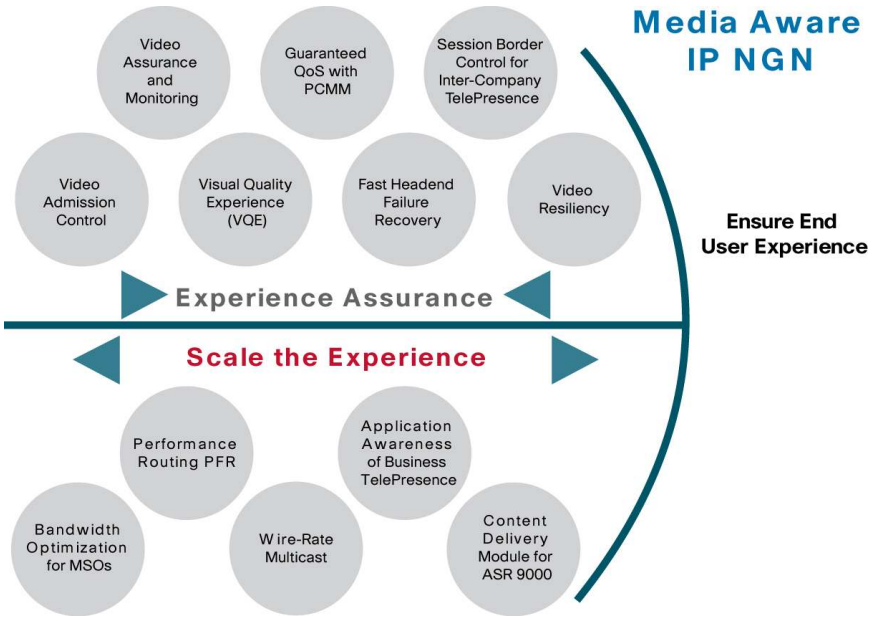
Media-Aware Cisco IP NGN

It's not enough for service providers to deliver new types of content. To meet today's customer demands, they must meet two fundamental requirements:

- Ensuring exceptional quality of experience (QoE)
- Scaling the experience efficiently and cost-effectively

Achieving both of these essential requirements demands a scalable, intelligent network that is optimized for rich media services. Cisco can offer a media-aware IP NGN designed to support a medianet evolution, and the most comprehensive portfolio of medianet-optimized network technologies in the industry (Figure 7).

Figure 7. Ensuring Quality and Scalability



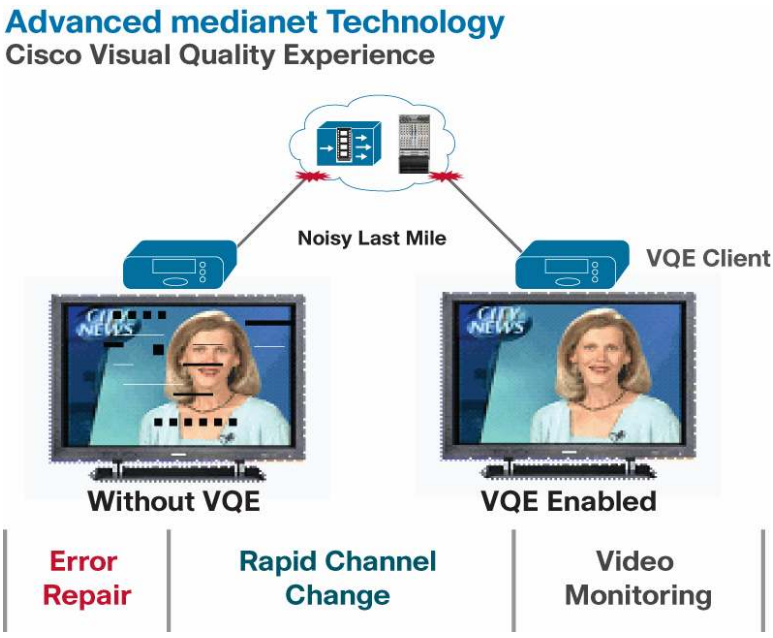
Ensuring a High-Quality Customer Experience

Delivering a high-quality media experience is essential, but IP video services pose unique challenges that any medianet must address. IP video streams are sensitive to packet loss, with even minimal loss resulting in significant degradation in video quality. A media-aware Cisco IP NGN provides the ideal medianet foundation. It extends media-aware intelligence end to end, from the IP core network to the customer home, to deliver consistently excellent quality of experience.

With a medianet-optimized Cisco IP NGN, service providers can support a broad range of QoE-enhancing services, such as:

- **Cisco Visual Quality of Experience (VQE): S**ervice providers need rigorous techniques to ensure high quality over noisy local access lines. Cisco VQE technology, currently employed by IPTV providers worldwide, corrects bit errors and dropped packets before subscribers even notice a problem, eliminating visual artifacts and delivering stunning picture quality (Figure 8). The same technology -- based on a VQE client in the STB communicating with a VQE server in the network -- can also speed channel change times and alert service providers of quality issues over last-mile networks.
- **Video admission control:** On-demand video streams are sensitive to network congestion. If a network link exceeds capacity by even a single video on demand (VoD) session, video quality degrades for all subscribers on that link. Cisco video connection admission control technology provides intelligent per-session admission control to prevent congestion and help ensure consistently high quality for all users.
- **Cisco Video Assurance Management Solution (VAMS):** Cisco VAMS provides extensive monitoring and video management capabilities for core and edge IP video networks. These capabilities let service providers continually monitor quality across the entire medianet, reduce the time required to identify and repair issues, minimize service calls, and ensure outstanding subscriber QoE.

Figure 8. Enhancing Subscriber QoE with Cisco VQE Technology



To find out about other Cisco technologies that help enhance and ensure QoE, visit: http://www.cisco.com.

Scaling the Experience

It is not enough to provide exceptional quality for some applications or a subset of customers. Service providers must be able to scale high-quality customer experiences across national and transnational networks. To achieve this degree of scalability while minimizing costs and

complexity, service providers need a medianet built on an intelligent IP network with high-performance multicast capabilities and guaranteed quality of service (QoS). Cisco can deliver:

- **Wire-rate multicast:** As service providers scale services to millions of subscribers, every component of the network from the core to the edge must support scalable multicast performance. Cisco was a pioneer of multicast and offers the broadest and deepest portfolio in the industry of scalable multicast solutions.
- **Proven scalability:** Cisco scalability has been independently verified by third parties, including a massive test of a Cisco video distribution architecture commissioned by Light Reading and the European Advanced Networking Test Center AG (EANTC). The test examined Cisco multicast performance, QoS, resiliency, and Cisco VQE and admission control technologies when scaled to 1 million subscribers and found that "Cisco delivered on these requirements in our test -- providing a new generation of hardware specifically suited for large-scale, real-time video deployment. [We have] a high level of confidence that the solution will easily scale to the design goal of a million users and beyond." (http://www.lightreading.com/document.asp?doc_id=126173)

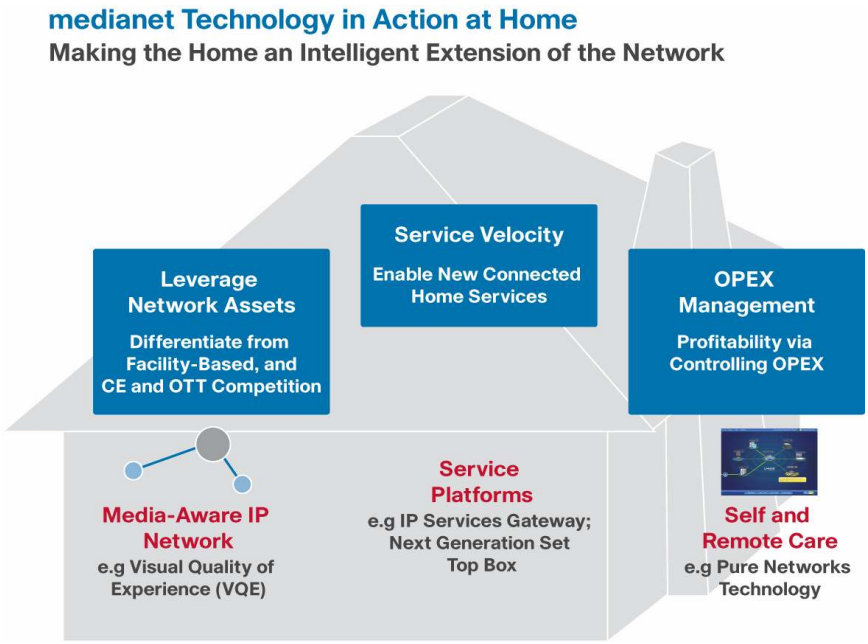
Cisco offers a broad range of other technologies to help service providers scale media experiences (Figure 7). For more information, visit: http://www.cisco.com.

Extending medianet Technology into the Home

Building on decades of expertise in set-top boxes (STBs) and home networking products, Cisco can make the consumer home an intelligent extension of the network (Figure 9). By incorporating the consumer home into the medianet, service providers can reduce CapEx and OpEx, increase revenues, and improve customer satisfaction. Cisco technologies for the consumer's home help service providers:

- **Accelerate service velocity:** Cisco provides next-generation STBs and IP services gateways that integrate IP gateway and routing functionality to closely interoperate with the intelligent medianet, and allow service providers to employ multiple technologies to distribute content throughout the home.
- **Provide a superior customer experience:** STBs that incorporate Cisco VQE technology continually communicate with Cisco VQE servers in the network to eliminate distortions and artifacts caused by dropped packets, and speed channel change times.
- **Reduce OpEx and enhance profitability:** Intuitive Cisco equipment and software for the home allow for greater self and remote care when addressing problems. For example, using Cisco Network Magic (from Pure Network Technology), service providers can make it easy for customers to add and configure home network devices themselves, reducing customer frustration and calls to the customer support center

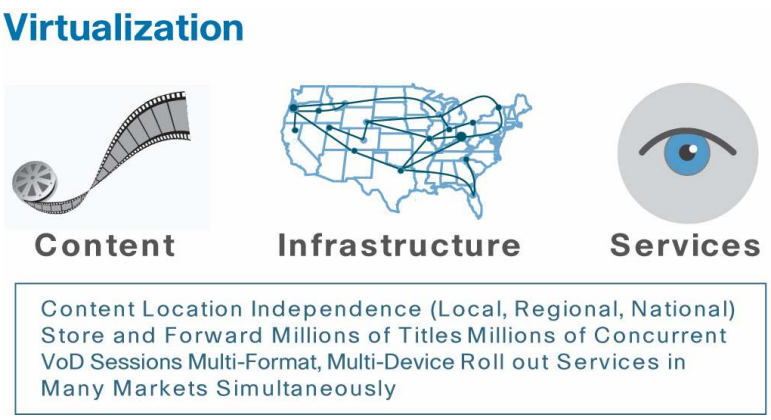
Figure 9. Extending Cisco Intelligence into the Home



Virtualization

As service providers add next-generation content and complexity to their offerings, they need next-generation efficiencies from their networks. Cisco can provide comprehensive solutions for virtualizing medianet content, infrastructure, and services (Figure 10).

Figure 10. Cisco Virtualization Capabilities



With Cisco virtualization solutions for video distribution networks, IP contribution networks, media creation workflows, and medianet data centers, service providers can:

- Deliver content locally, regionally, nationally, or globally -- regardless of where that content is stored
- Efficiently store and distribute millions of titles
- Support millions of concurrent VoD sessions
- Efficiently deliver content in multiple formats and for multiple devices
- Roll out new services in many market simultaneously

The Cisco Virtual Video Infrastructure

As service providers look to add additional media capabilities and thousands of hours of video to content libraries, they need new tools to manage growing complexity and efficiently scale video offerings to more customers. The Cisco Virtual Video Infrastructure provides an intelligent platform for delivering any type of real-time, time-shifted, or on-demand video content to any screen, across a national or transnational infrastructure. It lets service providers ingest content once for all markets, store that content in a centralized library, and accelerate distribution to any customer, anywhere.

With the Cisco Virtual Video Infrastructure, service providers can:

- **Accelerate service velocity:** The Cisco Virtual Video Infrastructure lets service providers easily distribute content to a large and continually growing customer base.
- **Deploy services to many markets at once:** Service providers can rapidly roll out current and next-generation video services in multiple markets simultaneously on a national/transnational basis.
- **Exponentially expand content:** Using the proven Cisco Content Delivery System (CDS) with industry-leading low latency, service providers can deliver content that resides anywhere -- even across vast geographies -- virtually instantly. As a result, service providers can exponentially expand content libraries without overwhelming the backbone network and make 100,000 titles or more available to all subscribers.
- **Reduce operational costs:** With the ability to serve an entire national or transnational customer base with a single content library and a highly efficient caching architecture, service providers can collapse head-end and content storage infrastructures across the network and consolidate operations centers.
- **Achieve nonstop service availability:** The Cisco Virtual Video Infrastructure employs intelligent resource pooling, load leveling, and auto-failover capabilities to create a “self-healing” video network.

For more details about the unique content caching intelligence of the Cisco Virtual Video Infrastructure and the extraordinary benefits it can deliver, visit: http://www.cisco.com/go/sp/medianet.

IP-Based Contribution Networks

Once service providers have an intelligent medianet in place, they can offer IP contribution network services to content producers, providing much more flexible and efficient mechanisms of transporting video programming from the source (such as a sports stadium) to the studio. By applying IP efficiencies to processes that traditionally have relied on legacy technologies, both service providers and content producers can realize significant benefits.

For service providers, IP contribution network services represent a potentially lucrative new revenue stream and an opportunity to generate additional value from their medianet investments. At the same time, content producers gain:

- **Improved flexibility:** IP contribution methods are much less rigid than conventional satellite contribution technologies. For example, content traversing an IP medianet doesn’t degrade over long distances, as it can when transmitted via satellite. In addition, satellite-based contribution networks are typically point-to-point systems. When content is ingested into an IP medianet, it is immediately available anywhere.

- **Reduced OpEx:** With the ability to transport content over a high-performance medianet, content producers can eliminate higher satellite transmission costs and reduce the equipment and employees that must be dispatched to remote venues.

IP Workflow Transformation

Even as most other media processes have gone digital, many content producers still rely on analog tapes for video editing and post-production. This makes these processes extremely linear and non-collaborative, since only one process can typically be performed at a time. To cut together shots from multiple cameras or add graphics or captions, for example, production staff must wait until they receive the physical tape. When multiple affiliates or production groups need video, they must wait for copies of tapes to be dubbed, adding further delays. And, when covering live events, full production teams must be dispatched onsite.

A next-generation medianet built with Cisco IP and video technologies can bring these processes into a modern digital environment, providing a more dynamic and collaborative media workflow that reduces costs and speeds content delivery. For example, editors can begin working as soon as the network begins ingesting content -- even while an event is still being recorded. Multiple groups can work on the same content at the same time, such as graphics teams creating overlays on the beginning of a broadcast even as editors are cutting together shots from later segments. Even more significant, with a medianet-enabled IP workflow, editing and production teams can collaborate from anywhere -- even when separated by thousands of miles.

There is no greater example of the transformative power of IP media workflows than the Beijing Olympics. Using next-generation medianet tools and a Cisco IP contribution network, NBC editors were able to produce the network's presentation of the Olympic games almost entirely from studios in New York and Los Angeles.

Data Center Virtualization

The service delivery data center must perform a careful balancing act. On the one hand, data centers must support a broad range of business needs, delivering next-generation video services, visual collaboration tools, and media content anywhere they are required, under strict service-level agreements. At the same time, data centers must meet operational challenges such as controlling power and cooling costs, utilizing and provisioning assets effectively, and ensuring security and availability.

Cisco provides a comprehensive suite of data center solutions that meet all of these requirements and provide the ideal foundation for a next-generation medianet. Cisco solutions for medianet data centers support:

- **Server networking:** Cisco solutions such as the Cisco Catalyst® Virtual Switching System help service providers isolate media and services, scale to millions of users, and enhance resiliency.
- **Storage networking:** Cisco offers medianet-enabled storage networking solutions such as the Cisco MDS Family of multilayer SAN switches that allow service providers to support millions of hours of content and optimize media production, post-production, distribution, and playout activities.

- **Unified fabric:** Innovative Cisco technologies such as the Cisco Nexus™ Family of data center switches and the purpose-built Cisco NX-OS Data Center Operating System support a unified fabric that dramatically simplifies the media environment. They help service providers reduce OpEx and CapEx, maintain a high QoE, and support universal access to content.
- **Virtual Machine (VM)-aware networking:** Cisco VM-aware networking technologies such as hypervisor-integrated switching let service providers scale applications, optimize the service creation infrastructure, and support emerging services such as “cloud media.”
- **Transparent virtualization:** Cisco virtualization technologies such as Cisco VFrame Server Fabric Virtualization Software support a variety of medianet data center automation and acceleration capabilities, and allow service providers to easily adapt to continually shifting user demand.

Monetization

Service providers building a medianet with Cisco media-aware technologies can do more than just optimize content delivery to their customers. They can also unlock new revenue opportunities beyond traditional video subscription services, incorporating online media marketplaces and new business models such as those built on advanced advertising.

New Revenue Models

When service providers use medianet-optimized Cisco technologies, they can virtualize media and overcome traditional dependencies on content format, delivery protocol, and playback device. The ability to make content available whenever and wherever customers want it provides ample opportunity to monetize new offerings and services tiers. The ability to expand the traditional “walled garden” of video services to encompass web-based content also allows service providers to support lucrative media marketplaces and link customers directly with content providers, offering opportunities for a variety of transaction-based and revenue-sharing business models.

Service providers can also monetize the exceptional QoE of the medianet itself. When medianets employ advanced Cisco content delivery and QoS capabilities, OTT content providers will want to pay to ensure that their customers receive the highest possible quality and capabilities. Enterprises that have implemented medianets will also seek out service providers with media-aware IP networks to ensure they realize the full benefits of their investments.

Advanced Advertising

In addition to supporting new business models, an intelligent end-to-end Cisco network can support advanced advertising. By delivering advertisements based on subscribers’ unique demographics, profiles, and interests, service providers can provide a much more targeted and lucrative advertising service.

Advertising has always been a primary means of monetizing content, but a service provider’s advertising inventory has traditionally been constrained to a small fraction of the total amount of the advertising sold on linear cable channels. While the broadcast networks use their affiliate stations to sell and insert local ads, the cable networks lack an equivalent mechanism for managing local content. Instead, carriage agreements typically allocate a percentage of a cable network’s ad inventory to the service providers for local ad insertion.

Given these constraints, there are basically two ways to increase a service provider's advertising revenue: increase the value of their existing inventory by introducing solutions that enable addressability (i.e., more precise audience targeting), and increase the quantity of inventory by expanding advertising on the rapidly growing amount of non-linear programming which is becoming available for television viewing.

In addition, there are also opportunities in the hybrid case of linear programming that is captured and viewed in a time-shifted fashion (i.e., via "Start Over" and "Look Back" services, DVRs or network PVR services). In these scenarios, ad inventory value, which typically expires soon after broadcast (72 hours in the United States), can be derived again and again via ad replacement. This strategy monetizes the content over the life of the asset, while allowing service providers to take advantage of the unicast nature of these types of services to deliver highly targeted ads.

Strategies to increase inventory quantity and inventory value are not mutually exclusive. In fact, when one considers the complexities of carriage agreements, it is unlikely that a service provider can monetize non-linear content via advertising without cooperation from the content owners. Some form of shared value, most likely through shared inventory ("splits"), will be required. But unlike linear programming, where the content provider and the service provider can each manage insertion of their own ads, the delivery path of non-linear (unicast) content is controlled entirely by the service provider; neither broadcast nor cable networks can independently place ads in non-linear programming, nor can they achieve any serious degree of addressability on their own.

As a result, service providers have an opportunity to turn an investment in ad placement infrastructure into a lucrative new business, offering ad placement services to content providers (broadcasters and cable programmers) who hold the rights to a far larger inventory pool. So while a service provider stands to derive incremental direct revenue from the deployment of new, non-linear advertising inventory, there is considerable revenue generation potential from partnering with broadcasters and cable programmers to place targeted ads on their behalf. Cisco is enabling these forward-looking business models with new infrastructure solutions for advanced advertising, in particular those based on the new Society of Cable Telecommunications Engineers (SCTE)-130 standard, which Cisco co-authored.

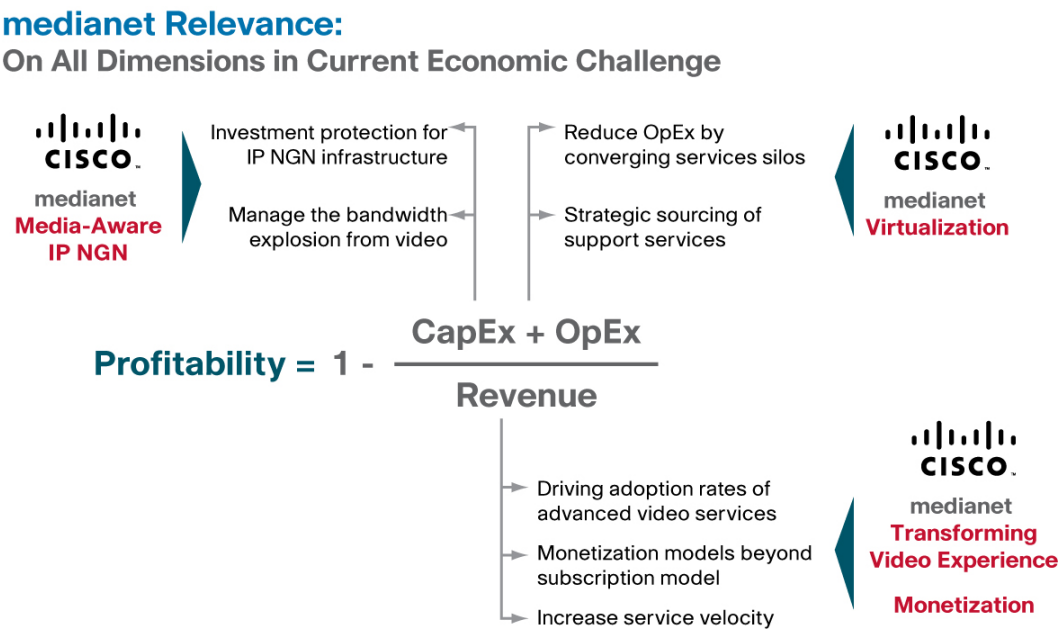
New Tools to Navigate Challenging Economic Times

To compete for customers and market share, service providers must continually invest in new capabilities and services. At the same time, service providers are not immune to challenges in the global economic environment. Fortunately, service providers don't have to choose between next-generation capabilities and next-generation efficiencies. By building a medianet with Cisco media-aware technologies, service providers can optimize all aspects of their overall business profitability. (Figure 11.) Cisco can help service providers:

- **Reduce CapEx:** Cisco can provide a comprehensive suite of intelligent IP core, distribution, and contribution network solutions that allow service providers to manage exploding bandwidth requirements more effectively and deliver more content, more efficiently. Additionally, a media-aware Cisco IP NGN is a highly flexible, scalable, standards-based medianet platform that can continually adapt to new services and requirements, providing ongoing investment protection.

- **Reduce OpEx:** Cisco content distribution, virtualization, and data center solutions provide unprecedented flexibility to converge operational silos and increase efficiency.
- **Increase revenues:** With the ability to offer a more personal, social, and interactive media experience, service providers can drive adoption rates of advanced video services. Innovative Cisco content delivery and virtualization technologies also accelerate service velocity, allowing service providers to scale new services to multiple markets simultaneously. And, a medianet that integrates Cisco IP intelligence end to end can support new business relationships, revenue models, and advanced advertising opportunities.

Figure 11. Enhancing Overall Profitability with Cisco



Benefits of medianet Technologies

Cisco IP technologies can deliver a broad range of medianet benefits for both service providers and their customers. For service providers, these technologies can:

- Provide a differentiated user experience with more content, control, and personalization
- Increase efficiency and reduce costs by collapsing operational silos
- Improve scalability by virtualizing content, infrastructure, and services, allowing operators to efficiently deliver more content to more subscribers
- Increase service velocity by allowing the launch of new services simultaneously in multiple markets or to national or transnational audiences
- Dramatically expand advertising opportunities and revenue models
- Successfully navigate challenging economic times
- Provide long-term flexibility to adapt to evolving business models and changing customer demands

At the same time, customers served by a medianet built on Cisco IP technologies gain:

- Access to vastly expanded content and services
- Dynamic media and rich applications available anywhere, on any screen
- Personalized media experiences shaped around their unique preferences and needs
- Consistent high quality and excellent performance
- Rich interactivity and social networking capabilities
- Faster access to new applications and services

Conclusion

As service providers strive to deliver the rich personal, social, and interactive media experiences their customers demand, they face a world of new technical, operational, and economic challenges. Those service providers that can meet these challenges and become true “experience providers” have an unprecedented opportunity to cement their place as market leaders in the next generation of groundbreaking media services.

Only Cisco can provide an end-to-end medianet to address the full range of service provider needs and fully deliver on the promise of the Connected Life. With a media-aware Cisco IP network architecture, service providers can transform the customer media experience, deliver unmatched quality and performance, accelerate service velocity across vast geographies, and unlock lucrative new revenue opportunities.

For more information about medianet-enabled Cisco IP technologies, visit: http://www.cisco.com/go/sp/medianet.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

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