



## Video 2.0 and the Changing Face of Cable Networks: The Experience Paradigm Shifts Again





Change triggers more change when trends never imagined by the architect of a single innovation begin to appear—and change paralyzes companies that remain rooted in the past. While some companies adapt successfully to new technologies, others falter. Such is the nature of business whenever the paradigm shifts.

Recognizing a shifting paradigm is critical to dealing with it. Maintaining success requires changing the way things are done. Over the past 18 months, a new paradigm swing in video-based entertainment what Cisco calls the Video 2.0 experience—has made old business models obsolete and created entirely new ways to view content. The video experience will never be the same again, and new capabilities in the IP next-generation network (IP NGN) will be required to deliver on the promise of this new technology swing.

## Following the Money

Today's video subscribers want choices, personalization, community-based content sharing, and instant gratification. No longer content to be just viewers, they are now producers or distributors in their own right, empowered by the worldwide IP network. People no longer buy CDs to get a single song or book appointments around the 8 pm broadcast of their favorite television show.

The Apple iTunes service—with over a billion downloads a year—demonstrated unequivocally that digital distribution not only works but also can reach new customers. Download-to-own television and podcasts followed with time-shifted programming to a device other than the television, while Comcast's own on-demand digital TV service has reached more than 3 billion cumulative video-on-demand (VoD) streams in just 2 years since 2004. Time-shifted viewing—what you want when you want it—is changing the way people watch video. Even the major broadcasters are posting their most popular TV shows to Websites moments after they are seen on network television.

Then there was YouTube, a phenomenon from nowhere that, mere months after going live, culminated in a \$1.65 billion acquisition by Google. YouTube, with an estimated 120 million video streams downloaded daily by an estimated 6.2 million<sup>1</sup> daily Internet visitors, has changed video distribution and viewing forever.



## Person-to-Person Content

Person-to-person video community-based sites have created an entirely new interactive forum as well as a virtual worldwide independent video network with free content coming from anywhere. YouTube offers viewers an opportunity to instantly self-publish and push their production to millions of people, who can share it, chat about it, and spend hours watching it—eyes that are literally glued to Internet-enabled screens.

This kind of stickiness offers opportunities for advertising across televisions; PCs; cell phones; personal digital assistants (PDAs); iPods; Xboxes; or a host of newly conceived interactive platforms that can search, browse, download, or host new forms of video independent of broadcast content. The world of many services to many screens is a reality, and video is leading the way.

## Video 2.0 Cuts the Cord to the TV Set

The Video 2.0 paradigm shift is rooted in the evolution of the Internet to Web 2.0—a migration from an Internet that relied upon static published content to one that makes use of interactive or two-way communication. Video 2.0 is interactive, whereas broadcasts and downloads operate on a one-way and “one-size-fits-all” model. Today's content is personalized. Subscribers can pick, choose, download, upload, critique, and eliminate content choices at will. Video 2.0 content can be created, indexed, and reviewed by subscribers, and the content has become as compelling as some Hollywood productions.

A universe of personalized rich media cannot be tamed by traditional broadcast and cable networks or their time slot programming directors. New generations of technology exacerbate the challenge by offering new devices, portability, access from anywhere, and forms of personalization that accelerate massive change in viewing, production, and distribution. The IP network must make it all work together to maintain an integrated video and visual experience.

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<sup>1</sup> September 2006.



## Video 2.0 Is Multidimensional

The Video 2.0 experience is multifaceted, offering an endless array of IP-enabled entertainment. Content that is just a click away using Internet TV through Slingbox or community sites such as YouTube and MySpace, interactive gaming sites, managed services such as iTunes, and broadcast networks from ABC to BBC or the cable networks of Comcast, Time Warner, or Cox—all these are part of the expanded Video 2.0 pool of entertainment. Network television becomes just one more interactive, personalized experience.

But Video 2.0 encompasses so much more by including business users too. Much of this video content is for consumers. Yet business video is equally as important to the “anything-to-anywhere” Video 2.0 experience and offers business subscribers ways to connect, communicate, and collaborate through telepresence, video-enabled chat, video conferencing, unified communications, or vertical applications such as distance learning and remote medical diagnosis.

## The Cisco IP NGN: Enabling New Video 2.0 Services

The Video 2.0 paradigm shift requires an IP NGN that is capable of defining, preserving, and realizing video to retain the visual experience for the viewer—regardless of access network, application, or device. Cisco® enables a connected life over its end-to-end IP NGN solution that is crafted to deal with the paradigm shift to Video 2.0.

### New Video 2.0 Requirements

Competitors' IP networks may be capable of getting content from one place to another, but in a Video 2.0 world so much more is needed—and possible. As video broadcast, on-demand viewing, and advertising content travels from a national center or headend to a metropolitan or regional center, local programming or advertising can be injected for local audiences. Scientific Atlanta, a Cisco company, offers a headend solution that is powerful and flexible and enhances the overall visual experience by transmitting the greatest number of channels with the best image quality and best possible bandwidth efficiency.

Enhancing IP networks with the Cisco Content Delivery System (CDS) allows providers to manage and deliver any content, on demand, to anywhere or any device—streaming to PCs, PDAs, iPods, cell phones, and so on—while offering capabilities to manage bandwidth constraints and screen displays that maintain the integrity of the video stream for each viewer. The Cisco CDS manages content diversity whether it is pushing content—such as broadcast—or pulling individualized content instantly to support niche or long-tail requests for individuals or small demographics.

VoD requests, Web requests, gaming sessions, or even individualized advertising are all possible. Network Personal Video Recorder (nPVR) support offers time shifting for viewers while allowing providers to use the network instead of expensive customer premises equipment (CPE) to offer trials of new services, thereby reducing expense when offering new services.



This fully distributed, real-time content delivery system offers scale and resiliency that allow providers to target individual users or small communities with selected promotions by injecting customized ads into the programming stream, reaching new levels of personalization. By prepositioning frequently used content at the network edge and using innovative streaming technology, it can rapidly fetch and send any media to any device. This programmable solution uses splicing techniques that are faster than real time, recompiling content in real time to meet the needs of single viewers or unique communities.


At the same time, today's subscribers are also demanding greater linear programming options than were available in the past. To meet their needs, Switched Digital Video (SDV) technology is enabling cable operators to get additional bandwidth efficiency out of the cable system Hybrid Fiber Coax (HFC) plant, enabling them to offer diverse ethnic programming tiers; more high-definition channels and content; and advertising systems that can target subscribers by demographics, physical location, or device type. Together, the Cisco CDS and switched digital video deliver a rich, extensive, and personalized Video 2.0 experience.

### Providing a Superior Quality of Experience

Cable operators will be judged not on the services they provide but on the experiences they deliver. Successful will be those that transition themselves to become experience providers. Those that do will be rewarded with superior customer loyalty and premium margins. Video has become an important aspect of today's human experience.

As video traverses the routers and switches of an IP network, an end-to-end system preserves the integrity of the visual experience for all subscribers.

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A person is holding a mobile phone with a data table on the screen. The background is a blurred outdoor scene with people walking. The phone screen displays a table with columns for 'Service Type', 'Priority', and 'Bandwidth'.

Cisco Dynamic Flow Control (DFC) is a service-control engineering solution for cable operators, which focus on real-time bandwidth allocation for shaping end-user traffic. The solution enables new Video 2.0 services, while helping ensure quality of experience for subscribers. DFC extends the availability of the network's most valuable resource—its bandwidth capacity. The infrastructure of the DFC solution includes PacketCable™ Multimedia (PCMM) technology in conjunction with Deep Packet Inspection (DPI), both of which are needed to deliver bandwidth-controlled services to the end user.

DFC provides application awareness, permitting service prioritization of any content from or to any device applied on a per-service basis and allowing the network to elevate the priority of voice over IP (VoIP) or video services that cannot sustain latency or elevate priority on a per-subscriber basis for fee-paid service-enhanced performance.

Dynamic Flow Control is enabled over Cisco IP NGN transport, which includes a full suite of products, ranging from the Cisco 7600 Series Routers at the edge to the Cisco CRS-1 Carrier Routing System at the core to manage unified quadruple-play (video, voice, data, and mobility) service delivery. The Cisco ONS 15454 Multiservice Transport Platform (MSTP) provides the optical underpinnings of the IP NGN and delivers any service type to any location in a regional or national dense wavelength-division multiplexing (DWDM) network. It also includes Cisco IP over DWDM (IPoDWDM) capabilities that work in conjunction with Cisco routing platforms; IPoDWDM integrates transponders into IP NGN routing platforms for lower capital expenditures (CapEx) and operating expenses (OpEx), simplifies the control plane and the management plane, and increases overall network reliability.

## Delivering Many Services to Many Screens

The dynamics that comprise the Video 2.0 environment require content to be viewed across any number of screens. We call this the “connected life,” where many services can be consumed on many devices anywhere and anytime. The experience provider delivers this connected life to its customers. IP-enabled solutions must overcome a plethora of problems ranging from simple bandwidth management—moving from standard-definition TV (SDTV) or high-definition TV (HDTV) across mobile, Wi-Fi, cable, and wireline networks—to telepresence solutions, where large screens must capture life-size personalities and present every nuance to the viewer while offering simultaneous voice to maintain the integrity of this “almost-there” encounter.

Cisco offers a variety of set-top box (STB) options such as direct-to-disk content transfer that allow subscribers to immediately create DVDs directly from their STB while watching a pay-per-view session. Linksys®, a division of Cisco, offers a complete set of home-connectivity options to further provide for the connected life experience.

Video-enabled iPods, Xboxes, cell phones, PDAs, PCs, and laptops all have peculiar presentation requirements to maintain, control, and present content as expected to a viewer. On and off does not work in an IP world that must accommodate pause, fast forward, and rewind—all done in real time. But the end-to-end Cisco IP NGN solution can accommodate the complexities of the Video 2.0 world order.

The reach of Video 2.0 is incomplete unless it encompasses the world of business too. Innovative new technologies, such as Cisco TelePresence, combine rich audio, high-definition video, and interactive elements that work together to deliver a “virtually there” in-person experience over the IP network. Cisco TelePresence offers a lifelike visual experience linking people to people, connecting them with each other across places to experience events in their personal and professional lives.

Simplistic networks beware: viewers’ devices must remain lightweight. They cannot be burdened with “heavy smarts” to be Video 2.0-ready. Intelligence in the network is required to coordinate bandwidth, prioritize services, and manage both sourcing and delivery while scaling to meet each subscriber’s request for content on demand. All this requires closely managing control and delivery capabilities to help ensure applications run as each subscriber expects. The Video 2.0 quality of experience dynamic is more complex than ever before, and IP network advances must keep up as the paradigm shifts to allow providers to succeed in their mission. IP networks cannot remain rooted in the past.

## Join the Human Network

The Cisco IP NGN is designed to meet the emerging requirements of a viewer’s world now defined by Video 2.0. The architects of the Cisco IP NGN, however, recognize that IP networking is not static; it is dynamic, ever changing. One thing is certain: the experience paradigm will shift again, and new evolutions will require that the network be flexible enough to keep pace with them. The Cisco IP NGN is committed to keeping up, to evolving, and to changing in order to meet the needs of your customers who want to live a connected life that joins them to the human network.



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