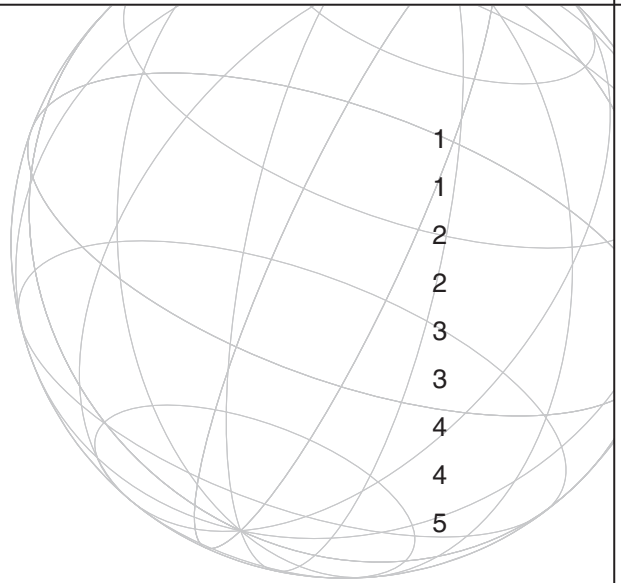


**Breaking the Continuum - Real TVoIP
Applications for Today**

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Lights! Camera! Action! Action? Where's the action? There has been a lot of talk about deploying IP-based video services to consumers, but so far there has not been much action. Many in the industry have been afflicted unawares by "channelthink"—the perceived need to reproduce in the television over IP (TVoIP) realm the legacy concept of television channels. Channelthink has held back the deployment of alternatives to terrestrial HFC or direct broadcast satellite (DBS) distribution systems.

Service providers clearly need to meet and exceed existing cable TV and DBS offerings, but trying to emulate the traditional channel-based model by distributing real-time network feeds captured from air may not be the best way to do this. Often, service providers try to differentiate themselves with service models that require tens or even hundreds of megabits-per-second of downstream bandwidth to deliver legacy television channel programming with premium video quality as well as a wide variety of high-definition—and high-bandwidth—content. Downstream DSL bandwidth of 24 Mbps can easily support two high-definition TV (HDTV) streams (each at roughly 8 Mbps) for blockbuster service offerings, plus concurrent voice over IP (VoIP) and Internet access. However, service providers may be missing out on the opportunity to differentiate themselves by offering alternate, quicker-to-market, billing-based service models for low-definition content.

The reality is that a great deal of television content, especially lower-cost content from the back of the vaults, is low definition and does not warrant high-definition bandwidth in the access network. Implicit in this fact is that service providers can start to source content directly from the production studios. The legacy television-channel model is predicated on the idea that the daily programming schedule runs in a continuum from just before dawn to the wee hours of the next morning, and that advertising revenues alone fund programming development. While program ratings certainly play a part, in general, certain segments of the continuum command advertising premiums. Service providers may fear that by breaking the continuum, that is, by not following the legacy television-channel model, the advertising dollars that fund content diversity will dry up. 'Channelthink' need not be terminal, however. Contrary to widespread belief, service providers that wean themselves from 'channelthink' can immediately implement a variety of revenue-generating service models that successfully break the continuum while maximizing the amount of programming they can offer over available bandwidth.

Breaking the Continuum

Most television shows are not broadcast 'live;' what many people think of as 'live TV' is mostly pre-recorded content. Even 'live' shows are recorded for replay in other time zones. Anyone who has seen Saturday Night Live in its West coast time slot has noticed the message 'pre-recorded from an earlier broadcast' across the opening credits. Most television content is pre-recorded and simply played back in real time somewhere along the daily continuum. With the exception of live sporting events, news, and pre-emptive programming, the bulk of 'live TV' has much more in common with video on demand (VOD), which is normally thought of only for feature films, than immediately meets the eye. VOD is really a TVoIP primitive—a base function that can be leveraged for a variety of higher-level applications.

This concept allows service providers a whole new perspective—virtually any type of programming can be video on demand, or rather programming on demand (POD.) Freed from the traditional concept that video services equate solely to live network feeds and television channels, service providers can open the doors to new concepts of television service and new applications.

Instead of building a channel-based infrastructure, service providers can start using the bandwidth they have today to generate additional revenues from television services. Service providers can use existing technology to store pre-recorded content obtained from studios in advance and use it in a variety of service models, in addition to broadcasting in real-time according to published schedules. New revenue-sharing models that split POD revenue with the studios will supplant royalty fees paid for by advertising revenue. 'Loss-leader' programs may be billed to their narrow market segments at a price that reflects true production costs, without being subsidized by high-margin content.

Current Technology Supports TVoIP

The near-term service models for TVoIP are rooted in the key functionalities of its four main components: the encoder, the server farm, the set-top box, and middleware. The encoder is a head-end device that works as a media gateway; video content arrives at the encoder before it is distributed throughout the network. If the signal arrives in analog form, the encoder encodes it into digital format (e.g., MPEG, Windows Media) for transmission on the IP network. If the signal arrives in digital format, such as DVB, the encoder demodulates, de-multiplexes, and transcodes the signal, as necessary.

The server farm component of the TVoIP model provides a host location for pre-recorded television content as well as feature films. The server farm also enables a 'network personal video recorder (PVR)' function that enables the viewer to rewind, fast-forward, and replay television programming stored on the server farm.

The set-top box is the subscriber interface to the TVoIP system, receiving the media stream and decoding it for display on a television set. Typically the set-top box receives the stream via a customer premise equipment (CPE) device such as an asymmetric digital subscriber line (ADSL) modem. The box's user interface lets customers interact with video servers. Finally, an analog interface for analog TV sets—which still predominate today—provides a smooth transition from analog TV to digital TV.

Middleware is the software that integrates the various parts of TVoIP into a complete system. It handles media asset management, channel management and scheduling, billing, security and conditional access, system management, and other management functions.

TVoIP services are enabled by many other factors as well, including the maturation of IP Quality of Service (QoS) mechanisms, video compression algorithms, and increased functionality in the mobile phone handset, including pictures and video.

Existing Applications, New Twists

While TVoIP technology holds great promise for new applications, service providers can use it now to put new twists on existing applications by taking advantage of the two most universally accepted user interfaces—the telephone keypad and the television remote control. Combining these familiar interfaces with existing applications and the power of TVoIP technology provides opportunities for a myriad of new service models, including the three explored in detail below.

The ‘Spend Once, Spend Twice’ Model

Anyone who has ever purchased a compact disc to replace a long-play record is familiar with the ‘spend once, spend twice’ model. A true audiophile of a certain age may have purchased the same recording by a favorite artist on eight-track, cassette, LP, CD, and finally, downloaded a single or two off the album from an online music store. Allowing a customer to repeat an enjoyable spending experience may be among the easiest transactions to close.

This service model adapts extremely well to video content. Imagine a couple at home selecting their evening’s entertainment from the POD choices available on their TV screen. Using the remote control, they scroll the choices and agree on and select a feature film. As the credits start to roll at the end of the film, a message appears on the screen offering the couple a chance to purchase a copy of the movie for download to their set-top-box for future repeat viewing. Perhaps the price of the download is less than the price of POD playback from the network, as local playback from the set-top-box is less taxing to the network. Perhaps the carrier offers a discounted price on a sliding scale commensurate with the time elapsed to make a purchase decision. A ticker scrolls across the screen as the discounted price increases, and the couple watches their discount start to evaporate. Once content is downloaded, a menu might offer to mark it as archived for indefinite repeat viewing.

Further still, imagine the couple enjoyed the movie so much that they want a relative to view it. The carrier could give them the option to purchase a copy and prompt them for the relative’s phone number so the network can download the content to the relative’s set-top-box. The network need not even wait until the end of the presentation to offer the viewer a chance to purchase the content for someone else—the choice could be offered anywhere in the selection process.

Everyone Benefits

Now, what benefits has TVoIP provided our happy couple that current alternatives do not? They have broken free of the daily programming continuum. They do not have to make trips to the video store to pick up and return cassettes or DVDs every time they want to see a movie, and they do not have to mail DVDs back to the rental company. The couple does not have to deal with the clutter of rented cassettes and DVDs, or find storage space for the videos they have purchased, because content is stored invisibly in the server farm or set top box when they are not viewing it. Finally, they can purchase and deliver a digital video gift certificate with just a few clicks of the remote.

Service providers benefit by realizing revenues from the ‘spend once, spend twice’ model that they would not otherwise be able to capture. Service providers also have an opportunity to capture money spent on late fees at brick-and-mortar video rental stores. (Industry anecdotes indicate that late fees represent 25 percent of a bricks-and-mortar video rental firm’s revenue.) In addition, service providers can gain a new revenue stream from subscribers who previously purchased movies for repeat viewing at home.

All of these revenues can be realized from a service model that leverages the existing TV remote control and a simple interface to enable customers to spend once, twice, and possibly thrice, for the same content.

The Archived Broadcast Model

Another TVoIP service model can be derived from current in-home PVRs that offer a ‘time-shifted television’ function. These recorders can pause, re-wind, and fast-forward through real-time television, and they can also record real-time television programs according to the network’s schedule and play them back when convenient for the subscriber.

The ‘archived broadcast’ model goes a step beyond time-shifted TV. In this model, the network server farm archives real-time TV programming, or is loaded with programming in digital form direct from the studios, and makes the content available to subscribers as POD content. For example, a service provider could acquire a complete library of the most popular television series of the last 20 years. For a fee—similar to renting the series on DVD from the video store—subscribers could view a series such as M*A*S*H or The Sopranos from beginning to end, without missing any episodes, order an entire season of their favorite program for playback at their own convenience, or just play the one or two episodes they missed during the regular season. Subscribers are freed from the schedules of the real-time television continuum and gain opportunities to view a program they forgot to set the PVR for in advance.

This model offers subscribers many more programming choices than previously available. Many cable providers repeat just a few programs throughout the day, while the archived content lets subscribers select from a huge variety of programming—on their own schedule. And the service gives providers another opportunity to re-sell product already in hand for an incremental fee.

The Remote Preview Model

The ability to deliver video to the mobile phone handset might leave one wondering just what to do with the capability. Will the family gather around the mobile phone to watch the latest Walt Disney feature? Not likely. However, this capability can be the basis for yet another TVoIP service model, one that uses video to the handset as a teaser for other services within the network. The remote preview model converges the familiar functions of the TV remote with the mobile phone handset to create a truly remote, take-anywhere unit that can control the home entertainment center.

Imagine a business traveler, a single businesswoman away from home for the week. Because she travels so much, she rarely gets to see movies in a theatre, and on this particular week, she is anticipating the release-to-IP of a particular feature. Before leaving on her business trip, she sets up an alert, perhaps through a Web page interface, for her service provider to notify her mobile phone when the movie becomes available. While on the road, she receives the alert and is able to see a preview of the movie on her handset from her hotel room. The network also offers previews of other features with the same actor, or with similar themes, that she has not previously viewed. Using her handset as an interface, she selects the movies she wants downloaded to her set-top-box (at a time convenient to the network) so that they are available to her upon her return home. In the case of a network storage model, perhaps she receives an early-bird discount for making the purchase commitment immediately upon release-to-IP, upon which funds from her account are immediately debited and credited to the service provider.

Video previews would also be of interest to parents. Picture a couple enjoying a night out on the town while they leave their two children with a babysitter. The children want to see a movie, but are not permitted to watch without their parents’ consent. Mom and Dad pull up a preview of the movie on their mobile remote before giving the babysitter consent to play the movie for their children. This consent also serves as billing consent.

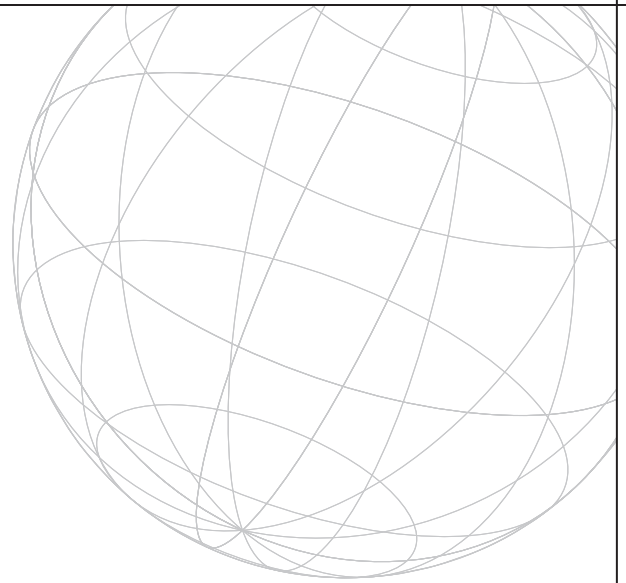
Subscribers will appreciate the convenience of receiving timely notification of the availability of content in which they are interested. Plus they can control delivery of entertainment services no matter where they are located. The result: a richer, broader entertainment experience, in which subscribers do not miss programming of interest just because they are not in front of the entertainment center.

Once again, a new service model offers opportunities for revenues for the service provider. The mobile remote creates greater opportunity for customer touch points and therefore new purchase opportunities. Less obvious may be the idea of billing subscribers for airtime used while previewing video programming. Further, there may be opportunities to shift network load to off-peak hours in a manner transparent to the subscriber.

TVoIP Comes of Age

The mechanisms for delivering TVoIP are ready for prime time, and the capabilities of the technology are changing the way the people view and think about television. As new service models are developed, the traditional concept of television channels and the daily programming continuum are becoming as outdated as the console televisions of the 1950s. Finally, the closing credits are rolling on channelthink.

Some of the earliest new service models are the simplest, where the magic is not so much in the technology or available bandwidth, but in the service and billing model. In the past, Hollywood used low-tech special effects and creative camera work to achieve great impact on screen. So it is that service providers today can combine some fundamental technology components with ingenuity to dazzle subscribers.



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