



The Migration to All-Digital Video Networks



Service providers continue to migrate to all-digital networks, and they are increasingly deploying digital set-tops to improve operations and to offer higher-value services to subscribers. However, few service providers today are building “greenfield” networks where they do not have to take into account investments in existing analog services.

The reality is that most service providers seek to deploy all-digital services to as many subscribers as possible while continuing to derive revenues from analog subscribers. Migrations to all-digital networks are inevitable, but they are also gradual. The challenge, therefore, is to smooth the migration to all-digital networks by motivating subscribers to take advantage of the entertainment benefits of all digital services. Motorola offers easy-to-use all-digital set-tops that can be deployed in the home so subscribers can take advantage of the rich digital applications and services that service providers can make available.

SHIFTING FROM ANALOG

Subscribers to analog services receive traditional programming channels as well as optional premium channels. Analog channels consume ten times more bandwidth than digital channels and leave service providers with limited abilities to offer higher-value premium services.

Many subscribers have become accustomed to analog channels, and many of them continue to receive services without using a set-top. They just plug their television into the coax cable connection within the home and receive analog services.

With digital cable, service providers are able to offer greater choice and better quality than with analog cable programming. Service providers use digital technology to compress video signals, allowing more than one program to be carried in the bandwidth space normally required for one analog channel. Typically, the signal is sent to the home and decompressed in the set-top for display on the television.

Service providers face the challenge of showing subscribers the exciting advantages of digital services so they can motivate subscribers to upgrade their services to digital packages. This will not only deliver an enhanced entertainment experience to the subscribers, it will also allow service providers over time to reduce operational costs and deliver more channels and services to subscribers.

MIGRATING TO DIGITAL

All digital set-tops will encourage subscribers to select more services—and to select higher-value services.

A shift toward an all-digital network will dramatically increase bandwidth efficiency for service providers. By deploying a set-top at a subscriber's location, each six MHz channel can carry ten or more digital channels instead of a single analog channel. Converting networks to all digital is filled with challenges ranging from customer acceptance to cost; therefore, the logical transition is to first implement digital simulcast, where analog channels are simultaneously carried in the digital tier.

Service providers can convert analog content at the master headend by receiving satellite content in analog format and digitizing it into MPEG 2 content, or by receiving content in digital format from satellite and converting it to a transmission format more suitable for HFC networks. Digital simulcasting offers significant capital and operating benefits. By converting analog programming to digital at the headend and providing subscribers both the digital versions and original analog versions from the network edge, a service provider can converge its video transport to a single tier, resulting in significant operational savings.

At the same time, a service provider can deploy less costly and more secure all-digital set-tops for new and existing subscribers and prepare for next-generation digital service offerings. Even though this requires more bandwidth in the interim, it provides a smooth migration path for subscribers and service providers.

Digital channels make dramatically more efficient use of downstream Radio Frequency (RF) spectrum, and digital simulcast allows service providers to protect revenue streams coming from analog subscribers while providing the time to offer promotions that motivate analog subscribers to upgrade to all-digital services. Service providers can also protect advertising revenue streams. Advertisements can be spliced into the digital content using digital advertising insertion servers. This allows service providers to continue to sell highly targeted local ads as they migrate from analog to digital infrastructure.

The migration to digital also allows service providers to improve picture quality. Encoding analog content and transporting it digitally results in higher video quality because digital video signals can be re-generated an unlimited number of times without degradation, while analog transmissions accumulate noise over long distances.

DEPLOYING ALL-DIGITAL SET-TOPS

All-digital set-tops will encourage subscribers to select more services—and to select higher-value services. This will increase revenues and prepare service providers for the migration to all-digital networks.

Implementing digital simulcast reduces the cost of set-tops, since service providers can deploy all-digital set-tops without the cost and overhead of analog set-top technology. This approach can also result in smaller and more attractive set-tops that will be more widely accepted by consumers.

By implementing digital simulcast, service providers will be able to design and implement a smooth migration to all-digital services. They will be able to offer additional channels and enhanced entertainment options that encourage brand loyalty and protect the installed base of subscribers from encroachment by satellite operators. As more and more subscribers use all-digital set-tops, it will be easier and more cost effective to sunset analog services and migrate to all-digital infrastructure and services.

BENEFITS OF ALL-DIGITAL NETWORKS

Deploying all-digital set-tops allows service providers to take advantage of digital simulcast today while preparing for all-digital services in the future. Service providers can immediately take advantage of the economic benefits of digital services, and subscribers can take advantage of more channels, additional programming options, and enhanced video services.

The following are some of the many advantages and features that can be realized by deploying all-digital set-tops:

Lower CPE Cost — Advanced set-top features, such as HDTV and DVR, are critical to attracting and retaining subscribers. At the same time, service providers are under pressure to reduce CAPEX. Eliminating the analog capabilities of the set-top lowers the cost by 8% to 47% without any sacrifice to the functionality provided to the subscriber.

Digital Video Recording (DVR) — Subscribers can record, store, and play back digital video using a single platform. Digital programming is stored on a hard drive and dual-tuner functionality allows subscribers to do multiple things at the same time, such as watching a live program while recording another, recording two programs that are on at the same time, or watching a previously recorded program while recording another.

Video on Demand (VOD) — Service providers can offer high-value VOD services that provide subscribers with maximum control over when-and-what they watch on their televisions. They can access extensive libraries of VOD content and download the programming, movies, and shows they want to watch—whenever they want to watch them.

High-Definition (HD) Television — Service providers can offer HD services that provide high-resolution video and theater-like sound to create a movie theater-quality television viewing experience. HD offers an increase in picture quality by providing up to 1,920 active horizontal pixels by 1,080 active scanning lines, representing an image resolution of more than two million pixels. In addition to providing improved picture quality with more visible detail, HD offers a widescreen format and digital surround sound.

Improved Audio Quality — Both Standard Definition (SD) and HD digital channels provide improved audio quality and a better listening experience to subscribers. Service providers can even offer CD-quality music channels that allow subscribers to listen to music through their home theater surround sound systems.

Improved Picture Quality — Subscribers will become accustomed to the higher resolutions and improved picture quality available on HD digital channels.

Interactive Services — Service providers can offer more sophisticated interactive services that increasingly put the control of content directly into the hands of subscribers so they can watch what they want, when they want to watch it. VOD, DVR, and programming guides are early examples of interactive services offered, but all-digital networks will create opportunities for additional interactive services that create lasting bonds with subscribers.

Follow Me TV™ Solutions — Subscribers can move personal or purchased digital content from one device to another. By implementing Follow Me TV, a user can transparently access stored digital entertainment—whether it is high-definition video on a DVR, music on a computer, or pictures on a digital camera—from any connected device in the home. This Follow Me TV solution allows subscribers to control where, when, and via what devices they will become informed, connected, and entertained.

Media Mobility — Control over in-home programming does not need to be limited to when the consumer is at home. Service providers will be able to enable Media Mobility and allow consumers to control DVR options from a cell phone from anywhere in the world. In seconds, a cell phone user will be able to review available content and schedule the recording of selected programming.

Programming Guides — Service providers can offer customized programming guides that provide information on available programming, as well as information on stored content available via VOD.

Bandwidth Efficiency — Service providers can drive down operational costs by delivering more content and services to residential subscribers. For example, an operator could fit approximately ten digital channels within the bandwidth typically consumed by a single analog channel. A service provider could also fit 2.5 to 3 HDTV channels into the bandwidth typically reserved for a single analog channel.

Theft Reduction — The use of encryption technology protects service providers from piracy. All-digital set-tops include keys that allow them to authenticate against the service provider's headend infrastructure to ensure that only paying customers receive services.

Near-Endless Programming Options — All-digital set-tops provide seemingly unlimited capabilities to deliver diverse programming. Service providers can offer programming bundles that allow subscribers to select the service packages they prefer, and they can offer new content to increase revenues.

The transition from analog programming to digital programming is crucial to the evolution of next-generation video technologies. All-digital set-tops are central to this migration. They allow subscribers to reap the benefits, in the form of new applications and services, that can only be made available on all-digital platforms.

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MOTOROLA DRIVES THE TRANSITION WITH ALL-DIGITAL SET-TOP PLATFORMS

Since Motorola Connected Home Solutions introduced the industry's first all-digital set-top in 2004, Motorola's hardware and software technologies have enabled leading service providers to offer an exceptional level of entertainment service to their subscribers. Prominent and progressive service providers are leveraging Motorola all-digital platforms to deliver digital entertainment experiences into consumer homes that previously either did not have digital or had it in a limited fashion.

The Motorola all-digital platforms are designed to provide service providers with a cost-effective means of deploying advanced video services along with the high-quality picture experience that subscribers expect from digital offerings. Motorola's set-tops are part of Motorola's robust portfolio of offerings and highlight Motorola's commitment to the nationwide transition to all-digital television broadcasts.

Motorola's all-digital set-tops support advanced technology applications such as DVR, HD, and the seamless sharing of stored digital entertainment. In the future, consumers will be able to enjoy access to their stored personal media. For service providers, the benefits gained from an all-digital set-top include increased bandwidth for HD and VOD content and a reduction in the theft of video services.

The Motorola all-digital set-top family is the natural choice for any service provider seeking to deploy advanced digital services. Motorola's heritage of set-top leadership and experience in building and supporting end-to-end networks is a primary consideration for service providers. Motorola has already shipped over 60 million digital set-tops, and the rapid acceptance of Motorola's set-top solutions is an endorsement of the inherent advantages of an all-digital strategy. Service providers are increasingly leveraging Motorola set-tops to realize savings by not having to support analog broadcasting, and consumers are realizing the benefits of digital's vast programming options and advanced features.

WIDE RANGE OF SET-TOP CHOICES

Motorola continues to expand its set-top portfolio to meet the changing needs of its customers and evolving technologies. The Motorola heritage DCT set-top product line offers legacy solutions with embedded conditional access (CA) security. These set-tops have a large deployed base throughout North America. With the July 2007 mandate for separable security, Motorola introduced and began shipping the DCH set-top product line, which added M-Card functionality for separable security and compliance with the mandate. Both the DCT and DCH lines offer analog/digital and all digital variants.

Most recently, Motorola has introduced its latest and most advanced M-Card, set-top product line: DCX. Aligning with industry trends, these set-tops are all-digital and offer a combination of MPEG-2 and MPEG-4 video decoders as well as advanced audio codecs. Additionally, these products have increased memory and CPU to run more compelling applications. The products utilize a 1 GHz tuner for increased bandwidth and a MoCA option for Follow Me TV and home networking.

ALL-DIGITAL SOLUTIONS FROM MOTOROLA

Motorola is driving the development of products that support the standards of tomorrow's all-digital network architectures. Our all-digital set-tops are already widely deployed worldwide. Motorola continues to develop the next-generation technologies that allow service providers to offer high-value programming choices. Solutions from Motorola create seamless connections to entertainment choices.

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Insight: Motorola's history of being involved in every aspect of broadband services delivery provides us with a solid working knowledge of broadband technologies, networks, service providers, and consumer requirements around the globe. This makes us best able to recognize the trends and issues that will impact cable operators as they migrate toward all-digital networks.

Innovation: Motorola continuously analyzes how new technologies and broadband services can improve the lives of end-users, and we act to deliver smart new solutions that work seamlessly together to create great broadband lifestyles.

Proven Solutions: Motorola has an unparalleled record for helping service providers build and grow their businesses. Regardless of the service or the unique requirements or the region, market, or consumer, we have consistently demonstrated our ability to deliver on the promise of the connected home.

All-digital set-tops are crucial to digital migration strategies, and Motorola Connected Home Solutions continues to pioneer new products and solutions that allow service providers to:

- Attract and retain more subscribers
- Derive more revenue from each subscriber
- Reduce the cost to serve subscribers

For more information about Motorola Connected Home Solutions and our family of all-digital set-tops, please visit <http://broadband.motorola.com/default.asp>.



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