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DIGITAL DIGEST

A Periodic Journal Providing Market Research From Digital Tech Consulting

IN THIS ISSUE

NEW RESEARCH

This market research digest is designed to give you a glimpse of some of the research that Digital Tech Consulting is preparing for publication. Here is some upcoming research from DTC:

Content Protection and Management in the Consumer Digital Era, coming summer 2002.

For more information and a copy of the table of contents, please call 214.915.0930 or visit us online at: www.dtcreports.com.

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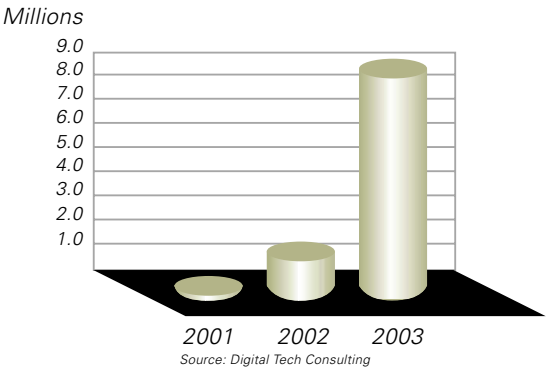
Wireless Video and MPEG-4

The promise of receiving digital video over a multitude of devices is driving many industries to carefully examine the merits of MPEG-4. But video applications are likely to differ dramatically across devices and it's unlikely that that traditional video programming will be used over advanced wireless networks to handheld devices.

Even though MPEG-4 enabled handset shipments are expected to take off starting in 2003 (chart), DTC believes that it is unlikely that MPEG-4 will be used to stream movies and long-form TV programs to mobile handsets in the near future.

Estimated MPEG-4 Equipped Wireless Devices



Source: Digital Tech Consulting

Instead, much of the initial content for the wireless arena is likely to be Internet content redeployed for wireless handsets – although perhaps altered to better address the limitations of both wireless speeds and handset designs (small screens, hard-to-use keypads, limited controls, occasionally difficult network connections and so on). In general, this content will be short format in length—probably averaging less than one minute long for the next decade or so.

A few applications lend themselves to this hostile environment. Among the key applications expected are movie trailers, video and photo e-mails, animations, games, news shorts and sports scores with video highlights and replays. Additionally, Multimedia Messaging Service (MMS), the multimedia successor to Short Messaging Service (SMS), could be a beneficiary of MPEG-4 because it enhances SMS with content such as voice, photos and eventually, video files.

Although SMS has not gained traction in the U.S.—a high installed base of PCs and Internet access diminishes its appeal here—in other regions, such as parts of Asia, where the phone is the primary Internet access device, SMS is wildly popular. In the second quarter of 2001 alone, users sent more than 54 billion SMS messages worldwide. It is still unclear whether MPEG-4 will be used to create MMS e-mails, or whether other lower-quality or existing solutions will be used. However, MMS will be relatively meaningless from a revenue standpoint until well into 2003.

Beyond MMS, there is any number of potential applications for MPEG-4 in wireless networks. A few, such as pornography and gambling, are proven moneymakers in virtually every medium. Others are repurposed older concepts, such as distance learning on wireless handheld devices. Internet-based storage of video, audio and other digital content is another potential application. Finally, remote medical consultations and real estate sales are only a few of the business- to-business and enterprise applications that could spring up in the next few years.

Continued on page 2

Additionally, because MPEG-4 allows content creators to embed interactive content in video streams, interactive advertisements can be inserted. This creates potential revenue opportunities for content creators and distribution networks. It also could reduce consumer costs by allowing consumers to "opt in" to ads in exchange for lower subscription pricing. Location capabilities being built into wireless networks in the U.S. and elsewhere offers the potential to create location-specific content and advertising. One possible example of this would be where an MPEG-4-encoded movie trailer is sent to cell phone users in cities where the movie is playing.

However, before these potential applications can take flight, proponents face a daunting task in selecting the right MPEG-4 development platforms and systems. These products and services include:

- Handheld software development kits
- Wireless-enabled application servers
- Mobile communications gateways
- Handset development platforms

And beyond simply making the technology work, wireless operators hoping to implement MPEG-4 solutions face a number of other key issues. Among them are digital rights management, interoperability, security and transaction processing.

Digital Content Protection Comes to the Fore

With more than 42 million digital TV subscribers globally and more than 48 million DVD players shipped worldwide during 2001, consumers' ability to render crystal clean copies of digital content is quickly becoming a major area of concern for content owners. The single biggest point of concern is the distribution of digital content over the internet.

But what form should that digital content protection take? The answer to that question impacts decisions for virtually every digital technology. Concerns over digital content protection have helped delay the rollout of digital television in the U.S., fueled a worldwide debate about protecting content on CDs and forced Napster and other digital content-swapping sites to close down.

Currently, public policy lags significantly behind the technical possibilities of the new technologies. With technical innovation evolving so rapidly, several areas of concern remain murky in law. Even the 1998 Digital Millennium Copyright Act (DMCA) (chart) leaves considerable gray area that has yet to be defined. Most significantly, the battle between "fair use" by consumers of digital media and the rights of copyright holders has only intensified since the law was passed.

10 Major Provisions of the DMCA

1. Illegal to circumvent anti-piracy measures in commercial software.
2. Manufacturing, selling and distributing code-cracking software is illegal.
3. Permits cracking of copyright protection devices for the purpose of encryption research, to test computer security and to assess product interoperability.
4. Nonprofit libraries, archives and educational institutions are exempted from anti-circumvention provisions under certain circumstances.
5. The Register of Copyrights must recommend ways to promote distance learning while avoiding copyright infringement as much as possible.
6. Limits copyright infringement liability for Internet service providers (ISPs) for only transmitting information.
7. "Webcasters" are required to pay licensing fees to record companies.
8. ISPs are required to remove material from their users' Web sites if that material appears to constitute copyright infringement.
9. Nonprofit institutions of higher education face limited liability for copy right infringement by faculty or graduate students in certain circumstances.
10. Preserves "fair use" and other copyright infringement limitations, though doesn't spell out how that balance is to be achieved.

Source: Digital Tech Consulting

And global courts are finding it equally difficult to bring clarity to digital content protection issues. For example, American courts have ruled Napster's service illegal—apparently largely because it was easier to shutter Napster than it would be to pursue Napster's 60 million users—who were clearly breaking the law—separately. Meanwhile, KaZaA (a similar file-swapping service) has just been granted a stay of execution by a Dutch court on the argument that the company can't be punished simply because its software might be "abused" by users.

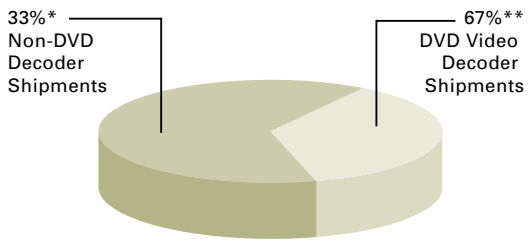
So far, the legal and political process could best be described as a crude tool that is gradually building some parameters. It will likely be some time before the process results in a clean and consistent set of rules guiding government, industry and consumers through the messy construction zone of digital copyright policy.

Development of DVD Recorder Market Critical to Optical Disc Format

Nearly 130 million MPEG-2 based digital video decoders shipped worldwide last year as the transition from analog to digital continues at a steady clip. Of those, nearly 67 percent of the decoders fall under the optical disc (DVD) format category (chart).

Although suppliers shipped more than 85 million DVD units into the market in 2001, DTC believes that will pale in comparison to the estimated 145 million estimated to ship worldwide this year. Despite the success of the DVD format, only a small fraction of these units will record MPEG-2 video. And a market for a viable recording format is essential in the long-term growth of the optical disc format.

Digital Video via Optical Disc Dominates
(2001 Estimated Shipments)



** Includes digital satellite, cable terrestrial receivers and VDSL receivers*
*** IncludesDVD video players and recorders, videogame systems with DVD drive and video playback and DVD PCs and peripherals.*

Source: Digital Tech Consulting

But a pesky format war, among other factors, has slowed the development of a DVD recorder market. There have been some recent developments that indicate format détente may be in the future, but DTC estimates that it will be 2003 before the market realizes annual worldwide shipments of 1 million units or more for set-top DVD recorders (estimate does not include DVD recorders in PCs or PC peripherals). The table below analyzes some of those recent events and their potential impact on development of a DVD recorder market.

Recent DVD Recordable Developments

Initiative	*Formats/ Technology*	*Analysis*
Creation of DVD-Multi format for DVD recording	DVD-R, DVD-RAM, DVD-RW	Multi format might alleviate some confusion among all the format offerings, but it doesn't include all DVD recording formats—most notably DVD+RW
Unveiling of Blu-ray DVD recording format	Blue laser recording	27 GB capacity format will allow for high-definition and standard definition recording; could be used to leap frog current-technology format skirmishes with agreement on format by major manufacturers; DVD developer Toshiba conspicuously absent from consortium

The Main Barriers to DTT in U.S.

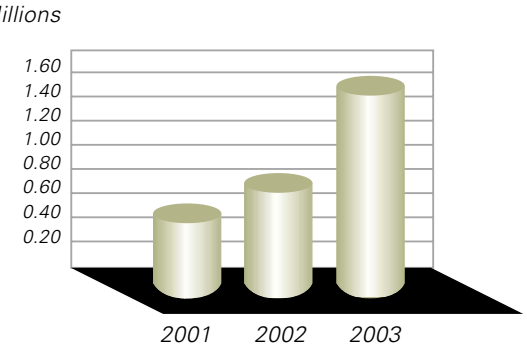
Although much of the digital terrestrial television (DTT) industry is counting the number of stations that will not be in compliance with the U.S. FCC May 1 commercial station deadline, those non-compliant stations do not represent the biggest hurdles to clear for a successful DTT market

The main barriers are lack of high-definition programming and the inability of most consumers to view local digital terrestrial broadcasts through their cable connections.

Nevertheless, a number of broadcasters won't make the May 1 deadline that requires all U.S. commercial broadcasters to turn on a digital signal. As of late March, the FCC reported that more than 860 commercial stations had requested extensions. In fact, only about 270 total commercial and public digital TV stations were on air at the end of March. All tolled, more than 65 percent of the nation's commercial broadcasters will miss the May 1 deadline by at least a couple of months.

Although the consumer electronics industry, broadcasters and some content providers have been working to build a DTT market for the last several years, DTT receiver shipments have been modest (chart).

Estimated U.S. DTT Receiver Shipments



Source: Digital Tech Consulting

Today, more than 70 percent of U.S. households are able to receive at least one terrestrial signal. Yet sales of receivers have been sluggish—despite rapidly improving sales of digital displays.

In a classic chicken-and-egg case study, consumers appear to be waiting for more available content, while broadcasters are waiting for enough consumers to jump into the market. Consumers also appear to be delaying purchase decisions until service is available on cable. Finally, ongoing concerns about copyright protection by Hollywood studios have seriously limited the amount of content available for broadcast.

And though cable operators Charter Communications and Comcast have recently joined Time-Warner in carrying digital broadcast signals on some of their digital systems, the industry has a long way to go before DTT achieves the widespread acceptance now afforded digital cable and digital satellite systems.

ABOUT DTC

Digital Tech Consulting is a market research firm providing strategic information and analysis to help companies succeed in the consumer digital marketplace. To learn more about DTC and how our analysts might help your company, please visit us online at www.dtcreports.com or call 214.915.0930.

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