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# Why DVD?

a meat & potatoes guide  
for the uninitiated



by Joseph Matheny

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## The Hows and Whys of DVD...

The foundation of DVD technology is incredible storage capacity (the media) coupled with interactive video (the medium). A single CD-sized DVD disc has enough storage space for the text of 20,000 novels, 100,000 digital photos, seven hours of CD-quality stereo audio or a high-resolution version of a theater-quality feature-length film. This enormous capacity makes DVD the ideal platform for a broad range of applications, particularly multimedia. This capacity has been made possible thanks to vast improvements in digital compression technologies, including MPEG-2 for video and Dolby AC-3 for audio. When coupled with the advent of sophisticated decompression ASIC chips produced at mass-market prices, the stage was set for the revolution.

## What is DVD-Video?

DVD-Video is rapidly transforming the video industry with the type of impact that the Compact Disc once had on the face of the music business or VHS with its creation of the home video market.

DVD and its foundation, the DVD-Video Specification guidelines, were specifically developed to support high resolution, full-screen video applications, making it the best format ever for bringing the movie theater experience into the home. Unlike any previous format, DVD was created to allow for navigation within the video content creating a truly interactive experience for the viewer.

In fact, a DVD-Video disc has the same form factor as a standard CD-ROM disc, but the similarity stops there. A DVD-Video disc is capable of holding 4.7 GB or more of data — enough to fill seven or more standard CD-ROMs — and that capacity is growing all the time. DVDs storage capacity enables a disc to comfortably store over two hours of digital video accompanied by CD-quality surround sound. As a result, most motion pictures can fit on a single DVD disc while delivering an experience to the home viewer capable of rivaling the theater experience. Playback is accomplished via a DVD-Video player — a mass market-priced television peripheral whose main purpose is to play movies.

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In addition to the feature movie, a DVD-Video disc can also store up to eight audio language tracks, thirty-two subtitle tracks, behind-the-scenes footage, cast filmography and interviews, etc. Your imagination is the only real limitation (OK, and the storage capacity of the disc, but that is increasing all the time).

Hollywood movie studios have more than one reason to desire replacing videocassettes with DVD discs. A DVD disc is much cheaper to manufacture (about 80 cents per unit for a DVD disc compared to \$2.20 for a VHS tape), occupies less shelf space, and never needs re-winding.

But how does the picture look? In a word, excellent. DVD-Video brings home a standard of video quality that was previously unattainable in the mass market.

### **DVD-Video by the numbers...**

[CEMA \(Consumer Electronics Manufacturers Association\)](#) reported a final tally of **1.1 Million** DVD-Video players shipped to dealers by mid 1999. After two years of DVDs, they're in more than 3 million American homes, and optimistic industry sources claim that number will quadruple by the year 2000, with 15 million players in American homes by 2002.

Already, all of the major Hollywood studios have announced DVD movie releases. By November 1998, 1691 titles had been released on DVD-Video. As of January 31, 1999, 2089 titles were available, with more being announced almost daily.

DVD has broad-based applications, opening new vistas for:

- Hollywood movie studios;
- independent movie producers;
- education and training;
- corporate communications.

### **What is DVD-ROM?**

A DVD-ROM drive is a computer peripheral whose main purpose is to play DVD-ROM discs. As with DVD-Video discs, DVD-ROM discs can hold 4.7 GB or more of data.

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The flexibility of the DVD-ROM format means that standard DVD titles can readily transition from playing on a PC to playing on set-top player connected to a television. Simultaneously, DVD enables producers to deliver high-resolution, full-screen multimedia content to the PC desktop. As such, DVD is truly a universal media format, capable of replacing both VHS tape and CD-ROM simultaneously. In the corporate world, DVD-ROM is poised to fundamentally change the computing landscape. Today, the publishers of very large databases — who now rely on CD-ROM — are about to become pioneers in DVD-ROM publishing, by re-purposing multi-volume CD-ROM sets and optimizing them on a single, convenient DVD-ROM. DVD-ROM is also the successor of choice for earlier training tools such as VHS and CD-i.

Industry analysts expect the DVD platform will grow quickly, and that in due time, DVD-ROM discs will replace CD-ROM discs in almost all applications. Recent exponential growth in the adoption of DVD-ROM by PC manufacturers is proving this hypothesis true.

### **DVD-ROM by the numbers...**

Specialists agree that most of the action in the DVD marketplace will take place on the ROM side of the equation. A growing range of software titles will be published on DVD-ROM discs in 1998, with worldwide revenues set to multiply to some \$567 million this year, up from a paltry \$3.5 million in 1997.

Statistics from drive manufacturers indicate 6 to 8 million DVD-ROM drives shipped in 1998. Another 5 to 7 million have shipped since then, bringing the total to somewhere between 11 and 15 million.

Throughout this year, however, DVD-ROM title sales revenues will still mainly come from PC system and upgrade kit bundle deals.

Retail sales will become the dominant distribution channel for new media titles by the second half of 1999, when DVD-ROM drives finally will become mainstream components in PCs.

By 2003, DVD-ROM title revenues are expected to reach a whopping \$70 billion, as the new media technology supplants CD-ROM as the primary supply format across both PCs and television set-top boxes.

By the end of 1998, more than 9 million DVD-ROM drives had been sold and 30 million are projected for 1999. Particularly strong demand for DVD-equipped PCs was seen in consumer markets during the 1998 holiday season. DVD-ROM drive sales are predicted to surpass CD-ROM drive sales by 2000. Just as 1987 was a pivotal year for CD-ROM, 1999 will be the pivotal year for DVD.\*

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## **DVD's Disc Capacity + Web Immediacy = A Recipe for Convergence**

Some call it "Hybrid." To others it is "WebDVD." Regardless, what is more important than the name is what it does.

With the nearly simultaneous explosion of both DVD and the Web, the convergence of all forms of media is nearing completion. Part of this convergence is the capability to create DVD titles and to link them to the Web, either through a computer or via a TV set. These Hybrid DVDs combine the DVD disc's capacity and capability with the Web's immediacy.

Content is still king in the multimedia world, but immediacy and transactive abilities are the real powers behind the throne. Taken together, DVD and the Web offer a powerful new distribution solution, enabling content creators to deliver their messages using the high-quality and interactivity of DVD with linkage and seamless integration to Web-base content.

Today's Web sites are quite good for distributing documents, one-to-one advertising material (like Macromedia's Flash Generator technology) and processing transactions (database actions, like E-Commerce, etc.). With their ability to be tied to database content, Web sites provide an excellent means of delivering timely, profiled information in a rich, text- and graphics-based environment. And in the form of E-Commerce sites, the Web provides a strong transactive medium for acquiring user input and providing output from back-end data sources.

Unfortunately, the Web's standalone potential is severely hampered by bandwidth limitations, and the situation is not expected to improve on a wide-scale basis for quite some time. Even on internal corporate networks, individuals have no guarantee of reliable, consistent content delivery.

DVD promises to relieve this situation by promoting the natural convergence of Web-based media and interactive media, taking advantage of the strengths of both to deliver a powerful, new hybrid.

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WebDVD combines/ a high-quality video experience for the viewer with built-in interactivity, one-to-one marketing capability, real-time database feedback, E-Commerce capabilities, and multimedia/ hypermedia capabilities triggered or invoked from within DVD video content. The potential for this integration is enormous as evidenced by two simple examples.

#### **Digital Catalogs:**

DVD enables very high-quality video presentations of products and services to be delivered within an onscreen interface. Navigation through the catalog is easily accomplished by specifying chapter points on the DVD that launch the footage for each product. Then, taking advantage of WebDVD integration, the producer could further link each individual chapter to live data delivered automatically via the Internet. Customers can get up to the minute pricing and availability in a live E-Commerce setting that goes well beyond today's limited impact Web sites. This scenario works well for entertainment titles as well. Imagine — just a few clicks during a film and the viewer has ordered the stylish leather jacket that the movie's star is wearing.

#### **Hybrid Training Video Discs:**

Video can be shown inside a hybrid environment that combines video navigation with a Web-based interface. Web-based exams using transactive connections can be administered throughout the training video to evaluate the viewer's retention and progress. Other tests could generate and report scores on-the-fly, posting results back to the user as well as to human resources staff — or anyone else who needs the information for decision-making.

## **DVD vs. VHS**

Until the advent of DVD, VHS tape was the only reliable method of distributing video. Outside of Hollywood movie titles however, it was highly underutilized. Most marketing people learned quickly that as a direct-to-audience piece, VHS tapes more often end up in the trash than they are viewed. Neither has VHS been affordably ubiquitous in the business environment . Few people have a television and a VCR

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sitting on their desk at work , so that everyone has to convene in some pre-designated site, at a generally inconvenient time, when equipment is available to watch the material.

VHS is a linear format in which the user inserts a tape and hits play. The only options for viewing non-sequential footage is the tedious process of fast-forwarding or rewinding through the material to an approximate point elsewhere on the tape. This severely limits the usefulness of VHS as a presentation medium. To present effectively, one needs on-the fly, instant context- sensitive access to any point in footage. These same difficulties limit VHS as a reference material.

VHS tape is a poor archival medium as well. Tapes tend to degrade physically during playback and storage, rapidly resulting in dramatic deterioration of the recorded material. Nor is VHS is a universal standard. Tapes must be recorded in either NTSC or PAL formats depending upon where in the world they are being distributed.

DVD addresses every one of these shortcomings.

Unlike a VHS tape, a DVD device can be mounted on a network for distribution from a single point. To accomplish this using VHS, you would have to digitize the footage to a networked drive — a time consuming and tedious process, after which you are not really using the VHS anymore.

By supporting multiple language tracks, a single DVD disc addresses geographic and cultural barriers. Simultaneously, a DVD can deliver a variety of subtitle track and even allows user selectable mixing. For example, an English audio track can be accompanied by French subtitles.

Multiple video tracks can be embedded on a DVD, allowing diverse audiences to be addressed by a single disc, while providing the means to ensure that viewers only see material that is relevant to them. A single DVD can also contain PAL, NTSC and DVD-ROM material.

DVD's flexibility and derivability make it the ideal replacement for VHS. Whether distributed to individuals for playback on PCs, shown to a group via set-top box, or mounted on the network for remote viewing, DVD ensures the intended message gets to every recipient.

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## DVD vs. CD-ROM

CD-ROM was the first multimedia technology to successfully achieve universal distribution. CD-ROM was the closest thing we had to a multimedia standard prior to DVD. In particular, CD-ROM was adept at addressing the myriad of problems VHS presented as a business communications tool. Its success is reflected in the fact that nearly every computer built before 1999 contained a CD-ROM player.

CD-ROM was the first technology to provide for the delivery of both data and multimedia content in an interactive format. Unfortunately, CD-ROM has severely limited data capacity, leaving room for neither independent video streams nor multiple video tracks and subtitles. CD-ROM is also limited to PC-based applications, as no set-top boxes for playback on a television have been developed.

Despite having interactive capability, these features remain quite difficult to implement, despite years of development. Even today, it is a time-consuming and painful process to author an interface that delivers an interactive environment via CD-ROM. This is further complicated by the fact that CD-ROM's technical specifications were never completed or fully developed — thereby limiting its reliability as a standard for interactive media. And in order to achieve the ISO 9660 compliance essential for mass market success, developers have been forced to eliminate many features — such as long filename support, severely restricting cross-platform functionality in varying OS environments.

CD-ROM's video sample rates are very limited and because of variable playback speeds between users systems, producers can't predict the end results. This has forced producers to cater to the lowest common technology denominator, severely limiting content and creativity. With no universal codec for CD-ROM video compression, it is virtually impossible to predict if a user will have the appropriate codec to play the material back at all.

Unlike CD-ROM, DVD is a truly universal format. High-resolution DVD content is accessible in both the television environments via set-top box as well as on the PC using DVD-ROM players. This flexibility makes DVD very portable, enabling the same disc to be used in a wide variety of playback situations.

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And unlike a CD, DVD is completely standardized ensuring that all viewers will be able to view the content.

The DVD-Video Specification allows for navigation within the video using a standardized chapter-pointing format. Unlike continuous video streams used in CD, the DVD video stream can be broken up into an infinite number of chapter points with defined beginnings and ends. This allows the user to jump to virtually any point in the video at any time. It also provides the producer with tremendous flexibility in designing navigation for a title. A single DVD can deliver a custom-tailored experience to meet the needs of different viewers.

## **Return on Investment**

In addition to being a superior technical product to previous content delivery formats, when the cost of DVD is looked at comparatively, it promises significant opportunities for economic savings and gains. These economic benefits operate on a variety of levels.

The most basic consideration — the cost of manufacturing discs — is significantly lower than the cost of VHS tape. In addition, the cost of production for DVD is dramatically lower. For example, the run cost of sending a DLT tape to a facility to create DVDs is much lower than the cost of sending a beta tape to a duplication facility. In fact, it is not uncommon for DVD duplication to cost as much as fifty percent less per unit than traditional tape mediums.

The distribution model for DVD offers further opportunity. The ability to integrate multiple soundtracks, video tracks and subtitles means that a single DVD unit can be re-purposed across multiple applications. Every other past medium has required a separate production for each application. That same flexibility also means that a single DVD unit can be used to deliver controlled, varying content across corporate divisions and geographic locations as well as across international borders of language and culture.

DVD makes significantly lower packaging and postage demands. The typical DVD shares the same low cost packaging scheme as CDs and shares CDs low shipping weight. Video requires expensive printed boxes and weighs significantly more.

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Most DVD authoring systems available today use an intuitive user interface model similar to those employed and proven for use in nonlinear editing systems. The learning curve is quite short and total training time is minimal. Sophisticated systems require little more initial knowledge than familiarity with standard point-and-click Windows style applications. Users with video and graphic backgrounds will find the authoring process to be quite similar to the applications used in these other activities.

As a result, DVD authoring does not require extensive specialized training or the associated expense of retaining single purpose, in-house specialists. The total cost of implementing DVD authoring is quite low when compared with other technologies.

The potential economic benefits of DVD are manifold. We have seen how these benefits can be achieved in three basic areas, cost of goods, cost of distribution and cost of training. The creative potential inherent in the DVD format promises to deliver even greater advantage when adapted to the specific goals of different organizations.

## **Growth of the DVD Industry Infrastructure**

The digital video disc (DVD) format and its associated manufacturing facilities originated in Japan, but as the market grows, production is rapidly headed overseas.

The global DVD market doubled to 4.2 million units from 2.1 million units in 1998, according to estimates by the Electronic Industries Association of Japan. For DVD-ROM drives, expansion is expected to be much steeper, jumping from about 9 million units last year to about 30 million this year, according to estimates by Toshiba Corp.

Toshiba began DVD-ROM production at its factory in the Philippines in May 1999. When the factory is fully operational, Toshiba says it will make 1 million units/year in Japan and another 500,000 in the Philippines.

As the video market grows and more players join, pricing is expected to become more competitive. An analyst recently predicted that

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list prices would soon hit the \$299 range. Cutting costs is the first priority for Pioneer, Sharp and Sony as they prepare to begin production in Malaysia for DVD players and for Toshiba as it readies its Philippines operation.

### **Hyper-Speed...**

Pioneer, which claims to have a 50 percent share of the DVD market in Japan, 15 percent in the United States and 20 percent in Europe, will begin production during summer 1999 at its Pioneer Video facility in Malaysia. With a startup capacity of 12,000 units per month, Pioneer expects that to soon double to 24,000 units per month.

The company also started production of DVD-video players in Shanghai, China in late 1998. The China factory has a current capacity of 4,000 units per month, which will be doubled by autumn 1999 to ship products to the United States in addition to supplying the Chinese market.

"We will shift whatever DVD products that can be made overseas to outside of Japan. In Japan, high-end products such as LD/DVD combo players will be the main products," a Pioneer spokeswoman said.

Sharp Electronics Corp. began pilot production of DVD-video players in January at Sharp Manufacturing Malaysia and has just begun volume production. Capacity is 20,000 units per month. Its domestic capacity of about 5,000 units will be devoted to value-added DVD products, a spokesman said.

Sony, which said that it expects to carve out about a 30 percent stake in the DVD-video market, will launch production at Sony Video Malaysia in April. It will have a capacity of 60,000 units a month.

Matsushita Electric Industrial Co. Ltd. will soon expand production at China Hualu Matsushita Video Co. Ltd. in Dalian, China, to about 70,000 units a year, up from last year's 8,000 units, to cope with the market expansion in China.

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## What Does DVD Mean in the Real World?

Most people today have heard something about DVD. And for most, DVD means Hollywood movies. As one of the most successful consumer technology introductions in history, with millions of players and thousands of movie titles already delivered, it is no wonder that Hollywood is what people think of first. But DVD is also delivering in many ways the public has not yet realized.

The nature of DVD's success lies in a true business revolution — the convergence of the computer, entertainment and consumer electronic industries. Hundreds of companies — including the powerhouses of each of those industries — combined forces to jointly develop and support a single technology that meets all their collective needs for media delivery. And despite its youth, DVD is a mature technology with a proven, standards-based foundation that is already generations of iterations beyond anything achieved by prior technologies such as CD-ROM or VHS.

DVD is one of those rare developments that significantly impact the marketplace on almost every level simultaneously. From consumers looking for exciting new entertainment; creatives working to showcase their talent; postproduction facilities hoping to maximize profits; and corporations needing to communicate with their employees and their customers, DVD has opened broad new avenues for delivering all forms of digital content. Moreover, for every one of those applications, there is massive potential for bottom-line return for those who create DVD titles.

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## DVD Resources

### **WebDVD.Org**

Developers association for Web enabled DVD titles, sponsored by Spruce Technologies.

<http://www.webdvd.org/>

### **TechWeb**

A good place to search and retrieve DVD related news.

<http://www.techweb.com/>

### **DVD Forum**

The DVD Forum (formerly called DVD Consortium) is an ad-hoc association of hardware manufacturers, software firms and other users of Digital Versatile Discs (the "DVD Format"), created for the purpose of exchanging and disseminating ideas and information about the DVD Format and its technical capabilities, improvements and innovations.

<http://www.dvdforum.com/>

### **DVD Insider**

DVD Insider delivers daily, concise news stories aimed at executives in the DVD industry. It will keep you on the leading edge of the DVD market.

<http://www.dvdinsider.com/>

### **Microsoft's DVD Resource Page**

Specifications. White Papers. Presentations

<http://www.microsoft.com/hwdev/dvd/>

### **Immersion New Media**

New Technology and information for DVD creators.

<http://www.immersion-media.com/>

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### **Yahoo's DVD Forum**

The latest DVD Entries on Yahoo

<http://dir.yahoo.com/Entertainment/Video/DVD/>

## **About Immersion Media**

Immersion Media was established to create and market a new generation of DVD content for both high-end interactive projects and the increasingly important independent and corporate projects.

Based in San Jose, California, Immersion combines the best Silicon Valley software expertise with extensive DVD, MPEG and postproduction knowledge.

## **About the Author**

Joseph Matheny is a Web and New Media consultant, in San Jose, California. He has been intimately involved in Hypermedia, Internet/Network technologies and Multimedia since the '80s.

He is not directly related to Pat Metheny, so stop asking.

For more info see: <http://www.immersion-media.com/>

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## **Strategy Analytics Forecasts DVD Software Market to Reach \$36 Billion by 2005** ***DVD Video Will Pass VHS in 2003, Say Analysts***

BOSTON, Sept. 7 /PRNewswire/ via NewsEdge Corporation -- US sales of DVD software will reach 57 million discs this year, worth \$1.5 billion, and by 2005 more than 1.3 billion discs will be shipped annually, worth \$36 billion. Annual sales of DVD devices will reach 9.1 million units in 1999, a growth rate of 128%, and will continue to soar, reaching 52 million by 2005. These findings are presented in "World DVD Planning Report", recently released by Strategy Analytics, Inc.'s advisory service, "The Interactive Home".

TV-based DVD video players are becoming the format of choice for movie fans and videophiles. DVD also will become a standard feature of home PC systems within the next year or so. New games consoles from Nintendo and Sony will also be DVD-based, DVD Audio will soon be launched for the hi-fi market, and DVD video recorders are around the corner.

The report predicts that 11% of US homes will own at least one DVD device by the end of 1999, and 58% by 2002. DVD PCs currently account for 75% of the installed base, but this share will fall to 59% by 2002 as TV-based DVD becomes more widespread.

In spite of the relatively low penetration (4%) of DVD video players (90% of households own a VCR), the shift from VHS to DVD software will happen quite rapidly, since early DVD owners are the avid movie and video enthusiasts who account for a major share of pre-recorded video sales and rentals.

Thorough analysis of historical software buying patterns combined with ownership projections for all types of DVD device has enabled the analysts to develop detailed sales projections for DVD Video, ROM, games and audio software. Video titles currently account for over 90% of the software market. By 2005 their share will have fallen to 43%, while DVD-ROM will account for 28% and games formats 24%.

"DVD is set to become the dominant packaged media platform for the next decade," says David Mercer, Senior Analyst with Strategy Analytics. "DVD players will be everywhere, and discs will be even more pervasive than CDs are today."

SOURCE Strategy Analytics, Inc.

Web site: <http://www.strategyanalytics.com/>

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