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Innovations Affecting Us

DVD: The CD-ROM Phoenix

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CD-ROM is dead. Long live CD-ROM!

When CD-ROM first appeared in 1985, librarians received it enthusiastically because of its voluminous storage capacity. It seemed that few applications would ever come close to filling the disc's 650 megabyte capacity. Large, unwieldy databases suddenly became manageable and portable; and it seemed that CD-ROM would siphon off business from online information providers. However, it wasn't long before preferences for graphics and text images, rather than ASCII text, caused databases to grow exponentially. Storing products with this type of data soon gobbled up all a CD's storage space and required multiple discs.

Managing titles with multiple discs, resolving hardware setup problems and incompatibilities, and dealing with multiple formats and user interfaces conspired to make CD-ROM appear less than a user friendly option in libraries. Many critics pronounced it a dead technology.

The emergence of the Internet seemed to offer a solution and the pendulum eventually swung back to the online environment. A common user interface (Web browser) facilitated searching. To keep their products up-to-date and to avoid losing their customer base, CD-ROM producers had to incorporate links to Internet sites.

Does the attraction of the Internet and the return to online sound the death knell of CD-ROM? Maybe, maybe not. The Internet is often slow and unreliable. Sites change or move without notice. Multimedia bogs down because of narrow bandwidth and slow data transfer times. Also, because of copyright restrictions and embargoes to protect print resources which constitute publishers' main streams of revenue, many online products are not much more current than their CD-ROM counterparts.

The DVD Format

Meanwhile, a new format is ready to materialize that may give CD-ROM a new life. Whereas CD-ROM emerged from the audio recording industry, the new format has its roots in the video industry. This format is called DVD (for TV set-top devices) or DVD-ROM (for devices attached to personal computers). Initially, the acronym stood for Digital Video Disc; and

some people still refer to it as such. When the rival Phillips/Sony and Toshiba/Time Warner camps agreed to set aside their differences to avoid a format war similar to the one between Beta and VHS in the videotape market and probably to avoid any confusion with the Video CD (also called Compact Videodisc) or videodisc formats, they changed the name to **Digital Versatile Disc**.

The DVD format promises to expand the CD-ROM's 650 megabyte capacity to 4.7 gigabytes — equivalent to more than 7 CD-ROMs. This would provide enough space for more than two hours of video. (A movie with CD-quality sound requires an enormous amount of storage space and broad bandwidth to keep the data streaming without interruption.) By storing data in two layers on a single side, producers can have the capacity for up to 8.5 gigabytes. Using two layers on both sides of the disc, they can reach data storage capacities of 17 gigabytes.

Not only will the DVD have the ability to package a large quantity of data, it will have the ability to deliver that data to the user much faster. Transfer rates of CD-ROM drives have continued to increase faster than the capabilities of the search and retrieval software. DVD players build on these advances and promise data transfer rates between 1.0 to 10 MB per second, with an average of 3MB per second.

DVD systems will also have faster processors with Intel's new MMX instruction set built in. Intel has designed the MMX chips for insertion on the motherboard to handle multimedia functions. Putting the multimedia commands

in hardware rather than in software accelerates the processing of video and audio data. This means that viewers will be able to enjoy high quality, full-screen, full motion video with CD quality audio in real time without any pauses. DVD, with a resolution of 720 pixels x 480 lines, will produce a sharper picture than possible from a laserdisc and one far better than the VHS's 300 lines of resolution.

Not only does the DVD disc have better video capabilities, it also has better audio range. Audio CD samples sound at 44KHz. DVD can go as high as 48KHz. It also has six channels, instead of two. This permits true surround sound for movies and games or multi-language voice tracks. For text applications, these channels can also be used for subtitles, editor's notes, cast bios, or other types of secondary information.

DVD players and DVD-ROM drives use the same digital video codes for the digital signal as the film and TV industries are working toward. This should make it much easier to trade bits among video, DVD-ROM, and World Wide Web pictures. DVD also uses the same compression scheme employed by Digital Satellite Systems. DVD players promise backward compatibility with existing media; so audio CDs, CD-ROMs, and other CD-format discs should play in the new players. Software producers will also support a universal disc format (UDF) that will guarantee backward compatibility. However, the drives won't be able to read discs written on CD-Recordable or CD-Erasable drives, as they use different technologies.

DVD's higher-quality digital video, graphics, and audio, along with better integration with Internet and cable, will allow developers to create products that are much more interesting than the book-and-disc combinations currently available. Multimedia titles will be able to incorporate more and better quality audio and video. In addition, that video will play on the full screen rather than inside tiny postage stamp windows.

Copy Protection

The technology to produce DVD players has been available for some time; but the delay in producing them resulted from the inability of the software developers, system manufacturers, and movie studios

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actions between users and rights administrators.

Providing the liaison between this ISO group and the information industry is **M. Dominique Yon** of the **International Confederation of Societies of Authors and Composers (CISAC)** in Paris.

DOI

Another important development is represented by the **Digital Object Identifier** initiative of the **Association of American Publishers** which was demonstrated at the AAP's Professional and Scholarly Publishers' meeting in February. As noted by the AAP: "The DOI System connects customers, via the Internet or any future networks, with the current copyright holder of a digital object. Its purpose is to facilitate digital commerce and scholarly re-

search by ensuring the uninterrupted availability of publishers' digital objects over time."

The technology underlying the DOI system is called the **Handle System**. It was developed by the **Corporation for National Research Initiatives (CNRI)**, an internationally recognized leader in information technology research and development located in Reston, Virginia. Since its inception in 1986 as a non-profit organization, CNRI has been actively engaged in the establishment of open, non-proprietary technological approaches for networked systems. The president of CNRI is **Dr. Robert E. Kahn**, who spent thirteen years at the **Advanced Research Projects Agency (ARPA)** before founding CNRI. The DOI system development team at CNRI is headed by **Constance McLindon**.

A prototype of the system is currently

under development, and the status of this prototype will be demonstrated at the **Frankfurt Book Fair** this fall. Videotapes of the February demonstration are available from the AAP's Washington office (1718 Connecticut Ave., Suite 700, Washington, D.C., 20009-1148: \$15 US in NTSC format and \$20 US in SECAM and PAL formats.) In addition, information can be found at <<http://www.doi.org>>.

Coming Soon

At the next meeting of the **International Standards Organization (ISO)** in London a delegation from NISO will lead a discussion on standards for electronic identifiers. This discussion promises to further our understanding of the framework within which electronic identifier standards will develop. Your editors from **ATG** plan to publish a report on this meeting in the September issue. 🐾

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to agree on a copy protection solution. The issue revolved around the movie industry's decision not to provide content without such protection. The hardware and software producers, on the other hand, were not as concerned with copy protection as with developing new markets and expanding existing ones.

The **Motion Picture Association of America** and the **Consumer Electronics Manufacturers Association** proposed copyright legislation, called the **Digital Video Recording Act** in April, 1996. That act intended to enforce compliance with a specific method of copy protection. It would have also made any importation, manufacture, or distribution of devices that do not comply with the stated method of copy protection punishable by law. That proposal met with much opposition and had to be re-worked.

An ad hoc group of 90 representatives from 60 companies and trade groups, known as the **Copy Protection Technical Working Group**, finally agreed on a proposal for a worldwide system for protecting material at a meeting in mid-September, 1996. Instead of endorsing a single manufacturer's method, the participants made the protection scheme part of the DVD specification. They agreed to have different encoding formats for each of six different geographical regions, similar to the NTSC and PAL video formats. This would make it difficult to copy or play discs created in a region other than that of origin. For example discs made in the U.S. will not play on drives produced in Europe or Asia.

The copy protection agreement requires every DVD-ROM drive and every MPEG-2 card to have a method that will protect

encrypted DVD movie discs from being copied. Its only purpose is to prevent people from watching or copying movies on a PC and to force them to pay for extra hardware which they don't need in most cases. It has no effect on other types of data, other than encrypted and scrambled audio and video. Software publishers and owners or providers of textual and still graphic information will need to find another way to protect their products.

System Availability

Shortly after reaching agreement on the copy protection issue, **Toshiba** and **Matsushita** began selling DVD players in Japan on November 1, 1996. **Akai Electric Co., Ltd.** quickly followed suit. **Pioneer** began selling DVD players in the U.S. on March 1, 1997. Toshiba planned to delay introducing DVD players in the U.S. until the end of the first quarter of 1997, while California-based **Diamond Multimedia** announced plans to market Toshiba's drive to end-users in a DVD multimedia upgrade kit in early 1997. The kit includes Diamond's PCI-based adapters which include decoders for MPEG-2 video and Dolby Digital Surround Sound AC-3 audio and copy protection decryption hardware. **Creative Labs, Inc.** also developed a new line of DVD products for the PC consumer, similar to Diamond's, which it will price beginning at \$499.

Wired, Inc. introduced free DVD playback software for its **MasonX** PowerMac MPEG board. The software allows the card to play DVD movies from either computer DVD-ROM drives, from DVD files stored on a hard disk, from a standard CD-ROM drive, or from a computer network. While the software is free, the card costs \$899.

While title producers will focus on movies and multimedia, some companies,

like **SilverPlatter**, are poised to convert some of their titles to the new format. SilverPlatter demonstrated its first database on DVD-ROM, **The Union Catalogue of Belgian Research Libraries**, at the **Online Information 96** conference held in London last December. It plans to follow it with **MEDLINE Advanced** by mid-1997 and other databases later in the year.

At present, DVD looks like an expensive, nonrecordable alternative to the VCR. While recordable and erasable DVD drives could arrive before the end of the year, they still won't have the re-recordable flexibility of a VCR.

Just as the audio CD was adapted for text and graphics, DVD-ROM could find a welcome audience in the library. It will be particularly appropriate for multimedia-rich titles. Titles could also be written with HTML code to permit downloading updates straight from the Web. The large storage capacity could solve the problems of handling multi-disc titles or large collections of images. Whether it will support a common user interface or be more user friendly than current systems remains to be seen.

It appears that DVD-ROM will eventually supplant CD-ROM; but the full transition will probably take a couple of years. With drives priced around \$800 for the foreseeable future, adoption will be slow. The issues related to networking the hardware and the development of DVD-ROM jukeboxes will also need to be addressed. In any case, adoption will require libraries to replace their hardware infrastructures. Whether or not DVD-ROM will provide enough incentive to do so or to break the popular fascination with the Internet remains to be seen. 🐾