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IASLIC Bulletin 45 (2), 2000, p. 49-54

CD-ROM to DVD-ROM : a new era in electronic publishing of Databases and Multimedia Reference Sources

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This article discusses the aspects of application of DVD technology in electronic publishing of reference sources and databases. There is a trend towards publishing reference sources and bibliographic databases in DVD format instead of CD-ROM. Due to its high storage capacity of 17 GB, high quality in data, diminishing price etc. libraries and database publishers will favour this technology very soon. The main factors holding DVD back are the delayed availability of DVD drives, trend towards online and the lack of standardisation in this technology. The Web, as the latest and easiest tool for delivery of information will take the prominent part, but CD/DVD-ROM technologies will have a place in libraries.

1. Introduction

Advances in computer technology have brought most people as close as a mouse-click to the wealth of information. It is no longer necessary to flip through volume upon volume of a printed encyclopedia to access information. Today we can simply go to our library, ask for our favourite encyclopedia on CD-ROM, sit down at a terminal, and retrieve infromation. No technology will last forever, but it appears that books and optical discs will last some time yet, even while we see the future. Optical discs, specifically in the form of CD-ROMs have become increasingly important as a medium for storage and dissemination of information during the 1990s. Most librarians thought that books would persist usefully forever, along with electronic sources. Optical media are much nearer to books than online, although their content can be networked and delivered online.

CD-ROM was introduced in 1985, the audio CD in 1982. The way thing moves these days, it's hardly surprising that these information technologies are on their last legs. In each case, the successor will be DVD. DVD has been around for a few years, making a slow start. The move from megabyte to gigabyte should stimulate any information professional's interest and imagination. DVD will transform libraries and information services, not fundamentally but measurably and definitely for the better. CD-ROM's days are counted. But it is clear that change will be even more dramatic than we have seen over previous centuries, and that optical

media is starting to fulfil its role in the history of reference source publishing. The economical availability of powerful PCs along with declining DVD prices and steady increase in DVD content will have many libraries seriously consider this option. DVD drives are in their third or fourth generation. PC manufacturers have already started to bundle DVD Drives with new systems. A recent survey by the Consumer Electronics Manufacturers Association (CEMA) indicates that 9 million US households are at least somewhat likely to purchase a DVD player this year and expects 2 million units to be sold actually. The International Recording Media Association says that DVD-ROM replication in North America will hit 75 million units this year, a significant 150 percent increase from 1998's 30 million units, with an estimated 15.5 million DVD-ROM drives to be shipped worldwide this year. Most realize that DVD is an important emerging technology. It will be in the library some day–but not just yet.

2. Multimedia and Digital Technology

Multimedia means the integration of various individual media such as texts, graphics, animation video clips and sound files into a digital environment. It has the ability to represent the data in an interactive and attractive environment through user-friendly interfaces and hypertext links. The CD-ROM can deliver decent multi media right now and the DVD, with its maximum capacity of 17 GB, is currently the only credible true multi media format. The advent of DVD and its gigabyte storage capacity has provided new potentials to expand the capacity of CD-ROM databases, especially for multi media applications. Yet many librarians may not be familiar with the capabilites of the more advanced medium—DVD and its high data storage capacity for multimedia in publishing of reference sources electronically.

3. What is DVD ?

DVD — Digital Video Disc, or Digital Versatile Disc for the computer industry, is the next generation to Compact Disc in optical disc storage technology. A DVD looks just like a CD (both 120 mm. diameter), but has higher data storage capacity. Like a CD, data is recorded on DVD in a spiral trail of tiny pits, and the discs are read using a laser beam. The DVD's larger capacity is achieved by making the pits smaller and the spiral tighter, and by recording the data in as many as four layers, two on each side of the disc. To read these tightly packed discs, lasers that produce a shorter wavelength beam of light are required, as are more accurate aiming and focusing mechanisms. In fact, the focusing mechanism is the technology that allows data to be recorded on two layers. To read the second layer, the reader simply focuses the laser a little deeper into the disc, where the second layer of data is recorded. However, since a 135-minute movie fits on a single DVD layer, single-layer DVDs will be the most common. DVD players can also read CDs. The DVD technology provides a storage capacity that is at least 6 to 7 times greater than that of a CD, in the same aerial space. A greater than two hour long movie can be stored on a DVD disc, with very high quality video (two to three times greater than with a VCR tape). Added to this, is an equivalent increase in audio quality. 5.1 channel sound is available for home theater applications. The main feature of DVD is the compression technology and storing data on multi-layer sides. A single sided-single layer DVD holds 4.7 GB and two-layer DVD can

hold 8.5 GB of data. There are other DVD formats with double-sided specifications. A double sided-single layer DVD can hold about 9.4 GB and double-sided double layer DVD can hold about 17 GB of data. There are various kinds of DVD's like DVD-ROM, DVD-Audio, DVD-Video, DVD-Recordable, DVD-Erasable etc. The transfer rate of data from a DVD can be sustained at more than 1 MB per second.

3.1 Comparison of DVD and CD characteristics

	DVD	CD
Diameter	120 mm	120 mm
Thickness	0.663 mm	1.2 mm
Track Pitch	0.74 nanometers	1.6 nanometers
Min. Pit Length	0.46 nanometers	0.834 nanometers
Laser Wavelength	640 nm	780 nm
Data Capacity (Per Layer)	4.7 GB	0.68 GB
Layers	1, 2, 4	1

3.2 Advantages of DVD multimedia reference sources on CD sources

- The high data storage capacity of DVDs makes it possible to represent more multi media elements, like sound and video and to integrate many reference sources on a single disc.
- The quality of sound and video in DVD is better than CD-ROM. In fact, DVD makes it possible to display longer full screen, full motion and high quality videos.
- DVD can deliver the data at a higher rate than CD-ROM.
- DVD drives can read both CD-ROMs and DVD-ROM's.
- By using DVD databases it might b possible to avoid CD-ROM jukeboxes.
- DVD eliminates the need for dis swapping of deluxe multimedia database and makes information-seeking informatio more convenient.
- No telecommunication facility is essential a in the case of Web.
- Printing and downloading the information i feasible.
- Multi-lingual databases can be handled.
- Better security of data.

3.3 Problems (?) of DVD

The main restriction of DVDs is the nee for extra hardware on PCs and its higher price in comparison to CD-ROM drives. The main factors holding DVD back are the delayed availability of DVD drives and the great consumer demand for re-writable CD's. The frequent up-dation will be a problem for DVDs also, like CDs as compare with Web. The number of reference sources available in DVD is very less.

Other factor is that there is no unique standard accepted till for hybrid media in the DVD specification. We can say there is a *standard battle* among the manufacturers of DVD discs and drives. *DVD forum (formerly called DVD Consortium)*, the industry group, which is steering the development of DVD technology, has approved a specification for erasable DVD, i.e., *DVD-RAM* (www.dvdforum.org) recently. The manufacturers like Hitachi, Toshiba and Panasonic already using this format. But Philips, Sony and HP opted for a completely different format *DVD+RW*, which will compete, with official format of DVD forum. It is too late to

agree a common choice and the stakes are enormous. Whichever system becomes the *de facto* standard will dominate the future of digital storage. Copyright issue is another aspect as in the case of CD's.

4. Library applications

The most important and relevant applications of this new technology in libraries may include the following areas.

- Large full-text databases.
- Mixed databases.
- Quick reference databases.
- Very high quality multimedia will help in better reference service.
- Archival Purposes.
- Cost-effective mass storage for networking purposes.
- Preservation media for multimedia libraries etc.
- Training applications.

Textual and multimedia reference sources on CD-ROM revolutionised library reference services. Now we have the novel, advanced technology of DVD to store gigabytes of bibliographic, full-text and multimedia databases.

There remain some questions also :

- How long will it take the developing countries are equipped with DVD-ROM drives?
- Will more reference databeses be available on DVDs?
- What significant changes and advantages will this medium bring to the libraries?

5. Some DVD Reference Sources

1. First databases to be made available on DVD was *Union Catalogue of Belgian Research Libraries* by SilverPlatter (1996 Novermber).
2. SilverPlatter's *MEDLINE* Advanced, was the first bibliographic database, over 8 million citations and abstracts of articles from 3700 journals from 70 countries.
3. EBSCO Publishing now offering Business Source Elite in DVD-ROM, which provides access to a rich collection of popular business magazines, scholarly journals and trade publications with coverage from 1984.
4. Some multimedia encyclopedias are now available in DVD form like,
   - *Microsoft Encarta99 DVD-ROM Reference suit* which comprises Encatra98 Encyclopedia Delux99, Encarta Virtual Gloge99 and Microsoft Bookshelf 99x.
   - *Britannica DVD* 99 with over 73,000 articles etc
   - *Webster's International DVD Encyclopedia* (Published by Multimedia 2000) with 10 million words, 50,000 entries, 12,000 photos, 67 videos and animations etc
   - *The learning company's Digital Library, Encyclopedia Electronica* with 85 minute of video, thousands of images etc
   - *Funk & Wagnall's Multimedia Encyclopedia* with over 15,000 multimedia elements
   - *Grollier Multimedia Encyclopedia.*
5. DK Interactive Learning has announced the *Eyewitness World Atlas DVD-ROM Deluxe Edition,* the first atlas available in DVD-ROM. It contains detailed and texture-rich landscapes drawn from massive cartographic databases. It contains 400 different maps, 40,000 separate data fields

and over 500,000 words of text including 3-D graphics etc. For more information access http://www.dk.com.

6. *The Complete National Geographic* on DVD-ROM

7. *Waterlow's New Media Titles* is the pre-eminent source of bibliographical and contact information on Multimedia Titles in Print. The 99 edition details over 2400 DVD Video and DVD ROM titles and includes profiles of over 3000 multimedia publishers with e-mail and www links.

The market is still have to come up, with new products entering the market and the number of titles and associated publishers continues to grow.

6. Impact of Web and online

The recent spread of Internet connectivity in the world has led to a belief that online is the sustainable alternative to disc storage technology. It is certianly true that the Internet allows access to many more remote information sources than a limited number of CD/DVD-ROM's. There is an un-mistakable migration from CD/DVD-ROM based products toward Web-based information resoruces accessed via the Internet. Web is the one user interface and the ideal environment for providing access to remote and frequently updated resources. Despite the diminishment of CD-ROM and DVD in the multi-user arena, there is no reason to believe that these technologies will die out in the near future, but Web will be the favourite medium for libraries. Now people started to speak about bandwidth instead of gigabytes and other technical terms related to storage media. Recent developments in networking and communication systems have enabled electronic resource sharing on national and international basis. The trend towards Network Based Information Services (NBIS) may bring less attention to CD/DVD-ROM reference databases, but not in near future, at least in developing countries. Remember that librarians are both online and offline information providers.

7. Conclusion

Libraries have had to revise their organisational philosophyand operational policies continually in order to accommodate the rapid changes that are taking place within our information-driven societies. This relentless change will undoubtedly challenge those of us who attempt to keep abreast of new information technologies, products and services. DVD is set to displace not only the CD-ROM, but also the audio CD and VCR media. DVD is superior to CD-ROM in many ways-increased storage, higher quality audio and video and greater cost-effectiveness etc. Storage media may have come and gone, but the "killer" technology has finally arrived : DVD. The role of this latest technology will notice an increase in the awareness of DVD among librarians and an increase in the number of DVD reference titles. The database industry itself is moving in the direction of web-based resources, or linked sources. Although DVD holds tremendous promise, it is merely one of competing and viable formats and its place in libraries is assured.

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