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By:



[The chronicles of a futile battle: Blu-Ray vs. HD-DVD](#)

Is DVD fading away?

While the CD, as data storage and delivery media, lasted successfully for decades and seems to be alive and kicking as we speak, we can't say the same about the DVD. On the market for a mere few years, the format is not very much taken into account when it comes to store and deliver video and audio content. Although at the beginning of the decade, the DVD seemed like a major discovery, it shortly proved itself unable to solve some of the most important problems that lead to its very creation. As far as entertainment is concerned, the maximum video resolution DVD could provide, 720x480, was shortly overcome by the technological progress pace and technical features of new TVs, multimedia projectors or other image display devices. But the main problem remains the poor security. DeCSS and DivX came as major surprises, and lessened the DVD enthusiasm. The IT industry wasn't very excited either by the new disc, all things considered. The DVD+R/RW vs. DVD-R/RW battle, born, all in all, still in the entertainment area, generated a lot of confusion and led to a much lower than expected PC technology implementation ratio. Combining both technologies in combo devices was a last resort solution, unable to generate much enthusiasm either. The future of DVD is still unclear, but what is certain is that a replacement is already needed and looked upon. And the favorite candidates seem to be Blu-Ray and HD-DVD. But things are far from being settled yet, as far as these two formats are concerned. **A real battle or beforehand publicity?** Although it will take a while till they become largely accessible - probably towards the end of 2005, but most likely in 2006 - the formats believed to replace the DVD generated several debates and the last CES (Consumer & Electronics Show) only proved that the two discs are really at war. Besides, if you're looking for information on Blu-Ray and HD-DVD, the first data you are most likely to obtain would be who's backing one format or the other, or who is undecided yet. Oh, and maybe the promised storage capacity for each format. If you're to confide in this data, then Blu-Ray promises 25 GB for single-layer and 50 GB for dual-layer, compared to HD-DVD's 15 GB for single-layer and 30 GB for dual-layer, and it's backed by the most important audio-video entertainment and IT companies, so we have a winner... Then why is there a battle, and, most importantly, is it really necessary? The answer is yes! The battle is inevitable, and it's not necessary about who is going to sell more units or who is going to get more popular, it's about information control. **The final stake: movies** One of the data broadly available on the Internet is the maximum supported resolution: an amazing 1920x1080 pixel. In brief, the movies offered on such a support would have incomparable image clarity, judging against DVD's present capabilities. And whoever wins the battle dictates the format for the new big movie, and, financially speaking, will control a hundred, maybe thousand billion dollar industry. And the sale increase of TV and other compatible displays adds to this. The big award for the winning format has so many zeros as even the companies used to astronomic figures would get dizzy with the taste of unlimited success. On the other hand, the two formats are incompatible with each other, so it's certain that a similar solution to that adopted in the case of DVDs is not feasible, since a device able to operate both technologies would require separate reading lasers and mechanisms, and would be, in the end, too expensive and bulky for the average user. The battle is hazardous and, if the industry won't settle soon for a direction or the other, the adopting of a format will be delayed and all the experts analyzing the phenomenon cite the end of another battle, the '80s confrontation between VHS and Betamax, which only brought disadvantages to all those involved. Apart from financial and other sort of estimates, at the end of the day, it's about competitors' egos. So whoever controls the way you watch movies in the future

remains to be seen. But which are each format's arguments? **Blu-Ray - winner before the race is over?** As I was saying, the discussion about which format is more technologically advanced pales to the list of those supporting the format, on the "majority has to be right" principle... But let's keep in mind past examples in which the majority was wrong. Anyway, Blu-Ray is presently supported by its inventor, Sony, and Dell, Hitachi, Hewlett-Packard, Panasonic, Pioneer, Philips, Samsung and other IT equipment producers. But, as the format will have a big word to say in the movie industry, the movie studios supporting it are also important. So far, Metro-Goldwyn-Mayer and Walt Disney declared their support for Blu-Ray. The format had also two of the major game companies announcing their support: Electronic Arts and Vivendi. Overall, the figure behind this association, with Apple the most recent joining member, is around 450 billion USD. But things are not very clear. The movie studios support is not exclusive, so if the rival format manages to get ahead sooner, we may witness important forsakings. Beyond the financial aspects, Blu-Ray is a more important technological development compared to the DVD. The laser ray used for reading CDs and DVDs belongs to the red spectrum, with wavelengths of 708, respectively 650 nm. Blu-Ray uses a blue spectrum laser (violet-blue, in fact), which operates on a wavelength of 405 nm, meaning a bigger quantity of information can be written on the same surface as a CD/DVD. But the minimum "spot size" that a laser can be focused is limited by diffraction, and depends on the wavelength of the light and the numerical aperture of the lens used to focus it. By decreasing the wavelength (moving toward the violet end of the spectrum), using a higher dual-lens system, and making the disk thinner, the laser beam can be focused much more tightly at the disk surface. This is, in a few words (in addition to the optical improvements), the technological advancement proposed by Blu-Ray. The protecting layer for CDs and DVDs (cover layer) is 0.6 mm. in thickness, while Blu-Ray's cover layer is only 0.1 mm. thick, which, roughly, means a better access to the recording area. The advantage? On the same 12 cm. surface (standard dimension of a CD/DVD), 25 GB of data can be stored (single layer), which translates to 2 hours of HDTV video and audio content. And this, with MPEG-2 encoded data, the same as for DVDs. And while using MPEG-4 H.265/AVC or VC-1, a codec derived from Windows Media 9, up to 4 hours of HDTV content can be stored. The transfer rate for such a disc is 36 MB/s, compared to the 5MB DVD can provide, and Blu-Ray discs 2x (72 MB/s) are already under study. And Blu-Ray is not going to stop here. 100 and 200 GB discs are under study, evolving from dual-layer to 4 or 8 layer. For greater mobility, the 8 cm. disc will be implemented, to use with portable devices. **HD-DVD - a cheaper alternative?** Blu-Ray's direct competitor, HD-DVD (High-Density Digital Versatile Disc) didn't gather in its corner so many IT producers: only Toshiba, the inventor and main supporter, and NEC, but, on the other hand, it's backed by more movie studios: Universal Studios, Paramount Pictures, Warner Bros and New Line Cinema. The sum behind it is of only 221 billion USD, but the involvement of the four major movie producers could definitely make a difference. Like Blu-Ray, HD-DVD uses 405 nm. blue laser, but it has more similarities with the DVD format. The numerical aperture of the lens is the same as on the case of the DVD, such as the protective layer thickness, of 0.6 mm. As for the supported codecs, there is no competition between the two formats, although the technological differences could impose the HD-DVD sooner. HD-DVD is supported by the DVD forum, which already crowned the format as the DVD successor. The transfer rate is 19 MB/s, the biggest speed so far. On the other hand, the reduced storage capacity will rise numerous problems to HD-DVD. The Hollywood studios know that a 135 minute movie with a compression rate of 12 Mbps means around 12-13 GB just for the video data. Add to this around 5 GB for a DVD quality soundtrack, space for supplementary soundtracks (either for other languages or other sound compressions), and the 30 GB a HD-DVD can hold become more than crowded. **Beyond technical data** This entire story about storage capacities, layers, wavelengths, lenses and all the technological talk is, after all, just publicity. Why? Because the judges, in this case, the Hollywood studios, don't care too much about storage and other technical data, and the race will be decided, in the end, by the copy protection.

Both Blu-Ray and HD-DVD wait for the new copy protection system, Advanced Access Content System, to be completed. This system assures of extra-security, which is all the producers, who want their audio-video content safe and sound, want to hear. And, above all, it promises not to be so easy to fool as CSS proved to be. While HD-DVD already declared its support for AACS, the Blu-Ray supporters still dream for their own protection system, but if AACS becomes stronger, they will have to adopt it. So the first competitor which will succeed to include AACS or other protection system in its technology will win the race, at least for the first six months. And, as peculiar it may sound, both competitors are holding their breath to see what the pornographic industry will decide. With over 10,000 titles per year, this industry has a big word to say and, by January this year, it didn't express its support to neither format. If everything goes according to plan, the first HD-DVD players should be commercialized worldwide from this autumn, while the Blu-Ray products won't be available sooner than the end of this year or the beginning of the next. Obviously, winning the battle doesn't mean eliminating the competitor, each of the formats already having its supporters and partisans. But whoever wins the hundreds and thousands of billion of dollars and whoever remains on the side, we can't possibly know yet, especially since... **The war is futile** ... because both formats, so debated since the beginning of 2004, may find themselves outrun by the Holographic Versatile Disc (HVD). While Blu-Ray and HD-DVD use the same laser, other producers thought of combining the two lasers (red and blue), in a single ray and [thanks to Optware](#) , on a disc the size of a CD or DVD, 1 TB of data could be stored (20 times more than on a Blu-Ray disc), with a transfer rate of 1 Gbit/s. The format is developed by the Japanese company Optware, in collaboration with Fuji Photo and CMC Magnetics. The three companies allied with Nippon Paint, Pulstec Industrial and Toagosei and "HVD Alliance" was born. The problem is that, while Blu-Ray and HD-DVD still allow the reading of present DVDs, along with the passing to the holographic storage era, the DVD days are over. So, all in all, this famous "disc format battle" could be won by a surprise competitor. Will Blu-Ray and HD-DVD sell, in these 4 years while the HVD is expected to pass its prototype stage? Hard to tell, since many believe that the DVD is dying, but never surrenders!