



## WHITE PAPER

**ENSURING CHILD SAFETY IN A DIGITAL WORLD**  
**A COMPREHENSIVE SOLUTION TO PARENTAL CONTROLLED VIEWING ACROSS DEVICES AND PLATFORMS****OVERVIEW**

We live in a world brimming with content. Consumers are now accustomed to accessing information and entertainment at their convenience across multiple platforms – broadcast, cable, satellite, wireless networks, the Internet – and on an increasingly diverse array of devices, including TVs, DVD players, radios, computers, mobile phones, e-books, and portable media players. The rising popularity of online social networks has also nurtured a pervasive culture of content recommendation and sharing. While the ubiquity of engaging and readily available content in a variety of contexts provides consumers with unprecedented opportunities and benefits, it also has the potential to compromise the safety of children and undermine the efforts of parents to monitor and control the kinds of material their children are able to access.



So far, dedicated technologies for ensuring child-safe consumption of media, like the V-Chip, have proven inadequate, often because they are device- or platform-specific. The V-Chip is a solution developed specifically for television, and thus lacks easy portability to other distribution channels. A child whose access to inappropriate content is blocked on a television may face no restrictions to the same content delivered on a laptop, mobile phone or DVD player. For a blocking solution to be truly effective and comprehensive in the long term, it will have to be easily deployable across all types of content and the full range of distribution channels, and compatible with every kind of device consumers currently use and are likely to use in the future. That is why a truly advanced parental control technology must be an intrinsic part of the content itself and persist with that content as it makes its way through the various distribution systems and platforms, regardless of copying, re-purposing or other transformations it undergoes along the way.


## DIGITAL WATERMARKING TECHNOLOGY

Digital watermarking is an imperceptible content identification technology, whereby a digital code is embedded into all forms of content, including images, audio, and video. Like a traditional watermark on paper or currency, which is applied during manufacture and remains an intrinsic part of each sheet or bill wherever it travels, the embedded code in a digital watermark persists with the content through manipulation, copying and format conversions, and as it migrates to various platforms, such as a mobile phone, the Internet, a CD, or a DVD. The embedded code is imperceptible to consumers of the content but easily detectable by devices equipped with a reader application.



The embedded code in a digital watermark persists as it migrates to various platforms, such as a mobile phone, the Internet, a CD, or a DVD.

In some cases, the information carried in a digital watermark can simply be a reference number – pointing, for example, to an online ratings database such as the Motion Picture Rating System. A unique reference number can also be used to track an individual content file as it moves through each link of a distribution chain. In addition to reference numbers, the watermark can carry a message or convey meaning in its own right, providing information that is semantic and declarative – for example, by declaring the nature of the content as “Adult” or “TV17.” Either kind of information can be accessed by a “reading” application in a playback device to trigger a rules-based action that allows content to be viewed or automatically blocked, depending on the parameters a parent or other user has established.



Digital watermarking is not new. It is a proven and pervasive technology that has been successfully deployed for years in a broad range of industries and applications.

- **Broadcast monitoring** allows content creators and advertisers to track where, when and how content is being used in geographically and demographically diverse markets worldwide.
- **Copy prevention** allows content owners and distributors to control and monitor the use of images, audio and video content, and provide broader and safer dissemination of copyrighted material.
- **Forensic tracking** gives content owners a means of determining exactly where and when a piece of content leaves its authorized distribution path.
- **Rights management** employs digital watermarks to make it possible for consumers to transfer content they have purchased between various playback devices and platforms without losing their rights to access it or affecting the playability of the content.
- **Content filtering and classification** allows peer-to-peer networks like Napster to facilitate legal file-sharing and distribution, using digital watermarks to identify and distinguish between copyrighted and non-copyrighted audio and video files.
- **E-commerce** benefits from a variety of watermarking-based content identification applications that, for example, allow consumers to instantly locate and purchase legal, downloadable music tracks when they hear a song through their phone, or access reviews and even purchase tickets simply by “reading” a movie or concert poster or a print ad with an enabled phone.
- **Counterfeit deterrence** using digital watermarks is being employed by national governments and central banks to protect the integrity of currencies across the world.

There are currently billions of digitally watermarked objects in distribution and millions of readers to detect them.

#### ESSENTIAL CHARACTERISTICS OF AN EFFECTIVE PARENTAL CONTROL SOLUTION

To achieve broad adoption of any blocking solution, it is important to first identify the fundamental characteristics required of the technology to be deployed. Those characteristics must be based on the recognition that consumer value is of foremost concern, and that maintaining a focus on meaningful empowerment of parents who will use the technology to protect their children is the best means of stimulating widespread and vigorous industry innovation.

An advanced blocking solution that meets government objectives and engages the energy and cooperation of a broad coalition of public and private stakeholders will embrace the following attributes. An effective solution must be:



- **Scalable.** The technology must be able to work with increasingly large volumes of content in addition to functioning across multiple content types (music, video, games, etc.) and consumption devices, including mobile phones and portable media players, and should be broadly deployable.
- **Content agnostic.** The technology must work with all forms of content and file types.
- **Format independent.** The technology must remain independent of format types, such as standard DVD format, digital broadcast format, or theatrical release format.
- **Mature.** The technology must already be tested and broadly adopted, and relied upon for mission-critical tasks in a range of industries and applications.
- **Extensible.** The technology must accommodate interoperability among multiple devices, and be readily adaptable to product upgrades and innovation.

Digital watermarking possesses each of these five characteristics, and is perhaps the only technology currently available with a track record of operating effectively across the full range of content types, formats, and devices. Content owners and distributors have already successfully adopted digital watermarking technology to protect disseminated content on a comprehensive range of media platforms. For the many digital content providers already using some form of watermarking, incorporating a child safety component into their production and distribution systems would be simply a matter of adding information during the embedding process, without significant disruption to workflows – requiring minimal additional investment in technology. Also, digital watermarks from one vendor are interoperable with watermarks from other vendors, and they can work with other signal processing technologies, such as fingerprinting or similar technologies based on hash values and header files. This means that multiple vendors will have the opportunity to offer solutions, and to compete and innovate within the ecosystem on a level playing field.

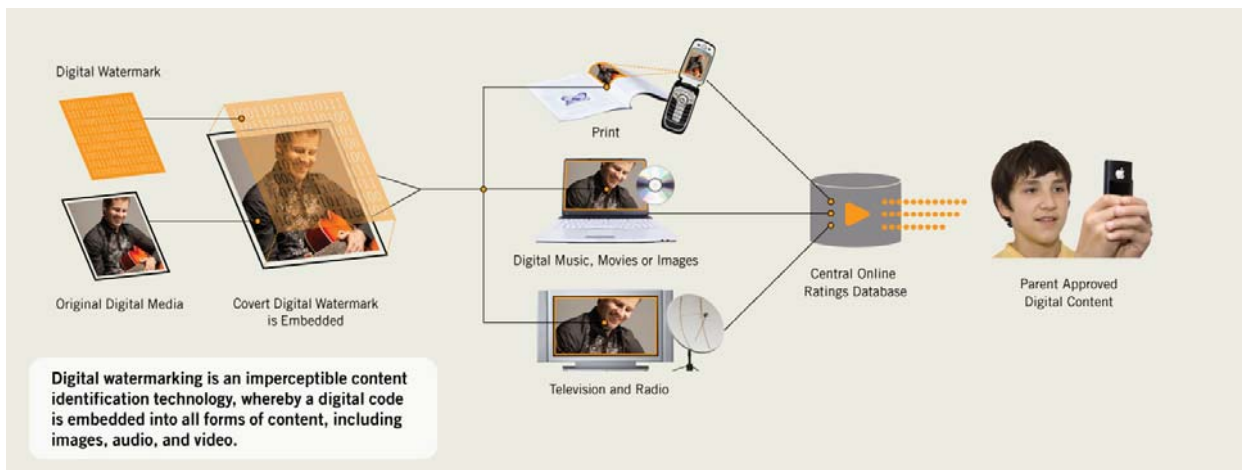
**Parents can efficiently and effectively block objectionable content on all of the devices their children may use, and choose a rating system based on their own personal values and preferences.**

#### **EMPOWERING PARENTS**

For widespread adoption of parental control technology to take hold, any solution will need to provide parents with the ability to activate blocking functions in accordance with their own cultural and social values. Choices about what content can be consumed by children will vary widely among different families – depending on such factors as religion, culture, and geographical region – and those choices will also be subject to variation and change within families as children mature and social norms evolve over time. A successful solution requires an adaptable and inclusive set of declarative labels that effectively classify content and can be used to automatically trigger blocking on all kinds of devices at parents' discretion.

Digital watermarking is fully compatible with any existing or future rating system. Rating systems and their associated labels can be provided by content distributors (e.g., satellite, cable or Internet service providers) or by vendors of player devices, allowing a broad range of providers to innovate and differentiate themselves in the marketplace by offering services tailored to their customers' needs. Customized ratings systems offering different or more specific content labels than are currently available could also be developed and implemented by other organizations, such as children's advocacy groups, churches, foundations, and cultural centers.

Even with all of these choices, however, parents are unlikely to invest in, and learn to use, multiple blocking systems on multiple devices. Technologies created for specific devices, platforms or delivery systems will only increase fragmentation within an already-complex ecosystem. Such an approach is also likely to frustrate parents who are looking for the convenience of a single technology to ensure their children are protected from inappropriate content, whether they are using a computer or watching TV at home, listening to music or playing video games on a portable device on their way to school, or using a mobile phone to share photos or videos or links to web pages with friends while shopping at the mall.



## CONCLUSION

Because digital watermarks are content-persistent, rather than channel- or platform- or device-specific, the technology is uniquely positioned to provide a comprehensive and lasting blocking solution for parents. Unlike other technologies, digital watermarking effectively locates the solution within the content itself, which means that the solution is permanent and far-reaching, persisting throughout all of the possible transformations and permutations content may undergo as it moves through myriad distribution systems and migrates to various platforms and delivery mechanisms. With a single, broad-based and thoroughly tested technology, parents can efficiently and effectively block objectionable content on all of the devices their children may use, and choose a rating system based on their own personal values and preferences.

For more information on the many uses of digital watermarking, visit the *Digital Watermarking Alliance* web site at [www.digitalwatermarkingalliance.org](http://www.digitalwatermarkingalliance.org).