

디지털 방송 콘텐츠 정보보호 기술

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Digital Rights Management

- ❖ Content owners are reluctant to make digital content available without protection against unauthorized copying and retransmission.
- ❖ DRM is critical to DTV penetration because digital content (Broadcast, Cable, DBS, DVD) key driver of DTV adoption.
- ❖ DRM policy seeks to balance incentives for content rights owners to produce and make available digital content with benefits to consumers of copying and sharing content.

DRM and FCC Actions

- "Broadcast Flag"
 - ❖ Seeks to limit Internet retransmission of digital broadcast programming
 - ❖ FCC expected to make decision shortly
- "Plug and Play"
 - ❖ Addresses DRM for pay TV content (Cable and DBS) as well cable-CE compatibility
 - ❖ Maintains the "chain of custody" for encrypted programming
 - ❖ FCC adopted rules September 10, 2003

Broadcast Flag

- Adopted by FCC November 4, 2003
- Provides protection from mass redistribution of content over the Internet
 - ❖ No restrictions on home copying
 - ❖ No need for new equipment
- "Redistribution Control Descriptor"
- Marks content for protection by receiver
- Content is in the clear during broadcast, but encrypted in consumer equipment
- Only unauthorized use is Internet redistribution of content
- FCC has approved 13 technologies from 10 companies for BF content protection

The Broadcast Flag

- The FCC's rule in 47 CFR 73.9002(b) and the following sections: "*No party shall sell or distribute in interstate commerce a Covered Demodulator Product that does not comply with the Demodulator Compliance Requirements and Demodulator Robustness Requirements."*

Plug-and-Play

- FCC adopted rules in September 2003
 - ❖ One-way "cable ready" sets
 - ❖ Should be available in 2004
 - ❖ Two-way negotiations beginning
 - ❖ Digital rights/home copying issues
 - ❖ Maximum copy restrictions apply to all MVPDs:
 - Broadcast programming – copy freely
 - Cable services, including movie channels – copy once
 - PPV/Video on demand – copy never

Copyrights vs. Related Rights

- Copyright
 - ❖ works covered: literary works --novels, poems, plays, reference works, newspapers and computer programs; databases; films, musical compositions, and choreography; artistic works such as paintings, drawings, photographs and sculpture; architecture; and advertisements, maps and technical drawings.
- Related Rights
 - ❖ differ from copyright, they belong to owners regarded as intermediaries in the production, recording or diffusion of works.

Related Rights

- Related Rights Provide A Layer Of Protection For Those Who Communicate And Distribute The Work To The Public
 - ❖ A musician *performs* a musical work written by a composer,
 - ❖ an actor *performs* a role in a play written by a playwright,
 - ❖ producers of phonograms -- or more commonly known as "the record industry" -- *record and produce* songs and music written by authors and composers, played by musicians or sung by performers, and
 - ❖ broadcasting organizations *broadcast* works and phonograms on their stations.

Protection of Copyrights & Related Rights

- Two treaties were concluded in 1996 at the *World Intellectual Property Organization* (WIPO).
 - ❖ The *WIPO Copyright Treaty* (WCT), deals with protection for authors of literary and artistic works, such as writings and computer programs; original databases; musical works; audiovisual works; works of fine art and photographs.
 - ❖ The *WIPO Performances and Phonograms Treaty* (WPPT), protects some "related rights"
 - performers and producers of phonograms.

View of WIPO

- The WIPO Treaties were presented as a response to developments in digital technology and in the marketplace.
 - ❖ "the owners of rights will be adequately and effectively protected when their works are disseminated through new technologies and communications systems such as the Internet".

View of WIPO

- They also *create new online rights* such as the right to use technological measures
 - ❖ the “anti-circumvention” provision requires countries to provide adequate legal protection and effective remedies against the circumvention of technological measures (such as encryption).
 - the second type of technological measures require countries to prohibit the deliberate alteration or deletion of electronic “rights management information” (i.e., information which identifies the work, its creators, performer, or owner, and the terms and conditions for its use).

WIPO Definition of Broadcasting

- WIPO SCCR/7/8 described broadcasting as follows:
 1. Main features have not changed since the 20th Century: broadcasting service is sending a stream of signals containing images/sounds for reception by the public at large.
 2. One transmitter can reach an audience of 2,000 or 2,000,000. Marginal cost for extra listeners or viewers is effectively zero.
 3. Some broadcasting organizations finance their activities through advertising or license fees. Others are financed by subscriptions.

Legal Framework for Protection of Broadcasters

- Broadcasting organizations are protected as holders of related rights under the *International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations* (a.k.a Rome Convention, 1961).
- Broadcast content as such, as opposed to broadcast signals, can also be protected by copyright and related rights, depending on the national legislation.

Protection under Rome Convention

- The "Rome Convention" was adopted in 1961 and has not been revised since. It is jointly administered by UNESCO, ILO and WIPO.
- Articles 13 & 14 (Rights to authorize or prohibit): re-broadcasting, fixation, reproduction of fixations, communication to the public in places accessible against payment of an entrance fee.
- There are exceptions and limitations for private use, short excerpts for reporting current events, internal ephemeral fixation, use solely for teaching or research

Protection under TRIPS Agreement

- The 1994 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which is administered by the WTO, incorporates or refers to this international protection, in Article 14.
- For 20 years, broadcasters "have the right to *prohibit* the following acts when undertaken without their authorization: the fixation, the reproduction of fixations, and the rebroadcasting by wireless means of broadcasts, as well as the communication to the public of television broadcasts of the same.

Protection under TRIPS Agreement

- Where Members do not grant such rights to broadcasting organizations, they shall provide owners of copyright in the subject matter of broadcasts with the possibility of preventing the above acts, subject to the provisions of the Berne Convention (1971).

Protection under Other International Treaties

- Where Members do not grant such rights to broadcasting organizations, they shall provide owners of copyright in the subject matter of broadcasts with the possibility of preventing the above acts, subject to the provisions of the Berne Convention (1971).

Protection under Other International Treaties

- The 1974 Brussels Satellites Convention addresses the question of protection of pre-broadcast program-carrying satellite signals by obliging member states to undertake measures against unauthorized distribution.

Copyrights

- Subject Matter: original creative expressions
 1. Literary works (includes software code);
 2. Musical works (including any accompanying words);
 3. Dramatic works (including any accompanying music);
 4. Pantomimes and choreographic works (dance notation, videotape, motion pictures satisfy the fixture requirement);
 5. Pictorial (i.e., photographs, maps), graphic, and sculptural works;
 6. Motion pictures (and other audiovisual works);
 7. Architectural works;
 8. Sound recordings.

Copyrights- Exclusive Rights

1. To *reproduce* the copyrighted work in copies or phonorecords;
2. To *prepare derivative* works based upon the copyrighted work;
3. To *distribute* copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending;
4. To *perform* certain copyrighted works publicly, such as literary, musical, dramatic, and choreographic works;
5. To *display* certain copyrighted works publicly, such as literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic or sculptural works.

Copyrights Exceptions

- Fair Use
 - ❖ In spite of Exclusive Rights, the law allows "fair use" of some copyrighted material
 - ❖ Fair use is a concept created by the copyright law as a defense to an assertion of copyright infringement. A "fair" use of copyrighted material may be found where the use is for purposes of *"criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research"*

Copyrights Exceptions

- Fair Use – Evaluation based on following 4 factors
 1. Purposes and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes
 2. Nature of the copyrighted work
 3. Amount and substantiality of the portion used in relation to the copyrighted work as a whole, and
 4. Effect of the use upon the potential market for or value of the copyrighted work.

DMCA Overview

- In 1998, the Digital Millennium Copyright Act (DMCA) was enacted.
- Anti-circumvention provisions are an important (but not only) focus of the DMCA.
- Prohibits hacking through measures used to control access to copyrighted works.
- Amends existing U.S. copyright law to comply with the international treaties (e.g., WIPO).
- The DMCA is divided into *five titles*.

DMCA Section 1201

- DMCA *Title I: Prohibition of all unauthorized access... by bypassing security measure...*
 - ❖ New Section 1201 implements the obligation to provide adequate and effective *protection against circumvention of technological measures* used by copyright owners to protect their works.
 - e.g., Hardware or software
 - e.g., Action that bypasses computer restrictions on access to databases could become a violation of federal law.

DMCA and Technical Measures

- DMCA *Title I: Prohibition of all unauthorized access... by bypassing security measure...*
 - ❖ New Section 1201 divides technological measures into two categories:
 - Category I: measures that prevent unauthorized *access* to a copyrighted work and
 - Category II: measures that prevent unauthorized *copying* of a copyrighted work.

DMCA: Act of Circumvention

- DMCA *Title I: Prohibition of all unauthorized access... by bypassing security measure...*
 - ❖ As to the act of circumvention in itself, the provision
 - Prohibits circumventing the Category I (*access*) of technological measures, *but*
 - Does not prohibit circumventing the Category II (*copying*) of technological measures

DMCA and Fair Use

- DMCA *Title I: Prohibition of all unauthorized access... by bypassing security measure...*
 - ❖ Why Distinction between Access & Copying?
 - Supposedly "*Fair Use*" may be a defense for act of circumventing a technology measure that prevents copying, i.e., Category II (*copying*).
 - "*Fair Use*" is *not* a defense to the Category I (*access*): the act of circumventing a technology measure in order to gain access is prohibited.

Proscription of Devices and Services

- DMCA *Title I: Prohibition of all unauthorized access... by bypassing security measure...*
 - ❖ Section 1201 *proscribes devices or services* that fall within any one of the following 3 *categories*:
 1. They are primarily designed or produced to circumvent;
 2. They have only limited commercially significant purpose or use other than to circumvent; or
 3. They are marketed for use in circumventing.

DMCA Saving Clauses

- DMCA *Title I: Prohibition of all unauthorized access... by bypassing security measure...*
 - ❖ Section 1201 contains two general *savings clauses*
 - 1201(c)(1) states that nothing in section 1201 affects rights, remedies, limitations or defenses to copyright infringement, including fair use
 - 1201(c)(2) states that nothing in section 1201 enlarges or diminishes vicarious or contributory copyright infringement

DMCA Exceptions

- DMCA *Title I: Prohibition of all unauthorized access... by bypassing security measure...*
 - ❖ The prohibitions contained in section 1201 are subject to a number of exceptions.
 - law enforcement,
 - government Intelligence, and
 - other governmental activities (Section 1201(e)).
 - ❖ The prohibitions contained in section 1201 are subject to 6 *other exceptions*.

DMCA Exceptions

- Exceptions to bypassing encryption measures
 1. Nonprofit libraries, archives, and educational institutions can bypass encryption measures of materials being reviewed for purchase if a copy of the materials is unavailable to them in any other manner (1200(d))
 2. Software developers can bypass encryption measures of legally obtained products in order to reverse engineer them (as allowed under existing copyright law) for interoperability development (1201(f))

DMCA Exceptions

- Exceptions to bypassing encryption measures
 3. Researchers studying new encryption technologies can bypass encryption measures when necessary under existing U.S. law if the materials are legally obtained and the researcher makes an effort to get permission from the copyright owner before attempting to bypass the security measures (1201(g))
 4. Protection of Minors: technology that prevents access of minors to material on the Internet (1200(h))

DMCA Exceptions

- Exceptions to bypassing encryption measures
 5. A user can bypass security measures (ex. disabling cookies) to protect personally identifying information if there is no other way to avoid the intrusion and there is no other effect on the performance of the product (1200(i))
 6. System administrators and security specialists can bypass encryption for purpose of testing the security of a computer, computer system or network, with authorization of owner or operator (1201(j))

DMCA Title II

- *DMCA Title II: Online service provider liability*
 - ❖ This title places *limitations on liability* for online service providers (OSP) who are in compliance with the nature of this law.
 - ❖ *Service providers* are defined as "an entity offering the transmission, routing, or providing of connections for digital online communications."

DMCA Title II

- *DMCA Title II: Online service provider liability*
 - ❖ In *exchange* for complying with this title, the OSP is afforded *some limitations on liability* in the event that a *user illegally posts, receives or stores* copyrighted material as long as the OSP is serving only as the means for transmitting the materials. The liability for infringement will lie with the individual who committed the offense.

DMCA Title II

- *DMCA Title II: Online service provider liability*
 - ❖ The new law requires implementation of *numerous operational procedures* that, if not carefully applied and monitored, could *sharply* limit the use of technologies for teaching and research.

DMCA: Procedural Obligations

- *DMCA Title II: Online service provider liability*
 1. The most obvious measure an OSP must comply with is the registration of an official agent with the U.S. Copyright Office to be included in a publicly available database. This individual would be the person a copyright holder notified in the event of a possible infringement by an OSP user.

DMCA: Procedural Obligations

- *DMCA Title II: Online service provider liability*
 2. The DMCA also states an OSP must provide all users with reasonable access to information about the OSPs policies and standard procedures for dealing with notifications of infringement.
 3. The OSP is obligated to inform users that their accounts and services will be terminated if they repeatedly violate copyright laws.

DMCA: Procedural Obligations

- DMCA *Title II: Online service provider liability*
 4. Removing or disabling access to materials if the university obtains knowledge of infringing activity or becomes aware of facts that suggest infringement.
 5. Adhering to numerous and extensive technical requirements for the storage and transmission of the infringing materials and all materials that may be communicated on the OSP's system or network.

DMCA Measures of Compliance

- Measures of compliance (Storage & Links)
 - ❖ Under the DMCA, the *storage of materials* on OSP systems is generally considered to be the *responsibility of the user* who placed the materials on the system.
 - ❖ Additionally, the *content* of materials accessible through referral tools such as links pages or search engines linking to infringed materials are *not* considered the direct responsibility of the OSP.

DMCA Measures of Compliance

- Measures of compliance (Storage & Links)
 - ❖ The DMCA provides this *limitation on liability* if the OSP:
 1. has no reason to know user stored or linked materials are infringing;
 2. quickly responds to claims of infringement by copyright holders;
 3. has not made any money off the infringed material; and
 4. follows the proper procedures for dealing with claims of infringement.

DMCA Measures of Compliance

- Measures of compliance (Caching)
 - ❖ System caching is another commonly performed activity of an OSP that is afforded some limitation on liability under the DMCA.
 - ❖ Caching involves the creation of temporary copies of a file that is requested often by system users. In the case of providing online service, caching speeds up access but creates a copy of the material within the system of the OSP.

DMCA Measures of Compliance

- The DMCA states that OSPs can make cached copies of materials and still be allowed some *limitations on liability* if they:
 1. store the material automatically when the original transmission was initiated by a user;
 2. transmit the material with no modifications to subsequent users who must then meet any conditions set up by the originator, such as fees to be paid for access or passwords needed to access;

DMCA Measures of Compliance

- The DMCA states that OSPs can make cached copies of materials and still be allowed some *limitations on liability* if they:
 3. update the copy as specified by the originator of the materials;
 4. leave all encryption and security measures in place; and
 5. remove or take down all copies if the original material is taken down and the copyright owner tells the OSP about it.

DMCA Measures of Compliance

- Measures of compliance (Routing & Storage)
 - ❖ Measure providing *some limitations on liability* to the OSP deals with the provision of connections or the routing and storage of materials sent through the system by the users.

DMCA Measures of Compliance

- The DMCA provides the OSP limitations on liability if:
 1. the material was transmitted by an automatic technical process at the direction of or because of the actions of someone other than the OSP;
 2. recipients of the material are selected by an automatic response to the users request;

DMCA Measures of Compliance

- The DMCA provides the OSP limitations on liability if:
 3. only the recipients are able to access the materials and the OSP does not keep a copy of the file longer than necessary to transmit it; and
 4. the OSP does not modify the material as it passes through their system.

DMCA Title III

- *DMCA Title III: Computer Maintenance or Repair Copyright Exemption*
 - ❖ Reserves the right of the owner or lessee of a machine to make a copy of a program in order *to perform maintenance or repair work* on computer hardware. The copy can only be used for repair and has to be destroyed when the work is done.
 - ❖ Additionally, *only* the programs *necessary* to make the computer *function* can be copied

DMCA Title III

- *DMCA Title III: Computer Maintenance or Repair Copyright Exemption*
 - ❖ Title III *expands* the existing exemption relating to computer programs in *Section 117* of the Copyright Act, which allows the owner of a copy of a program to make reproductions or adaptations when necessary to use the program in conjunction with a computer.

DMCA Title IV

- *DMCA Title IV: Miscellaneous Provisions*
 - ❖ Addresses varied topics such as duties, job descriptions and salaries of certain U.S. government copyright and patent employees,
 - ❖ Other significant issues of this title are perhaps:
 - Distance Education (Study)
 - Digital Copies for Preservation

DMCA Title IV

- Varied topics (Distance Education & Digital Copies for Preservation)
 - ❖ Distance Education (Study)
 - Section 403 establishes a study by the U.S. Copyright Office to gather information about distance education for the purpose of preparing a congressional report containing ideas to promote distance education through digital technologies.

DMCA Title IV

- Varied topics (Distance Education & Digital Copies for Preservation)
 - ❖ Digital Copies for Preservation
 - Section 404 amends existing law to allow libraries and archives to make up to three digital copies of rare or deteriorating materials for preservation purposes. The digital copies can only be used on the library premises.

DMCA Title IV

- Varied topics (Distance Education & Digital Copies for Preservation)
 - ❖ Digital Copies for Preservation
 - Copies of materials stored in technologically obsolete formats may also be made. A format is considered obsolete if the device or machine needed to access the material is no longer being manufactured or reasonably available.

DMCA Title IV

- Varied topics (Distance Education & Digital Copies for Preservation)
 - ❖ Digital Copies for Preservation
 - Prior to enactment of the DMCA, section 108 permitted such libraries and archives to make a single facsimile (i.e., not digital) copy of a work for purposes of preservation or interlibrary loan.

DMCA Title V

- *DMCA Title V: Protection of Certain Original Designs*
 - ❖ This section of the DMCA is called the Vessel Hull Design Protection act. This Act amends copyright law to protect new boat hull designs for a period of 10 years after the design was originally introduced.

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