



Long Comment Regarding a Proposed Exemption Under 17 U.S.C. § 1201

COMMENT OF THE MUSEUM OF ART AND DIGITAL ENTERTAINMENT

Item A. Commenter Information

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The Museum of Art and Digital Entertainment (the “MADE”) is a 501(c)(3) non-profit organization in Oakland, California dedicated to the preservation of video game history. The MADE supports the technical preservation of video games, presents exhibitions concerning historically-significant games, and hosts lectures, tournaments, and community events. The MADE has personal knowledge and experience regarding this exemption through past participation in the sixth triennial rulemaking relating to access controls on video games.

The MADE is represented by the Samuelson Law, Technology & Public Policy Clinic at the University of California, Berkeley, School of Law (“Samuelson Clinic”). The Samuelson Clinic is the leading clinical program in technology and public interest law, dedicated to training law and graduate students in public interest work on emerging technologies, privacy, intellectual property, free speech, and other information policy issues.

ITEM B. PROPOSED CLASS ADDRESSED

Proposed Class 8: Computer Programs—Video Game Preservation

Privacy Act Advisory Statement: Required by the Privacy Act of 1974 (P.L. 93-579)

The authority for requesting this information is 17 U.S.C. §§ 1201(a)(1) and 705. Furnishing the requested information is voluntary. The principal use of the requested information is publication on the Copyright Office Web site and use by Copyright Office staff for purposes of the rulemaking proceeding conducted under 17 U.S.C. § 1201(a)(1). NOTE: No other advisory statement will be given in connection with this submission. Please keep this statement and refer to it if we communicate with you regarding this submission.

ITEM C. OVERVIEW

1. Introduction

For future historians, video games like *Minecraft* and *Second Life* will say as much about 21st century America as Dicken’s *Oliver Twist* does about 19th-century Britain.¹ That is, if these games actually survive into the future. Unfortunately, video game preservation lags far behind other media and is impaired by technological challenges² and legal limitations.³ The Copyright Office has recognized this problem, and took steps to support video game preservation in the previous rulemaking.⁴ Unfortunately, online video games were not covered. So, despite their ever-growing cultural importance, online video games continue to turn into digital dust⁵ when their copyright owners cease to provide access to an external server necessary for the game to function—i.e., when these games are “**abandoned.**”

To avoid this outcome, we ask the Register of Copyrights to recommend a modest expansion of the video game exemption adopted during the last rulemaking (the “**Current Exemption**”)⁶ to allow for the preservation of abandoned video games that depend on external servers to function (“**online games**” or “**online video games**”). This proposal is being made on behalf of preservationists who wish to preserve abandoned online video games in playable form and who do not seek to expand the portions of the Current Exemption concerning personal gameplay beyond their current bounds. Therefore, we ask: (a) for renewal of the portions of the Current Exemption that allow circumvention for the purpose of restoring access to video games that require server authentication for personal local or LAN-connected gameplay;⁷ and (b) for slight

¹ See Mike Ashenfelder, “Saving Mementos from Digital Worlds,” *The Signal* (Feb. 6, 2014), available at <https://web.archive.org/web/20171004021728/https://blogs.loc.gov/thesignal/2014/02/saving-digital-mementos-from-virtual-worlds/> (archived October 3, 2017) (describing *Minecraft*).

² See Devin Monnens et al., “Before it’s Too Late: A Digital Game Preservation White Paper,” 2 *American Journal of Play* 139, 140-143 (2009), available at <http://web.archive.org/web/20171129073552/http://www.journalofplay.org/sites/www.journalofplay.org/files/pdf-articles/2-2-special-feature-digital-game-preservation-white-paper.pdf> (archived Nov. 29, 2017) (discussing the imminent need to preserve video games due to their “shockingly short life span due to the natural decay of the original materials and the rapid obsolescence of older media forms.”)

³ See Allison M. Hudgins, “Preservation of the Video Game,” 29 *Provenance, Journal of the Society of Georgia Archivists* 32, 37-38 (2011), available at <http://digitalcommons.kennesaw.edu/cgi/viewcontent.cgi?article=1032&context=provenance> (discussing legal obstacles to video game preservation).

⁴ U.S. Copyright Office, Section 1201 Rulemaking: Sixth Triennial Proceeding to Determine Exemptions to the Prohibition on Circumvention, Recommendation of the Register of Copyrights 350–352 (2015) [hereinafter “Register’s Recommendation 2015”] (recommending Current Exemption for the preservation of abandoned video games).

⁵ See Jerome McDonough, et al., “Preserving Virtual Worlds Final Report,” at 6 (2010), available at <https://web.archive.org/web/20171107162212/https://www.ideals.illinois.edu/handle/2142/17097> (archived Nov. 7 2017) (discussing technical and legal challenges to preservation of online video games); Clay Risen, “Pac Rat: The fight to preserve old videogames from bit rot, obsolescence, and cultural oblivion,” *The Atlantic* (Mar. 2010), available at <https://web.archive.org/web/20171003233405/https://www.theatlantic.com/magazine/archive/2010/03/pac-rat/307911/> (archived Oct. 3, 2017) (discussing the problem of “bit rot” that effects software storage media); Partial List of Abandoned MMOs, *infra* at A-16 [hereinafter “Abandoned MMOs”] (providing partial list of MMOs that have been abandoned by their publishers).

⁶ See 37 C.F.R. § 201.40(b)(8).

⁷ See *id.* at (i)(A).

modifications to the Current Exemption to allow circumvention of TPMs for the purpose of preserving abandoned online video games by libraries, archives, museums, and individuals who are engaged in lawful game-preservation activities under the supervision of eligible libraries, archives, or museums (the “**Proposed Exemption**”). Proponents respectfully request that the Register of Copyrights recommend to the Librarian of Congress the new exemption language provided in Item C-2 below.

This proposal naturally extends the Current Exemption to address technological change. Preservation of networked multiplayer games was contemplated by the Current Exemption, which allows for preservation of multiplayer games that may be played through a local-area network.⁸ At the time, the Register of Copyrights noted that “continued access and use of video games, including multiplayer play, is still possible using locally connected devices.”⁹ Today, however, local multiplayer options are increasingly rare,¹⁰ and many games no longer support LAN-connected multiplayer capability.¹¹ Instead, “[y]ou can’t really find games that offer LAN modes, since [nearly] every multiplayer game on the market ... requires a constant connection to the home servers.”¹² This means that “even if you get together in the same room to play, you need to loop in [the game’s] servers and matchmaking services...”¹³ In other words, even if game clients are connected to the same local network, they will still need to connect to external servers to function.¹⁴ More troubling still to archivists, many video games rely on server connectivity to function in single-player mode and become unplayable when servers shut down.¹⁵ “Some games require a connection to an external server—sometimes on an ongoing basis—for all types of play, including single-player play.”¹⁶

Although the Current Exemption does not cover it, preservation of online video games is now critical. Online games have become ubiquitous and are only growing in popularity. For example, an estimated fifty-three percent of gamers play multiplayer games at least once a week, and

⁸ See 37 C.F.R. § 201.40(b)(8)(iii)(C) (defining “local gameplay” to mean “gameplay conducted on a personal computer or video game console, or locally connected personal computers or consoles, and not through an online service or facility.”).

⁹ Register’s Recommendation 2015, *supra* note 4, at 351.

¹⁰ See The Death of Local Multiplayer: Gaming’s Worst Trend,” All You Can Geek, available at <https://web.archive.org/web/20170127221136/http://allyoucangeek.net/death-of-local-multiplayer/> (archived Jan. 27, 2017) (discussing the reduction in games with local multiplayer features).

¹¹ See Ben Kuchera, “Gaming has left the LAN party behind,” Polygon (Jan. 29, 2015), available at <https://web.archive.org/web/20171129060417/https://www.polygon.com/2015/1/29/7944755/lan-party-gaming-call-of-duty> (archived Nov. 28 2017).

¹² *Id.*

¹³ *Id.*

¹⁴ See *id.*

¹⁵ See Statement of Henry Lowood, *infra* at A-6 [hereinafter “Lowood Statement”] (“If a game server is shut down without provisions being made for access to the original software, preservation is impossible.”). See also Abandoned MMOs, *supra* note 5.

¹⁶ Register’s Recommendation 2015, *supra* note 4, at 345.

spend, on average, six hours a week playing with others online.¹⁷ Moreover, fifty percent of gamers identify “online gameplay capability” as a factor in their game-purchasing decisions.¹⁸ “From *Hearthstone* and *Overwatch*, to *Playerunknown’s Battleground* and *Rocket League*, to *Dota 2* and *League of Legends*, to *Clash of Clans* and *Tom Clancy’s Rainbow Six: Siege*, and on and on, the games getting the most player attention (and money) today tend to be never-ending online competitions.”¹⁹ Therefore, to keep pace with changing technology and increased cultural demand, the Current Exemption should be modestly expanded to allow preservation of abandoned online video games that rely on external servers to function.

As part of this expansion, the class of people who may use the Proposed Exemption should include eligible libraries, archives, museums, and affiliated individuals who are engaged in lawful game preservation activities under the supervision of libraries, archives, or museums (“**Affiliate Archivists**”). These individuals “may be able to contribute to valuable preservation efforts by lending their talents and expertise to qualified institutions,”²⁰ such as the MADE,²¹ the Video Game History Foundation,²² the Museum of Modern Art,²³ the International Center for the History of Electronic Games at the Strong Museum of Play (“**ICHEG**”),²⁴ and the video game archives at the University of Texas²⁵ and the University of Michigan.²⁶ For example, the MADE’s restoration of *Habitat*, the world’s first massively-multiplayer online game (“**MMO**”), took over four years and involved “thousands of person-hours, including countless hours provided by volunteers.”²⁷ On that project “[s]cheduling, high-level technical strategy (e.g., “do we rewrite it from scratch, or try to get the old server running?”), and overall project management was done by the MADE, but volunteers under the MADE’s supervision provided the bulk of the day-to-day

¹⁷ See Electronic Software Association, Essential Facts about the Computer and Video Game Industry 4 (2017), available at https://web.archive.org/web/20170924222303/http://www.theesa.com/wp-content/themes/esa/assets/EF2017_Design_FinalDigital.pdf [hereinafter “ESA Essential Facts”] (archived September 24, 2017)

¹⁸ See *id.* at 14.

¹⁹ Kyle Orland, “Big-budget, Single-Player Gaming Isn’t Dead (yet),” *Ars Technica*, available at <https://web.archive.org/web/20171024235207/https://arstechnica.com/gaming/2017/10/big-budget-single-player-gaming-isnt-dead-yet/> (archived on Oct. 24, 2017).

²⁰ Register’s Recommendation 2015, *supra* note 4, at 351.

²¹ “About Us,” The Museum of Art and Digital Entertainment, available at <https://www.themade.org/about/> [hereinafter “About MADE”].

²² “Who We Are,” The Video Game History Foundation, available at <https://web.archive.org/web/20170827172939/https://gamehistory.org/who-we-are/> (archived Aug. 27, 2017).

²³ “About MoMa,” Museum of Modern Art, available at <https://web.archive.org/web/20160806082220/http://press.moma.org/intro/> (archived Aug. 6, 2016).

²⁴ “About International Center for the History of Electronic Games,” The Strong Museum of Play, available at <https://web.archive.org/web/20171129073202/http://www.museumofplay.org/about/icheg> (archived Nov. 29, 2017) [hereinafter “About ICHEG”].

²⁵ See “Mission,” The UT Videogame Archive, available at <https://web.archive.org/web/20171005143633/http://www.cah.utexas.edu/projects/videogamearchive/index.php> (archived Oct. 5, 2017) [hereinafter “About UT”].

²⁶ See “About the Computer and Video Game Archive,” University of Michigan Library, available at <https://web.archive.org/web/20170512121354/http://guides.lib.umich.edu/cvga> (archived May 12, 2017) [hereinafter “About Michigan CVGA”].

²⁷ Statement of the Museum of Art and Digital Entertainment, *infra* at A-1 [hereinafter “MADE Statement”].

technical work required to bring the game back to life.”²⁸ Similarly, Affiliate Archivists may be needed to help “document how [game] software works, map the game worlds, identify key components of the software and how they operate, reveal hidden aspects of online games, etc.”²⁹ Without Affiliate Archivists’ valuable contributions of “time and expertise [made] out of their love for video games,” the game preservation work undertaken by libraries, archives, and museums will be greatly limited.³⁰ Moreover, harnessing the expertise of amateur experts, under supervision, is in line with good preservation practice. Indeed, in 2008, the Section 108 Study Group (an independent body sponsored by the Copyright Office) recommended involving outside parties in preservation efforts undertaken by libraries and archives for similar preservation of other materials.³¹ Therefore, the class of exemption users should be expanded to encourage Affiliate Archivists to participate in game preservation projects.

Abandoned online video games are worthy of preservation in playable form, and doing so will support future research, scholarship, teaching, criticism, and commentary about video games and video game culture. Conversely, without the Proposed Exemption, future generations will not be able to learn from the technological achievements (and missteps) of their predecessors or to understand the place of online video games in contemporary popular culture.³² As a result, future scholars will end up “looking back at western civilization and wondering what went on in the big hollow spaces where knowledge ought to be.”³³ To avoid losing a huge portion of video game history to a digital dark age,³⁴ the Register of Copyrights can help preserve these culturally vital works by empowering libraries, archives, museums, and affiliated Affiliate Archivists to preserve abandoned online video games.

In 1998, Congress enacted the DMCA anti-circumvention rules out of concern that, without the protections afforded by technological protection measures, copyrighted content would be at high risk of rampant infringement.³⁵ Yet, Congress also credited the views of those who ex-

²⁸ *Id.*

²⁹ *Id.*

³⁰ Lowood Statement.

³¹ See Section 108 Study Group, The Section 108 Study Group Report, at i (2008), available at <https://web.archive.org/web/20171207124042/http://www.section108.gov/docs/Sec108StudyGroupReport.pdf> (archived Dec. 7, 2017) [hereinafter “Section 108 Study”] (“Section 108 should be amended to allow a library or archives to authorize outside contractors to perform at least some activities permitted under section 108 on its behalf.”).

³² See, e.g., Meredith Rose, “Erasing the Past: When (and How) a Groundbreaking Game Disappears for Good,” Medium, available at <http://web.archive.org/web/20170114150229/https://medium.com/@PublicKnowledge/erasing-the-past-when-and-how-a-groundbreaking-game-disappears-for-good-9ea089a703cb> (analogizing the shutdown of an multiplayer online game to “bulldozing a museum.”).

³³ Phil Hartup, “Why It’s Down to this Generation to Begin Preserving Video Game History,” New Statesman (Apr. 2015), available at <https://www.newstatesman.com/killing-time/2015/04/why-its-down-generation-begin-preserving-video-game-history>.

³⁴ See Monnens, *supra* note 2, at 140.

³⁵ See U.S. Copyright Office, Section 1201 of Title 17: A Report of the Register of Copyrights, at i (1998), available at <http://web.archive.org/web/20171029040623/https://www.copyright.gov/policy/1201/section-1201-full-report.pdf> (archived Oct. 29, 2017) (“Congress recognized that the same features that make digital technology a valuable delivery mechanism—the ability to quickly create and distribute near-perfect copies of works on a vast scale—also carry the potential to enable piracy...”).

pressed concern that the use of TPMs might interfere with lawful uses.³⁶ This rulemaking procedure was created to enable those who have been thwarted in making lawful uses of TPM-controlled works to apply for and make a showing that they had been harmed or chilled from making such uses.³⁷ Because the Proposed Exemption poses no risk of facilitating rampant infringement and would have positive consequences in preserving an important part of our cultural heritage, it should be granted.

As directed by the Register of Copyrights, this Comment focuses on the “legal and evidentiary bases for modifying the exemption, rather than the underlying exemption,” and, therefore, will exclusively discuss why modifying the Current Exemption to enable preservation of abandoned online video games is necessary.³⁸ Item C-2 details our Proposed Exemption language, and Item C-3 provides definitions of terms used throughout this Comment. Item D-1 describes the architecture of online video games, and Item D-2 details the technological protection measures and methods of circumvention applicable to abandoned online video games. Item E-1 discusses why the preservation of abandoned online games is consistent with Congress’ intent regarding the nature and scope of legitimate preservation activities. Item E-2 provides legal arguments for why preservation of abandoned online video games is a non-infringing fair use. Item E-3 provides evidence showing that the prohibition on circumvention is causing an adverse impact on this non-infringing use. Item E-4 discusses § 1201(a)(1)(C)’s five statutory factors, and answers the specific questions the Copyright Office asked concerning the Proposed Exemption.³⁹ Item E-5 concludes. An appendix of documentary evidence is attached.

2. The Proposed Exemption modifies the Current Exemption to allow for preservation of abandoned online video games that depend on external servers to function.

The Proposed Exemption below modifies the Current Exemption (codified at 37 C.F.R. § 201.40(b)(8)) to allow for the preservation of abandoned online video games by libraries, archives, museums, and Affiliate Archivists. In this suggested language, bold text indicates additions to the Current Exemption and strikethrough text indicates deletions:

(i) Video games in the form of computer programs embodied in physical or downloaded formats that have been lawfully acquired as complete games, when the copyright owner or its authorized representative has ceased to provide access to an external computer server necessary to **either** facilitate an authentication process to enable local gameplay **or to conduct online gameplay**, solely for the purpose of:

³⁶ See *id.*

³⁷ See *id.* at 22 (discussing legislative history of § 1201 rulemaking).

³⁸ See Copyright Office, Exemptions to Permit Circumvention of Access Controls on Copyrighted Works, 82 Fed. Reg. 49550, 49558 (Oct. 28, 2017) (“In cases where a class proposes to expand an existing exemption, commenters should focus their comments on the legal and evidentiary bases for modifying the exemption, rather than the underlying exemption.”).

³⁹ See *id.* at 49561–62.

(A) Permitting access to the video game to allow copying and modification of the computer program to restore access to the game for personal, **local** gameplay on a personal computer or video game console; or

(B) Permitting access to the video game to allow copying and modification of the computer program to restore access to the game on a personal computer or video game console when necessary to allow preservation of the game in a playable form by an eligible library, archives or museum, **or an eligible library, archives or museum's eligible affiliate**, where such activities are carried out without any purpose of direct or indirect commercial advantage and the video game is not distributed or made available **to the public** outside of the physical premises of the eligible library, archives or museum.

(ii) Computer programs used to operate video game consoles solely to the extent necessary for an eligible library, archives or museum, **or an eligible library, archives or museum's eligible affiliate**, to engage in the preservation activities described in paragraph (i)(B).

(iii) For purposes of the exemptions in paragraphs (i) and (ii), the following definitions shall apply:

(A) "Complete games" means video games that can be played by users without accessing or reproducing copyrightable content stored or previously stored on an external computer server, **or video games that can be played by users through lawful access of game content stored or previously stored on an external computer server.**

(B) "Ceased to provide access" means that the copyright owner or its authorized representative has either issued an affirmative statement indicating that external server support for the video game has ended and such support is in fact no longer available or, alternatively, server support has been discontinued for a period of at least six months; provided, however, that server support has not since been restored.

(C) "Local gameplay" means gameplay conducted on a personal computer or video game console, or locally connected personal computers or consoles, and not through an online service or facility.

(D) "Online gameplay" means gameplay conducted on a personal computer or video game console using an external computer server.

(DE) A library, archives or museum is considered "eligible" when the collections of the library, archives or museum are open to the public and/or are routinely

made available to researchers who are not affiliated with the library, archives or museum.

(F) An affiliate of a library, archives, or museum is considered “eligible” when engaged in the lawful preservation of video games under the supervision of an eligible library, archives, or museum.

3. Defined terms used in this Comment

In addition to the terms defined in the Proposed Exemption above, the following technical terms are used throughout this Comment:

“Abandoned” means that the copyright owner of a video game, or its authorized representative, has ceased to provide access to an external computer server necessary for the game to function.

“Affiliate Archivists” means persons who engage in lawful game preservation activities under the supervision of an eligible library, archives, or museum.

“Current Exemption” means the DMCA exemption adopted during the sixth triennial rulemaking, as currently codified at 37 C.F.R. § 201.40(b)(8).

“Game architecture” means the various software components of a video game, such as the game’s client, protocol, and external servers, and any other software or copyrighted content required for a video game to function.

“ICHEG” means the International Center for the History of Electronic Games at the Strong Museum of Play.

“MMO(s)” means massively-multiplayer online games that require a persistent external server connection to operate.⁴⁰

“Online games” or **“online video games”** means video game software designed for personal computers or video game consoles that depend on an external computer server to function.

“Playable form” means that a video game’s software is fully operational and can be played in the manner intended by the game’s developer or publisher when the game was first distributed.

⁴⁰ See, e.g., Hyun Chu, “Building a simple yet powerful MMO game architecture,” IBM developerWorks, available at <http://web.archive.org/web/20160721164625/https://www.ibm.com/developerworks/library/ar-powerup1/> (archived July 21, 2016) (describing common architecture of an MMO).

“Preservation,” “Preserve,” or “Preserving” means the repair, modification, replication, or replacement of the game architecture of an abandoned video game to restore it to playable form, including, but not limited to, the creation of new, interoperable protocols and servers.

“Preservationists” or “archivists” means eligible libraries, archives, museums, and Affiliate Archivists.

“Proposed Exemption” means the proponent’s proposed modifications to the Current Exemption to allow circumvention for the purpose of preserving abandoned online video games, as indicated in Item C-2.

ITEM D. TECHNOLOGICAL PROTECTION MEASURES AND METHODS OF CIRCUMVENTION

1. Effective preservation of an abandoned online video game requires copying or modifying all components of the game’s architecture.

Most modern online games use the same basic architecture, which has three main software components: game client, protocol, and external servers.⁴¹ All of these elements must be preserved for an online video game to be fully functional.

The client: In a typical online game, the client program is sold on a game disc or is downloaded onto a user’s computer when purchased. The client contains much of the game’s copyrightable material, such as graphics, music, and expressive software code. This is done for performance reasons, as it is faster to store and retrieve this data locally rather than to stream it over a network.⁴² While broadband Internet makes streaming data-intensive game content more feasible, nearly all modern online games still require a client, due to their ever-increasing graphical intensity and limits on network data usage.⁴³

The protocol: The game protocol acts as the middleman between the client and the server and define the rules of communication.⁴⁴ The protocol is typically bundled with the client software

⁴¹ See *id.* In 2015, the proponents of the Current Exemption made a technological distinction between games that utilize online matchmaking services and games that require persistent server connections, like MMOs. See Sixth Triennial Section 1201 Rulemaking: Initial Comments of the Electronic Frontier Foundation, Class 23, at 2, 4 (2015) [hereinafter “EFF Initial Comments 2015”]. However, because the underlying technologies at issue are nearly identical and involve similar TPMs, this distinction is likely unnecessary. See Sixth Triennial Section 12012 Rulemaking: Opposition Comments of the Entertainment Software Association, Class 23, at 7 (2015).

⁴² See Gabriel Gambetta, “Fast-paced Multiplayer (Part I): Client-Server Game Architecture,” available at <http://web.archive.org/web/20171031130651/http://www.gabrielgambetta.com/client-server-game-architecture.html> (discussing performance issues in client-server architecture).

⁴³ Cf. Glenn Fiedler, “What Every Programmer Needs to Know about Game Networking,” Gaffer on Games, available at http://web.archive.org/web/20170810080053/https://gafferongames.com/post/what_every_programmer_needs_to_know_about_game_networking/ (discussing network latency issues associated with game architecture).

⁴⁴ See Bradley Mitchell, “Network Protocols: A brief explanation of computer network protocols,” LifeWire (Nov. 2, 2017), available at <https://web.archive.org/web/20171120054427/https://www.lifewire.com/definition-of->

on a game disc or is downloaded onto a user's computer at the time of purchase. When engaged in online play, game players' actions are transmitted from the client to the server through the protocol. Because the information being transferred through the protocol is specifically tailored to the game being played (e.g., the data needed to conduct an online soccer match in *FIFA 2018* is different from the data needed to play *Farmville*), most online games use custom-built protocols.⁴⁵ This is due, in part, to performance requirements: many standard protocols (like TCP) send data packets in ways that cause video games to function poorly.⁴⁶ As a result, game developers typically implement modified protocols that are built around specific game requirements.⁴⁷ This increases game play performance, but it also makes different game's protocols incompatible with each other.⁴⁸

The server: The server acts as the referee between game players, receiving inputs from individual clients and relaying consolidated information back. When player actions occur simultaneously in a game, the server decides how these actions will affect the game overall and in what order they will occur. Say, for instance, Player One attempts to hit Player Two and Player Two simultaneously blocks; the server, based on its internal rule set and game logic, decides which one of these actions prevails. The server then relays its decision back to the individual game clients via the protocol.⁴⁹ Upon receiving this data, each game client renders the audio-visual elements that correspond to the server's output (e.g., Player Two's block is successful), and the players respond accordingly, beginning the process anew. In this way, with just a slight latency period, player actions appear to occur instantaneously.

If any of these three architectural components (client, protocol, or server) are inoperable, an online game cannot be preserved in playable form.⁵⁰ For instance, nearly "every multiplayer game on the market ... requires a constant connection to the home servers" for multiplayer features to work, even if game clients are locally connected through a LAN.⁵¹ Worse still, "[s]ome games require a connection to an external server—sometimes on an ongoing basis—for all types of play, including single-player play,"⁵² which means these games become completely un-

[protocol-network-817949](#) (archived Nov. 20, 2017) ("A network protocol defines rules and conventions for communication between network devices."); Cf. Glenn Fielder, "UDP vs. TCP: Which Protocol is Best for Games?," Gaffer on Games, available at https://web.archive.org/web/20171021194123/https://gafferongames.com/post/udp_vs_tcp/ (archived Oct. 21, 2017) (stating that the "most basic aspect of network programming [is] sending and receiving data over the network.").

⁴⁵ Statement of Russell Spitzer, *infra* at A-5 [hereinafter "Spitzer Statement"] ("[T]here still are no true unified protocols for building [online games].").

⁴⁶ See Glenn Fielder, Gaffer on Games, "UDP vs. TCP: Which Protocol is Best for Games?," available at https://web.archive.org/web/20171021194123/https://gafferongames.com/post/udp_vs_tcp/ (archived Oct. 21, 2017) ("Using TCP is the worst possible mistake you can make when developing a multiplayer game").

⁴⁷ See *id.*

⁴⁸ See Spitzer Statement ("Different programmers all had different takes on how the client-server model should be implemented and almost none of these approaches were compatible.").

⁴⁹ Cf. Fielder, *supra* note 43.

⁵⁰ See Lowood Statement.

⁵¹ Kuchera, *supra* note 11.

⁵² Register's Recommendation 2015, *supra* note 4, at 345.

playable when servers are shut down.⁵³ Therefore, to restore online games to full functionality, preservationists must create replacement servers and protocols that interoperate with a game's client.⁵⁴ Such reverse engineering to achieve interoperability is a favored activity under copyright law.⁵⁵

2. Technological protection measures must be circumvented to preserve abandoned online video games in playable form.

Various technological protection measures are used to control access to abandoned online video game software. For instance, online video game software may be controlled by a *CD key*, which is a string of numbers and letters inputted during installation.⁵⁶ Alternatively, games may be subject to a *limited install activation*. With this access control, client software is verified by an external server prior to installation and only a limited number of copies may be installed.⁵⁷ Another TPM common to abandoned online video games is a "phone home" *server authentication*, where the game client connects to an authentication server at start-up and transmits an activation key for verification.⁵⁸ If the activation key is incorrect or the authentication server is inaccessible, game play is disabled.⁵⁹ This type of TPM was discussed extensively during the sixth triennial rulemaking.⁶⁰ Lastly, some modern video games require *persistent online authentication*, which means that the game client must remain connected to an authenticating server at all times.⁶¹ If the connection is broken, the game will stop functioning, even in single-player mode.⁶² Some games may also use multiple TPMs concurrently.⁶³ Similarly, copying or modifying specific components of a game's architecture (such as a protocol) may be considered cir-

⁵³ See Lowood Statement ("If a game server is shut down without provisions being made for access to the original software, preservation is impossible.").

⁵⁴ See MADE Statement.

⁵⁵ See Register's Recommendation 2015, *supra* note 4, at 336.

⁵⁶ See Digital Rights Management, University of North Carolina School of Law, available at <http://web.archive.org/web/20170321171357/http://drm.web.unc.edu/games/> (archived Mar. 21, 2017) (discussing digital rights management software).

⁵⁷ See *id.*

⁵⁸ See EFF Initial Comments 2015, *supra* note 41, at 4 (discussing "phone home" authentication); see also Kuchera, *supra* note 11.

⁵⁹ See *id.*; see also Statement of Jason Scott, *infra* at A-15 [hereinafter Scott Statement].

⁶⁰ See Register's Recommendation 2015, *supra* note 4, at 324 (discussing server authentication checks and related technological issues).

⁶¹ See Digital Rights Management, *supra* note 56.

⁶² See Register's Recommendation 2015, *supra* note 4, at 345; see also Tom Senior, "Constant net connection no longer required for Ubisoft games," PC Gamer (Dec. 31, 2010), available at <http://web.archive.org/web/20170812172204/http://www.pcgamer.com/constant-net-connection-no-longer-required-for-ubisoft-games/> (archived Aug. 12, 2017) (discussing games with persistent online authentication).

⁶³ See, e.g., "Bioshock 2 PC has Three Types of DRM," Spong (Feb. 8, 2010), available at <http://web.archive.org/web/20160407081908/http://spong.com/article/20530/BioShock-2-PC-has-Three-Types-of-DRM> (archived Apr. 7, 2016) (describing a video game that contains three different types of access controls).

cumvention of a TPM.⁶⁴ “Because replicating a server protocol requires applying secret information in order to access game functionality, or bypassing or removing cryptographic verification, server protocols may be technical measures that effectively control access to the work.”⁶⁵

As part of the preservation process for most abandoned online games, it will be necessary for preservationists to circumvent one or more TPMs to implement new, interoperable software components as part of the game’s architecture.⁶⁶ For example, an abandoned online game’s client may include a server authentication step that must be circumvented to load the game and enable play.⁶⁷ Without TPM circumvention, “processes such as authentication will block access [to the game for] researchers, and they will be unable to activate the software.”⁶⁸ Likewise, cryptographic verifications (such as SSL certificates) that are part of an abandoned online game’s protocol may operate effectively as TPMs and will need to be circumvented during preservation.⁶⁹ “Since entry into most server-based games and virtual worlds requires an authentication procedure such as a login, after a server shuts down, the authentication procedure built into the software will be an obstacle for preservation or research activities.”⁷⁰

Therefore, TPMs present significant technical hurdles for abandoned online game preservation. For example, when the MADE preserved the world’s first MMO, *Habitat*, they had working copies of both the game client software and the server.⁷¹ (They received this code from the game’s copyright owners, who authorized the project.) However, the MADE didn’t have the “layer between the [client and server] which handled billing and sign-on” and functioned as a “primitive DRM.”⁷² This piece of software had to be circumvented in order for the original *Habitat* client and server software to interoperate and for the game to be restored to playable form—a process that took four years to complete.⁷³

Thus, archivists need to be able to circumvent TPMs in order to preserve abandoned online video games in playable form.

⁶⁴ See, e.g., *MDY Indus., LLC v. Blizzard Entm’t, Inc.*, 629 F.3d 928, 954 (9th Cir. 2010) (finding that a game server protocol that required client software to report on the contents of the computer’s memory was a TPM because it required the application of information to gain access to the work).

⁶⁵ EFF Initial Comments 2015, *supra* note 41, at 4.

⁶⁶ See, e.g., MADE Statement (discussing need to circumvent “primitive DRM” as part of restoration of *Habitat* game).

⁶⁷ See Register’s Recommendation 2015, *supra* note 4, at 324 (“According to proponents, requiring that a video game communicate with a third-party server before enabling play ... can constitute TPMs subject to section 1201’s prohibition on circumvention.”); see also Scott Statement.

⁶⁸ Lowood Statement.

⁶⁹ See Register’s Recommendation 2015, *supra* note 4, at 324 (“...the specific server protocols or cryptographic verification used ... can constitute TPMs subject to section 1201’s prohibition on circumvention.”).

⁷⁰ Lowood Statement.

⁷¹ MADE Statement.

⁷² See *id.*

⁷³ See *id.*

ITEM E. ASSERTED ADVERSE EFFECTS ON NON-INFRINGEMENT USES

For a particular class of works to be exempted under 17 U.S.C. § 1201(a)(1), proponents must show that the “uses affected by the prohibition on circumvention are or are likely to be non-infringing.”⁷⁴ Here, the preservation of legally acquired, abandoned online video games is likely to be a non-infringing use for two reasons: (1) it is within the scope of legitimate preservation activities contemplated by 17 U.S.C. § 108 (which provides limited reproduction rights to libraries and archives); and (2) it is a fair use.

1. The preservation of online video games is within the scope of legitimate preservation activities contemplated by § 108.

According to the Register of Copyrights, libraries, archives, and museums engage in “valuable preservation activities with respect to video games.”⁷⁵ The Copyright Act explicitly recognizes the importance of such preservation activities by providing libraries and archives⁷⁶ with a limited right to reproduce copyrighted works for the purpose of preservation.⁷⁷ “In copyright law, preservation uses are treated differently from general, all-purpose uses.”⁷⁸ This right, provided in § 108, allows for the limited reproduction of copyrighted works by libraries and archives “for purposes of preservation and replacement, and when a format has become obsolete.”⁷⁹ This right “highlight[s] Congress’s recognition of preservation as an important social activity.”⁸⁰ However, § 108 is silent as to whether circumvention of access controls for purposes of preservation is allowable,⁸¹ and so, on its own, § 108 “appear[s] inadequate to address institutional needs in relation to digital works.”⁸² Nevertheless, according to the Register of Copyrights, § 108 provides useful guidance to “Congress’s intent regarding the nature and scope of legitimate preservation activities, and hence the types of uses that are most likely to qualify as fair in this area.”⁸³

During the previous rulemaking, the Register of Copyrights applied § 108’s “guidance” to the question of whether preserving abandoned video games was fair use.⁸⁴ In doing so, the Register

⁷⁴ 17 U.S.C. § 1201(a)(1)(B). *See also* Register’s Recommendation 2015, *supra* note 4, at 15 (2015).

⁷⁵ Register’s Recommendation 2015, *supra* note 4, at 351.

⁷⁶ In the context of video game preservation, the Register of Copyright found that there was “no reason to exclude museums from the reach of the proposed exemption” because “museums engage in similar efforts to preserve video games.” Register’s Recommendation 2015, *supra* note 4, at 342. Therefore, no distinction between libraries, archives, and museums will be drawn here.

⁷⁷ *See* 17 U.S.C. § 108 (providing libraries and archives with a limited right to reproduce works for preservation purposes).

⁷⁸ Register’s Recommendation 2015, *supra* note 4, at 341.

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ *See* 17 U.S.C. § 108; *see also* Register’s Recommendation 2015, *supra* note 4, at 341 (noting that section 108 does not address the full range of preservation-related activities advocated by the 2015 abandoned video games exemption proponents).

⁸² *See* Register’s Recommendation 2015, *supra* note 4, at 3 (discussing proposal for Current Exemption).

⁸³ *Id.* at 342.

⁸⁴ *Id.* at 341–42.

noted that there are five indicative markers of a fair use in this context. First, video game preservation activities should be carried out by a “preservation-oriented institution,” such as a library, archives, or museum.⁸⁵ Second, the collections of these institutions should be open to the public and/or routinely made available to researchers who are not affiliated with the library, archives, or museum.⁸⁶ Third, preservation must not be done for “direct or indirect commercial gain.”⁸⁷ Fourth, preserved video games should not be made available to the public in digital formats “outside the premises” of the library, archives, or museum.⁸⁸ However, § 108 “permits limited distribution of copies to other libraries and archives.”⁸⁹ Fifth, and finally, § 108 only applies to the right of reproduction and distribution in the context of preservation, and does not authorize public performance or display of copyrighted works.⁹⁰

Here, the Proposed Exemption bear all five markers. First, preservation of online video games would be carried out by “preservation-oriented” groups, namely libraries, archives, museums and Affiliate Archivists.⁹¹ Second, to qualify, libraries, archives, and museums must make their collections “open to the public and/or routinely [] available to researchers who are not affiliated with the library, archives or museum.”⁹² Third, game preservation activities carried out under the Proposed Exemption must be done “without any purpose of direct or indirect commercial advantage.”⁹³ Fourth, the Proposed Exemption disallows distribution of preserved games to the general public “outside of the physical premises of the eligible library, archives, or museum.”⁹⁴ Fifth, the Proposed Exemption only permits copying and modification of video game software to “allow preservation of the game in a playable form,” and does not authorize the public performance or display of preserved online games.⁹⁵ Therefore, the Proposed Exemption is consistent with the § 108 markers identified by the Register of Copyrights, and preservation conducted under it is likely to be fair.⁹⁶

⁸⁵ *Id.* at 342.

⁸⁶ *Id.* at 341.

⁸⁷ *Id.* at 342.

⁸⁸ *Id.* at 341.

⁸⁹ *Id.* See also 17 U.S.C. § 108(b)-(c).

⁹⁰ Register’s Recommendation 2015, *supra* note 4, at 341–42.

⁹¹ See Item C-2 *supra*.

⁹² *Id.*

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ *Id.*; see also Register’s Recommendation 2015, *supra* note 4, at 342 (“The performance and display of a video game for visitors in a public space is a markedly different activity than efforts to preserve or study the game in a dedicated archival or research setting.”).

⁹⁶ See Register’s Recommendation 2015, *supra* note 4, at 342.

2. Copying and modifying software elements of an abandoned online video game for the purpose of preservation is a fair use.

Video games, like most computer programs, contain both functional and expressive elements.⁹⁷ Functional elements of a video game—such those that are “dictated by the function to be performed, by considerations of efficiency, or by external factors such as compatibility requirements and industry demands”—are not copyrightable.⁹⁸ Moreover, copying functional elements of copyrighted software to achieve interoperability is a favored activity under copyright law.⁹⁹ Conversely, expressive elements of video games are protected by copyright.¹⁰⁰

Here, preservation of abandoned online video games requires copying and modifying both functional and expressive elements contained in a game’s architecture.¹⁰¹ This is likely to be non-infringing use because copying the functional elements of an abandoned online game is allowed under § 102(b),¹⁰² and copying the expressive elements of an abandoned online game for the purpose of preservation is likely fair use.¹⁰³

Under 17 U.S.C. § 107, courts must consider four non-exhaustive factors to determine whether a certain use of a copyrighted work is a fair use. These factors are: “(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work.”¹⁰⁴ Take as a whole, these four factors support a finding that copying and modifying abandoned online video games for the purpose of preservation is fair use.

⁹⁷ See *Sony Computer Entm’t, Inc. v. Connectix Corp.*, 203 F.3d 596, 599 (9th Cir. 2000) (“Copyrighted software ordinarily contains both copyrighted and unprotected or functional elements.”).

⁹⁸ See 17 U.S.C. § 102(b); see also *Sega Enterprises Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1524 (9th Cir. 1992) (“The protection established by the Copyright Act for original works of authorship does not extend to the ideas underlying a work or to the functional or factual aspects of the work.”); *Computer Assocs. Int’l, Inc. v. Altai, Inc.*, 982 F.2d 693, 714 (2d Cir. 1992) (“functional elements ... do not qualify for copyright protection”).

⁹⁹ See Register’s Recommendation 2015, *supra* note 4, at 336 (noting that it is “Congress’s understanding that reverse engineering and the pursuit of interoperability are favored activities under the law.”); see also *id.* at 368 n. 2481 (“Congress recognized the importance of compatibility in the DMCA by including a statutory exemption to the prohibition on circumvention for certain reverse engineering activities.”). Unfortunately, this statutory exemption (§ 1201(f)) does not apply to preservation activities here, so a temporary exemption is needed. See *id.* at 368 n. 2481.

¹⁰⁰ See 17 U.S.C. § 102(a).

¹⁰¹ See, e.g., MADE Statement (discussing components that were modified to preserve the abandoned video game *Habitat*).

¹⁰² See *Sega Enterprises*, 977 F.2d at 1524 (citing *Baker v. Selden*, 101 U.S. 99, 102–04 (1879) (“To the extent that a work is functional or factual, it may be copied”).

¹⁰³ See Register’s Recommendation 2015, *supra* note 4, at 343 (“the purpose and character of the use—preservation of a video game in playable form for research and study—are favored purposes under section 107”).

¹⁰⁴ 17 U.S.C. § 107.

- a) The first factor weighs in favor of fair use because preservation of an abandoned online video game in playable form for research and study is consistent with the statutory examples provided by § 107, is a transformative use, and is a non-commercial activity providing substantial public benefits.**

Under the first factor, courts must consider “the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes.”¹⁰⁵ In doing so, courts ask, among other things, whether: (i) the purpose of the use is consistent with the examples given in the preamble to § 107; (ii) whether the use is transformative (meaning that the use “adds something new, with a further purpose or different character, altering the [copyright work] with new expression, meaning, or message”); and (iii) whether the use of the work is of a commercial or non-commercial nature.¹⁰⁶

- (i) *The “purpose and character” of the intended use (i.e., preserving an abandoned online game in playable form for research and study) is consistent with the statutory examples provided in § 107.*

According to the Supreme Court, in assessing the first factor, courts may be “guided by the examples given in the preamble to § 107.”¹⁰⁷ This preamble provides that uses for “purposes such as criticism, comment, news reporting, teaching ... scholarship, or research, is not an infringement of copyright.”¹⁰⁸ Subsequent courts have further noted “a strong presumption that factor one favors the defendant if the allegedly infringing work fits the description of uses described in section 107,”¹⁰⁹ and that when a use falls into one of these statutory categories, “assessment of the first fair use factor should be at an end.”¹¹⁰ Furthermore, the Register of Copyrights has previously noted that “the purpose and character of the use—the preservation of a video game in playable form for research and study—are favored purposes under section 107,”¹¹¹ and that Congress regards preservation as an “important social activity.”¹¹²

Here, the purpose behind the preservation of abandoned online video games fits comfortably within all of the § 107 categories except for “news reporting.”¹¹³ The preservation work being

¹⁰⁵ *Id.*

¹⁰⁶ *Campbell v. Acuff-Rose Music, Inc.*, 510 U.S. 569, 578–79 (1994).

¹⁰⁷ *Id.* at 578.

¹⁰⁸ 17 U.S.C. § 107.

¹⁰⁹ *Wright v. Warner Books, Inc.*, 953 F.2d 731, 736 (2d Cir. 1991); *see also NXIVM Corp. v. Ross Inst.*, 364 F.3d 471, 477 (2d Cir. 2004) (noting same).

¹¹⁰ *New Era Publications Int'l, ApS v. Carol Publishing Group*, 904 F.2d 152, 156 (2d Cir. 1990).

¹¹¹ Register’s Recommendation 2015, *supra* note 4, at 343.

¹¹² *Id.* at 341.

¹¹³ A similar conclusion was reached by both the Register of Copyrights and the NTIA during the last rulemaking. *See* Register’s Recommendation 2015, *supra* note 4, at 343 (“the purpose and character of the use—preservation of a video game in playable form for research and study—are favored purposes under section 107”); Sixth Triennial Section 1201 Rulemaking: Recommendations of the National Telecommunications and Information Administration to the Register of Copyrights 66 (2015) [hereinafter “NTIA 2015”] (“research and scholarship are favored uses under the fair use analysis”).

done by the MADE and similar organizations is explicitly intended to promote criticism, comment, teaching, scholarship, and research of the abandoned online games being preserved.¹¹⁴ For instance, the purpose of the Video Game History Foundation is to “provide researchers access to rare materials, encourage their study through research grants, and educate the public on ... the 21st century’s primary form of entertainment and expression”;¹¹⁵ the ICHEG “conducts and encourages research and writing about the historical and cultural significance of video games”;¹¹⁶ and the University of Michigan “collects materials relating to games for the purpose of academic inquiry.”¹¹⁷ As such, the preservation of abandoned online video games serves critical, educational, and scholarly purposes consistent with the examples provided in § 107. Therefore, the first factor weighs towards fair use.¹¹⁸

(ii) *Preservation of abandoned online video games is a transformative use, as the purpose of preserving an abandoned online game is different from the original purpose of the game’s creation.*

In addition to being consistent with the § 107 examples,¹¹⁹ preservation of abandoned online games is also a transformative use, as the purpose of preserving an abandoned online game is different from the original purpose of the game’s creation.

In addressing the first factor, courts consider “whether the new work merely supersedes the objects of the original creation or whether and to what extent it is ‘transformative,’ altering the original with new expression, meaning, or message.”¹²⁰ In doing so, courts ask whether the use in question has a purpose that is “separate and distinct” from the original purpose for which the work was created.¹²¹ Although transformative use is not necessary for a fair use finding,¹²²

¹¹⁴ See MADE Statement; Lowood Statement; Statement of Frank Cifaldi, *infra* at A-11 [hereinafter “Cifaldi Statement”]; Statement of Steven Lavoie, *infra* at A-12 [hereinafter “Lavoie Statement”].

¹¹⁵ Cifaldi Statement.

¹¹⁶ About ICHEG, *supra* note 24.

¹¹⁷ About Michigan CVGA, *supra* note 26.

¹¹⁸ See Register’s Recommendation 2015, *supra* note 4, at 343 (“the purpose and character of the use—preservation of a video game in playable form for research and study—are favored purposes under section 107”); see also *Wright*, 953 F.2d at 736 (where a use falls into one of the statutory categories under §107, “the assessment of the first fair use factor should be at an end.”); see also *New Era Publications Int’l*, 904 F.2d at 156. *Cf. Campbell*, 510 U.S. at 578–79.

¹¹⁹ See Register’s Recommendation 2015, *supra* note 4, at 343.

¹²⁰ *Campbell*, 510 U.S. at 579.

¹²¹ See *Bill Graham Archives v. Dorling Kindersley Ltd.*, 448 F.3d 605, 610 (2d Cir. 2006) (concluding that defendant’s “transformative purpose of enhancing the biographical information in [the work at issue was] a purpose separate and distinct from the original artistic and promotional purpose for which the images were created.”); see also *Authors Guild, Inc. v. HathiTrust*, 755 F.3d 87, 97 (2d Cir. 2014) (copying of books to create a full-text searchable database “adds to the original something new with a different purpose and a different character,” and thus the use was transformative).

¹²² See Register’s Recommendation 2015, *supra* note 4, at 338 (“A used need not be transformative ... to be fair use.”).

the more transformative a use is, the less significant other factors will be.¹²³ In addition, copying the entirety of a work does not necessarily weigh against finding a use to be transformative, so long as the use “serves a different function than the original work.”¹²⁴

Here, the intended use—preservation of abandoned online games—is highly transformative. The purpose of preserving an abandoned online video game is to enable research, study, education, and critical commentary about the preserved game,¹²⁵ whereas the original purpose behind the game’s creation was to entertain consumers and to generate revenue from game sales.¹²⁶ For example, preserved online games may be used in a variety of academic research projects,¹²⁷ such as anthropological studies of online player communities¹²⁸ or psychological experiments that “would be impossible to achieve in the confines of a university lab.”¹²⁹ Similarly, for future generations of design students, having the “ability to explore old games” and to see how older “multiplayer function[s] actually worked, is an incredibly valuable pedagogical tool.”¹³⁰ Moreover, “[s]cholars and others who seek to understand the cultural and design aspects of video games—as well as their research efforts and commentary—will benefit if the games remain available in playable form.”¹³¹ Thus, the purpose of preserving an abandoned online game—i.e., to enable research, study, education, and teaching—is of a wholly different character than the purpose originally intended by the game’s creator.

¹²³ See *Campbell*, 510 U.S. at 579 (“the more transformative the new work, the less will be the significance of other factors, like commercialism, that may weigh against a finding of fair use.”).

¹²⁴ *Kelly v. Arriba Soft Corp.*, 336 F.3d 811, 819 (9th Cir. 2003) (“Arriba’s use of the images serves a different function than Kelly’s use—improving access to information on the internet versus artistic expression ... Because Arriba’s use is not superseding Kelly’s use but, rather, has a different purpose for the images, Arriba’s use is transformative.”). See also *Perfect 10, Inc. v. Amazon.com, Inc.*, 508 F.3d 1146, 1165 (9th Cir. 2007) (“The fact that Google incorporates the entire Perfect 10 image into search engine results does not diminish the transformative nature of Google’s use.”).

¹²⁵ See Cifaldi Statement (“We provide researchers access to rare materials, encourage their study through research grants, and educate the public on how they too, can study the history of what we believe will come to be the 21st century’s primary form of entertainment and expression”); About MADE, *supra* note 21 (the MADE preserves games in order to “educat[e] the public on how video games are created.”).

¹²⁶ See, e.g., 2016 Annual Report, Entertainment Software Association (2016), available at <http://web.archive.org/web/20171216234446/http://www.theesa.com/wp-content/uploads/2017/09/ESA-AnnualReport-Digital-91917.pdf> (archived Dec. 16, 2017) (video game industry generates over \$30 billion in annual revenue).

¹²⁷ See About UT, *supra* note 25 (noting that the University of Texas preserves video games “for use by a wide array of researchers”); About ICHEG, *supra* note 24 (the ICHEG maintains a collection of over 60,000 items related to video game history that are available to researchers).

¹²⁸ See generally Bonnie A. Nardi, *My Life as a Night Elf Priest: An Anthropological Account of World of Warcraft* (2010) (compiling three years of participatory research into *World of Warcraft* play and culture); Celia Pearce, *Communities of Play: Emergent Cultures in Multiplayer Games and Virtual Worlds* (2009) (discussing fan cultures in networked digital worlds).

¹²⁹ Jeremy Hsu, “Inside the Largest Virtual Psychology Lab in the World,” *Wired* (Jan. 27, 2015), available at <http://web.archive.org/web/20171216235809/https://www.wired.com/2015/01/inside-the-largest-virtual-psychology-lab-in-the-world/> (describing the “new psychological insights” gained from using an online video game as “a virtual lab capable of running experiments with thousands or even millions of human players.”).

¹³⁰ Statement of T.L. Taylor, *infra* at A-13 [hereinafter “Taylor Statement”].

¹³¹ Register’s Recommendation 2015, *supra* note 4, at 348.

Therefore, the intended use here is transformative, and the first factor weighs toward fair use.¹³²

(iii) Fair use is favored because the preservation of abandoned online video games is a noncommercial activity that provides substantial public benefits.

Lastly, as part of the first factor analysis, courts must consider whether “the use in question is of a commercial nature or is for nonprofit educational purposes,”¹³³ and often consider whether the use results in public benefits.¹³⁴

Here, to ensure that online game preservation is done for “nonprofit educational purposes” only, the Proposed Exemption explicitly requires that the preservation of abandoned online games be “carried out without any purpose of direct or indirect commercial advantage” by museums, archives, libraries, and affiliated Affiliate Archivists, and that the collections of such organizations must be “open to the public and/or routinely made available to researchers who are not affiliated with the library, archives or museum.”¹³⁵ Thus, the preservation of abandoned online video games will serve a noncommercial, educational mission.

Additionally, preservation has been recognized “important social activity,”¹³⁶ and the preservation of abandoned online games will have demonstrable public benefits. By making their collections available to the public and to other researchers, preservationists will bolster scholarly engagement with video game history and culture.¹³⁷ “Scholars and others who seek to understand the cultural and design aspects of video games—as well as their research efforts and commentary—will benefit if the games remain available in playable form.”¹³⁸ Thus, the preservation of abandoned online video games provides substantial public benefits.

Therefore, given that the preservation of abandoned online video games is done for purposes favored under § 107, that these purposes are likewise transformative, and this activity is non-commercial and provide substantial public benefits, the first factor strongly weighs in favor of fair use.

¹³² See *Campbell*, 510 U.S. at 579; see also *Bill Graham Archives*, 448 F.3d at 610 (concluding that defendant’s “transformative purpose of enhancing the biographical information in [the work at issue was] a purpose separate and distinct from the original artistic and promotional purpose for which the images were created.”).

¹³³ 17 U.S.C. § 107.

¹³⁴ See *Sega Enterprises*, 977 F.2d at 1523 (noting that the court is “free to consider the public benefit resulting from a particular use notwithstanding the fact that the alleged infringer may gain commercially”).

¹³⁵ See Item C-2 *supra*.

¹³⁶ Register’s Recommendation 2015, *supra* note 4, at 341.

¹³⁷ See Taylor Statement. Cf. Lowood Statement (“Critical-historical research about game worlds is greatly handicapped when access to these worlds ends. The cost is not just lost game history, but lost cultural, technical and social history of the late-20th and early-21st centuries.”).

¹³⁸ Register’s Recommendation 2015, *supra* note 4, at 348.

b) Preservation of abandoned online video games focuses on repairing and re-implementing the functional aspects of a game’s architecture.

The second fair use factor—“the nature of the copyrighted work”—recognizes that some works are “closer to the intended core of copyright protection than others.”¹³⁹ Highly creative expressive works fall within the core of copyright protection, whereas purely functional works are unprotected because, among other things, they are “dictated by considerations of efficiency or other external factors.”¹⁴⁰ When a copyrighted work contains both expressive and purely functional elements (as computer programs do), and where “it is necessary to copy the expressive elements in order to perform those functions,” the second factor “arguably supports a finding that the use is fair.”¹⁴¹ Furthermore, the second factor carries limited weight in cases where the use of expressive elements is consistent with a transformative purpose.¹⁴² Last rulemaking, the Register of Copyrights noted that while video games are highly expressive works,¹⁴³ the second factor would not weigh heavily against fair use if the “focus of the copying” was on a game’s “functional aspects.”¹⁴⁴

Here, to successfully preserve an abandoned online game in playable form, preservationists must copy or modify parts of the game’s software to rebuild the client–protocol–server architecture.¹⁴⁵ This process primarily involves copying and modifying functional elements to make game clients and servers interoperate.¹⁴⁶ As part of this work, it may also be necessary to copy or modify expressive elements that are intertwined with a game’s functionality—e.g., modifying graphics that were once stored on the original game server. As such, even if expressive content is copied during preservation, the focus remains on modifying functional aspects of the game to restore playability.¹⁴⁷ Moreover, this copying is done in pursuit of a transformative purpose—preservation of abandoned online games to enable criticism, comment, teaching, scholarship, and research—which supports fair use.¹⁴⁸

¹³⁹ *Campbell*, 510 U.S. at 586.

¹⁴⁰ *Oracle America Inc. v. Google, Inc.*, 750 F.3d 1339, 1375 (Fed. Cir. 2014); see also 17 U.S.C. § 102(b); Register’s Recommendation 2015, *supra* note 4, at 338.

¹⁴¹ *Oracle*, 750 F.3d at 1375; see also Register’s Recommendation 2015, *supra* note 4, at 338, 343.

¹⁴² See *Bill Graham Archives*, 448 F.3d at 612 (indicating that the second fair use factor “may be of limited usefulness where the creative work of art is being used for a transformative purpose.”).

¹⁴³ Register’s Recommendation 2015, *supra* note 4, at 338 (“video games are highly expressive and thus at the core of copyright’s protective purposes.”).

¹⁴⁴ *Id.* at 343.

¹⁴⁵ See Made Statement.

¹⁴⁶ See *id.*

¹⁴⁷ See Register’s Recommendation 2015, *supra* note 4, at 343 (“For the second factor ... the works at issue include highly expressive elements, but the focus of the copying is on functional aspects of those works ... [therefore] this factor does not weigh heavily against fair use.”).

¹⁴⁸ See *Campbell*, 510 U.S. at 586; *Bill Graham Archives*, 448 F.3d at 612 (indicating that the second fair use factor “may be of limited usefulness where the creative work of art is being used for a transformative purpose.”); see also Register’s Recommendation 2015, *supra* note 4, at 341 (“In copyright law, preservation uses are treated differently from general, all-purpose uses.”).

Therefore, the second factor does not weigh against fair use.

c) The amount and substantiality of abandoned online video game software copied by archivists will not be excessive and will be consistent with the purpose of preservation.

The third fair use factor asks whether “the amount and substantiality of the portion used in relation to the copyrighted work as a whole ... are reasonable in relation to the purpose of the copying.”¹⁴⁹ This involves both a quantitative and qualitative review: how much of the copyrighted work was used, and whether the portion used was an essential element of the copyrighted work.¹⁵⁰ Quantitatively, the third factor “asks whether the secondary use employs more of the copyrighted work than is necessary, and whether the copying was excessive in relation to any valid purposes asserted under the first factor.”¹⁵¹ Courts have held that if the purpose of the use is valid, and the user “only copies as much as necessary for his or her intended use,” then the third factor will not weigh against fair use.¹⁵² Furthermore, for some purposes, “it may be necessary to copy the entire copyrighted work.”¹⁵³ Likewise, qualitatively, it may be fair use to copy the “heart” of a copyrighted work if this copying is consistent with a permissible purpose.¹⁵⁴

Here, a substantial portion—in some cases, all—of a game’s architecture as well as some expressive elements will need to be copied and modified in order for an abandoned online game to be preserved. While substantial, this copying is not “excessive” because it is necessary to the transformative and socially beneficial purpose¹⁵⁵ of preserving the work.¹⁵⁶ “Even though the entire work may be copied and used in modified form, because these uses are aimed at functional rather than expressive aspects of the work, this factor carries little weight.”¹⁵⁷ Thus, the quantity of material used should not weigh against fair use.¹⁵⁸ Qualitatively, while the portion copied may contain the “heart” of the game, this does not preclude a finding of fair use, because preservationists *must* copy the heart of the game to preserve it.¹⁵⁹ As such, copying the

¹⁴⁹ *Campbell*, 510 U.S. at 586 (citing 17 U.S.C. § 107).

¹⁵⁰ *See, e.g., Marcus v. Rowley*, 695 F.2d 1171, 1176 (9th Cir. 1983) (holding that the third factor “requires analysis of both the quantity and quality of the alleged infringement.”).

¹⁵¹ *Authors Guild, Inc. v. HathiTrust*, 755 F.3d 87, 96 (2d Cir. 2014) (citing *Campbell*, 510 U.S. at 586).

¹⁵² *Kelly*, 336 F.3d at 820–21.

¹⁵³ *Authors Guild*, 755 F.3d at 98 (citing *Bill Graham Archives*, 448 F.3d at 613); *see also* Register’s Recommendation 2015, *supra* note 4, at 344.

¹⁵⁴ *See Campbell*, 510 U.S. at 588–89.

¹⁵⁵ Register’s Recommendation 2015, *supra* note 4, at 341 (noting that Congress has recognized preservation as an “important social activity.”).

¹⁵⁶ *See also Authors Guild*, 755 F.3d at 86 (citing *Campbell*, 510 U.S. at 586); *see also Bill Graham Archives*, 448 F.3d at 613.

¹⁵⁷ Register’s Recommendation 2015, *supra* note 4, at 344.

¹⁵⁸ *See id.*

¹⁵⁹ *See Campbell*, 510 U.S. at 588; *see also* Register’s Recommendation 2015, *supra* note 4, at 341 (“In copyright law, preservation uses are treated differently from general, all-purpose uses.”).

“heart” of the game is consistent with a permissible purpose—preservation.¹⁶⁰ Thus, the qualitative review of the material copied should not weigh against fair use.¹⁶¹

Therefore, because the amount and substantiality of the copyrighted works used are no more than necessary and are consistent with the transformative purpose of preservation, the third factor does not weigh against fair use.

d) Preservation will not negatively impact the market for, or value of, abandoned video games, and will positively benefit copyright holders and the public.

Under the fourth factor (“the effect of the use upon the potential market for or value of the copyrighted work”),¹⁶² the inquiry is whether, if the use at issue should become widespread, “it would adversely affect the potential market for the copyrighted work, by diminishing potential sales, interfering with marketability, or usurping the market.”¹⁶³ Courts have generally held that a use that does not materially impair the marketability of a copyrighted work is fair.¹⁶⁴ Furthermore, when a work is no longer available for purchase through normal channels, that fact supports fair use.¹⁶⁵ The Second Circuit has noted that “a key, though not necessarily determinative, factor in fair use is whether or not the work is available to the potential user. If the work is ‘out of print’ and unavailable for purchase through normal channels, the user may have more justification for reproducing it than in the ordinary case.”¹⁶⁶

Here, the online video games being preserved are no longer sold or supported by their publishers—these games are abandoned and “out of print.”¹⁶⁷ As such, there is little-to-no market for these titles, as the market “has been essentially vacated by copyright owners.”¹⁶⁸ Further, there is little possibility of market demand in the future should these games remain inoperable and

¹⁶⁰ See *Campbell*, 510 U.S. at 588.

¹⁶¹ See *Authors Guild*, 755 F.3d at 96.

¹⁶² 17 U.S.C. § 107.

¹⁶³ *Sega Enterprises*, 977 F.2d at 1523.

¹⁶⁴ See *Harper & Row Publishers, Inc. v. Nation Enterprises*, 471 U.S. 539, 566–67 (1985) (“Fair use, when properly applied, is limited to copying by others which does not materially impair the marketability of the work which is copied.”); see also *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417, 450–51 (1984) (“[A] use that has no demonstrable effect upon the potential market for, or the value of, the copyrighted work need not be prohibited in order to protect the author’s incentive to create.”).

¹⁶⁵ See *Maxtone-Graham v. Burtchaell*, 803 F.2d 1253, 1264 n.8 (2d Cir. 1986) (quoting legislative history for the proposition that a “key, though not necessarily determinative factor in fair use is whether or not the work is available to the potential user. If the work is out of print and unavailable for purchase through normal channels, the user may have more justification for reproducing it.”); cf. *Harper & Row Publishers*, 471 U.S. at 563–64 (citing same legislative history, though finding no fair use).

¹⁶⁶ See *Maxton-Graham*, 803 F.2d at 1264 n.8.

¹⁶⁷ See MADE Statement; Abandoned MMOs, *supra* note 5.

¹⁶⁸ Register’s Recommendation 2015, *supra* note 4, at 338–39 (discussing the potential market for abandoned games and noting that evidence provided in the 2015 rulemaking “concerning potential markets for discontinued versions of games was scant” and so opponents “failed to demonstrate that the market for reissued games would be materially impacted by [the 2015 exemption].”).

unsupported.¹⁶⁹ This fact favors fair use.¹⁷⁰ Furthermore, preservation activities done under the Proposed Exemption must be explicitly noncommercial—i.e., they may not be “for direct or indirect commercial advantage”¹⁷¹—and preserved online games may not be “distributed or made available outside of the physical premises of the eligible library, archives or museum.”¹⁷² As such, during the last rulemaking the Register of Copyrights found that: “circumventing discontinued console-based video games themselves, as well as PC games, is unlikely to harm the market for or value of those copyrighted works.”¹⁷³

Further, preservation may have a salutary effect on the market value of abandoned online games. By making abandoned online games playable once again, preservationists will substantially increase the value of these games to researchers and scholars, thus increasing academic demand for these titles. Furthermore, scholarly research into abandoned online video games may promote interest in these games generally, which would benefit copyright owners should they choose to re-release or remake them in the future. For example, Nintendo has had tremendous success in recent years reselling old games for new and improved hardware, such as 2016’s NES Classic¹⁷⁴ and this year’s SNES Classic.¹⁷⁵ Should Nintendo (or any other copyright owner) wish, it could re-release its currently abandoned titles in the future, and prior preservation of these games would only add to demand for the reissued versions. As such, preservation of abandoned online video games has the potential to dramatically improve the market value of these titles overall.¹⁷⁶

Therefore, given that the noncommercial preservation of abandoned online games is unlikely to harm the market for such games and may well have a beneficial effect, the fourth factor supports fair use.

¹⁶⁹ See *id.* at 339 (“Not all [abandoned] games will be reintroduced, and in the few examples provided by opponents, the games were remastered and did not always include the same functionality as the discontinued versions.”).

¹⁷⁰ See *Maxtone-Graham*, 803 F.2d at 1264 n.8.

¹⁷¹ See Item C-3 *supra*.

¹⁷² *Id.*

¹⁷³ Register’s Recommendation 2015, *supra* note 4, at 339.

¹⁷⁴ Matt Peckham, “Nintendo Says it Sold Over 2 Million NES Classics,” *Time* (Apr. 28, 2017), available at <https://web.archive.org/web/20171115082702/http://time.com/4759594/nes-classic-millions-sales/> (archived Nov. 15, 2017).

¹⁷⁵ Mike Williams, “SNES Classic sells 2 Million worldwide,” *US Gamer* (Oct. 31, 2017), available at <https://web.archive.org/web/20171107055556/http://www.usgamer.net/articles/snes-classic-sells-2-million-worldwide-will-continue-shipping-moving-forward> (archived Nov. 7, 2017).

¹⁷⁶ Register’s Recommendation 2015, *supra* note 4, at 339 (“The Register finds that circumventing discontinued console-based video games themselves, as well as PC games, is unlikely to harm the market for or value of those copyrighted works.”).

In sum, given that the Proposed Exemption conforms to the “guidance” provided by § 108,¹⁷⁷ and analysis of the four § 107 factors generally supports fair use, the preservation activities enabled by the Proposed Exemption are likely to be non-infringing uses, as required under § 1201(a).

3. Adverse effects: the preservation of abandoned online games is not possible without a properly tailored exemption, and alternatives to circumvention are not adequate.

In addition to showing that a proposed use is non-infringing, proponents of a temporary exemption must also demonstrate that “as a result of a technological measure controlling access to a copyrighted work, the prohibition is causing, or in the next three years is likely to cause, an adverse impact on those uses.”¹⁷⁸

Here, an abandoned online game’s complete client–protocol–server architecture must be restored (or rebuilt) for the game to be preserved.¹⁷⁹ This process will, in most cases, also require circumvention of technological protection measures.¹⁸⁰ “Since entry into most server-based games and virtual worlds requires an authentication procedure such as a login, after a server shuts down, the authentication procedure built into the software will be an obstacle for preservation.”¹⁸¹ Therefore, the Current Exemption needs to be modestly expanded to allow for the circumvention of TPMs embedded in abandoned online games so that these games may be preserved.¹⁸²

In addition, Affiliate Archivists—persons who “may be able to contribute to valuable preservation efforts by lending their talents and expertise to qualified institutions”—need to be added to the class of exemption users.¹⁸³ Harnessing the expertise of amateur experts, under supervision, is in line with good preservation practice. Indeed, in 2008 the Section 108 Study Group (an independent body sponsored by the Copyright Office) recommended involving outside parties in preservation efforts undertaken by libraries and archives for similar preservation of other materials.¹⁸⁴ The class of exemption users should be similarly expanded to allow Affiliate Archivists to participate in abandoned online game preservation.

¹⁷⁷ See *id.* at 342 (“The Register finds that section 108 provides useful and important guidance as to Congress’s intent regarding the nature and scope of legitimate preservation activities, and hence the types of uses that are most likely to qualify as fair in this area.”).

¹⁷⁸ *Id.* at 15 (restating 17 U.S.C. § 1201(a)(1)(B)).

¹⁷⁹ See, e.g., MADE Statement (detailing the process involved in restoring the MMO *Habitat*).

¹⁸⁰ See, e.g., *id.* (discussing circumvention of “primitive DRM”).

¹⁸¹ Lowood Statement.

¹⁸² See Register’s Recommendation 2015, *supra* note 4, at 343 (indicating that “the purpose and character of the use—preservation of a video game in playable form for research and study—are favored purposes under section 107”).

¹⁸³ *Id.* at 351.

¹⁸⁴ Section 108 Study, *supra* note 31, at i (“Section 108 should be amended to allow a library or archives to authorize outside contractors to perform at least some activities permitted under section 108 on its behalf.”).

Alternatives to circumvention—such as video recordings and still images of game play—are inadequate because they fail to preserve interactivity, which is the essential characteristic of online video games. “Screen capture, which makes an audiovisual recording of the game in operation, is not adequate to mitigate the adverse effects on preservationists,”¹⁸⁵ because “an alternative that removes the interactivity from a fundamentally interactive medium does not seem to be a reasonable one.”¹⁸⁶ Licensing as an alternative to circumvention is also inadequate because, in many cases, it is impossible to determine who owns the copyright to an abandoned game and to secure their permission to preserve it.¹⁸⁷

Therefore, without a modest expansion of the Current Exemption to allow for the circumvention of TPMs embedded in an abandoned online game’s architecture that extends to all people involved in the preservation process, preservation efforts will be chilled, negatively impacting research, comment, criticism, teaching, scholarship, and study of these technologically-delicate works.

a) Preservation of abandoned online games is not possible without an expansion of the Current Exemption.

Online video games are among the most culturally significant and socially important media forms in existence today, yet they are also among the most vulnerable to destruction “through media decay, obsolescence, and loss.”¹⁸⁸ In comparison to books and films that can last for decades even when stored in sub-optimal conditions, video games are constantly under threat of “bit rot.”¹⁸⁹ Online games are particularly imperiled, given their “complex dependencies on platform, operating system, and network environment.”¹⁹⁰ Thus, in many cases, “waiting until these games are deemed old enough or culturally significant enough to be worthy of preservation” is not a feasible option to preserve such fragile media.¹⁹¹ Rather, “active steps to preserve materials may be required early in the life of a digital work due to the inherent instability of many digital media and formats and the rapid obsolescence of formats and equipment ...”¹⁹² Because of their vulnerability, the preservation of video games, particularly online video games, is urgent and critical.¹⁹³

This situation is unfortunately not alleviated by the Current Exemption, because games that require access to “copyrightable content stored or previously stored on an external computer

¹⁸⁵ Register’s Recommendation 2015, *supra* note 4, at 346.

¹⁸⁶ NTIA 2015, *supra* note 113, at 69.

¹⁸⁷ See McDonough, *supra* note 5, at 6 (discussing orphan works in the video game industry).

¹⁸⁸ Monnens, *supra* note 2, at 140.

¹⁸⁹ Hudgins, *supra* note 3, at 38; Risen, *supra* note 5.

¹⁹⁰ McDonough, *supra* note 5, at 9.

¹⁹¹ Hudgins, *supra* note 3, at 38.

¹⁹² Section 108 Study, *supra* note 31, at 7.

¹⁹³ See Register’s Recommendation 2015, *supra* note 4, at 346 (“To the extent that the shutdown of an authentication server bars access to a video game entirely, the record demonstrates that efforts to preserve video games will likely be impeded by the prohibition on circumvention.”).

server” are specifically excluded.¹⁹⁴ At the time the Current Exemption was adopted, the Register of Copyrights noted that “continued access and use of video games, including multiplayer play, is still possible using locally connected devices, [making it] a reasonable alternative to circumvention.”¹⁹⁵ Today, however, local multiplayer options are increasingly rare, and many games no longer support LAN-connected multiplayer capability.¹⁹⁶ Instead, nearly “every multiplayer game on the market ... requires a constant connection to the home servers.”¹⁹⁷ As a result, even if game clients are connected to the same local network, they will still need to connect to online servers for many game features to work.¹⁹⁸ More troubling still to archivists, many video games rely on server connectivity to function and become unplayable (even in single-player mode) when servers shut down.¹⁹⁹ “Some games require a connection to an external server—sometimes on an ongoing basis—for all types of play, including single-player play.”²⁰⁰ As a result, the Current Exemption needs to be modified to allow for the preservation of abandoned online games that can “be played by users through lawful access of game content stored or previously stored on an external computer server.”²⁰¹ Without this change, “many kinds of preservation and research projects effectively become impossible.”²⁰²

This lacuna in the Current Exemption not only affects game preservation efforts, but also restrains scholarship, research, and teaching about online video games. For example, the ability to study player interactions in an online game is vitally important to countless research projects, such as anthropological studies of online player communities²⁰³ or psychological experiments that “would be impossible to achieve in the confines of a university lab.”²⁰⁴ For scholars who use video games in their work, an online game is only meaningfully preserved if they have the opportunity to “understand the complexity of [the game’s] mechanics which, increasingly, means understanding multiplayer components.”²⁰⁵ Without preservation, “researchers can no longer ‘get inside’ the software, which inhibits efforts to understand the development of the technology.”²⁰⁶ As such, “the prohibition on circumvention inhibits scholars from accessing older works and replicating ‘the experience of originally playing the game’ in order to study game

¹⁹⁴ See 37 C.F.R. § 201.40(b)(8)(iii)(A) (definition of “complete games”).

¹⁹⁵ Register’s Recommendation 2015, *supra* note 4, at 351.

¹⁹⁶ See Kuchera, *supra* note 11.

¹⁹⁷ *Id.*

¹⁹⁸ See *id.*; see also “The Death of Local Multiplayer: Gaming’s Worst Trend,” All You Can Geek, available at <https://web.archive.org/web/20170127221136/http://allyoucangeek.net/death-of-local-multiplayer/> (archived Jan. 27, 2017) (discussing the reduction in games with local multiplayer features).

¹⁹⁹ See Lowood Statement (“If a game server is shut down without provisions being made for access to the original software, preservation is impossible.”); Abandoned MMOs, *supra* note 5.

²⁰⁰ Register’s Recommendation 2015, *supra* note 4, at 345.

²⁰¹ See Item C-2 *supra*.

²⁰² Lowood Statement.

²⁰³ See generally Nardi, *supra* note 128 (compiling three years of participatory research into *World of Warcraft* play and culture); Pearce, *supra* note 128 (discussing fan cultures in networked digital worlds).

²⁰⁴ Hsu, *supra* note 129 (describing the “new psychological insights” that might be gained from using an online video game as “a virtual lab capable of running experiments with thousands or even millions of human players.”).

²⁰⁵ Taylor Statement.

²⁰⁶ Lowood Statement.

design or construction.”²⁰⁷ Similarly, students need to be able to study classic online games to understand how early game developers overcame technical limitations.²⁰⁸ For students, the “ability to explore old games” and to see how older “multiplayer function[s] actually worked, is an incredibly valuable pedagogical tool.”²⁰⁹ Therefore, for these pedagogical tools to remain available, abandoned online games must be preserved in playable form, which requires adoption of the Proposed Exemption.

b) Preservation of abandoned video games is being impeded because the class of users for the Current Exemption does not extend to Affiliate Archivists, who are essential to the preservation process.

Under the Current Exemption, only libraries, museums, and archives may engage in game preservation activities.²¹⁰ Unfortunately, limiting eligibility in this way adversely effects video game preservation efforts because necessary participants—Affiliate Archivists—are not included in the user class. Affiliate Archivists are individuals that wish to engage in lawful game preservation activities under the supervision of libraries, archives, or museums in order to “contribute to valuable preservation efforts by lending their talents and expertise to qualified institutions.”²¹¹ Affiliate Archivists provide crucial assistance to professional video game archivists, and “[e]very cultural institution that collects software or game-related collections owes a huge debt to the non-professional games community.”²¹² For instance, the MADE’s restoration of the world’s first MMO, *Habitat*, took over four years and involved “thousands of person-hours, including countless hours provided by volunteers.”²¹³ On that project, “[s]cheduling, high-level technical strategy (e.g., ‘do we rewrite it from scratch, or try to get the old server running?’), and overall project management was done by the MADE, but volunteers provided the bulk of the day-to-day technical work required to bring the game back to life.”²¹⁴ Similarly, Affiliate Archivists contribute to game preservation projects by offering: “(1) personal software collections that are transferred to repositories; (2) collections of documentation (screenshots, videos, developer documents, etc.); (3) emulator development; [and] (4) documentation and reverse-engineering of game technologies, without which the understanding of game hardware, on-line systems, game software, and actual play contexts would suffer greatly.”²¹⁵ The contributions of Affiliate Archivists are particularly crucial to the preservation of abandoned online games, because developer documentation is often unavailable or does not provide sufficient detail, and Affiliate Archivists are needed to fill in the gaps.²¹⁶

²⁰⁷ Register’s Recommendation 2015, *supra* note 4, at 348.

²⁰⁸ *See id.*; *see also* Raiford Guins, *Game After: A Cultural Study of Video Game Afterlife* 94–101 (2014) (describing the benefits of “game labs” where students have access to vintage consoles).

²⁰⁹ Taylor Statement.

²¹⁰ *See* 37 C.F.R. § 201.40(b)(8)(iii)(D).

²¹¹ Register’s Recommendation 2015, *supra* note 4, at 351.

²¹² Lowood Statement; *see also* Statement of Christian Charles David, *infra* at A-9 [hereinafter “David Statement”].

²¹³ MADE Statement.

²¹⁴ Lowood Statement.

²¹⁵ *Id.*

²¹⁶ *See id.*; MADE Statement; David Statement.

Therefore, because the involvement of Affiliate Archivists is essential to video game preservation, the class of people who may use the Proposed Exemption should include eligible libraries, archives, and museums as well as individuals engaged in the lawful preservation of video games under the supervision of an eligible library, archives, or museum. Without this expansion of the user class, online video game preservation will be hindered.²¹⁷

c) Alternatives to circumvention are inadequate because they either don't mitigate the adverse effects on preservationists or are impractical.

(i) *Video recordings and still images of video game graphics are inadequate alternatives to fully restoring abandoned online games.*

For researchers, video recordings or still images of game play are inadequate substitutions to circumvention because they fail to preserve an abandoned online game's interactivity, and "[s]cholars need to be able to emulate conditions of original use as much as possible."²¹⁸ The Register of Copyrights made a similar point during the previous rulemaking, noting that "screen capture, which makes an audiovisual recording of the game in operation, is not adequate to mitigate the adverse effects on preservationists, who rightfully may seek to preserve playable versions of games."²¹⁹ The National Telecommunications and Information Administration concurred, noting that "[f]or research and preservation purposes, an alternative that removes the interactivity from a fundamentally interactive medium does not seem to be a reasonable one."²²⁰ As such, video recordings and still images are not acceptable alternatives to circumvention for the purpose of abandoned online game preservation.

(ii) *Licensing abandoned online games from copyright holders is an inadequate alternative to circumvention because it is often impossible to identify the owners of an abandoned game's copyrights.*

In some fortuitous cases, preservationists have been able to track down copyright holders and secure permission for their projects.²²¹ For example, the MADE's restoration of the game *Habitat* was done with permission from Fujitsu and America Online, the owners of the game's copyrights.²²² However, such circumstances are rare, and it is often extremely difficult—if not impossible—to determine who owns an abandoned work and to secure permission to preserve

²¹⁷ Cf. Spitzer Statement ("If we don't actively let institutions like the MADE and their affiliates attempt to restore these MMOs, they will simply be lost to time and America will be the worse off for it.").

²¹⁸ Taylor Statement; see also Cifaldi Statement ("When it comes to video games, there is no source more primary than the game itself."); David Statement ("By extending the DMCA exemption to online titles, you leave the door open ... to future generations to be able to interact and understand prior art in a form that is closer to how it may have been presented.").

²¹⁹ Register's Recommendation 2015, *supra* note 4, at 346.

²²⁰ NTIA 2015, *supra* note 113, at 69.

²²¹ See MADE Statement; Lowood Statement.

²²² See MADE Statement.

it.²²³ “While obtaining the permission of the rights owner to make a preservation copy offers a potential path around [the DMCA’s prohibition on circumvention], securing these permissions is complicated by the existence of a large number of ‘orphan works’ in the field of computer games, and the great difficulties encountered in trying to track intellectual property rights ownership in an industry as volatile as the game software industry.”²²⁴ Because game development companies are often short-lived and “copyrights are transferred or lost through acquisitions and business failures,” it is often impossible for preservationists to locate current copyright owners.²²⁵ Even when they can be tracked down, there is often still “considerable confusion among rights-holders” concerning the scope of their copyrights, which may prevent archivists from securing all necessary permissions.²²⁶ Additionally, the preservation of abandoned video games is likely fair use and does not require permission from copyright holders.²²⁷ Therefore, licensing is an inadequate alternative to circumvention.

In sum, § 1201 is causing, or is likely to cause in the next three years, an adverse impact on the preservation of abandoned online games, which is a non-infringing use, and alternatives to circumvention are inadequate. Therefore, the Register of Copyrights should recommend the Proposed Exemption to allow for preservation of abandoned online games.

4. The Proposed Exemption Meets 1201(a)(1)(C)’s Five Statutory Factors

In deciding whether a DMCA exemption should be granted, the Librarian of Congress must consider the following factors: (i) “the availability for use of copyrighted works; (ii) the availability for use of works for nonprofit archival, preservation, and educational purposes; (iii) the impact that the prohibition on the circumvention of technological measures applied to copyrighted works has on criticism, comment, news reporting, teaching, scholarship, or research; (iv) the effect of circumvention of technological measures on the market for or value of copyrighted works; and (v) such other factors as the Librarian considers appropriate.”²²⁸ Analyzing these factors involves a consideration of the “benefits that the technological measure brings with respect to the overall creation and dissemination of works in the marketplace, in addition to any negative impact.”²²⁹

Here, the Proposed Exemption allows circumvention of TPMs for the purpose of preserving abandoned online video games by libraries, archives, museums, and Affiliate Archivists, and the § 1201(a)(1)(C) factors apply to this Proposed Exemption as follows.

²²³ See Lowood Statement.

²²⁴ McDonough, *supra* note 5, at 6.

²²⁵ Lowood Statement.

²²⁶ *Id.*

²²⁷ See Item E-2 *supra*.

²²⁸ 17 U.S.C. § 1201(a)(1)(C).

²²⁹ Register’s Recommendation 2015, *supra* note 4, at 16.

a) The Proposed Exemption will increase the availability for use of copyrighted works, such as abandoned online video games and related copyrighted works.

The Proposed Exemption will significantly increase the availability of abandoned online video games for use by researchers and scholars. Last rulemaking, the Register of Copyrights found that an exemption to the prohibition on circumvention would “allow libraries, archives and museums to restore and maintain access to video games that might otherwise be lost, thus enhancing the availability of copyrighted works.”²³⁰ Although this statement referred to the more narrowly-focused Current Exemption, it is equally applicable here. Many online games, like MMOs,²³¹ are rendered unplayable when their game servers are shut down, making them unavailable for use.²³² Preservation enabled by the Proposed Exemption would counteract this problem by making it possible to restore abandoned online games to full functionality. Similarly, preservation of abandoned online games will likely “stimulate new copyrighted works offering commentary and analysis of video games,”²³³ thus increasing the number of copyrighted works related to online video games that are available generally. Therefore, the Proposed Exemption will increase the availability for use of copyrighted works.

b) The Proposed Exemption will increase the availability for use of abandoned online video games for nonprofit archival, preservation, and educational purposes.

As the Register of Copyrights noted in 2015, “regarding the second factor, which considers the availability for use of works for nonprofit archival, preservation and educational purposes, the record clearly favors granting the exemption [to allow circumvention for purposes of video game preservation].”²³⁴ This is equally true today. At present, scholars and educators do not have access to most abandoned online video games.²³⁵ “When access to a virtual world ceases with the ending of developer support, scholarly access ... ends along with it.”²³⁶ Preservation of abandoned online video games would counteract this problem by making abandoned online video games available for education uses.²³⁷ Therefore, the Proposed Exemption will increase the availability for use of works for nonprofit archival, preservation, and educational purposes.

²³⁰ *Id.* at 348.

²³¹ See Abandoned MMOs, *supra* note 5.

²³² Register’s Recommendation 2015, *supra* note 4, at 345 (“Some games require a connection to an external server—sometimes on an ongoing basis—for all types of play, including single-player play.”).

²³³ *Id.* at 348.

²³⁴ *Id.*

²³⁵ See McDonough, *supra* note 5, at 6; see also Abandoned MMOs, *supra* note 5.

²³⁶ Lowood Statement.

²³⁷ See Taylor Statement (“The ability to explore old games, including seeing how a multiplayer function actually worked, is an incredibly valuable pedagogical tool”).

c) The Proposed Exemption will have a positive impact on criticism, comment, teaching, scholarship, and research.

Currently, § 1201 has a negative impact on criticism, comment, teaching, scholarship, and research related to abandoned online video games. Because archivists cannot legally circumvent TPMs embedded in their architecture, abandoned online games cannot be protected from destruction through “media decay, obsolescence, and loss.”²³⁸ This makes these games unavailable for future research, study, critique, commentary, and teaching.²³⁹ Moreover, “researchers can no longer ‘get inside’ the software, which inhibits efforts to understand the development of the technology.”²⁴⁰ As such, “the prohibition on circumvention inhibits scholars from accessing older works and replicating ‘the experience of originally playing the game’ in order to study game design or construction.”²⁴¹ The Proposed Exemption will help solve this problem by preventing “bit rot”²⁴² and preserving abandoned online games for future critical, educational, and scholarly use.²⁴³ Thus, the Proposed Exemption will have a positive impact on criticism, comment, teaching, scholarship, and research.

d) The Proposed Exemption will not negatively impact the market for, or value of, abandoned online video games or older video games generally, and may positively benefit copyright holders.

The Proposed Exemption will not negatively impact the current or potential market for abandoned online video games. Game preservation conducted under the Proposed Exemption must be explicitly noncommercial: it may not be done “for direct or indirect commercial advantage,” and preserved online games may not be “distributed or made available outside of the physical premises of the eligible library, archives or museum.”²⁴⁴ As such, preservation activities will not take away from the commercial value of abandoned online games. Moreover, as the Register of Copyrights found during the previous rulemaking, “circumventing discontinued console-based video games themselves, as well as PC games, is unlikely to harm the market for or value of those copyrighted works.”²⁴⁵ This remains true today, as there is currently little-to-no market demand for abandoned online video games.²⁴⁶ Thus, preservation activities are unlikely to impair the market value of the abandoned online games being preserved.²⁴⁷

²³⁸ Monnens, *supra* note 2, at 140.

²³⁹ See Lowood Statement (“If a game server is shut down without provisions being made for access to the original software, preservation is impossible”).

²⁴⁰ *Id.*

²⁴¹ Register’s Recommendation 2015, *supra* note 4, at 348.

²⁴² See Risen, *supra* note 5.

²⁴³ See Taylor Statement (“The field of digital game design and study is still very much emerging and one of the key components to its continued growth is making sure the next generation of students are able to build on the tremendous work that has already been undertaken by developers.”).

²⁴⁴ See Item C-3 *supra*.

²⁴⁵ Register’s Recommendation 2015, *supra* note 4, at 339.

²⁴⁶ See *id.* (noting that evidence provided in the 2015 rulemaking “concerning potential markets for discontinued versions of games was scant” and so opponents “failed to demonstrate that the market for reissued games would

Furthermore, preservation may have a salutary effect on the market value of abandoned online games. By circumventing TPMs that are embedded in an abandoned online game in order to rebuild its architecture and make it playable again, preservationists will substantially increase the value of this title to researchers and scholars, thus raising the game’s academic market value. Similarly, preserving abandoned online games may increase demand for refurbished video game hardware, as educational institutions that want to use preserved games for research or teaching purposes will need to acquire functioning hardware to do so. The preservation of abandoned online video games may also strengthen the general market for older video games by increasing interest in obscure franchises. As such, preservation has the potential to improve the market value of abandoned video games themselves, and the market for older games and hardware generally. Thus, the preservation of abandoned online video games may positively benefit copyright holders.

Therefore, the Proposed Exemption will not negatively impact the market for, or value of, copyrighted works.

In sum, the first four factors of § 1201(a)(1)(C) support granting the Proposed Exemption.

e) Other factors support granting the Proposed Exemption.

In the Notice of Proposed Rulemaking, the Register of Copyrights raised three questions regarding the Proposed Exemption.²⁴⁸ Specifically, would the Proposed Exemption “impact the market for video games: (1) by allowing users of unlawfully acquired video games to bypass similar server checks; (2) by contributing to the circumvention of client-server protocols for non-abandoned video games; and (3) by impairing the market for older games or for licensed services or products facilitating backwards compatibility for video games.”²⁴⁹

- (i) *The Proposed Exemption would not allow users of unlawfully acquired video games to similarly bypass server checks.*

The Proposed Exemption would not allow users of illegal copies of video games to similarly bypass server checks. First, the Proposed Exemption only allows circumvention of abandoned online games by eligible libraries, museums, archives, and Affiliate Archivists for the purpose of preservation.²⁵⁰ Therefore, it does not alter the potential liability for individuals who unlawfully circumvent video game TPMs. Second, preserved game architecture will not be distributed or

be materially impacted by [the 2015 exemption]”); *see also id.* at 338 (discussing potential market for abandoned games).

²⁴⁷ *See* Register’s Recommendation 2015, *supra* note 4, at 339.

²⁴⁸ Exemptions to Permit Circumvention of Access Controls on Copyrighted Works, 82 Fed. Reg. 49,500, 49,562 (Oct. 26, 2017) (to be codified at 37 C.F.R. § 201).

²⁴⁹ *Id.*

²⁵⁰ *See* Item C-2 *supra*.

made available to the public “outside the premises” of a library, archives, or museum.²⁵¹ As a result, because preservation enabled by the Proposed Exemption would be restricted to “on-site activities in a controlled environment,” unlawful circumvention is prevented.²⁵² Third, as a technical matter, restored game architecture will only function with a specific abandoned online game and will not be generally applicable to other games. “The reality is that as every piece of software is written differently, every attempt at preservation must itself be different, so there is no categorical “master key” to unlock all online software titles.”²⁵³

Therefore, the Proposed Exemption would not allow users of unlawfully acquired video games to similarly bypass server checks.

(ii) *The Proposed Exemption will not contribute to the circumvention of client–server protocols for non-abandoned video games because each game protocol is unique.*

The Proposed Exemption will not contribute to the circumvention of client-server protocols for non-abandoned video games. The Proposed Exemption only allows circumvention of client–server protocols for the purpose of preserving abandoned online games;²⁵⁴ it does not alter the potential liability for individuals who unlawfully circumvent client-server protocols for other reasons. Likewise, preserved game architecture (including protocols) will not be distributed or made available to the public “outside the premises” of an eligible library, archives, or museum.²⁵⁵ Furthermore, even if a preserved protocol were unlawfully removed from the physical premises of a library, archives, or museum, it would not contribute to the circumvention of other protocols,²⁵⁶ as nearly all online games (both abandoned and not) use custom-built protocols to facilitate client–server interaction, and knowledge of how to circumvent one is inapplicable to another.²⁵⁷

Therefore, the Proposed Exemption does not contribute to the circumvention of client-server protocols for non-abandoned video games.

²⁵¹ See *id.*; see also Register’s Recommendation 2015, *supra* note 4, at 341 (discussing the limitation on preservation indicated by § 108).

²⁵² See Register’s Recommendation 2015, *supra* note 4, at 344 (“[I]n the case of preservation activities, libraries, archives and museums are a far more confined class than gamers at large, and the proposed uses would be limited to on-site activities in a controlled environment. The risk of piracy would therefore appear to be greatly diminished in the preservation context.”).

²⁵³ David Statement; see also Spitzer Statement (“Because each game is so unique we are faced with an individual challenge for the support for each game.”).

²⁵⁴ See Item C-2 *supra*.

²⁵⁵ See *id.*; see also Register’s Recommendation 2015, *supra* note 4, at 341 (discussing the limitation on preservation indicated by § 108).

²⁵⁶ See David Statement (“The reality is that as every piece of software is written differently, every attempt at preservation must itself be different, so there is no categorical “master key” to unlock all online software titles for preservation”).

²⁵⁷ See Spitzer Statement (“There still are no true unified protocols for building [online games]. Even modern attempts at unification within the major consoles have failed.”) Cf. Glenn Fielder, *supra* note 46.

- (iii) *The Proposed Exemption will not impair the market for older video games or for licensed services or products facilitating the backward compatibility of video games because these products and services are not offered for abandoned games, which have little-to-no market value.*

The Proposed Exemption will not impair the market for older games. Currently, there is little-to-no market for unsupported, unplayable titles,²⁵⁸ so preservation of these games will not negatively impact their value. “The Register [previously found] that circumventing discontinued console-based video games themselves, as well as PC games, [was] unlikely to harm the market for or value of those copyrighted works.”²⁵⁹ As to the general market for older video games, the preservation of abandoned online games is likely to have a salutary effect. For example, scholarly research into abandoned online games (enabled by preservation) would likely stoke interest in these titles, thus benefiting copyright owners should they choose to re-release or remake a previously-abandoned game in the future. Similarly, preserving abandoned online games may increase demand from academic institutions for refurbished video game hardware to use with preserved games. Regardless, even if no positive benefits are realized, the preservation activities enabled by the Proposed Exemption would not detrimentally impact the market for older games, as the exemption is narrowly tailored to cover only abandoned games, which currently have little-to-no commercial value.²⁶⁰

Similarly, the Proposed Exemption will not impair the market for licensed services or products facilitating the backwards compatibility of video games. The Proposed Exemption only applies to abandoned online games, which by definition are games whose online functionality is longer supported by their copyright owners.²⁶¹ So, if licensed services or backward-compatibility products exist to facilitate online play of a game, then this game would not be abandoned and the Proposed Exemption would not apply. For example, Microsoft recently made a limited number of its older Xbox and Xbox 360 titles backwards-compatible and available for digital download, thereby reactivating their online play.²⁶² Because server support for these games has been restored, they would not be eligible for preservation under the Proposed Exemption. “There are too many games that have been taken offline for [archivists] to possibly waste time to preserve things that are already being preserved. Microsoft, for example has begun to bring its old Xbox games back into its online store, re-enabling online play for them. For this reason, Xbox games are now at the absolute bottom of [archivists’] priority list.”²⁶³

²⁵⁸ See Register’s Recommendation 2015, *supra* note 4, at 339 (noting that evidence provided in the 2015 rulemaking “concerning potential markets for discontinued versions of games was scant,” and so opponents “failed to demonstrate that the market for reissued games would be materially impacted by [the 2015 exemption]”).

²⁵⁹ *Id.* at 339.

²⁶⁰ *Id.* at 338.

²⁶¹ See Item C-2, *supra*.

²⁶² Microsoft, “Xbox One Backwards Compatibility,” available at <https://web.archive.org/web/20171113042129/https://www.xbox.com/en-US/xbox-one/backward-compatibility> (archived Nov. 13, 2017).

²⁶³ MADE Statement.

Therefore, the Proposed Exemption will not impair the market for older games or for licensed services or products facilitating backwards compatibility for video games.

5. Conclusion

To facilitate the preservation of abandoned online video games, the Current Exemption needs to be modestly expanded. Specifically, we ask: (a) for renewal of the portions of the Current Exemption that allow circumvention for the purpose of restoring access to video games that require server authentication for personal local or LAN-connected gameplay;²⁶⁴ and (b) for slight modifications to the Current Exemption to allow circumvention for the purpose of preserving abandoned online video games by eligible libraries, archives, museums, and individuals who are engaged in lawful game-preservation activities under the supervision of eligible libraries, archives, or museums.²⁶⁵ Without this expansion, future generations will not be able to learn from the technological achievements (and missteps) of their predecessors or to understand the place of video games in 21st century popular culture.²⁶⁶ As a result, future scholars will end up “looking back at western civilization and wondering what went on in the big hollow spaces where knowledge ought to be.”²⁶⁷ Therefore, to help preserve these culturally vital works, and to avoid losing a huge portion of video game history to a digital dark age,²⁶⁸ we respectfully request the Register of Copyrights recommend the Proposed Exemption.

²⁶⁴ See 37 C.F.R. § 201.40(b)(8)(i)(A).

²⁶⁵ Register’s Recommendation 2015, *supra* note 4, at 351 (noting that such individuals may be able to “contribute to valuable preservation efforts by lending their talents and expertise to qualified institutions.”).

²⁶⁶ See, e.g., Rose, *supra* note 32 (analogizing the shutdown of a multiplayer online game to “bulldozing a museum.”).

²⁶⁷ See Hartup, *supra* note 33.

²⁶⁸ See Monnens, *supra* note 2, at 140.

DOCUMENTARY EVIDENCE

Statement of The Museum of Art and Digital Entertainment November 9, 2017

The Museum of Art and Digital Entertainment is a 501(c)(3) non-profit video game museum located in downtown Oakland, California. We host a playable private library of over 5,000 games across 30+ systems, and offer free programming classes for kids to teach them STEM skills under the guise of making games. In our six-year history, our volunteers have undertaken a number of preservation efforts, from saving lost television shows and documentaries, to interviewing industry luminaries on camera, to relaunching the world's first massively multiplayer online game, *Habitat*.

Bringing back *Habitat* was a four-year project which took thousands of person-hours, including countless hours provided by volunteers. These volunteers contributed their time and expertise out of their love for video games, and this project could not have been completed without their assistance. Scheduling, high-level technical strategy (e.g., "do we rewrite it from scratch, or try to get the old server running?"), and overall project management was done by the MADE, but volunteers provided the bulk of the day-to-day technical work required to bring the game back to life.

As of now, neohabitat.org is live, and hosting a free *Habitat* server for players around the globe. *Habitat* was created in 1984, and first beta tested in 1986. It was the creation of the company that would go on to be America Online, and LucasFilm Games, a subdivision of George Lucas' production company. Both of these companies have since been acquired by larger entities: Verizon and Disney, respectively.

In 1986, *Habitat* laid out the framework for every subsequent massively multiplayer game since. It coined the term "Avatar" to refer to the player's character. The game was also the first to offer in-game currency, player-owned housing, and collaborative games. Today, these are the fundamental building blocks of online games.

We had the great benefit, in this unique endeavor to preserve a supremely important piece of American culture, of working with the two original authors of the game, Randall F. Farmer and Chip Morningstar. They were able to supply us with most of the original source code to the game server, the original source code to the client, and their own depth of knowledge about the platform.

We worked with Fujitsu and America Online to secure the rights needed to bring *Habitat* back online, and we also had the help of over two dozen deeply dedicated and professionally skilled developers and former players of the game.

In our work to bring back *Habitat*, our end goal was to make the game playable with the original unpatched client software, using a replacement server rewritten from scratch in a modern language (JavaScript), on a modern operating system (Linux). This was chosen as the goal after a great deal of time was wasted attempting to secure the remaining missing pieces of the original server code, which were somewhere inside Verizon and accessible only by a single employee familiar with the ancient 1980's era tape backup systems. That employee has since retired, and though he got the data we needed, Verizon, though amenable and working towards our goal, was unable to navigate its own internal legal bureaucracy systems in time to get us the data. They never said no, they simply stopped responding. We assume they had something more profitable to do, as they were working on this for free as a way to help us preserve their corporate history. This has typically been the problem we've encountered with corporate rights holders: they simply do not have the time or resources to help us, though they would like to. Our work does not generate revenues, and so it is not a priority.

The largest missing piece of the *Habitat* puzzle was the network server software that sat between *Habitat* and the player: Quantum Link. This was the dial-up network and company that preceded America Online, and it has not been preserved in any official way. As a result, while we had the client for *Habitat*, and the server code, we did not have the layer between the two which handled billing and sign-on: in essence, we faced a primitive DRM system. This missing network is analogous to the original Xbox online service, the Sega Dreamcast's online service, or the TEN gaming network, all now offline and undocumented.

Without that missing Quantum Link DRM piece, we were essentially unable to restore *Habitat*, and without Verizon's help to gather those missing resources, we were faced with the possibility that this incredibly unique and important piece of American culture would be lost forever. Instead of giving up, however, we felt that the work was essential to future generations who would likely find this to be as significant and important historically as we do.

Despite the missing pieces from Quantum Link, we were able to build out the necessary infrastructure ourselves. After four years of near continuous work, we were able to bring the game back online. This was something we were told repeatedly could never be done, even by the game's original authors.

This success, however, was the result of a perfect storm of opportunities. We had the source code, the developers, and volunteers all working together to build this project. Even with those resources, four years is a long time to work on a restoration project. In that short four-year period, thousands of other games have launched and vanished from the Internet entirely.

We will never again have this many resources at our disposal for a restoration project. *Habitat* has been well-documented as prior art, and thus was preserved for many years by its authors for use in patent litigation. If that had not been the case, the original source code would likely have been lost.

And even with all of the possible variables completely in our favor, this project was ridiculously complex. Resurrecting *Habitat*—a game that existed and still exists within 64kb of RAM, ran over 1200 baud modems, and was played with a joystick and a single button—still took us four years.

The going wisdom when we began this project was that this work was impossible. Technically, it was remarkably difficult and relied on very old technology modern developers are unfamiliar with. Legally, it required contacting the chief counsel of multiple multi-billion dollar enterprises.

Ultimately, the gaming community and game development community wanted to see *Habitat* returned, and thus, they were able to help us accomplish this goal. But even the companies we worked with who were willing and excited to help us preserve their corporate history were too busy to spend the time we needed to help us. They were in no way hostile to our work, they simply did not see it as a source of revenue.

Other games we'd like to target in the future include SOCOM U.S. Navy Seals 1/2/3 on Playstation 2 and Playstation 3, The Matrix Online, and Star Wars Galaxies. Our current preservation project is Neverwinter Nights, an MMO that was operational from 1991–1997. We are again attempting to contact all the stakeholders, but it is unclear who owns which pieces of the game's copyrights (the principal copyright owners are Wizards of the Coast, AOL, and Cryptic Studios). However, even if we can secure all necessary rights and the original creator of the game has the source code, it will still take years to get this game running again in any form, as the codebase is a VOS/Stratus monster from a bygone era.

This is why we need an exemption for the circumvention of DRM in online games and massively multiplayer games for the purpose of preservation. Even if our work is never seen by the public in our lifetimes, it is the users and developers of the future we are working for. Working around the actual DRM we've thus encountered has always been one of the least challenging technical parts of our work, but it remains the largest legal hurdle to our efforts.

The Greeks and Romans worked in marble. The French worked in oils on canvas. Americans work in bits. The United States is where video games were invented, honed, and perfected. The entire industry originated here, and others like Japan, adopted it. The United States is where much of the industry norms were invented as well: the platform game, the first-person shooter, the online virtual world.

The problem, as we see it, is there are too many targets, too many games that have been taken offline for us to possibly waste time working to preserve things that are already being preserved. Microsoft, for example, has begun to bring its old Xbox games back into its online store, re-enabling online play for them. For this reason, Xbox games are now at the absolute bottom of our priority list, a list which extends into the horizon with beyond 10,000 games on it.

Every day we are losing our digital heritage as games turn unprofitable and are retired by their owners. We have the ability to work towards preserving and resurrecting about one to two games at a time, with average return completion around 4 years. That's a rate that is so slow and almost ineffective that it is impossible for us to even contemplate our work as a solution: we're just trying to triage the most important subjects first, while thousands go passing by into the darkness every year.

Compounding the problem is the fact that we are currently losing the generation that originated video games. This will also happen with the 8-bit era, the 16-bit era, and beyond, over time.

Time waits for no man or woman. In order to preserve these digital cultural assets, the MADE and other entities need to work tirelessly and immediately to stem the never-ending flow of lost relics. Waiting for legal approval to circumvent 30-year-old DRM just makes our fair use efforts to save these cultural heirlooms that much harder.

We don't know what will be important to have preserved in the future. Therefore, it is important to be able to preserve as much as possible. For online games, something must be done to preserve or reverse engineer the server-side in order to preserve the game itself, otherwise the whole thing is lost. With thousands of new online games launching every year, the MADE is hoping an exemption can help us at least try to preserve one or two of those lost treasures at a time.

Statement of Russell Spitzer, Software Engineer
December 2, 2017

While the 20th century has brought us an exponential increase in the creation of new creative works, many of these creations are being lost to the general entropy of modern society. In particular, there are thousands of games which citizens have invested countless hours in that are simply flickering out of existence. Their effect on society will only be preserved in the memory of dedicated enthusiasts. In order to preserve these treasures so that future generations may be able to experience first-hand what I and many others were able to live through, I fully support the MADE in its attempt to obtain the legal rights to responsibly preserve Massively Multi-player Online (MMO) games.

One of the most striking reasons to support this is to preserve the plethora of different systems written by programmers to solve unique challenges. How can we let individuals from all over the world interact? Different programmers all had different takes on how the client-server model should be implemented and almost none of these approaches were compatible. Each of these expressions should be preserved so that future programmers can see the approaches that were taken. As a Software Engineer, I would feel a great loss if the history of all of these developments were lost. Almost every title had a unique architecture and arrangement.

Because each game is so unique we are faced with an individual challenge for the support for each game. Restoring one game will not make it easier to restore another closed down game so any one restoration should not enable piracy for other titles. This extends to modern games as well since there still are no true unified protocols for building these MMOs. Even modern attempts at unification within the major consoles have failed because of the need for cross system support. For example, although Sony provides networking capabilities for any title developed against its system, most popular games still implement their own architectures so that they can enable matchmaking between players on PC or Xbox.

MMOs have been a touchstone for many Americans, providing a sense of community that simply wasn't possible across distances prior. If we don't actively let institutions like the MADE and their affiliates attempt to restore these MMOs, they will simply be lost to time and America will be the worse off for it.

Statement of Henry Lowood, Curator, Stanford University
December 5, 2017

I am writing as an individual in support of the DMCA exemption request for the purpose of restoring access to multiplayer video gaming on consoles and personal computers when the developer and its agents have ceased to support such gaming. My opinions do not necessarily reflect those of Stanford University, my employer.

Q: Could you please describe how games preservation and archiving requires bypassing or defeating access controls built into the games?

Preservation activities undertaken either by cultural institutions (museums, libraries) or individual researchers usually become literally impossible when developers cease support of the technical infrastructure required to maintain these games. This statement is true for several reasons.

First, current digital preservation practices are universally predicated on data migration, which means the transfer of data from fragile, historical media to the robust technical systems that have been designed for digital preservation. Access to the original software and to the digital assets (maps, audio files, character animations, etc.) that make up a game or virtual environment is fundamentally important. If a game server is shut down without provisions being made for access to the original software, preservation is impossible.

Moreover, preservation without access to the software, both as data and as an executable program, becomes a meaningless activity. Since entry into most server-based games and virtual worlds requires an authentication procedure such as a login, after a server shuts down, the authentication procedure built into the software will be an obstacle for preservation or research activities. Without a circumvention of DMCA restrictions, processes such as authentication will block access by the repository or researchers, and they will be unable to activate the software.

Shutting down support for game or virtual world servers also destroys other positive aspects of these kinds of software that benefit preservation activities. Two examples are the social communities that exist around games and the digital assets and affordances that games provide for artistic expression. When access to a game shuts down, the player community dies with it. The emotional impact of such closures on a community can be observed in the video titled, "EA- Land: The Final Countdown (2008)," archived as part of the Archiving Virtual Worlds collection hosted by the Internet Archive (https://archive.org/details/EALand_FinalCountdown). However, there is also an impact on preservation efforts; with the shutting down of the system, documentation assembled by players in the game community disappears along with access to these witnesses. Several historical and preservation activities conducted by the How They Got Game project at Stanford (which I lead) have been predicated on contact

with players in the game world. If there is no access to the game world, it becomes impossible to work with the game community on preservation projects.

In addition, forms of artistic expression such as machinima (game-based movie-making) have imaginatively made use of settings and other resources uniquely available in game and virtual worlds. As an example, one technique employed by machinima-makers involves composition of character animations or maps/levels stored in databases associated with specific on-line games, such as *World of Warcraft*. If support for such a game ceases, the only method available to re-create this experience (as a preservation activity) will be to set up private or repository-supported servers, which currently is a DMCA violation.

All of the situations described above force repositories and researchers into the uncomfortable situation of considering unauthorized circumvention of copyright law in order to preserve or provide access to game and virtual world environments, data, and software. Without circumvention of current restrictions, many kinds of preservation and research projects effectively become impossible.

Q: Is getting permission from developers a reliable option for players or archivists who want to run multiplayer or circumvent authentication servers?

Based on my experience with preservation, archival and research projects, this approach is at best a short-term solution. Over the history of the software and game industries, most developers are short-lived and copyrights are transferred or lost through acquisitions and business failures. In the long term, it is often impossible for institutions or individuals to locate corporations or people who can sign off on the rights – or even know that they are the rights-holders. I have encountered considerable confusion among rights-holders concerning their ownership of copyrights, even in cases when I was confident that I had contacted the documented owner of those rights, and the owner was sympathetic with a request.

Q: How does the non-professional games community contribute to or assist professional archivists?

In a word: crucially. Every cultural institution that collects software or game-related collections owes a huge debt to the non-professional games community. The areas of activity in which this debt has accumulated include: (1) personal software collections that are transferred to repositories; (2) collections of documentation (screenshots, videos, developer documents, etc.); (3) emulator development; (4) documentation and reverse-engineering of game technologies, without which the understanding of game hardware, on-line systems, game software and actual play contexts would suffer greatly. This last point is particularly relevant with respect to on-line games for which developer support has ceased, because developer documentation often does not describe these complex game systems in great detail, or is not available. Players have stepped in to document how the software works, map the game worlds, identify key components of the software and how they operate, reveal hidden aspects of on-line

games, etc. How players inspect, explore and document game and virtual worlds has been a focus of my own historical games research and publication, and I can attest to the fact that much crucial historical information is lost when players no longer have access to a game system. Often, this information is important not only for historical understanding of game technologies and culture, but in order for cultural repositories to preserve and provide access to the games in their collections.

Q: How are older video games relevant to criticism, scholarship, teaching and research?

As in almost any scholarly discipline, historical study of the evolution of technologies, culture, social networks, design practices, and users is essential. With respect to this circumvention application, it may be useful to think of game worlds as social and cultural spaces enabled by a technical infrastructure. In other words, games are virtual worlds. Scholarship, teaching and research are concerned with the nature and histories of these virtual worlds as worlds, that is, as social communities with specific histories. They are also concerned with the structure of these worlds and the technical disciplines that create them, ranging from game design to computer programming. When access to a virtual world ceases with the ending of developer support, scholarly access to the historical world (events, activities, participants) represented by that game ends along with it. Moreover, researchers can no longer “get inside” the software, which inhibits efforts to understand the development of the technology. Critical-historical research about game worlds is greatly handicapped when access to these worlds ends. The cost is not just lost game history, but lost cultural, technical and social history of the late-20th and early-21st centuries.

**Statement of Christian Charles David, Software Engineer
December 1, 2017**

I have been programming for over three decades now. Video games are actually what got me into programming, and I am writing on behalf of The MADE (Museum of Art and Digital Entertainment)'s position to extend their DMCA exemption to network based/online software. Already, they have demonstrated resurrecting one of the first Massively Multiplayer Online software titles, Habitat (source code available publicly here: <https://github.com/Museum-of-Art-and-Digital-Entertainment/habitat>), which had not been in a usable state since the 1990s. By extending the DMCA exemption to similar titles, it would facilitate similar preservation efforts. For example, another preservation effort was done among the Phantasy Star Online community to re-implement the network server portions so that individuals could continue playing it, after SEGA had taken such services offline. Here is the fan site: <https://ephinea.pioneer2.net>. Here is a codebase to facilitate such after end-of-commercially-supported-life preservation: <https://github.com/Solybum/Aselia>.

It is my understanding that the US Copyright Office, currently takes the position that by extending the exemption, it might facilitate more piracy. This is not the case. Indeed, the reality is that as every piece of software is written differently, every attempt at preservation must itself be different, so there is no categorical "master key" to unlock all online software titles for preservation. By extending the DMCA Exemption, in effect you will be leaving the door open for more archivists to toil, but it will not meaningfully change the threat model of pirates, who have always operated with a disregard for copyright law anyway.

In other words, by extending the DMCA exemption to online software, you don't facilitate piracy, moreover, you don't even automatically preserve the games in a playable state. There is still a significant amount of development effort that is required in order to re-implement such things, often requiring forms of reverse engineering, partnering with the original developers (if they are alive and amenable to such things, as some thankfully were in the NeoHabitat restoration effort) and so on.

By extending the DMCA exemption to online titles, you leave the door open not to pirates, who will disregard your policies regardless, but to future generations to be able to interact and understand prior art in a form that is closer to how it may have been presented, even long after maintaining the original server software may have been considered no longer commercially viable.

In well-funded businesses, sometimes "Software Escrow" takes place so that large organizations can maintain working build infrastructure for business partners in the event that something catastrophic happens to the partner. One of my previous employers, NCC Group, offers such services to Fortune 500 sorts of companies. By extending the DMCA exemption to preserve online software to organizations such as the MADE, you will be ensuring that even with-

out the sorts of clout and finances that Fortune 500 organizations have, some forms of art and games may be able to be preserved in the most maintainable way possible.

Thank you for your time and consideration. I hope that you will side with preservation organizations such as The MADE in your decision-making process. As it is, they are currently underfunded, and one of only 17 organizations globally which are even attempting such museum work. Moreover, while they boast to having something around 5300 physical copies of existing prior art, last time I checked the list of published video games was closer to 90,000. Which is to say, even among some of the core organizations devoted to preserving this sort of art, they have at best, only managed to preserve approximately 1/16th of extant examples.

By extending the DMCA exemption, you will not guarantee that preservation efforts will be perfect, but you will at least not inhibit such efforts unduly. I hope I have presented my perspective in a manner that is easy to understand. Feel free to reach out if you have any questions and I will do my best to help elucidate my position further.

**Statement of Frank Cifaldi, CEO, Video Game History Foundation
November 16, 2017**

The Video Game History Foundation is a 501(c)(3) that promotes the idea that the history of video games is worthy of academic study, and that this study is only possible through access to primary source materials. We provide researchers access to rare materials, encourage their study through research grants, and educate the public on how they, too, can study the history of what we believe will come to be the 21st century's primary form of entertainment and expression.

When it comes to video games, there is no source more primary than the game itself. And while most of history's most notable "offline" games (those that do not necessitate online play) can be accessed and played as intended by their authors, the maintenance of "online" games introduces unique challenges that cannot be overcome with traditional methods.

It is because of this that I am writing today in support of the MADE's petition for a DMCA exemption for abandoned online games. One of our founding principles at the VGHF is that we refuse to allow the history of early video games to suffer the same fate as the history of American cinema.

According to The Film Foundation, over 90% of films made before 1929 are considered lost, meaning that historians have an incomplete view of the formative years of that medium. We believe that without measures such as this proposed DMCA exemption being put in place, many of our formative online games will suffer the same fate.

**Statement of Steven Lavoie, Librarian
November 15, 2017**

I am writing in support of the petition by The Museum of Art and Digital Entertainment (The MADE) for an exemption from the Digital Millennium Copyright Act (DMCA). As a public librarian, I have direct responsibility for an extensive collection of historical photographs, audiotapes, films and other media for which current copyright law is applicable. The blanket fair use exemption for institutions such as mine was critical for the provision of the essential service that collection supports.

I have previous experience, as a research assistant at the University of California, Berkeley, helping to recover footage of great historical significance, including interviews and speeches given by such figures as Malcolm X and groups such as the San Francisco Mime Troupe and the United Farm Workers from obsolete recording formats. Some of this footage was inaccessible to the copyright holder because of the unavailability of playback equipment. Moving it to contemporary formats on preservation quality materials allowed the copyright holder the ability to generate revenues from resale and subsequent royalties while bringing the content of these remarkable recordings back into view. Because fair use applied to these materials due to the nature of the institution, this preservation strategy was possible.

Software-based intellectual property faces very similar challenges as those faced with video and audio recordings during this rapidly changing technological environment and the same exemptions should apply to software products such as video games. At a time when research is flourishing on the impacts of digital entertainment and social media product, resulting in significant breakthroughs in our understanding of the nature of human cognition and other social and neurological processes, access to the digital artifacts is essential to enable on-going scientific study and to assure that access to the material by copyright holders for any future commercial exploitation is possible.

What better place to oversee this preservation than a non-profit museum dedicated to the preservation of video games? Its status as a non-profit organization removes any incentive to violate copyright for the purpose of profit and the personnel such an institution will attract could greatly advance the much-needed development of tools to provide access to obsolete technology for future enjoyment. Based on my assessment of the principals at The MADE through personal acquaintance with them, an exemption from the DMCA for the purpose of preservation of significant works in the digital realm would greatly benefit our efforts to both safeguard the nation's creative heritage and to build vital tools for future generations.

[Originally submitted as part of the EFF's 2015 petition.]

**Statement of T.L. Taylor, Associate Professor of Comparative Media Studies
February 5, 2015**

I am writing in support of the Exemption for Circumvention Necessary to Run Game Software After the Developer's Authentication or Matchmaking Server Has Shut Down. I am a sociologist who has done extensive work on digital gaming, in particular researching player communities. I teach in a program where serious attention is given to understanding computer games as vibrant works of design, art, and culture. Allowing players, students, and scholars to continue to access and work with games where developer support has ceased is crucial in several ways.

Player communities. Much of what we've learned through the last 15 years of scholarship on digital gaming is that players are active, dedicated users of various titles even long after the works are supported by the original developers. Players not only derive powerful connection to these cultural properties but, critically, to other players of the game. While game companies regularly make practical choices to discontinue online services and facilitation mechanisms, player communities do not follow such trajectories. Gamers themselves often step in to try and fill in the gap, wanting to sustain their own communities through "labors of love" long after the original developers have moved onto other titles. An exemption that recognizes the value of the communities that players develop around titles, and the efforts they make to sustain them after developer interest has waned, strikes me as a critical component to situating ideas of a public good in the age of digital networks and leisure.

Educational value. The field of digital game design and study is still very much emerging and one of the key components to its continued growth is making sure the next generation of students are able to build on the tremendous work that has already been undertaken by developers. As educators, we face a fast-moving space of digital products that quickly cycle in and out of the commercial market. Being able to ensure our students can leverage a rich base of knowledge about prior developments is crucial. The ability to explore old games, including seeing how a multiplayer function actually worked, is an incredibly valuable pedagogical tool.

Scholarship. Those of us who study the complex intersection of user experience and digital media face an ongoing challenge due to the ephemerality of much of the domain. In the same way, we've seen the incredible value of archiving all kinds of material for historical analysis (from physical objects to the fantastic work of sites like the Internet Archive), much can still be done to facilitate the social and cultural analysis of technological objects after their original life cycle. The preservation of computer games includes not only making sure we can see their graphics or hear their sounds, but understand the complexity of their mechanics which, increasingly, means understanding multiplayer components. Play-

ing together is not a trivial side aspect to digital gaming and this means that scholars need to be able to emulate conditions of original use as much as possible. Given the market life-cycle of most games, protection is needed to ensure research can continue on these artifacts even after developers have moved onto other ventures.

I believe the exemption proposed here offers a critical path to supporting a range of work that, far from harming any stakeholders, fosters the lively use, development, and scholarship of digital gaming.

[Originally submitted as part of the EFF's 2015 petition]

Statement of Jason Scott

February 6, 2015

My name is Jason Scott. I work at the Internet Archive, where I manage the software archiving and preservation projects. Recently, this has included the Internet Arcade, as well as a library of MS-DOS games.

The Internet Arcade is a web-based library of arcade (coin-operated) video games from the 1970s through to the 1990s, emulated in JSMAME, part of the JSMESS software package. Containing hundreds of games ranging through many different genres and styles, the Arcade provides research, comparison, and entertainment in the realm of the Video Game Arcade.

The game collection ranges from early “bronze-age” video games, with black and white screens and simple sounds, through to large-scale games containing digitized voices, images and music. Most games are playable in some form, although some are useful more for verification of behavior or programming due to the intensity and requirements of their systems.

The MS-DOS collection includes action, strategy, adventure and other unique genres of game and entertainment software. Through the use of the EM-DOSBOX in-browser emulator, these programs are bootable and playable.

The Internet Archive is interested in continuing to digitize and make available games to the public. However, as we come up to more current operating systems, and more modern examples, authentication servers start becoming part of the picture. The problems start changing and begin to include DMCA §1201.

In the Windows 3.1 and Windows 95 era programs, by 1996 and 1997, we start seeing pretty coherent phone home schemes. Usually the company who produced the software will augment them with a phone number you can call or a code you get, but most of them want to use a server. And then over time, the companies get rid of the phone all together and they make the server a more important part.

In order to continue to preserve and archive these games as they start to rely on authentication servers, we will need to deactivate the server authentication mechanisms. Although we have not done this so far, it will become more important to do so in the near future.

Partial List of Abandoned MMOs

December 11, 2017

Game	In Existence	Source of Information on Shutdown
Neverwinter Nights	1991–1997	The MADE
Marvel Heroes	2013–2017	https://www.reddit.com/r/shutdownmmos/
Free Realms	2009–2014	https://www.reddit.com/r/shutdownmmos/
Clone War Adventures	2010–2014	https://www.reddit.com/r/shutdownmmos/
Darkspore	2011–2016	https://www.reddit.com/r/shutdownmmos/
Monkey Quest	2011–2014	https://www.reddit.com/r/shutdownmmos/
EverQuest Next Landmark Alpha	2014–2014	https://www.reddit.com/r/shutdownmmos/
Rubies of Eventide	2003–2009	https://www.reddit.com/r/shutdownmmos/
Millsberry	2004–2010	https://www.reddit.com/r/shutdownmmos/
Cartoon Network Universe: FusionFall	2009–2013	https://www.reddit.com/r/shutdownmmos/
Exteel	2007–2010	https://www.reddit.com/r/shutdownmmos/
Dungeon Runners	2007–2010	https://www.reddit.com/r/shutdownmmos/
Lego Universe	2010–2012	https://www.reddit.com/r/shutdownmmos/
Playstation Home	2008–2015	https://www.reddit.com/r/shutdownmmos/
MSN Gaming Zone CD-ROM Lobbies	1996–2006	https://www.reddit.com/r/shutdownmmos/
Asheron's Call 2	2012–2017	https://www.reddit.com/r/shutdownmmos/
Grand Chase Brazil	2006–2015	https://www.reddit.com/r/shutdownmmos/
Bearville	2007–2015	https://www.reddit.com/r/shutdownmmos/
The Imagination Network	1991–1998	https://www.reddit.com/r/shutdownmmos/
Club Penguin	2005–2017	https://www.reddit.com/r/shutdownmmos/
DarkSpace	2015–2016	https://www.reddit.com/r/shutdownmmos/
Virtual Magic Kingdom	2005–2008	https://www.reddit.com/r/shutdownmmos/
Phantasy Star Online	2000–2007	https://www.reddit.com/r/shutdownmmos/
Battlefield Heroes	2009–2015	https://www.reddit.com/r/shutdownmmos/
Phantasy Star Universe	2006–2012	https://www.reddit.com/r/shutdownmmos/
Motor City Online	2001–2003	https://www.reddit.com/r/shutdownmmos/
Glitch	2011–2012	https://www.reddit.com/r/shutdownmmos/
Toontown Online	2003–2013	https://www.reddit.com/r/shutdownmmos/
Asheron's Call	1999–2017	https://www.reddit.com/r/shutdownmmos/

PlanetSide 1	2003–2016	https://www.reddit.com/r/shutdownmmos/
Final Fantasy XIV	2010–2012	https://www.reddit.com/r/shutdownmmos/
Pirates of the Caribbean Online	2007–2013	https://www.reddit.com/r/shutdownmmos/
City of Heroes	2004–2012	https://www.reddit.com/r/shutdownmmos/
Star Wars Galaxies	2003–2011	https://www.reddit.com/r/shutdownmmos/
Shin Megami Tensei: Imagine	2007–2016	https://www.reddit.com/r/shutdownmmos/
EverQuest Online Adventures	2003–2012	https://www.reddit.com/r/shutdownmmos/
Warhammer Online: Age of Reckoning	2008–2013	https://www.reddit.com/r/shutdownmmos/
Eve: Dust 514	2013–2016	https://www.reddit.com/r/shutdownmmos/
The Matrix Online	2005–2009	https://www.reddit.com/r/shutdownmmos/
Auto Assault	2006–2007	https://www.reddit.com/r/shutdownmmos/
Tabula Rasa	2007–2009	https://www.reddit.com/r/shutdownmmos/
The Sims Online / EA-Land	2002–2008	https://www.reddit.com/r/shutdownmmos/
Need for Speed: World	2010–2015	https://www.reddit.com/r/shutdownmmos/
Stone Age 2	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Pi Story	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
The Legend of Ares	2007–2009	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Holic Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Fury	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Shadowbane	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Survival Project	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Gold Slam	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Xiah Rebirth	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Chaos Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/

BB Tanks	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Dragon Sky	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Corum Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Elf Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
SlapShot	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Smash Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Turf Battles	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Nida Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Manga Fighter	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Project Torque	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Esteria Mythos	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Endless Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Hockey Dash	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Bright Shadow	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Warrior Epic	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Mercenary Wars	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Red War	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Emil Chronicle Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Cue Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Soul Master	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/
Phoenix Dynasty Online	2007–2010	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorpgs/

Valkyrie Sky	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
UpShift StrikeRacer	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
Martial Heroes	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
NEO Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
Shadow of Legend	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
Fantasy Earth Zero	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
FIFA Online	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
Genesis AD	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
Kitsu Saga	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
Mythos	2011–2014	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
Vanilla Gate	-	https://mmohuts.com/news/the-mmo-graveyard-dead-mmorppts/
City of Villains	2005–2012	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Dark and Light	2006–2008	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Darkeden	1997–2013	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Darkfall Unholy War	2013–2016	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Dragon’s Prophet	2013–2015	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Earth and Beyond	2002–2004	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Firefall	2014–2017	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Free Realms	2009–2014	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
LaTale	2009–2010	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Priston Tale	2001–2013	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games

Rusty Hearts	2011–2014	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Sangokushi Online	2008–2010	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Soul of the Ultimate Nation	2007–2013	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
StarQuest Online	2007–2014	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Tales of Pirates	2007–2016	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Vanguard: Saga of Heroes	2007–2014	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Wizardry Online	2013–2014	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
World of the Living Dead	2014–2014	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Zu Online	2007–2012	https://en.wikipedia.org/wiki/List_of_massively_multiplayer_online_role-playing_games
Landmark	? – 2016	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Arcane Saga Online	? – 2013	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Pac-Man Social	? – 2012	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
My Monster Rancher	? – 2012	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Family Guy Online	? – 2012	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Doctor Who: Worlds In Time	? – 2012	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Puzzle Bobble Online	? – 2011	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Zodiac	? – 2011	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Sonic Tweet	? – 2011	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Divine Souls	? – 2011	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
2029 Online	? – 2009	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
The Chronicles of	? – 2008	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/

Spellborn		mmo/3015-3661/games/
Asda Story	? – 2008	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Space Invaders: World War	? – 2008	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Hellgate: London	? – 2007	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Age of Armor	? – 2007	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Fury	? – 2007	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Fantasy Tennis	? – 2007	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
SEED	? – 2006	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Tales of Eternia Online	? – 2006	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Yu-Gi-Oh! Online	? – 2005	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Neocron	? – 2002	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Legend of Mir 2	? – 2001	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Westward Journey Online	? – 2001	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
WWE With Authority!	? – 2001	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Infantry	? – 1999	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
Legends of Future Past	? – 1992	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/
AD&D Dark Sun Online: Crimson Sands	? – 1996	https://www.giantbomb.com/discontinued-mmo/3015-3661/games/