Data Salvage –
Preserving Software-based Artworks
in the Museum of Contemporary Art Kiasma

Maija Grönqvist, MA student, University of Helsinki

How to preserve process, context, and instability? Software-based art requires a certain amount of institutional rethinking in terms of collecting and preservation. Museums, entrusted with the task of preserving and re-exhibiting their collected artworks even in the most distant future, are battling with a new set of problems related to software-based art. The underlying challenge is that the artworks – often manifested as everything but objects – are created on technologically evolving platforms. As a result, theoretical models and practical strategies linked to software-based artworks are inevitably bound to change.[1]

Preserving software-based artworks is challenging yet vital, as they not only represent the artists' ideas and concepts, but also the technological possibilities and the complex communication landscape of our time.[2] Long before the official recognition of the digital revolution, artists were already experimenting with the novel possibilities of new media. The first wave of digital art was exhibited mainly at technology conferences or digital media festivals. Towards the end of the last century, however, new media art, the art form that used to be considered 'peripheral to the mainstream art world'[3], became an established genre and finally a welcome addition to galleries and museums. This expansion occurred globally in the 1990s, following the unforeseen affordability and user-friendliness of projectors and personal computers.[4]

Terminology around new media art still seems to be far from being established, let alone self-explanatory. Beryl Graham succeeds in laying out the situation as follows:

> The artworks known as new media art have amassed around them a varied nomenclature, including 'born digital', art & technology, art/sci, computer art, electronic art, digital art, digital media, intermedia, multimedia, tactical media, emerging media, upstart media, variable media, locative media, immersive art, interactive art, and Things That You Plug In.[5]

1   Paul 2015, 87; Fino-Radin 2011, 6.
2   LIMA 2016.
3   Paul 2003, 7.
4   Paul 2003, 7; London 2014, xviii; Lialina 2010, 38–39.
5   Graham 2014, 5.

Meanwhile, a number of artists, curators, and theorists have already declared an age of post-media: software processes are piercing all levels of our daily infrastructure and along with that, artistic practice.[6] Melanie Bühler claims that no art is being currently made without dependence on or at least a connection to the internet. 'Even when artists are not working with digital technologies as their primary "medium", these technologies are nevertheless involved in the process of producing, disseminating, and/or selling an artwork—.'[7] Andreas Broeckmann sees the term 'digital art' as best used to signify artistic practices that utilised digital technologies at a time when they were still not mainstream. Similarly, he claims that the term 'new media' lost its relevance in 2007 as the Apple iPhone convincingly combined all the major media technologies of the 20th century – telephone, radio, television, and networked computer – all in one device.[8]

Finding relevant terminology is not merely the focus of my attention in discussing the topic in a timely manner, but also because the Finnish contemporary art field has yet to establish its own vocabulary concerning new media art. 'Media art' is still widely interpreted solely as video, while 'new media art' is used hardly at all. To define software-based art, I have drawn upon the research and writings of Pip Laurenson, Head of Collection Care Research at Tate in the UK, among other museum professionals working with the medium in question. New media art is an overarching concept, comprising a number of art forms where artistic content is either partly or entirely generated by computer-based forms of media. Software-based art naturally falls under this definition. Similar to the way oceans are composed of water, software is the material of which computer programs are composed.[9] Software-based art, sometimes informally referred to as the 'new' new media art, is often the outcome of a continuous process, such as an active algorithm or interaction between an artwork and its audience. Laurenson compares software-based art to traditional time-based art, such as video, film, or audio. The primary mode of function in traditional time-based art is linear playback, whereas software-based artworks are designed to *do* something in real time, producing a different output from the input.[10]

Software-based artworks are inherently dependent on external links or components, such as websites, interfaces, plug-ins, devices, live events, or human intervention. Artists may display or distribute their software-based artworks through more than one platform – for instance, both as a physical installation and an online version experienced through a mobile device – which is referred to as the artwork's diffusivity.[11]

Rather than acquiring a fixed entity (represented by the majority of artworks in museum collections), institutions collecting new media art are often acquiring variable content, such as algorithmic parameters or a technological platform. Yet, collecting new media art is a critical and necessary first step in preserving it.[12] As Beryl Graham points out, artworks in collections are more likely 'to develop provenance, to be re-exhibited, written about, researched and historicised'.[13]

The exhibition 'ARS17 Hello World!', held at Kiasma from March 2017 until January 2018, paved the way for software-based art into the collections of Kiasma. To extend the physical exhibition to the internet, Kiasma launched 'ARS17+ Online Art', which also laid the foundation for a permanent platform to present Kiasma's online art collection. 'ARS17', curated around the idea of the post-internet age, featured altogether 12 software-based artworks (following the preceding definition), out of which four took place in the physical

6   Paul 2015, 83–84; Vickers 2015, 79.
7   Bühler 2015, 9.
8   Broeckmann 2015, 320.
9   Rothenberg 2006, 1.
10   Laurenson 2014, 77.
11   Laurenson 2014, 77.
12   Dietz 2005, 60, 68.
13   Graham 2014, 2.

Reija Meriläinen, *Survivor*, **2017,**
video game installation.
Installation photo, second floor, Mediateekki, Kiasma at 'ARS17 Hello world!',
31 March 2017 – 14 January 2018
Photo: Finnish National Gallery / Pirje Mykkänen

exhibition at Kiasma[14], and eight on the online platform ARS17+[15]. From these artworks, Kiasma eventually acquired 11 for its collections. According to Kati Kivinen, Chief Curator of Kiasma's Collections, 'ARS17' was not only a push towards software-based art for museum visitors, but also for the staff of Kiasma. Commissions and acquisitions from 'ARS17' presented an opportunity to test out and adjust the museum's existing practices in the context of software-based art.[16]

Museums and collectors are not the only ones concerned about the survival of media art, as several contemporary art organisations in Finland are taking measures to improve its surrounding conditions. AV-arkki, the Distribution Centre for Finnish Media Art, is currently carrying out a project which aims to improve and develop certain structures for the use of media art mediators, predominantly galleries dealing with video art.[17] In June 2018, Frame Contemporary Art Finland, the advocate organisation for Finnish contemporary art, published a report which raises structural issues concerning the production, distribution, and financing

14   Juha van Ingen, *AS Long As Possible* (2015); LaBeouf, Rönkkö & Turner, *#ALONETOGETHER* (2017); Reija Meriläinen, *Survivor* (2017); and Rachel Rossin, *Alembic Cache Passes (Time-snark)* (2016).
15   Juha van Ingen, *Inter_active (Black and White)* (2016); Juha van Ingen, *Web-Safe* (1999—2000); Pink Twins, *Infinity* (2016); Angelo Plessas, *Homo Cybersphericus* (2017); Tuomo Rainio, *Untitled (Gravitation Waves)* (2017); Jarkko Räsänen, *O.D.O. (Ordered Dance Online)* (2017); Axel Straschnoy, *The Detective* (2017); and Jenna Sutela, *Gut-Machine Poetry* (2017).
16   Kati Kivinen. Interview on 27 June 2018.
17   AV-arkki 2018. In 2016, AV-arkki published a government-funded survey on sustainable archiving of media art, thanks to which linear and single-channelled video art is nowadays archived at KAVI, the National Audiovisual Institute of Finland (Åberg 2016, 6–7).

of the media art field.[18] Kati Åberg, the head producer of AV-arkki's surveys, points out that a vast majority of media art exhibited at galleries is, however, linear and single-channelled video, and a crucial question within the Finnish art scene is still whether galleries exhibit media art at all.[19] According to Kati Kivinen from Kiasma, software-based art unfortunately falls outside the focus area of the most recent media art surveys conducted in Finland. Software-based art is still widely considered marginal compared to linear media art.[20]

Three case studies

To approach the preservation of software-based art at Kiasma from a practical point of view, I will introduce three case study artworks from the museum's collections, and later on look into the challenges they are facing in terms of documenting, re-exhibiting, distribution, and preservation.

    AS Long As Possible (*ASLAP*) is a 1,000-year long animated GIF loop, an artwork by Juha van Ingen, made in collaboration with Janne Särkelä.[21] Visually *ASLAP* (2015) consists of black frames with a white number in the middle, indicating which frame of the chronologically numbered loop is currently showing. Altogether the loop contains 48,140,288 frames changing approximately every ten minutes, which makes the total duration of the GIF animation 1,000 years. The animation started from the beginning of the loop on March 28, 2017 at 12:00 EEST at Kiasma, right before the opening of 'ARS17', where it stayed on view until the end of the exhibition. At Kiasma, *ASLAP* was exhibited in the form of an installation featuring the GIF animation played on a monitor, a computer running the GIF inside a glass cabinet, printed copies of the GIF's binary code in another glass cabinet, and photographic prints from the animation framed on the wall.
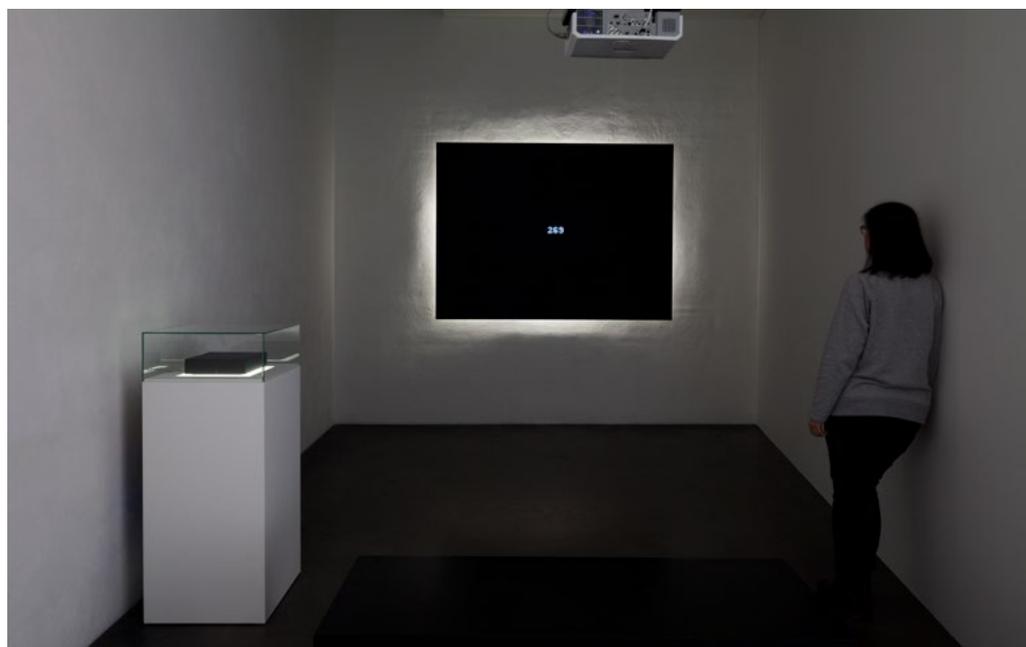
Juha van Ingen (in collaboration with Janne Särkelä), *AS Long As Possible*, 2015, **1,000-year-long animated GIF loop, computer, photographs, prints. Installation photo, second floor, Kiasma at 'ARS17 Hello world!', 31 March 2017 – 14 January 2018.**
Photo: Finnish National Gallery / Pirje Mykkänen

18   Muikku 2018.
19   Kati Åberg. Interview on 23 May 2018.
20   Kati Kivinen. Interview on 18 May 2018.
21   The artist prefers not to define *ASLAP* as a software-based artwork, as it is technically a complete animation instead of being generative (Juha van Ingen. Email interview in August 2018.). However, since *ASLAP* requires a computer program to run and thus faces similar preservation challenges as the other two examples, I will include it under the definition of software-based art within the framework of this research.

Kiasma acquired *ASLAP* for its collections in 2016 and committed to keep the GIF playing until the year 3017, when the first loop of the GIF ends. Van Ingen handed over the digital master file to Kiasma, along with photos for archiving, preview materials and instructions for installation, a certificate of authenticity, and a time capsule of *ASLAP*.[22] To protect *ASLAP* from interruptions, the GIF animation plays continuously on a computer located in one of Kiasma's storage spaces, while a copied file runs simultaneously on several synchronised playback units at different locations. Van Ingen has compiled instructions in case one or more playback units are destroyed in a war or a natural disaster, or simply needs to be technically upgraded.[23]

Infinity (2016) is an online artwork by the artist duo Pink Twins (Juha and Vesa Vehviläinen). The artwork invites users to remix Pink Twins' electronic music recordings from the past decade into their own version, while serving as a platform for the duo to archive and distribute their audio art. Users of *Infinity* can download mixes on their own computers, share them on social media, and listen to other users' versions as audio-visual streams embedded on the website. *Infinity* is a clear exception in Pink Twins' total body of work, which mostly comprises music, both performed live and recorded in studio settings, as well as video pieces.[24]
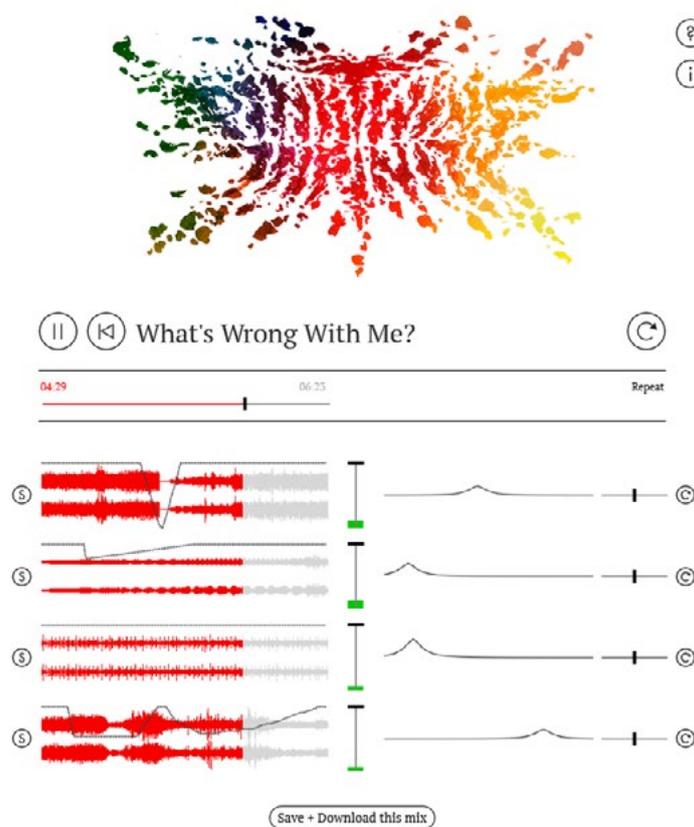
Pink Twins, *Infinity*, 2016, interactive online artwork
Screen capture of the artwork's user interface

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22   The time capsule contains the GIF animation files, information for the potential event of reconstructing *ASLAP*, a written definition of a GIF file, a written description of *ASLAP*, and Pontus Kyander's essay *The Itch for Eternity* (2015) about the artwork *AS Long As Possible* 2017).
23   *AS Long As Possible* 2017.
24   Pink Twins. Interview on 19 June 2018.

Infinity was first presented to the public on 27 February 2018 as part of the 'ARS17+ Online Art' exhibition. During its 1.5 year-long lifespan to date, *Infinity* has gathered a collection of several thousand user remixes. When Kiasma acquired the artwork for its collections, Pink Twins provided the museum with *Infinity*'s computer program and source code, images, an information package about the artwork, and a certificate of authenticity. The contract also defines a period of five years, from 2017 until 2022, during which Kiasma will exhibit *Infinity* as part of its online collection, and Pink Twins are committed to maintain the artwork.

Reija Meriläinen's *Survivor* (2017) is a 3D video game that borrows both its name and principal plot from an international reality television concept. In Meriläinen's *Survivor*, the viewer, or the player more suitably, competes against nine characters in the game in various challenges and by voting other contestants out one by one. The player may also interact with the characters of the game through loosely scripted conversations. Kiasma originally commissioned an artwork from Reija Meriläinen only for the physical 'ARS17' exhibition, but later suggested including it also in the exhibition's online extension, 'ARS17+ Online Art', through which *Survivor* continues to be available for playing and downloading.[25] As part of the physical exhibition 'ARS17', *Survivor* was projected on a wall-sized screen at Kiasma's black box, Mediateekki. There were speakers on both sides of the screen, and a geometrically shaped, nude colour chair with playing controls in front of the screen.

As part of the acquisition of *Survivor*, Kiasma purchased the computer running the game during 'ARS17', while Meriläinen supplied Kiasma with *Survivor*'s computer program, source code, the chair included in the physical installation, still photos, an information package about the game, a certificate of authenticity, and a playthrough video to demonstrate the core idea and aesthetic of the game.[26] In *Survivor*'s case, the playthrough functions as a documentation of the original artwork in case the game itself becomes impossible to re-exhibit, but only if the context of the original work was somehow explained too.[27]

Juha van Ingen takes a stricter view in terms of re-exhibiting *ASLAP*, explaining that in addition to the visual criteria, perhaps the most important factor about presenting the artwork is to not exhibit it for example via video or on the internet. [28] Exhibiting *ASLAP* in anything but the original GIF format would inevitably change the essence of the artwork which, in this case, clearly points to its technical realisation.

Pink Twins were not asked to produce a playthrough video or an equivalent as part of *Infinity*'s archival package for Kiasma. Yet, they are now planning to make something similar but only to serve the reconstruction of the artwork if necessary. As running software does not necessarily mean the software is running correctly, Pink Twins consider it valuable to see the artwork 'in action', yet they would not consider this documentation suitable for exhibition. Annet Dekker and Patricia Falcao aptly remark that keeping the artwork's source code is not sufficient in itself to recreate the work at a later stage. Capturing the performance of an artwork is as important as understanding its technological properties.[29]

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25   Reija Meriläinen. Interview on 29 May 2018.
26   A playthrough is a recording of playing a video game from start to finish.
27   Reija Meriläinen. Interview on 29 May 2018.
28   Juha van Ingen. Email interview in August 2018.
29   Pink Twins. Interview on 19 June 2018; Dekker & Falcao 2016, 18.

Challenges

The computer language, operating system, and hardware form an infrastructure that supports the artwork, but they are not the artwork. The artwork is an algorithm, a design built on this infrastructure, which is constantly changing and rapidly aging. To hold onto that technology is to tie us to a sinking ship. We have to be nimble enough to jump to the next boat, and our artwork has to be adaptable enough to do that gracefully.[30]

Mark Napier draws a drastic parallel to describe the pressing nature of preserving software-based artworks. It is wise for any kind of collector to make proactive preparations in terms of software-based art while, firstly, the artist is still available for consulting; and secondly, the artwork can be saved from definitive technical obsolescence. Pip Laurenson suggests a shift in the way we think about artworks as being static, and instead urges us to understand that a large part of the art we collect today has, in fact, change built into its DNA.[31]

Ben Fino-Radin, Digital Conservator at Rhizome ArtBase in New York, lists diffusivity, data obsolescence, physical degradation, and physical obsolescence as the four essential threats which artworks in new media are facing. Each threat – or inherent vice, as Fino-Radin calls them – emerges in a multitude of forms, and one artwork may be subject to all four of them simultaneously.[32]

Reija Meriläinen, *Survivor*, **2017, video game**
Finnish National Gallery / Museum of Contemporary Art Kiasma
Screen capture of the online artwork

30 Napier 2001, 111.
31 Sharpe 2018.
32 Fino-Radin 2011, 8–9.

Diffusivity refers to works that utilise external resources, such as databases or real-time data sources, in their basic functioning. Diffusive artworks often exist in a variety of locations and platforms, instead of being exhibited or experienced only in one location, be it physical or digital. 'A work that is diffuse presents a data structure that is diametrically opposed to singular authority and ownership,' Fino-Radin specifies.[33] *Survivor* by Reija Meriläinen, for instance, is currently available for download both through Kiasma's 'ARS17+ Online Art' exhibition and through an indie game platform, where Meriläinen uploaded it after finishing the work. However, *Survivor* comprises three editions, out of which only one is currently in a collection. 'I find editions very artificial. For me it is not necessary to limit the spreading of an artwork, but I understand that someone who has acquired the artwork would not want it to spread endlessly on the internet,' Meriläinen explains.[34] Pink Twins also publish their video works on the internet, but primarily see it as an effective means to promote and mobilise the actual works. They consider spatiality an integral part of their video works, thus they are best presented as installations or screenings for which the artists can define the surrounding conditions.[35]

'More traditional institutions might wonder why buy an artwork that is anyway constantly on view online,' says Kati Kivinen from Kiasma. 'We see the artwork as part of our collections regardless of being shown elsewhere. The art of our time comes with certain parameters, such as artists wanting to publish their work online. Perhaps some collectors still view it as a limiting factor for the acquisition.'[36]

The second threat is data obsolescence, ever-present and inherent in all forms of new media. Software-based artworks can be described as interaction between different programs, such as operating systems and their applications. In fact, all artists and programmers are somewhat dependent on the infrastructure and legacy built by other programmers. 'Since these relationships involve mutual interdependence, any changes in the relevant software – be it a browser or a player – can disrupt what is seen on the screen. Repairing these disruptions often means altering what can be considered as the work's structure,' says visual artist Markus Schwander.[37]

Pink Twins offer a case in point: '[*Infinity*] contains a number of parts, which may have to be modified to keep it functioning, for example the social media buttons through which a user can share their complete remix. It might as well be that Facebook does not exist five years from now,' Vesa Vehviläinen explains. '[O]r that Facebook's sharing functions change in such a way that it becomes impossible [to share the remixes]. This is typical because it is a living platform,' Juha Vehviläinen continues. The artists programmed *Infinity* to utilise the Chrome browser's already existing attributes, instead of creating software layers that would have to be updated more actively. Still, the artwork requires regular checks to ensure it is compatible with the browser's newest versions. After all, data obsolescence is of regrettably recurrent nature: it is only a matter of time before a successfully updated artwork becomes obsolete again.[38]

The third threat, physical degradation, refers to the decline of a physical component of an artwork, such as delicate storage media, or a physical element containing digital information. In addition to this, artworks may be afflicted with physical obsolescence, the last one of the four threats listed by Ben Fino-Radin, which in most cases means storage media being incompatible with computer systems. Luckily, as Fino-Radin remarks, the rapidly shifting cycles of storage media, characteristic of the 1980s–90s, have already subsided drastically.

33 Fino-Radin 2011, 8–9; Moss, 2010.
34 Reija Meriläinen. Interview on 29 May 2018. If Meriläinen wishes to exhibit or distribute *Survivor* in another context than that of Kiasma's, the artist is obliged to mention that Kiasma originally commissioned the artwork for the ARS17 exhibition.
35 Pink Twins. Interview on 19 June 2018.
36 Kati Kivinen. Interview on 31 May 2018.
37 Schwander 2010, 30; Fino-Radin 2011, 10–11.
38 Pink Twins. Interview on 19 June 2018; Wysocka 2008, 18.

For museums this means that nowadays artists can deliver most of the archival material of software-based artworks digitally.[39]

Solutions – now and ideally

Three commonly acknowledged forms of restoration prevail in the context of software-based art: emulation, migration, and reinterpretation. I will continue drawing upon Ben Fino-Radin's research on the topic to briefly introduce each of them. Emulation is a strategy that suggests simulating the structure and behaviour of the original operating system of an artwork in order to run the work on a contemporary computer. Emulation is considered best suited for works that are somehow tied to their original form or physical display, requiring a high level of investment for a relatively short-term solution. Migration refers to a strategy in which the digital assets of an art object are converted from obsolete formats to contemporary formats. For instance, works that employ the .JPG image format could be converted to a more current and stable format in case the .JPG started showing signs of deterioration. Migration can be applied most conveniently to simple formats, such as images, sound, and video. Finally, reinterpretation is the approach taken when a piece of software no longer runs on contemporary systems and conversion is not possible. 'Reinterpretation calls for delving into the uncompiled source of the software, and repairing whatever is the root cause of its obsolescence. In some cases this may be as simple as altering the format of the compiled software, while in others it may call for a fundamental re-write of the software's source code,' Fino-Radin explains.[40]

Juha van Ingen has given Kiasma permission to develop further or even replace the program that plays *ASLAP*, but feels positive about the survival of the actual GIF. 'GIF is a 30-year-old file format. Its developers were instructed to create a file that would have to be as compatible as possible with different platforms, and structurally simple. Hence, I assume future civilisations to be able to maintain *ASLAP*, if they so wish, even at a time when computers and televisions no longer exist.'[41]

The preservation of Pink Twins' *Infinity* will inevitably require either emulation or reinterpretation. The artists prefer the idea of keeping *Infinity* properly functioning, instead of displaying it in the format of the year 2017, or without the possibility of user interaction. After all, the starting point was to keep exhibiting *Infinity* on the internet, as it is part of Kiasma's online collection. 'When users make new mixes on the website, they are saved as part of *Infinity*. If the artwork exists and is used 50 years from now, still collecting mixes produced by its users, it can be quite different as a whole from what it is currently. One aspect of the work is how it cumulates and becomes more interesting through time', Juha Vehviläinen explains.[42]

Reija Meriläinen provided Kiasma with an extensive amount of material in order for the technicians at Kiasma to be able to look inside *Survivor* and fix whatever might become obsolete over time. Nevertheless, Meriläinen finds it unlikely to happen in a real situation because of the effort and many working hours it would require. The artist supposes the remastered *Survivor* will inevitably become slightly different from the original, 'simply because media looks like the tools it was created with – in the strictest sense, it would not be my game any more', she says. Instead of making a remastered version of *Survivor*, Meriläinen believes that Kiasma would start exhibiting the playthrough video.[43]

39   Fino-Radin 2011, 12–14.
40   Fino-Radin 2011, 17–19.
41   Juha van Ingen. Email interview in August 2018.
42   Pink Twins. Interview on 19 June 2018.
43   Reija Meriläinen. Interview on 29 May 2018.

Juha van Ingen (in collaboration with Janne Särkelä), *AS Long As Possible*, **2015**
Screen capture of the last frame of the GIF loop, to be exhibited in the year 3017
Finnish National Gallery / Museum of Contemporary Art Kiasma

On the other hand, Meriläinen weighs the possibilities of reviving old computer games in relation to *Survivor* and other similar artworks: 'Some of the computer games from my childhood can nowadays be played through an emulator that imitates the old computer. Perhaps it is not my game which would have to be modified in order to function, but there would be many other games that people would want to play 50 years from now. There might already be resources through which all of them could be restored.' Following a similar train of thought, Juha van Ingen points out that restoring artworks with complex technology, such as virtual reality, might become significantly easier and cheaper in the coming years, thanks to the rapid progress of technology.[44]

Preserving the functionality of an artwork is one thing, but being able to archive some of its historical, cultural, and social context is a whole other ball game. In this sense, Annet Dekker, Researcher Digital Preservations at Tate, talks about the 'social life' of an artwork. It is an assemblage of components, people and the relations between them; a certain representation of the artwork's changing context. Or, as Hanna Maria Anttila from AV-arkki puts it, 'Internet art is so much more than a website. It is citizen activism, which is closely connected to what is happening in society – that cannot be documented simply by gulping down the website.'[45]

Kati Kivinen from Kiasma looks back at the social encounters and a certain kind of collectivity that Meriläinen's *Survivor* generated: 'The game naturally became a collective experience, as viewers present in the room were giving advice to whoever was playing the game.'[46] *Infinity*, on the other hand, has a built-in characteristic of sociability, thanks to its sharing functions through which users are free to spread their mixes to the masses via social media. Instead of being limited to its URL and first-hand users, *Infinity* is built in the way that enables the mixes to keep reaching new audiences online, technically with no limitations.

44   Reija Meriläinen. Interview on 29 May 2018; Juha van Ingen. Email interview in August 2018.
45   Bühler 2015, 96–97; Hanna Maria Anttila & Kati Åberg. Interview on 23 May 2018.
46   Kati Kivinen. Interview on 13 June 2018.

Advances in media art preservation

Contemporary art institutions have been tackling the challenges of preserving new media art ever since the 1990s. The first decade of the 21st century witnessed the emergence of a number of significant professional initiatives, networks, communities, and resource platforms with a mutual focus on preserving new media art, or in some cases media art more generally. Borrowing principles from tech communities and game platforms, an overarching feature in the following examples is that almost all resources are free to use and to download. As a result, organisations have been able to take their cue from what fellow experts have accomplished elsewhere in the world, and to take it a step further in their own preservation efforts.

Perhaps the most prominent enterprise of the early stages is the **Variable Media Network (VMN)**, which emerged in 1999 at the Guggenheim museum to facilitate the preservation of media-based and performative artworks. Still widely recognised and cited, the Variable Media approach emphasises an artwork's essential meaning and significant properties as guiding principles for its preservation strategy. The VMN later on launched the Variable Media Questionnaire (VMQ), an online survey to help artists envision alternative forms that their works can be translated into, in case their original medium has become obsolete.[1]

Matters in Media Art is a collaborative project between the New Art Trust and its partner museums MoMA, the San Francisco MoMA, and Tate. Launched in 2005, Matters in Media Art functions as an online information resource for professionals, featuring practical guides on the acquisition, documentation, loan, and digital preservation of media art. The Matters in Media Art website offers free templates for cost assessment, condition reports, and agreements of copyright, purchase, and loan.[2]

Some initiatives focus on the documentation of an artwork, such as the **Artwork Documentation Tool**, launched in 2017 by the Dutch media art platform LIMA. The tool exists solely on the internet, helping artists document and archive their own software-based work in a professional manner. Influenced by the VMQ, the Artwork Documentation Tool offers a clear set of steps and related tasks, covering the minimum procedures necessary for an artist to document their work properly, such as saving sketches and working notes, and making a video registration of the artwork.[3]

The **Rhizome ArtBase**, a non-profit organisation and an affiliate of the New Museum in New York, recently launched an online archiving service called Webrecorder. It differs from other web archiving services by focusing on dynamic web content. Instead of saving or copying data, Webrecorder captures the user's interaction with a web page by recording network traffic and processes within the browser. This enables a more complete experience of a website instead of just archiving its building blocks.[4]

1   Guggenheim 2018.
2   Matters in Media Art 2015.
3   LIMA 2017.
4   Webrecorder 2018.

Hanna Maria Anttila and Kati Åberg believe that archiving software-based art could have something to learn from video games, which are preserved in the archives of the National Library of Finland together with documents of their surrounding culture and elements that demonstrate the game experience. Preserving software-based artworks could be done in a similar way, by speculating 20, 50, or 100 years hence, when, for instance, the artwork's original platform no longer exists. 'Documents about the artwork might eventually become even more interesting than the artwork itself by explaining why the artwork used to be surprising, or which societal matter it was commenting on or bringing pressure to,' Åberg says. The thought coheres well with art historian Peter Schneeman's portrayal of the museum as being not only supposed to preserve, but also to record the history of an artwork's impact in different times.[47]

47   Hanna Maria Anttila & Kati Åberg. Interview on 23 May 2018; Schneemann 2010, 25.

Looking ahead

Most often it is the artist's responsibility to maintain their software-based artwork. This would not be the case if it wasn't for the artist's own technological skills and resourcefulness, yet in the case of artworks acquired for museum collections, alternative solutions should be actively sought. Reija Meriläinen is happy to continue being consulted about *Survivor*, but does not express interest in maintaining the artwork for as long as is humanly possible. She takes a flexible attitude towards the changing of *Survivor*, as long as the game content and the dialogues stay the same.[48] Now that Kiasma is committed to the artist's final decisions and instructions concerning the artwork, Meriläinen prefers moving on to other projects. Pink Twins, on the contrary, are committed to maintain the domain and functionality of *Infinity* for five years, from 2017 until 2022, after which the artists will discuss future proceedings with the staff of Kiasma. 'Perhaps if we had ordered the technical realisation from someone else, it would feel more reasonable for others to make corrections to it. In this case, the maintenance falls naturally on our shoulders,' Juha Vehviläinen explains. Pink Twins consider it sensible to limit the maintenance agreement temporally, even though exhibiting *Infinity* continuously and permanently is a mutual interest between the artists and the museum. Somewhere between the views of Reija Meriläinen and Pink Twins is Juha van Ingen, who sees the maintenance of *ASLAP* inevitably as a collective effort. Knowing that the artwork is to be kept running at Kiasma until the year 3017, van Ingen considers the challenge of long-term preservation as an essential part of *ASLAP*. Regardless of the artwork being housed at Kiasma, he considers it his responsibility to find people willing to work for its preservation.[49]

'But will there be humanity in 1,000 years time, or a nation called Finland, or GIF files, or technical platforms familiar with such formats?' asks curator and critic Pontus Kyander in his essay enclosed with the time capsule of *ASLAP*.[50] The answer is impossible to predict, bearing in mind how technology has leapt forward even during the past decade. Meanwhile, software-based artworks require preservation that regards them in light of three essential factors: first, *process*, manifested in the ever-cumulating, participatory audio library of Pink Twins' *Infinity*; second, *context*, varying from the online gaming culture to social encounters around Reija Meriläinen's *Survivor*; and third, *instability*, despite which not only Juha van Ingen's *AS Long As Possible*, but all software-based artworks can be kept running for the next thousand years.

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48 From March to June 2018, *Survivor* was on view at FACT (Foundation for Art and Creative Technology) in Liverpool as part of the exhibition 'States of Play: Roleplay Reality'. For that occasion, Meriläinen slightly modified both the game as well as its installation in order to match the exhibition context better. (Reija Meriläinen. Interview on 29 May 2018.)
49 Reija Meriläinen. Interview on 29 May 2018; Pink Twins. Interview on 19 June 2018; Juha van Ingen. Email interview in August 2018.
50 Kyander 2015, 3.

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