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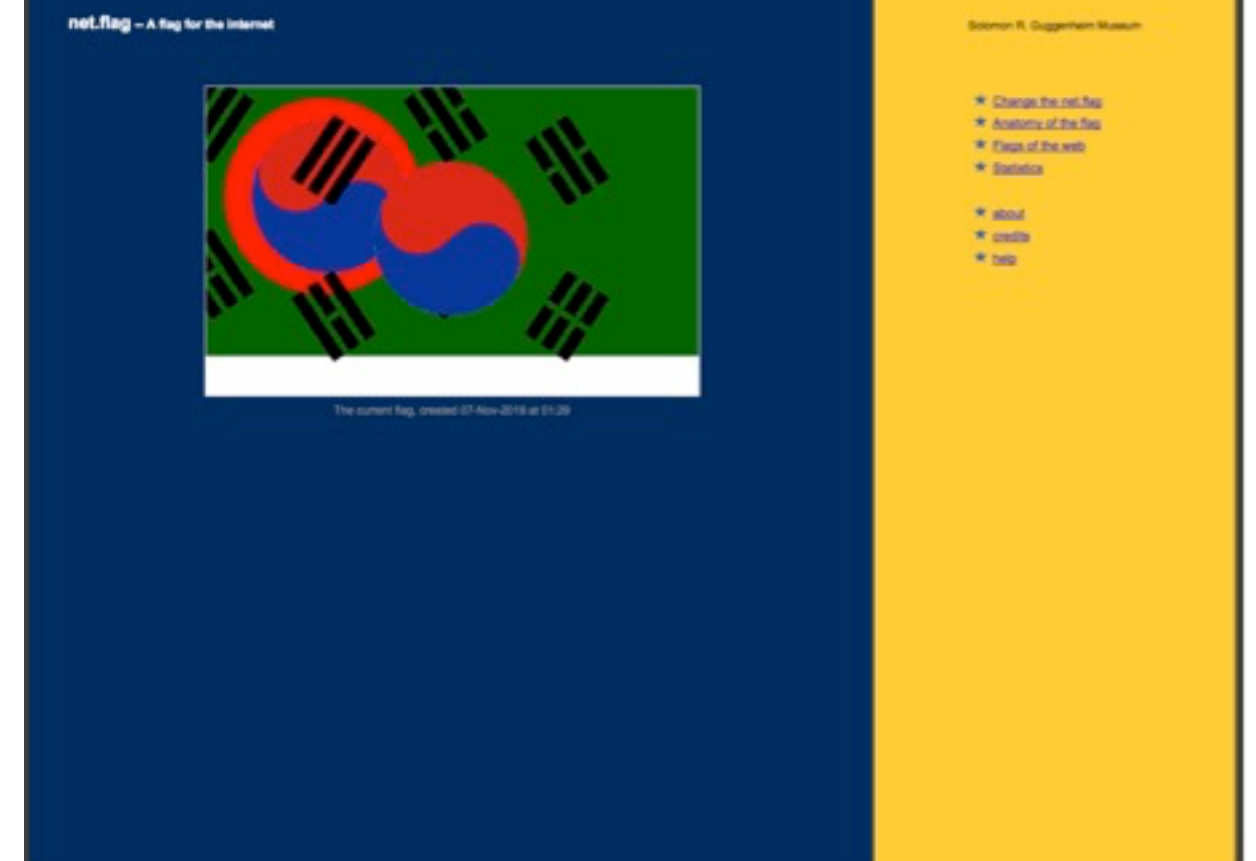
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Restoring Mark Napier's Online Work net.flag for a Changing World

By Deena Engel, Emma Dickson, Jonathan Farbowitz

In 2002 the Guggenheim commissioned Mark Napier to create an internet artwork. The result was *net.flag*, a piece that allows visitors to design their own “flag for the internet” by remixing and reconfiguring the shapes, colors, and insignia of existing national flags from around the world. Writing at the time, curator Jon Ippolito described the work as “an emblem for the Internet as a new territory, one composed of people from various geographical regions and ideologies.” A record of each flag was saved, and the museum has maintained the files for each user-generated flag dating back to piece’s original public release on February 14, 2002.

Napier’s exploration of national borders, globalization, and online community has only increased in importance since its release. Long before social media came to dominate the web, *net.flag* offered visitors the opportunity to create and share their own content. Napier has called the work an “interactive, collaborative, conceptual public art piece” and has compared it to a public sculpture.



Any country’s flag that existed on the internet at the time was downloaded, and Napier and his assistants painstakingly analyzed each to create the proper colors and proportions within the piece. (Only about 60 percent of the countries recognized by the United Nations as of 2002 were represented in *net.flag*.) The texts describing the meanings attributed to the different colors and elements of the flags were also sourced by the artist from the internet. In addition to inviting visitors to create their own flags, the artwork also allows them to browse a library of previously created flags.

In 2002 dial-up modems were more common than broadband to connect to the internet. An image file that now loads in seconds on a broadband connection might take minutes on dial-up. Napier wanted the piece to be as accessible as possible, and his goal was for all of the components of the piece to load quickly in the browser, even with a slower internet connection, which meant file sizes would be kept to a minimum. Instead of generating large image files, Napier decided to store the data of user-created flags in his own homegrown file format, which he designated “.flag.”

Restoring the Artwork

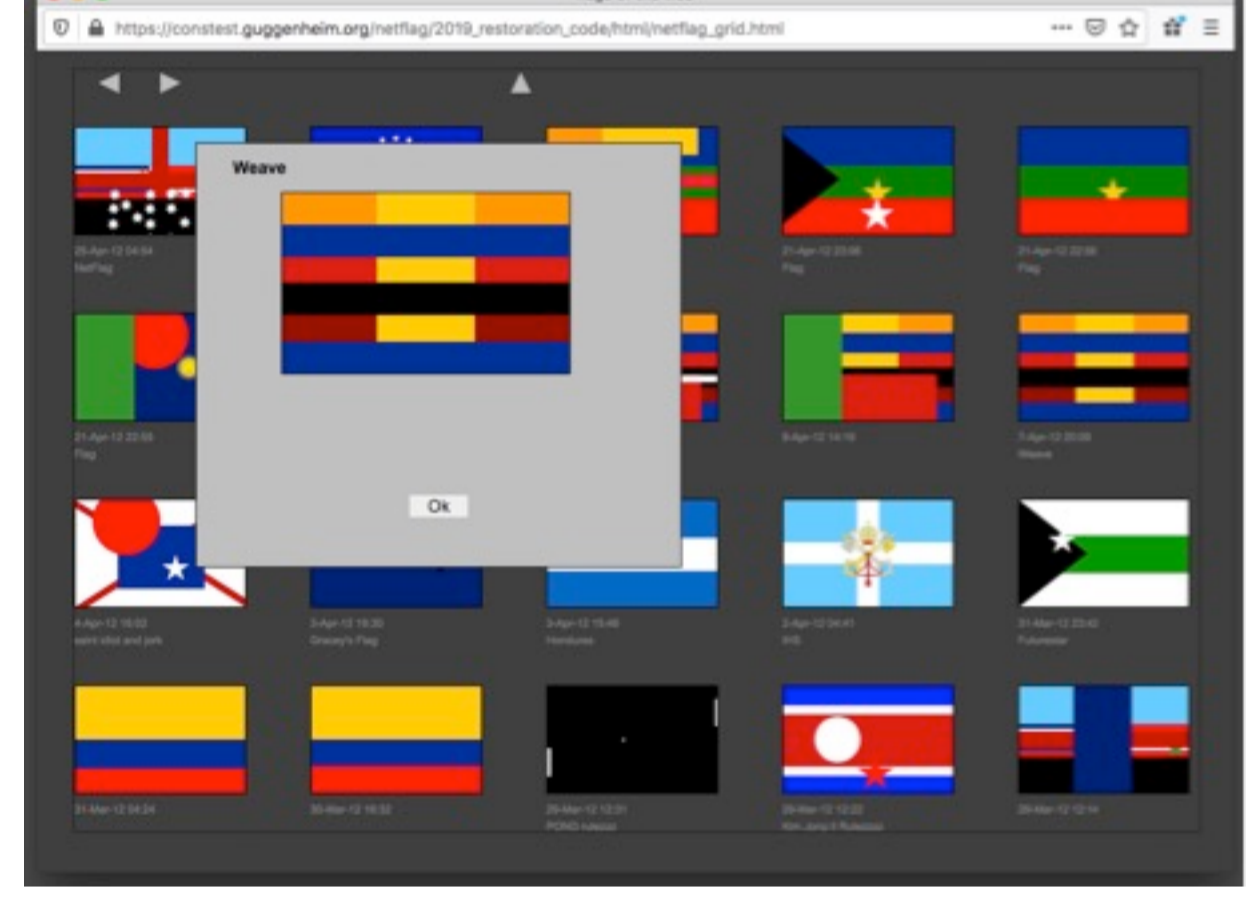
Despite its contemporary relevance, *net.flag*, like the Guggenheim’s other web artworks, *Brandon* (a 1998–99 piece by Shu Lea Cheang that was restored in 2017) and *Unfolding Object* (John F. Simon Jr.’s 2002 work that was restored in 2018) suffered from the obsolescence of its technology. In its original incarnation, *net.flag* was written as a Java applet, a technology for creating interactive web applications which is no longer supported by current web browsers.

The Guggenheim’s Conservation Department began its restoration of *net.flag* in March 2019. The goal of the project was to bring back the artwork’s original interactivity and behaviors and allow it to be experienced by the public again. The museum hired Emma Dickson as the lead programmer to migrate the code from Java to JavaScript. A cornerstone technology of the contemporary web, JavaScript was also chosen because it was present within the existing piece.



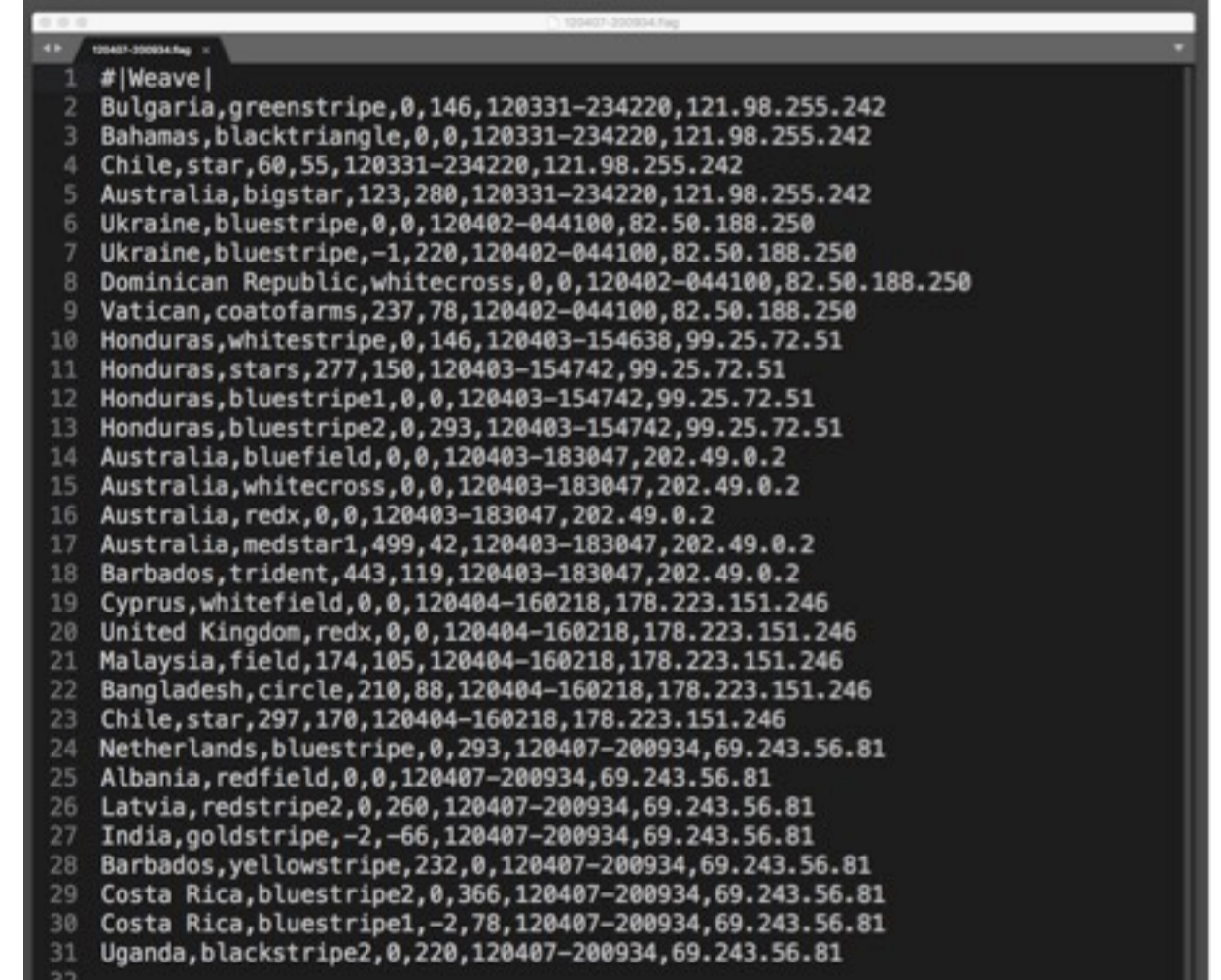
As part of the Guggenheim’s ongoing collaboration with New York University’s Department of Computer Science, NYU students examined *net.flag*’s code under the joint supervision of Professor Deena Engel and the museum’s former Senior Conservator of Time-Based Media, Joanna Phillips. The students began their research by reading through the source code and documenting it in the form of narrative reports and charts, and in some cases, by annotating a copy of the source code made for this purpose. Then they participated in an artist interview with Napier to discuss the future of the piece. Next, the students created a specification for the migration of the obsolete Java code to JavaScript so that the piece could function within contemporary web browsers.

Net.flag incorporates over 22,000 text files, gathered since the work was launched. Each of these text files has Napier’s suffix of .flag and contains the title and comments entered by the user as well as structured information about where to position each of the layered elements that makeup the flag. Napier noted the “egalitarianism” of placing all flags within a 30-line text file, always with the same structure.



Napier made a distinctive user interface for *net.flag*. At the time of the work’s creation, there were few standards for user interface design, and the artist took his inspiration from common consumer technology such as VHS and DVD players. The *net.flag* editor interface includes symbols like a red dot that appears when a user is able to save their flag design, similar to the “record” button on a VHS deck. The forward and back buttons on the flags of the web window also bear similarities to “play” and “rewind” buttons.

Napier selected a limited number of colors, shapes, and keywords by which the flags are indexed. When Guggenheim staff tested the piece, they were amazed by the wealth of information that was presented about the meanings of those various flag elements. Visitors enjoyed discovering what the meanings of the different flags were, and it changed the way they perceived the flags’ components.



During a second interview in which Napier approved the restoration prototype, the artist noted that it was critical to add flags from countries that were newly formed since 2002 and countries that were not present in the original piece. Since *net.flag* is an international piece, he also felt it was important to allow visitors to write flag titles and descriptions in their own languages. Previously *net.flag* only supported the Latin character set, which meant that visitors could not enter text in non-European alphabets.

Conservation of software-based artwork requires managing the way the artwork changes over time. Much in the world and on the internet has changed since 2002: new countries such as Montenegro, South Sudan, and Timor-Leste have been recognized, and international standards for working with text (such as Unicode) have been established. The restoration now supports non-Latin character sets, including Arabic, Chinese, Hebrew, Korean, and many others.



The original meanings of flag elements from 2002 have not been modified, but the meanings have been added for new flags. For example, the gold star of the South Sudanese flag “represents unity (of the states), hope, and determination for all people.”

The restoration of *net.flag* makes the work accessible to a new group of visitors who can create their own flags and describe them in the language of their choice. According to the artist, *net.flag* “generates its own humor, drama, and political challenges.”

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