

# ARTBASE REDESIGN: PROTOTYPE DEVELOPMENT

4

## About this report series

This report is part #4 in a series documenting the research process and practice of Lozana Rossenova, a PhD researcher embedded at Rhizome between 2016–2020. These reports trace the development of a practice-based interaction design research project, starting with a Discovery and User Research Phase. This phase includes the study of the organizational context and history, documented in Report #1; gathering information about past and current use-cases and user expectations, documented in Report #2, as well as a review of the current landscape of digital design for cultural heritage archives and collections, documented in Report #3. The next phase—Design Exploration, including low-fidelity sketches and prototypes and continuing the conversations with users, is documented in Report #4. This report also includes a summary of the Evaluation Phase, since it is an iterative process throughout the other phases, rather than one final step. The final outcomes of the Design Specification Phase, wherein the initial design proposals are transformed into interactive prototypes and specific recommendations for a data model schema, can be found under the [Prototypes](#) and [Data Models](#) sections of the PhD portfolio website, respectively.

## About the researcher

Lozana Rossenova is a digital designer and researcher, and a PhD candidate at London South Bank University's Centre for the Study of the Network Image. Her PhD is a practice-based collaboration with Rhizome. Lozana is particularly interested in working with open source and community-driven approaches to infrastructure, which organizes, stores and makes cultural heritage data accessible. Her current research focuses on born-digital archives and born-digital art. Her PhD project develops design methods which build understanding across diverse communities of practice and facilitate informed interaction, favoring nuance and complexity over reductive simplification.

This research is made possible through funding by the AHRC in the UK and additional support by Rhizome.

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# Executive summary

## Introduction

The first three reports in this series have covered the first phase of the design process (Discovery and user research). This report is broader, examining all activities carried out through the remaining Phases of the design process. These activities involve interdependent, non-linear processes that cannot be easily separated. Different sections of the report cover micro-phases such as the iterative exploration of different design prototype options (Phase 2); specific propositions around the design implementation (Phase 3); as well as insights from evaluation sessions with research participants and stakeholders (Phase 4). The report traces how the iteratively developed design propositions both serve as an outcome, and inform the methodology of this research.

## Methods

The micro-phases documented in this report included developing distinct versions of the prototype designs as well as coordinating workshops and feedback sessions with users, employing methods such as A/B testing, semi-structured interviews and surveys. The iterative prototyping activities involved working with a variety of materials: low-fidelity sketches and wireframes, diagrams and clickable visualizations. The method for compiling and designing this report follows the “annotated portfolio” method, combining visual documentation (screenshots and diagrams) of the proposed design artifacts with annotations. Design researchers Gaver and Bowers (2012) devised the “annotated portfolio” method in order to make the embodied knowledge in design artifacts explicit, and to contribute towards better understanding of the design process across disciplines. Thus, this final report of the PhD portfolio aims to render the design process visible as a whole, so that it is open to reflection, critique and future iteration.

## Structure of the report

The report’s structure follows the design process through 3 stages of iteration punctuated by user feedback workshops which were organized between each major iteration. The sections titled Version 1, 2, etc., illustrate and discuss the decisions behind specific design elements and user interactions introduced in each version. The Workshop and Evaluation sections following each Version

include short summaries of the proceedings for each session and relevant user feedback. The report concludes by outlining a set of organizing principles, or design strategies—but not fixed solutions—that emerged in the course of developing each iteration of the design prototypes. These principles can be taken forward by Rhizome into implementation, or can be developed further into future research projects.

## Summary of findings

The prototype designs and the stages of iterative refinement with users discussed in this report, aim to address the specific needs of presenting and contextualizing net art via a linked data database. Rhizome's decision to adopt linked data software for the archive backend provided an opportunity to work with the native capabilities of the Wikibase software.<sup>1</sup> Even though the full implementation of the prototype designs was not feasible within the timeframe of this research project, it was possible to test and model data in the existing Wikibase infrastructure, to run SPARQL<sup>2</sup> queries and test what kinds of results could be achieved, before sharing these findings with users alongside visual design prototypes during workshops and evaluation sessions.

The primary goal of this iterative workflow was to facilitate effective user communication and informed user agency via the archive's interface. The prototype versions and workshops outline three specific design strategies towards achieving these goals:

- ▶ presenting the new database ontology in a visually explorable way;
- ▶ presenting temporal and performative context around net art works;
- ▶ and lastly, presenting the data interconnections enabled by the new linked data structure.

The design strategies discussed in this report do not invent completely new interaction paradigms. Rather, they propose new ways of combining existing interface metaphors (buttons, pop-ups, overlays, timelines, etc.) to better support user agency across the unfamiliar structures of linked open data and the new custom data model and ontology for the ArtBase. Conceptually, the design strategies draw on theoretical and practical developments in the fields of digital preservation and archive science with regards to the preservation, presentation and classification of complex born-digital artifacts. The application of the design

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1 Wikibase is a free and open-source software system for creating, managing and sharing structured data (See: <http://wikiba.se/> [Accessed 3 September, 2017]). See also Report #1, p.27.

2 SPARQL is an acronym for SPARQL Protocol and RDF Query Language. It is an RDF query language, i.e. a semantic query language for databases, and is able to retrieve and manipulate data stored in RDF format. Source: <https://en.wikipedia.org/wiki/SPARQL> [Accessed 3 September, 2017]

strategies in the prototype visuals utilizes some of the built-in features of Wikibase, as well as the possibility to draw connections across data nodes in the database via real-time SPARQL queries.

Even so, various aspects of designing, working with and making SPARQL queries and results accessible via the frontend interface, can benefit from further user research following Rhizome's implementation of the prototype designs in practice. Such research would provide further insight into how specific design strategies can better support continued user involvement with the archive infrastructure following the initial redesign and launch.

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# Introduction

## Problem statement

In the fields of UX design and HCI, substantial research has been done around issues of discoverability, accessibility and usability in digital archives (Wray, et al, 2013; Whitelaw, 2015; Kräutli, 2018; Windhager, et al, 2018; Vane, 2019). Research and design work focusing on digital object “surrogates” (usually image thumbnails and a small selection of visible metadata) provide new ways of browsing through digital archival interfaces via narrative- (Wray et al, 2013) or data-visualization-based approaches (Whitelaw, 2015). Hence, interface design can move beyond a purely search-box-based approach—allowing users to interact with archival materials without the explicit need for specialized prior knowledge. Such developments in the design of digital archival interfaces are important precedents for the practical work carried out as part of this PhD project. However, these approaches tend to be focused primarily on archives with text- or image-based documents and are premised on the properties of physical objects such as paintings or book covers, which can be captured and represented via a single digital image.

On the other hand, complex digital artifacts, such as net art works, can prove impossible to summarize, or to extract parameters for meaningful interpretation, based on a single .jpeg or .png screenshot alone. What is more, the new software tools and preservation approaches developed by Rhizome with the goal of providing ongoing access to the works in the archive, utilize a variety of non-standardized modalities for user interaction—from browser-based emulation, wherein a user interacts with a functional legacy browser inside an iframe on a webpage, to web archived artworks with partially missing or temporally-mismatched resources. Such modalities need to be integrated within the overall interface of the ArtBase archive and made intelligible to users, alongside a range of new categorizations and classifications in the metadata schema representing the artworks.

The first three reports in this series have covered the first phase of the design process (Discovery and User Research), which consisted of three micro-phases: gathering contextual knowledge around the subject domain (Report #1); analyzing user expectations (Report #2); and reviewing the landscape of existing interaction design patterns (Report #3). This, Report #4, is broader, looking across a range of activities which took place during the remaining Phases of the

design process. These latter Phases are interdependent and distinctly non-linear, therefore not easily separated into individual reports. Different sections of this report document the iterative exploration of design prototype options (Phase 2); specific propositions around the design implementation (Phase 3); as well as insights from evaluation sessions with research participants and stakeholders (Phase 4). The report traces how the iteratively developed design propositions both serve as an outcome, and inform the methodology of this research.

## Methods

The iterative prototyping activities included working with a variety of materials: low-fidelity sketches and wireframes, diagrams, clickable visualizations, etc. When each design iteration generates a prototype, it can be considered a micro-phase of Phase 2, Design Exploration, which feeds into a next iteration cycle opening up new questions and possibilities in the process (Kennedy-Clark, 2013; Kräutli & Boyd Davis, 2016), and not simply fixing solutions. The micro-phases documented in this report included developing distinct versions of the prototype designs as well as running workshops and feedback sessions with users employing methods such as A/B testing,<sup>3</sup> semi-structured interviews, surveys, etc. One specific method which was used to facilitate co-designing during the workshops was inspired by Gaver, Dunne and Pacenti's (1999) "cultural probes". The probes in this case took the form of low-fidelity prototype sketches and collages of the archive's interface, developed by workshop participants working individually or in groups. The resulting visuals indicated preferences, biases and conceptual hierarchies in the participants' thinking.

The workshop sessions informed the development of updated prototype versions, which were then further tested with evaluation activities (Phase 4). Typically evaluation is conducted within expert groups—users and stakeholders with detailed knowledge and/or extensive experience around the subject matter and software tools of the project (Kennedy-Clark, 2013, p.28). The expert groups participating both in the workshop activities and the subsequent evaluation activities, included past and present ArtBase users, Rhizome stakeholders, as well as other researchers and practitioners in relevant fields such as digital preservation and archiving. The micro-phase activities discussed in this report do not seek to follow reproducibility criteria, but instead aim to incorporate humanities-based values and methods (Coles, 2016, p.4, cited in Vain, 2019, p.39). This includes "using domain experts to assess the quality, originality, and persuasiveness of the arguments and other research products" and trusting their answers about their perceptions (*ibid.*).

The method for compiling and designing this final report follows the "annotated portfolio" method, combining documentation of the proposed design artifacts with annotations. Design researchers Gaver and Bowers (2012) devised the "annotated portfolio" method in order to make the embodied knowledge in design

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3 See: [https://en.wikipedia.org/wiki/A/B\\_testing](https://en.wikipedia.org/wiki/A/B_testing) [Accessed 14 May, 2019]

artifacts explicit and to contribute towards better understanding of the design process across disciplines.<sup>4</sup> Thus, this final report of the PhD portfolio aims to render the design process visible as a whole, so that it is open to reflection, critique and future iteration.

Lastly, the annotated sections in the report are illustrated with snapshots from different versions of the interface prototypes and data visualizations. The illustrations were devised to depict specific functionality and spatial layout, rather than to focus on visual style. Style-wise they leave multiple options possible for implementation by Rhizome. Rhizome could choose to keep the original Wikibase<sup>5</sup> interface and lightly customize it; they could develop a separate application for displaying and interacting with the data from Wikibase, for a more branded approach; or they may even choose to maintain multiple interfaces, possibly partly developed by other members of the community, too. The flexible structure of the linked data environment allows for this plurality.

## Structure of the report

The report's structure follows the design process through 3 stages of iteration punctuated by user feedback workshops which were organized between each major iteration. The sections titled Version 1, 2, etc., illustrate and discuss the decisions behind specific design elements and user interactions introduced in each version. The Workshop and Evaluation sections following each Version include short summaries of the proceedings for each session and relevant user feedback. Additionally, this report draws on previous reports, including user story cards from Report #2 at strategic points where such cards informed specific decisions in the design of the interface. The report concludes with a description of the final web-based version of the prototype, which functions as the outcome of the Design Specification Phase (Phase 3), as well as a set of organizing principles—but not fixed solutions—that emerged in the course of developing the various iterations of the design prototypes, and can be taken forward into implementation, or further research projects.

## Limitations of the method

The discussions of different design Phases in this report take into account the limitations of the research project, wherein literal implementation was not possible within the timeframe of the project. The discussions around what is typically an implementation phase (Design specification / Phase 3) are limited to a design artifact—the web-based prototype discussed at the end of the report—which remained just a prototype rather than a dynamic implementation

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4 “Annotations and the designs they annotate are mutually informing. [...] Annotations can shape how artifacts are appreciated and understood, and what scientific and aesthetic value they might have, as well as suggest future research and design possibilities.” (Gaver and Bowers, 2012, p.46-7)

5 See footnote #1.

with live data. While the web-based prototype provided opportunities to test specific interactions and the details of the underlying data model with users, the majority of users during the final evaluation stage expressed interest in seeing the prototypes populated with live data. And so, the design process does not end with this report. The implementation of the design proposals could result in further adjustments and updates to the design, which will certainly require additional user testing and evaluation. Indeed, the methodological framework proposed in the thesis accompanying this PhD project argues that the design process, or at least the process of active engagement with users should continue beyond the limited time that a designer is involved with the project.

In this sense, producing design artifacts as tangible outcomes of the practice (i.e. the prototypes described in this report) is not perceived as a solution to all aspects of the research questions initiated with this project. Rather, these outcomes are carriers of provisional and context-specific propositions relating to the redesign of the ArtBase archive within a linked data environment. Many questions concerning the implementation of the prototypes into Rhizome's actual infrastructure, as well as the broader adoption of linked open data for digital cultural heritage, remain open and invite further research. This report does not list them all, but provides some direction for further research in the concluding section.

## Artwork title

Artist Name

Timeframe 2001~



Caption: Image generation. Image attribution.

Access via artist link

Access via Rhizome archival copy

Access via Rhizome webarchive

## Description

Close

Attributions: Artist / Curator name

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam ut tortor nibh. Mauris dapibus tortor eu felis consequat, quis maximus justo dictum. Curabitur elit neque, fringilla ac ullamcorper sed, molestie ac sem. Integer ligula lectus, ultrices at ante et, aliquet commodo nisl. Duis cursus eros non justo finibus sollicitudin. Curabitur in mollis mauris. Fusce vel odio tristique, pellentesque mauris at, vestibulum odio. Phasellus ultrices turpis justo, laoreet maximus neque auctor a. Phasellus pharetra ligula lobortis, volutpat nisi et, vehicula tortor. Aenean semper ipsum ut dolor iaculis tempor consequat at risus.

Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Morbi ultrices arcu sit amet orci luctus, ac lobortis est placerat. Curabitur mollis odio eget commodo hendrerit. Proin nisi massa, hendrerit non dictum a, sollicitudin non urna. Duis auctor ac massa in facilisis. Interdum et malesuada fames ac ante ipsum primis in faucibus. Praesent risus urna, mattis non finibus in, ultricies sed lectus. Suspendisse sit amet dolor nec metus imperdiet euismod eget at felis. Ut sem mi, posuere sit amet ultrices sed, blandit a dolor.

Attribution: Author nameSubmitted via open submission

Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Morbi ultrices arcu sit amet orci luctus, ac lobortis est placerat. Curabitur mollis odio eget commodo hendrerit. Proin nisi massa, hendrerit non dictum a, sollicitudin non urna. Duis auctor ac massa in facilisis. Interdum et malesuada fames ac ante ipsum primis in faucibus. Praesent risus urna, mattis non finibus in, ultricies sed lectus. Suspendisse sit amet dolor nec metus imperdiet euismod eget at felis. Ut sem mi, posuere sit amet ultrices sed, blandit a dolor.

Attribution: Author nameAdded by Rhizome

## Metadata

Close

## Descriptive data

Artwork type: WebsiteArchival status: Cloned; Webarchived;Tags: sample tag; sample tag; sample tag; sample tag; sample tag; sample tag;Submitted via open submissionTags: sample tag; sample tag; sample tag; sample tag; sample tag; sample tag;Added by Rhizome

## Administrative data

Date of accession: 19 Jun 2002

License: CC-BY-SA

## Provenance

Artist link: www.example.com

Inception: 2001

Attributed to: Artist Name

Active from: 2001 to 2017

Rhizome archival copy: archive.rhizome.org/example.com

Inception: 2003

Attributed to: Artist NameAssociated with: RhizomeGenerated by: CloningRhizome webarchive: webenact.rhizome.org/example.com

Inception: 2015

Attributed to: Artist NameAssociated with: Archivist name / RhizomeGenerated by: Webrecorder captureNeed more data? – Request access

Download metadata record

RDF JSON

Artwork record page in Version 1 of the  
ArtBase redesign wireframes.



## Artwork record page

The following list presents the hierarchy of elements visible to users upon landing on the artwork record page. This order follows conventions established in the interfaces reviewed in Report #3, the user feedback documented in Report #2, as well as the co-design proposals from the user workshops (see [pp.36–37](#)):

“

As an ArtBase user, I want to see more **temporal contextual information** around each artwork, so that I have to do less research in other sources.

► **Artwork name**

► **Artist name**

► **Date:** an important metadata element and, crucially, different from other forms of temporal identification associated with more traditional artforms. Here, it is not revealed as a single value, but a clickable button titled “Timeframe”. Description of the functionality of this button follows in a later section.

“

As a researcher, I want to see information about **exhibition history and publications featuring the work**, so that I can get an idea of how the work has been shown and received over time.

► **Images:** sample artwork images (usually screenshots) take prominent space on the page as a slideshow. These are accompanied by appropriate captions.

► **Variant<sup>6</sup> access points:** the entry points need to be clearly identifiable and therefore occupy a prominent position.

► **Artwork description and metadata:** these elements can be expanded or collapsed as needed.

“

As a researcher, I want the **metadata for the artwork records presented in a more granular way**, so that I can choose how much metadata to see if/when I need it.

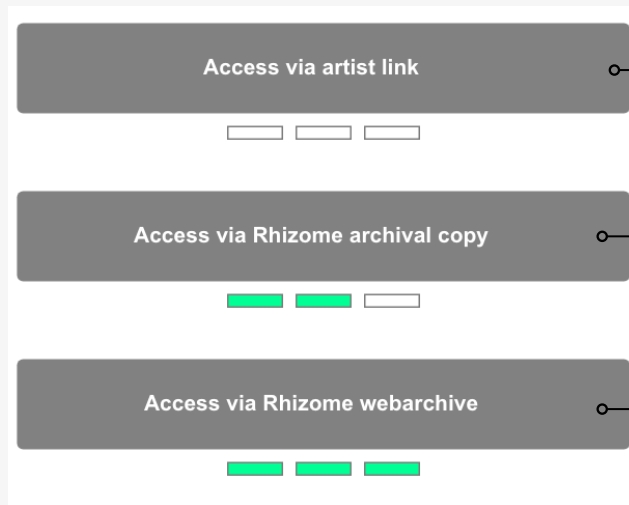
► **Further metadata:** if available, further expandable elements are situated below the metadata element. These include: related research (for literature that cites the artwork directly), a list of exhibitions (if the artwork has been exhibited), and related artworks (if present).

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User story cards which informed the design of the wireframes for single artwork record pages (see Report #2, pp.36-37)

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<sup>6</sup> Variant is the term used by Rhizome to denote an instantiation of an artwork other than the original instant made by the artist and maintained on their own infrastructure. Variant is preferred to other terms such as “version” for example, to avoid miscommunication, if the artist themselves release a new / different “version” of the artwork or if the artwork’s software dependencies change versions, etc. A further discussion on the term is provided in section Version 2, [p.43](#).

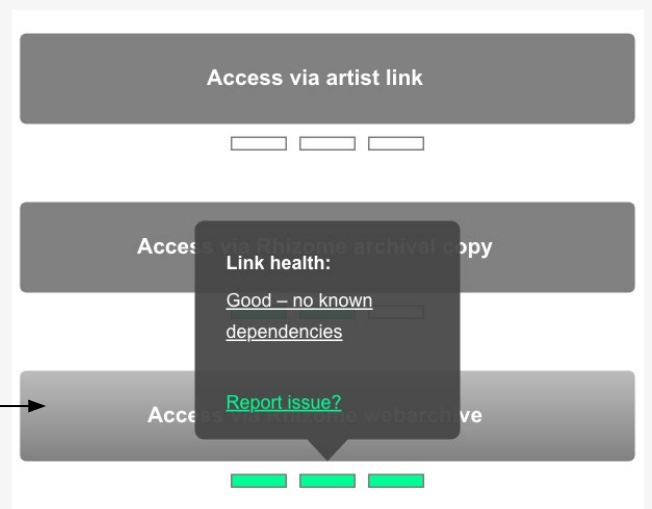
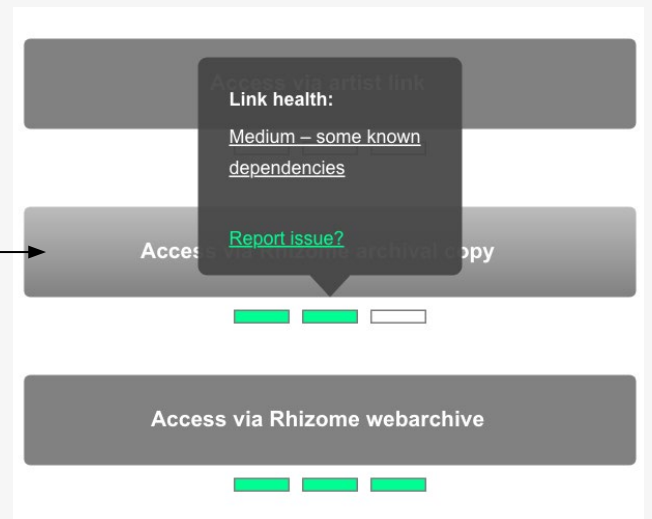
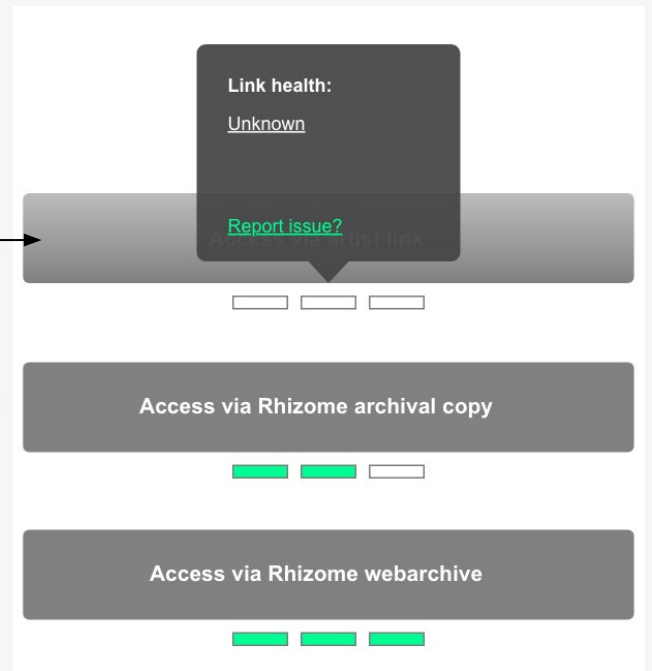


Version 1—Access points:  
Option A, link health pop-up designs.

MOUSE  
OVER

MOUSE  
OVER

MOUSE  
OVER



## Artwork access points

Access points to an artwork need to communicate two main things. Firstly, which variant the user is accessing and whether they are accessing it within the database or on an external site. Secondly, the access point must provide an indication of the variant's condition, whether it is completely inaccessible, partly damaged, or generally functional. To achieve this, the different access points to each variant must be clearly demarcated as separate buttons with text labels. The most effective form of labeling remains to be tested in greater depth, but the first iteration of the design uses the following terms:

- ▶ Access via artist link
- ▶ Access via Rhizome archival copy
- ▶ Access via Rhizome webarchive

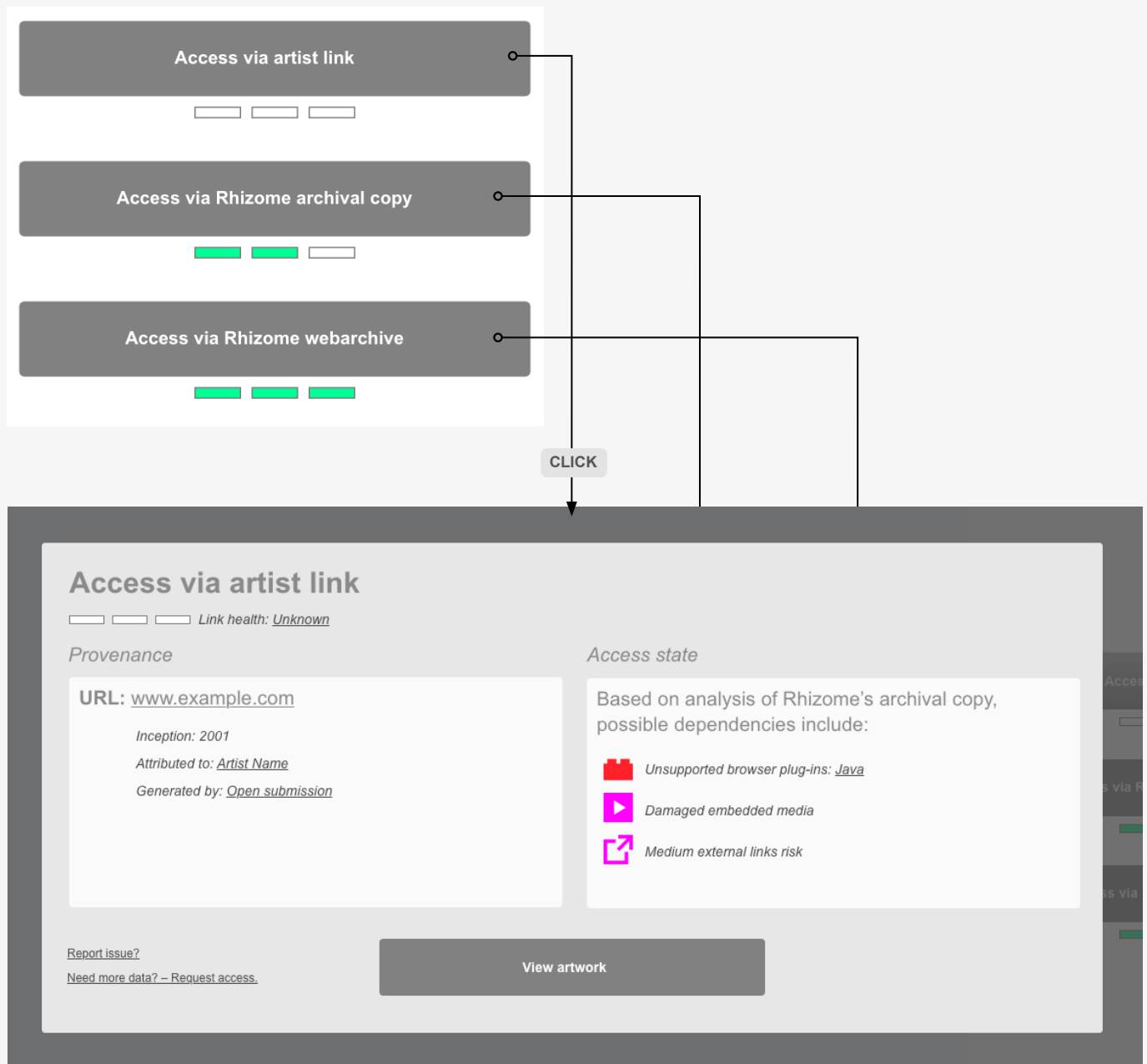
Particular terms that require additional user testing include “access”, “archival copy” and “webarchive”. While these might be easily understood by someone familiar with the ArtBase or the artistic and preservation programmes at Rhizome, they are likely to be more difficult to decipher for new users.

The buttons are designed to work well alone or in combination. As many buttons can be added to the record page as there are variants. Future variants might also include “emulated archival copies” or other forms, to describe emerging preservation strategies.

Specifying the host location of the artwork—an artist's server or Rhizome archive, the design also serves to signpost the direction of navigation, signaling to a user whether they will be accessing the artwork within the ArtBase, or via an external website.

Finally, the access points indicate each variant's functional state, but this feature requires further testing. The initial design includes 3 bars underneath each button. They are designed to operate as ‘indicator lights’—lighting up to denote the ‘health’ of the variant. To avoid discouraging access of less ‘complete’ variants, the color green was chosen over a more traditional combination of red, yellow and green. One green bar indicates ‘poor’ condition of access, two green bars indicate ‘medium’, and three indicate ‘good’ access. In cases where access points, particularly artist links, have not yet been audited by an archivist, the bars would display white, to denote ‘no data’.

This initial version of the design features two interaction options for revealing further information.



Version 1—Access points:  
Option B, access state overlay designs.

## Option A

Option A provides a mouse-over state including a small pop-up box labeled “Link Health”, to establish what the green bars serve to indicate. Below the label, a value for ‘health’ is given, for example, the visual mock-up displays “unknown”, “medium” and “good”. The latter two values are supplemented by a further explanation—“some known dependencies” and “few known dependencies”, respectively. All values are underlined—suggesting they are links which could be clicked to reveal further information. These links could be connected directly to the Wikibase item records for these values (or a custom UI overlay, if such is developed for elements in Wikibase beyond the artwork record).

The pop-up box includes one more link—“Report issue?”—aiming to fulfill two goals:

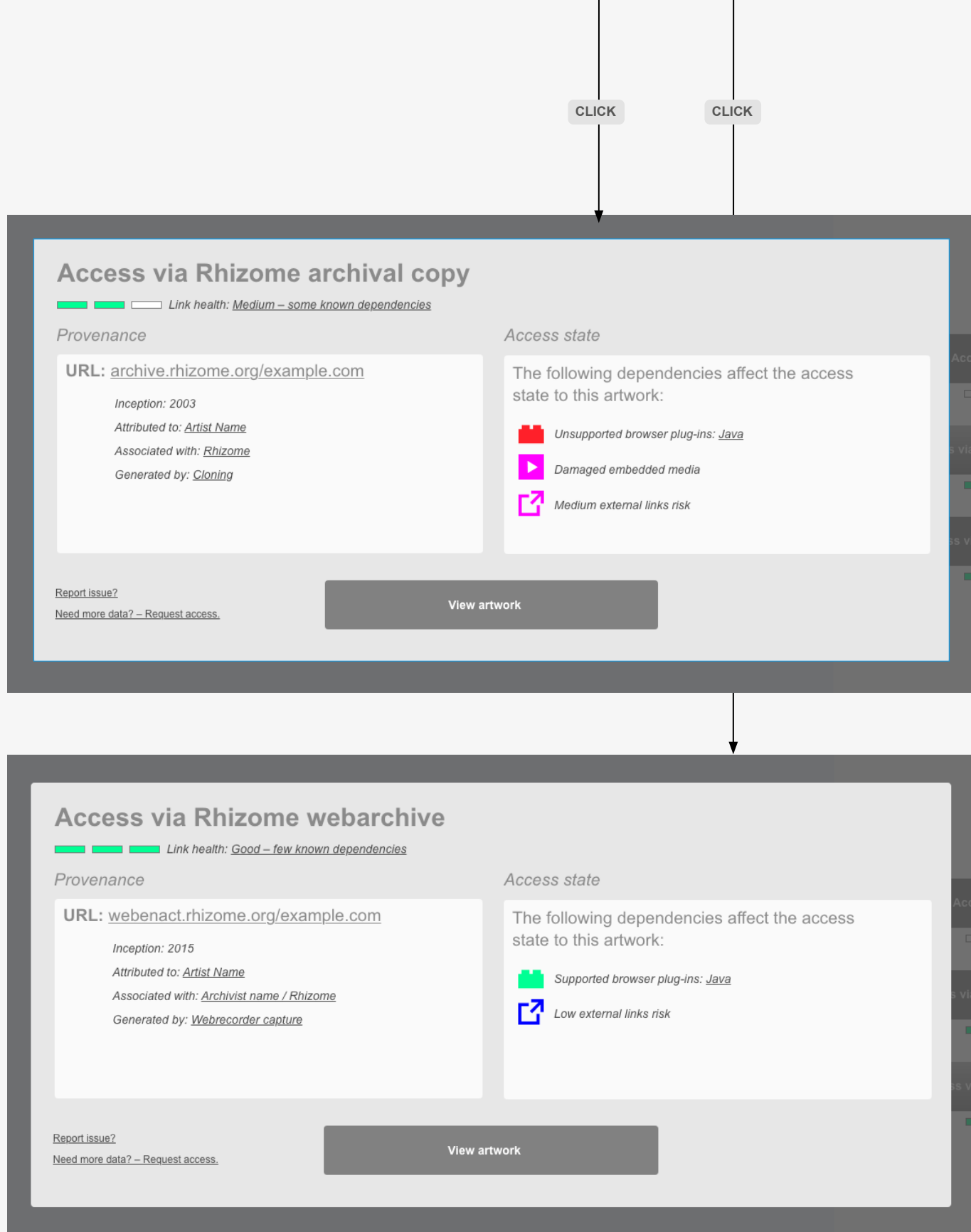
1. To suggest that the ArtBase is not a fixed archive, but rather (like all born-digital archives)—in flux, constantly changing and needing help from its users to stay up-to-date.
2. To enable users to register for an account and contribute to the database, if Rhizome choose to keep the database open. Alternatively users could be forwarded to an online form, where they would fill in the title of the artwork and report that the condition of variant may have changed or broken since the last official archival audit. This would be particularly useful for artist links, because Rhizome do not have the resources to constantly audit and monitor these.

This version of the design minimizes extra data, so as not to overwhelm casual users. If specialist users want to access further details, they can click through to one of the ‘health’ links, or scroll down the page and read more in the metadata section.

## Option B

Option B includes the features in Option A, but also provides an additional layer of information to users before they enter the artwork. Here, when users click on an “Access” button, they encounter an overlay screen before being redirected. This intermediary step provides extra information about provenance and dependencies before they can actually view the artwork. While this extra step could become distracting to expert users who visit the ArtBase often, it is potentially valuable to users who are new to the Artbase, or who want to access additional detail, for a more informed understanding of what they are looking at once they enter a specific artwork variant.

The overlay screen includes a shading of the majority of the page with an “info” box in the middle. This box is split into two main sections: *Provenance* and *Access state* (both terms which, again, need further user testing).



Version 1—Access points:  
Option B, access state overlay designs.

*Provenance* includes information about the access point URL providing an immediate indication of whether the user is about to navigate to a domain under Rhizome’s control or the artist’s maintenance. Additionally, the *Provenance* box has information about how the access point was generated, who it is associated with and when it was created. This information is provided as part of the new data model developed for each artwork variant, which is compatible with the PROV standard for data provenance.

*Access state* supplements the “link health” indicators, explaining how the evaluations of “good”, “medium” or “poor” were arrived at. Under *Access state*, a listing of software dependencies (with iconographic representation and labels) are color coded with the aim of providing some level of technical information to interested users, even if not in great detail. The information available is sourced from an audit conducted 2015–16 by Rhizome’s then resident archivist, Morgan McKeehan, and includes information on browser-plug-ins, external media, embedded media and risk of external (or internal links). At this early stage of the prototype, these labels are not fully resolved and a few are used here as place-holders for testing. The color scheme applied to them – red, magenta, blue (instead of the traditional red, yellow, green), is designed to indicate (similar to the other “link health” indicator bars) that this information is not guaranteed to be precise and objective. Instead it is an approximation—based on an audit, which is subjective and can quickly become outdated in any case. But as users in the initial user studies requested more information about the technical condition of

the artworks, this low level of technical detail can be considered an improvement on a completely opaque approach which provided no information whatsoever.

“Dependencies” is not a common term, unless you are familiar with digital preservation or software development (see Report #1, p.77), so a short textual explanation precedes the iconographic representations. In cases where the access URL is an artist’s link, the text indicates that the dependencies are inferred from the audit of the “cloned” archival variant. In the case of archival variants, the text simply states that the dependencies affect access to the artwork. The challenge of communicating whether the “supported” / “unsupported” labeling is referring to the browser setup of the user or to the archival environment is not resolved at this early stage.

Finally, another prominent and clearly labeled button invites users to “view” the artwork. Switching the language from “access” to “view” is an indication of the transition from the metadata record page in the archive to the actual interactive artwork experience.

“

**As an ArtBase user, I want to see more **technical information** about the processes used in the artwork, so that I know what to expect when I try to access the artwork.**

“

**As a researcher, I want to be able to see more **provenance or preservation metadata**, so that I can better understand the history of this work within Rhizome’s collection and how it has been cared for over time.**

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User story cards which informed the design of the wireframes for the single artwork record page (see Report #2, pp.36-37)

Version 1: August/September 2018



Further interaction elements once again include the option for users to “report an issue”, or “request access” to more data. Additional technical metadata is likely to be present in the Wikibase database, even if not displayed in the public frontend interface. There are several possible ways to deliver additional data when a user “requests access”. Rhizome could decide to offer users the option of logging into the Wikibase back-end, or deliver them a “metadata dump” in the form of a JSON or RDF file. Both options are practicable and viable.

The succeeding phases of interaction haven’t been been mocked-up. The visualization of accessing different archival variants is developed further in Version 3 (see [p.83](#)).

## Description expandable element

The description element is separated from the rest of the metadata section, because it is the only metadata for the artworks which is available as natural language text rather than structured data. Additionally, since many of the descriptions were provided by the artists themselves, they need to be handled differently from other types of contextual metadata, for example, that provided by Rhizome’s archivists.

The expandable element aims to provide a clear provenance for the descriptive text, including who it can be attributed to and how it was generated (following PROV principles<sup>7</sup>). This is especially important in cases where there are two descriptive texts, one written by Rhizome, and another by the artist.

## Metadata expandable element

The state of metadata completeness in the ArtBase is widely varied across different artwork records. In line with theoretical developments in archival science, it is important to communicate states of in/completeness openly. An indicator system, similar to the green bars under the access buttons, was developed for the metadata element. This system has already been implemented in other museum online collection interfaces and is usually referred to as metadata “richness” or “completeness” (see Report #3, pp.128–129). The indicator in this case is a long, thin rectangle, which is filled up with different levels of green color according to the level of “richness”, full green bar meaning “very high” level, and half or quarter-full meaning “medium” or “poor”. Here, the bar would never be completely empty (white), because there is some basic level of metadata for all artworks.

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<sup>7</sup> PROV is a W3C ontology and data model used to describe data provenance on the web as linked data. See: <https://www.w3.org/TR/prov-overview/> (Accessed 10 Dec 2020). The use of the PROV model in the metadata structure of the ArtBase redesign is discussed in more detail in the thesis accompanying this report, and a research paper presented at the iPRES 2019 conference available, here: <https://osf.io/4xyan/> (Accessed 10 Dec 2020)

Metadata richness:  
Poor – many missing  
statements

[Can you contribute?](#)

Metadata richness:  
Medium – some missing  
statements

[Can you contribute?](#)

Metadata richness:  
High – few missing  
statements

[Can you contribute?](#)

Metadata

Read more

Metadata

Read more

Metadata

Read more

Version 1—Metadata richness indicators and pop-ups

## Metadata

Close



### Descriptive data

**Artwork type:** [Website](#)

**Archival status:** [Cloned](#); [Webarchived](#);

**Tags:** [sample tag](#); [sample tag](#); [sample tag](#); [sample tag](#); [sample tag](#); [sample tag](#);

[Submitted via open submission](#)

**Tags:** [sample tag](#); [sample tag](#); [sample tag](#); [sample tag](#); [sample tag](#); [sample tag](#);

[Added by Rhizome](#)

### Administrative data

**Date of accession:** 19 Jun 2002

**License:** CC-BY-SA

### Provenance

**Artist link:** [www.example.com](http://www.example.com)

*Inception:* 2001

*Attributed to:* [Artist Name](#)

*Active from:* 2001 to: 2017

**Rhizome archival copy:** [archive.rhizome.org/example.com](http://archive.rhizome.org/example.com)

*Inception:* 2003

*Attributed to:* [Artist Name](#)

*Associated with:* [Rhizome](#)

*Generated by:* [Cloning](#)

**Rhizome webarchive:** [webenact.rhizome.org/example.com](http://webenact.rhizome.org/example.com)

*Inception:* 2015

*Attributed to:* [Artist Name](#)

*Associated with:* [Archivist name / Rhizome](#)

*Generated by:* [Webrecorder capture](#)

[Need more data? – Request access](#)

[Download metadata record](#)

RDF JSON

Version 1—Zoomed-in  
view of the expanded  
Metadata element

This indicator bar also has a mouse-over state—similar to the green “link health” bars. The mouse-over state opens a pop-up box, comprising a label (“Metadata richness”) and a value (“medium”, “high”, etc). Users have the option to contribute metadata—via the “Can you contribute” link. As with the “Report issue” link, Rhizome has the choice to either let users login into the Wikibase database and contribute directly, or to collect data via an online form. The former requires trusting the community of users not to vandalize the database while archivists police the contributions. The latter requires archivists vetting the information first and then manually ingest it into the database. Both options ultimately require time and investment of staff resources, but could significantly benefit the richness of the database with valuable user-generated metadata.

Once expanded, the metadata element provides a further grouping of data statements. The first one is “Descriptive data”, and includes the following statements:

- ▶ *Artwork type* (denoting whether the artwork is a website, a video, a game or social media performance, for example)
- ▶ *Archival status* (such as “Cloned”, “Webarchived” or “Emulated”, based on the available variants)
- ▶ *Tags* (with appropriate attributions via the PROV model)

These terms and grouping headings need to be tested. The *Artwork type* is not intended to indicate genre or movement, because all artworks in the ArtBase are some flavour of net or internet art, but they are not all websites. It is possible to deploy it only on the few records which are not websites, simply to make it clear that they are a video or a game, etc, but can still be considered net art. This might also be an appropriate place to introduce the concept of “artwork documentation”, which was noted in the most recent ArtBase audit in cases where artwork records contain only links to websites that document the artwork, rather than constituting the artwork itself.

The next grouping of metadata is *Administrative*, consisting of information about acquisition date and licensing—though this may change this may change as licensing data in the ArtBase is, historically, not reliable (see Report #1, p.43).

The final data grouping is *Provenance*. This grouping contains all the data related to each variant, following the PROV model. The data provided here has already been made available in the intermediary overlay screen—activated by the access buttons in Option B of this design version—but here it is visible for all artwork variants at the same time, and it can also be expanded/collapsed on demand.

All data in the metadata section of the artwork record is composed of statements containing values. When these values represent more complex concepts or when they are going to be used multiple times across multiple records, they can be designed as separate records in the Wikibase database, so they can themselves be clicked and explored further (see Version 3, [p.75](#)). If researchers need more data, they have the option to request that data through the “Request access” link.

Finally, the last possible interaction within the metadata expandable element is the “Download” button, which Rhizome may or may not wish to make available, but based on user research, there is interest in this functionality. Ideally, users would be given an option to download an RDF or JSON file of the artwork record.<sup>8</sup>

## **Related research and exhibitions expandable element**

Related research and exhibitions are similar expandable elements, providing a list of related database items in textual form. In the case of research publications, basic statements about the publication such as attribution and source will also be shown. In the case of exhibitions, these statements will be related to date and location. As these items will have their own Wikibase entries, additional data could be recorded there, if available and relevant.

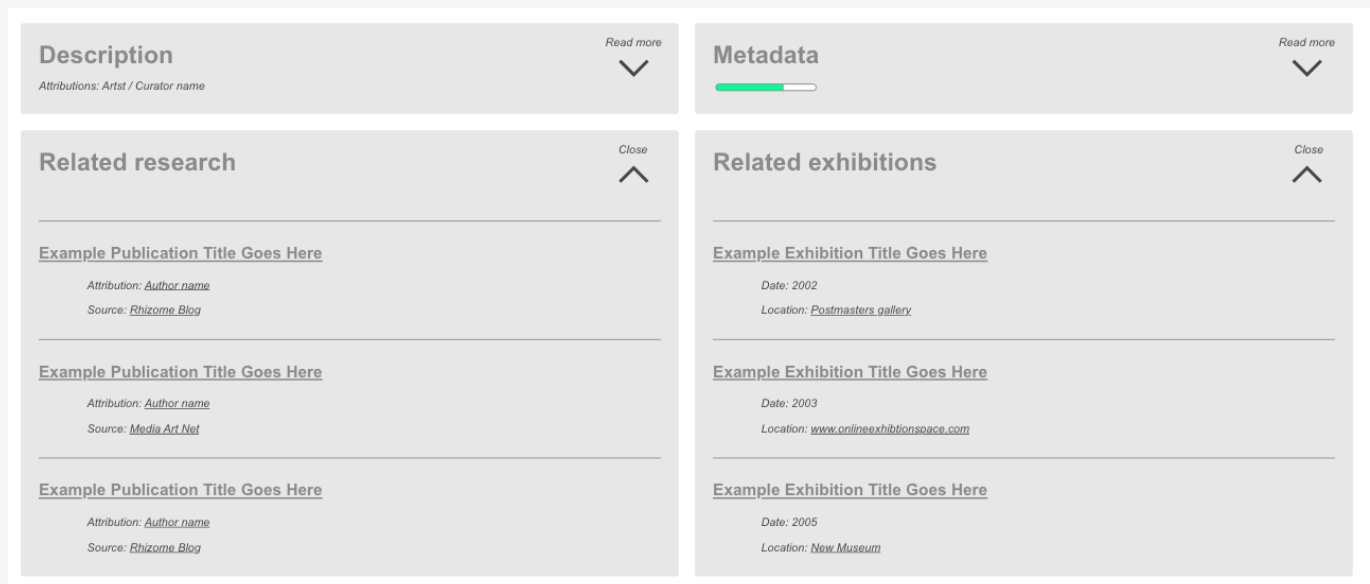
## **Related artworks expandable element**

This element is important for the redesign, as a primary concern of the findings from the user studies was the lack of options for discovering relationships between artworks, and improving the browsability of the archive.

The solution explored in the first prototype features a network graph visualization, which aims to highlight the links between the visited artwork and other artworks in the database considering several possible directions of relation. These possible directions include: common creators or collaborators, common tags, common research (publications) or common exhibitions. The style of the visualization follows some existing conventions for rendering RDF graphs (see Report #3), but aims to increase clarity by featuring preview images and text labels associated with each artwork. Additionally, the current artwork “on view” is positioned centrally, indicating a starting point for relationships to be drawn. The current artwork marks the centre of a “scored field” which is subdivided into quadrants. Each quadrant is labeled with the possible directions of relation. Unlike most network graph visualizations, this graph does not show all the relations as connecting lines with arrows. Instead, it positions the relevant related artworks in the relevant fields. The connecting lines with arrows only appear once the user selects an artwork to interact with. The currently visited artwork is selected by default, then clicking on another artwork reveals a dashed connecting line, and further, the label of the particular type of relation, for example, creator, or a specific tag, or exhibition.

---

<sup>8</sup> RDF and JSON are machine-readable data formats available for export from a linked data database, such as Wikibase and its public version, Wikidata. The possibility to download machine-readable data from the database is useful, not only for internal maintenance of the archive, but for external scholarship by digital humanities researchers.



Version 1—Expanded views of the Related research and Related exhibitions page elements

“  
As a researcher, I want to see information about **exhibition history and publications featuring the work**, so that I can get an idea of how the work has been shown and received over time.

“  
As a researcher, I want to be able to get specific **citation information**, so that I can correctly reference artworks in my research.

“  
As an ArtBase user, I want to see **selections of related artworks**, so that I can explore the collection through the relationships within it.

User story cards which informed the design of the wireframes for the single artwork record page (see Report #2, pp.36-37)



## Artwork title

Artist Name

Timeframe 2001~



Caption: Image generation. Image attribution.

Access via artist link



Access via Rhizome archival copy



Access via Rhizome webarchive



## Description

Attributions: Artist / Curator name

Read more



## Metadata

Read more



## Related research

Read more



## Related exhibitions

Read more



## Related artworks

Read more



Version 1—Artwork page mock-up highlighting  
the timeframe access point



As the expandable page element for Related artworks is not particularly large, the user only sees a few related artworks—determined by the closest ‘degree of separation’ with total number limited to 6 or 8. However, the user also has the option to open up a full screen view of the graph. In that view, the user is presented with more distantly related artworks and the field is expanded to span the full screen against a darkened background. The scoring lines remain the same. In this initial prototype, no further options for interaction are indicated. But if users respond positively to this form of visualization, additional interaction options could be included later on, for example, users could be presented with dropdown options to choose their own “directions of relation”, instead of the default ones. The visualization could be made even more interactive if the user could zoom in/out to increase or decrease the number of relations in view (and thus the degrees of separation). While this work would require substantial additional user testing, it could be an effective way for users to engage with the SPARQL endpoint<sup>9</sup> of Wikibase without requiring the technical knowledge to write SPARQL queries from scratch. The rendering of related artworks will, in fact, be a real-time rendering of SPARQL query results, along the lines of relations indicated by the ‘quadrants’ in the scored field. Additional forms of visualization will also be explored in subsequent versions of the prototype too, as there is not enough evidence to indicate that network graphs are the most effective way to present relations, even though they are visually engaging.

## Timeframe

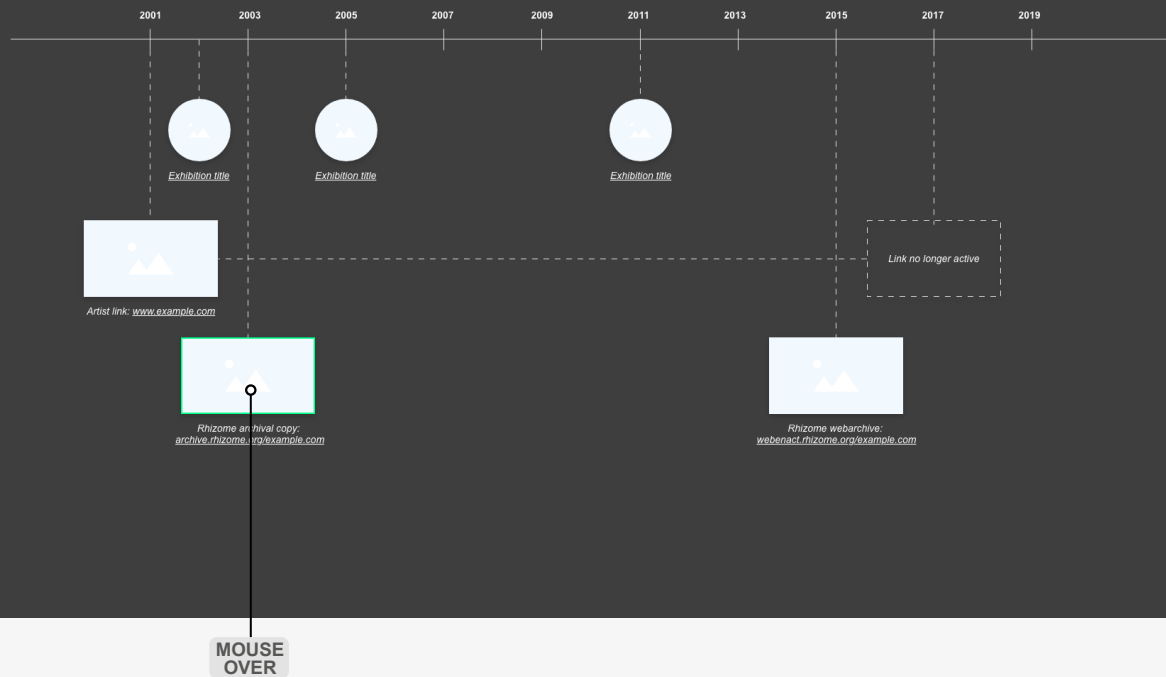
Another method for visualizing relations is provided by the Timeframe visualization which is available for each artwork in the ArtBase. This visualization replaces the static way of dating an artwork that has been applied in the ArtBase until now; and that is used in virtually all other institutional digital archives. The timeframe visualization acknowledges the fact that a born-digital artwork is not a fixed entity, but rather a performative and processual assemblage of multiple components, which may each have their own parallel timeframes.

At this point in the Design Exploration Phase, the timeframe maps a fairly simple concept—the date of inception of an artwork and all its variants, from artist’s links to archival copies. It can also map exhibitions (or other significant events) associated with the artwork long its timeline. As more research and audits of the ArtBase are conducted, additional events can be plotted onto the timeline. Events might include the date an artwork link became inactive (when it was moved offline), or when a crucial dependency in the performance of the artwork became broken or damaged.

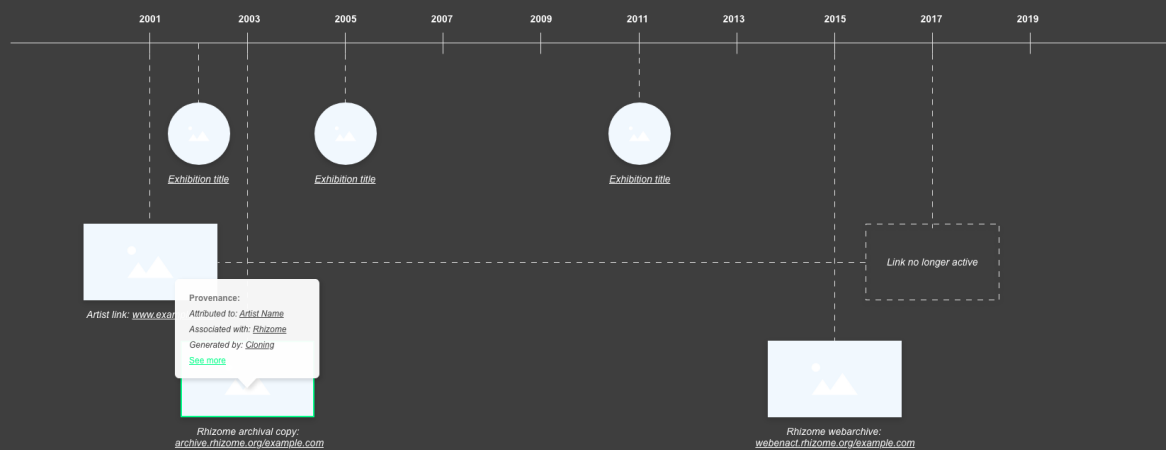
---

9 A SPARQL endpoint is a conformant SPARQL protocol service, which enables users to query a database via the SPARQL language. Source: [http://semanticweb.org/wiki/SPARQL\\_endpoint.html](http://semanticweb.org/wiki/SPARQL_endpoint.html) [Accessed 3 September, 2017]. See also footnote #2.

## Artwork title: Timeframe 2001~



## Artwork title: Timeframe 2001~



Artwork variants and events on the timeline are represented by thumbnail images with labels. Connecting lines link each variant to the date(s) associated with it, including the date of inception and, in some cases, the date a variant was found to be no longer active. Additionally, as the Timeframe button is positioned high in the record page's layout hierarchy, users might click and open this visualization, before they explore the access buttons or the metadata elements. Therefore, they may not know what the various thumbnails represent, or what is meant by the different variants. Although the URL addresses will be visible, indicating that each variant has a unique location, this may still not provide enough context. To account for this scenario, mouse-over states for each thumbnail representation provide additional contextual information. These mouse-over state boxes can, once again, be framed within the category of 'provenance' metadata, because they provide some of the basic details of how and by whom each variant was created. The "See more" link serves to return users to the artwork record page or, more specifically, to the detailed metadata element in its expanded form.

The Timeframe visualization, and the position of its entry button, are designed to account for the critical role of time in the lifecycle of digital artifacts. Additionally, this gives an at-a-glance temporal context for the various instantiations, and respective provenance, of the artwork. This is something users have been requesting since the earliest user studies. Although this may not be the preferred way of interacting with the artwork record for all users, it provides an *additional* view. Current research on visualizing cultural heritage collections via digital interfaces suggests that the possibility of having *multiple* view options for the data associated with each record has been widely recognised as an important user need (see the Bibliography for Report #3).

## Open Call: Past, present and future in the net art archive

Join us for a research workshop at New Inc!

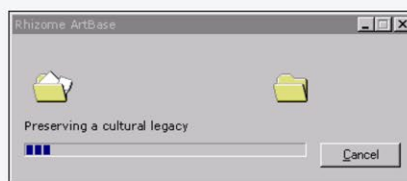
By Lozana Rossenova  
Sep 17, 2018



*Image: Background detail from Raiders of the Lost ArtBase blog.  
<http://archive.rhizome.org/exhibition/raiders/>.*

Building on the [survey with ArtBase archive users](#) we conducted earlier this year, we are organizing a follow-up hands-on workshop session for Rhizome community members based in/around NYC. This practical research session, led by our PhD researcher Lozana Rossenova, continues the commitment of our digital preservation program to consider the needs and requirements of our users and to factor them into the on-going process of re-developing our archive of net art.

This 3-hour workshop session will feature presentations on the current state of the archive, as well as demos of work-in-progress new interface prototypes. Through practical exercises, participants will be encouraged to think together through issues around the context, description and presentation of artworks in the archive. Participants will be able to learn more about how Rhizome is exploring the potential of linked data to support digital preservation for complex digital artworks, and will be able to test some of the archival interface tools we're currently developing.



*Gift by Ben Frow-Roddis, source: <http://rhizome.org/editorial/2018/sep/05/artbase-updates/>*

The workshop will take place on Monday, Sept. 24th from 10am-1pm. Breakfast and tea/coffee will be provided. Unfortunately, we are unable to offer compensation for travel expenses.

This workshop is aimed at anyone familiar with Rhizome's archive and preservation programme, but anyone interested in digital art preservation in general, particularly artists, preservation professionals, or students are all welcome to attend. Places are limited, so if you'd like to attend please [fill in this short form](#) and we'll get back to you to confirm your attendance.

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*This workshop is part of an ongoing joint research project between Rhizome and London South Bank University. Feel free to contact Lozana at [lozana.rossenova@rhizome.org](mailto:lozana.rossenova@rhizome.org) with any questions or concerns regarding user studies in the archive.*

Blog post promoting the first user workshop. See: <https://rhizome.org/editorial/2018/sep/17/open-call-past-present-and-future-in-the-net-art-archive-1/> (Screenshot 2020-04-06).

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# User workshop 1

This workshop session was developed as a mix of user testing, usability and co-design exercises. It aimed to engage users with the archive's Wikibase infrastructure and the newly designed prototypes, as well as to explore users' perceptions of what an artwork record in an archive should look like. The session was held in September 2018 and was conducted in Rhizome's NYC offices. Participation in the session was open to all, via an invitation spread through Rhizome's media channels. In the end, a total of 13 participants took part: 4 artists (who work in digital media), 5 students (mostly from archiving/ information science/ preservation disciplines), 3 professionals from the archival/ preservation field, and 1 Rhizome staff member. The presentation slides shown on [pp.32–33](#) give an overview of the workshop's format. What follows is a summary of observations and user feedback, gathered at different points of the workshop. Discussions were audio-recorded and subsequently transcribed. This feedback influenced subsequent design iterations in prototypes Version 2 and 3.

## Exercise 1: Working with Wikibase

Some users stated that it was confusing **to navigate the Wiki UI horizontally**, particularly, when clicking on property values. Each property represents a link to a separate item within the database, so users found themselves inadvertently navigating away from the artwork they were looking at. Some suggested some form of **breadcrumbs** would be useful, in order to re-trace their own pathways through the database.

Several users found aspects of the **terminology** used in the Wiki statements confusing. They highlighted “inception” and “outside URL” as especially problematic. Others asked for descriptions for the “creator” field and values used with the “instance of” property. They wondered how they could find more information about the role of the “creator” or the definition of “artwork”.

Users expressed an interest in doing more than simply *using* the database: they were keen to understand more about its structure and affordances, especially given the relative novelty of linked data systems. Several suggested that there should be a page dedicated to **explaining the basics of linked data for new users** and also a dedicated page **explaining how Wikibase works**. One user proposed adding “a synopsis with a quick how-to and/or reminder of what certain terms mean, that stays as a permanent banner on the record pages, to help me not get confused while exploring”.

# AGENDA

1. Introductions
2. History of the ArtBase
3. Exercise 1 – Wikibase exploration
4. Exercise 2 – Search queries

## *Break*

1. Exercise 3 – Card sorting
2. Prototype exploration
3. Final discussion

## EXERCISE 1 – WIKIBASE

Go to [catalog.rhizome.org](https://catalog.rhizome.org)

Explore the archive records for 3 artworks. Suggested artworks:

- Untitled[scrollbars] by Jan Robert Leegte
- [V]ote-auction by Ubermorgen
- VWebcam by Petra Cortright

Focus on exploring the metadata record more than the artwork links perse. Follow metadata links– as far you want to go. Note down (on paper or in a text doc) anything you find confusing / unclear along the way).

Use the distributed blank paper pieces to fill in metadata about one of the artworks you explored.

## EXERCISE 2 – SEARCH INTERFACES

Go to <https://query.wikidata.org/>

Search for **artists** who work with **internet art**. You may want to start by looking at the artist record in Wikidata to see how the metadata statements are constructed. Example artists include

- Olia Lialina or Cornelia Sollfrank, Ubermorgen, Evan Roth. See if you can also add images to your results.

Try to run the same query in <https://tools.wmflabs.org/wd-query-builder/>

Note down (on paper or in a text doc) anything you find confusing / unclear along the way).

---

The three images on this page and the top two on the following, represent slides from the presentation shared with participants during the workshop. The bottom image on the next page is a view of some of the blank paper mockup templates which participants were provided with as part of Exercise 3—card sorting.

## EXERCISE 3 – CARD SORTING

Use the large paper sheets provided to start laying out a hierarchy of the metadata elements you annotated during exercise 1.

Feel free to add any new metadata elements that you think should be provided with each record, and/or fill in some sample data the way you think it should be provided, even if we didn't have such data in our archive records that you explored earlier.

## PROTOTYPE A/B TESTS

Explore one of the links provided below:

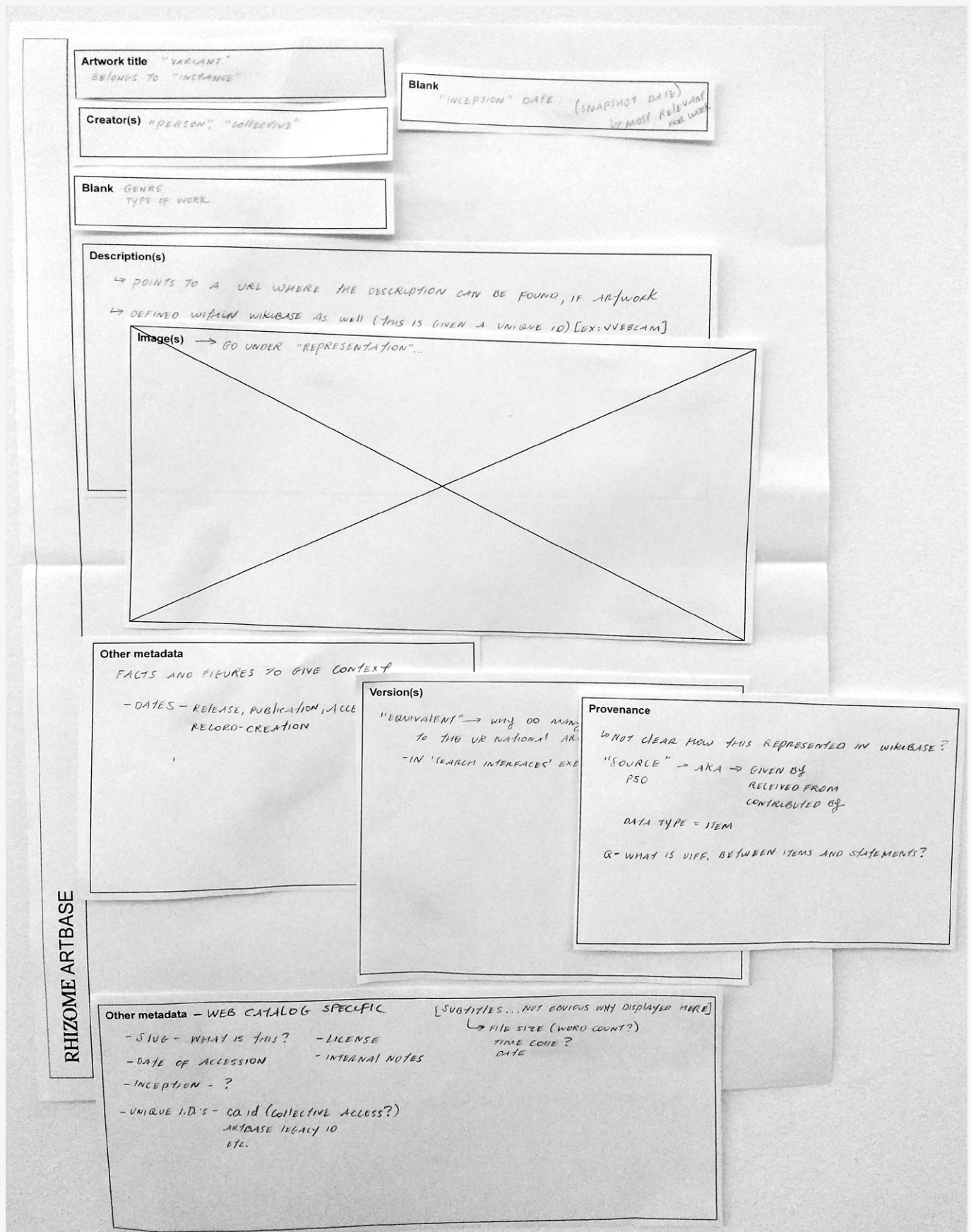
A – <https://xd.adobe.com/view/91ba856b-fe65-42b0-5381-612ef1c1ccb0-e78b/>  
password: artbase2018A

B – <https://xd.adobe.com/view/18ef955a-5e03-4dc7-4450-02560e7dec31-6ede/>  
password: artbase2018B

Note down (on paper or in a text doc) anything you find confusing / unclear along the way).

Artwork title	Blank	Blank
Creator(s)	Time	Blank
Image(s)	Version(s)	
Description(s)	Provenance	





An example of a user mockup design from Exercise 3.



## Exercise 3: Design your own artwork record page

This was an exercise in co-design. Users were provided with a stack of cut pieces of paper with labels on them, such as: *Artwork Title*, *Creator(s)*, *Time*, *Provenance*, *Image(s)*, *Description(s)*, *Version(s)*, *Other metadata*, or *Blank*, so that users could assign their own labels. They were asked to arrange their selection of labels into record page layouts. Of these predetermined choices, the five most popular elements which users chose to position at the top of their layouts were: *Artwork Title*, *Artist Name*, *Time* (often specified to include both inception date & accession date), *Images*, and *Description* (see chart on pp.36–37). The order sometimes varied, but the majority of users considered these elements to be most important, and therefore that they should be close to the top of the page. Whereas other metadata elements, including *Version(s)*, *Provenance*, and *Other metadata* were typically positioned lower on the page (see images on pp.34, 36, 37, 38, 40).

The most frequently requested additional labels for metadata fields—those which users wrote onto the Blank labels—included: “genre”, “medium”, “artist statement”, “made of”, “what tech was used to create the work”, “what browser should the work be viewed in”, “runtime”, “file size” and “language”.

## Exercise 4: Explore the redesigned ArtBase UI

Most users observed that the prototype designs improve upon the Wikibase default GUI. They commented positively on the introduction of large images high up in the hierarchy of the page layout, which mapped closely to their own layout designs and expectations. The following observations are grouped in three categories relating to different sections of the prototype.

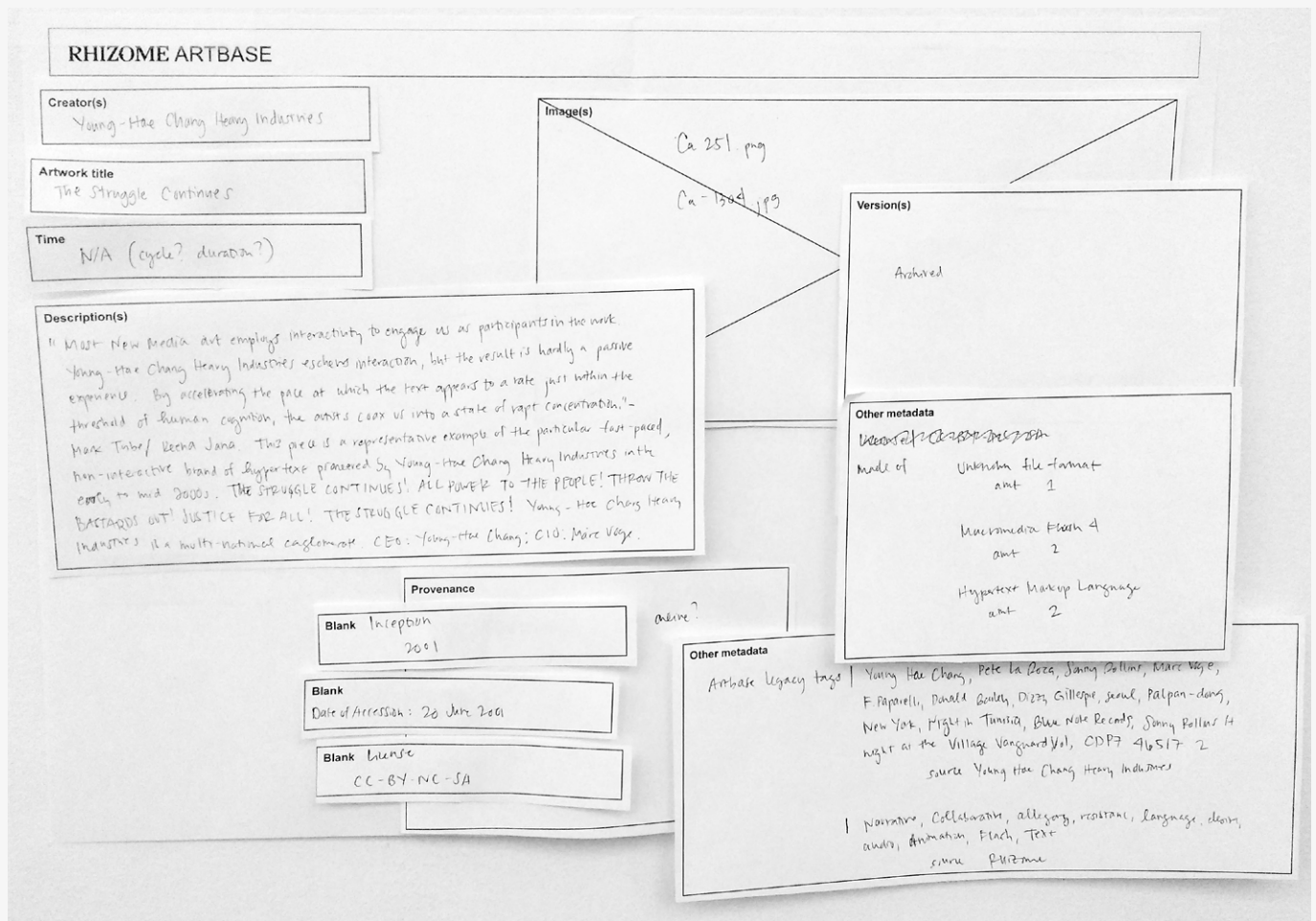
### Artwork access points

Several users were unclear about what the green rectangles beneath the access points signified. One user thought they related to file size. Others suggested that a single colored icon, using a system of **traffic light colors**, would be clearer to indicate whether access to the artwork was more or less functional/operative.

Some users didn’t understand the difference between “Rhizome **archival copy**” and “Rhizome **webarchive**”. They suggested that more explanation, such as including a **glossary** of terms, would be useful.

### Metadata section

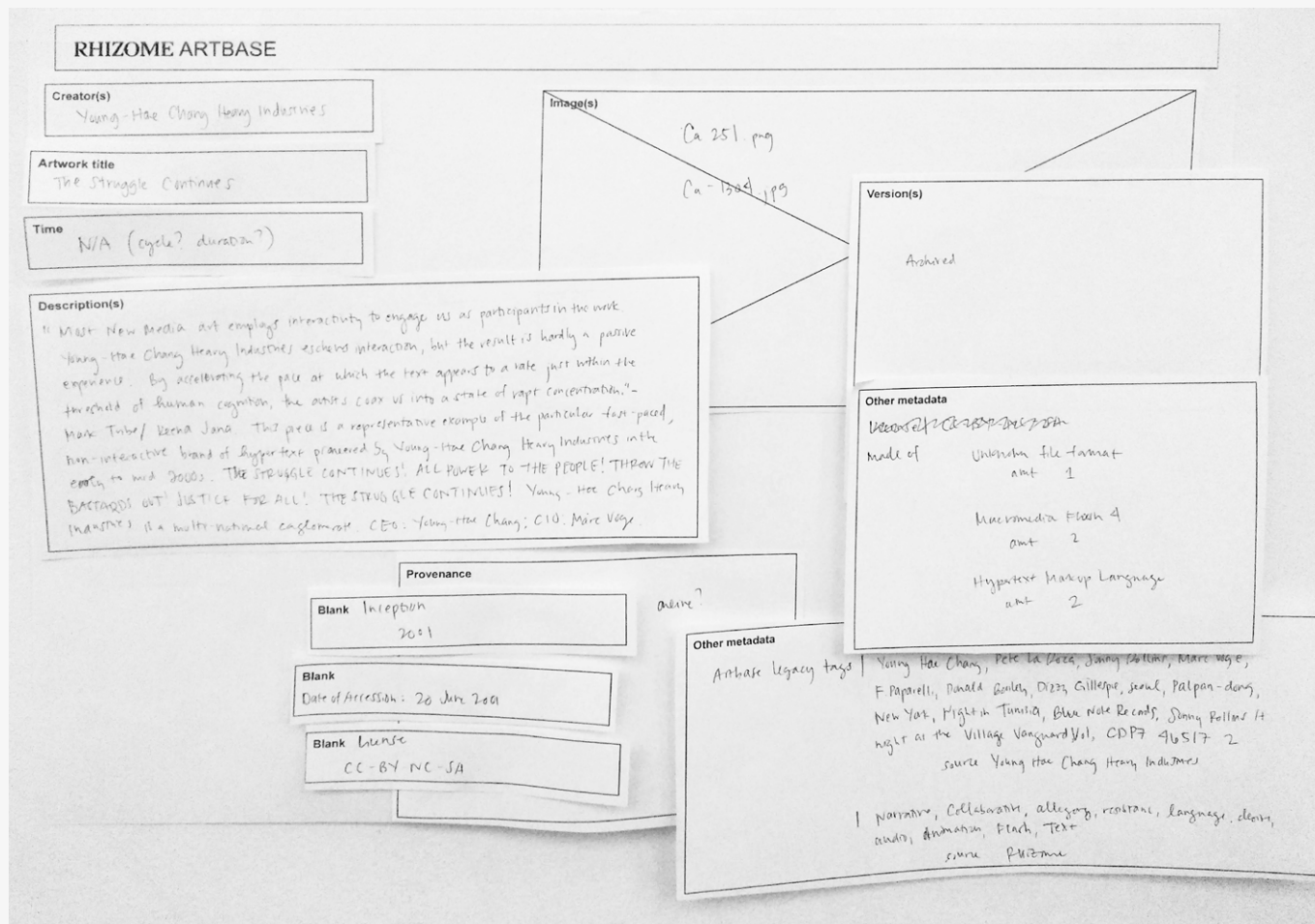
Users reacted positively to the option to **download metadata**, expressing that this would be a very useful feature if implemented.



An example of a user mockup design from Exercise 3.

	A	B	C	D	E	F
1	Element #	Layout 1	Layout 2	Layout 3	Layout 4	Layout 5
2	1	Artwork title	Creator	Artwork title	Artwork title	Creator
3	2	Creator	Artwork title	Creator	Images	Artwork title
4	3	Genre	Time (inception + accession)	Artist statement	Creator	Images
5	4	Images	Images	Medium / Material / Type	Made of	Time
6	5	Description	Description	Time	Provenance (inception)	Description

Participants produced a total of 11 layout mockups during Exercise 3. This table summarises the five elements most frequently positioned near the top of the mockup archival record pages. This loosely indicates a hierarchy of elements which users perceive as most important for describing the works. The table continues on the next page.



An example of a user mockup design from Exercise 3.

G	H	I	J	K	L
Layout 6	Layout 7	Layout 8	Layout 9	Layout 10	Layout 11
Artwork title	Artwork title	Artwork title	Images	Artwork title	Images
Creator	Time (inception)	Images	Versions	Creator	Artwork title
Medium	Creator	Creator	Artwork title	Time (accession)	Creator
Time (inception + accession)	Genre / Type of work	Time (inception)	Creator	Description	Time (inception + accession + link rot)
Images	Description	Description	Description	Tags	Description

Part two of the table from page 36.



**RHIZOME ARTBASE**

Image(s)

link to accessible artwork

Artwork title  
VVEBCAM (if archived, the link)

make sticky

Creator(s)  
Petra Cortright → link to separate page with other works

Blank  
made of / ~~paper or material?~~

Provenance  
originally created:  
in February 2007

Genre / movement

Description(s)  
~~no description~~  
Q2596

Blank  
ArtBase legacy ID

Time archived: 21 October 2011  
originally published: ~~not~~

Blank  
~~Petra Cortright~~ license

Version(s)  
variant: WEBCAM (archived)  
with website w/ embedded video

Other metadata

history of clicks

random log cards

back end access (sticky sidebar)

An example of a user mockup design from Exercise 3.

When asked if anything was missing from the metadata section, several users raised the question of “**medium**”, and suggested that if there is no specific medium or genre defined, then perhaps **tags** could be used as a way of navigating the database and finding related artworks via keyword terms considered similar to medium or genre. *However, this means tags would have to be made into database nodes, which they currently are not, as they were added simply as text strings during the last data migration.*

One of the questions in the post-workshop survey asked users whether they considered some of the data available in the artwork record pages (both in the Wikibase UI and the custom prototype) to be relevant to the category of “**provenance**”. Several users reported that they were unsure what the term relates to. They noted that they didn’t have archival backgrounds, and this highlights the specialist nature of this term. However, a large group of users in this workshop session did actually come from an archival background, either educationally or professionally, and their and their answers map closely with the intended use of metadata in the prototype design. Metadata which this group considered to be provenance includes, according to their answers: “date created”, “date accessed”, “date link stopped working”, “different versions”, “versions and historical context—was this artwork made as part of a digital exhibition or was it a one-off piece by a mostly-analog artist?”, “who was responsible for amassing digital information, who compiled elements”, “made of”<sup>10</sup>, “legacy tags”<sup>11</sup>, “creator”, “including Rhizome or the repository that is holding the artworks”, “the process in which the artwork was contributed (whether the artist submitted it or Rhizome requested it, etc.)”, “transaction/exchange transparency: was it donated by the artist? or a collector? or purchased from primary market sale?”, “being able to register different attempts at preservation”, and “being able to note transfer of ownership of archives’ link”. While this understanding of provenance is relatively broad, the ideas generally relate to: an artwork’s historical context, preservation processes it may have undergone, and the actors involved at any of these stages. This understanding is closer to the way provenance is used within the sphere of archival science (and certainly, post-modern archival science) than how the term is applied in traditional art-historical/ museological discourse.<sup>12</sup>

This particular user group were able to understand the term provenance as deployed in the prototype. In relation to this, some users noted that: “The timelines in the prototype are great provenance tools. They show the conception of the art and the changes it’s been through”; and further—“Loved the timeframe visualization tool: in my various archival work environments this is one of the most basic, yet confusing aspects of understanding a work.”

---

10 This is a metadata term used in the Wikibase UI to list file types that make up the components of the artwork, eg. html, css, Macromedia Flash (with a specific version).

11 This is a metadata term used in the Wikibase UI to list the tags used in previous instantiations of the ArtBase. There is a set of “legacy tags” associated with each artwork.

12 For a more detailed discussion of different definitions of the term provenance and how it is used across different disciplines, or schools of practice within a single discipline, please refer to the PhD thesis accompanying this project, Part III, Chapter 7.

**RHIZOME ARTBASE**

Artwork title: untitled [scrollbars]

Creator(s): Jan Robert Leegte

genre:

Image(s):

Description(s): artwork by Jan Robert Leegte  
also known as:  
untitled scrollbars  
scrollbars  
scrollbar composition

Time: date of accession: 19 June 2001  
inception: 2000

Other metadata:  
- made of:  
- direct link

Version(s): untitled [scrollbars] (archived)  
untitled [scrollbars] (web archive)

Blank: media: Q 2508  
new keywords: "research fundamental"

Blank: artwork legacy id: 2549  
ca id: H 312

Blank Representation:  
Ca-250.jpg  
Ca-1302.jpg (- notice by this name exists)

**RHIZOME ARTBASE**

Image(s):

Description(s): An interactive, formless art site navigated aimlessly by clicking through blank boxes & links. ....

Artwork title: Form ART

Creator(s): Alexi Shulgin

Time: (Inception) 1997

Blank: Date of accession

Blank: Date of link rot if applicable

Blank: LINK / Download  
~~Form ART~~

Version(s): ~~Form ART~~ archived version  
Form ART (archived)

Other metadata:  
tags

Examples of user mockup designs from Exercise 3.

## Visualizing relationships

Following on from the feedback on the **timeline visualizations**, most users appreciated the **related artworks** visualization which mapped relationships across a “scored field”.

Users also noted the opportunity for intuitive interactions with the timeline, and observed how this could help them retrace the history of an artwork. They wondered if other such timelines could be deployed elsewhere in the archival interface. For example, timelines relating to a single artist, or timelines presenting sets of different artworks from a specific time period.

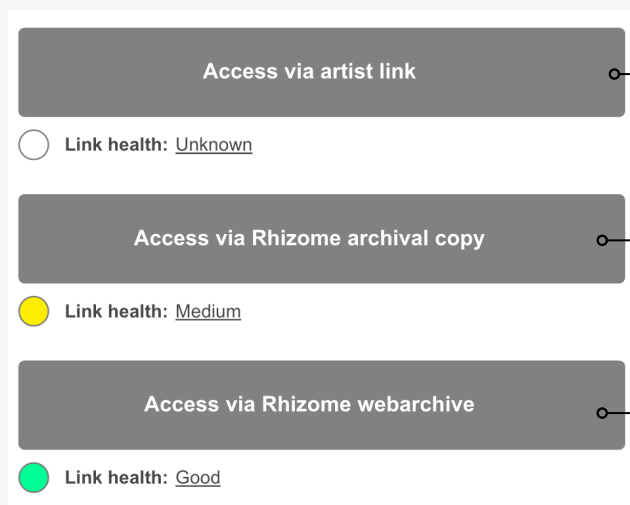
---

Questions from the online survey shared with users after the workshop. The responses to these questions are included in the analysis on the preceding pages. A total of 10 participants filled out this survey. Answers to question 7 informed the design of the next workshop.

### Post-workshop survey

1. Have you ever worked with linked data archive records before today?
2. Have you ever used Wikidata before today?
3. Were you able to read the wiki “statements” as archival metadata? If you could change something about the presentation of these statements, what would that be?
4. Did you consider any of the data in the archival record as “provenance data”? If yes or no—why? What would you include as provenance data for digital art in an archival record?
5. Did you find the access state and dependencies labels in the prototype exploration exercise clear or confusing? What additional data would you like to see in terms of describing access to born-digital materials?
6. Do you have any additional feedback or questions about the prototypes which you didn’t get a chance to express during the group discussion?
7. What did you think about this workshop? Do you have any feedback about the way the sessions were run?
8. Would you like to stay in touch and participate in further research sessions?





Version 2, Option A—Access points:  
Link health indicators following a traffic-light  
color-codign system with pop-up designs.

MOUSE  
OVER

Link health:  
Unknown – this access  
link has not been  
audited by an archivist

[Report issue?](#)

Access via artist link

Link health: Unknown

MOUSE  
OVER

Access via Rhizome archival copy

Link health: Medium

Access via Rhizome webarchive

Link health: Good

MOUSE  
OVER

Access via artist link

Link health:  
Medium – some known  
dependencies

[Report issue?](#)

Access via Rhizome archival copy

Link health: Medium

Access via Rhizome webarchive

Link health: Good

Access via artist link

Link health: Unknown

Access via Rhizome archival copy

Link health:  
Good – few known  
dependencies

[Report issue?](#)

Access via Rhizome webarchive

Link health: Good



---

## Version 2: October 2018

Following findings from the user workshop conducted in September, Version 2 features a small number of changes to the artwork access points and, again, was presented as two options for further user testing.

### Artwork access points

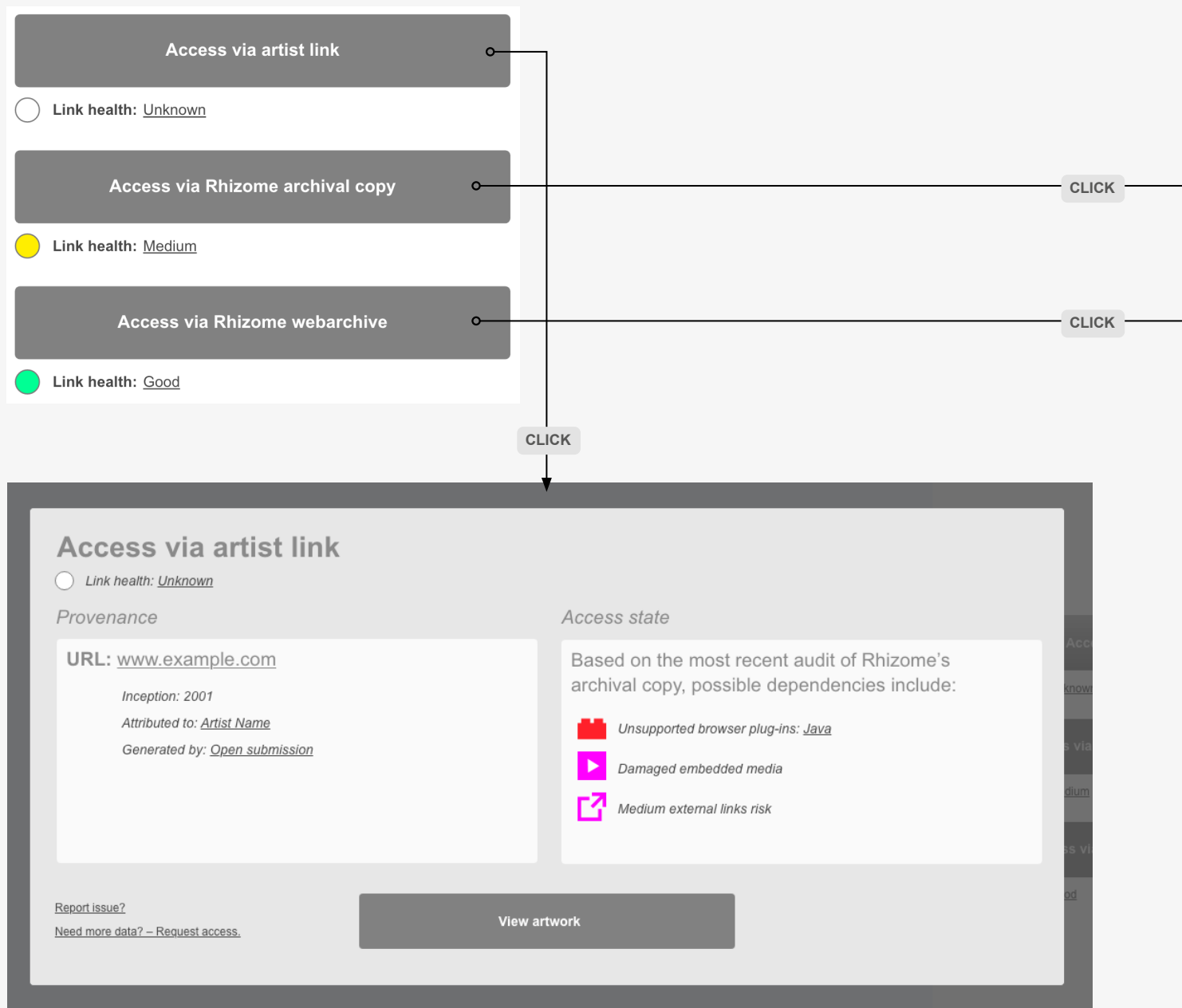
#### Option A

This prototype updates the way “link health” is indicated to users. Instead of the rectangular bars which light up green depending on the link’s health, this option uses the “traffic-light” system suggested by users. Small circular “stop lights” are placed beneath each button with text labels spelling out “Link health: Unknown”, “Link health: Medium”, etc. This extra level of labeling (beyond the conventional color coding in red/yellow/green) is intended to provide additional guidance to users, so there is even less room for confusion. Furthermore, this option combines both approaches from Options A & B of Version 1, in terms of mouse-over states and overlays. Here, once a user moves their mouse over the stop light or label text, they trigger the pop-up from Option A of Version 1, which gives more information about the link health, including a description what “medium link health” means, and an option to report an issue. In Version 2, “unknown link health” is supplemented by an explanation: “link not been audited by an archivist”. This was another suggestion that was raised in the user workshop. In addition to this link health pop-up box, an intermediary overlay state (same as in Option B of Version 1) appears when users click on the artwork access button.

Overall, this option aims to provide as much contextual information around the access points as possible, and aims to test how users would respond to this. In fact, most users preferred this option and didn’t mind the additional level of detail.


#### Option B

Option B of this Version remains the same as Option B of Version 1. It serves as a contrasting point against Option A, because it provides less detail at first glance. It retains the original green bars signaling system rather than the traffic-light system, and there is no pop-up available on mouse-over. The method of triggering the intermediary overlay with more information about access and provenance, is to click the access button. No further changes were made to the design of proptotype Version 2, because the next workshop provided opportunity to engage with a new group of users who represented entirely different backgrounds than the group who attended the first workshop.



Version 2, Option A—Access points:  
Access state overlay designs.

## Access via Rhizome archival copy

 Link health: Medium

### Provenance

URL: [archive.rhizome.org/example.com](https://archive.rhizome.org/example.com)

Inception: 2003

Attributed to: [Artist Name](#)

Associated with: [Rhizome](#)

Generated by: [Cloning](#)

### Access state

Based on the most recent audit, the following dependencies affect access to this artwork:



Unsupported browser plug-ins: [Java](#)



Damaged embedded media




Medium external links risk

[Report issue?](#)

[Need more data? – Request access.](#)

[View artwork](#)

## Access via Rhizome webarchive

 Link health: Good

### Provenance

URL: [webenact.rhizome.org/example.com](https://webenact.rhizome.org/example.com)

Inception: 2015

Attributed to: [Artist Name](#)

Associated with: [Archivist name / Rhizome](#)

Generated by: [Webrecorder capture](#)

### Access state

Based on the most recent audit, the following dependencies affect access to this artwork:



Supported browser plug-ins: [Java](#)

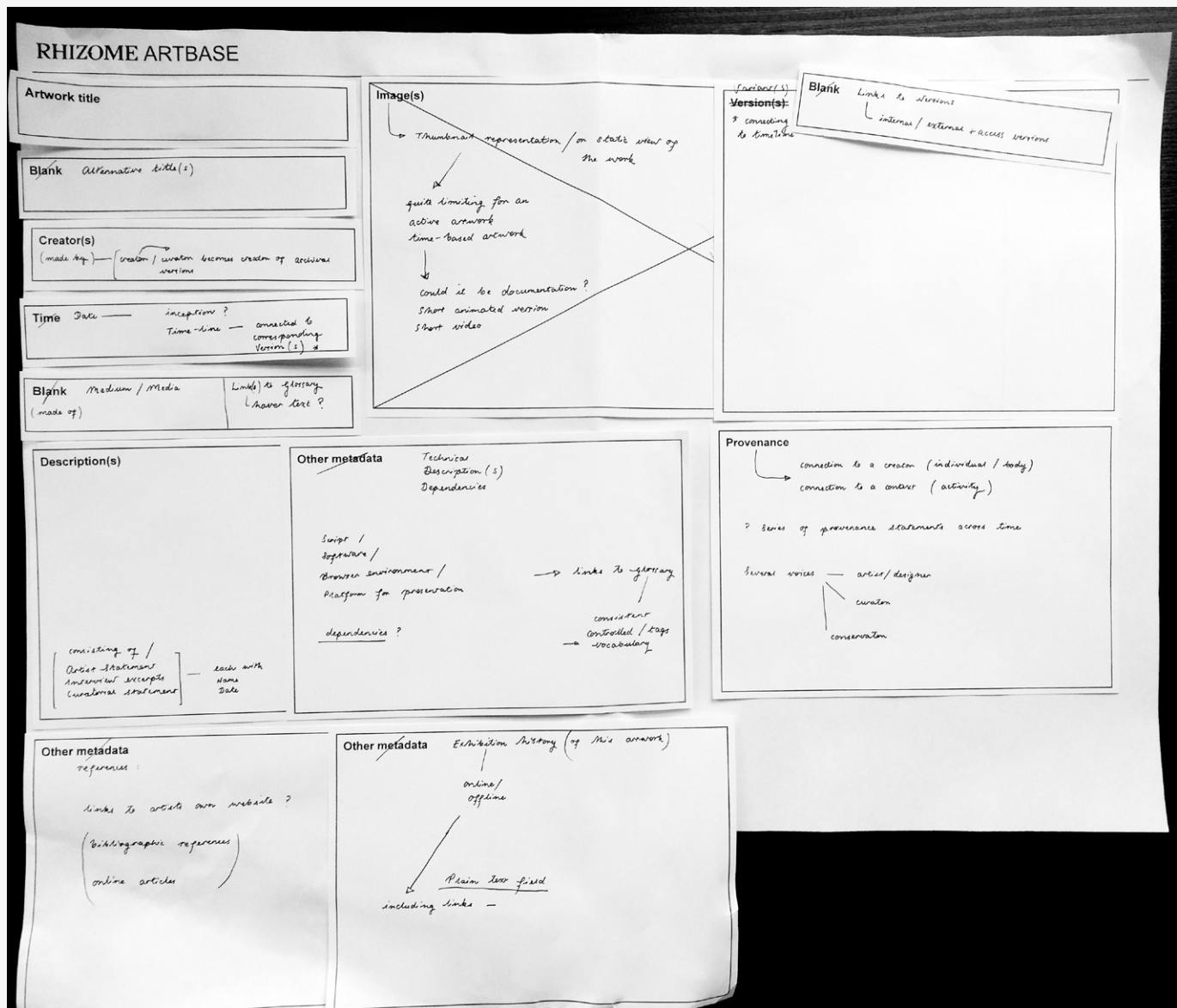


Low external links risk

[Report issue?](#)

[Need more data? – Request access.](#)

[View artwork](#)



An example of a participant group mockup design from Exercise 3.

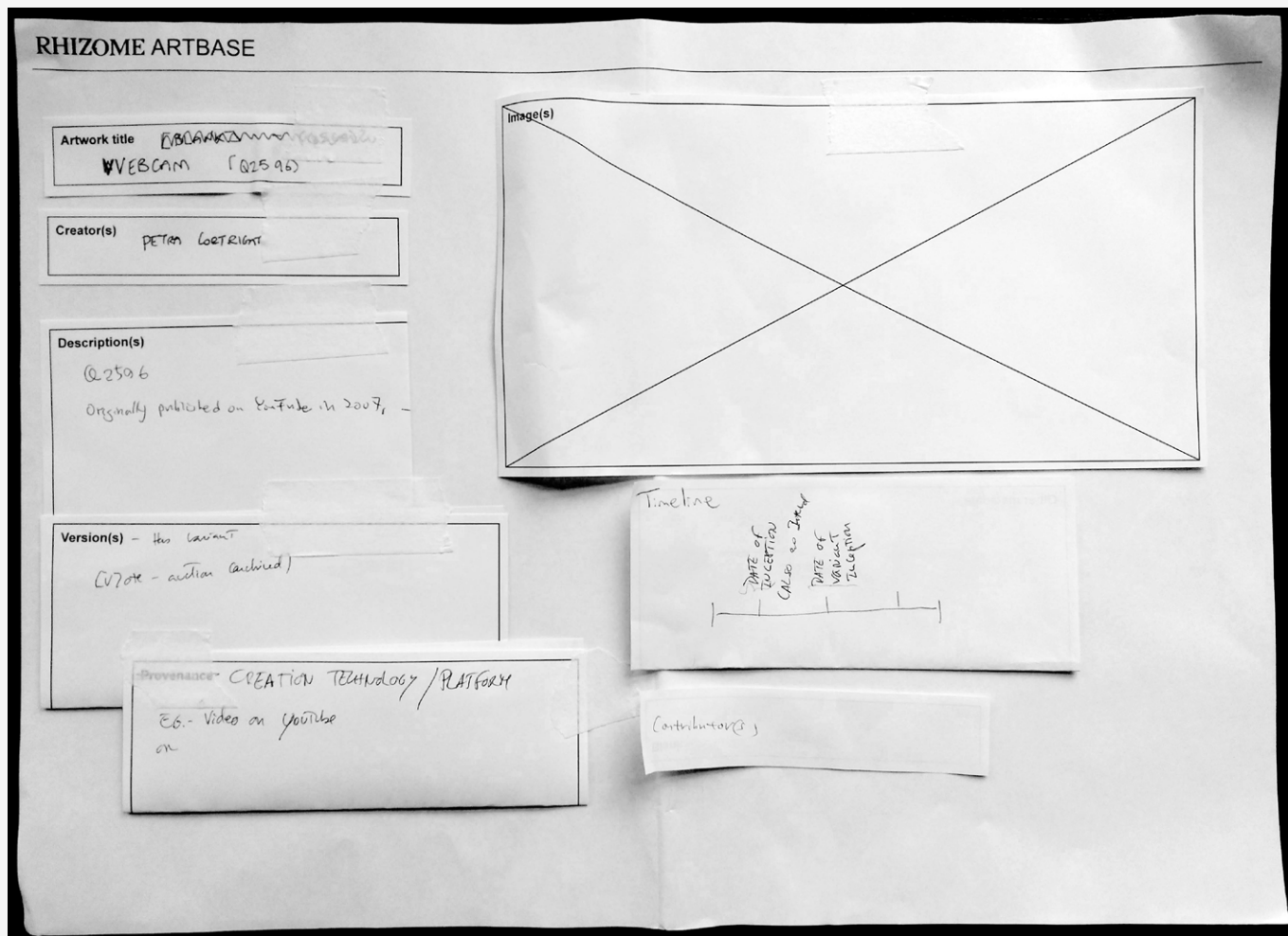
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# User workshop 2

Similar to the first user workshop, this session was conceived as a mix of user testing, usability and co-design exercises. The session was held in October 2018 and was conducted in London at the LSBU campus. Unlike the previous workshop, this session was run by invitation only and aimed to introduce a slightly different community of users to the prototype designs. A group of 15 researchers and museum professionals were invited; they all had affiliations with museums or research institutions and some of them were familiar with the ArtBase redesign project already. In the end, 11 participants took part in the workshop. The group consisted of 3 time-based media preservation specialists (Tate), 3 curatorial researchers (V&A), 2 archival specialists (V&A/The Photographers' Gallery), and 3 PhD students with a focus on preservation or archiving. In terms of format, this workshop followed the same structure as the first, consisting of 4 exercises and a follow-up survey at the end. The only difference was that instead of asking participants to produce individual mockups during Exercise 3, they were encouraged to work in groups. Following feedback from the first workshop, the group work was proposed as a way to encourage participants to exchange experience and ideas among themselves. So the workshop became not just a vehicle for the designer to gain insights from users, but also an opportunity for users to collaborate and learn from each other. What follows is a summary of observations and user feedback gathered at different points during the workshop. Discussions were audio-recorded and subsequently transcribed. This feedback influenced subsequent design iterations in prototype Version 3.

## Exercise 1: Working with Wikibase

Users reported that they found **the Wikibase interface** difficult to navigate. One user found it unsuitable for human interaction, particularly in the context of cultural heritage: "Artwork entries as they are presented now seem like **designed for machines, not for humans**. Almost like if one would read a database in phpMyAdmin. Most of the information there is useless to most people, even to net art researchers. One would expect more narratives and context." Another user commented on the need for "some kind of **grouping system** for related elements" in order to "break up the 'wall of statements'." These comments correlate with the goals of the new prototype to improve upon the default interface view in Wikibase.



An example of a participant group mockup design from Exercise 3.

	A	B	C	D
1	Element #	Layout 1	Layout 2	Layout 3
2	1	Artwork title	Artwork title	Artwork title
3	2	Images	Creator	Images
4	3	Version(s) / Variant(s)	Time (inception + accession)	Creator
5	4	Creator	Media	Description
6	5	Timeline (connected to variant)	Images	Version(s) / Variant(s)

Participants produced a total of 11 layout mockups during Exercise 3. This table summarises the 5 elements most frequently positioned near the top of the mockup archival record pages. It indicates a loose hierarchy of elements which users perceive as most important to describe the works.

Another useful observation regarding how the prototype could develop more varied interface templates for different types of data, came from a user commenting on the lack of **difference in the presentation between “the abstracted artwork” and “specific instances”**, and the need for clearer differentiation.

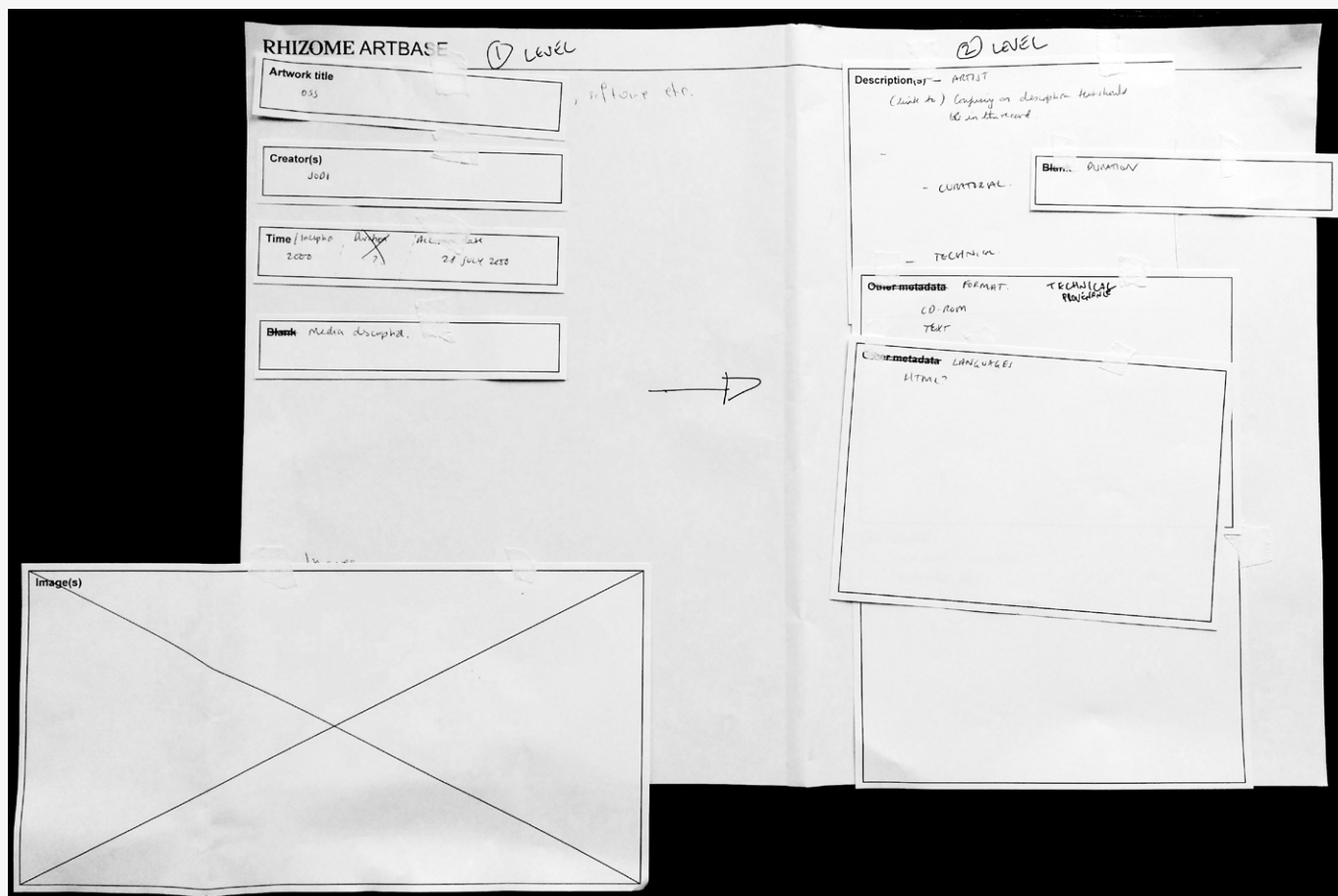
With regards to the use of **terminology**, several users commented that they were unfamiliar with the term “**inception**”, although they were able to understand the meaning well enough, in context. Others asked for additional details about the **tags**, including their overall purpose, and whether tags represented formal categories. They also asked who was responsible for adding tags and making decisions around the taxonomy. Furthermore, users enquired about **technical descriptions** of medium, format, programming language(s). They wondered what happened when some of this information was also recorded as tags, for example, one user pointed to an artwork which had “CD-ROM” as a tag). All of these observations raised important questions to be considered during the data modeling phase of this project.

### Exercise 3: Design your own artwork record page

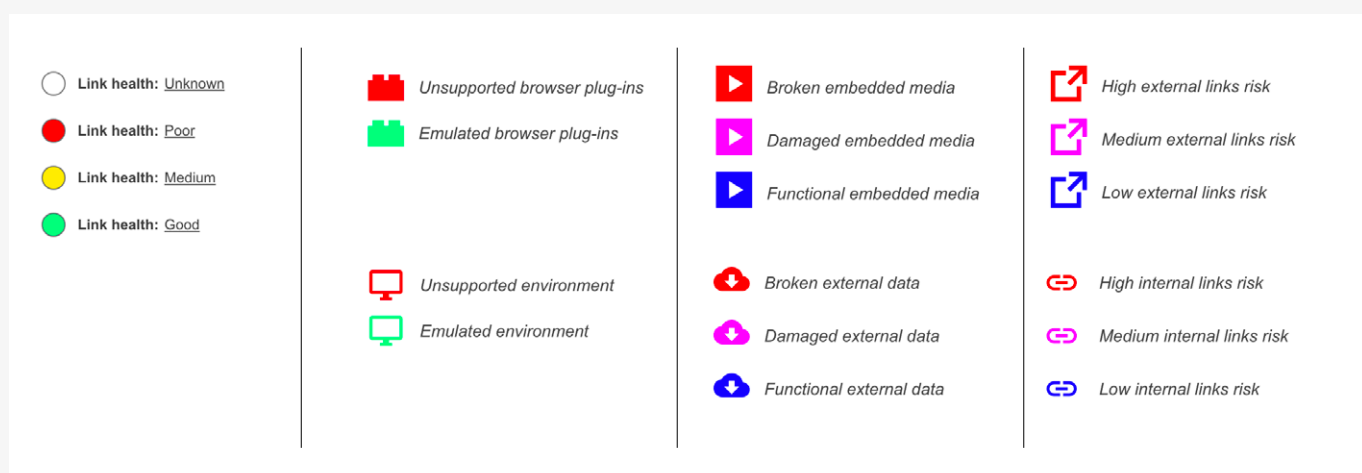
This was an exercise in co-design. Users were provided with a stack of cut pieces of paper assigned with labels, such as: *Artwork Title*, *Creator(s)*, *Time*, *Provenance*, *Image(s)*, *Description(s)*, *Version(s)*, *Other metadata*, or *Blank*—meaning that users could assign their own labels. Users were split into three groups and each group was asked to produce their own layout for an artwork record page. Of the provided labels, the 5 elements which users most frequently positioned at the top of their layouts were: *Artwork Title*, *Artist Name*, *Time* (often, users specified that they intended this to include both inception date and accession date), *Images*, and *Version(s)*. The order sometimes varied, but most users considered these elements to be most critical, and therefore gave them prominent positions towards the top the layout, whereas other metadata elements, including *Description*, and custom choices for “other” metadata were typically positioned lower down the page. (See chart on [p.48](#))

The most frequently requested additional labels for metadata fields included: “medium”, “made of”, “format”, “technical provenance”, “creation technology/platform”, “programming language(s)”, “duration”, and “timeline”.

One particularly interesting idea represented in the mockups suggested that separate **images could be more closely connected to each different variant** (see [p.46](#)). This mockup also proposed the use of **timelines** to plot a range of activities throughout the life cycle of each variant, which could be visually connected to the variant links. These aspects bear close resemblance with a later iteration of the design, subsequently shared during Exercise 4 as prototype Version 2.



An example of one group's mockup design from Exercise 3.



The visual system of icons used in Version 2. Users suggested a consistent traffic-light color-coding system should instead be adopted across all icon sets used in the prototypes.



Several users spoke about the usefulness of mouse-over text descriptions to define some of the more specific terms used in the archive, as **a form of glossary**. Another suggested a visual **description of the artwork**. This could be achieved via a simple one- or two-line description written by a curator, serving as a quick, confirmatory identifier beneath an artwork's title.

In follow-up feedback, one user gave a very detailed description of what, in their view, was the most important information to be included on the record page: "I think in practical terms, most visitors are interested in seeing **name of artist, work, year, thumbnail, very short description and/ or tags, and link to the work**. This is also how most contemporary art museum collection websites are designed today. This can fit nicely in the main screen—all shown in the browser without the need of scrolling. Below this main screen I would put two things: other works of the artist in the collection, and related artworks. And below those, everything else. Also it would be interesting to indicate that this or that work is part of Net Art Anthology, and this or that work is part of New Museum show in 2019, and other highlights from the work's 'career'." This provides a clear starting point and has certainly influenced some of the layout design decisions in the prototypes, but doesn't necessarily address the particular requirements for (re)performance or the risk(s) of obsolescence that concern digital art.

## Exercise 4: Explore the redesigned ArtBase UI

### Artwork access points

Users universally preferred the **"traffic-light" color system** for describing link health/ access state. They also suggested carrying over this color scheme to the dependencies icons, for continuity.

One user pointed out the more **custom requirements of some artworks** in the ArtBase—those which are not solely web-based, or require emulation to be accessed: "My concern is with artworks in Rhizome's collection which are not web-based, and how these would fit in. For example, the record for I/O/D's Web Stalker in the ArtBase is a link out to a website where the artwork software can be downloaded. The dependencies for this work are not the same as the link health for the website, but rather are the system requirements for the software program. I wonder if this kind of information could also be captured and displayed somehow? There would be a similar issue for emulated artworks. You can describe dependencies in terms of either the health of the emulated version as something running in the browser, or in terms of the execution environment required by the original version." This is an important concern and can be addressed by expanding the dependencies categories and moving away from the concept of "link health" towards the more general "access state".

Another user commented on the terminology used in the variant links: "I found the terms **'archival copy'** and **'webarchive'** a bit ambiguous. I was unsure

what the difference between the two was, until I read the descriptions under the Provenance section of metadata.” This point echoes some comments from the first workshops and in response, Version 3 of the prototype changes its approach towards a visual (iconographic) representation to avoid terminological confusion.

## Metadata section

As with the previous workshop, users commented on the lack of “**medium**” metadata. One user commented that: “Website seems like a very broad descriptor” when they encountered it in the metadata field “Artwork type”. They suggested that: “‘Artwork type’ be substituted with ‘Artwork category’, then drilled down one further level to provide more specific detail about the media that constitute the artwork and the techniques used to create it (perhaps originating from statements P77-P81 of the property index).”<sup>13</sup> Elaborating further, this user explained: “I am thinking about its material, tactile, visual, or functional properties, i.e. a basic description of the format. Is it an animation, a performance, a video, does it use photographic elements, drawn lines?; what software was used to create it?; what browser environment was it produced within?”.

Another user commented along the same lines: “As a curator I’d be interested to know **display requirements**—which support technologies are needed and any other specifications, such as [programming] language”. Another user added a further comment from a **conservation** perspective: “It would be useful in conservation to have more technical metadata if it was ex-tractable from the database or the instance of an artwork, like the dependencies etc.”

## Provenance

The question of what constitutes a work’s “**provenance**” and whether the term was used appropriately in the interface of the prototype, proved divisive among this group of users. Differences of interpretation were particularly strong between users who came from a museum background, or worked in museums, vs users from an archival background.

Several users found the proposed use of the term provenance problematic in relation to net art, because they associated it with ownership history and they couldn’t see how that could be related to net art when ownership online means something very different. One user commented that the purpose of provenance for museums was largely to prove the legitimacy of the artworks, i.e. that they were “not forged and not retrieved from grey/black market and not stolen from a colony etc.” and they felt this had no relevance to net art. Another user commented that: “provenance typically describes the way a specific piece of work

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<sup>13</sup> While browsing the Wikibase UI in Exercise 1, users were also encouraged to refer to the index of all available properties in Wikibase, to get a better sense of the current data structure of the archive.

has come into a collection. Documenting this journey is the basis to validating the authenticity of an artwork.” A further user expressed similar sentiment: “Although I do understand where you are coming from, I am still not quite sure if the expanded use of ‘provenance’ works for me... Within a museum, art history and art market context, provenance is strongly associated with ownership history.” However, these users also felt that preserving archival actions was important, and so it needed to be described, but by a different title. One suggestion was **“preservation narrative”**.

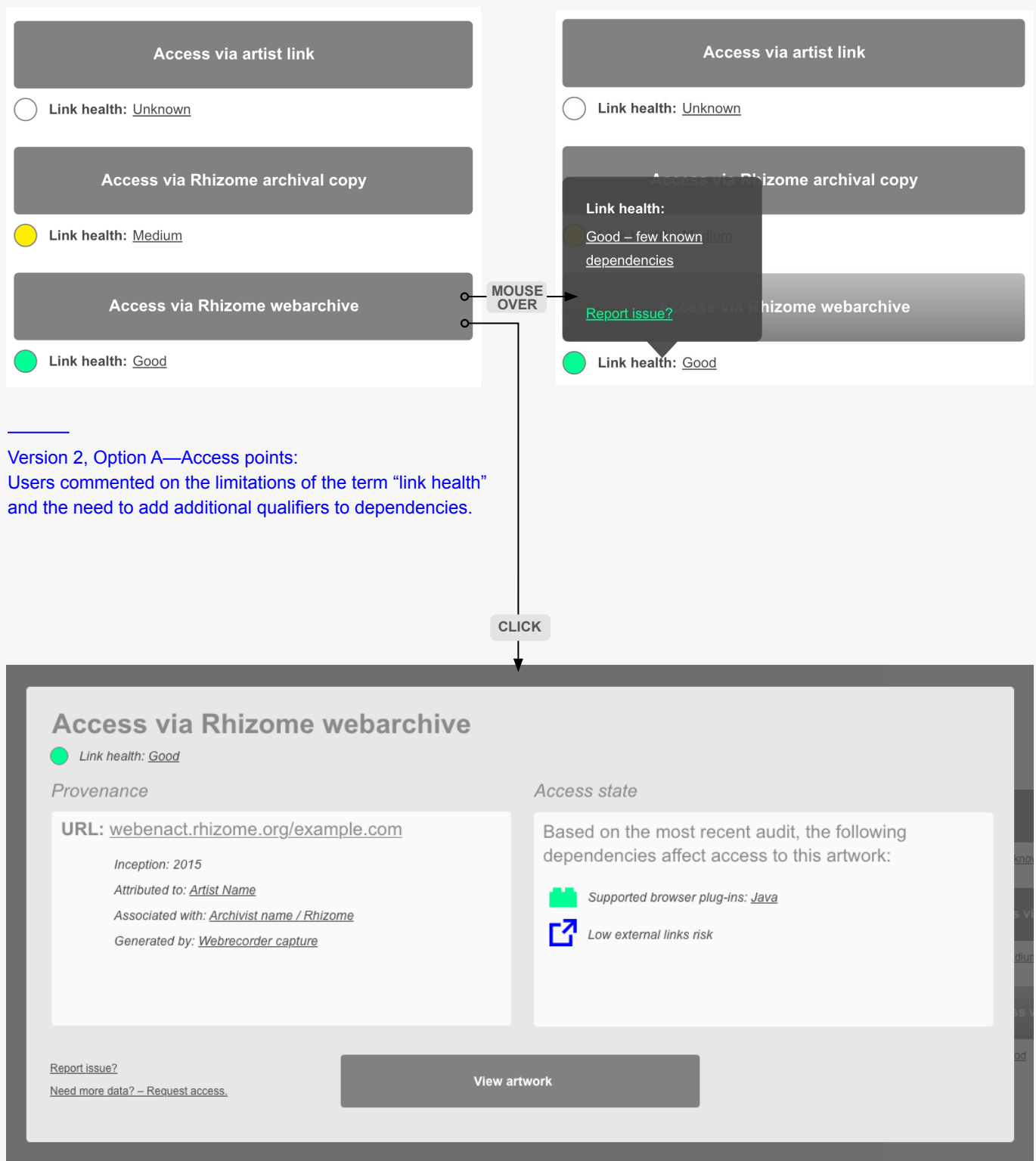
Users from archival backgrounds were more open to the current proposed use of provenance. One user observed that: “I consider the following statements to be part of a record’s provenance data: ‘artbase legacy id’; ‘collective access legacy id’; ‘ca id; inception’; ‘date of accession’. These statements relate to individuals’ actions concerning the object: something done, by someone, at a specific point in time. To ensure authenticity, I think it is critical to include these data. My sense is that for digital art, it is particularly important to document curatorial/ archival actions. The actions and decisions associated with capture/migration/ emulation come to define the object accessed by an end user, and therefore should be recorded and explained.” They quoted archival theory as a source for using “provenance” in this context and mentioned that in archival theory, provenance statements can be conceptualized as connections to either a creator/ creating body or **connections to context/ activities in context**. This user also commented that this understanding was also applied in their group’s mockup from Exercise 3 and noted the similarity between their mockup and the prototype presented for testing: “we envisaged the concertina structure for provenance data as similar to that used in the prototype, where a sequence of actions, associated with a series of individuals and anchored to particular moments in the timeline, were readable as **a plotted history of the object’s active and archival lifespan**.” (See mockup image on [p.46](#))

Another user with archival background also observed that: “I would personally refer to all dates (e.g. creation, accession) and process information (e.g. variant lineage) as provenance data.” However, one of the conservation professionals in the workshop mentioned that they think of provenance as only the actions that have been taken around an artwork’s creation time—before it entered the archive. The actions taken to preserve the work are considered **preservation actions** within their cultural institution.<sup>14</sup>

All of these observations informed the decisions how to develop the conceptual and practical application of provenance data in the next iteration of the ArtBase prototypes.

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<sup>14</sup> For a more detailed discussion of different definitions of the term provenance and how it is used across different disciplines, or schools of practice within a single discipline, please refer to the PhD thesis accompanying this project, Part III, Chapter 7.



Version 2, Option A—Access points:  
Users commented on the need to only display metadata related to access in this overlay state.

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# Evaluation I: Individual sessions, October 2018

There was significant interest in both workshops, but some users couldn't attend in person, a number of additional remote sessions were conducted in which users were asked to explore the prototypes and give feedback via unstructured interviews. These sessions were conceived as part of the Evaluation Phase of the design process, rather than Design Exploration, because they were more reflective and involved less hands-on involvement by the participants. Instead, these sessions offered opportunities for more in-depth conversations that could reflect on the workshop proceedings as well as on the iterative development of the prototype versions following the workshops. This section summarizes some insights from these evaluation sessions.

## Artwork access points

Several users thought that **“link health”** was a potentially confusing term and one user suggested using **“access state”** instead. One user pointed out that the way **“link health”** is defined may also be problematic—they felt that **“few”** or **“many”** dependencies is inaccurate, because artworks always have dependencies. They suggested that dependencies could better be described as supported/unsupported, or damaged/restored.

Other users also felt that **“archive copy”** / **“webarchive”** are unclear terms. One user suggested simply using **“variant”** instead, and to use a numbered list: variant #1, 2, 3, etc, and to use URLs to distinguish individual variants.

One user questioned the division between **“Provenance”** and **“Access state”** in the intermediary access state overlay. They suggested that some of the provenance information may be better suited to the access state area instead, e.g. **“generated by”**. They commented that they preferred to see only information directly related to **“access”** in that intermediary state.

Another user requested a clearer distinction between **dependencies for the artwork** and **dependencies for the reperformance environment**. They questioned if there might be a better way of specifying how a user's own browser settings might affect the artwork reperformance, for example.

Metadata

Close

Descriptive data

Artwork type: Website

Archival status: Cloned; Webarchived;

Tags: sample tag; sample tag; sample tag; sample tag; sample tag; sample tag;

Submitted via open submission

Tags: sample tag; sample tag; sample tag; sample tag; sample tag; sample tag;

Added by Rhizome

Administrative data

Date of accession: 19 Jun 2002

License: CC-BY-SA

Provenance

Artist link: www.example.com

Rhizome archival copy: archive.rhizome.org/example.com

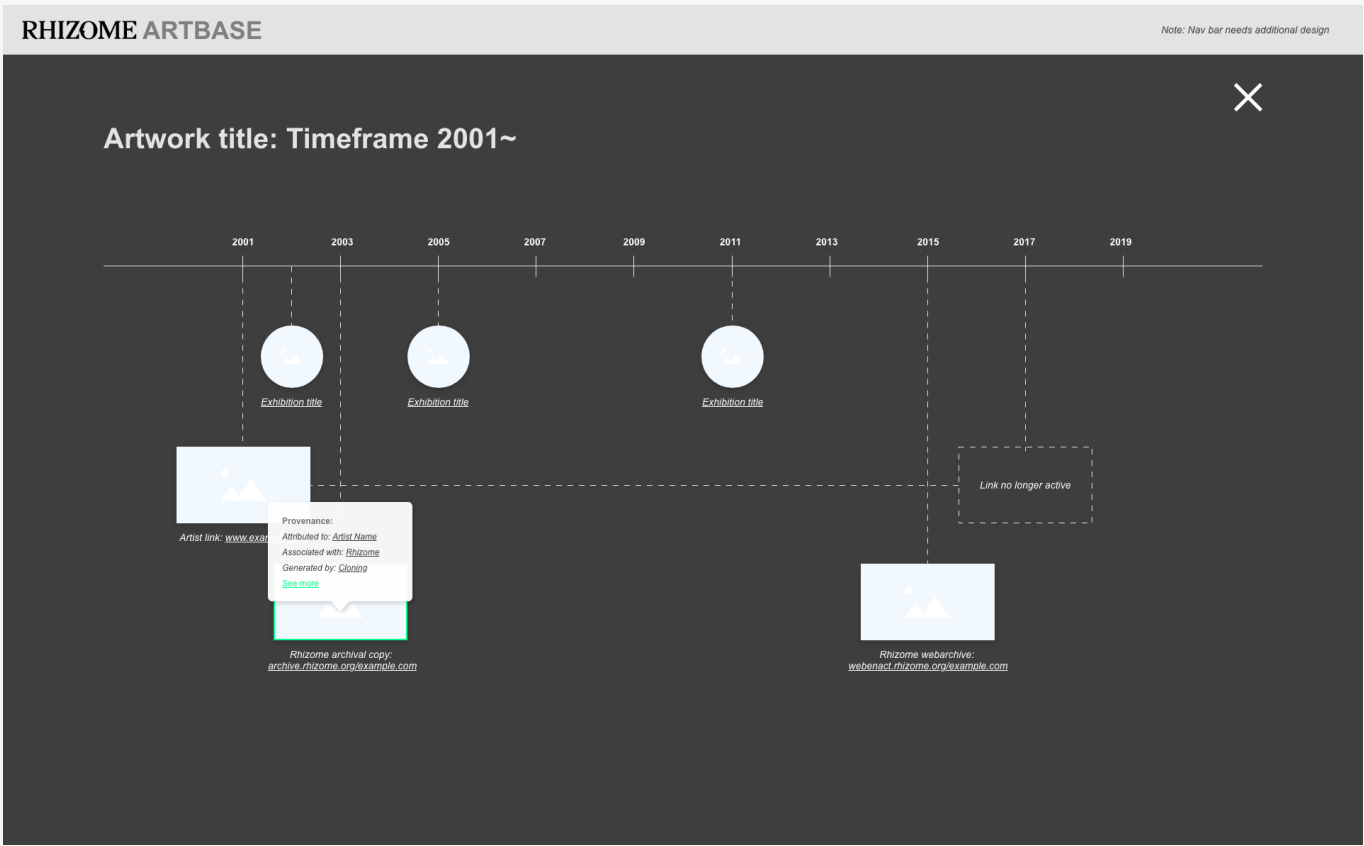
Rhizome webarchive: webenact.rhizome.org/example.com

Need more data? – Request access

Download metadata record

RDF
JSON

Version 2—Metadata section:  
Users questioned the use of the term provenance here (left), and suggested it would be more suitable in the timeline visualization (below).



Finally, several users proposed that a **glossary of special terms** such as “archive copy” or “webarchive” would be useful, and in addition it would be useful to be able to quickly reference definitions directly from the artwork record page (e.g. as a tooltip on mouse-over).

## Metadata section

One user suggested that “**artwork type**” should be replaced with “**medium**”. Meanwhile, another user felt that “artwork type” was a better category than “medium”, but perhaps not specific enough and suggested “**artwork platform**” or “artwork platform type” as other possible options. This user thought that if there was a “medium” category, it should be more technical, e.g. describing a video game made with Unity vs other software.

Users also commented on the use of “Provenance” as a theme for grouping some metadata. Some did not think it was suitable, as it tended to be a contested term across disciplines. Several suggested “**Preservation history**” instead.

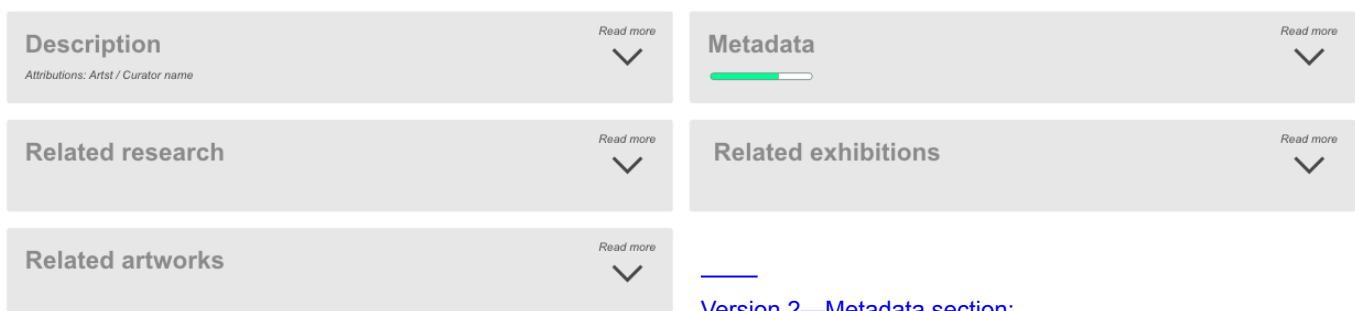
## Visualizing relationships

Most users commented positively on the related artworks visualization and the timeline. But a few, thought that the “**provenance**” **mouse-over state** was more appropriately used in the timeline view than in other places in the prototype.

One user commented that the **timeline** feature was very useful and represented something that other museums tend to “ignore, or don’t want to acknowledge, or don’t know how to represent—the idea that the artwork is not a fixed entity.”

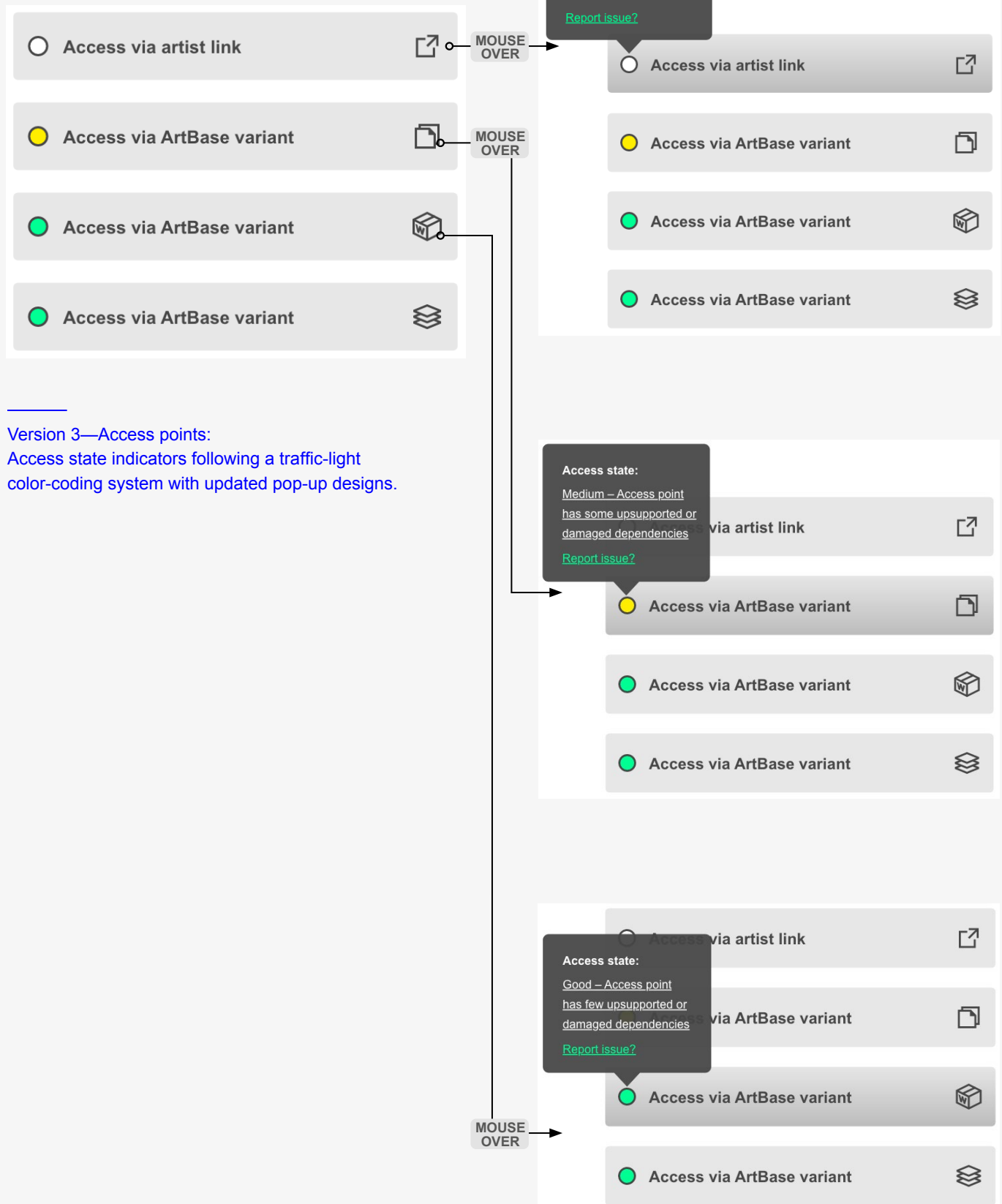
Another user commented that it might be useful to map **related artworks based on time periods**, and again represent these relationships via a timeline visualization.

Some users noted that “**research**” and “**exhibitions**” should not be prefixed with “related”, as it implies that the relationships are indirect. They proposed “**citations**” as an alternative to research or publications.



Version 2—Metadata section:

Users suggested removing “related” from the sections on research and exhibitions; they also preferred “citations” to “research”.





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# Version 3: November, 2018

The design process for Version 3 included first consolidating the feedback from user testing sessions with Versions 1 & 2 and then applying the actionable points into one new version for testing.

## Artwork access points

### Access buttons

Some of the most significant updates in this version relate to the artwork access points. After user testing pointed towards the direction of the traffic-light color-coded system vs the green bar system for access indicators; Version 3 prototype aims to improve on the implementation of the “traffic-light” system. The symbols are now integrated into the design of the access buttons themselves, making the access button closely connected with the message communication by the color (red, yellow or green). This update responds to feedback from users, who interpreted “link health” as relating to links within the artwork, rather than the artwork access link itself. This results in a shift in terminology and layout. As well as integrating the “traffic-light” symbol more closely with the access button, the terminology is updated from “link health” to “access state” following consultation with users.

Furthermore, the previous use of terminology to differentiate between distinct types of variants was unclear to most users. In Version 3, the only differentiation in terminology is between “artist link” and “ArtBase variant”. Variants can still be multiple, therefore a set of icons is developed to indicate the form of the variant. The artist link access point is indicated by an “external link” icon. ArtBase variants can be (1) cloned file copies, (2) webarchives, or (3) emulated variants (among others). These common types are indicated by (1) a generic symbol for copying (two overlaying rectangles); (2) a WARC file icon (as developed by the Webrecorder team); (3) a more abstract symbol of stacked rhomboids, suggesting the emulation stack. Further icons can be developed as new forms of variants become part of the ArtBase.

### Pop-ups and overlays

In keeping with the findings from the test with Version 2 Option A, this version retains both the pop-up mouse-over feature and the intermediary overlay state as ways of further explaining the “access state”.



Version 3—Access points:  
Intermediary overlay access state designs.

The pop-up hover state is the same as in Version 2 Option A, except that “access state” replaces “link health”, and the dependencies are specified as unsupported or damaged.

When users click on the access button they access the intermediary overlay state. This state is redesigned from Version 2 to accommodate user feedback. It is made more succinct. Labels such as “Provenance” and “Access state” are removed. All the information in the overlay box is intended to relate to the access state—this is the level of detail users considered most useful at this stage and further metadata is provided in the metadata expandable element. Users were confused by “Provenance” in particular and felt that their understanding of the concept either didn’t match the information that was provided in the metadata beneath “Provenance”, or that the place for such metadata was not in the box that is supposed to relate to access. Attribution metadata is also removed, as potentially superfluous and repetitious, since all artist links can be attributed to the artist, and all Artbase variants—to Rhizome. A more detailed level of attribution is included in the metadata expandable element.

The information that is included in the new overlay state box is structured in a single column and covers the following: *access URL*; *access state* (repetition from the pop-up, but placed here in case the user is on a device without mouse-over states or simply skips the mouse-over state by clicking the access button quickly); *generated by*; *archival plan* (if applicable); *reperformance platform* (if applicable); and finally—*dependencies*. Dependencies follow the same format as they did in the previous versions, but the color scheme of the icons is updated. Users in the previous tests indicated a preference for a consistent traffic-light color scheme and this version provides that, with the intention to test further. Other interaction patterns include the “Report issue” button and the “View artwork” button.

## Description, expandable element

This element has several structural changes in this version.

The provenance labeling of the descriptive text has been made consistent with how such metadata is represented elsewhere on the record page. The process of creation of the text is labeled as “generated by” and the accompanying “generation activity” is styled as a hyperlink, so users can click to find out more. Attribution is provided alongside this information below each section of descriptive text (there could be multiple texts associated with each work, each attributed to different sources or processes of generation).

Furthermore, the “Tags” element has been transferred to “Description” from the “Metadata” expandable element. Following feedback from users, tags are consolidated under one heading for brevity, but they are still separated into two sub-groups, with appropriate attribution. The term “legacy” is added to the

## Description



Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam ut tortor nibh. Mauris dapibus tortor eu felis consequat, quis maximus justo dictum. Curabitur elit neque, fringilla ac ullamcorper sed, molestie ac sem. Integer ligula lectus, ultrices at ante at, aliquet commodo nisl. Duis cursus eros non justo finibus sollicitudin. Curabitur in mollis mauris. Fusce vel odio tristique, pellentesque mauris at, vestibulum odio. Phasellus ultrices turpis justo, laoreet maximus neque auctor a. Phasellus pharetra ligula lobortis, volutpat nisi et, vehicula tortor. Aenean semper ipsum ut dolor iaculis tempor consequat at risus.

Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Morbi ultrices arcu sit amet orci luctus, ac lobortis est placerat. Curabitur mollis odio eget commodo hendrerit. Proin nisi massa, hendrerit non dictum a, sollicitudin non urna. Duis auctor ac massa in facilisis. Interdum et malesuada fames ac ante ipsum primis in faucibus. Praesent risus urna, mattis non finibus in, ultricies sed lectus. Suspendisse sit amet dolor nec metus imperdiet euismod eget at felis. Ut sem mi, posuere sit amet ultrices sed, blandit a dolor.

Attributed to: [Author name](#)

Generated by: [Open submission](#)

Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Morbi ultrices arcu sit amet orci luctus, ac lobortis est placerat. Curabitur mollis odio eget commodo hendrerit. Proin nisi massa, hendrerit non dictum a, sollicitudin non urna. Duis auctor ac massa in facilisis. Interdum et malesuada fames ac ante ipsum primis in faucibus. Praesent risus urna, mattis non finibus in, ultricies sed lectus. Suspendisse sit amet dolor nec metus imperdiet euismod eget at felis. Ut sem mi, posuere sit amet ultrices sed, blandit a dolor.

Attributed to: [Author name](#)

Associated with: [Rhizome](#)

### Legacy descriptive tags:

sample tag; sample tag; sample tag; sample tag; sample tag;

Attributed to: [ArtBase users](#)

Generated by: [Open submission](#)

sample tag; sample tag; sample tag; sample tag; sample tag;

Attributed to: [Rhizome](#)

Version 3—Description, expandable element:

Provenance information for sources is standardized with other metadata areas in the prototype; Tags are added here as plain text.

“

As an ArtBase user, I want to see **metadata about themes or subjects** in the archive, so that I can gain an overview of what types of things are present in the collection.

“

As an ArtBase user, I want to see a **list of all tags** used in the archive, so that I can gain an overview of what types of things are present in the collection.

“

As an ArtBase user, I want to filter artworks by **keywords or categories**, so that I can gain an overview of what types of things are present in the collection.

“

As a researcher, I want to see **keywords and categories**, so that I can find my way into a large collection by narrowing it down in terms of **timeframe, media, etc.**

User story cards which relate to users' habits of using tags or thematic categories to browse archives (see Report #2, pp.34-35)

category “tags”, as during discussions with users, it became clear that users have different expectations of “tags”, which are a widely-used interaction pattern..

Many users thought that tags should aim to provide useful categorization of themes, genres, movements, storage mediums, programming languages, etc, which would allow users to browse the archive via such terms (see sample user stories to the left). In reality, the tags collected by Rhizome vary widely: some were added by the artists themselves, others were added by users—as a form of folksonomy – in the mid ‘00s, others were added by Rhizome staff with the intention of providing a more formal categorization. The final result is a wide-ranging mix of approaches and philosophies about what tags should or shouldn’t include, and how they can facilitate browsing of the archive. For now, it is not practical to make all the numerous and heterogeneous tag terms individual and clickable nodes in the linked data database. Therefore, in these prototypes they are treated as natural language text (i.e. they are not clickable), and are preserved purely as historical evidence—a testimony to previous forms of organization and description extant in the ArtBase.

By using the term “legacy tags” in the user interface, the message to users is that these tags are not functional nodes for navigating the collection, but simply historical, descriptive keywords. Ideally, tags will remain searchable (as keyword text) via the general Wikibase search box. But they need not be used in any other formal, structural way in the database and need not be queryable via the SPARQL endpoint. The choice not to implement what users suggested in the user stories is deliberate, as there are other ways to support browsability in a linked data archive; they are simply not so wide-spread and familiar among users. However, one of the tasks of the prototypes is also to change this, and help users become acquainted with new and unfamiliar user interaction patterns.

Finally, some users questioned the heading “Description”, asking instead, if the text could be labeled “artist statement”.

While in many cases, this might indeed be more appropriate, this particular metadata element has been referred to as “description” in previous iterations of the ArtBase interface. What is more, there are often several descriptive texts associated with each artwork in the ArtBase, and so a generalized label is appropriate here, with the addition of metadata to differentiate between different types of descriptions (e.g. artist statement, curatorial summary etc) being a further option for the future.

Metadata richness:  
Poor – many missing  
statements

[Can you contribute?](#)

Metadata richness:  
Medium – some missing  
statements

[Can you contribute?](#)


Metadata richness:  
High – few missing  
statements

[Can you contribute?](#)


**Metadata**



**Metadata**



**Metadata**


Version 3—Metadata richness indicators and pop-ups


**Metadata**


*Descriptive data*

**Title:** Artwork title

**Artist:** Name Surname

**Collaborator:** Name Surname

**Software developer:** Name Surname

**Artwork type:** Website

*Administrative data*

**Date of accession:** 19 Jun 2002

**License:** CC-BY-SA

Version 3—Metadata, expandable element:  
Expanded top section with descriptive and  
administrative data.

## Metadata, expandable element

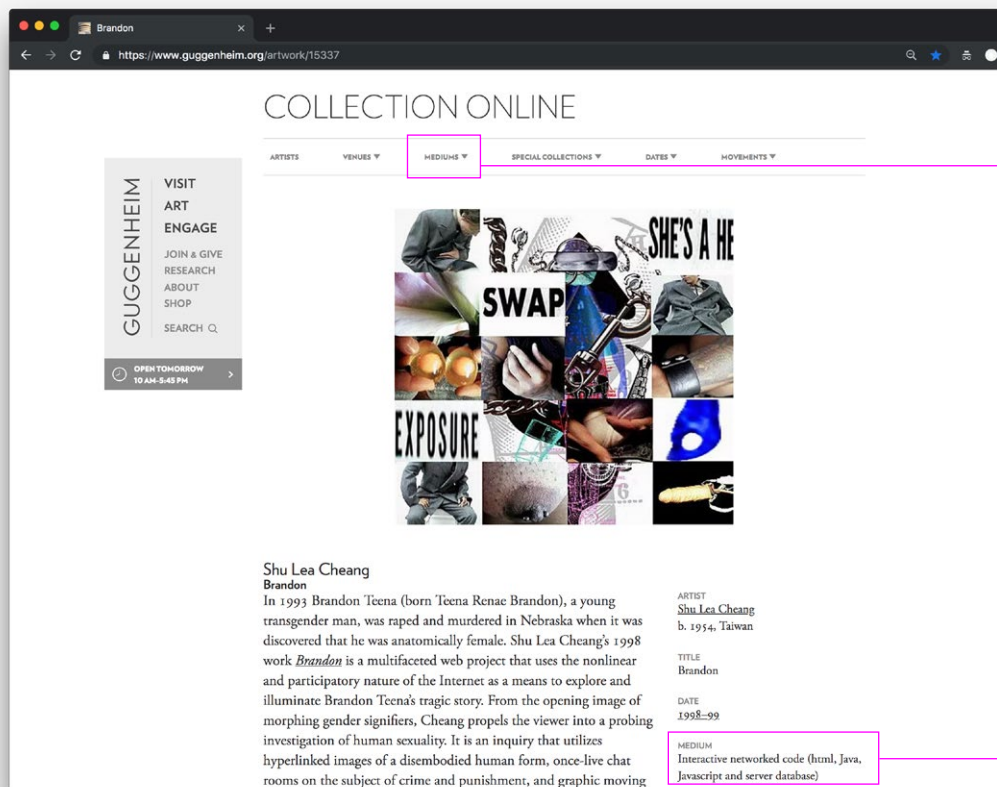
There are several updates in the metadata element as well. First, the visual indicator for metadata richness visible in the collapsed metadata element is updated to match the artwork access state indicator (circular button) more closely. This consistency aims to make the interpretation of the indicator clearer, but needs to be tested. Instead of using a fully-filled circle of color, this indicator is split into a pie-chart with different degrees of “fullness” indicating different degrees of metadata richness. This change in the approach to color aims to differentiate access state from metadata richness—these are different concepts, even though they are both indicated by a similar graphic symbol. Furthermore, unlike the access state, which could be fully broken (red) or fully functional (green), metadata richness represents a continuum. There will always be at least a minimum amount of metadata statements. Equally, there will never be completely “full” metadata, because data can always be enriched if further research is conducted or new restoration work undertaken. To that end, the visual symbol of the pie chart will move between  $\frac{1}{4}$  full and  $\frac{3}{4}$  full (poor, medium and high richness), but it will never be less than  $\frac{1}{4}$  or more than  $\frac{3}{4}$  full.

Once the metadata element is expanded, the metadata groupings are similar, but with some terminology changes.

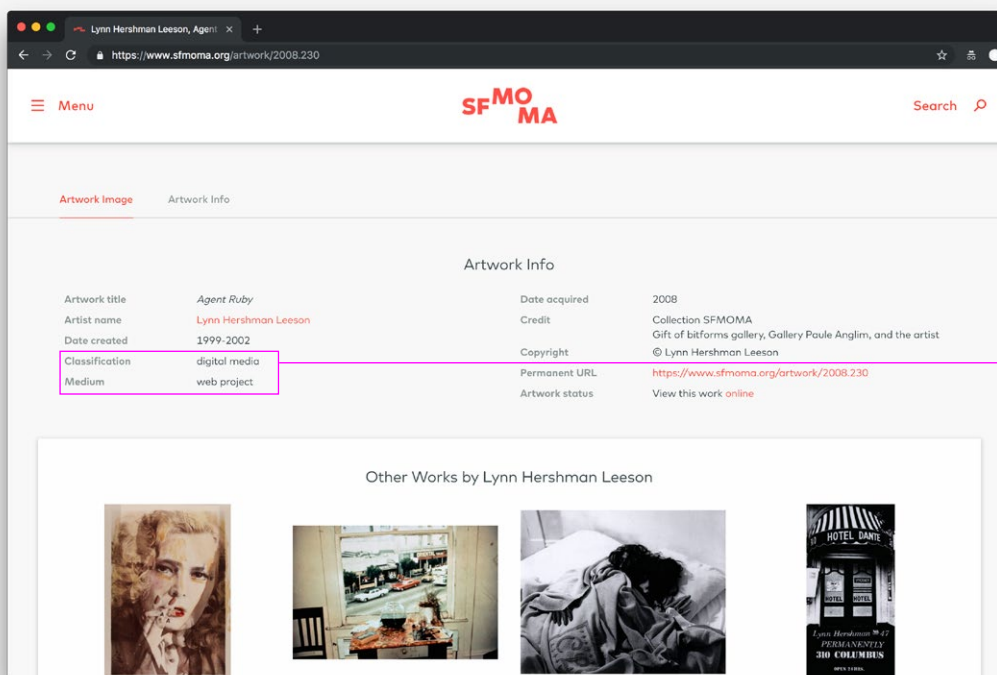
### Metadata groupings

The “Descriptive data” group has been updated following user feedback. Firstly, the artwork title and artist name are repeated. This repetition was suggested by some users, as once expanded, the metadata element fills the whole screen and obscures the information visible higher up on the page. While perhaps not relevant in all use cases, repetition of metadata can be helpful for casual browsers who move across artworks quickly and may need reminders, at various points, of where in their journey they are.

Furthermore, this repetition can be useful in cases where there are multiple collaborators associated with an artwork, although one individual may claim the largest contribution towards the work and therefore be attributed the title “artist”. With complex digital artworks, there are usually collaborators involved who perform specific tasks such as programming or animation, etc. While this is not always recorded, wherever possible the database should retain information about what these collaborators’ respective roles are, as that may be crucial for future preservation work. This is why the data model is designed to accommodate multiple actors associated with an artwork, while at the same time being able to designate very specific roles to each person, such as “artist”, “developer”, “animator”, etc. Including the artist name again in this descriptive metadata section provides the right context to also present additional information about collaborators, if and when available.



The Medium filter at the top of the Collection Online page for the Guggenheim museum allows filtering for "Internet Art". On each artwork page, users get a different, more detailed value for "Medium". (Screenshot: 2018)



In the SFMOMA online collection site there is a classification for digital media, and the medium for individual works is "web project". (Screenshot: 2018)



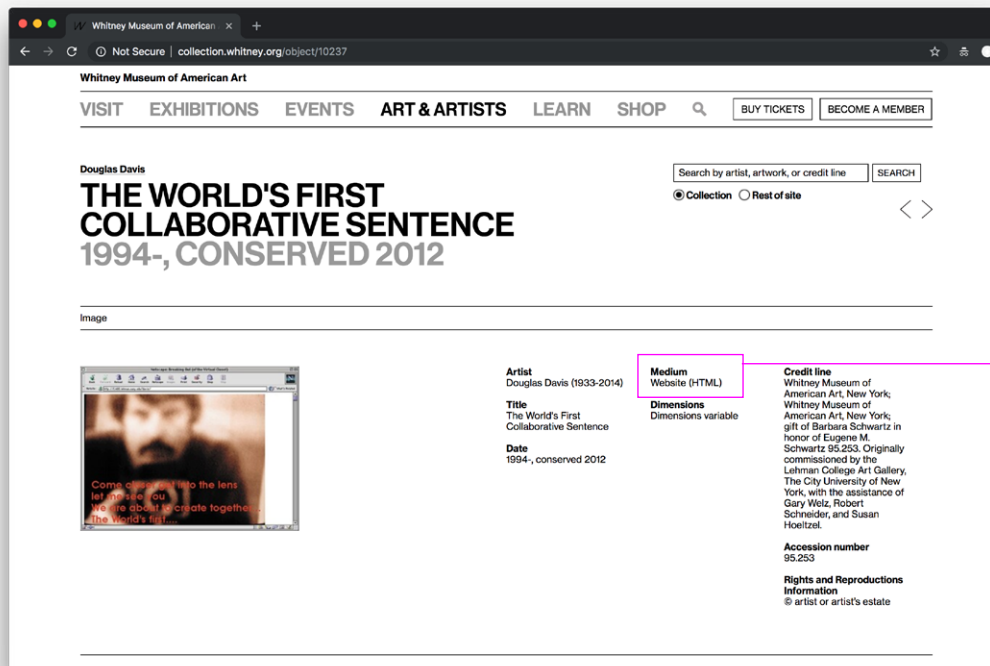
## Artwork type or Medium?

Next, the category “artwork type” was questioned by some users and the term “medium” was suggested instead. “Medium” was considered a more conventional term used in museum collection websites. This prompted a more thorough investigation of how the term medium is currently used by museums in relation to born-digital art, and net art specifically.

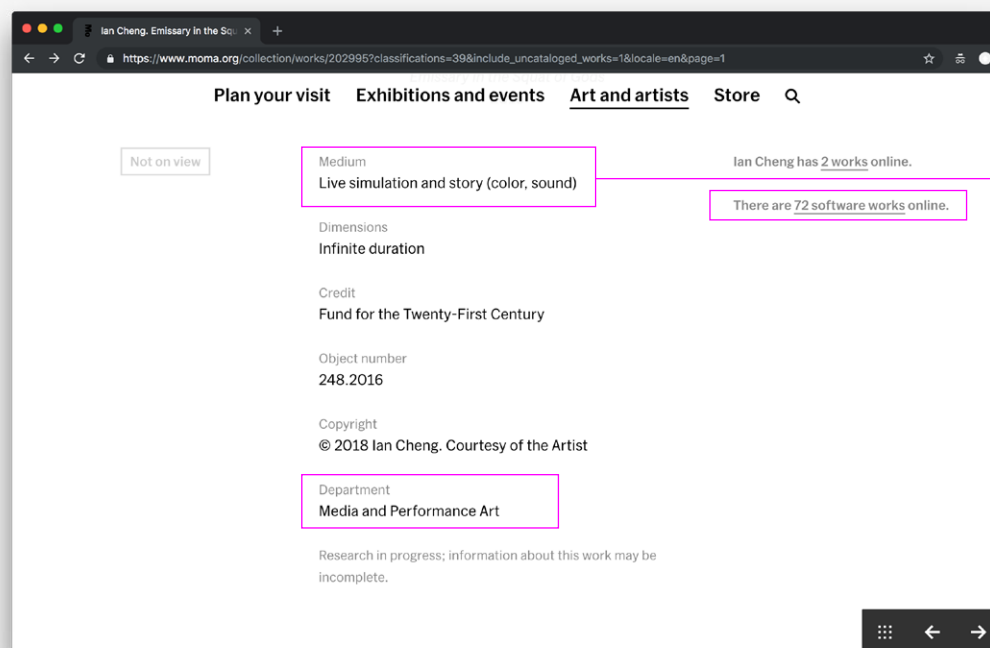
Of the few museums that have such collections, the Guggenheim use a filter titled “Medium” to separate all the artworks which can be categorised as “internet art”. Drilling further into their artwork records, reveals a separate “medium” metadata element used in conjunction with relatively specific values such as: “interactive networked code”, plus associated programming languages in brackets. SFMoMA group their works under “Collection area: media arts”; then they use a further classification of “digital media”; and finally “medium” is simply stated as “web project”. The Whitney only have one internet artwork in their collection (despite a large number of commissions, which are not classified or catalogued as collection items, as of 2018). Their artworks’ “medium” is identified as “website (HTML)”. Finally, MoMA’s catalogue shows artworks grouped by categories such as “website” or “software”. The “website” artworks have “medium” specified as “interactive software”—which would be far too general to be of any use as a distinct category in the ArtBase. Some artworks from MoMA’s collection classified under “software”, were made by artists included in the ArtBase and could also be considered net art. Their “mediums” range from the specific: “C++, OpenGL, Java, MySQL, touch-screen monitor”; to more general classifications such as: “digital files” or “video game software”.

What all this points to is that “medium” is not treated equally by different museums, or even used consistently within the same collection. During user testing sessions, many users expressed interest in knowing the medium of artworks. What they usually seemed to refer to as medium tended to be quite specific: programming language(s) or software environment(s) used to create the work (e.g. one user provided the example of “Unity” for video game software). Such information could be useful for some ArtBase artworks, but has not been gathered consistently for all works. There are also further concerns with regards to the temporal and performative characteristics of net art—medium in the sense of programming language or environment may not be consistent throughout the artworks’ lifecycle and more recent, or archived, or emulated variants may have different technical specifications.

In terms of classifying artworks in the ArtBase under a global category, broadly they can all be considered net art or internet art works. The way “artwork type” has been used since the first prototype (Version 1) aims to differentiate net art works on a high level – e.g. software application, video game, social media performance, online video, etc, with the predominant type being simply “website”. This concept is retained in Version 3. This will need further testing once users can see more records with real data. They will then be able to judge the effectiveness of using the “type” category vs a category such as “medium”.



Medium on the Whitney Museum website is specified as "Website (HTML)". (Screenshot: 2018)



In MoMA's online collection, software artworks have various medium descriptions (some quite specific, some less so). Software works are classified under the Media and Performance Art Department. (Screenshot: 2018)

There is also one particular edge-case: some artworks are present in the archive only in the form of documentation. For example, when an artwork was conceived as a durational performance and then for technical or conceptual reasons the link which the artist submitted to the ArtBase is a link to a website which provides only documentation (text description, images, video) of the artwork, but is not the artwork per se. In this case, the “artwork type” might be “performance” or something even more specific, but the variants listed within the artwork record, might also have “variant type” specified, which could be denoted as “documentation”. Once again, the effectiveness of this proposition will need to be tested after the prototypes are populated with real data.

Further changes in the “Descriptive data” grouping include removing the “archival status” element, which didn’t seem to be meaningful to users, while the provision of detailed information associated with each variant was considered enough. Tags were removed and transferred to the descriptive expandable element instead, as outlined above.

The “Administrative data” grouping remains the same.

### Preservation history data

The final metadata grouping, which was titled “Provenance” in the previous two prototype versions is now retitled to “Preservation history data”. This is a title several users suggested (at different sessions). It is also consistent with the way some museums are attaching metadata to their complex born-digital collections.<sup>15</sup> While not as specific as “Provenance”, this title is flexible and can encompass a range of associated metadata. As one user put it: “this section covers all you need to know to preserve the artwork” (see [p.70](#)). This includes information on all available variants (which can also be expanded or collapsed). A further reason to move away from “Provenance” is that the intention to implement the PROV model into the Wikibase structure spans across different groupings of metadata, some statements associated with “Descriptive” or “Administrative data” could also be considered within the remit of artwork provenance. Therefore, in this latest version, while provenance is still the conceptual backbone of the data model, it is not a term used in the frontend user interface as a title to group metadata statements.

Once the individual variant metadata “accordion” elements are expanded, the user will see some data, which can be modeled as PROV statements, such as “inception”, “generated by”, or “associated with”<sup>16</sup>. There are additional statements which can be useful from a preservation standpoint, such as “variant type”—this can be “documentation” or “video”, rather than simply “artwork”—or “access state”. The latter is a repetition of the access state indicated in the artwork entry point buttons, but it can be useful to be made visible in this

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<sup>15</sup> For more information on how MoMA conservators are using terms like process history and preservation metadata with regards to their time-based media collections, see Griesinger (2016).

<sup>16</sup> For a full description of the implementation of the PROV model, refer to the PhD thesis accompanying this project, Part III, Chapter 7.

## Preservation history data

**Artist link:** [www.example.com](http://www.example.com)

Inception: 2001

Variant type: *Documentation*

Access state: *Unknown – access point has not been audited by an archivist*

Generated by: *Open submission*

Active: 2001 – 2017

Interaction input: *Computer keyboard: Mouse*

**ArtBase variant:** [archive.rhizome.org/example.com](http://archive.rhizome.org/example.com)

Inception: 2003

Access state: *Medium – access point has some unsupported or damaged dependencies*

Generated by: *Cloning*

Associated with: *Rhizome*

Archival plan: *Partial reconstruction*

Browser plug-in: *Java*

External media: *Damaged*

External links risk: *Medium*

Interaction input: *Computer keyboard: Mouse*

**ArtBase variant:** [webenact.rhizome.org/example.com](http://webenact.rhizome.org/example.com)

Inception: 2015

Access state: *Good – few known dependencies*

Generated by: *Webrecorder capture*

Associated with: *Rhizome*

Archival plan: *Exclusion of external links from capture*

Re-performance platform: *Webenact*

Browser plug-in: *Java*

External links risk: *Low*

Interaction input: *Computer keyboard: Mouse*

Interaction notes: *[Read notes here](#)*

**ArtBase variant:** [eaas.rhizome.org/example.com](http://eaas.rhizome.org/example.com)

Inception: 2017

Access state: *Good – few known dependencies*

Generated by: *Emulating cloned copy*

Associated with: *Rhizome*

Re-performance platform: *Emulation-as-a-Service*

Environment: *Windows 98*

External media: *Damaged*

External links risk: *Medium*

Interaction input: *Computer keyboard: Mouse*

Interaction notes: *[Read notes here](#)*

Version 3—Metadata, expandable element:  
Expanded section with preservation history data.

collected data context, as well. Other statements which can be made visible here include “archival plan”, another statement part of the PROV model. It aims to give further detail to the generation process and can be linked to specific activities, such as “Exclusion of external links from capture”, for example. In this version, there is also a “Reperformance platform” statement, which describes variants accessed via the Webenact or EAAS platforms.

Crucially, this version of the prototype introduces software dependency statements in the metadata area. Each dependency is presented as a separate statement to improve interoperability for querying the database. A final set of six dependency areas were identified, in discussion with archivist Morgan McKeehan and following the data available in her audit of the ArtBase:

- ▶ Environment (could be a complete server or client environment or a single application)
- ▶ Browser plug-in
- ▶ External media
- ▶ External data services
- ▶ External links risk
- ▶ Internal resources

The constraints for the possible values associated with each of these dependency statements are listed in the full data model presented in the portfolio website.<sup>17</sup> Several additional statements relating to interaction dependencies might be added if/ when necessary, for example “interaction input” relates to the device necessary for interaction with the work, while “interaction notes” provide additional instructions to users in plain text.

Finally, as in the previous prototype versions, the metadata area offers users the option to either request access to further data or simply download a data dump.

## “Related” expandable elements

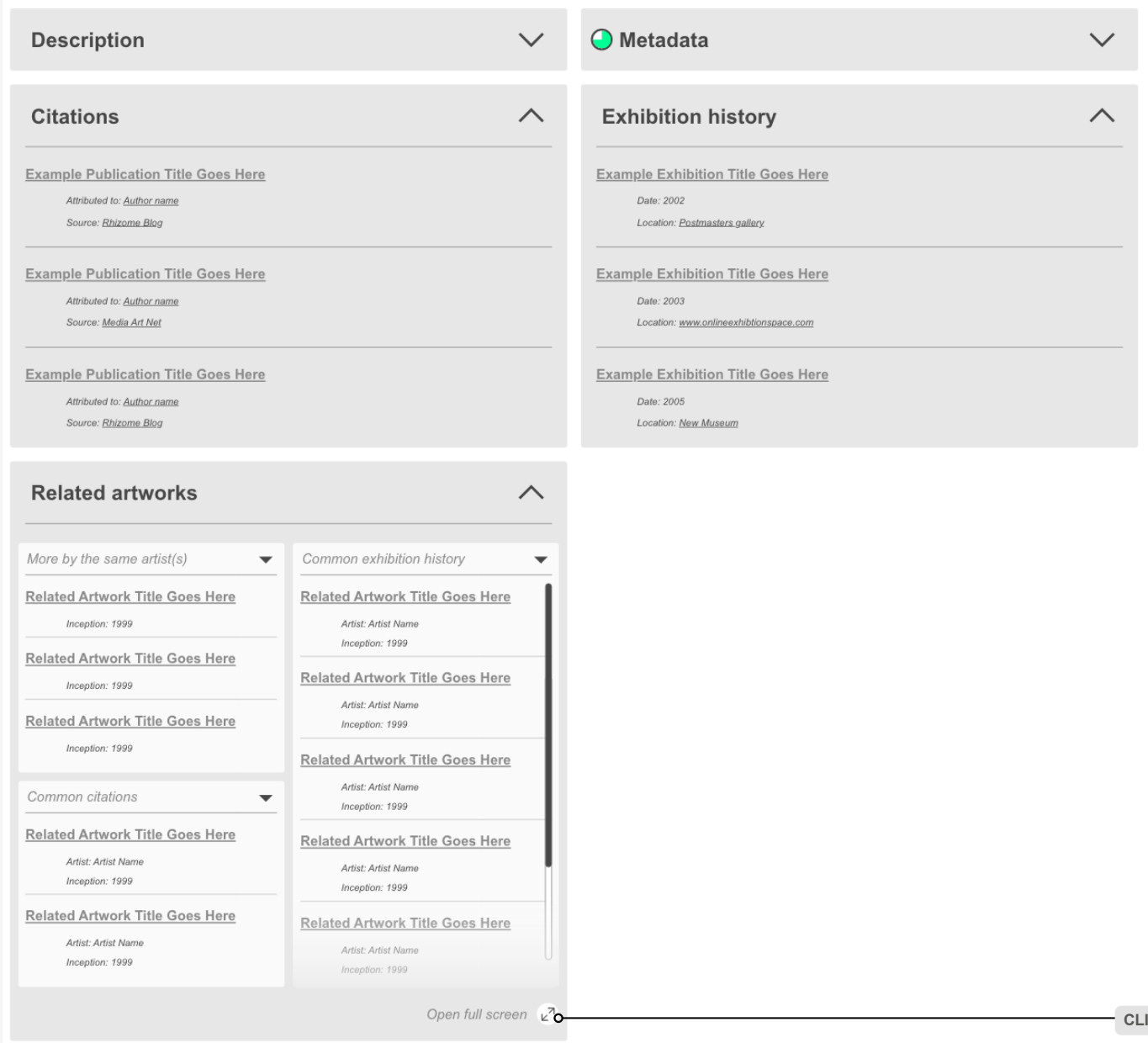
The exhibitions and citations expandable elements remain largely unchanged from previous versions, except for their titles, which have been updated following user feedback. Some users proposed that the order of elements be adjusted, with exhibition history and citations last on the page below “related artworks”. This proposition will be tested with the final web-based prototype.

### Related artworks

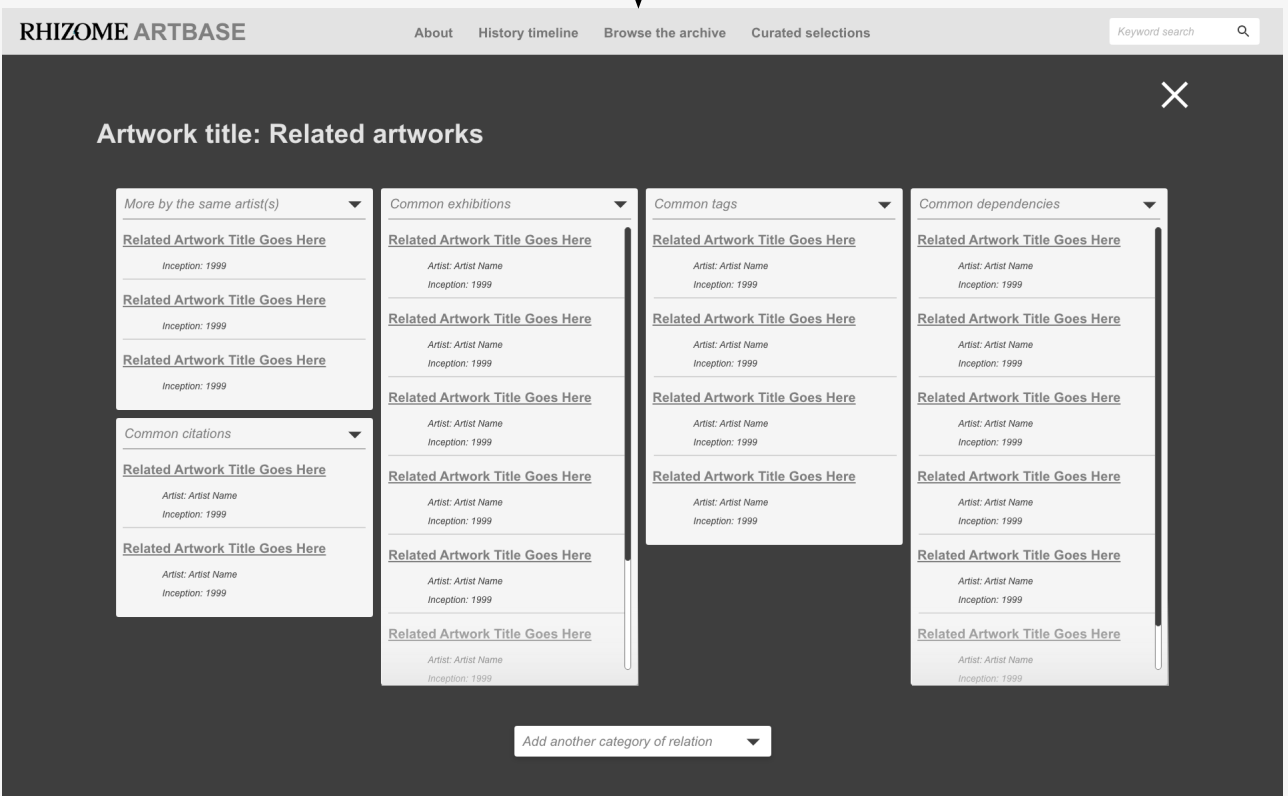
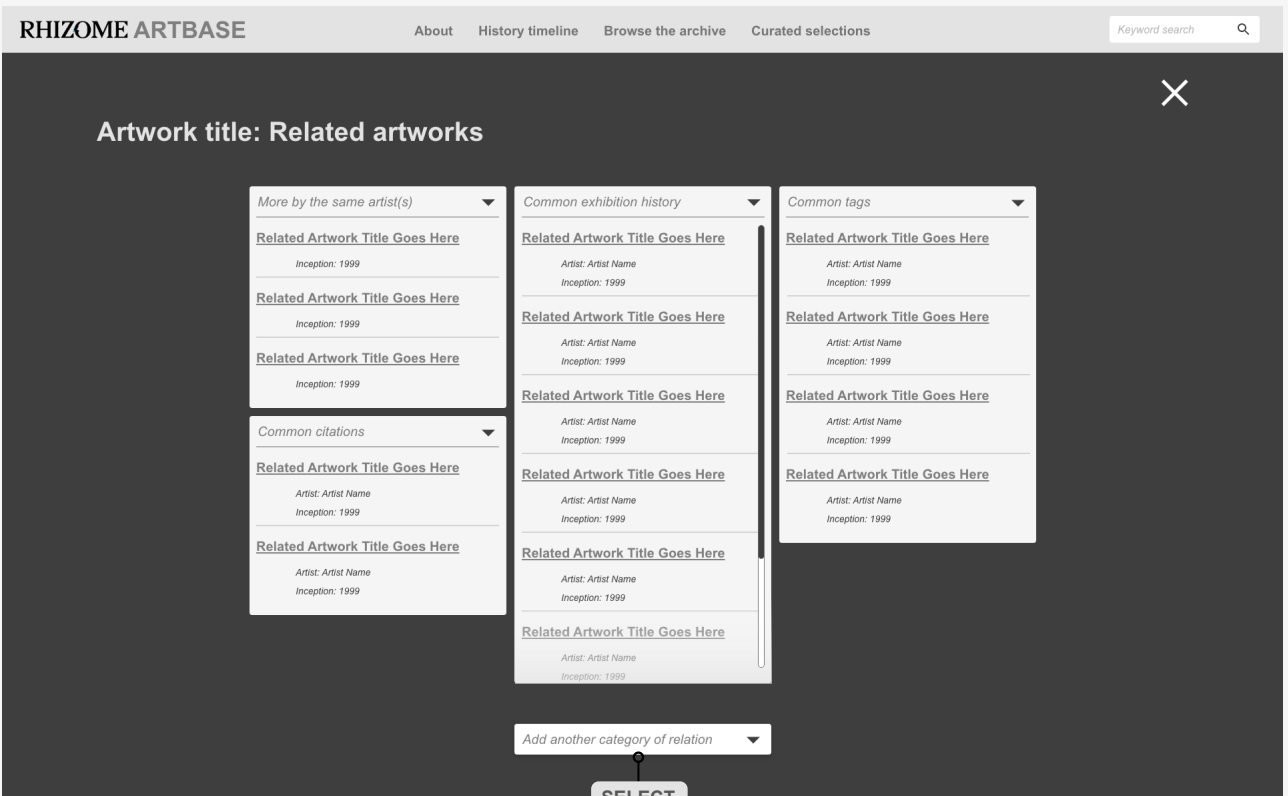
During initial testing, users responded positively to the network graph diagram which expresses relationships between artworks.

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<sup>17</sup> See: <https://sites.rhizome.org/artbase-re-design/data-models.html>



Version 3—"Related" expandable elements:  
Related artworks is expanded to show a tree chart  
visualization of relations.



Version 3—“Related” expandable elements:  
Related Artworks full screen view mode is enabled. This  
view is modular and areas can be added or edited by users.

Network diagrams can, however, easily become unwieldy if there are too many relationships, or look empty if there are too few. The network diagram visualization would also require significant custom programming to make it look and function as intended in the prototype designs. An alternative approach—which will be tested with the final web version of the prototype—could be a simpler data visualization, such as a tree chart.

A visualization expressing relations in the form of a tree chart, would use the directions of relation as area headings, while the number of related artworks would determine the size of the corresponding tree chart area (within the limitations of the available screen space). Users would be able to preview the “top three” directions of relation showing the most relevant results, such as common artist/ creator, common citations, common exhibition history. They could also pick their own relations, if the title of each section of the tree chart is turned into a drop down menu from which users could select across a range of available options to view related artworks. Selecting an option involves running a precomposed SPARQL query and real-time results populating the tree chart.

Furthermore, similar to previous versions of the prototype, users here could also view a full screen rendering of the tree chart. Full screen view reveals broader areas of related query results. Again, there would be an option to change the relationship via a dropdown at the top of each chart area. Users could also add additional areas on the screen to view more related results in one overview.

In this visualization (see [pp.72–73](#)), the information is predominantly textual, as including images could be problematic, both visually and programmatically. In the case of many results, image thumbnails could become too small to be meaningful visual symbols. Additionally, loading images would be likely to slow down the live-querying process, whereas loading text results only, should perform more efficiently. By making the results more compact—in text form only—users can view more relationships at-a-glance, and might be able to start mapping patterns of relations across the archive. Determining the visual appeal and operational efficiency of this visualization approach vs the network graph diagram requires further testing. The primary goal of this metadata element is to allow users to explore the potential of linked data for drawing connections across items in the database without having to write SPARQL queries manually.

## Timeline

This element is largely unchanged from the previous versions, except for some adjustments to terminology. The title “Timeline” has been updated from “Timeframe”, as it is a term used more commonly in data visualization design to express any form of visualization tracking time periods and it was often mentioned by users.

Similar to the related artworks element, the goal of this timeline visualization is primarily to allow users to experience the possibilities of doing research across a linked data database even without needing to be fully fluent in its structure and language (i.e. SPARQL).



# Design for other types of records in the database beyond the artwork record

## Person records

Based on feedback and observations during workshops with the previous two versions of the prototypes, this version suggests how other types of records or nodes in the database may be presented via a customized version of the database UI. Among the most important of these other types of records is the artist record.

The template presented in this prototype can be applied to different persons present in the database—artists, curators, developers, Rhizome staff members, etc. The metadata in this template is entirely optional: for many artists there is unlikely to be much of this information available on record. Ideally, every person would be matched to their identifiers in other databases and authority control registries (such as ULAN and VIAF), if they are present in such external resources (see [p.76](#)).

For artists/ creators, one other element in the template will be particularly important—a listing of artworks, which they either created themselves or were somehow involved in as collaborators. This listing can be populated via a preconfigured SPARQL query. The button provided at the top right corner of the page template does just that, while removing the need for users to create their own SPARQL queries. The button will open up a listing page, styled in the listing page template (for listing page information see [p.91](#)).

Additionally, as with the design of the artwork record, it could be useful to see a timeline of all activities associated with a person, whether the creation of an artwork (variant) or participation in an exhibition, etc. The visualization approach here will be the same as that developed for artwork records.

## Properties and items

Properties and items in Wikibase which will be used to populate the metadata fields for artworks and artists, could also benefit from customized UI templates. Users should not need to know all the details of how linked data in the ArtBase is structured—what are properties, what are items, what are qualifiers, etc. Although this knowledge would certainly be beneficial for those interested in more advanced research. However, it should be possible for all users to understand what different terms used in the metadata record of an artwork refer to. Therefore, all metadata elements in the artwork and person records should be clickable and explorable. Metadata elements refers to both property fields and their values, so a property such as “access state” and its associated value, “medium”, for example, would both lead users to pages with additional explanations (and additional data) about each term (see [p.77](#)).

RHIZOME ARTBASE

About

History timeline

Browse the archive

Curated selections

Keyword search

Q

Name Surname

Timeline

Caption: Image attribution.

See all artworks associated with Name Surname

CLICK

Metadata

Descriptive data

Date of birth: 1975

Residence: [New York](#)

Country of citizenship: [USA](#)

Occupation: [Artist](#), [Curator](#), [Educator](#)

Member of: [Artist collective name](#)

Biography: [www.example-source-url.com](#)

Official website: [www.example-website-url.com](#)

Identifiers in other databases

Wikidata ID: [QXXXXXX](#)

ULAN ID: [XXXXX](#)

VIAF ID: [XXXXX](#)

Need more data or would like to contribute?

[Request access](#)

Download metadata record

RDF

JSON

CLICK

RHIZOME ARTBASE

About

History timeline

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Keyword search

Q

Name Surname: Timeline

2001

2003

2005

2007

2009

2011

2013

2015

2017

2019

Exhibition title

Artist link: [www.example.com](#)

Exhibition title

Artist link: [www.example.com](#)

Exhibition title

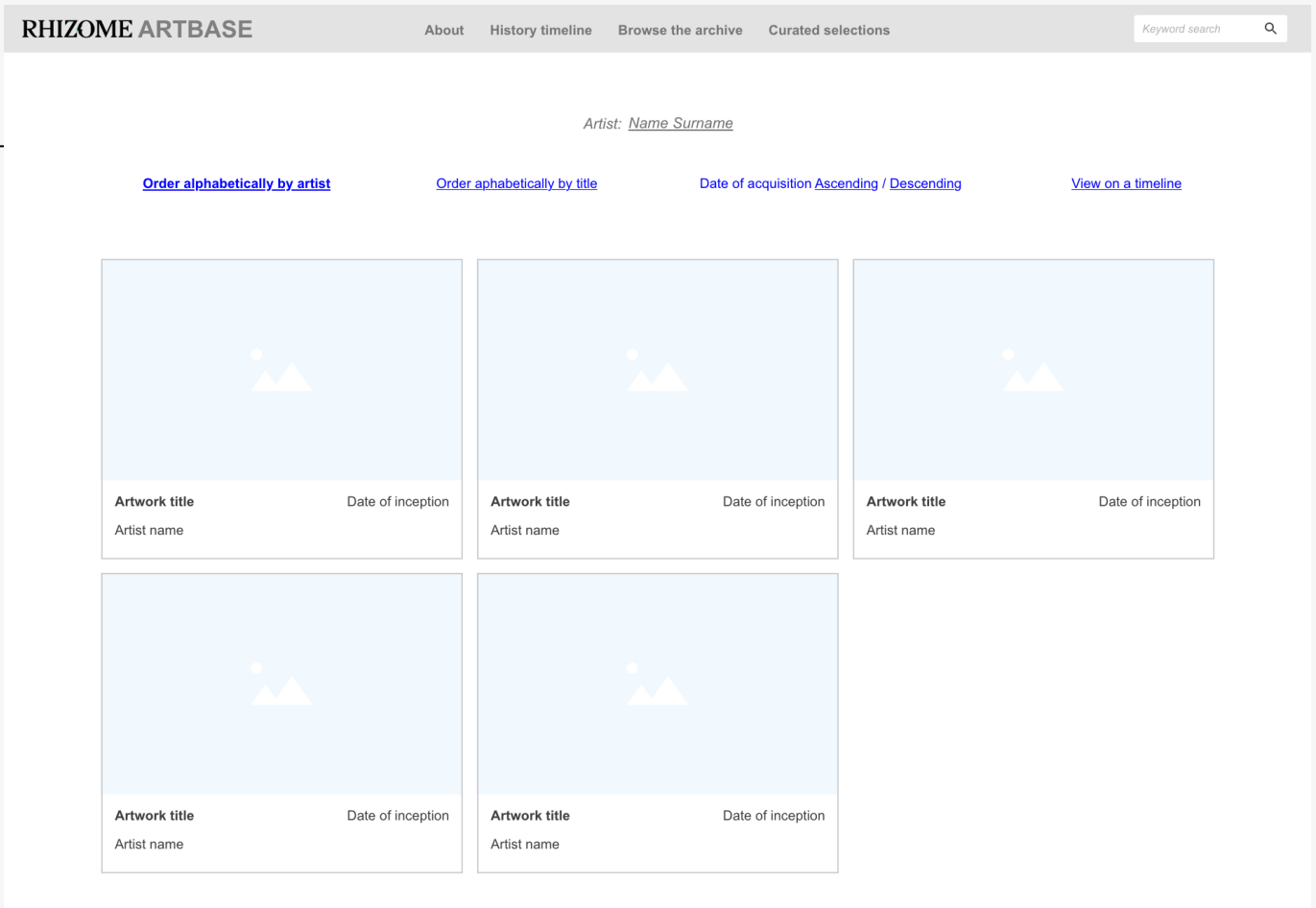
Artist link: [www.example.com](#)

Link no longer active

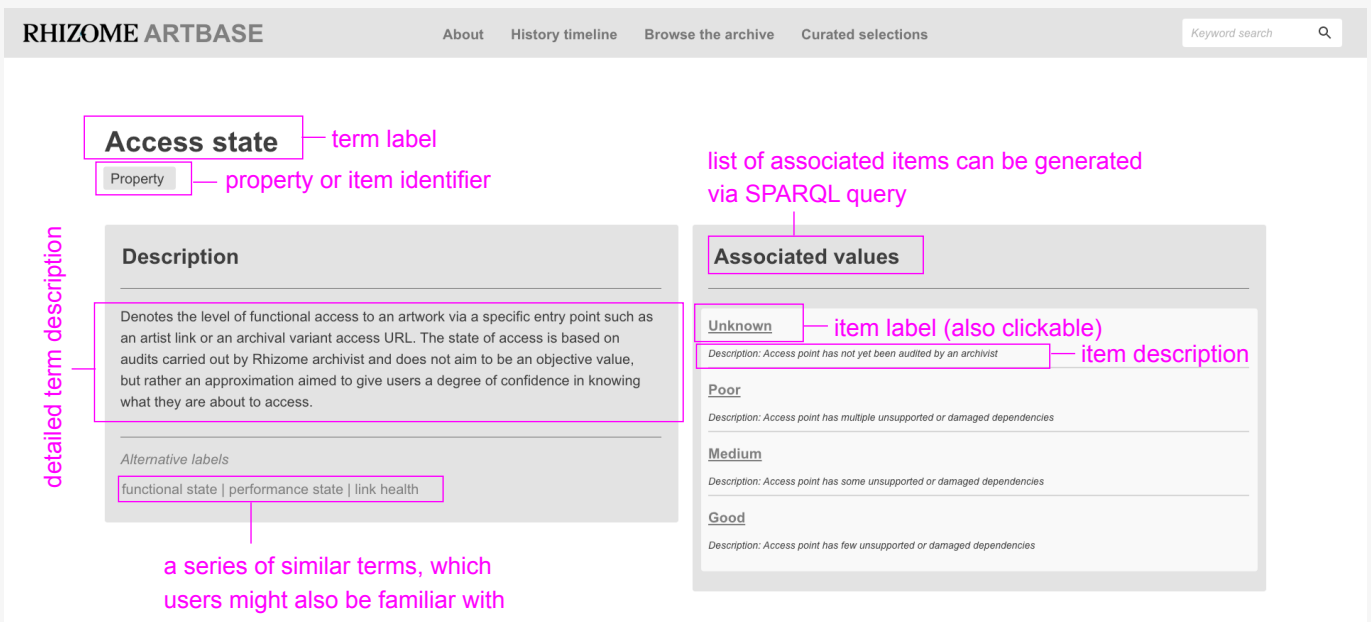
Version 3—Person record:

Top: Metadata available on person records;

Bottom: Timeline visualization for person records;



Version 3—Listing page template:  
Artworks associated with an artist/ creator.



Version 3—Property record:  
Anatomy of the property page template.

Property

Discussion

property or item identifier

term label

(P117)

generated by

Generation is the creation of a new artwork variant by a specific activity, carried out either by the artist, or another agent (use only with activity items, not agent items)

▼ In more languages

Configure

Language	Label	Description
British English	No label defined	No description defined
English	generated by	Generation is the creation of a new artwork variant by a specific activity, carried out either by the artist, or another agent (use only with activity items, not agent items)

detailed term description

Also known as

prov:wasGeneratedBy

a series of similar terms, which users might also be familiar with

Data type

Item

Statements

mapping property to other ontologies

exact match

https://www.w3.org/TR/prov-o/#wasGeneratedBy

▼ 0 references

RHIZOME ARTBASE

About

History timeline

Browse the archive

Curated selections

Keyword search

Generated by

Property

Description

The activity or preservation procedure through which an item in the ArtBase database has been created. This may refer to primary source materials supplied by artists, such as artist links and descriptions. It may also refer to actions undertaken by the archivists and the preservation team at Rhizome in order to generate an artwork variant.

Alternative labels

created by | submitted via | archived via | preserved via

Equivalent property

PROV-O: <https://www.w3.org/TR/2013/REC-prov-o-20130430/#wasGeneratedBy>

CIDOC-CRM: <http://www.cidoc-crm.org/Property/p94-has-created/version-6.1>

Associated values

Open submission

Description: The process of adding items to the database between 1999–2008 was open to all without any filtering or curating by Rhizome staff.

Cloning

Description: The process of making a copy of the artwork files hosted on the artist's server and transferring the copy to Rhizome's server. This process was part of the open submission period, but was optional, artists could choose to link their works or clone them.

Webrecorder capture

Description: This process involves the use of Rhizome's web archiving software tool Webrecorder in order to create an archival WARC file. WARC files are re-performed via Rhizome's Webenact platform. These re-performances aim to be as close to the original presentation of the artwork as possible, but still involve curatorial decisions taken by the archivist. See the Archival Plan metadata for more details.

Webarchive capture

Description: This process involves the use of a mix of web archiving tools and web archiving resources in order to create an archival WARC file. WARC files are re-performed via Rhizome's Webenact platform. These re-performances aim to be as close to the original presentation of the artwork as possible, but still involve curatorial decisions taken by the archivist. See the Archival Plan metadata for more details.

Emulated re-performance

Description: This process involves the use of either a cloned copy or a webarchive capture of the artwork, which is then re-performed in an emulated environment due to the artwork's dependencies on specific components in an operating system or software application which are no longer supported in contemporary iterations of these systems or applications. The emulated environment is served via the Emulation-as-a-Service framework. See the emulated environment's item page for more details, as well as the Interaction Notes metadata for performance instructions.

A mapping between default Wikibase UI and Version 3 property record template.

Top: Default Wikibase page for the property “generated by”;

Bottom: Property page for “generated by” following custom template prototype;

Note: The values for descriptions and alternative labels are different, as these had not yet been finalized at the time of making the prototypes.

A key part of the custom UI templates for properties and items is dedicated to clearly written and succinct explanations of concepts. These explanations can take the form of “descriptions” which are required for all Wikibase pages. Additionally, including the “alternative labels”—also visible on all Wikibase pages—would be useful to communicate the meaning of concepts to users, as alternative labels could provide synonymous concepts, which users might be more familiar with.

In addition to the description section, other elements on these properties and items pages can begin to communicate the basic principles of the linked data structure to users in a visual way. The simple labels of “property” and “item” beneath each page title may not be entirely clear at first glance, but when encountered several times, across several pages, users should be able to understand the general differences between properties and items. Providing “associated” elements for each page can start to further reveal the linked structure connecting the entire archive. Property pages will contain “associated values” and item pages will contain “associated properties”. Each of these values and properties will be presented as a clickable title followed by their distinctive description. The values will perform the role of controlled vocabularies, or to use Wikibase-specific terminology—they will function as “property constraints”. New items can easily be added and associated with specific properties, but this will be done at the discretion of the preservation team at Rhizome. For certain properties, adding new values will not make sense, for example “access state” is already served well by values such as “unknown”, “poor”, “medium” or “good”. Other properties, such as “generated by” can start with a small number of possible generation activities, determined by the history of the archive, however, these could easily grow in the future, as new artworks are added to the archive via new preservation methods.

Furthermore, for properties modeled on existing standards to begin with, it will be important to map them to corresponding ontologies. This fulfils the potential of linked data to establish connections across databases. For example, “generated by” is a property modeled on the PROV linked data ontology, so can be mapped to it directly. As efforts are underway to map Wikidata properties to CIDOC-CRM (a standard ontology in the cultural heritage field), such mappings can also be facilitated by Rhizome’s Wikibase.

By exposing the links to other databases—both for properties and for items—the UI does not simply show data which is useful for conducting cross-database querying. By making this data visible to users, the UI makes it possible for users to pursue the links, if they are interested, and learn more about how certain properties are conceptualized in other ontologies, or which characteristics items have in other specialist databases. The role of the ArtBase is to be a specialist database for artworks, so other records in the database need not be as detailed as the artwork records. But by directly exposing the links between nodes in the ArtBase and other specialist resources, the database can become a much richer resource for data not only for artworks, but also artists, software, web archiving, etc.



## Webrecorder capture

Item

[See all artworks associated with this item](#)

### Description

This process involves the use of Rhizome's web archiving software tool Webrecorder in order to create an archival WARC file. WARC files are re-performed via Rhizome's Webenact platform. These re-performances aim to be as close to the original presentation of the artwork as possible, but still involve curatorial decisions taken by the archivist. See the Archival Plan metadata for more details.

#### Alternative labels

Webrecorder archive | Webarchive captured with Webrecorder

### Metadata

Tools used: [Webrecorder](#)

Resources: [Live Web](#); [Internet Archive](#)

Re-performance platform: [Webenact](#)

Dependencies: [Webrecorder](#); [Webenact](#); [pywb](#)

### Associated properties

#### Generated by

Description: The activity or preservation procedure through which an item in the ArtBase database has been created. This may refer to primary source materials supplied by artists, such as artist links and descriptions. It may also refer to actions undertaken by the archivists and the preservation team at Rhizome in order to generate an artwork variant.

### Associated archival plans

#### Exclusion of external links from capture

Description: The archivist (or curator) has decided to exclude some external links from the archival capture of the artwork, either due to link rot, or intentional curation aimed at preserving a bounded variant of the artwork without violating third-party copyrights, potentially sensitive or private data, or for another reason deemed suitable by the archivist.

#### External links restored via public web archive captures

Description: Some of the external links in this archival capture have been restored through extraction from public web archives, such as the Internet Archive. This procedure is occasionally necessary if links are broken in the live web variant of the artwork, but suitable resources from the relevant time period can be found in existing web archives.

#### Temporal mismatch in some external resources

Description: Some of the external links in this archival capture have been restored through extraction from public web archives, such as the Internet Archive, but due to unavailability of complete resources from the same time period, some resources may have been restored from archival captures taken at different points in time. Such restoration work is carried out at the discretion of the archivist and aims to preserve temporal fidelity as best as possible.

#### Social media privacy allowances

Description: Some links in this archival capture may have been disabled in order to preserve the privacy of third-parties who may not have granted the rights to archiving their data to the artist. This archival plan is commonly used in archival captures of social media performance artworks where the privacy of users other than the artist and their collaborators should be honoured.

CLICK

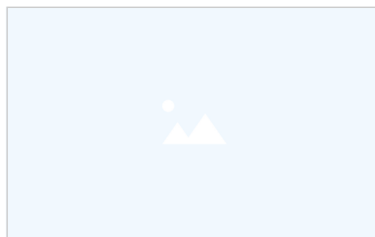
Version 3—Item record:

Top: Example of a complex item page including property constraints, data constraints, and additional metadata entries;

Bottom: Example listing page template showing artworks associated with the item.

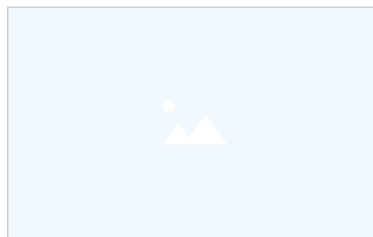


Generated by: [Webrecorder capture](#)

[Order alphabetically by artist](#)[Order alphabetically by title](#)[Date of acquisition Ascending / Descending](#)[View on a timeline](#)

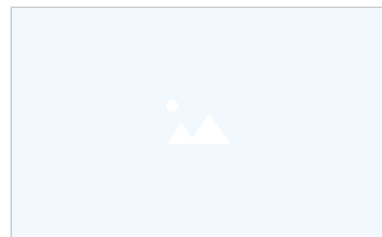
Artwork title      Date of inception

Artist name



Artwork title      Date of inception

Artist name



Artwork title      Date of inception

Artist name



Despite cross-database linking, some item pages may require additional metadata in order to reveal their full complexity to users. For example, the item page for a generation activity, such as “Webrecorder capture” requires not only a description and associated property, but also “associated archival plans”, because these “archival plans” add specific information about the restoration actions applied to each artwork which was “generated by” the “Webrecorder capture” activity (see [p.80](#)). Of all the possible archival plans archivists use as part of the preservation programme in Rhizome, few will be applicable to the process of “Webrecorder capture”. Recording this data as a form of “data constraint” alongside the relevant items in the database on the UI level could be useful both for internal and external users. For internal users, it would provide a quick at-a-glance overview of which plans they have used in the past for a specific generation activity. For external users, it would make a further layer of contextual relations in the database visible.

Complex items, like generation activities or archival plans, can include further metadata statements, such as:

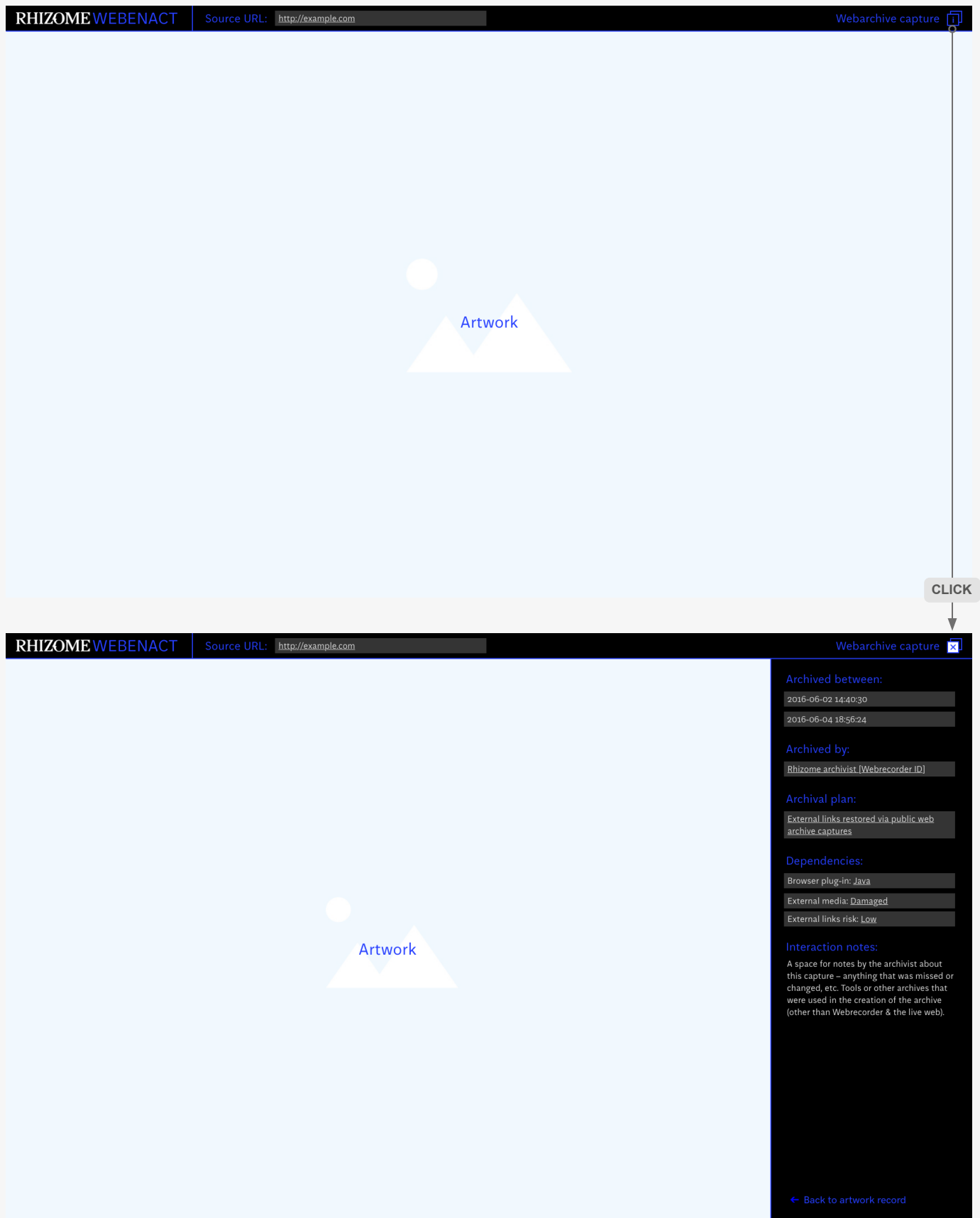
- ▶ “Tools” (Which tools were used during the activity?)
- ▶ “Resources” (Which resources were used in the activity?)
- ▶ “Dependencies” (Software objects or processes can also have various dependencies, just like artworks.)
- ▶ “Reperformance platform” (What platform will the activity require in order to render the artwork variant to end-users?)

This is not an exhaustive list and due to the way in which the data model of the Wikibase software can grow organically, new metadata statements can be added as and when the need arises.<sup>18</sup> The templates presented in these prototypes show how different types of metadata can be presented in a user interface, but they are not intended to show a definitive list of all possible metadata values.

Finally, similar to the person record template, the templates for a number of other items would also benefit from providing a way for users to view a list of artworks linked to these items via the associated properties. Again, such a list would be populated via a preconfigured SPARQL query. The button provided in the top right corner of the item page template functions similarly to the button displayed on person pages. The button would open up a listing page with the associated artworks, styled in the listing page template (see [p.80](#)).

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<sup>18</sup> For a full description of the data modeling process in Wikibase, refer to the PhD thesis accompanying this project, Part III, Chapter 6.



Version 3—Webenact presentation:

Top: View of the artwork reperformance environment for web archive variants in the ArtBase;

Bottom: Same view with curtain sidebar opened.



## Viewing artwork variants

Alongside designs for the different types of records in the archive database, Version 3 prototype also proposes new designs for other aspects of the archival interface. These include the presentation interface for artwork variants which are captured as webarchives and presented via Rhizome's Webenact platform or variants which are emulated via the Emulation-as-a-Service platform.

### Webenact presentation

This design, which includes some minimal branding, was originally designed in Summer 2018, as part of ongoing work with the preservation team at Rhizome. It has been updated slightly to correlate with the concepts for data modeling and record presentation developed in prototype Version 3.

The design includes a sticky top navigation bar, which features the Rhizome logo and the Webenact platform name as an adjacent graphic symbol. Clicking that symbol will take users back to a view of the ArtBase, filtered to show only artworks available to view via the Webenact platform.

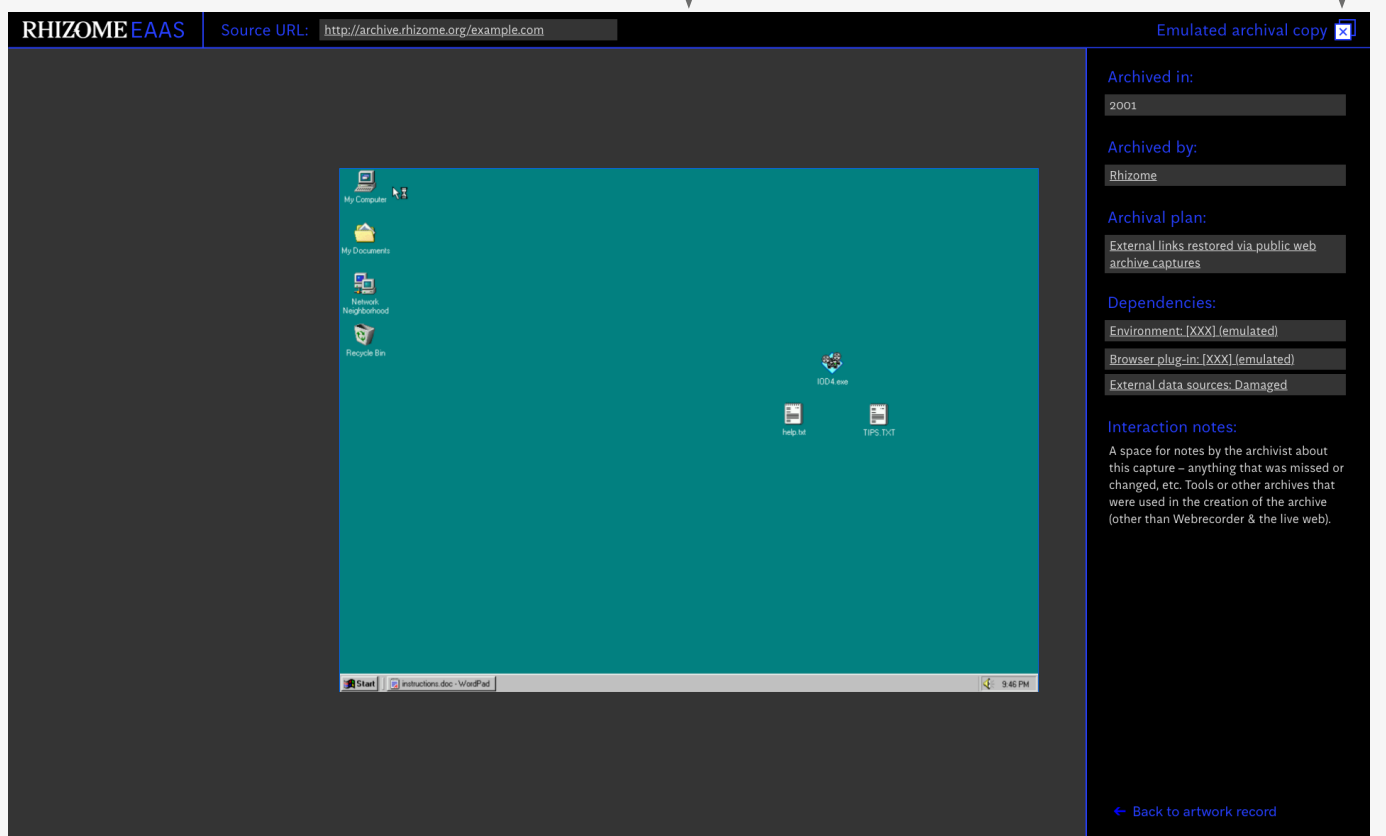
Next to the platform branding, users are able to see the source URL for the work being presented. This is necessary, since the URL visible in the primary browser URL bar will be the archival location on Rhizome's server and the original artwork's URL will not be visible there. Whether this original source URL is still live or not, it is an important art historical piece of metadata and represents part of the provenance statement for the artwork.

At the other side of the navigation bar, a generation activity term is used to describe the artwork variant being reperformed, e.g. "Webarchive capture". This could also be "Webrecorder capture", for some variants where the only web archiving tool used was Webrecorder. This term reinforces the link between the Webenact platform and the artwork variant record metadata which is available through the artwork record page.

There is also an additional information button. If users click it, they will be able to see additional information about the variant via a curtain sidebar. This sidebar is closed by default, so that the primary focus remains on the artwork itself, which will occupy the entirety of the available screen space below the navigation bar. The information sidebar will include metadata specific to the webarchive capture, such as the time period when the archiving took place. This can be very specific, as it is something captured as part of the WARC file's own metadata. Additionally, the name of the archivist could also be recorded, or even their Webrecorder ID shared, considering that the particular form and boundary of the web archive will largely depend on their subjective decisions. Making the identity of the archivist explicit, additionally reinforces the concept of the archive as a subjective construction, rather than "neutral" conservation procedure.<sup>19</sup>

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19 For a theoretical discussion of the subjective role of the archivist/ curator in web archiving processes, refer to the PhD thesis accompanying this project, Chapters 2 and 7.



Version 3—EAAS presentation:

Top: View of the artwork reperformance environment for emulated variants in the ArtBase;

Bottom: Same view with curtain sidebar opened and also with the emulated environment running.

Furthermore, some metadata from the primary artwork record page can be reintroduced here, including the archival plan, dependencies and interaction notes specific to this particular artwork variant. These aspects could better inform the user's understanding of what it is they are seeing in this presentation, without requiring them to go back a step. Finally, a link back to the artwork record is another standard navigational cue and interaction pattern users requested during the user research sessions, which can be integrated into the curtain sidebar.

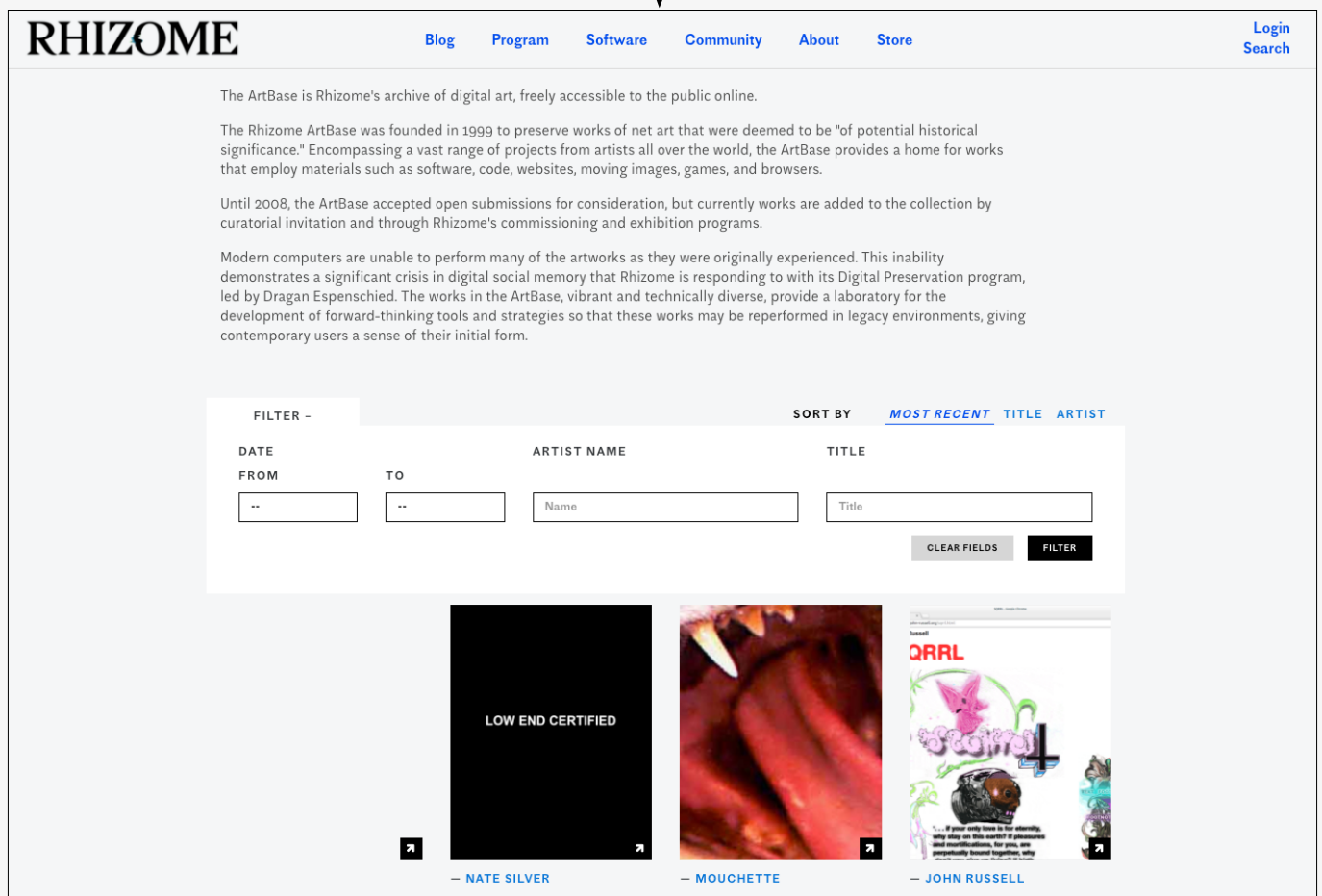
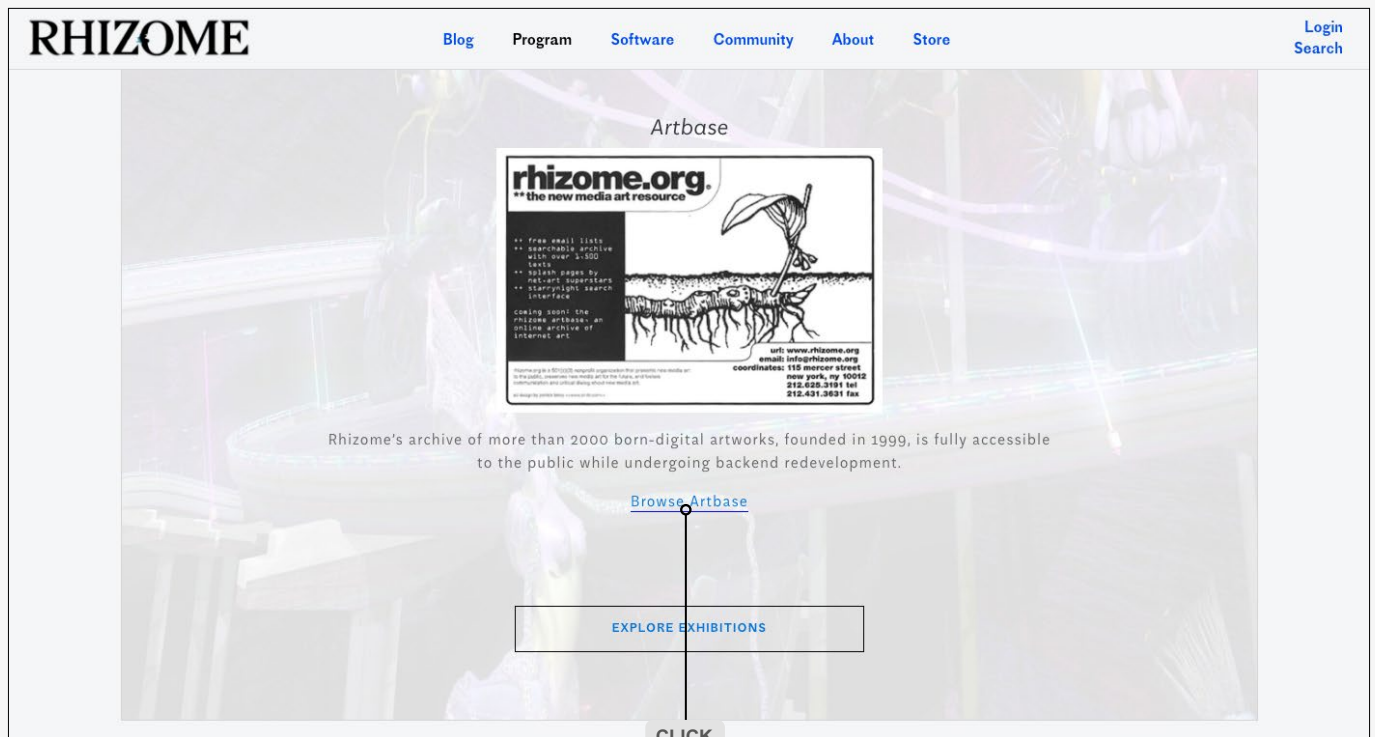
## Emulation-as-a-Service (EAAS) presentation

The presentation for emulated variants follows the design pattern established with the Webenact platform presentation design.

A sticky top navigation banner features the logo combination symbol (Rhizome logo and presentation platform name), which again can take users back to an ArtBase page with a listing of artworks available to be viewed via EAAS.

The source URL is important here as well. In the Webenact presentation, the source URL is the URL used to create the webarchive which, in most cases, would be the artwork variant on the live web, either hosted by the artist on their own server space or hosted on a third-party platform such as a social media channel. In the EAAS presentation, however, archivists might use the archival copy variant hosted on Rhizome's servers. In that case, this archival URL would be the source URL, rather than the artist's original link. This information has been requested by users, who are interested to know when an emulation is using the live web as source vs an archival variant. The latter is likely to be only a specific snapshot in time and may not incorporate all potential updates or changes affecting an artwork which has remained under the control of the artist. Hence, it is important for users to be aware which variant is being emulated.

The next element in the navigation bar is the generation activity used to create the variant—in this case it is an “Emulated archival copy”, followed by the information button. The information button once again opens up a curtain sidebar with additional information about the emulation. In this case, the archival time period would likely be a single point in time, as opposed to a duration, because that level of detail was not captured for early archival copies. The associated actor with the generation activity would be the organization Rhizome, rather than a specific person in most cases, as generating emulated presentations for archival copies is likely to be an automated task once the database is restructured to comply with the new data model. Additionally, the sidebar could provide information about a specific archival plan, if information about it exists, or if it can be deduced based on the condition of the archival copy. Variant dependencies and interaction notes could, again, be repeated from the primary artwork record, because they can be helpful to users about to interact with the artwork. Finally, a back button can return users to the artwork record.



Top: Rhizome's Program page which provides access to the ArtBase (design as of 2018);

Bottom: ArtBase homepage (design as of 2018).

Note: Users found the common navigation menu (and particularly the keyword search button) confusing as they were expecting separate navigation and search for the ArtBase.

The presentation of the artwork itself would be different from the presentation in Webenact. Emulated artworks can usually only be presented at a much smaller screen resolution ratio than most contemporary retina screens, as the software being emulated—often software from the late 90s or early 00s—was designed for smaller screen resolutions, hence the emulation of this software also has to follow period-specific screen resolution standards. Therefore, the artwork presentation frame would not take up the entire available space in a user’s browser window. This space can be filled with a dark background to offset the emulator frame, which would then be centred within the user’s browser at its largest possible resolution (for some artworks that may be as low as 800x600 or even 640x480, for others it can go up to 1024x768). This form of presentation was widely utilized in Rhizome’s Net Art Anthology (NAA) online exhibition. When user research was conducted around the exhibition, users generally found the emulators easy enough to use and understand (see Report #2). One small update from that NAA presentation is including a more specific heading to the emulator’s “run” button. Instead of simply stating “Start emulator”, the proposition here is to name the specific environment being emulated—e.g. “Run Windows 98 OS emulator”. That way, users will know from the onset what the base environment is that this artwork needs for its reperformance. And furthermore, users who may not be familiar with what emulation is, or what it does, will get an instant cue from the button that emulation has something to do with recreating a legacy computing environment. This element still needs more testing, however.

When users click the “run” button and select their region, the emulator starts up and users can interact with the artwork in its intended environment, just as they can currently do in the NAA exhibition. The addition of the information sidebar in this presentation, and interaction notes therein, aim to provide any further instructions users may need in order to successfully navigate the emulated legacy environment.

## Archive landing page and discovery

Finally, fully resolving the design of the search and discovery processes in the ArtBase is beyond the scope of this research project. However, Version 3 of the prototypes puts forward some recommendations towards the design of the archival landing page and associated discovery tools, based on findings during the initial discovery stage of the user research (see Report #2) and on a review of the current state of museum and archival collection interfaces (Report #3).

### Homepage

The landing page for the archive is currently accessible from the “Program” page on the main Rhizome website. Once users click on the “View ArtBase” button, they will be redirected to the new ArtBase landing page. This page can use core branding elements from Rhizome’s main site, but will need to also function separately from the main site in order to avoid confusion over navigation and search—two areas which were identified as confusing to users during the initial User Research Phase.

“

As an ArtBase user, I want to have **multiple entry points** to browsing the works, such as sort-by-color, curated lists or a random button, so that I can discover new works in serendipitous ways.

“

As an ArtBase user, I want to see **rotating highlights or random selections** on the archive homepage, so that I can discover new work every time I visit the archive.

“

As an ArtBase user, I want to browse **lists of artworks created by curators or other users**, so that I can see what others consider to be of interest in the collection.

“

As an ArtBase user, I want to interact with an interface with a **more exhibition-led approach**, featuring curated selections displayed on a curatorial calendar, akin to a museum, so that I can discover new works in serendipitous ways.

“

As an ArtBase user, I want to see **curated lists** around specific themes or processes, so that I can explore smaller subsets of the collection focused on a specific topic.

“

As a researcher, I want the archive **search interface to be clearly separated from the sitewide search**, so that I can conduct the queries that I need within the archive.

---

A set of user story cards which informed decisions on structuring the navigation menu and the homepage of the new ArtBase prototypes (see Report #2, pp.33-35)

To that end, the ArtBase should have a custom top navigation bar—different from the primary Rhizome website navigation. This navigation bar can include a combined graphic symbol for the Rhizome logo and the Artbase—similar to the Webenact presentation design. Other navigation items in the top bar can include:

- ▶ About: A page that tells users more about the origins of the ArtBase—something users have enquired about throughout the user studies.
- ▶ History timeline: A page featuring a version of the timeline developed in the course of this research project, which has been shown in multiple presentations and has been well received as an information-sharing tool among diverse audiences (see Report #1, pp.50–51).
- ▶ Browse the archive: A listing page giving a full archive overview via a standard grid-based, paginated presentation.
- ▶ Curated selections: This could be a different flavor of a listing page, showing some curated lists (either algorithmically or human-curated), which are a common feature across collection-based interfaces, frequently requested by users.

Finally, the navigation bar can also include a keyword search box—distinct from the site-wide search currently available on Rhizome’s website. This search box can perform the same search facility currently available in any Wikibase installation by default. It searches for keywords in the text elements on Wikibase pages, and can match user input to autocomplete values, when such values are present in page titles, e.g. artwork titles or names of artists, etc. Additionally, if Rhizome decide to make Wikibase’s editing capabilities accessible to some users, there might be a login facility incorporated in the navigation bar, as well. This recommendation is optional, and may also be implemented at a later stage. It will be important to make it clear that this login facility is different from the login facility available on Rhizome’s website, where members can login and post messages on the community board, etc.

The main section of the homepage will contain a very brief text introducing the archive to users and some suggested interactions. These interaction suggestions serve as a form of light “onboarding”. Below the text, three artworks will be represented via thumbnail previews at random, and will change with every user visit. This approach is common in other collection interfaces and during the user studies, users requested a rotation of artworks on the homepage, as a useful strategy to highlight different parts of the archive.

The artworks’ thumbnail preview images will be accompanied by core identifying information, namely: title, artist, date of inception—the same information most widely used in other museum interfaces to represent object previews. Images in this prototype should be larger than previous thumbnail grid sizes used in the ArtBase. Users have identified the relative size of thumbnails used in the Net Art Anthology as a good size for image representation, therefore a grid of three similarly large thumbnail images is applied in the new prototype.



### Version 3—ArtBase homepage:

Top: View of the new wireframe for the ArtBase homepage, with a distinct navigation, separate from Rhizome's main website;  
Bottom: View of the SPARQL query toolbar, which is accessible as a sticky footer on the homepage and other listing pages .



The randomly presented artworks can be shown in a grid of one or two rows, but the total number of shown works shouldn't be overwhelming—it is meant to be just a glimpse into the archive. Additionally, action buttons such as “Show me more” or “Random artwork” positioned below the artwork representations can either change the selection or take the user to a random artwork page. The latter approach has also been requested by users and is a common feature in other collection interfaces.

“

As an ArtBase user, I want to interact with a **search query interface**, so that I can do research into very specific elements of the collection.

“

As a researcher, I want to use more **sophisticated search tools** with facets or filters similar to academic journal databases, so that I can create more precise search queries.

“

As a researcher, I want to have an **expanded search capability**, including keywords, subject, media, form, etc, so that I can find works in the archive relevant to my research interests.

“

As a researcher, I want to be able to **search by alternate names/titles** and get all relevant results, so that I can conduct research even if I'm not familiar with the specifics of the data model in use in the archive .

A set of user story cards which relate to search interactions in the archive (see Report #2, p. 35)

## Search queries

The search query facility will be a clearly separate feature, which will primarily serve expert and/or advanced users of the archive. Additional design features across the different page templates will aim to meet any querying needs users might have in general, such as seeing all related artworks, seeing all artworks associated with an artist, or seeing all artworks associated with a specific technical dependency, to name a few.

However, some users might need to perform more complicated queries. The ArtBase should provide a GUI for this use-case. The design prototype features one such proposed GUI, which is a sticky, expandable element attached to the bottom of the homepage and can be featured on general listing pages as well. This GUI is an example place-holder. Its design is based on existing tools within the Wikimedia ecosystem, e.g. the default Query Service for Wikidata, as well as examples from other linked data research projects (see Report #3, pp.72–75). However, this type of search interface is still far from the standard “advanced search” filter paradigm users are likely to be more familiar with from other academic databases, and so it will need further development and testing with users before it can be implemented. There is also the possibility to embed an existing GUI, developed elsewhere—either by Wikimedia or other potential partners Rhizome have been in contact with throughout the research phases of this project.

## Listing views

In addition to the homepage, one further template is developed—in order to show how aggregations of artwork previews can be laid out. This sample template can be applied to the “Browse the archive” page view, available from the top navigation bar, but also to custom curated lists, or lists generated from queries, such as “See all artworks associated with [...]”.










Browse the entire archive below

Order alphabetically by artist

[Order alphabetically by title](#)

[Date of acquisition](#) [Ascending](#) / [Descending](#)

[View on a timeline](#)

 <b>Artwork title</b> Artist name	<b>Date of inception</b>	 <b>Artwork title</b> Artist name	<b>Date of inception</b>	 <b>Artwork title</b> Artist name	<b>Date of inception</b>
 <b>Artwork title</b> Artist name	<b>Date of inception</b>	 <b>Artwork title</b> Artist name	<b>Date of inception</b>	 <b>Artwork title</b> Artist name	<b>Date of inception</b>
 <b>Artwork title</b> Artist name	<b>Date of inception</b>	 <b>Artwork title</b> Artist name	<b>Date of inception</b>	 <b>Artwork title</b> Artist name	<b>Date of inception</b>

[1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#), [8](#), ... [141](#) [>](#)

Search query toolbar



### Version 3—Listing page template:

Listing page templates offer several ways of sorting the results, and paginated navigation at the bottom. The SPARQL query search toolbar is available on these page templates, too.

The listing pages will feature a grid of three or four rows of artwork thumbnails. They can offer some sorting facilities, based on alphabetising the artist names or artwork titles. Dates of acquisition (or inception) could be another sorting device. The option to view all artworks in the listing on a timeline would also be a useful feature, which many users have requested. A multi-object timeline is possible to generate via preconfigured SPARQL queries, similar to the single-object timelines proposed for the individual record pages.

Overall, the archive's listing pages need to perform the function of providing essential information for previewing a selection of artworks, which has been requested by users, but need not be overly complicated or designed using custom data visualization techniques and libraries (except for the timeline visualization, which is a well-researched and established approach). While some visualization strategies utilizing computer vision, for example, to analyze and process color or compositional similarities in images are visually stimulating, these also add an additional layer of complexity (and technical dependency), which is more difficult to maintain in the long run. Such approaches appear to be more and more widely used in the context of interfaces for cultural heritage (see Report #3, pp.63–69). But apart from the novelty effect, there is still little evidence in the research literature to suggest that users actually find such visualization approaches useful for conducting research.

# Evaluation survey

1. How would you evaluate the **use of terminology** in the prototype? Were there any particular terms that you found unclear or confusing? Were there any terms that you found surprising or used incorrectly in your view?
2. How would you evaluate the **structuring of information** proposed in the prototype (including **visual hierarchy**)? Were there any data relations (either among items in the archive or among metadata entries) that you thought were structured incorrectly? Did you miss any links (or relations) that you would assume should be there?
3. How would you evaluate the **representation of time** in relation to artworks, variants and people in the prototype? Is there anything else, in terms of temporal dimensions, that you would like to see represented?
4. Do you have any **additional feedback** or questions about the prototypes which you didn't get a chance to express during our previous workshops or discussions?

Questions from the online survey that was shared with users as part of the evaluation for the final web-based prototypes. A total of 6 users completed this survey. And 2 more users responded via email feedback.

## Metadata per record



Metadata richness: High



Metadata richness: Medium



Metadata richness: Low

## Variant typology



Artist link (i.e. outside archive)



Cloned copy



Webarchive (WARC) file



Emulation presentation

## Access to variants



Access state: Unknown



Access state: Poor



Access state: Medium



Access state: Good

## Dependencies matrix



Unsupported browser plug-ins



Emulated browser plug-ins



Unsupported environment



Emulated environment



Broken external media



Damaged external media



Complete external media



Broken external data services



Damaged external data services



Complete external data services



High external links risk



Medium external links risk



Low external links risk



Broken internal resources



Damaged internal resources



Complete internal resources

Web-based prototype—Color schema and iconography:

The color schema and icons for the access states in particular were developed following accessibility testing for color-blindness.

---

# Evaluation II: April–May, 2019

## Web-based prototype: February–March, 2019

Version 3 of the prototypes was used as the basis for developing a fully interactive web-based final prototype. This latter prototype was developed for two reasons: 1) To be used during for the next round of evaluation with users, described in this section; and 2) To be used as specification guidelines for Rhizome during the implementation process following the end of this research project.

In order to run this second round of evaluation with users, an email was sent out to participants from previous user testing sessions (the sessions outlined in Report #2) and participants from the workshops and evaluation sessions described earlier in this report. The email contained brief information of the latest web-based prototype, where it could be accessed online, and a link to an online survey that interested users were invited to fill out after they try browsing and interacting with the web prototype.

The prototype is accessible here:

<https://lozanaross.github.io/artbase-prototype/index.html>

The survey questions are listed on [p.95](#).

A total of 6 users filled out the survey and two more users responded via email and gave additional feedback. The users were primarily from an academic or archival/ conservation background.

The prototype was also shared and discussed with Rhizome staff. One of the immediate updates to the designs of Version 3, which was introduced in the web-based prototype was the change in the color schema of the iconography. Tests with Rhizome staff and additional software for web accessibility helped refine a color palette and icons that have better accessibility rates for color-blindness. Resolving this issue was particularly important with the access state icons, since it was important to communicate to users access states accurately when the only available visual cue was an icon, with text only visible on mouse-over. The updated color scheme was used throughout all icons in the prototype and it is shown on [p.95](#).

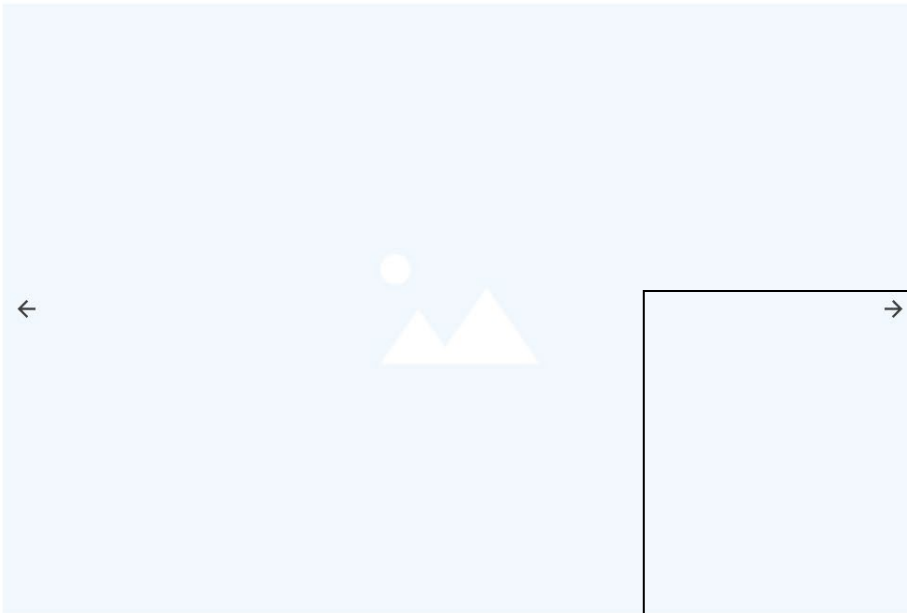
The following pages outline some key comments from the answers users gave to the online survey and show the changes that were implemented in the prototype design following the evaluation session.



## Artwork Title

Artist Name

Timeline 2001~



Caption: Image generation. Image attribution.

- ☐ Access via artist link
- ☒ Access via ArtBase variant
- ☐ Access via ArtBase variant
- ☐ Access via ArtBase variant

CLICK

Access via ArtBase variant

Access URL: <archive.rhizome.org/example.com>

Access state: [Medium](#)

Generated by: [Cloning](#)

Dependencies:

Based on the most recent audit, the following dependencies affect access to this artwork:

- Browser plug-in: [Java](#)
- External media: [Damaged](#)
- External links risk: [Medium](#)

[Report an issue?](#)

View Artwork

CLICK

Web-based prototype—Artwork record:

Top: The new icons are implemented in the access points here.

Bottom: In this updated version of the prototype, users can click on the access point label in the intermediary overlay state to reach additional information pages about the terminology.



## Variant

Item

### Description

Variant is the term Rhizome uses to denote a specific instantiation of an artwork. A single artwork oftentimes has multiple variants, which can be created by the artists and/or other actors, such as archivists or digital conservators. There are two types of variants in the ArtBase: [Artist links](#) and [ArtBase variants](#).

### Associated properties

#### Instance of

Description: Denotes that an item is a specific example and a member of that class.

Artworks associated with this item

CLICK

CLICK

CLICK



## ArtBase variant

Item

### Description

An ArtBase variant is an instantiation of the artwork under the custody of Rhizome. Most ArtBase variants are created by the Rhizome preservation team, using a variety of generation processes, such as [Cloning](#), [Webrecorder capture](#), [Emulated re-performance](#), etc. Rhizome takes responsibility for recording the access state of these links and providing better access whenever possible.

### Matadata

Subclass of: [Variant](#)

### Associated properties

#### Instance of

Description: Denotes that an item is a specific example and a member of that class.

Artworks associated with this item



## Artist link

Item

### Description

An artist link is an instantiation of the artwork under the custody of the artist, or another entity other than Rhizome. Most artist links in the ArtBase are submitted by the artists. Rhizome does not take responsibility for the access state of these links.

### Matadata

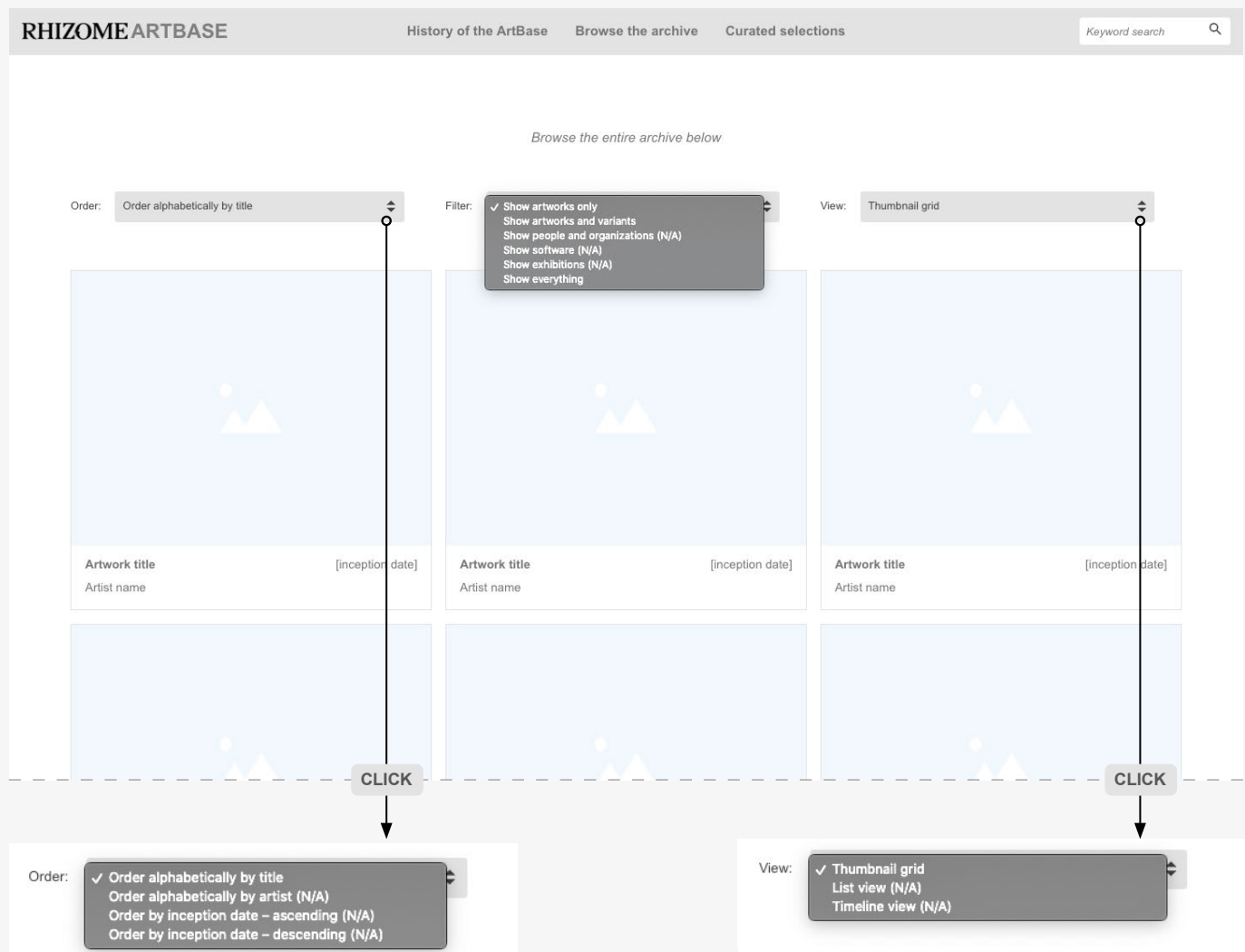
Subclass of: [Variant](#)

### Associated properties

#### Instance of

Description: Denotes that an item is a specific example and a member of that class.

Artworks associated with this item



### Web-based prototype—Listing page:

New sorting options are added for ordering the page results; new filter options allow seeing more pages in the archive than just artworks; and lastly several different views can be designed and presented to users, other than the default grid view.



# Online survey

## Terminology

The first question in the survey concerned the use of terminology in the prototypes. The terms some users still thought needed further explanation concerned the variants, access points, and associated icons. One of the actionable changes discussed with users and implemented after the evaluation is shown on [pp.96–97](#), where users can now access item pages about different types of variants through the overlay state of each access point. The decision to add this additional interaction followed feedback such as: “the fact that you can click on the short statements to read a fuller description/explanation of the access state provides a way for those new to the field to understand, and I felt the descriptions offered were exceptionally clear in their wording.” In addition, although users still found some terms unclear to begin with, continuous use improved comprehension, for example, one said: “Inception date is unusual, but I think correct, and after seeing it a couple of times, didn’t really bother me.”

Lastly, one user raised the need to do more research into the term “dependency”. They wondered whether “performance requirements” might be more accurate, as there may be a need to differentiate between software dependency and resource dependency, for example. At the moment software dependencies such as specific plug-ins are listed alongside media or data dependencies. In the current prototype “Dependencies” is a term only used as a heading, but it could be transformed into a link with its own item page and more detailed description. Alternatively, additional research with users could be carried out during implementation when real data is used to populate the templates; then it might become clearer to users what the term includes or doesn’t include.

## Information structure

The next question in the survey concerned the overall layout of information on the prototype pages and the clarity of the visual hierarchy. Users responded positively to the layout choices introduced in Version 3 and the web-based version of the prototypes. Two primary areas of concern remained the issue of artwork “medium” and the structure of the preservation metadata.

With regards to medium, several users expressed the need to showcase such information higher up on the artwork record page: “In any basic museum/archival record’s brief caption, I would expect (at a glance) to see Title, Artist, Date and Medium information.” These users thought that the current metadata labeled “artwork type” could fulfill that role if it was moved higher up the page, and also if it was made more specific: “I wanted a little more detail under the ‘artwork type’ property. ‘Website’ is a pretty broad descriptor, which could include anything from an HTML document to something interactive using any number of technologies (JavaScript, Processing, etc.)”. However, for reasons already mentioned in the description of prototype Version 3 ([p.67](#)), no updates have yet been made to address this particular feedback.

With regards to the preservation metadata sections, users thought they should be higher up in the layout than accession data. In addition, one user noted: “I really like the breadth of metadata providing the art historical context as well as the archival context (how things are being preserved, what techniques are being used, etc.) Of course, these contexts cannot be separated as these preservation efforts are necessary to keep works accessible and in the art historical and art critical conversation.” However, they commented that the archival plan should be surfaced higher up in the layout hierarchy: “I also wanted an archival plan overview more prominently displayed on the splash page for the artwork that gives a more general description of how the archiving/preservation of the artwork was being undertaken.” This last piece of feedback will need additional coordination with Rhizome’s preservation team to assess feasibility of writing succinct archival plan descriptions for all artworks, before implementation can be considered.

Lastly, some users suggested adding additional filters for browsing, and a general expansion of the sorting facilities on the listing page templates. The updated filters and sorting options are shown on [p.98](#).

## Time and timelines

The last set of questions in the survey considered the representation of time in the archive.

Temporal relations in the design and the timeline visualizations had already been positively reviewed in most workshop and testing sessions, and within this final session some further ideas were raised:

- ▶ “It might also be interesting to have a general timeline of web technologies (like CSS, Flash, JavaScript) that users could overlay on the timelines of particular works. That could help to illuminate how/when certain preservation decisions were made.”
- ▶ “I wondered if you were showing any relations to web captures at the Internet Archive or similar [in the timeline visualization]?”
- ▶ “...in the timeline view, it would be cool if I could select multiple artworks, and then view them together in the timeline, i.e. something like ‘Add another artwork into this timeline’ (especially from the Related artworks section?)”

All of these are interesting ideas that could be explored at a later stage following an initial implementation of the current prototype designs.

One final comment with regards to the temporal representations came from a Rhizome staff member: “The individual work entries don’t feel particularly temporally-oriented, but rather functionally-oriented. (This works, this doesn’t.) Original or live web link vs. preserved/ingested, rather than multiple variants, would likely communicate this better.”

This is a relevant observation and could be developed further during implementation stage, particularly as other users also commented that the differences between variants and access points remained unclear. The addition of item pages with descriptions for different types of variants (see [p.97](#)) is already a step towards clarifying some of the differences. However, additional terms or dates could be added to the access point buttons to further emphasize the temporal aspects of variability across artwork instantiations, as well as functional aspects. This additional development of the prototype needs to be considered during the implementation stage. It will be more effective to consider and evaluate this with users again when a critical mass of data has been populated and the exact requirements of specific variants become more apparent.

## Live data

Lastly, all users raised the question of when they could see the prototypes populated with live data. This requires full implementation of the data model and significant development on the part of Rhizome's preservation team. It is planned as a next step following the completion of this research project. So this round of evaluation with users cannot be considered final, because additional evaluation will be necessary following the implementation of the prototype designs in Rhizome's live infrastructure. The methodological approach discussed in more detail in the thesis accompanying this research project, does not envision the design process as a linear progression with a clear start and finish. Evaluation and communication with users should continue on a regular basis even after implementation, because these activities are not solely a part of the design and development process, but ideally an integral part of the process of maintaining the archive as an active community resource. With that in mind, this report does not conclude with a definitive set of recommendations and best practices, but rather a range of propositions and lessons learned throughout the research process. These can be taken further into implementation stage, and then continuously tested and refined further. For more on this methodological framing, refer to the thesis Chapters discussing MDI (model–database–interface), Chapters 1 and 8.

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# Summary of findings

Facilitating effective user communication and informed user agency via the archive's interface were key objectives in redesigning the ArtBase. Strategies for achieving these goals were gradually refined throughout the design phases of this project, and contributed to the articulation of the MDI framework (model—database—interface) discussed in the PhD thesis accompanying the reports.

Prototypes and their iterative refinement in collaboration with users, as discussed in the previous sections, aimed to address the specific challenges of presenting and contextualizing net art via a linked data database. The prototypes and workshops discussed in this report propose three specific design strategies towards achieving these goals:

- ▶ presenting the new database ontology in a visually explorable way;
- ▶ presenting temporal and performative context around net art works;
- ▶ and lastly, presenting the data interconnections enabled by the new linked data structure.

## Visually-explorable ontology

Building upon the affordances of the default Wikibase interface, visual strategies in the new ArtBase prototypes include presenting the new ArtBase data model and ontology via familiar interface metaphors, such as pages, hyperlinks, pop-ups, overlays, and sections which can be expanded or collapsed on click. These metaphors are used to enable familiarization with the non-hierarchical, networked model of linked data databases and to propose new forms of user interaction, for instance, exploring the ontology and relations enabled by the data model via links and page descriptions. The properties and items which are used to populate the metadata fields of artwork records are all 'clickable' elements in Wikibase, and the hyperlinks lead to proper pages in the database interface. Instead of retaining this as a purely 'backend' or 'administrative' feature, the frontend user interface could also make use of this native capability of Wikibase and develop these pages into glossary entries, providing textual descriptions and more. Users do not necessarily need to be experts on the entire technical infrastructure of a linked data database if they are able to 'visually explore' the custom terminology and gain a clear understanding of its use in context. This approach to visualizing the data structure of the ArtBase aims to focus users' attention not only on the 'content', but also on the ways 'content' is woven together into particular narratives around works in the archive.

In addition, the ArtBase is not a siloed resource. Just as artwork variants may link out to resources outside the boundary of the archive, its ontology and individual data nodes can be connected to external databases, too. While developed with the specific needs of the ArtBase in mind, the custom ontology relies on some existing standards and classification principles. A richer context around value- and knowledge-production entangled with the classification system for net art variants and data provenance, is made accessible to users via links to those standards. What is more, this fulfils the potential of linked data to enable connections across heterogeneous databases.

## Temporal and performative context

Net art works change and evolve over time, and require reperformance in order to be experienced by users. All variants and reperformances in the Artbase are a part of the data provenance records of their associated artworks. The processes of maintenance entangled within those provenance records need to be made visible to users.

During user studies conducted throughout the design practice, references to the term “variant” and related entities in the ArtBase ontology, such as “access state”, “archival copy”, “webarchive”, and “emulated variant”, proved unfamiliar and often confusing to users. Being able to access individual variants, while maintaining an understanding of the different types of variants and their interrelations, presented a challenge to users. This was an unfamiliar interaction pathway without precedent in existing online collection interfaces. Therefore, the access points to individual variants developed and refined throughout the different prototype versions, aimed to communicate two primary points: 1) which variant is the user accessing, and 2) what is the condition of this variant—i.e. whether it is generally functional, partly damaged, or entirely inaccessible. Text labels, icons, pop-ups and glossary-style descriptions all aimed to aid user understanding of these access points. While many users reacted positively to the updates introduced in Version 3 of the prototypes, clarification of terminology and temporal presentation could still be refined further particularly following implementation with live data.

Besides the access point buttons, the timeline visualizations proposed in the ArtBase prototypes provide an at-a-glance temporal context for the various instantiations, and respective provenance, of a complex, born-digital artwork. The timeline visualizations became a key visual design and interaction strategy, moving away from the conventions associated with object-based museum collection records towards a performance-focused presentation, contextualized within a particular time. However, these too can benefit from further testing and evaluation with users following the design’s integration with live data. In addition, users who found the timeline visualizations useful, also wondered if other timelines could be added in the archival interface, signaling the need to provide further interaction pathways which highlight the interconnections between different data nodes in the linked data database, particularly for users who may not be able to construct their own queries of the data.

## Presenting data interconnections

This final design strategy, or organizing principle of the ArtBase prototype, focuses on new ways of accessing and using the archive, taking into consideration the affordances of the linked data environment and the new data model for the ArtBase. The variant access points, timeline visualizations, as well as the hyperlinked pages of properties and items which combine to make up the new ArtBase ontology, are all examples of different ways to expose connections in the linked data database. But most of these connections are direct, i.e. they are explicitly linked together via a predetermined set of properties (for example, 'has variant' / 'variant of'), or the links are native features of the Wikibase software (for example, the property and item pages).

Other, non-direct data connections can be made manifest via SPARQL queries. too. However, there are few graphical user interfaces which allow users to interact with a database using the full programmatic potential of SPARQL. Until such interfaces are developed, the redesigned ArtBase could integrate the results of dynamic, real-time SPARQL queries into the visual design of the user interface. Displaying the results of ready-made queries does not provide users with full agency over the construction of the queries (i.e. enabling them to pose their own research questions to the database), but it does provide ways for users to interact with the queries and become familiar with the possibilities of manipulating linked data dynamically, without preexisting SPARQL knowledge.

This approach is applied to several of the prototypes for page templates in the new ArtBase interface. For example, the associated items and properties featured in the templates on pp.78/80, are designed as integrated, real-time SPARQL queries. In this way, if a new archival plan is added to the database and later associated with a variant generated by a "Webrecorder capture" process, for example, it would automatically be added to the results of the SPARQL query for "Associated archival plans" on the "Webrecorder capture" item page. In addition, the button provided in the top right corner of the item page templates (see pp.76–77,80) opens up listing pages detailing associated artworks and variants.

During the initial user studies with previous instantiations of the ArtBase interface, a primary concern among members of various user communities was the lack of options for discovering relationships between artworks, which limited the browsability of the archive. Building upon established patterns of interaction in collection interfaces, in which 'related' is a typical feature of most collection item pages, the new prototypes propose an expandable feature for "Related artworks" on all artwork pages.

However, the prototypes developed to visualize indeterminate data connections remain largely speculative propositions. Compared with the interface designs for the timeline visualizations or the property and item page templates, initiating meaningful community discussions about related artwork visualizations proved difficult, particularly without live access to the data and a finished integration between frontend prototypes and backend database. This integration is beyond

the scope of this research project, and would be possible only after further development work is undertaken at Rhizome. Discussions about the potential of generating indeterminate connections via SPARQL queries were carried out within an abstract, conceptual sphere only during the user workshops,<sup>20</sup> and it is likely additional adjustments to the visualizations and precise interactions with them via buttons, menus, etc., would need to be carried out during the implementation stage.

## Conclusion

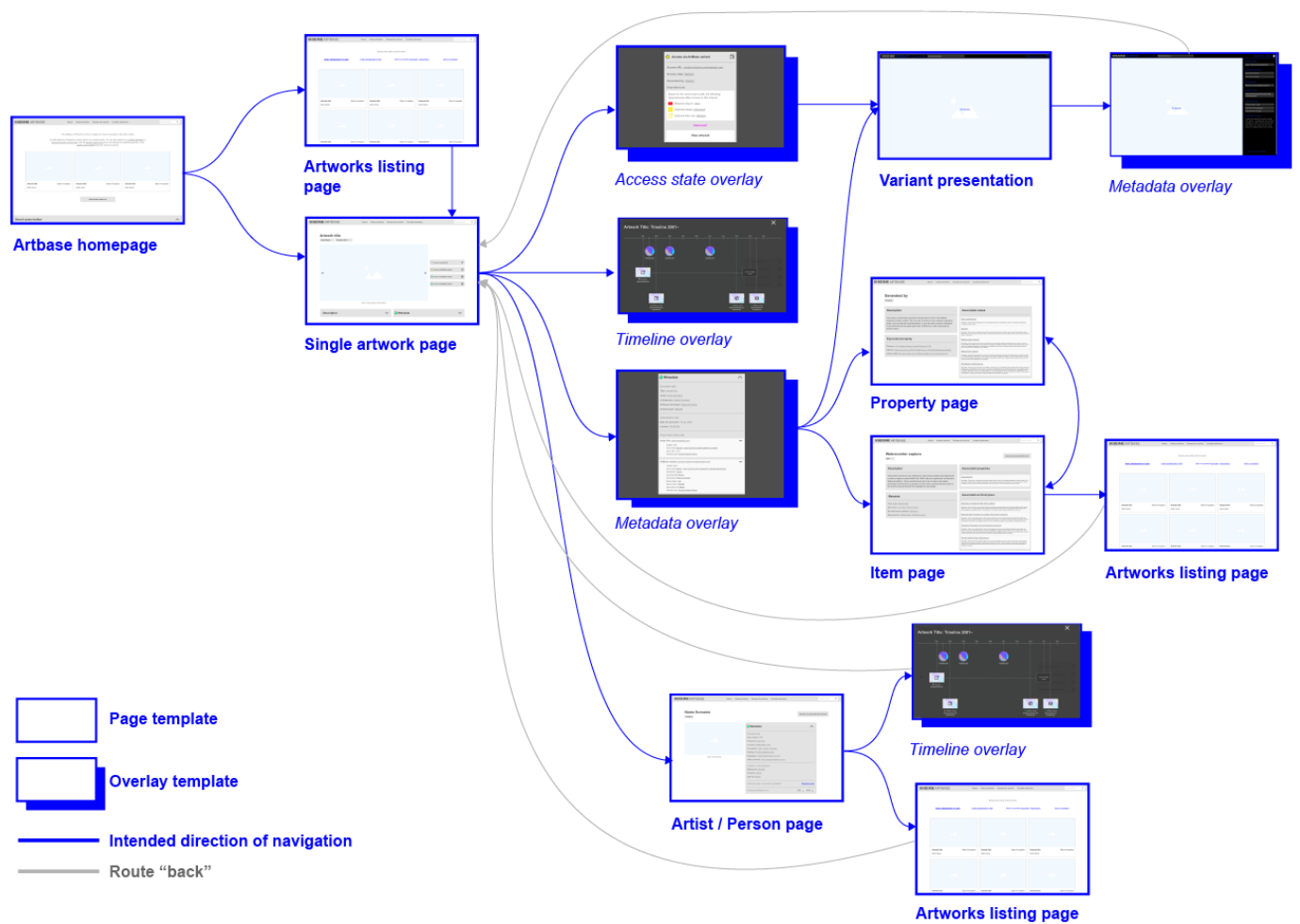
The design strategies discussed above do not invent completely new interaction paradigms. Rather they propose new ways of combining existing interface metaphors (buttons, pop-ups, overlays, timelines, etc) in order to better support user agency across the unfamiliar structures of linked open data, the custom data model and ontology for the ArtBase. Conceptually, the design strategies draw upon theoretical and practical developments in the fields of digital preservation and archival science with regards to the preservation, presentation and classification of complex born-digital artifacts. The application of the design strategies in the prototype visuals relies on some of the built-in features of Wikibase as well as the possibility of drawing out connections across data nodes in the database via real-time SPARQL queries.

Although the full implementation of the prototype designs was not completed within the timeframe of this research project, it was possible to test and model data in the existing Wikibase infrastructure, run SPARQL queries and test what results were possible, and then to share this with users alongside visual design prototypes during workshops and evaluation sessions. The activities discussed in this report involved users as active agents in the design process, all the way from the initial discovery and prototyping stages through to the stages when concrete specifications and recommendations were proposed to Rhizome. The report highlights how specific user feedback informed decisions throughout all stages of the design process. Still, various aspects of designing SPARQL-queries, working with them and making their results accessible via the frontend interface of the linked data database, could benefit from further user research following Rhizome's implementation of the prototype designs in practice. Such research would provide additional insights into how specific design strategies can better support continued user involvement with the archive infrastructure following the initial redesign and launch.

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20 This does not diminish the potential for useful insights from such discussions. Drucker has noted that “the study of the relational features of any material artifact and system puts us squarely into the realm of diagrams and the study of the semantics of relations.” However, she also observes that the diagrammatic dimension does not rely on visual graphical forms only, instead relations can operate at various levels of abstraction: logical, mathematical, social (2013, par. 27). Hence, even without visuals of live, dynamic updates of the data in real-time, users can still have meaningful discussions about the possible relationships that the linked data model and new ontology could enable. These discussions influenced the design of the final web-based prototype, which will be taken further into the implementation stage by Rhizome.

# Appendix



## Web-based prototype—Navigation map:

This map sketches out the main paths a user can navigate through the ArtBase interface prototypes. As an interaction aid, the map helps manage user expectations by outlining the boundaries of the prototypes. As a design tool, the map also helps set out the priority areas for development of the ArtBase interface. The prototypes do not capture every possible interaction with the elements listed on each page, so the map only includes areas that are explorable, and therefore a priority for design and iterative refinement with users.



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