ARTBASE REDESIGN: PROTOTYPE DEVELOPMENT

4

Design Exploration and Evaluation

2018–2019

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 interative 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 recommendataions 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.

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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.[1] 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[2] 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.

Introduction

Problem statement

In the fields of UX design and HCI, there has been substantial research 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.

Complex digital artifacts, such as net art works, on the other hand, 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 also 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 so far covered the first Phase of the design process (Discovery and user research), consisting 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 focuses on activities carried out throughout the remaining Phases of the design process, as these are very

much interdependent, rather than linear, easy-to-separate processes. 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). Activities carried out throughout these micro-phases influenced follow-up activities. This report traces how the iteratively developed design propositions become both an outcome and a method of this research practice.

Methods

The iterative prototyping activities included working with a variety of materials: low-fidelity sketches and wireframes, diagrams, clickable visualizations, etc.. Each design iteration generating a prototype can be a considered a micro-phase during the Design exploration (Phase 2), 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 and running workshops and feedback sessions with users using methods like A/B testing,[3] semi-structured interviews, surveys, etc. One specific method for 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 interface of the archive, 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, 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) have devised the

3 See: https://en.wikipedia.org/wiki/A/B_testing [Accessed 14 May, 2019]

“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.[4] Thus, this final report of the PhD portfolio aims at rendering the design process as a whole more visible and open to reflection, critique and future iteration.

Lastly, the annotated sections in the report are illustrated with snapshots from the different versions of the interface prototypes and data visualizations. The illustrations are purposefully not focusing on visual style, but more on function and layout. Style-wise they leave multiple options possible for implementation by Rhizome. Rhizome could choose to keep the original Wikibase[5] 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 which went through 3 stages of iterations with intermittent user feedback workshops which were organized between each major iteration. The Version sections illustrate and discuss the design decisions behind specific design elements and interactions introduced in each version. There are Workshop and Evaluation sections, following the Version sections, which include short summaries of the proceedings for each session and relevant user feedback. Additionally the report draws on previous reports, more specifically 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 scope 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 in the end of the

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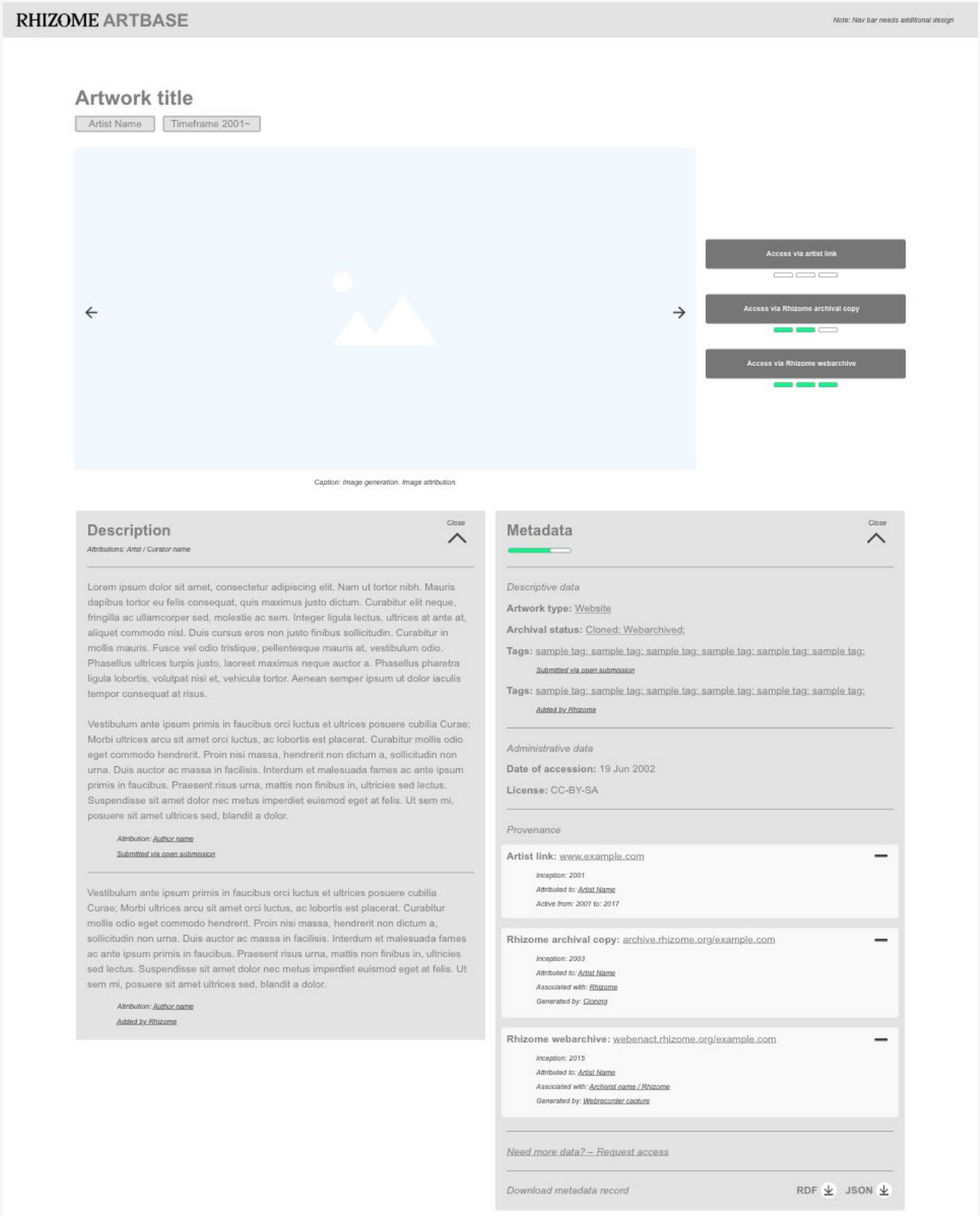
4 “Annotations and the designs they annotate are mutually informing. … Annotations can shape how artifacts are appreciated and understood, and what scientific and aesthetic value they might have, as well as suggest future research and design possibilities.” (Gaver and Bowers, 2012, p.46-7)

5 See footnote #1.

report—which remained just a prototype rather than a dynamic implementation with live data. While the web-based prototype provided opportunities to test specific interactions and the details of the underlying data model with users, most 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 here could result in further adjustments and updates to the design, which will certainly require additional user testing and evaluation. What is more, the methodological approach 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 conceived as a solution to all aspects of the research questions initiated with this project. Instead, these outcomes are conceived as carriers of provisional and context-specific propositions relating to the design 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 cannot list all of them, but provides some direction for further research in the concluding section.



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 is in line with most of the interfaces reviewed in Report #3, user feedback documented in Report #2, as well as the co-design proposals from the user workshops (see pp.36–37):

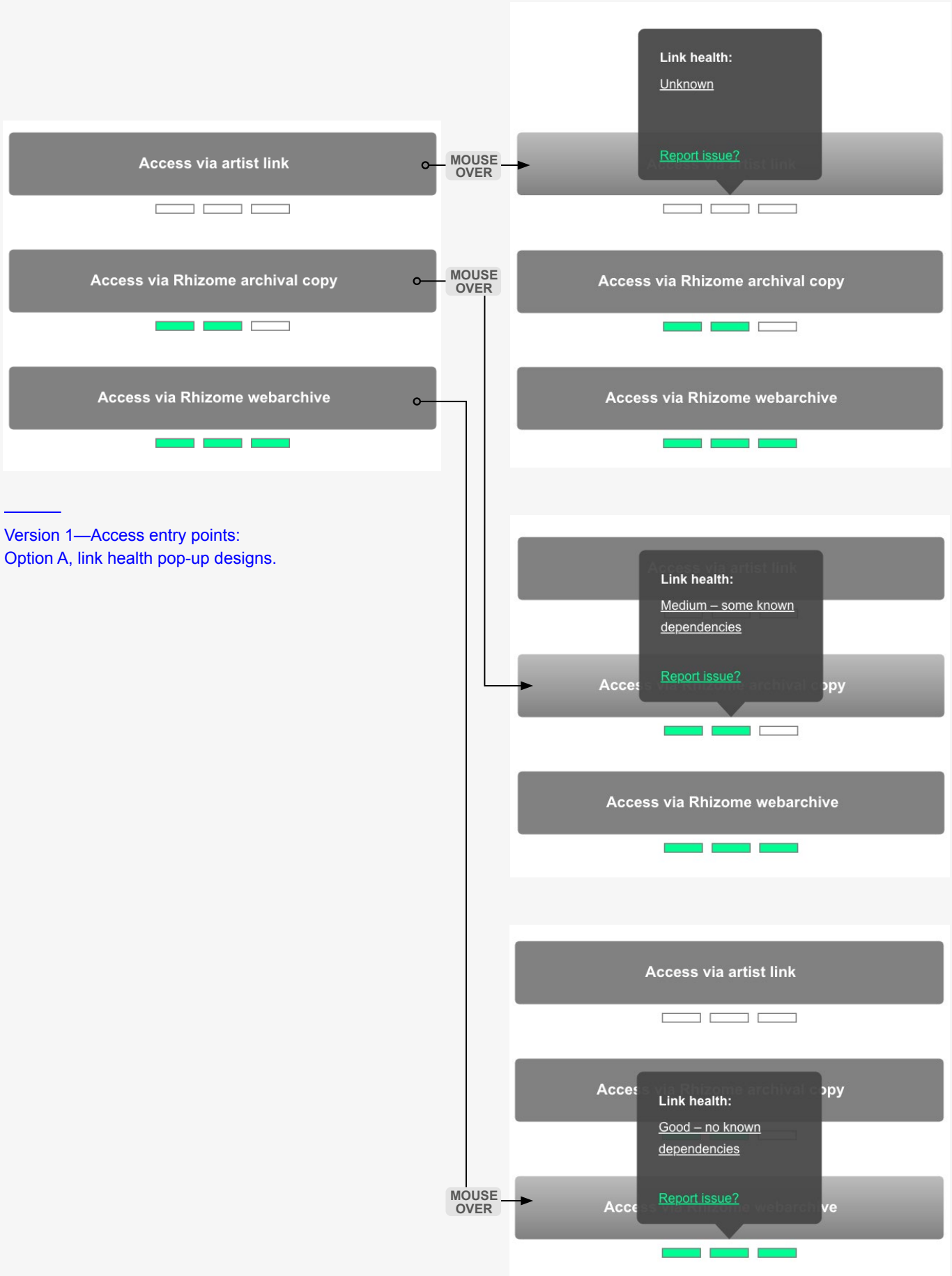
> ❝
>
> **As an ArtBase user, I want to see more temporal contextual information around each artwork, so that I have to do less research in other sources.**

> ❝
>
> **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 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.**

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

- **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 that button follows in a later section.
- **Images** – a few images (however many are available in the database) take a prominent space on the page as a slideshow. These are also accompanied by appropriate captions.
- **Artwork access entry points** – the entry points require to be clearly identifiable and occupying a prominent position.
- **Artwork description and metadata** – these elements can be expanded or collapsed if/when needed.
- **Further metadata** – if available, further expandable elements would be situated below the metadata element. These could include: related research (for literature that cites the artwork directly), exhibitions (for exhibitions the artwork has been featured in), and finally related artworks (only when present).



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

Artwork access entry points

The access points to the artwork need to communicate two main points – what variant[6] is the user accessing (and where) and what is the condition of this variant – i.e. is it completely inaccessible, partly damaged, or generally functional.
To achieve this the different access points to different variants are clearly demarcated as separate buttons with text labels. What might be the best way of labeling them remains open for testing. The first iteration of the design uses the following terms:

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

The terms that need testing with users include “access”, “archival copy” and “webarchive”. While these might make sense to someone familiar with the ArtBase and the artistic and preservation programmes at Rhizome, they will likely be more difficult to decipher for new users.

The buttons are otherwise designed to work well alone or in combination, and as many buttons can be added to the record page, as there are variants. Future variants might also include “emulated archival copy” or other terms describing emerging preservation strategies.

By denoting the origin of the entry point – “artist” or “Rhizome”, the design also aims to give a hint to the user where they might be going once they access the artwork – whether they will stay on the Rhizome domain or will leave the archive.

Finally, the indication of the functional state of the entry point needs more testing. The initial design includes 3 bars underneath each button. They are meant to function as “stop lights” – lighting up as 1, 2, or 3 colored bars depending on the “health” of the artwork entry point. But in order to avoid putting users off access to less “complete” variants, the color green is chosen over a more traditional combination of red, yellow and green. The concept is that 1 green bar indicates “poor” condition of access, 2 green bars indicate “medium”, and 3 indicate “good” access. In the cases where some access points, particularly artist links, are not audited by an archivist, the bars would all be white.

This initial version of the design also features two options for how to reveal further information.

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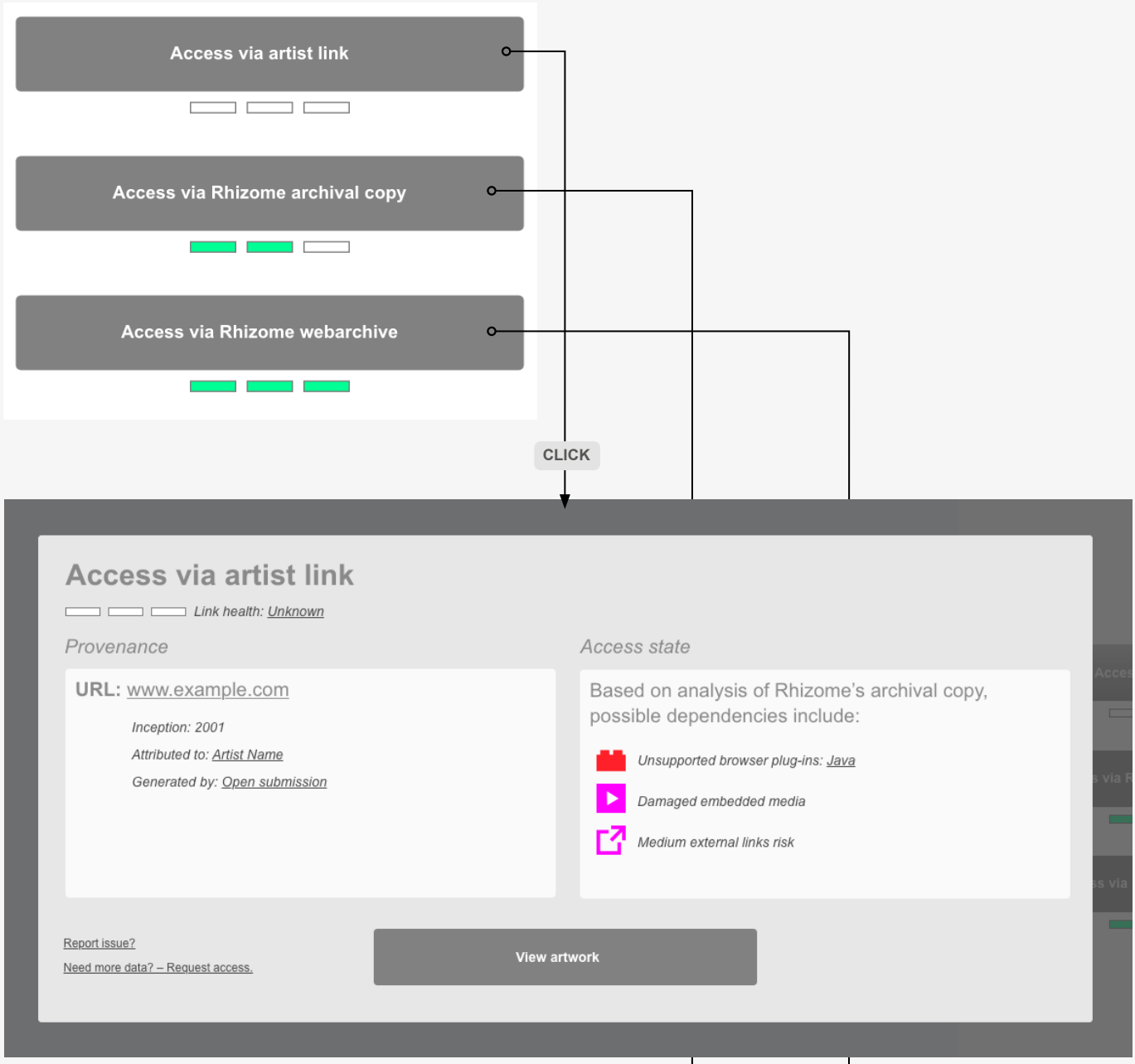
6 Variant is the term used by Rhizome to denote an instantiation of an artwork other than the original instant made by the artist and maintained on their own infrastructure. Variant is preferred to other terms such as “version” for example, to avoid miscommunication, if the artist themselves release 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 entry points:
Option B, access state overlay designs.

Option A

Option A only provides a mouse-over state for the green bars indicating the condition of the entry point. This mouse-over state includes a small pop-up box containing the label “link health” – aiming to suggest that the green bars indicate the “health” of the entry point. Below the label, there is the value for “health”, which in the particular example shown in the visual mock-up includes options for “unknown”, “medium” and “good”. The latter two values come with 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:

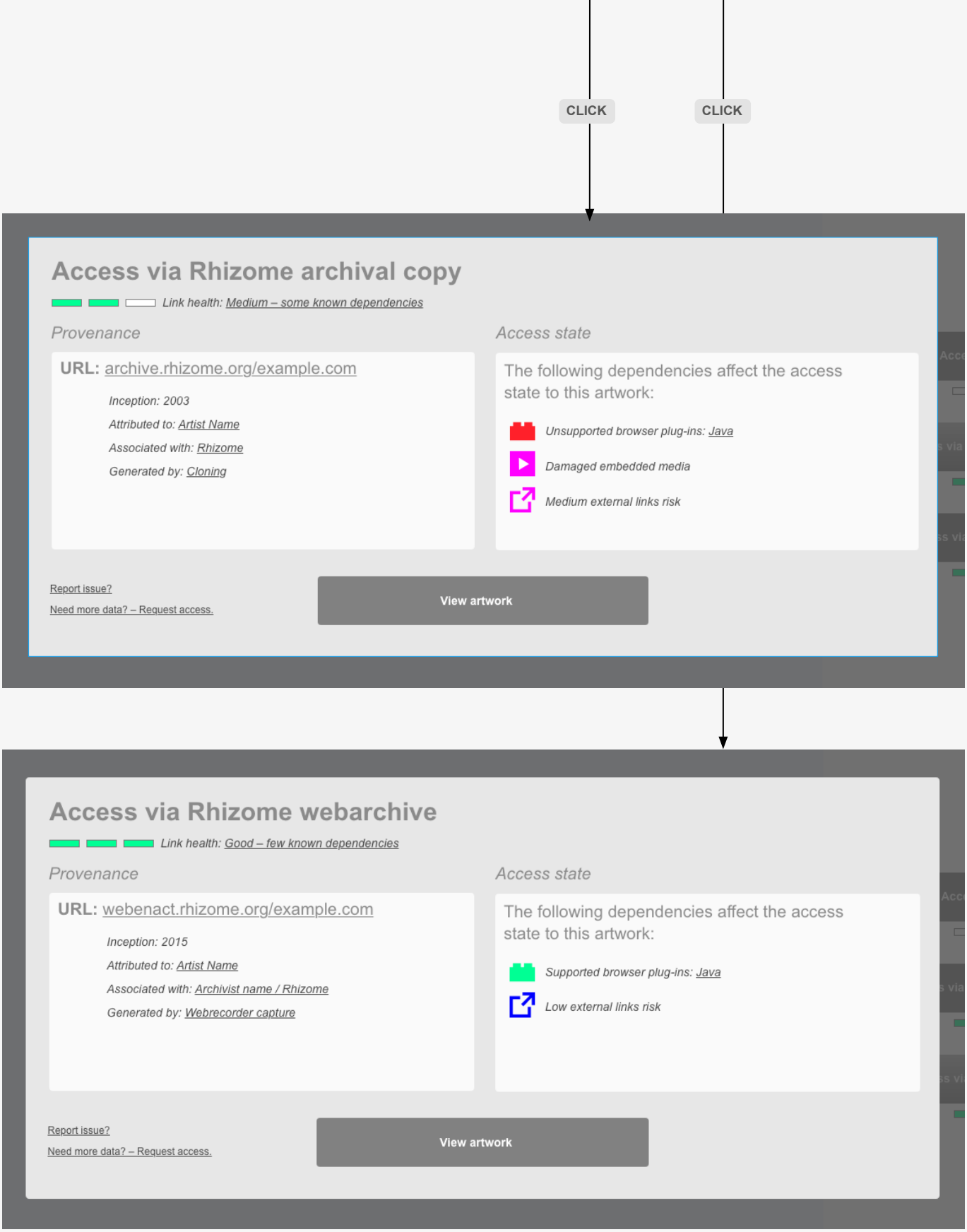
1. To suggest that the ArtBase is not a fixed and authoritative archive, but rather (like all born-digital archives) – in flux, constantly changing and needing help from its users to stay up-to-date.

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 could fill in the title of the artwork and report that the condition of the entry point may have changed (gone broken) since the last official archival audit. This would be particularly useful for artist links, since Rhizome do not have the resources to constantly audit and keep track of these.

This version of the design keeps extra data to a minimum in order not to overwhelm casual users. If specialist users want to get further details, they can click through to one of the “health” links, or go further down the page and read more in the metadata section.

Option B

Option B opts for all the features in Option A, but also provides an additional layer of information to users before they “enter” the artwork. In this option, when users click on the “Access” buttons, instead of being redirected to the appropriate variant location, they will first encounter an overlay screen – an intermediary step – giving them extra information on 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 may be new to the Artbase or who want to get all of that additional detail, so they can have a more informed understanding of what they are looking at once they “enter” the artwork.



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

The overlay screen includes a darkening 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 need further user testing).

Provenance includes information about the URL of the entry point – which would immediately indicate whether the user is about to go to a domain under Rhizome’s control or the artist’s maintenance. Additionally, the *Provenance* box has information about how the “entry point” was generated, who it is associated with, when it was created, etc. – all information provided as part of the new data model, compatible with the PROV standard for data provenance, developed for each artwork variant.

Access state is meant to shed more light on the “link health” indicators. How was the “good”, “medium” or “poor” link health evaluation decided? Under *Access state*, a listing of software dependencies (with iconographic representation and labels) are color coded and aim to provide 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 archivist Morgan McKeehan and includes information on browser-plug-ins, external media, embedded media, risk of external (or internal links) etc. At this early stage of the prototype, these labels are not fully resolved and a few are used here just as place-holders for testing. The color scheme applied to them – red, magenta, blue (instead of the traditional red, yellow, green), is meant to indicate (similar to the other “link health” indicator bars) that this is not 100% accurate information. Instead it is approximate and subjective – based on an audit, which is subjective and may get quickly outdated in any case. But since users in the initial user studies requested more information about the technical condition of the artworks, this low level of technical detail is considered an improvement over a completely opaque approach which provides no information whatsoever.

Since “dependencies” is not a common term, unless you are familiar with digital preservation (or software development), a short textual explanation precedes the iconographic representations. In the case of the artist link, the text indicates that the dependencies are determined indirectly. In the case of the variants, the text simply states that the dependencies affect access to the artwork. The question of how to communicate 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 big and clearly labeled button invites users to “view the artwork” – switching the language from “access” to “view” is meant to indicate the transition from the metadata record page view of the archive to the actual interactive artwork experience.

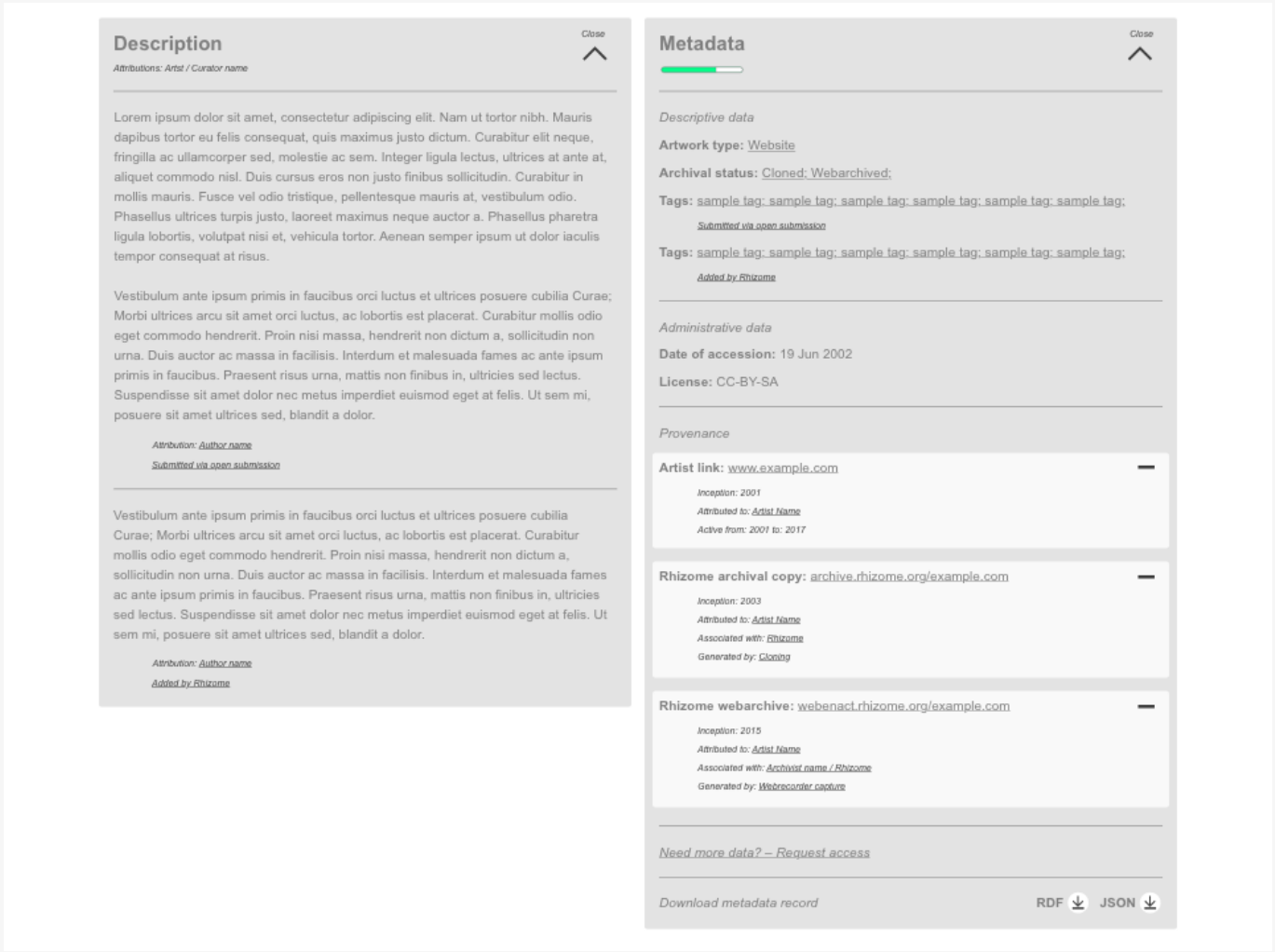
❝

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.

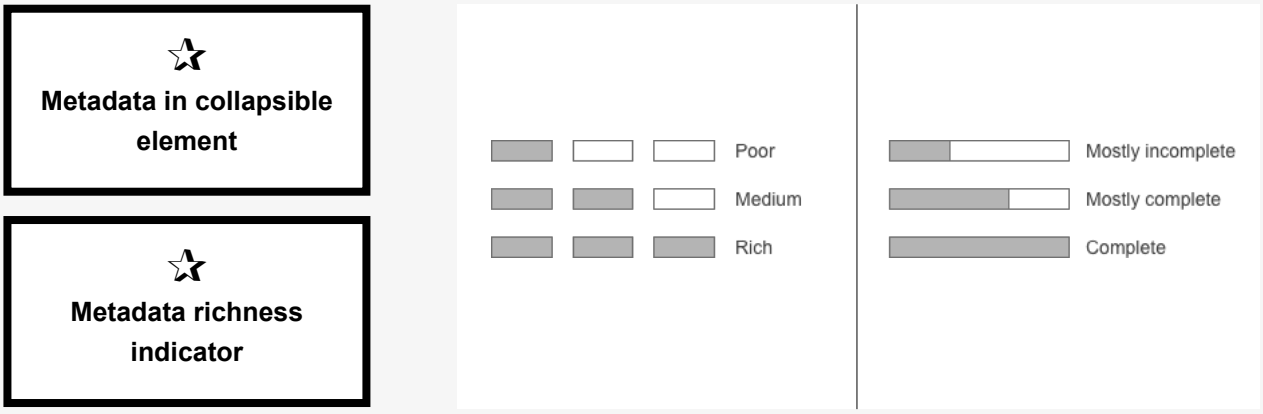
❝

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.

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



Version 1—Description element and metadata element in expanded states.



Feature cards and mockups of metadata richness indicators from the review of online collection interfaces, Report #3, pp.128–129

A few other additional interaction elements, include (again) the option for users to “report an issue”, as well as the further option to “request access” to see more data, since additional technical metadata is likely to be present in the Wikibase database, but not necessary in the public frontend interface. Whether researchers who request access are given the option to “login” into the Wikibase view of the database, or simply given a metadata dump, is yet to be decided by Rhizome, but both options are practically viable.

The prototype then stops at this point and does not pursue further the visualization of the actual variants, this is developed in Version 3 (see p.83).

Description expandable element

The description element was split out from the rest of the metadata section, because it is the only metadata for the artworks available as natural language text and not as structured data. Additionally, since many of the descriptions were provided by the artists themselves, they should be treated differently from other types of contextual metadata provided by e.g. Rhizome archivists.

The expandable element aims to provide a clear provenance for the piece of natural language text, in terms of who it can be attributed to and how it was generated (following PROV principles[7]). This is especially important in cases where there might be two descriptive texts, one written by Rhizome, and another by the artist.

Metadata expandable element

Similar to the various conditions of the artwork variants, the state of metadata in the ArtBase is widely varied across different artwork records. To indicate this (and to be open about it, in line with theoretical developments in archival science), an indicator system similar to the green bars under the access buttons, is developed for the metadata element as well. 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 thi is a long thin rectangle, which would “fill 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”. The bar would never be completely empty, because there is some basic level of metadata for all artworks.

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 with a label (“Metadata richness”) and a value (“medium”, “high”, etc).

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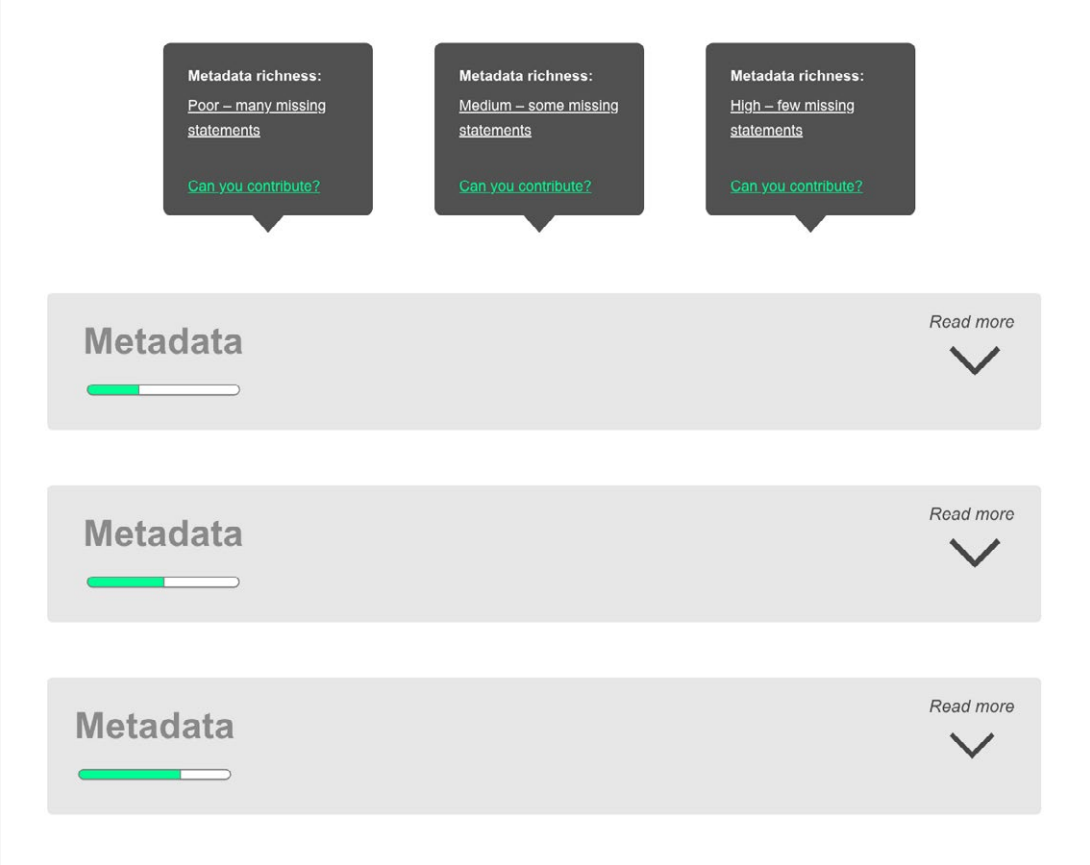
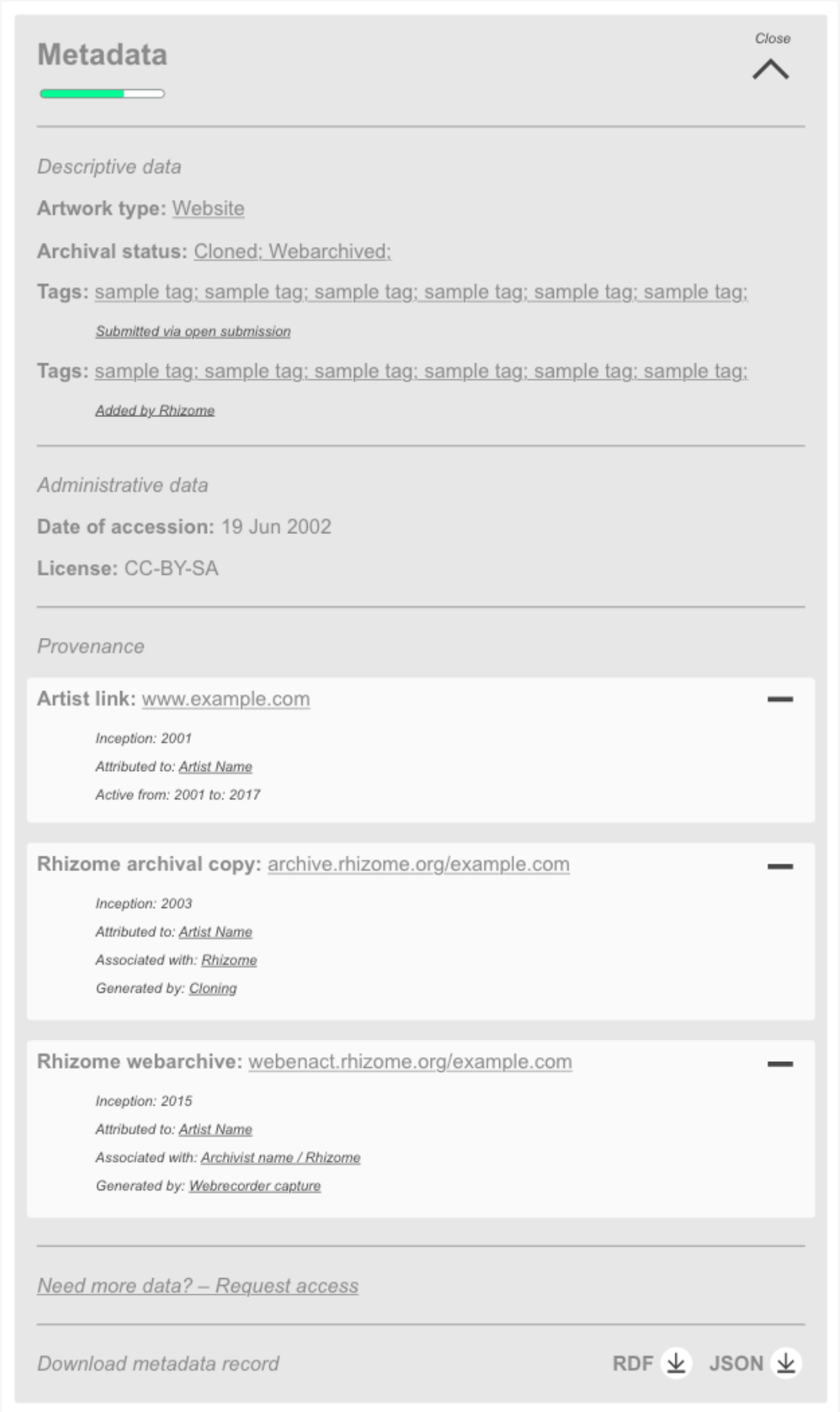
7 PROV is a W3C ontology and data model used to describe data provenance on the web as linked data. See: https://www.w3.org/TR/prov-overview/ (Accessed 10 Dec 2020). The use of the PROV model in the metadata structure of the ArtBase redesign is discussed in more detail in the thesis accompanying this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



Version 1—Metadata richness indicators and pop-ups



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

Additionally, users have the option to contribute metadata – via the “Can you contribute” link. Again, as with the “Report issue” link, Rhizome has the choice to either let users login into the Wikibase database and contribute there directly, or to simply go to an online form and fill in data there. The former requires trust in the community of users not to vandalize the database and archivists to police the contributions, the latter requires archivists to vet the information 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 potentially valuable user-generated metadata.

Once expanded, the metadata element includes 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” or “Webarchived” or “Emulated”, based on the available variants)
- *Tags* (with appropriate attributions via the PROV model)

All of these terms (and grouping headings) need to be tested. The *Artwork type* is not meant to indicate genre or movement – all artworks in the ArtBase are some flavour of net or internet art, but they are not all websites. It is also 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, nonetheless. This might be also the appropriate place to introduce the concept of “artwork documentation”, which was noted in the most recent ArtBase audit, since some artwork records contain links only to websites documenting the artwork (e.g. if it was a performance with limited duration), rather than constituting the artwork itself.

The next grouping of metadata is *Administrative*, consisting of information about licensing and acquisition date, though this may change as licensing data in the ArtBase is not historically 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. This data is already 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 made expandable/ collapsible on demand.

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

Finally, the last possible interaction inside 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 will be given an option to download an RDF or JSON file of the artwork record.[8]

Related research and exhibitions expandable element

Related research and exhibitions are similar expandable elements. They list a series of related database items in textual form. They include the title of the item – a publication or an exhibition. In the case of the research publications, basic statements about the publication such as attribution and source will also be shown in the frontend. In the case of the exhibitions, these statements will be related to date and location. Since these items will have their own Wikibase pages, additional data could be recorded there, if available and relevant.

Related artworks expandable element

This element is important for the redesign, since a primary concern in the findings from the user studies is the lack of ways of discovering relationships between artworks at present, 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, along a few different possible directions of relation. These possible directions include: common creators or collaborators, common tags, common research (publications) or common exhibitions, as a start. The style of the visualization follows some existing conventions of 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 the relationships to be drawn. The current artwork marks the centre of a “scored field” which is subdivided into quadrants. The quadrants are 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 just 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 – e.g. creator, or a specific tag, or exhibition, etc.

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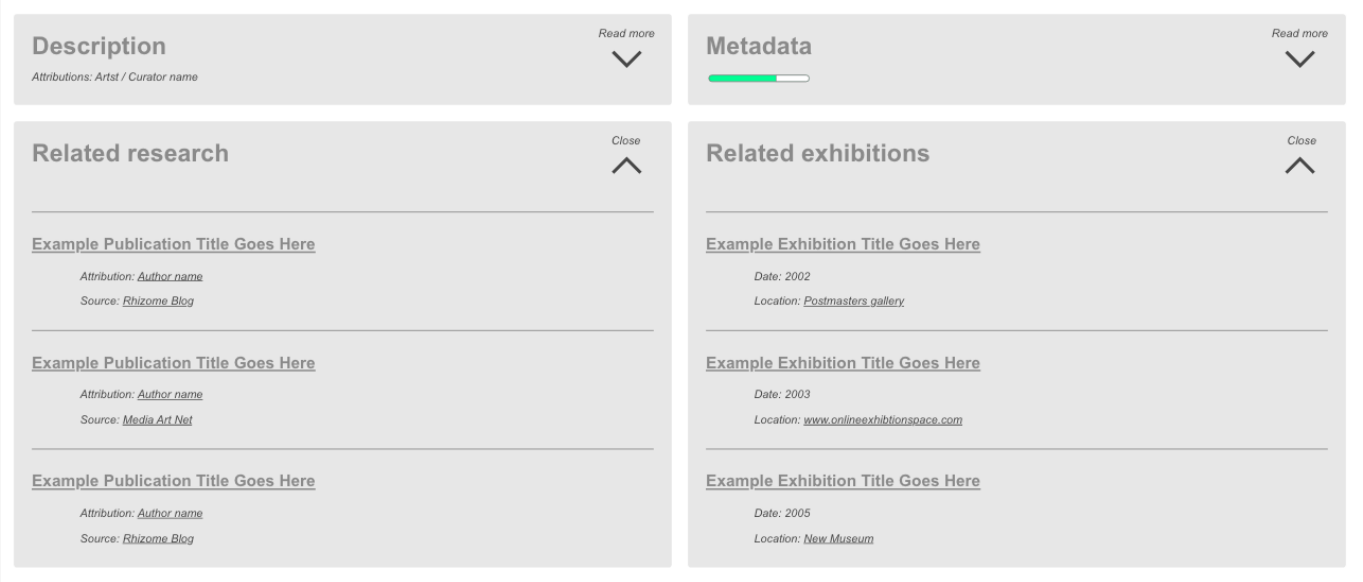
8 RDF and JSON are machine-readable data formats available for export from a linked data database, sich as Wikibase and its public version, Wikidata. The possibility to download machine-readable data from the database is useful not only for internal maintenance of the archive, but for external scholarship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



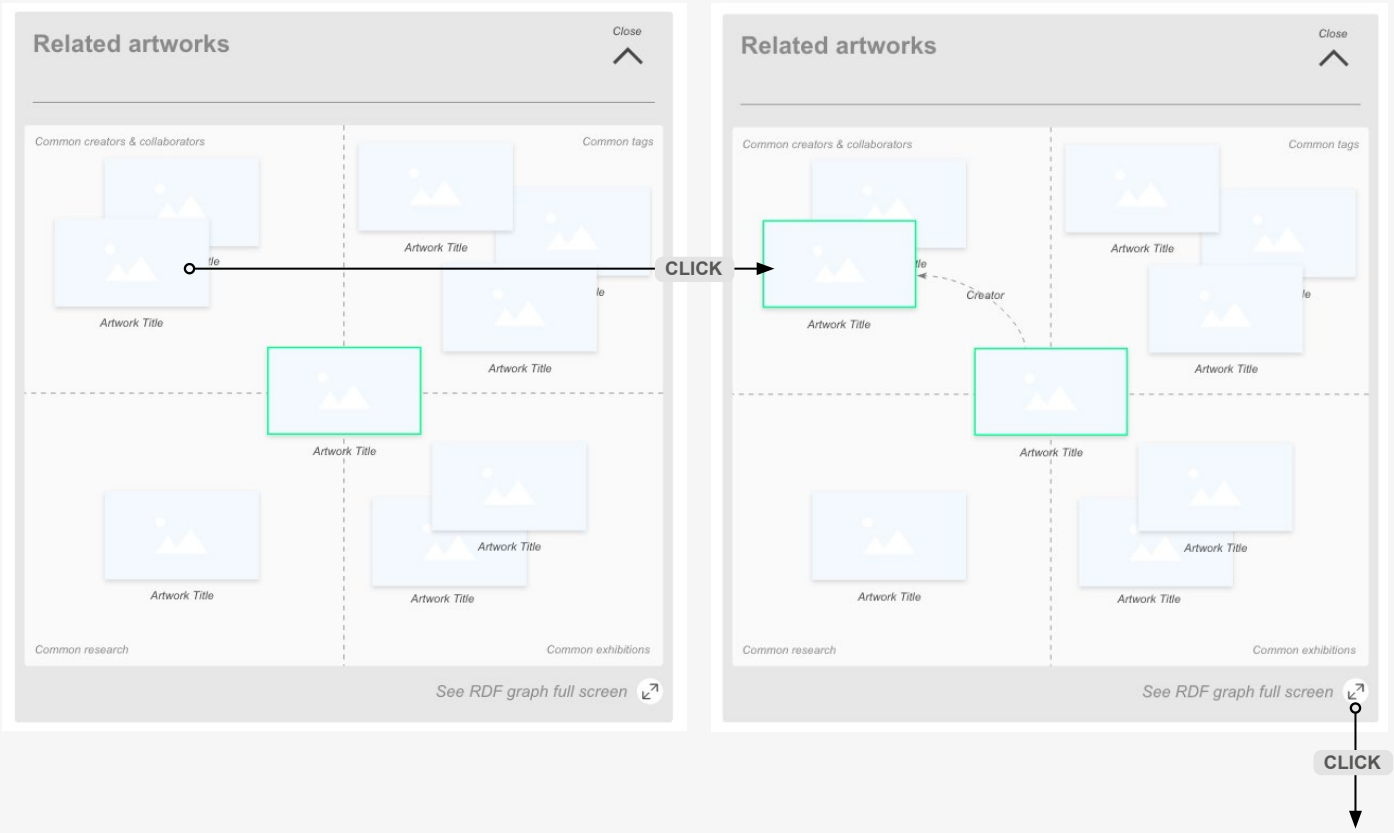
Version 1–Expanded views of the Related research and Related exhibitions page elements

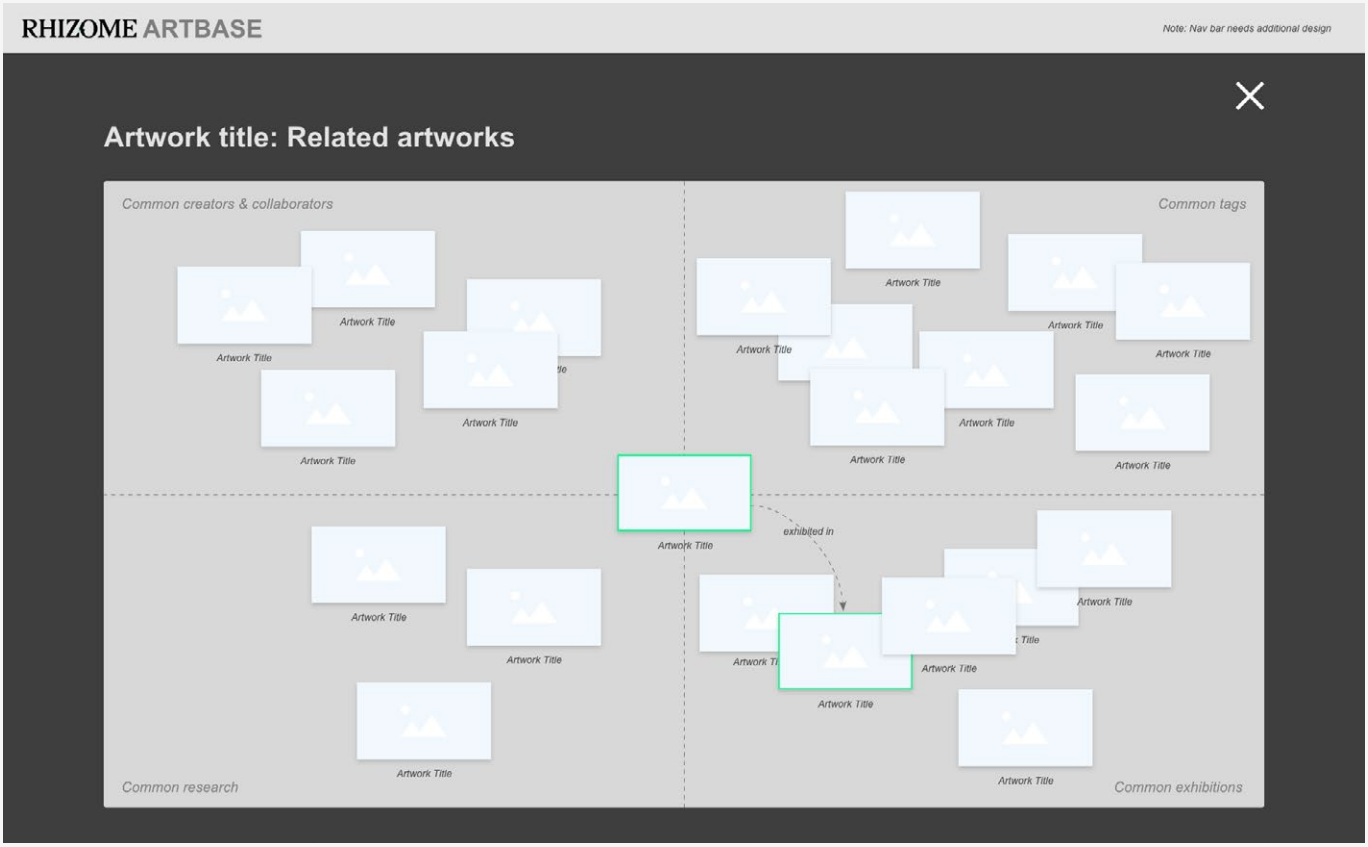
> **As a researcher, I want to see information about exhibition history and publications featuring the work, so that I can get an idea of how the work has been shown and received over time.**

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

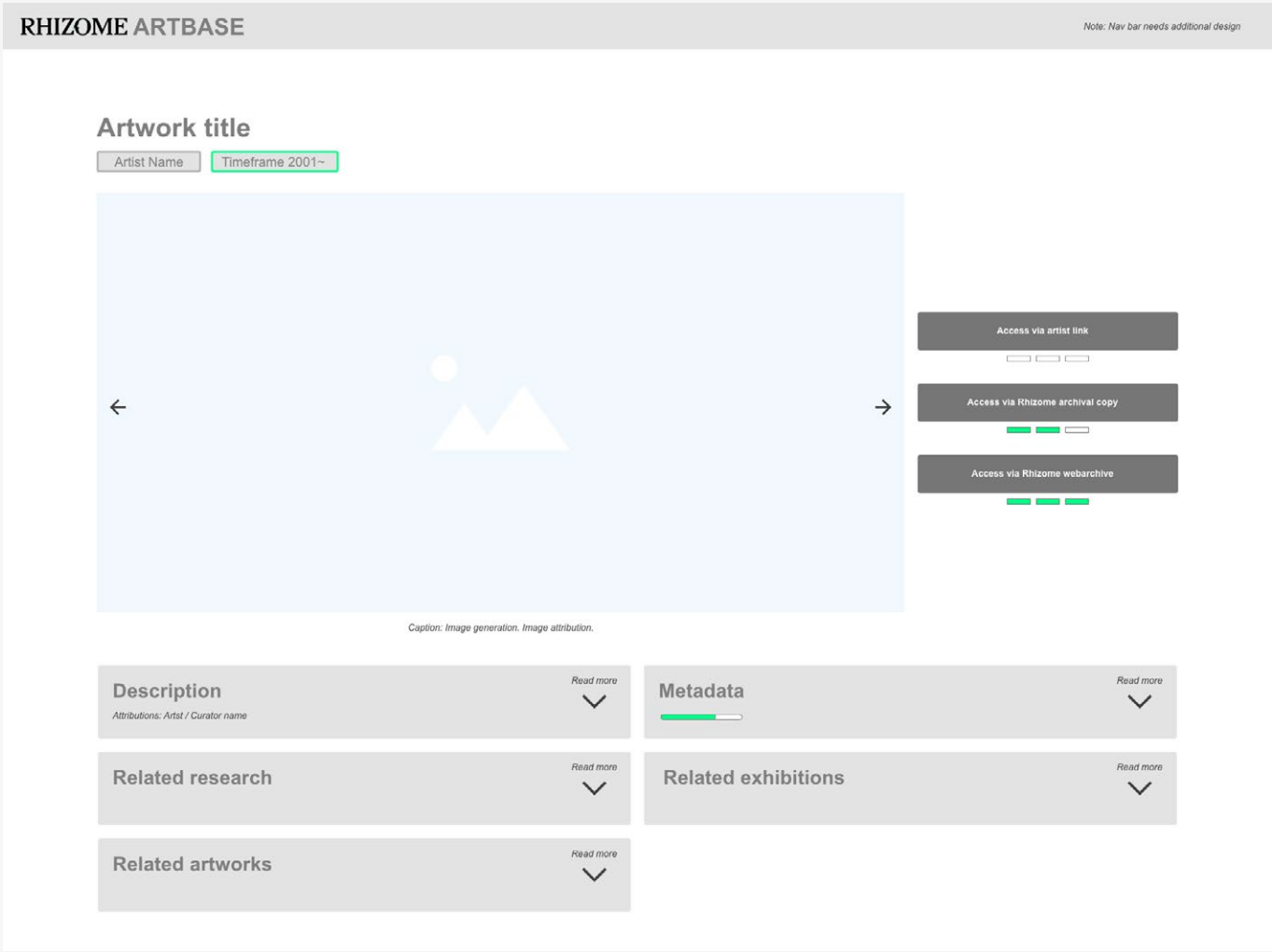
> **As an ArtBase user, I want to see selections of related artworks, so that I can explore the collection through the relationships within it.**

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





Version 1–Expanded views of the Related artworks page element, showing possible user interactions leading to a full screen view mock-up



Version 1–Artwork page mock-up higlighting the timeframe access point

Initially, since 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 (distant) related artworks and the field is expanded to span the full screen (against a darkened background). The scoring remains 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, e.g. 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). This work needs a lot of additional user testing, but could be a promising way for users to engage with the SPARQL endpoint[9] of Wikibase without actually writing 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 that network graphs are the most effective way to present relations, even if they are visually engaging.

Timeframe

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

At this point in the design exploration phase, the timeframe maps fairly simple concepts – the date of inception of an artwork in all its variants – artist link, archival copy, etc. It can also map exhibitions (or other significant events) associated with the artwork on the timeline. As more research (and audits) in the ArtBase are conducted, ideally additional events, such as the point in time when an artwork link stopped being active (essentially when it was taken offline), or when a crucial dependency in the performance of the artwork became broken or damaged.

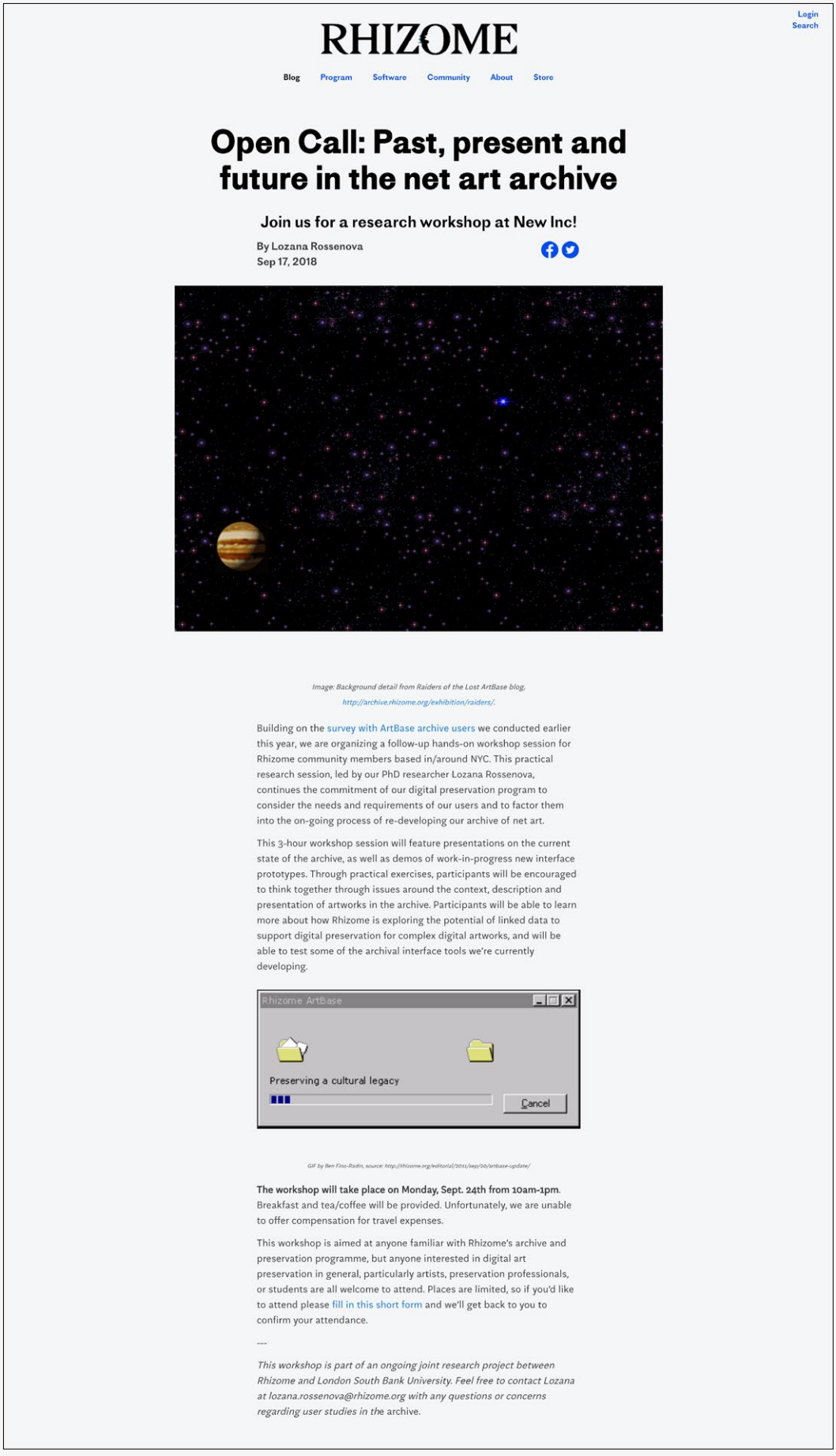
Artwork variants and events are represented by stand-in surrogates (thumbnails and labels) and connecting lines link events associated with the same variant, such as date of inception and date of de-activation. Additionally, since the

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 [Accessed 3 September, 2017]. See also footnote #2.

Version 1–Full screen expandad timeframe view

Timeframe button is quite high in the layout hierarchy of the record page, many users might click and open this visualization first – before exploring the access buttons or the metadata elements. Therefore, they may not know what the various surrogates represent and what is meant by the different variants. The URL addresses will be visible to provide basic indication of the locations of the variants, but this may still be not enough context. To account for this scenario, mouse-over states over the surrogate representations provide additional contextual information. These mouse-over state boxes can once again be framed within the context of “provenance” metadata – and provide some of the basic details of how or by whom the variant was created. The “See more” link will take users back to the artwork record page – more specifically, to the detailed metadata element (in expanded form).

The aim of the Timeframe visualization, and the position of its entry button, is to properly account for the role of time in the lifecycle of digital artifacts. Additionally, it can give an at-a-glance temporal context for the various instantiations, and respective provenance, of the artwork – something users have been requesting in the early user studies. Finally, this may not be the preferred way of interacting with the artwork record for all users, but it will provide an additional view. In current research on visualizing cultural heritage collections via digital interfaces, the possibilities to have multiple levels of granularity and views into a record has been widely recognised as an important user need (see the Bibliography for Report #3).



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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.

GIF by Ben Fino-Radin, source: http://rhizome.org/editorial/2011/sep/20/artbase-update/

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.

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 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).

ArtBase redesign: prototype development

User workshop 1

This workshop session was conceived as a mix of user testing, usability and co-design exercises aiming to engage users with the Wikibase infrastructure of the archive, the newly designed prototype, and to explore users' conceptions of what an artwork record in an archive should look like. The session ran 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 format of the workshop. What follows is a summary of observations and user feedback gathered during different parts 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 found it confusing **navigating the Wiki UI "horizontally"**: particularly so, once they end up clicking into property values (which are also database items with separate pages) and then wondering how to get back to the artwork they were originally looking at. Some suggested some form of **breadcrumbs** would be useful, in order to track their own pathways of browsing the database.

In terms of the **terminology** used in the Wiki statements, some users found terms like "inception" and "outside URL" confusing. Some users also asked for descriptions for the "creator" and "instance of" fields. They wondered how they can get more information about the role of the creator or the definition of "artwork".

There seemed to be an interest among users to not only use the database, but understand more about its structure and affordances, given the relative novelty of linked data systems. A few users suggested there should be a page dedicated to **explaining the basics of linked data for new users** and also a dedicated page **explaining how Wikibase work**. 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

Explore the archive records for 3 artworks. Suggested artworks:
– Untitled[scrollbars] by Jan Robert Leegte
– [V]ote-auction by Ubermorgen
– VVebcam 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.

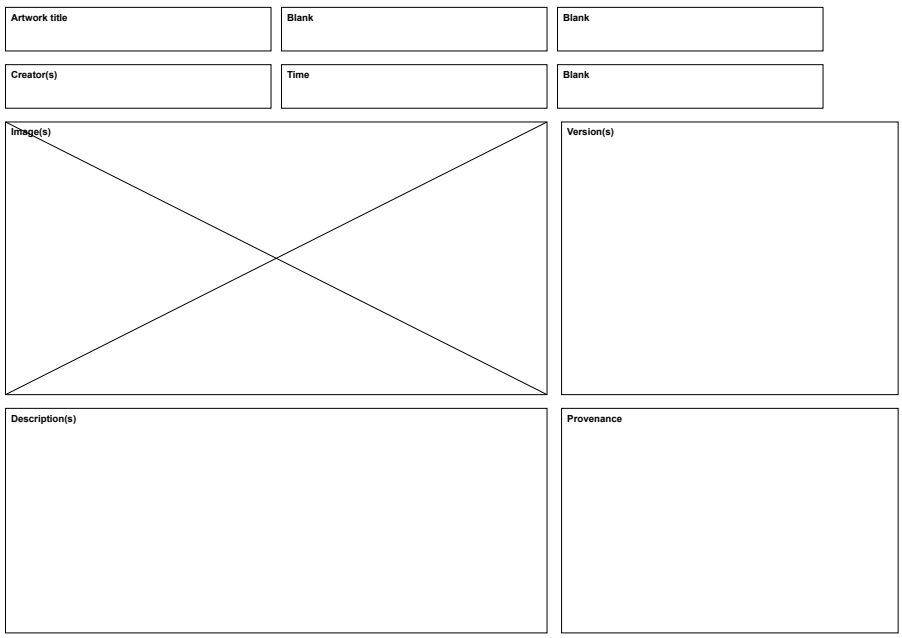
Feel free to add any new metadata elements that you thing should be provided with each record, and/or fill in some sample data the way you think it should be provided, even if we didn't have such data in our archive records that you explored earlier.

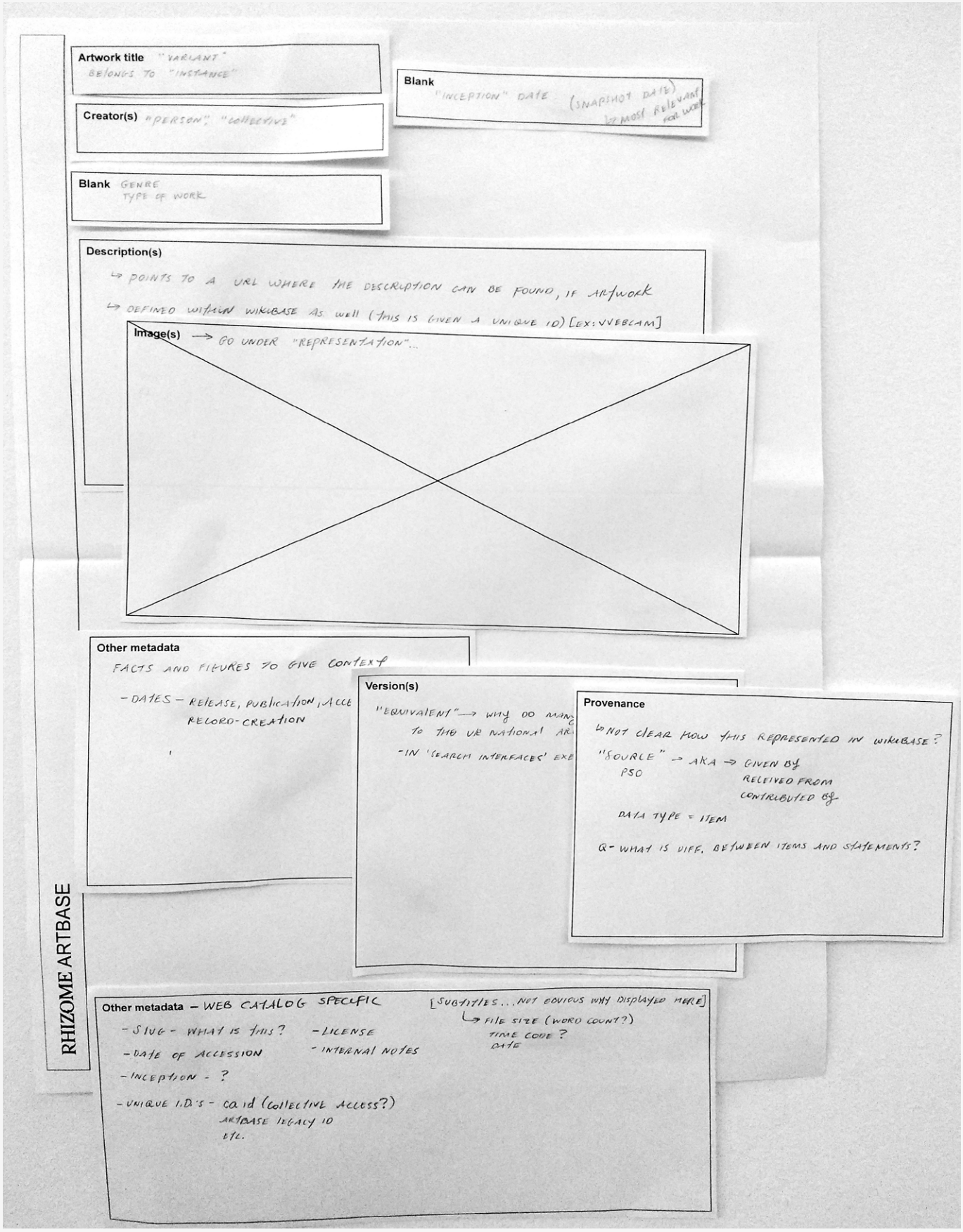
PROTOTYPE A/B TESTS

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).





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 just *Blank* – meaning that users could assign their own labels. They were asked to arrange them into record page layouts. Out of these predetermined choices, the top 5 elements which users positioned 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 most users considered these elements to be most important to be near the top of the page, whereas other metadata elements, including *Version(s)* and *Provenance*, and *Other metadata* were typically positioned lower on the page (see images on pp.34, 36, 37, 38, 40).

The most requested additional labels for metadata fields, which users marked on the Blank cut pieces, include: “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”, “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 related to different sections of the prototype.

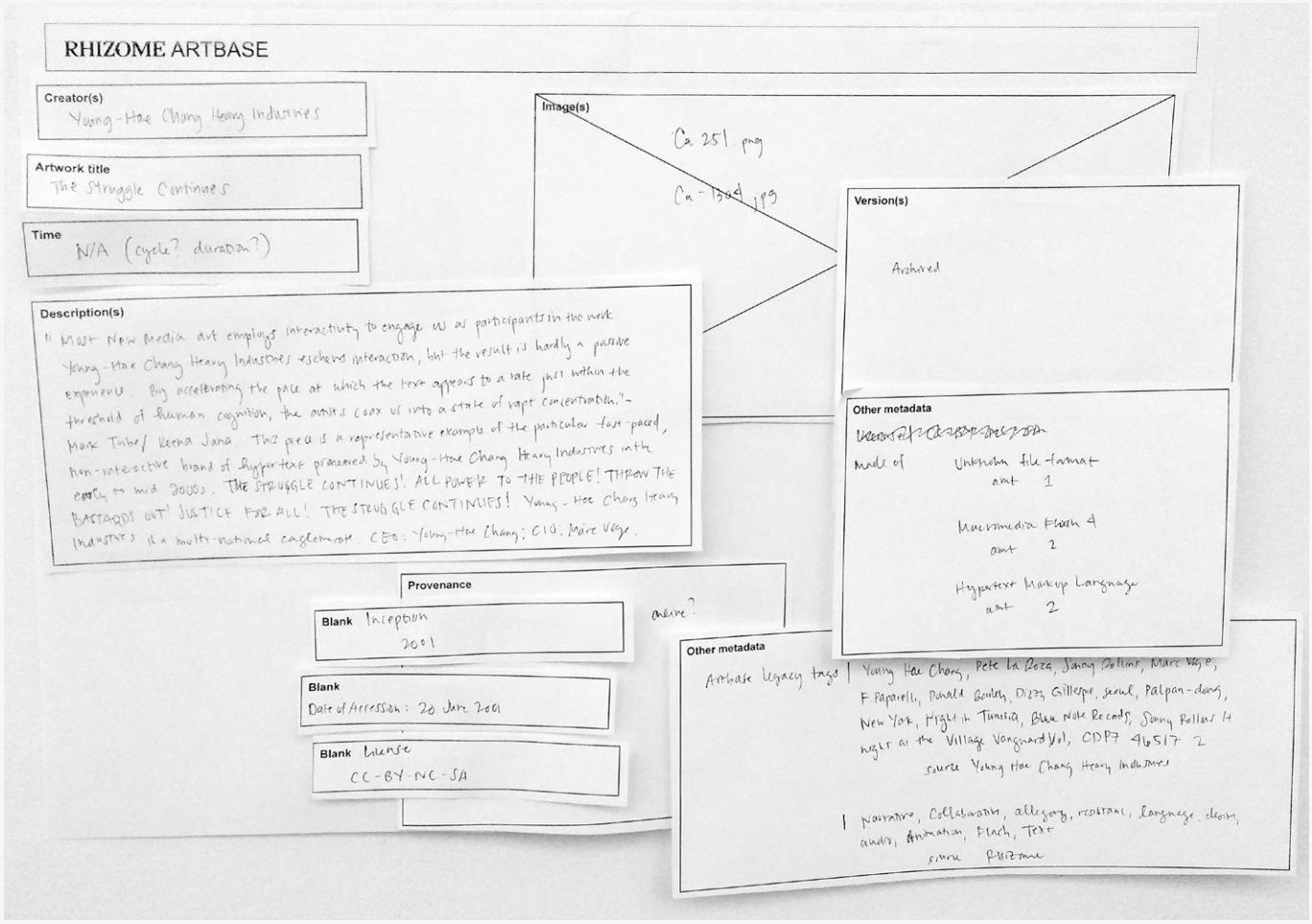
Artwork access points

A few users were unclear about what the green rectangles beneath the access points signify, e.g. one user thought they relate to file size. A few users suggested that a single colored icon using a system of **traffic light colors** would be more clear to them in suggesting how functional/ dysfunctional access to the artwork is.

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

Metadata section

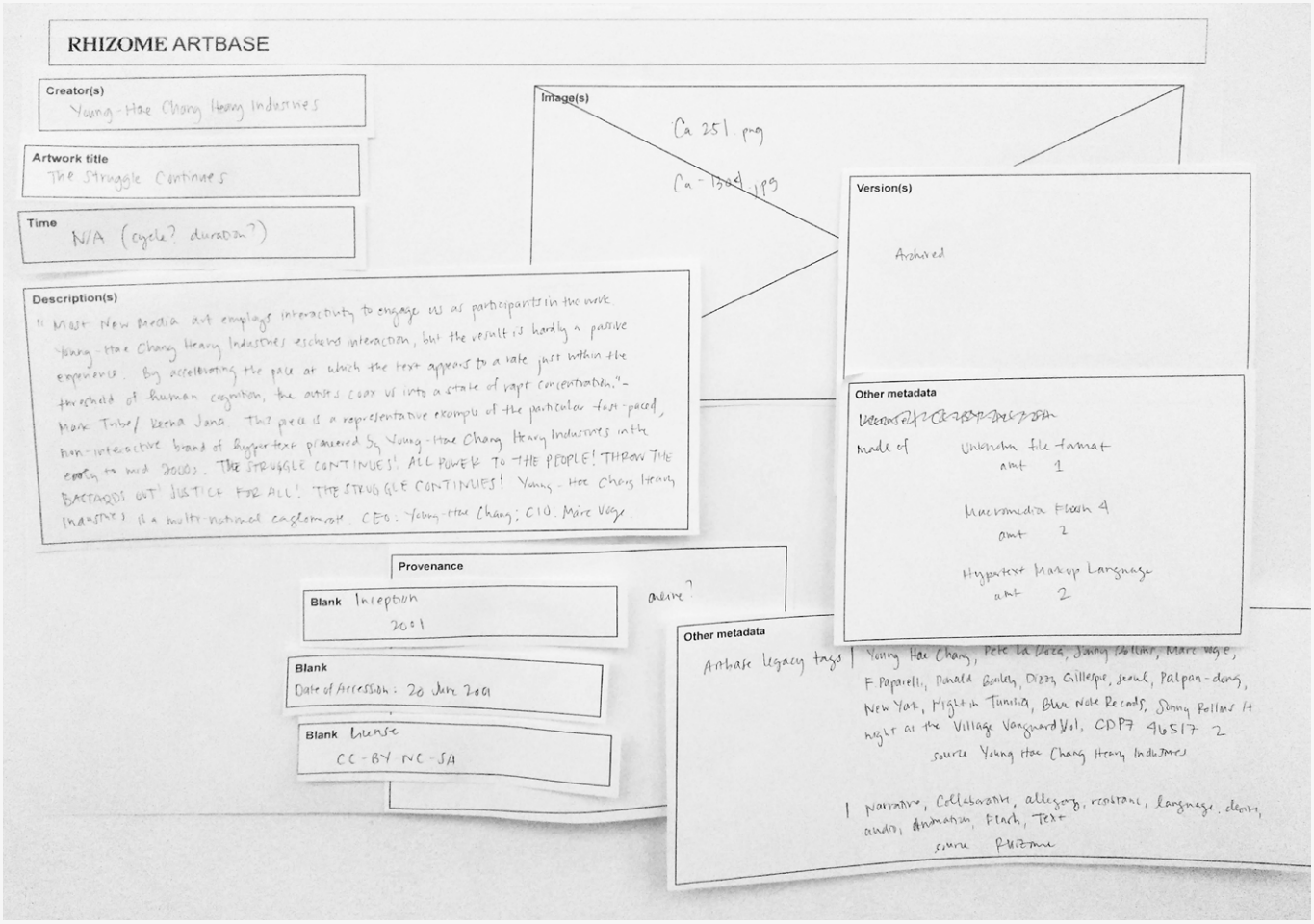
Users reacted positively to the option to **download metadata** and thought that would be a very useful feature if it’s implemented.



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

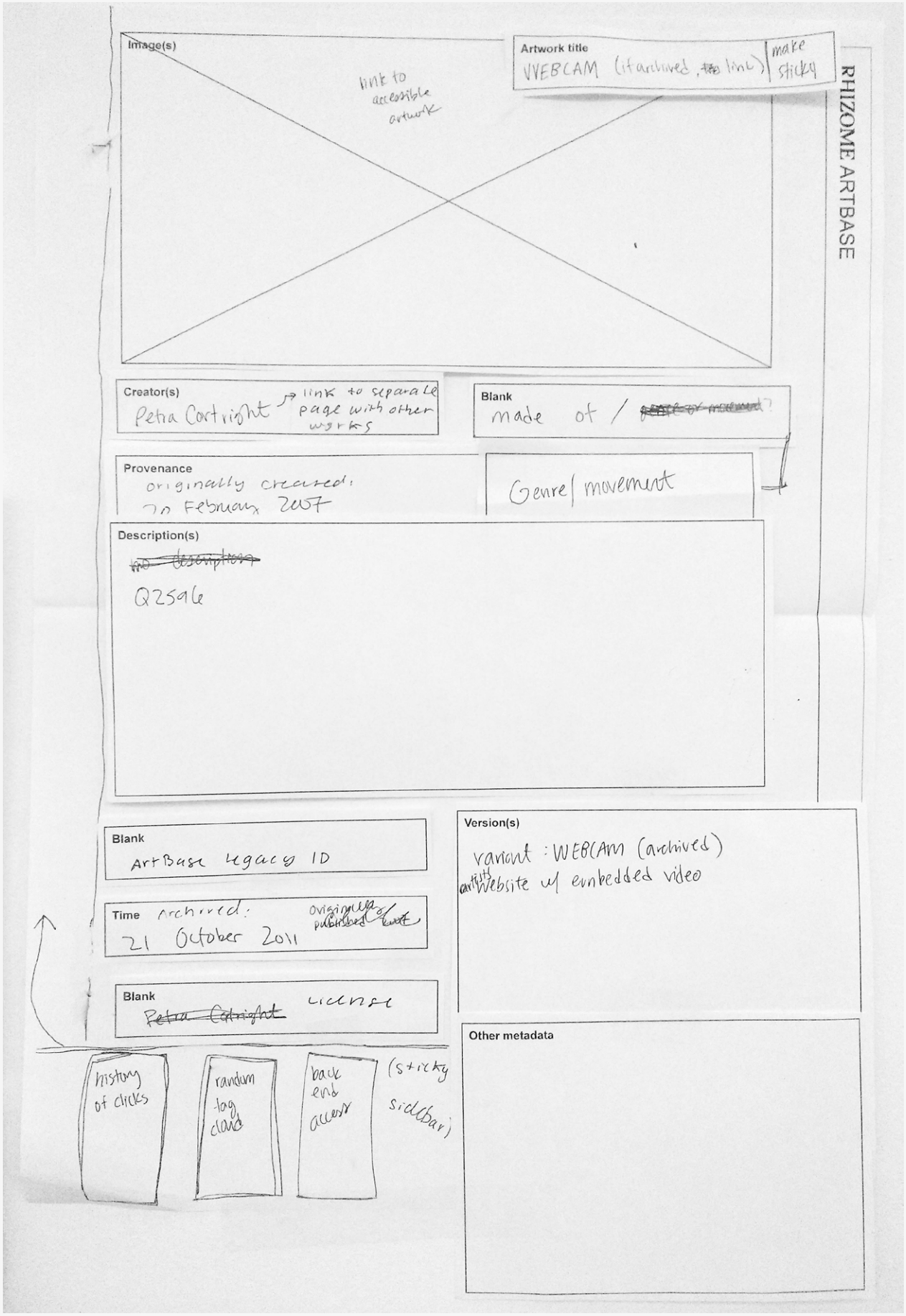
Participants produced a total of 11 layout mockups during Exercise 3. This table summarises the top 5 elements that were positioned near the top of the mockup archival record pages. It indicates a loose hierarchy of elements that are users perceive as most important to describe the works. The table continues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



An example of a user mockup design from Exercise 3.

When asked if anything is missing from the metadata section, some users raised the question of **“medium”**, and suggested that if there is no specific medium or genre defined, then perhaps the **tags** could be used as a way of navigating the database and finding related artworks via keyword terms which might be 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 are simply text strings.]

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 fall within the category of **“provenance”**. A few users said they weren’t sure what the term means. They noted they don’t have archival backgrounds, which highlights the specialist nature of the term. However, a large group of users in this workshop session did actually come from an archival background – either educational or professional, and their answers map closely with what was intended in the design of the prototype. Metadata which they considered to be provenance includes, as per 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”[10], “legacy tags”[11], “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”, “being able to note transfer of ownership of archives’ link”. While this conception of provenance is still fairly broad, it does tend to revolve around the historical context and the preservation processes the artwork has undergone within the archive, including any actors involved in any of these stages. This conception is closer to the definition of provenance within the sphere of archival science, and certainly post-modern archival science, where provenance is mostly synonymous with context. But it is quite distinct from more traditional understanding of provenance within the art world and art historical/ museological discourse.[12]

Within the understanding of this particular user group, provenance as conceived and deployed in the prototype made sense. 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.”

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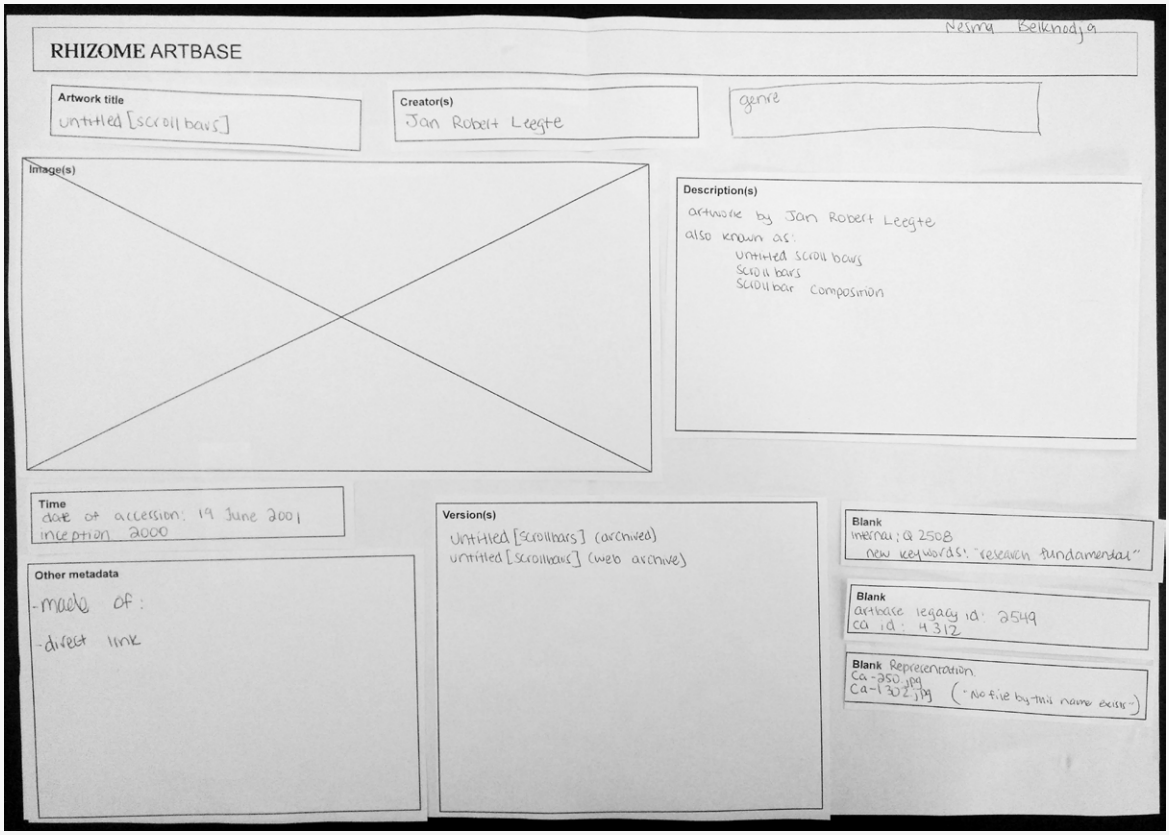
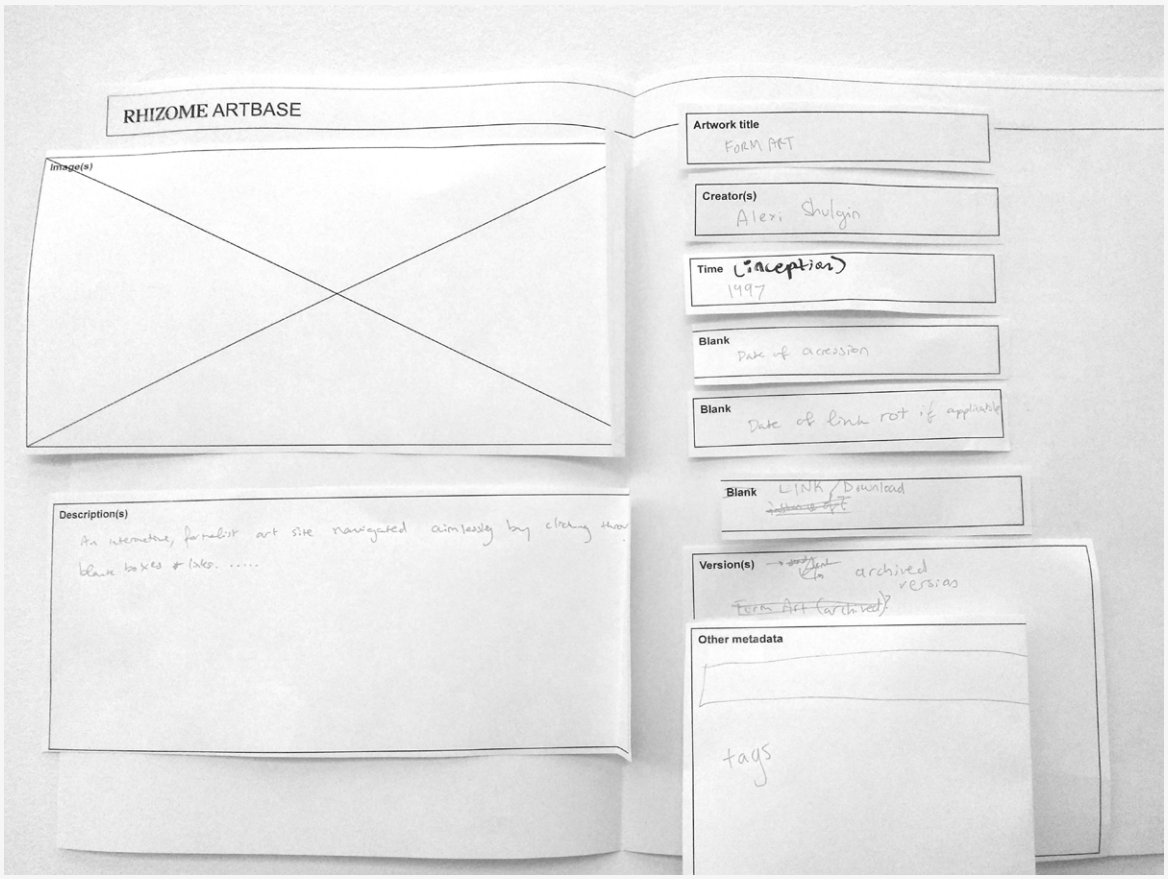
10 This is a metadata term used in the Wikibase UI to list file types that make up the components of the artwork, eg. html, css, Macromedia Flash (with a specific version), etc.
11 This is a metadata term used in the Wikibase UI to list the tags used in previous instantiations of the ArtBase. There is 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 8.





Examples of user mockup designs from Exercise 3.

Visualizing relationships

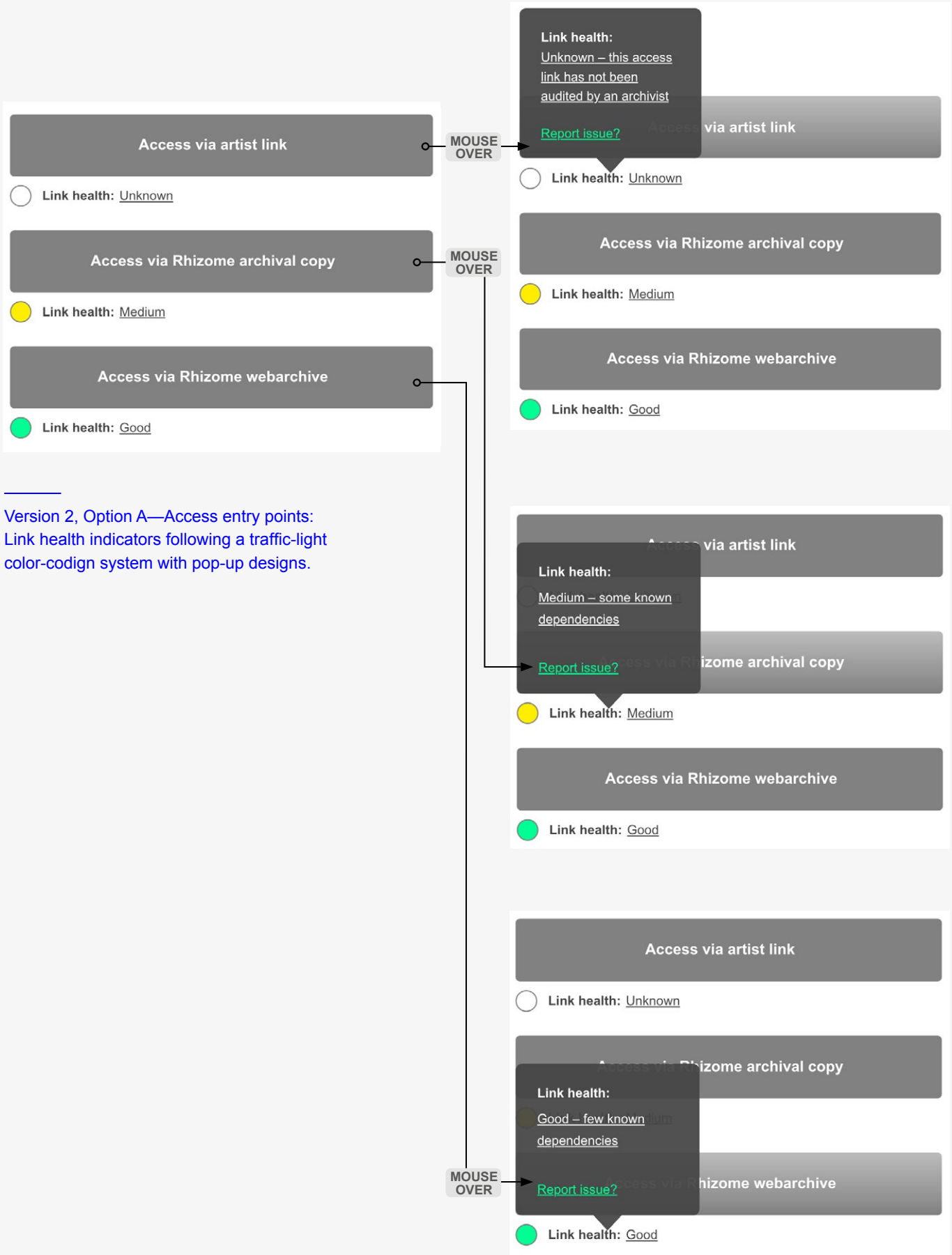
Following on from the feedback on the **timeline visualizations**, most users appreciated the **related artworks** visualization which mapped relationships across a “scored field”.

Users also noted the intuitive interaction with the timeline visualization and how that can help relate the history of the artwork, and also wondered if other timelines can be deployed in the archival interface – timelines relating to a single artist, or timelines presenting sets of different artworks from a specific time period, for example.

Questions from the online survey that was shared with users after the workshop. The responses to these questions were already 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 entry points: Link health indicators following a traffic-light color-codign system with pop-up designs.

Version 2: October 2018

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

Artwork access entry points

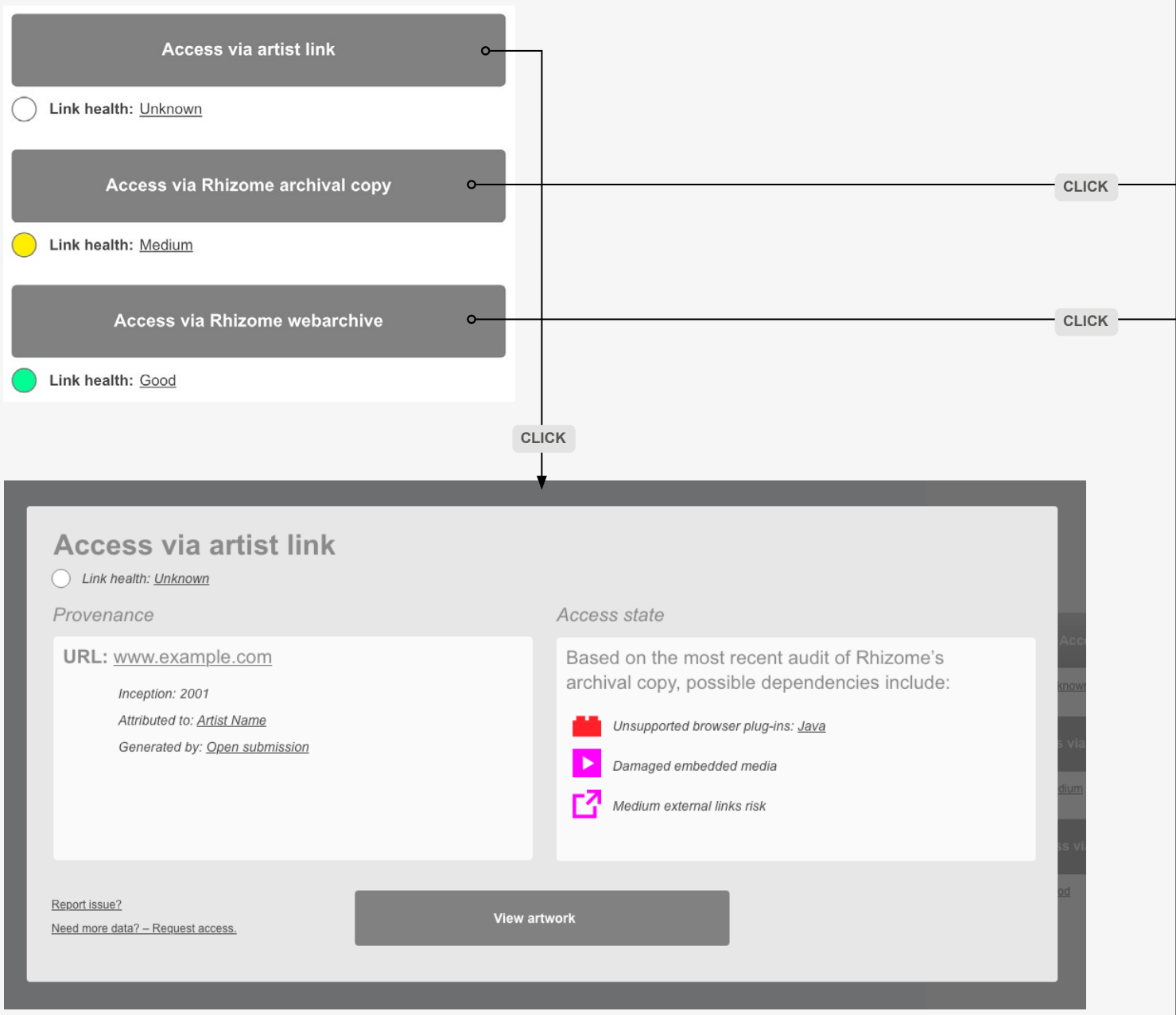
Option A

This protoype 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 get the pop-up from Option A of Version 1, which gives more information about the link health, i.e. a description what "medium link health" means, and an option to report an issue. In Version 2, "unknown link health" also gets an explanation: "link not been audited by an archivist", which was another suggestion that came up in the user workshop. In addition to this link health pop-up box, an intermediary overlay state (same as per Option B of Version 1) appears once users click on the artwork access button.

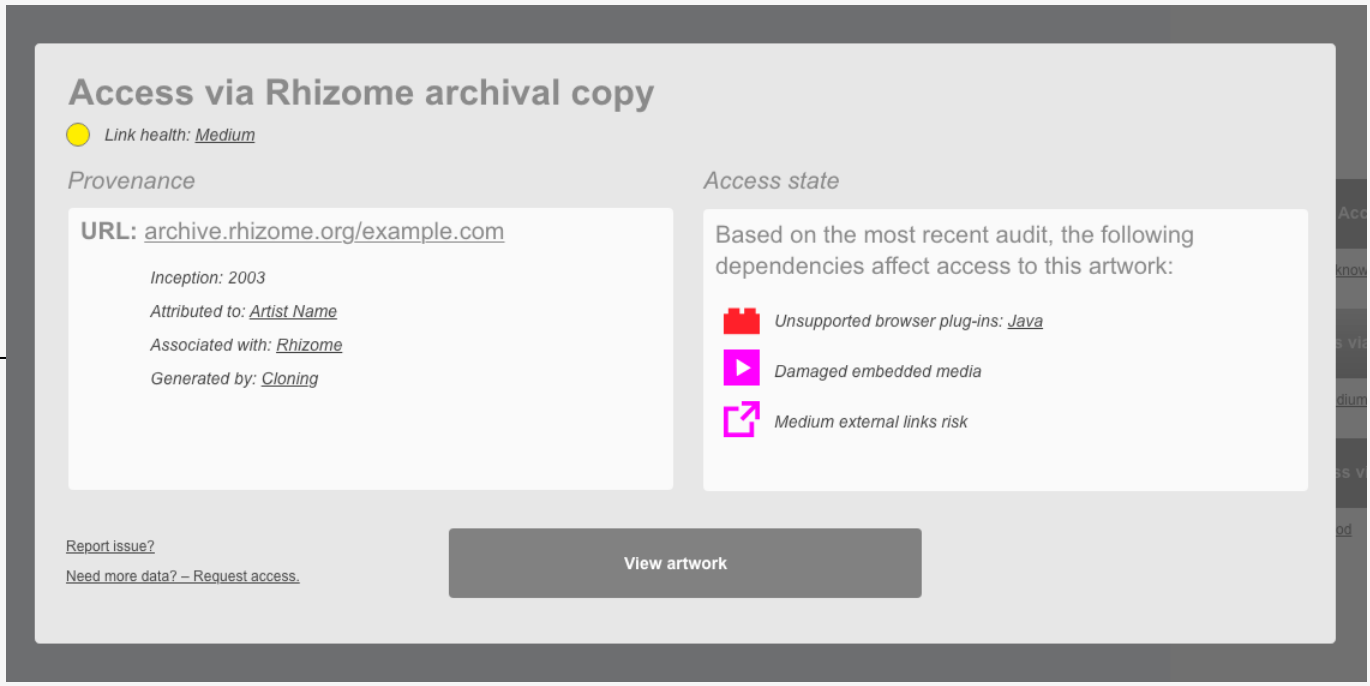
Overall, this option aims to provide as much contextual information around the access points as possible and aims to test how users would respond to this: whether they would find it too much or not. In fact, most users ended up preferring this option and didn't mind the additional level of detail.

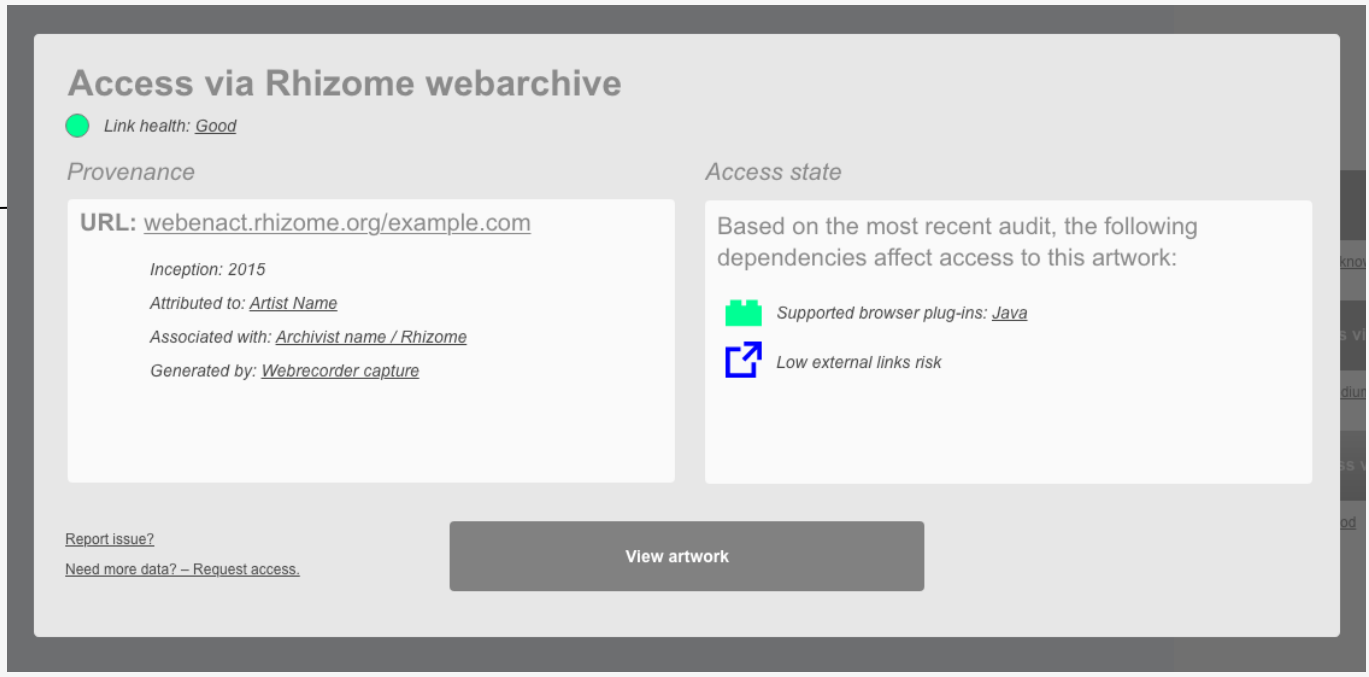
Option B

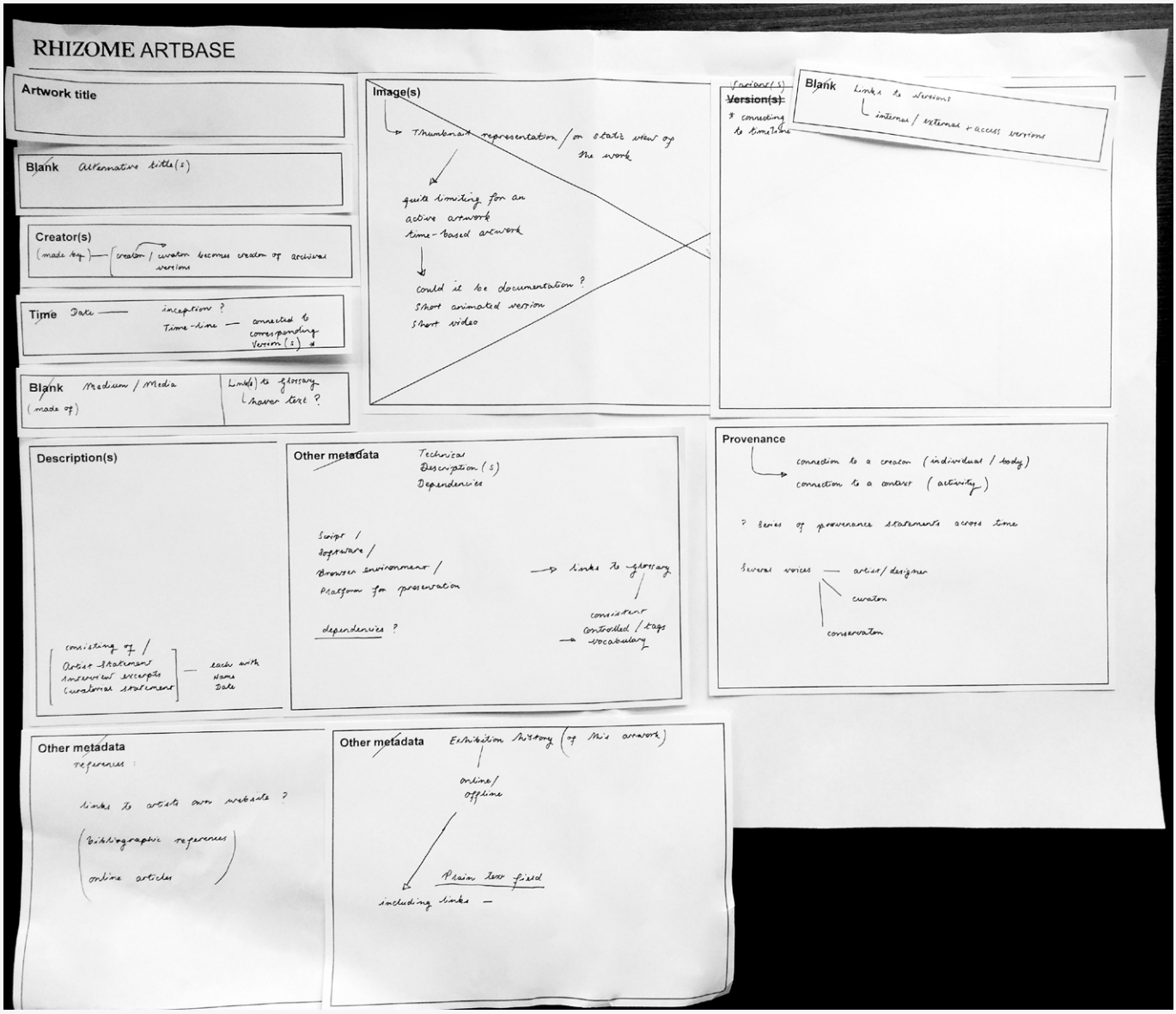
Option B in this Version remains the same as Option B of Version 1. It serves as a contrasting point against Option A, because it provides less detail at first glance – it retains the green bars signaling system vs the traffic-light system, and there is no pop-up available on mouse-over. The way to get to 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, as the next workshop provided opportunity to engage with a new group of users, from different backgrounds than the group in the first workshop.



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


Access via Rhizome archival copy
Link health: Medium
Provenance
URL: 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
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



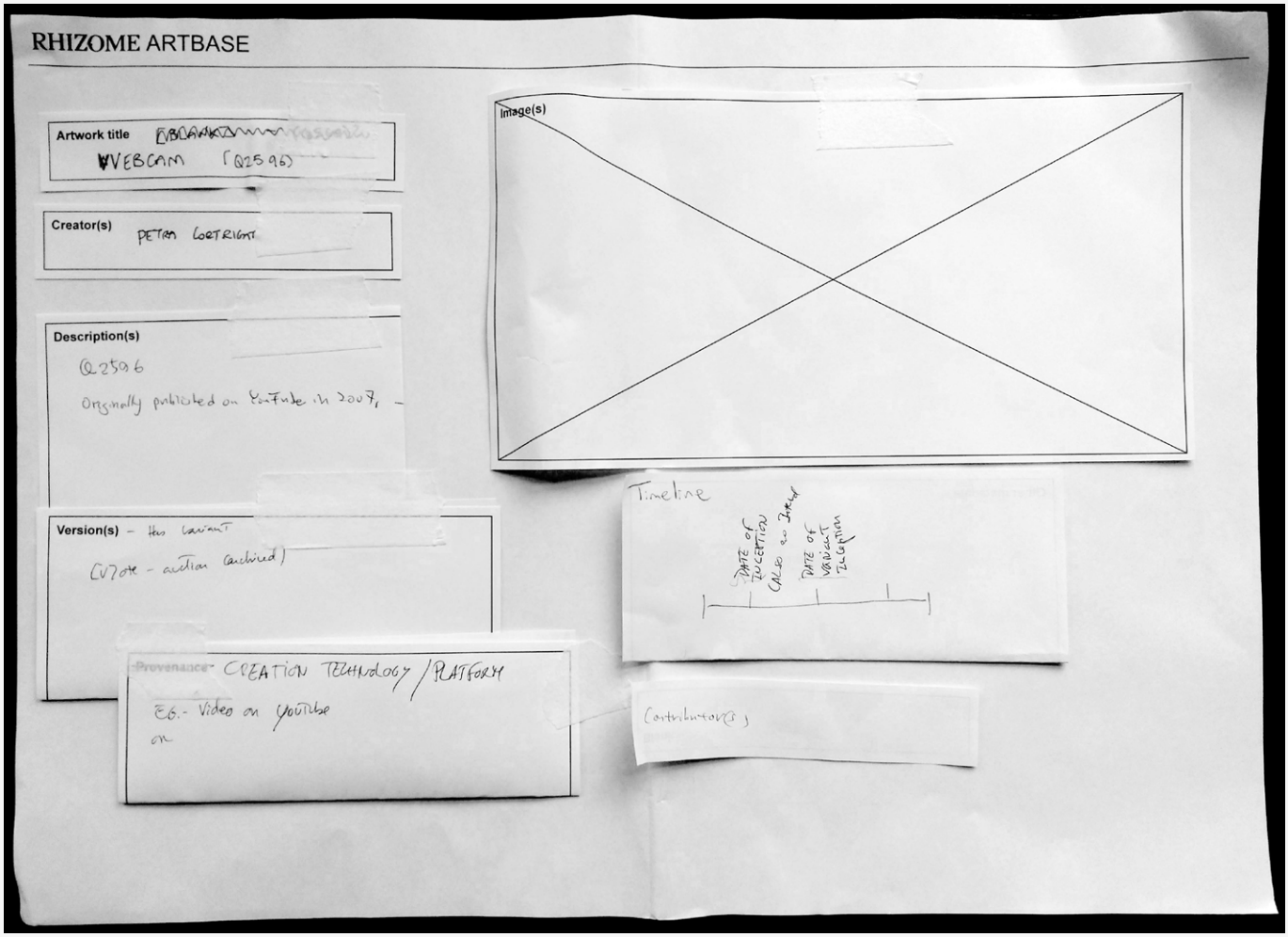
An example of a participant group mockup design from Exercise 3.

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 ran 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), 3 PhD students with a focus on preservation or archiving. In terms of format, the workshop followed the same structure as the first one, consisting of 4 exercises and a follow-up survey in the end. The only difference was that instead of asking participants to produce individua 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 is not just a vehicle for the designer to gain insights from users, but also to encourage users to collaborate and learn from each other. What follows is a summary of observations and user feedback gathered during different parts of 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 commented on their experience with **the interface of Wikibase** as not a particularly readable one. 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 of “some kind of **grouping system** for related elements” in order to “break up the ‘wall of statements’.” These comments are in line 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 top 5 elements that were positioned near the top of the mockup archival record pages. It indicates a loose hierarchy of elements that are users perceive as most important to describe the works. The table continues on the next page.

Another useful observation regarding how the prototype needs to 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 a more clear differentiation.

In terms of **terminology**, a few users commented on being unfamiliar with the term **"inception"**, but being able to understand the meaning in context. Some users asked for more details about the **tags** – they wondered what is their purpose – are they formal categories? They also asked who was adding tags and making decisions around the taxonomy. Furthermore, users enquired about **technical description** in terms of medium, format, programming language(s). They wondered what happened when some of this information was recorded as tags (e.g. 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 work of this project.

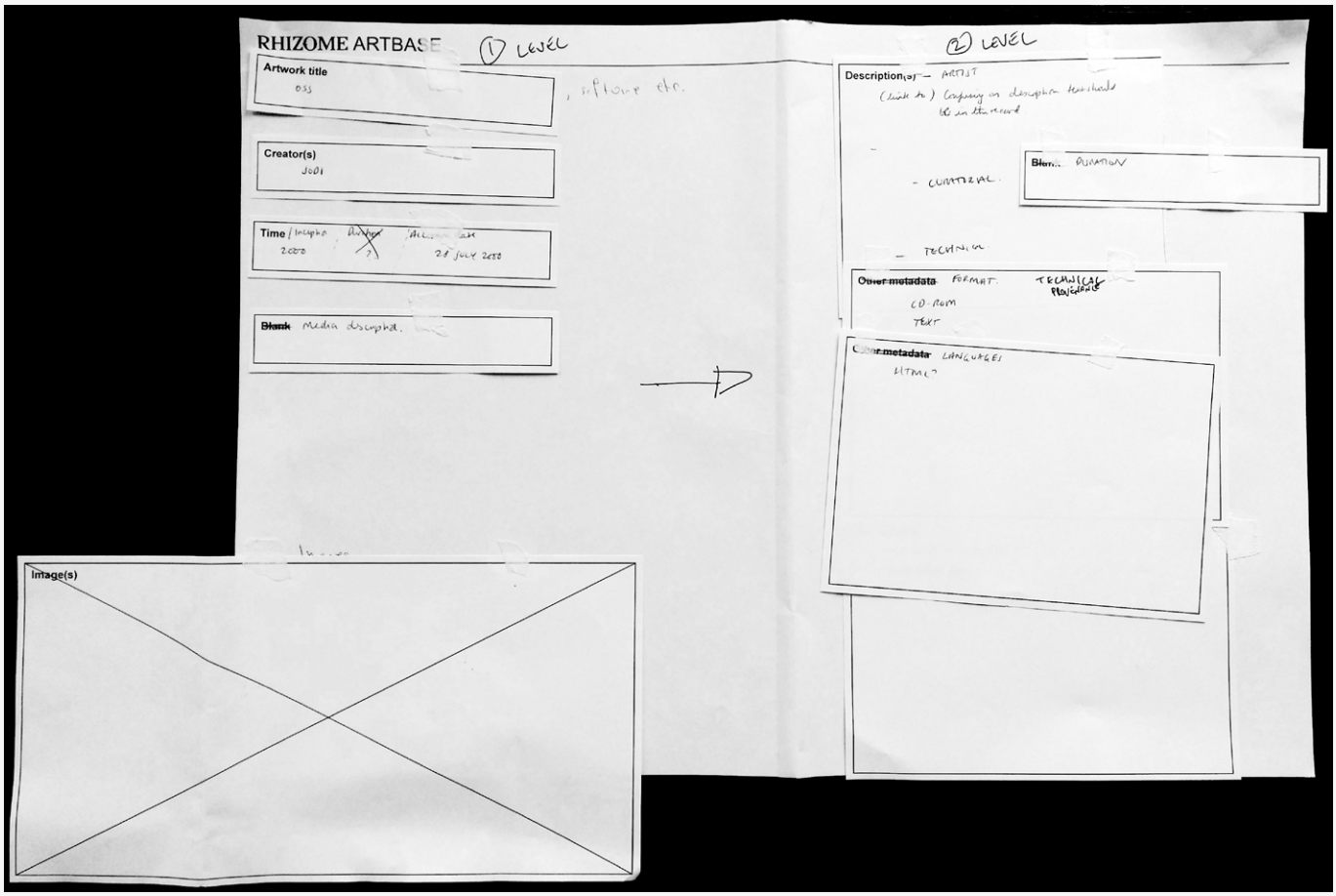
Exercise 3: Design your own artwork record page

This was a group 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 just *Blank* – meaning that users could assign their own labels. Users were split into three groups and each group had to produce their own layout for an artwork record page. Out of these predetermined choices, the top 5 elements which users positioned at the top of their layouts were: *Artwork Title, Artist Name, Time* (often specified to include both inception date & accession date), *Images,* and *Version(s)*. The order sometimes varied, but most users considered these elements to be most important to be near the top of the page, whereas other metadata elements, including *Description*, and their custom choices for "other" metadata were typically positioned lower on the page. (See chart on p.48)

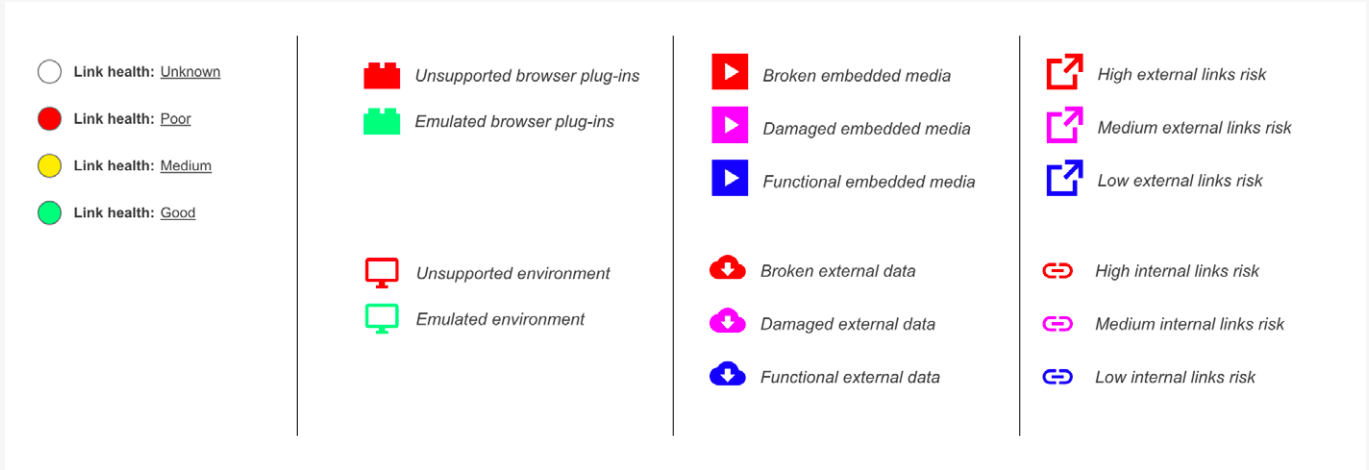
The most requested additional labels for metadata fields include: "medium", "made of", "format", "technical provenance", "creation technology/ platform", "programming language(s)", "duration", "timeline".

One 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 **timelines** of various activities surrounding the life cycle of a variant to be visually connected to the variant links, in close keeping to what was only subsequently shown during Exercise 4 as prototype Version 2.

A few users spoke about providing mouse-over text descriptions to some of the more specific terms used in the archive, as **a form of glossary**. Another user suggested a visual and/ or aesthetic **description of the artwork** – something that can be a one- or two-line description written by a curator – which could go under the artwork title as a quick identifier feature.



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



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

In follow-up feedback, one user gave a very detailed description of their view on what is important to be visible 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 is all clear as a starting point and certainly has influenced parts of the layout design decisions in the ptotoypes, but doesn’t necessarily address the particular requirements around performance and 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 suggesting carrying over the same color scheme to the dependencies icons, for continuity purposes.

One user pointed out the more **custom requirements of some artworks** in the Artbase, which are not just web-based, or may need emulation: “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 Version 3 of the prototype changes its approach towards a visual (iconographic) representation to avoid terminilogy 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.” in relation to 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 constitutes the artwork and the techniques used to create it (perhaps originating from statements P77-P81 of the property index).”[13] Elaborating further: “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 also commented along the same lines: “As a curator I’d be interested to know **display requirement** (required support technology and any other specification, such as language)”.

Lastly, another user added the **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 around what constitutes the work’s **“provenance”** and whether provenance was used appropriately in the interface of the prototype proved divisive among this group of users with differences in interpretation between users coming from a museum background, or working in museums, vs users coming from an archival background.

A few users found the proposed use of the term provenance in relation to net art problematic, because they associated provenance with ownership history and they couldn’t see how that can be related to net art when ownership there means something very different online. 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 also commented that: “provenance typically describes the way a specific piece of work has come into a collection. Documenting this journey is the basis to validating the authenticity of an artwork.” A further user observation 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

13 During browsing the Wikibase UI in Exercise 1, users were also encouraged to look at the index of all available properties in Wikibase, to get a better sense of the current data structure of the archive.

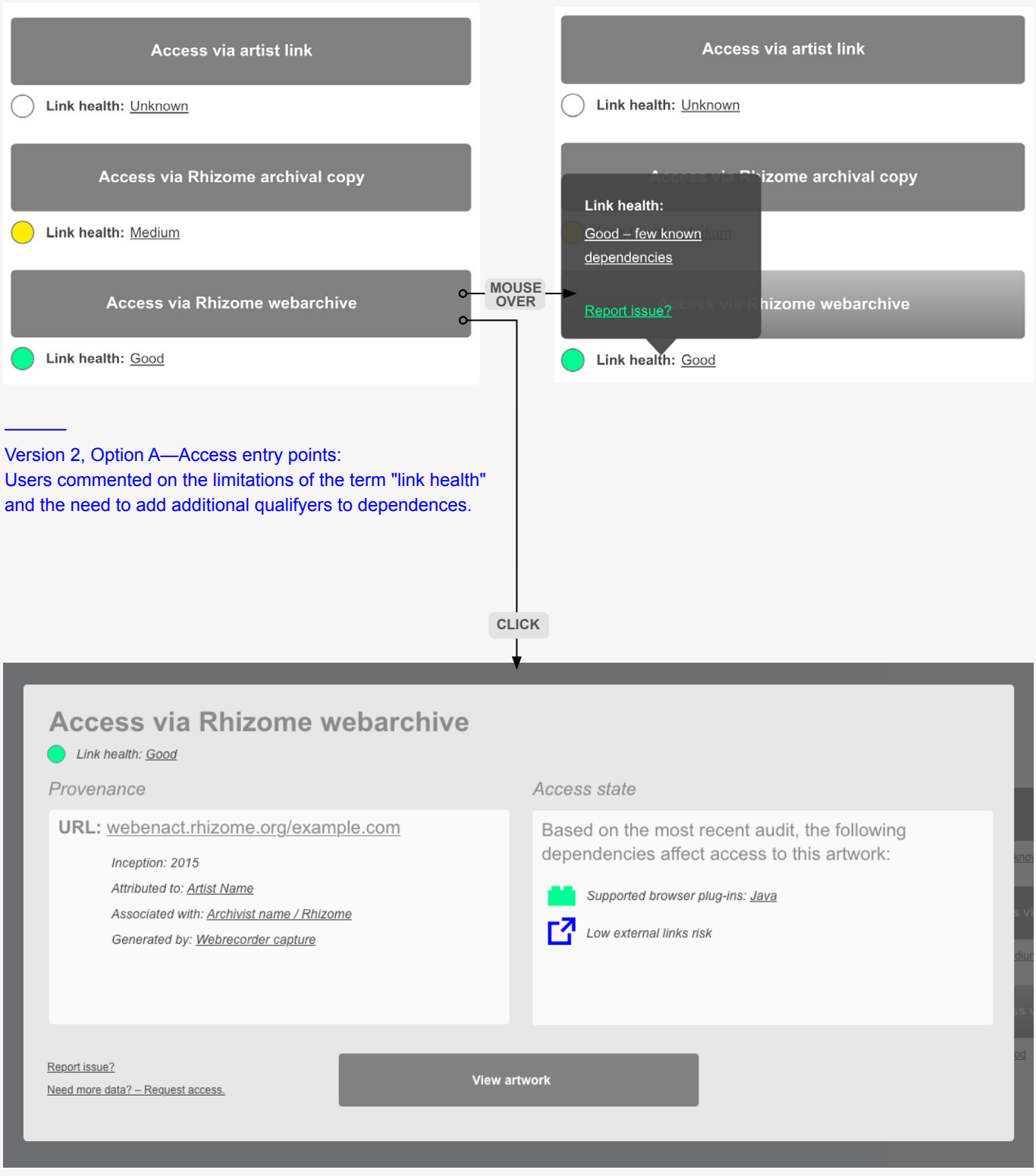
museum, art history and art market context, provenance is strongly associated with ownership history." However, these users also felt that preserving archival actions was important, and so it needed to be described by a different title, one suggestion was **"preservation narrative".**

Users coming 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 relating to 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 also 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. What actions are then taken to preserve the work are considered **preservation actions** within their cultural institution.[14]

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.

14 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 8.



Version 2, Option A—Access entry points:
Users commented on the limitations of the term "link health" and the need to add additional qualifyers to dependences.

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

Evaluation I: Individual sessions, October 2018

Since there was quite a lot of interest in both workshops, but some users couldn't attend in person, a few additional remote sessions were conducted where 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, as they were more reflective and involved less hands-on involvedment by the participants. Instead these sessions offered opportunities for more in-depth conversations that could reflect on the workshop procedeeings and on the iterative development of the prototype versions following the workshops. This section summarizes some insights from these evaluation sessions.

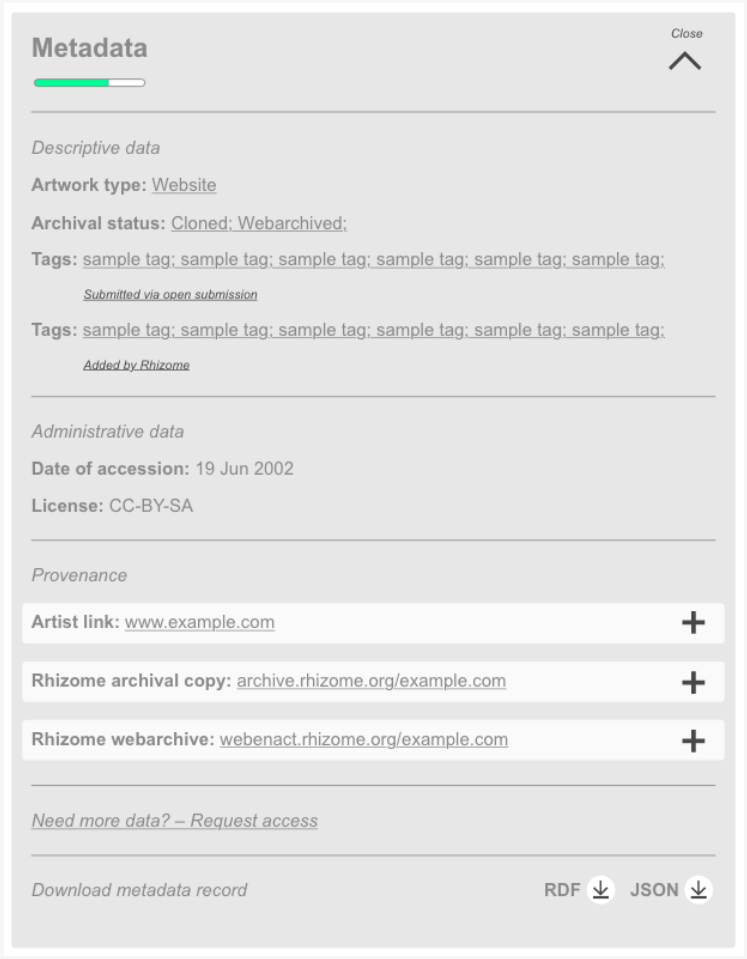
Artwork access points

A few 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 described may also be problematic – they felt that "few" or "many" dependencies is not accurate, because the artworks always have dependencies. Sometimes these may be unsupported or damaged vs supported and restored. They suggested changing the descriptive texts as well.

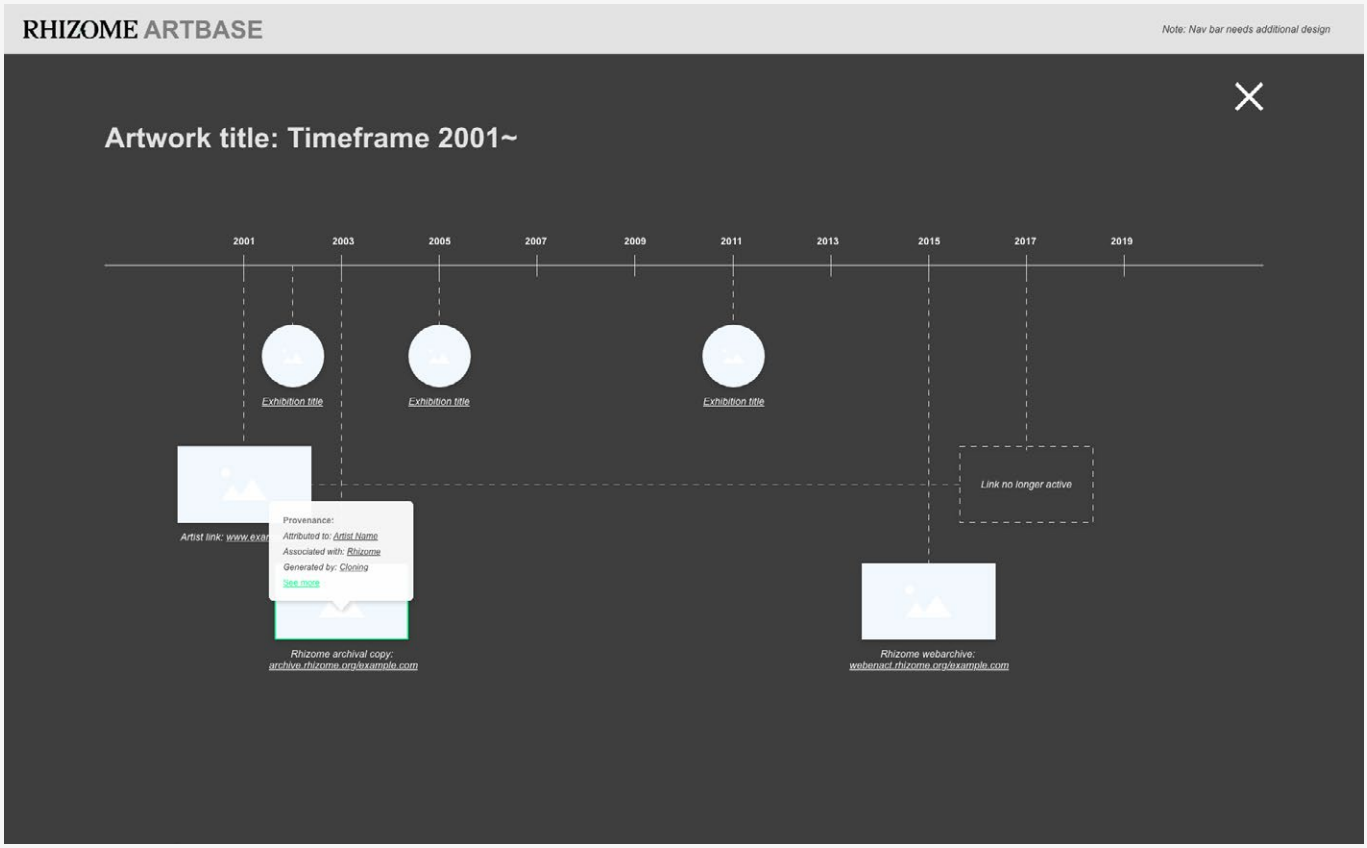
Other users also suggested that **"archive copy" / "webarchive"** are unclear terms. One user suggested to simply use "variant" instead, and to use a numbered list: variant #1, 2, 3, etc, and use URLs to distinguish individual variants.

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 more suited to the access state area instead, e.g. "generated by". They commented that they only want to see information directly related to "access" in that intermediary state.

Another user pointed out that there needs to be a clearer distinction between **dependencies for the artwork and dependencies for the reperformance environment**. They questioned if there might be a better way of differentiating how a user's own browser settings might affect the artwork reperformance.



Version 2—Metadata section:
Users questioned the use of Provenance here (left), and thought it was more suitable in the timeline visualization (below).



ArtBase redesign: prototype development

Finally, a few users proposed that a **glossary of special terms** like archive copy or webarchive would be useful, and in addition it would be useful to be able to quickly look up what those terms mean directly from the artwork record page (e.g. as a tooltip on mouse-over).

Metadata section

One user suggested that **“artwork type”** should actually be **“medium”**. On the other hand, another user felt that “artwork type” was a better category than “medium”, but maybe not even 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 even more specific and 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. A few suggested **“Preservation history”** instead.

Visualizing relationships

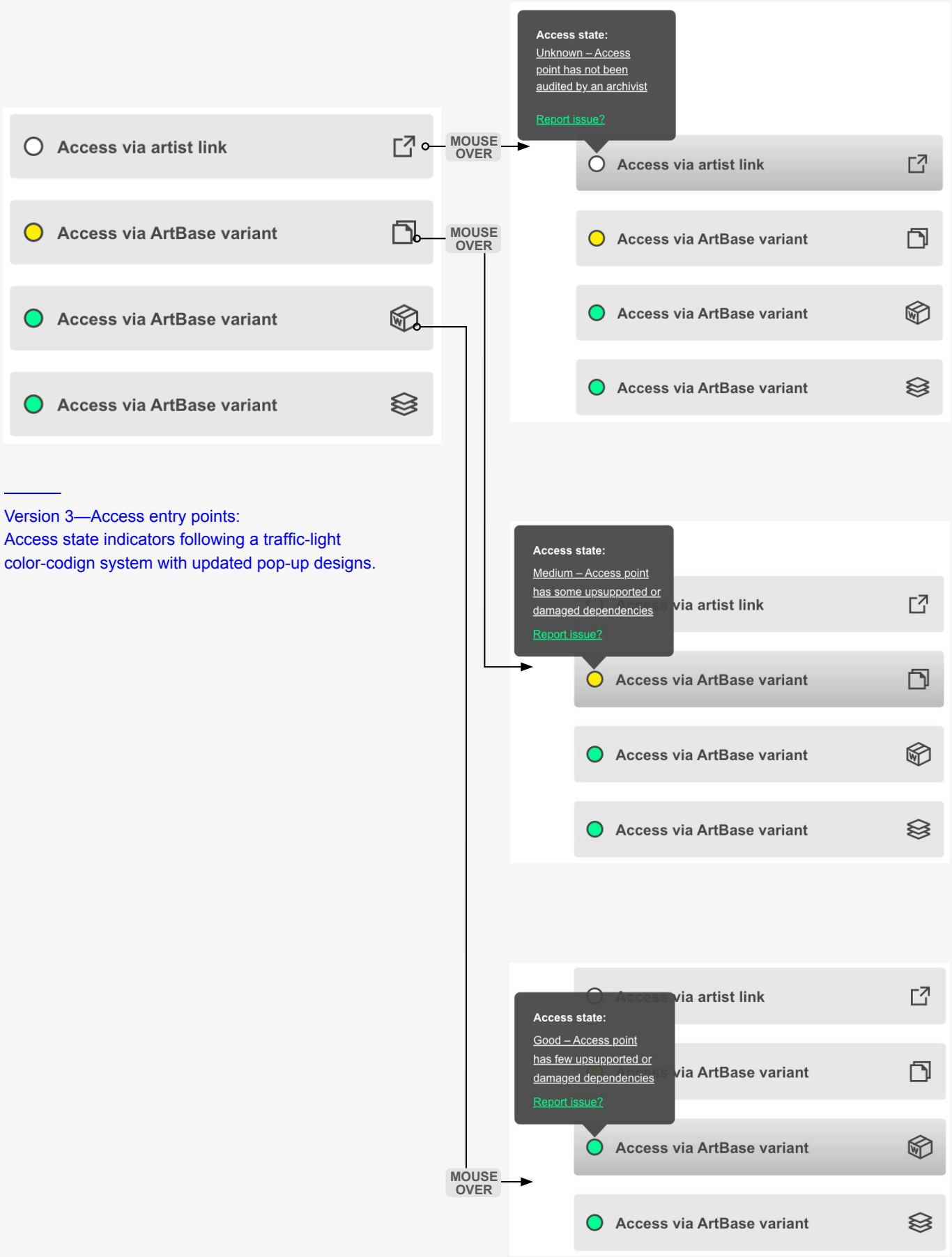
Most users commented positively on the related artworks visualization and the timeline. A few, thought that the **“provenance” mouse-over state** was more appropriately used in the timeline view than in other places in the prototype.

One user commented that the **timeline** feature is very useful and represents 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 also 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 lose the “related” adjective, as it might imply that the relationship wasn’t direct, 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”.



Version 3—Access entry points:
Access state indicators following a traffic-light color-codign system with updated pop-up designs.

Version 3: November, 2018

The design process for Version 3 included first consolidating the feedback from running user testing sessions with Versions 1 & 2 and then actioning it out into one new version for testing.

Artwork access entry points

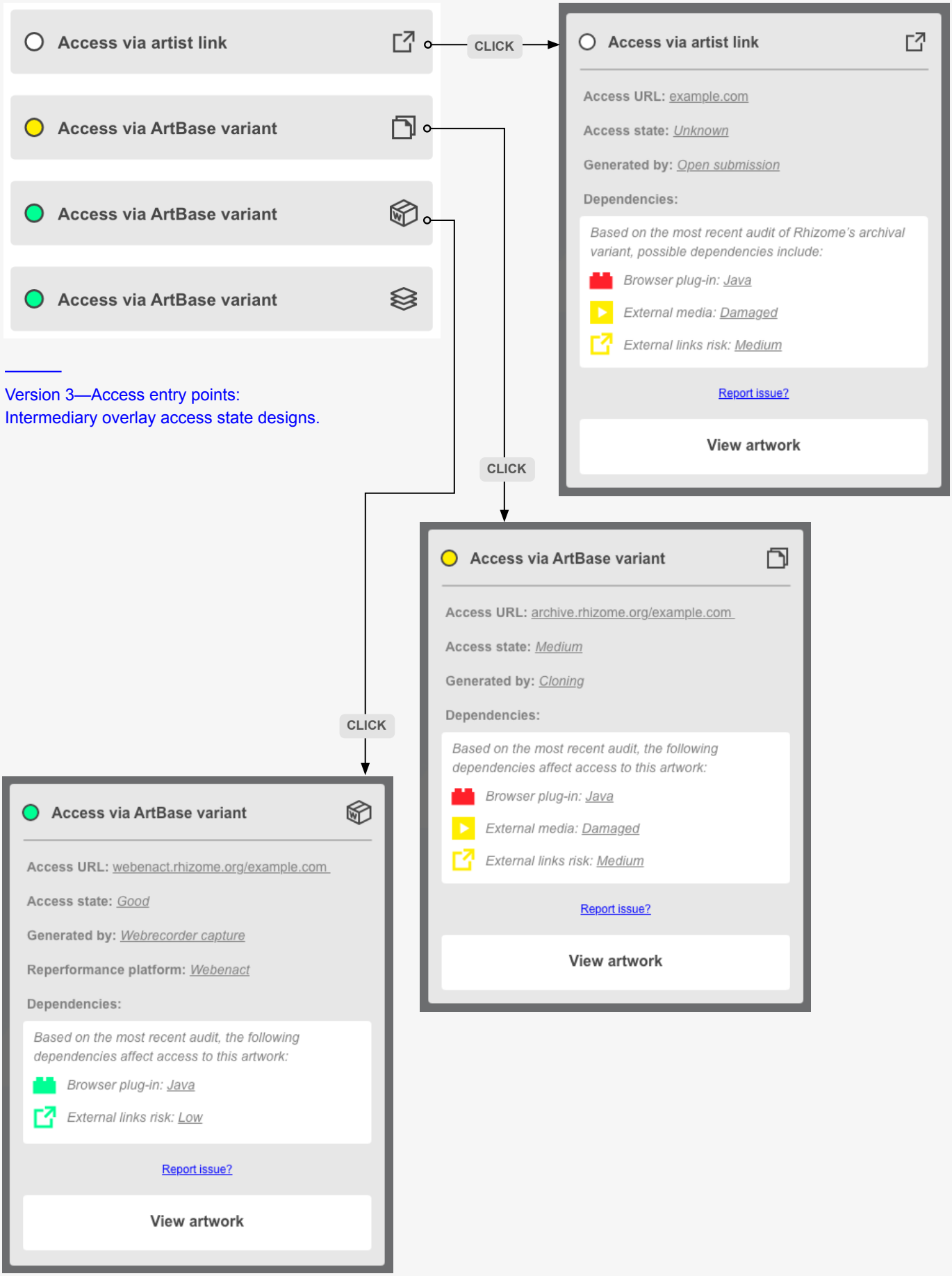
Access buttons

Some of the biggest 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 stop-light system. The stop-light symbols are now integrated into the design of the access buttons themselves, making the access button closely connected with the message of the “light” rather than something separate. This update follows feedback from users, who interpreted “link health” as something relating to links inside the artwork, not relating to the actual artwork access link itself. This results in a shift in both terminology and layout. Besides integrating the stop-light symbol more closely with the access button, the terminology shifts from “link health” to “access state” following consultation with users.

Furthermore, the previous use of terminology to differentiate between the different types of variants appeared unclear to most users. In Version 3, the only differentiation in terminology is between “artist link” and “ArtBase variant”. Variants can still be more than one, 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 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 are developed.

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 entry 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 considered to relate to the access state – this is the level of detail users considered most useful at this stage, further metadata is provided in the metadata expandable element. Users were confused about “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. The attribution metadata is also removed, as potentially superfluous and repetitious – all artist links are attributed to the artist and all Artbase variants are attributed to Rhizome. A more detailed level of attribution is included in the metadata expandable element in any case.

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 just skips the mouse-over state by clicking the access button quickly); *generated by*; *archival plan* (if applicable); *reperformance platform* (if applicable); and finally – *dependencies*. The dependencies follow the same format as they did in the previous versions, but the color scheme in 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 a few structural changes in this version.

The description provenance labeling has been made consistent with how it is represented across the record page, so the process of creation of the text is labeled “generated by” and the accompanying “generation activity” is styled as a hyperlink, so users can click into it further and read more. Attribution is provided alongside this information below each piece of descriptive text (there could be multiple pieces of text associated with each work, and attributed to different sources or processes of generation).

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

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 around 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.**

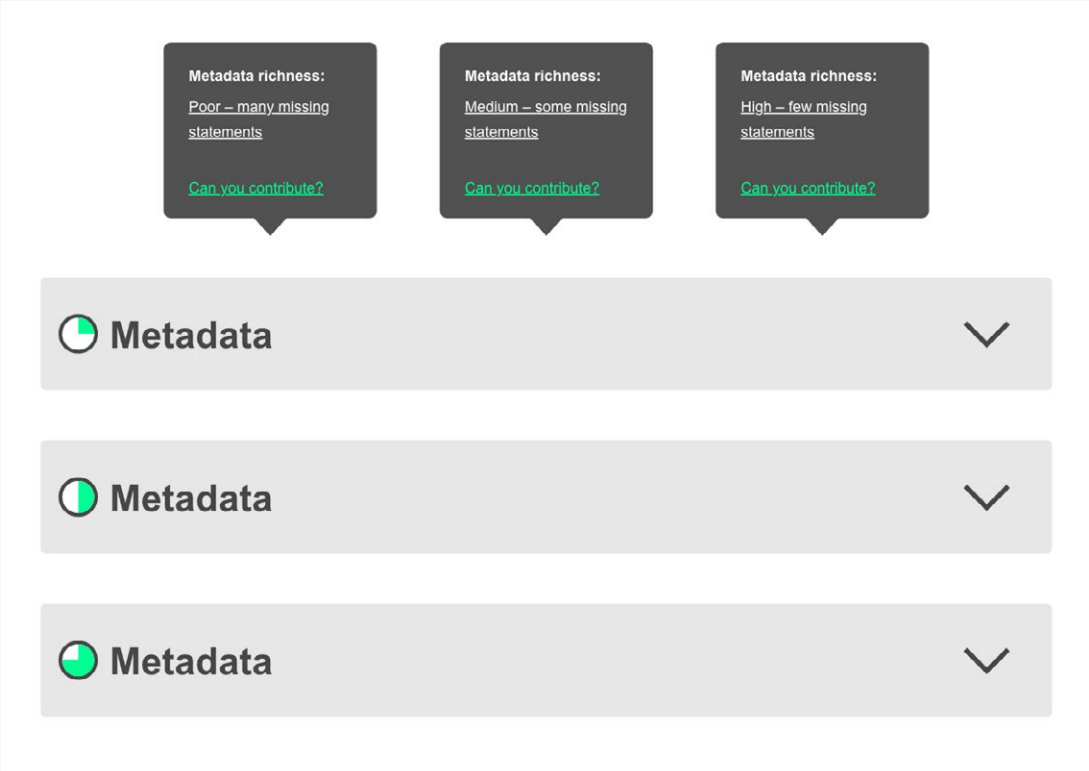
A set of user story cards which relate to users being accustomed to using tags or thematic categories to browse archvies (see Report #2, pp.34-35)

since during discussions with users it became clear that users have different expectations from this widely-used interaction pattern – the “tag”.

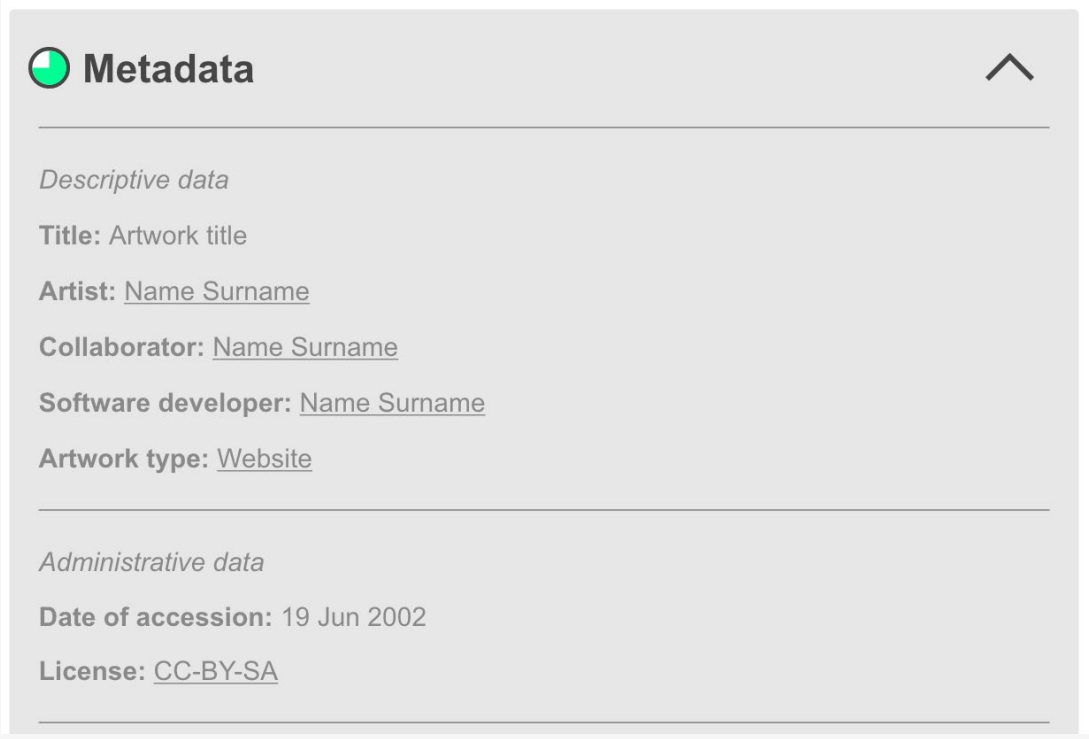
A lot of users thought that tags should aim to provide useful categories – themes, genres, movements, storage mediums, programming languages, etc, which would allow users to browse the archive via such terms (see some sample user stories to the left). In reality, the tags collected by Rhizome vary widely: 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 to provide a more formal categorisation. The final result is a wide-ranging mix of approaches and philosophies about what tags should or shouldn’t include and how they should be used to browse the archive. For now, it will not be practical to make all the numerous and heterogeneous tag terms individual and clickable nodes in the linked data database. Therefore, in the 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 ways of navigating the collection, but just historical, descriptive keywords. Ideally, tags will still be 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 follow what users expressed 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, but the task of the prototypes is also to change this and help users get acquainted with new and unfamiliar user interaction patterns.

Finally, some users also questioned the heading – “Description” – asking, instead, if the text shouldn’t 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 more than one descriptive texts associated with an artwork in the ArtBase, and so a more general 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.



Version 3—Metadata richness indicators and pop-ups



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

Metadata, expandable element

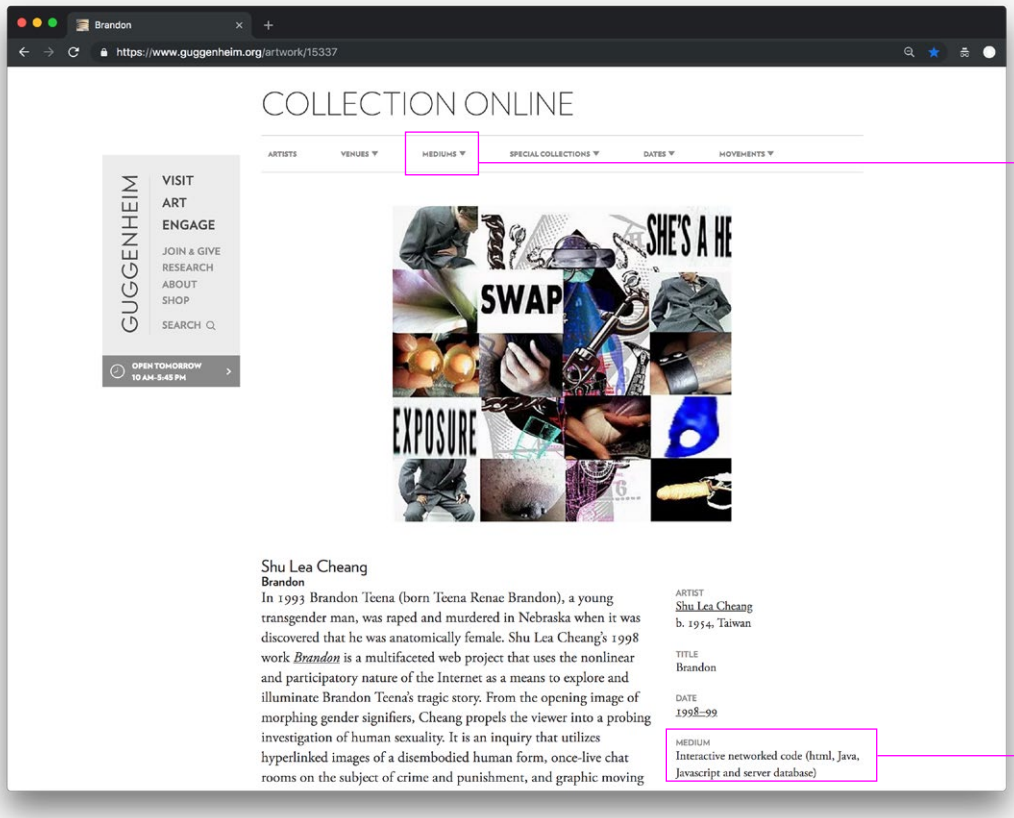
There are a few updates in the metadata element as well. First the visual indicator for metadata richness visible in the collapsed metadata element is updated to match closer the artwork access state indicator (circular button). This consistency aims to make the interpretation of the indicator more clear, but needs to be tested. Instead of using a fully filled circle of color, this indicator is split like 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 if they are both indicated by a graphic symbol. Furthermore, unlike the access state, which could be fully broken (red) or fully functional (green), metadata richness is a continuum. It will always have at least a minimum amount of metadata statements. Equally, it will never be completely “full”, metadata 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 ¼ full and ¾ full (poor, medium and high richness), but it will never be less or more than that.

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

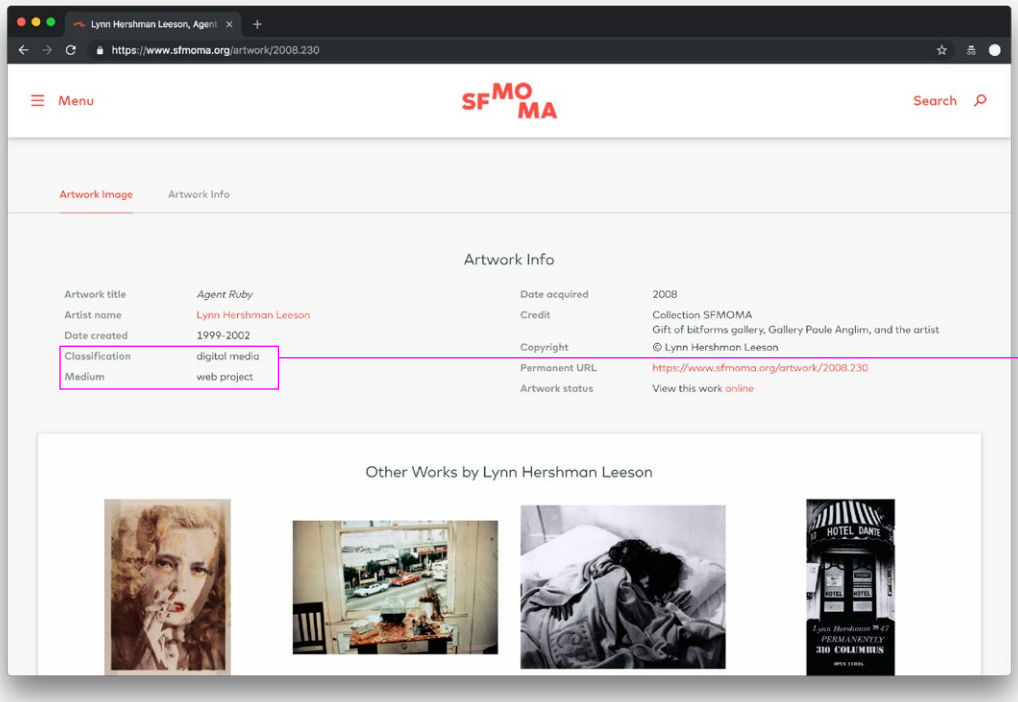
Metadata groupings

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, since 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 of where in their journey they are at various points.

Furthermore, this repetition can be useful in cases where there were more than one collaborators on an artwork, even though one person may claim the largest contribution towards the work and the title artist. With complex digital artworks, there are oftentimes collaborators who perform more specific tasks such as programming or animation, etc. While 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)

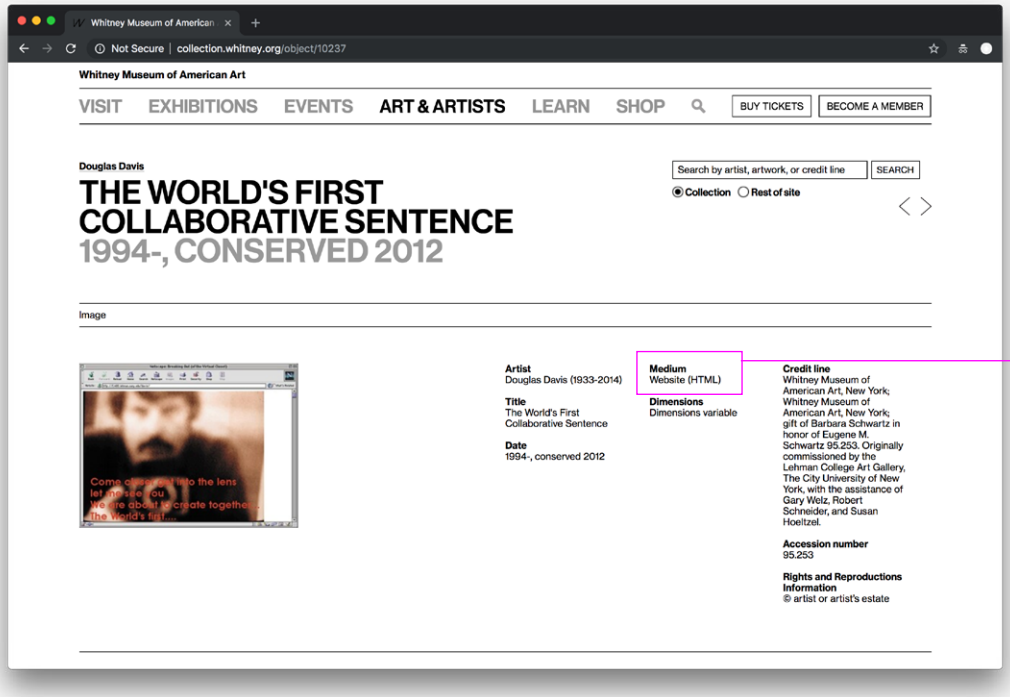
Artwork type or Medium?

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 actually used by museums in relation to born-digital art, and net art more specifically.

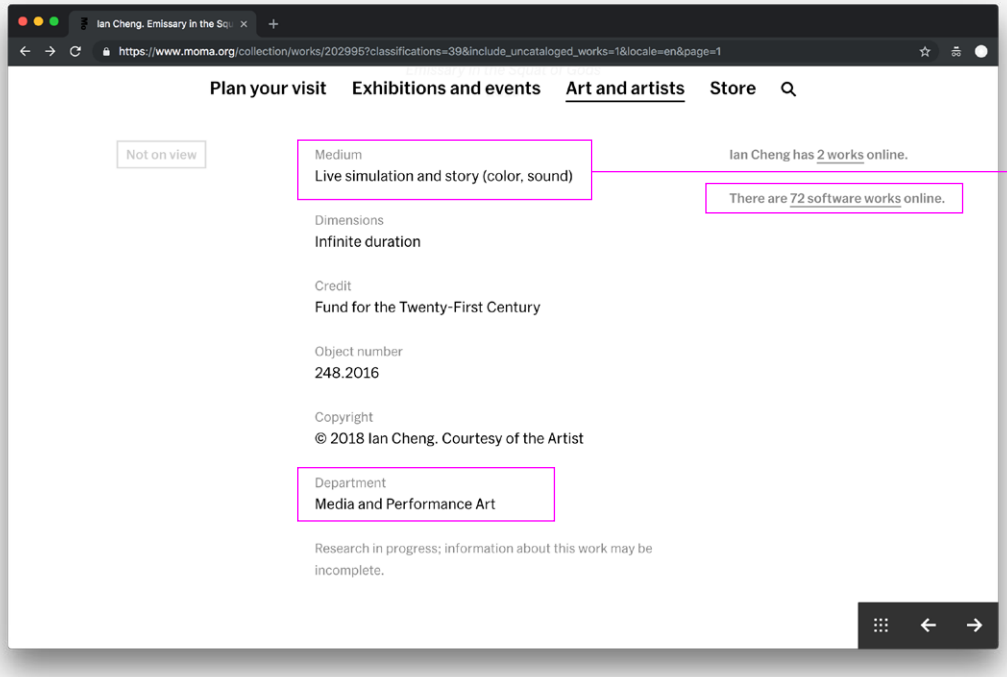
Of the few museums that do have such collections, the Guggenheim use a filter titled “Medium” to separate out all the artworks which can be categorised as “internet art”. Drilling further into their artwork records, reveals a separate “medium” metadata element used in conjunction with fairly specific 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 of 2018 at least). Their artworks’ “medium” is identified as “website (HTML)”. Finally, MoMA’s catalogue shows artworks under categories such as “website” or “software”. The “website” artworks have “medium” specified as “interactive software” – which is 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 present 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, and even 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. But there are 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 specificaitions.

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 and can then judge the effectiveness of using the “type” category vs a different 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 Deparment. (Screenshot: 2018)

There is also one particular edge-case: some artworks are present in the archive only in the form of documentation, e.g. 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 and the provision of detailed information associated with each variant was considered enough. Tags were removed and transferred to the descriptive expandable element instead, as already outlined above.

The "Administrative data" grouping remains the same.

Preservation history data

The final metadata grouping, which used to be 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 in line with how some museums are attaching metadata to their complex born-digital collections.[15] While not as specific as "Provenance", it is flexible and can cover a lot of different associated pieces of 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"[16]. There are additional statements useful from a preservation standpoint, such as "variant type" (e.g. this could be "documentation" or "video", as opposed to simply "artwork"), "access state" (which is a repetition of the access state indicated in the artwork entry point buttons, but it would be useful to be visible in this collected data context, as well), among others.

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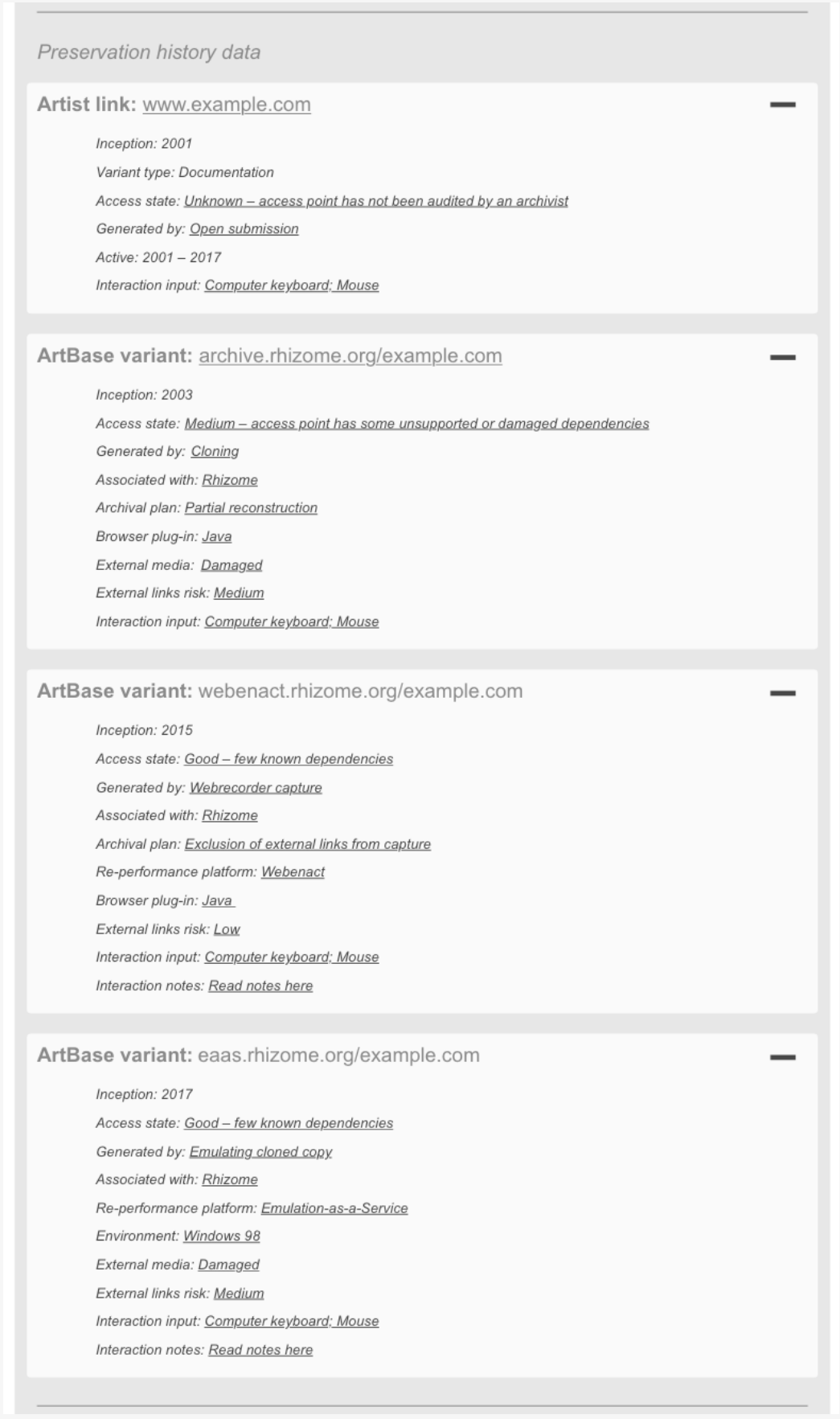
15 Add citation to MoMA's case study paper.

16 For a full description of the implementation of the PROV model, refer to the PhD thesis accompanying this project, Part III, Chapter 8.



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

Other statements which can be made visible here include “archival plan” – this is a statement, part of the PROV model, again, which aims to give further detail to the generation activity and can be quite specific, such as “Exclusion of external links from capture”, for example. “Reperformance platform” is a statement describing variants accessed via the Webenact or EAAS platforms.

This version of the prototype also introduces the software dependency statements in the metadata area. Each dependency is split out as a separate statement – improving interoperability for querying the database. A final set of six dependency areas are 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 values of each of these statements are listed in the full data model presented in the portfolio website.[17] A few additional statements relating to interaction dependencies might be added if/ when necessary, e.g. “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 to either request access to more data or just download a data dump.

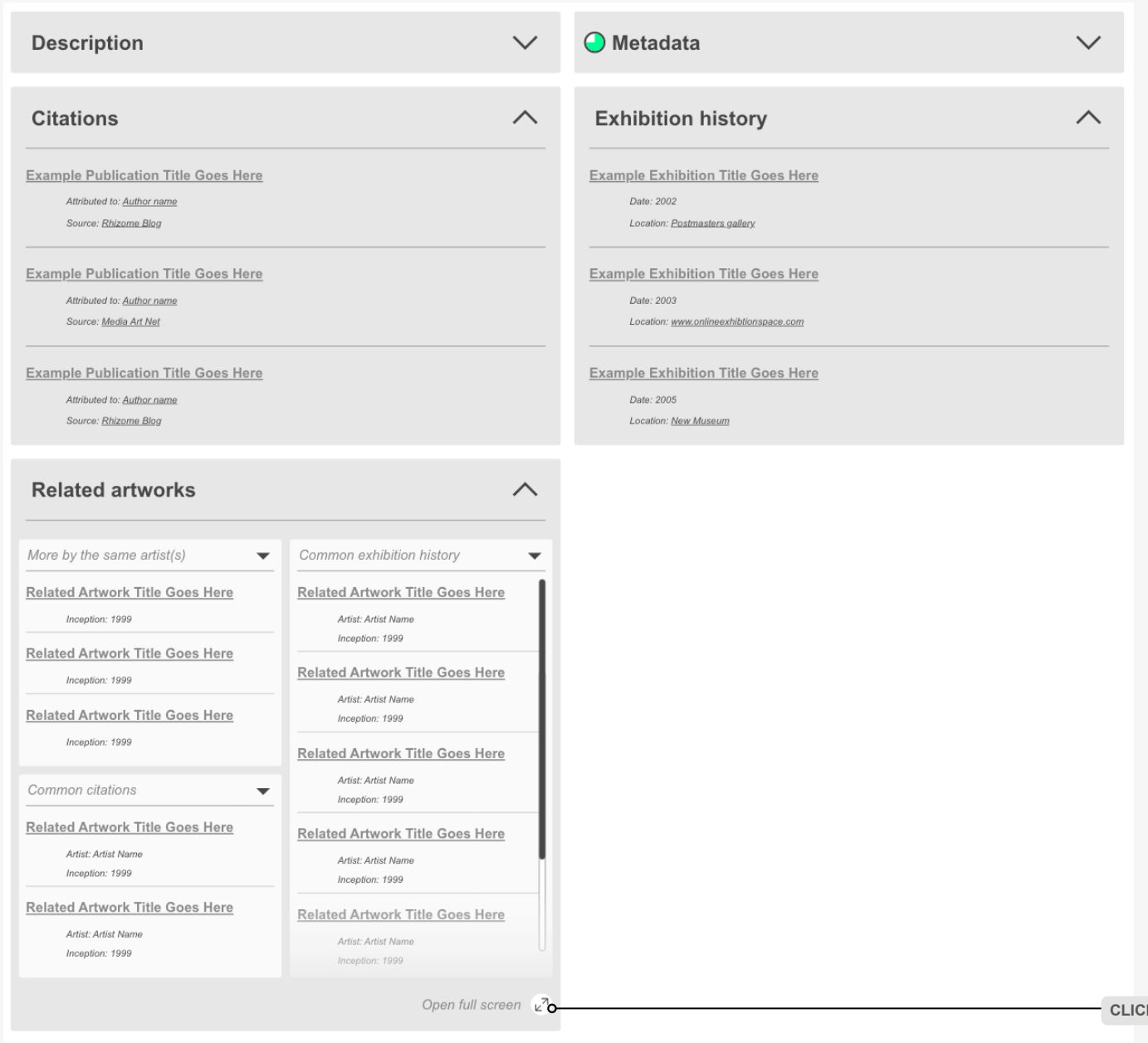
“Related” expandable elements

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

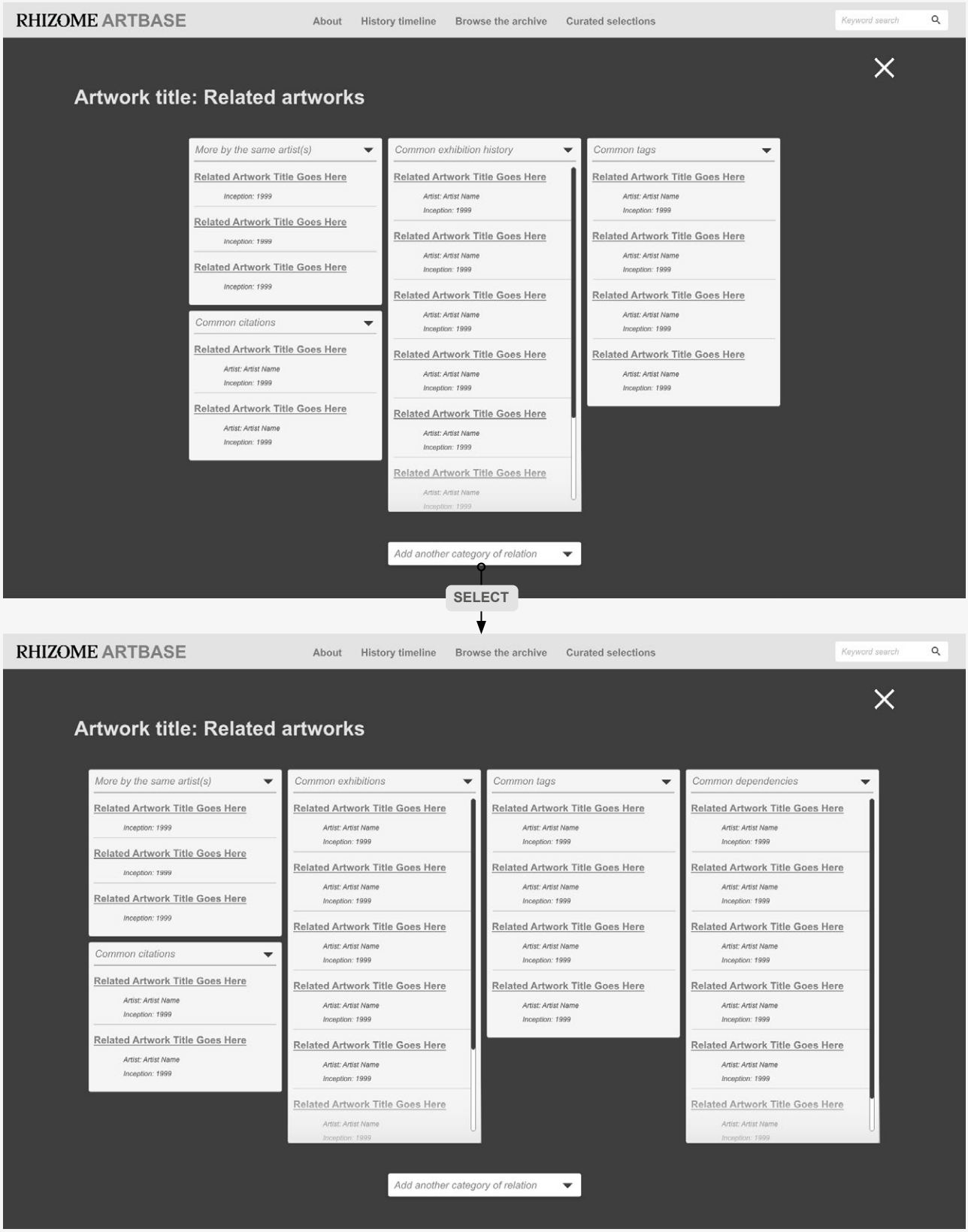
Related artworks

During initial testing, users responded positiveily to the network graph diagram expressing relationships between artworks. Network diagrams can, however, easily become unwieldy, if there are too many relationships, or look empty if there are too few.

17 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.

The network diagram visualization would also require a lot of 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, could use the directions of relation as area headings, while the number of related artworks can determine the size of the corresponding tree chart area (within the limitations of the available screen space). Users can preview the “top three” directions of relation, which show 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 made to be a drop down menu where users can select across a range of available options to view related artworks. Picking an option means running a precomposed SPARQL query and getting real-time results populating the tree chart.

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

In this visualization (see pp.72–73), the information is predominantly textual, since including images might be problematic both visually and programmatically. In the case of many results, image thumbnails might get too small to be meaningful visual symbols. Additionally loading images will 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 see 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 to draw connections across items in the database without having to manually write SPARQL queries.

Timeline

This element is largely retained from the previous versions, except for some changes in terminology. The title “Timeline” is 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 before they are 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.

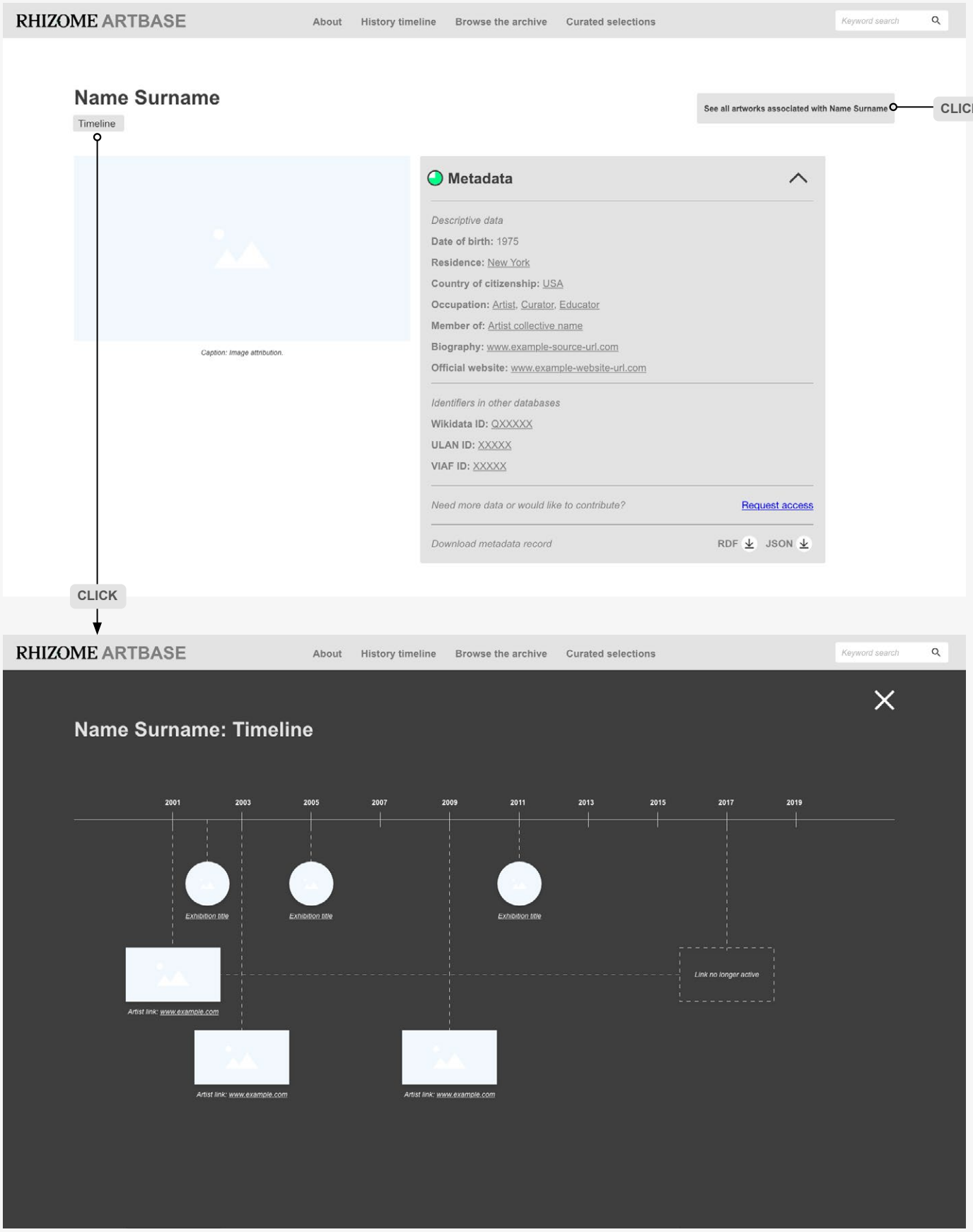
The template presented in this prototype can be used for different persons present in the database – artists, curators, developers, Rhizome staff members, etc. The metadata in this template is entirely optional: for many artists there will not be as much (or hardly any) of this information available on record. Ideally, every person will 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 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 in the top right corner of the page template aims to do just that, while removing the need for users to create their own SPARQL queries. The button will open up to a listing page, styled in the listing page template (for listing page information see p.91).

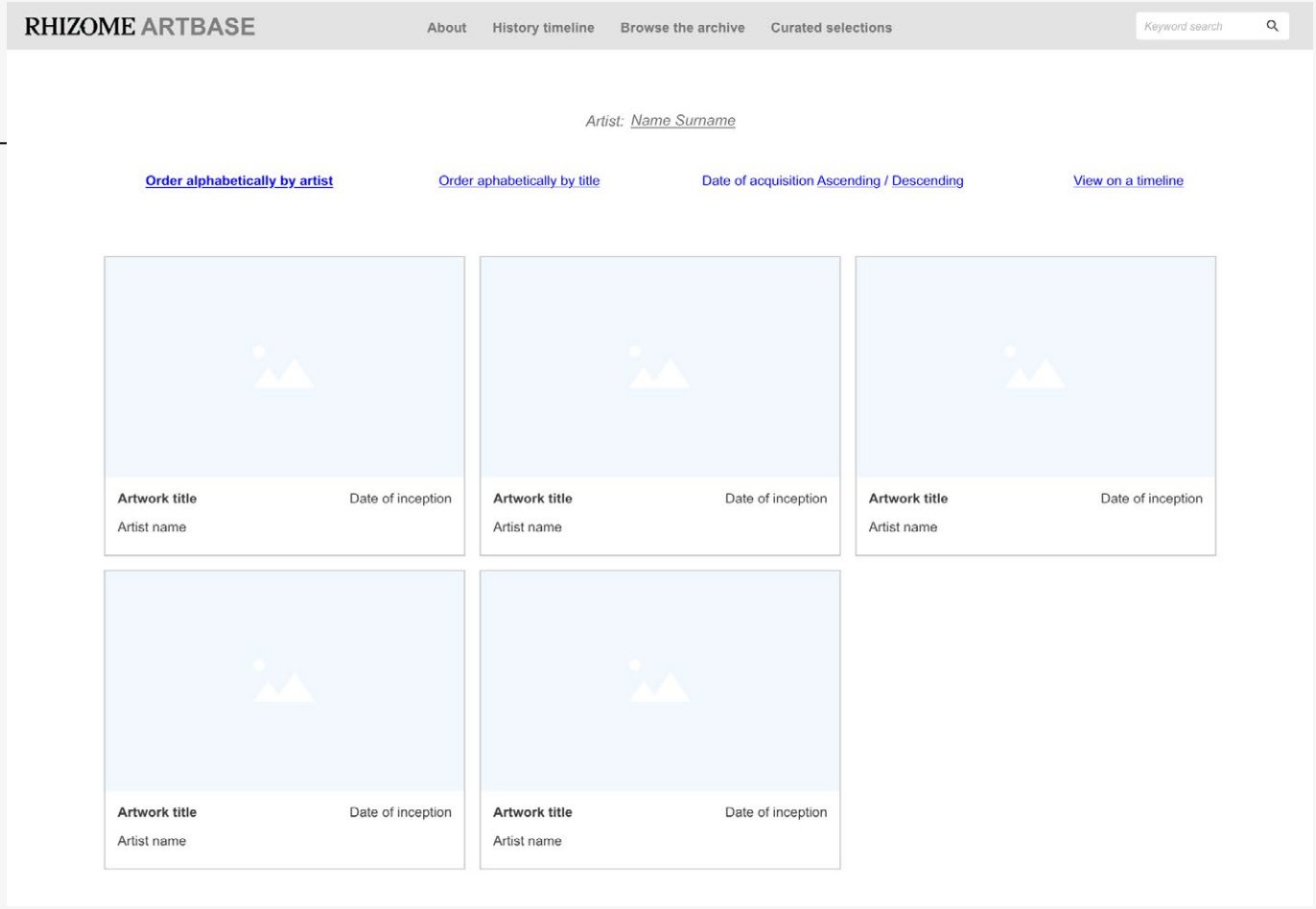
Additionally, similar to the design of the artwork record, it could be useful to see a timeline of activities associated with a person – whether the creation of an artwork (variant) or participation in an exhibition, etc. The visualization approach here will be the same as the one developed for artwork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

Properties and items

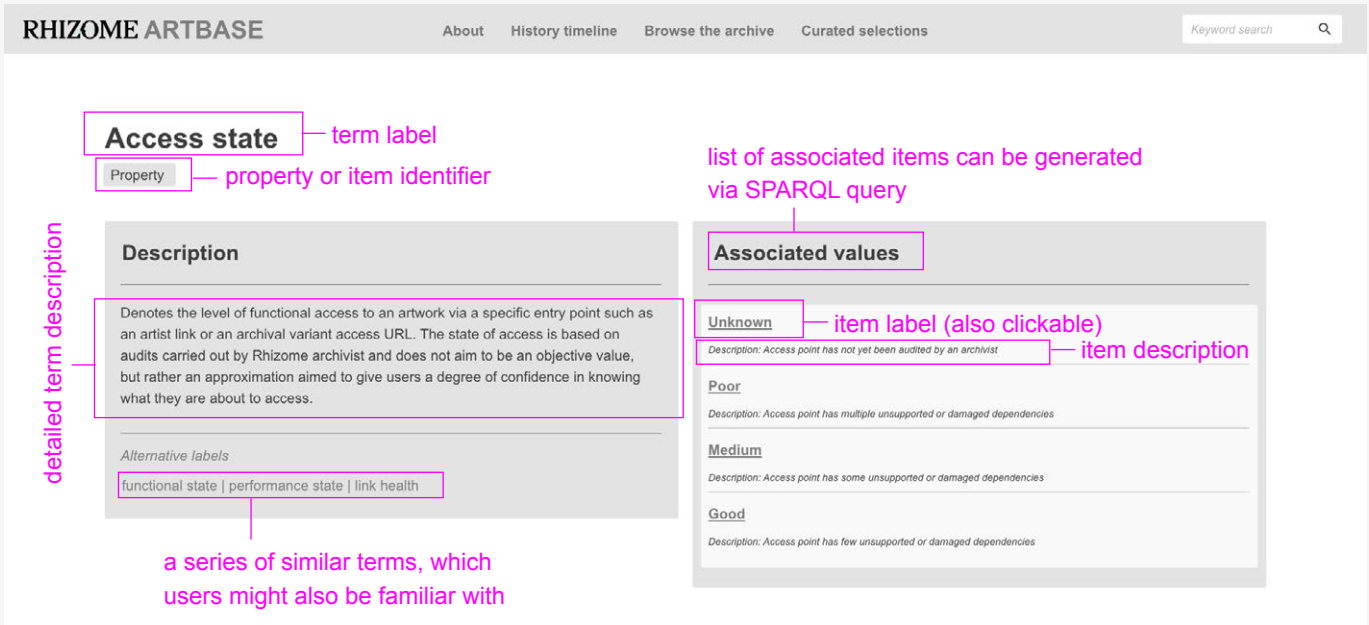
Properties and items in Wikibase which will be used to populate the metadata fields for artworks and artists could also benefit from customized UI templates. Not all users need to know all the details of how linked data in the ArtBase is structured – what are properties, what are items, what are qualifiers, etc. (although it would certainly be beneficial for those interested in more advanced research). However, all users should be able 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, will both lead users to pages with additional explanations (and additional data) about each term (see p.77).



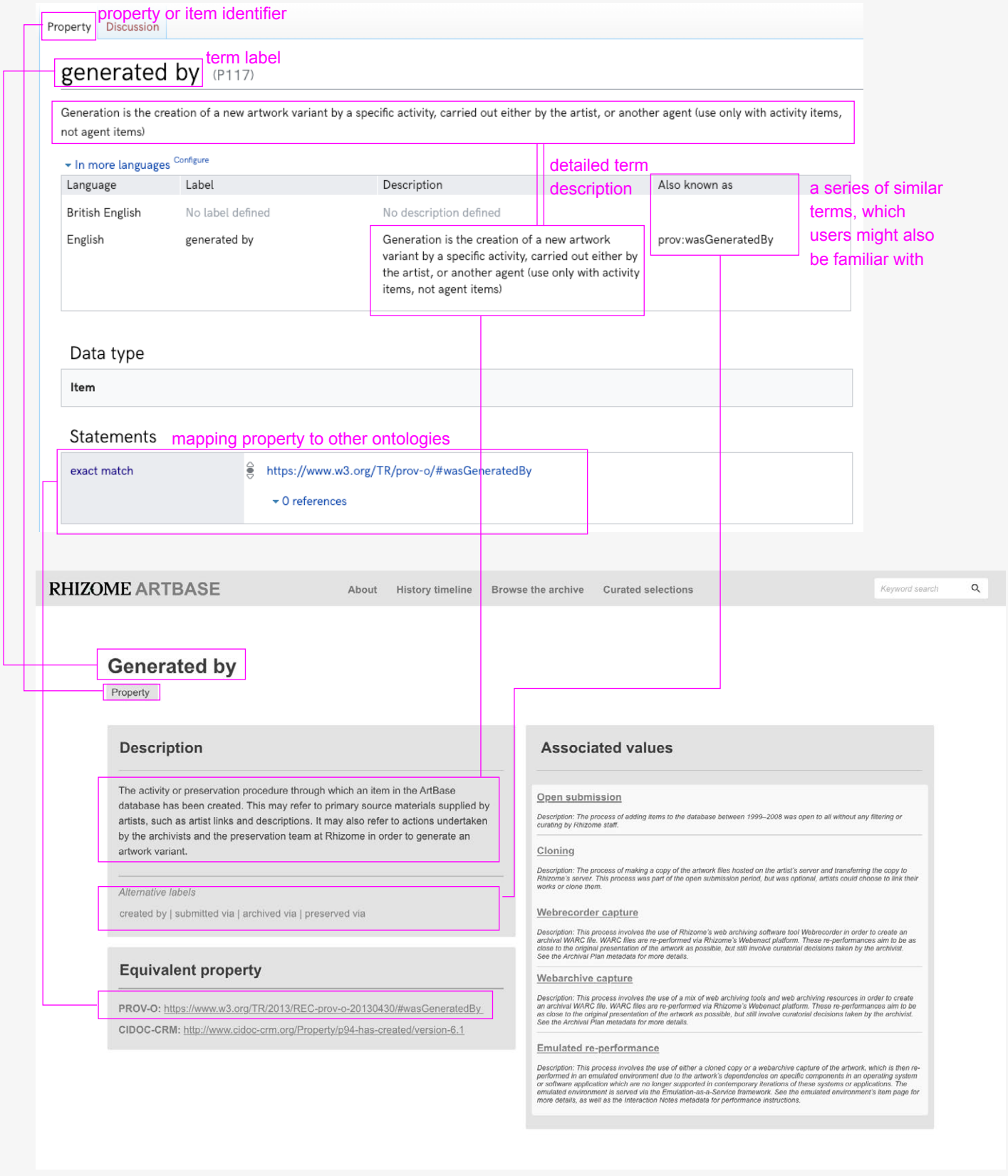
Version 3—Person record:
Top: Metadata available on person records;
Bottom: Timeline virualization for person records;



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



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



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” required for all Wikibase pages. Additionally, including the “alternative labels” – also visible on all Wikibase pages – would be useful to communicate the meaning of a concept to a user, since alternative labels could provide synonymous concepts, which users might sometimes be more familiar with.

Besides the description section, a few 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 label of “property” and “item” beneath each page title might not make a lot of sense at first glance, but after users encounter a few of these pages, they can start making out the 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”. 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 some properties, adding new values will not make sense – “access state” is already served well by values such as “unknown”, “poor”, “medium” or “good”. Other properties, like “generated by” can start with a small number of possible generation activities – determined based on the history of the archive, however, these could potentially easily grow in the future, if new artworks are added to the archive via new preservation methods.

Furthermore, for some properties it will be important to map them to other ontologies, if they are modeled on other existing standards to begin with. 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, and can be mapped to it directly. Since efforts are underway to map Wikidata properties to CIDOC-CRM (a standard ontology in the cultural heritage field), such mappings can also be facilitated in 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, they could pursue the links (if interested) and learn more about how certain properties may be conceptualised in other ontologies or what types of characteristics items have in other specialist databases. The role of the ArtBase is to be a specialist database for artworks, so all other items in the database do not have to 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 just on artworks, but also artists, software, web archiving, etc.

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.

Still, even with cross-database linking, some item pages might 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” can add specific information about the restoration actions applied to each artwork which was “generated by” the “Webrecorder capture” activity (see p.80). Out of all the possible archival plans archivists use as part of the preservation programme in Rhizome, only some will be applicable to the process of “Webrecorder capture”. Recording this data as a form of “data constraint” to the relevant items in the database on the UI level can be useful both for internal and external users. For internal users, it provides a quick at-a-glance overview of what plans they have used in the past for a specific generation activity. For external users, it provides a further layer of contextual relations in the database made visible.

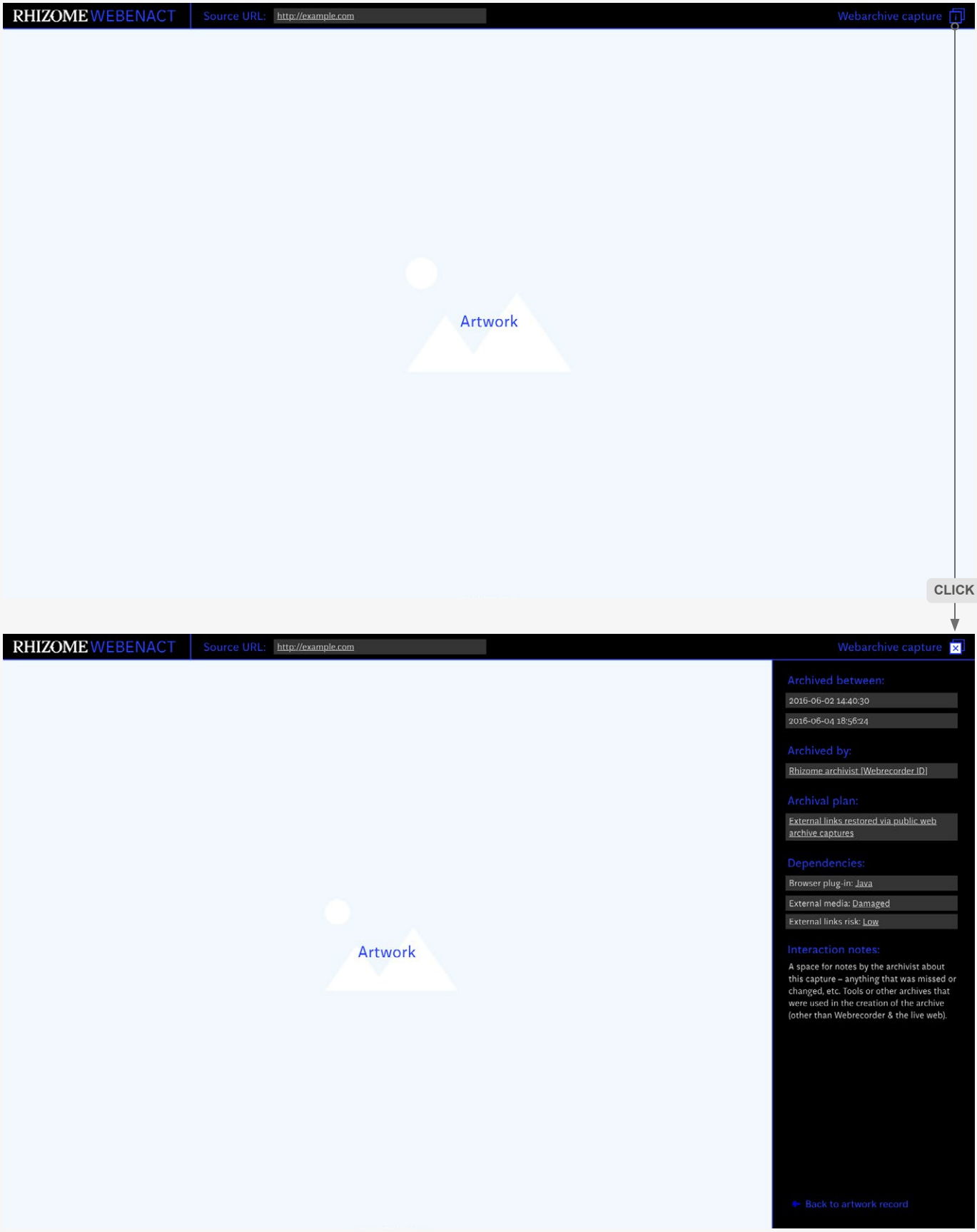
Complex items, like generation activities or archival plans, can include further metadata statements, such as:

- “Tools” (What tools were used during the activity?)
- “Resources” (What 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, 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.[18] The templates presented in these prototypes only show how different types of metadata can be presented in a user interface, but they are not meant to show a definitive list of all possibile metadata values.

Finally, similar to the person record template, the templates for some items will 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 can 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 provided on person pages. The button opens up a listing page with the associated artworks, styled in the listing page template (see p.80).

18 For a full description of the data modeling process in Wikibase, refer to the PhD thesis accompanying this project, Part III, Chapter 7.



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 light branding, was originally designed in Summer 2018, as part of ongoing work with the preservation team at Rhizome. It has been updated slightly to fit 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 part of the provenance statement of the artwork.

At the other end 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 no other web archiving tools were used other than Webrecorder). This term reinforces the link between the Webenact platform and the artwork variant record metadata 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 is on the artwork itself, which will take up 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 metadata. Additionally, the name of the archivist could also be recorded, or even their Webrecorder ID shared, since the particular form and boundary of the web archive will largely depend on subjective decisions taken by the archivist. Making the identity of the archivist explicit, additionally reinforces the concept if the archive as a subjective construction, rather than "neutral" conservation procedure.[19]

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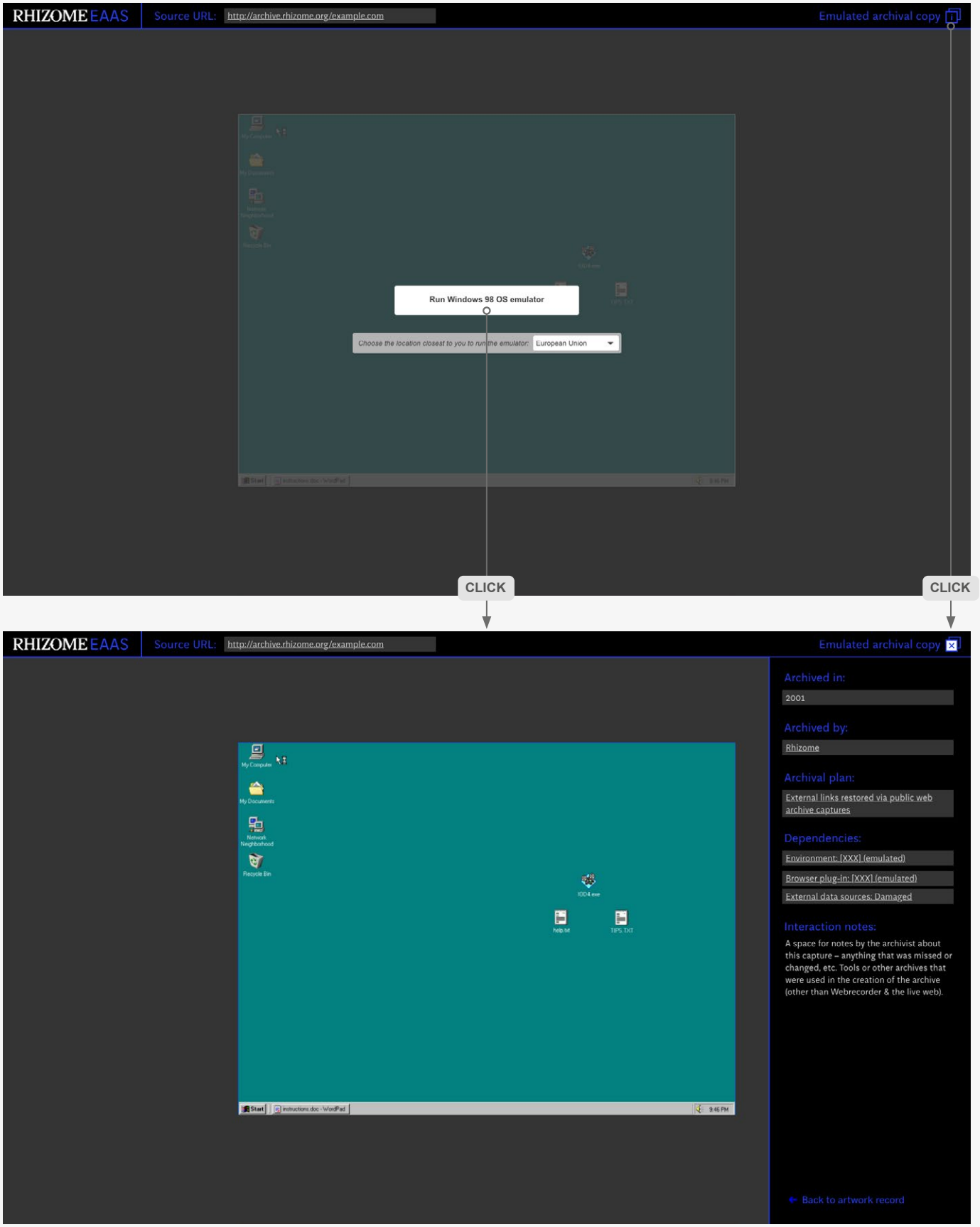
19 For a theoretical discussion of the subjective role of the archivist/ curator in web archiving processes, refer to the PhD thesis accompanying this project, Chapters 3 and 8.



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.

ArtBase redesign: prototype development

Furthermore, some metadata from the primary artwork record page can be reintroduced here, such as the archival plan, dependencies and interaction notes specific to this particular artwork variant. This 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 – to the artwork record page. Finally, a link back to the artwork record is another standard navigational cue and interaction pattern users have requested during the user research sessions, which can be integrated in the curtain sidebar.

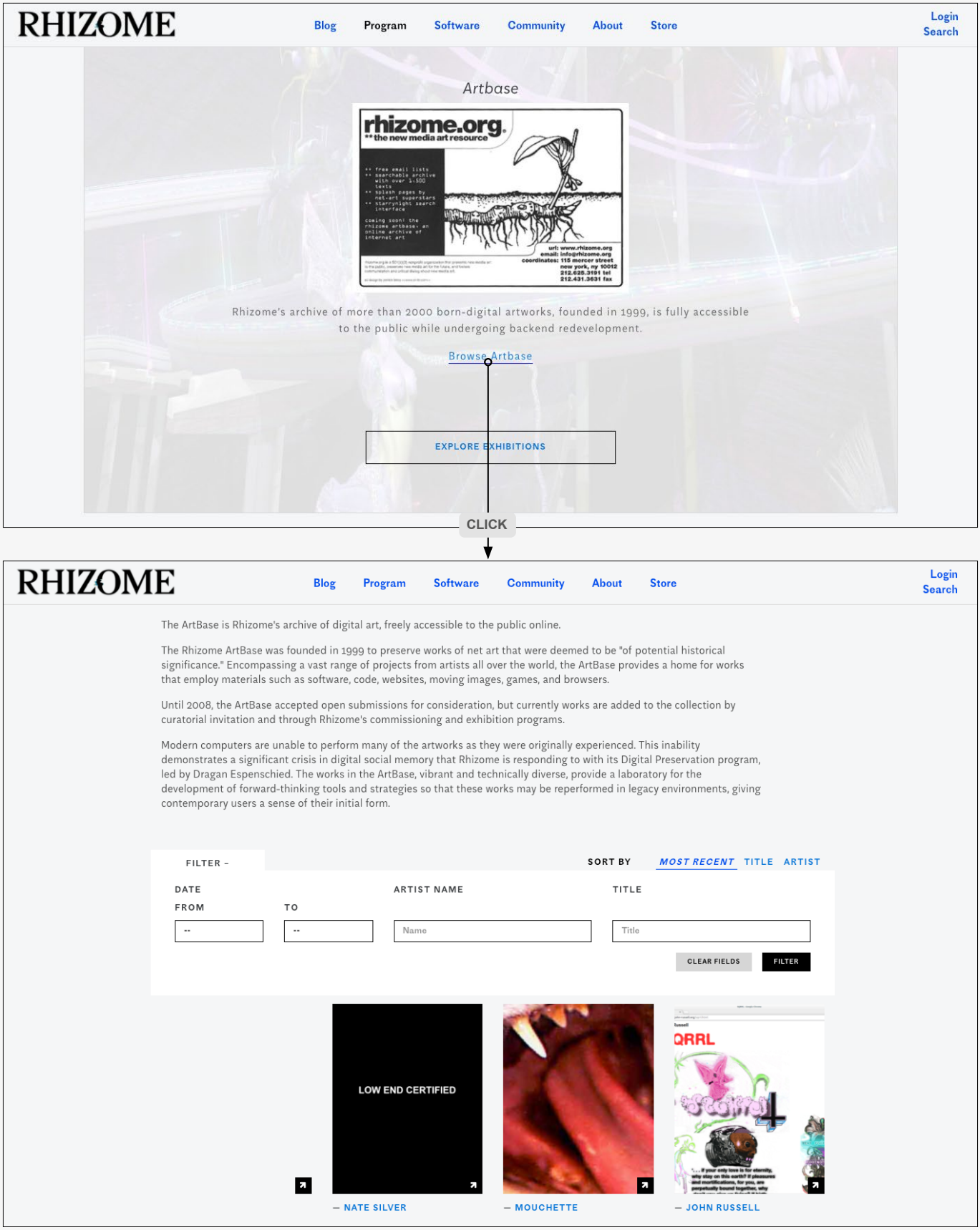
Emulation-as-a-Service (EAAS) presentation

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 & 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 for instance. In the EAAS presentation, however, the 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 that might have happened to an artwork which has remained under the control of the artist. Hence, it is important for users to be aware what variant is being emulated.

The next element in the navigation bar is the generation activity used to generate 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 just a single point in time, as opposed to a duration, since that level of information was not captured about early archival copies. The associated actor with the generation activity would be Rhizome, rather than a specific person in most cases, since generating emulated presentations for archival copies will likely 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, since they can be helpful to users about to interact with the artwork. Finally, a back button can take users back 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.

ArtBase redesign: prototype development

The presentation of the artwork itself would be different from the presentation in Webenact. Emulated artworks usually can only be presented at a much smaller screen resolution ratio than most contemporary retina screens, since the software being emulated—e.g. 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 can 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 start what is the base environment that this artwork needs for its reperformance. And furthermore, users who may not be so familiar with what emulation is, or what it does, will get an instant cue from that button that emulation has something to do with recreating a legacy computing environment. This element still needs more testing, however.

Once 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 might 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 the Rhizome main site, but will need to also function separately form 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 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 see curated lists around specific themes or processes, so that I can explore smaller subsets of the collection focused on a specific topic.

❝

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 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 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 the Rhizome 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 access to Wikibase available 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 the Rhizome 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 a few 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 bigger 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.

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.

Still, some users might need to make more complicated queries. The ArtBase should provide a GUI for such queries. 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 just an example place-holder. It is designed 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 might be more familiar with from other academic databases, and so it will need further development and testing with users before it can be be implemented. There is also the possibility to embed an existing GUI developed elsewhere—either by Wikimedia or or other potential partners Rhizome have been in contact with throughout the research phases of this project.

Listing views

Besides the homepage, one more 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 [...]". The listing pages will feature a grid of three or four rows of artwork thumbnails.

❝

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.

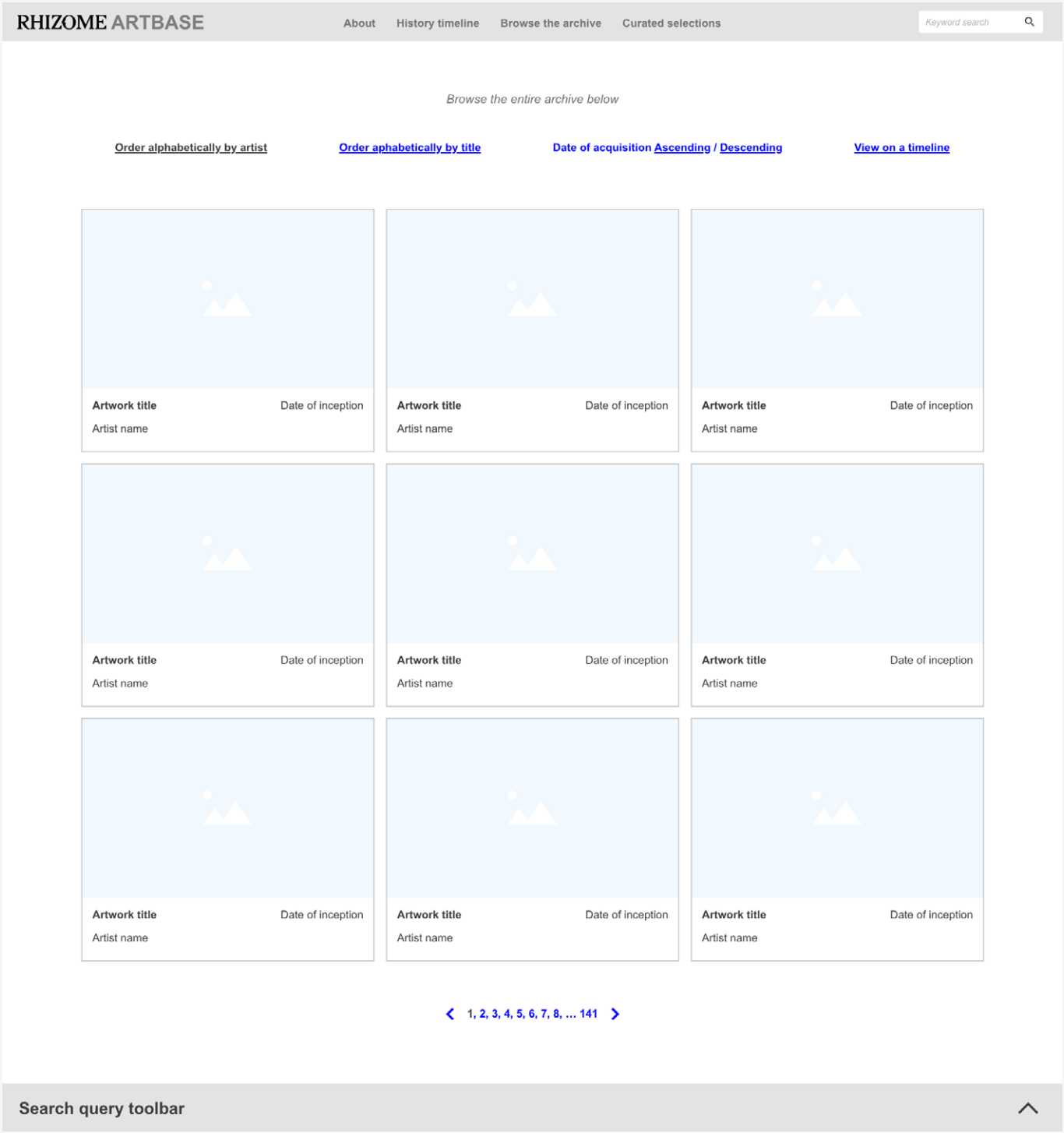
❝

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)



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.

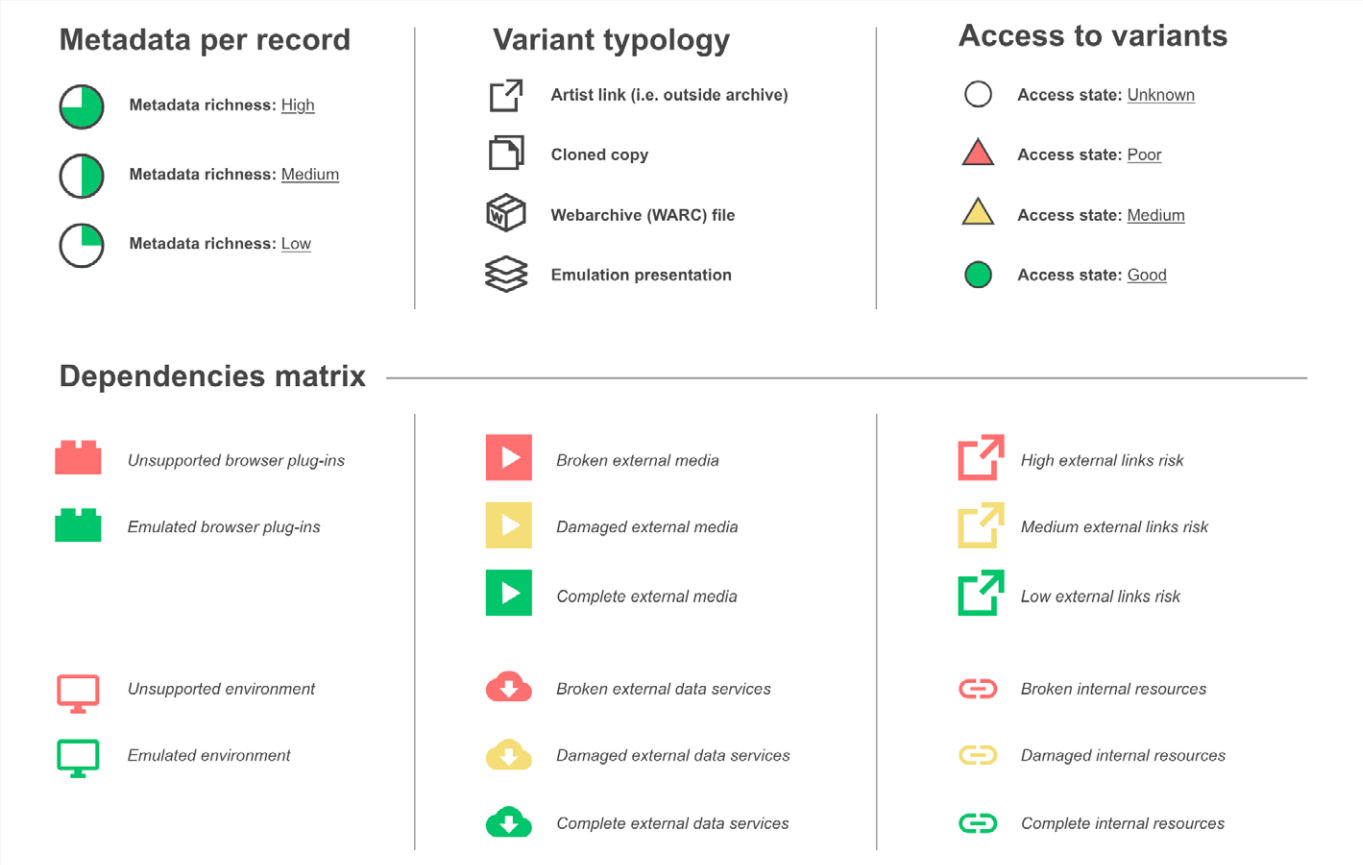
They can offer some sorting facilities – based on alphabetising the artist names or artwork titles. Dates of acquisition (or inception) could be another sorting device. The option to view all artworks in the listing on a timeline would also be a useful feature, which many users have requested. A multi-object 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 dependencies), 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 filled out this survey. And 2 more users responded via email feedback.



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 is used as the basis for developing a fully interactive web-based final prototype. This latter prototype is 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 guilines for Rhizome during the implementation process following the end of this research project.

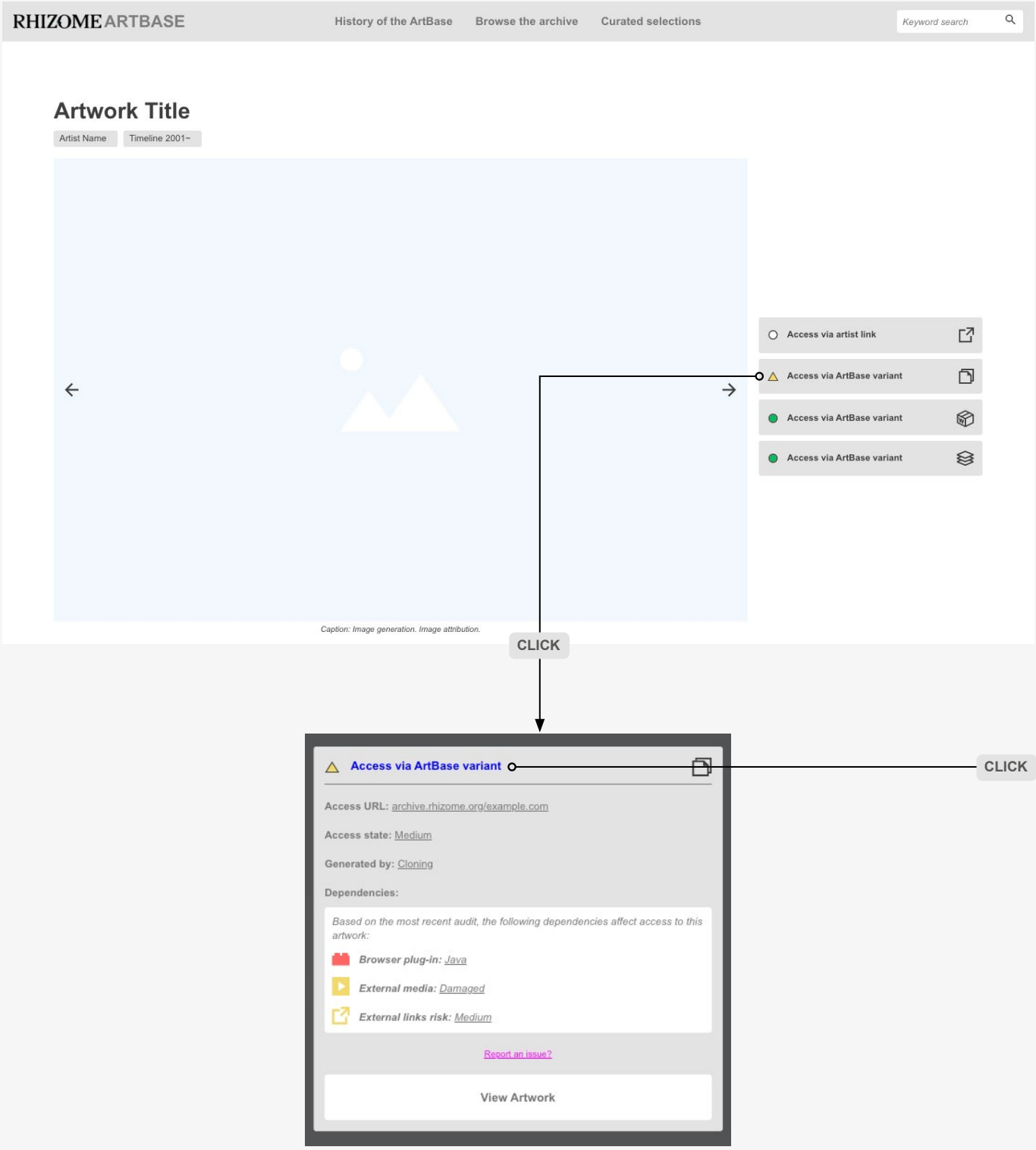
In order to run this second round of evaluation with users, an email was sent out to participants from previous user testing sessions (i.e. the sessions outlined in Report #2) and participants from the workshops and evaluation session described earlier in this report. The email contained brief information of the latest web-based prototype, where it can 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.

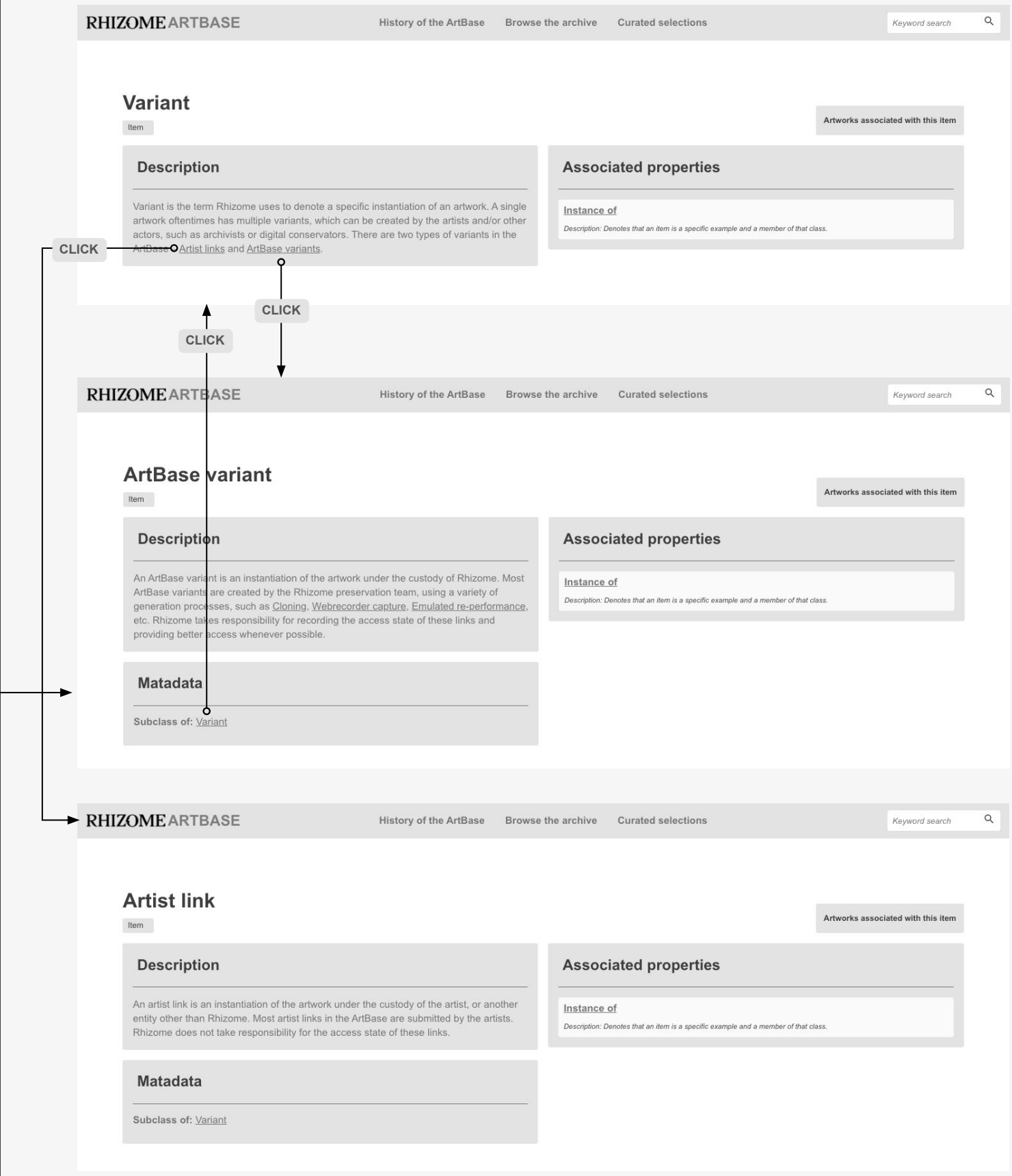
A total of 6 users filled out the survey and two more users responded via email and gave additional feedback. The users were primarily with an academic or archival/ conservation background.

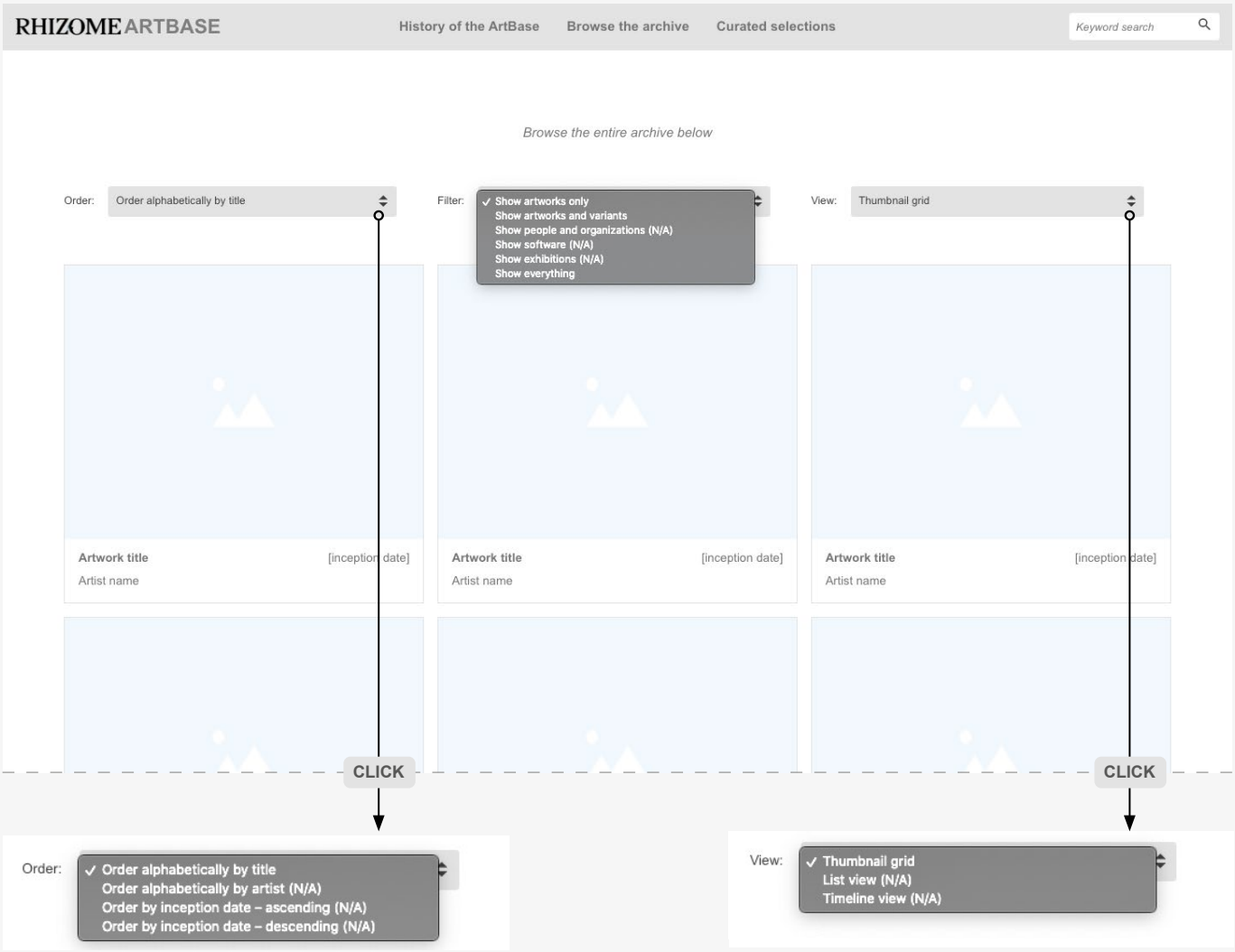
The prototype was also shared and discussed with Rhizome staff. One of the immediate updates to the designs of Version 3, which was introduced in the web-based prototype was the change in the color schema of the iconography. Tests with Rhizome staff and additional software for web accessibility helped 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 communite to users access states accurately when the only availabel visual cue was an icon and text was only visible on mouse-over. The updated color scheme was used throughout all icons in the prototype and it is shown here on p.95.

The following pages pick up on 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.



Web-based prototype—Artwork record:
Top: The new icons are implemented in the access entry points here.
Bottom: In this updated verison of the prototype, users can click on the access point label in the intermediary overlay state to reach additional information pages about the terminology.


RHIZOME ARTBASE
History of the ArtBase
Browse the archive
Curated selections
Keyword search
Variant
Item
Artworks associated with this 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.
CLICK
CLICK
CLICK
RHIZOME ARTBASE
History of the ArtBase
Browse the archive
Curated selections
Keyword search
ArtBase variant
Item
Artworks associated with this 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.
Associated properties
Instance of
Description: Denotes that an item is a specific example and a member of that class.
Matadata
Subclass of: Variant
RHIZOME ARTBASE
History of the ArtBase
Browse the archive
Curated selections
Keyword search
Artist link
Item
Artworks associated with this 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.
Associated properties
Instance of
Description: Denotes that an item is a specific example and a member of that class.
Matadata
Subclass of: Variant



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 surve 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 are able to 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 in the beginning, continous use improved comrehension, e.g.: “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 not be more accurate, since 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 prorotype “Dependencies” is a term only used as a heading, but it could be turned 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 and it might become more clear 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 visual hierarchy. Users responded positivily 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 is moved higher up on the page, and also if it is 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 been made yet to address this particular feedback.

With regards to the preservation metadata sections users thought, it 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 context cannot be separated as these preservation efforts are necessary to keep works accessible and in the art historical and art critical conversation.” However, they also commented that the archival plan can 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 succint archival plan descriptions for all artworks, before implementaiton can be considered.

Lastly, some users suggested adding additional filters for browsing and generally expanding 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.

The temporal relations in the design and the timeline visuaizations had already been positively reviewed by most workshop and testing sessions, with this final session some further ideas came up:

- “This may be outside the scope of the ArtBase, but 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 timelie 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 since 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 emphasize further the temporal aspects of variability across artwork instantiations, and not just functional aspects. This additional development of the prototype needs to be considered during implementation stage, as it will be more effective to consider and evaluate again with users once a critical mass of data has been populated and the exact requirements of specific variants can become more apparent.

Live data

Lastly, all users brought up the quesion of when they can 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 and is planned as a next step following the completion of this research project in 2020. And so this round of evaluation with users cannot be considered final, since additional evaluation will be necessary following the implementation of the prototype designs in Rhizome's live inftrastructure. In any case, the methodology approach discussed in more detail in the thesis accompanying this research project does not envision the design process as a linear progression with clear start and end. Evaluation and communication with users should continue on a regular basis even after implementation and 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. On that note, this report does not end with a definitive set of recommendations and best practices, but rather a set of propositions and lessons learned throughout the research process, which can then be taken further into implementation stage, and then continously tested and refined further. For more on this approach, refer to the thesis Chapters discussing MDI (model–database–interface), e.g. Chapters 1 and 9.

Summary of findings

Facilitating effective user communication and informed user agency via the archive's interface are key aspects of the approach to redesigning the ArtBase that was adopted and gradually refined throughout the design phases of this project.

The prototypes of and the iterative refinement with users discussed in the previous sections aim to address the specific needs of presenting and contextualizing net art via a linked data database. They do so in the context the MDI approach to redesigning the ArtBase which was developed and gradually refined throughout the design phases of this project. The primary goals of the approach are to facilitate effective user communication and informed user agency via the archive's interface. The prototype versions and workshops discussed in the 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

The strategies adopted in the visual design of the ArtBase prototypes build upon the affordances of the default Wikibase interface and include visualizing the new ArtBase data model and ontology via familiar interface metaphors, e.g. pages, hyperlinks, pop-ups, overlays, and sections which can be expanded or collapsed on click. These metaphors are used to enable familiarization to the non-hierarchical, networked model of linked data databases and to propose new forms of user interaction (e.g. 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 the users' attention not only on the 'content', but also on the ways 'content' is weaved together into particular narratives around the 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 other databases, too. While developed with the specific needs of the ArtBase in mind, the custom ontology does rely on other existing standards and classification principles. A richer context around the value- and knowledge-production entangled with the classification system of 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 to be reperformed 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 and the processes of maintenance entangled in those provenance records need to me made more 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", "emulated variant", etc., proved unfamiliar and often confusing to users. Being able to access individual work variants, while retaining an understanding of the different types of relations possible to be enacted between individual variants, e.g. relations of derivation, or reperformance via emulation or a web archive, were all unfamiliar interaction pathways without precedent in existing online collection interfaces. The access points to individual variants developed and refined throughout the different prototype versions aim to communicate two primary points – what variant is the user accessing (and where) and what is the condition of this variant – i.e. is it completely inaccessible, partly damaged, or generally functional. Text labels, icons, pop-ups and glossary-style descriptions all aim 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 can 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 in 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 implementation 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 with 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 given 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 building up the ontology in the ArtBase, are all examples of different approaches to exposing 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 (e.g. 'has variant' / 'variant of'), or the links are native features of the Wikibase software (e.g. the property and item pages).

Other non-direct data connections can be made manifest via SPARQL queries, too. However, there are yet few graphical user interfaces which enable users to interact with a database with 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 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. over the posing of their own research questions to the database), still it provides ways for users to interact with the queries and get familiar with the possibilities of manipulating linked data dynamically, without requiring 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. That way, if a new archival plan is added to the database and then 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 with 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 ways of discovering relationships between artworks, which also limited the browsability of the archive. Building on from established patterns of interaction in collection interfaces, where 'related' is a typical feature of most collection item pages, the new prototypes propose an expandable feature for 'Related artworks' on all artwork pages.

Admittedly, the prototypes developed to visualize indeterminate data connections remain largely speculative propositions. Compared to the interface designs for the timeline visualizations or the property and item page templates, initiating meaningful community discussions around related artwork visualizations proved difficult without live access to the data and a finished integration between frontend prototypes and backend database. This integration is outside the scope of this research project, and would be possible only after further development work at Rhizome is undertaken. Discussions around the potential to generate indeterminate connections via SPARQL queries during user workshops were carried out within an abstract, conceptual sphere only,[20] and it is likely additional adjustments to the visualizations and precise interactions with them (via buttons, menus, etc) would have to be carried out during the implementation stage of the work at Rhizome.

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

Even though the full implementation of the prototype designs did not happen within the timeframe of this research project, it was possible to test and model data in the existing Wikibase infrastructure, to run SPARQL queries and test what results were possible, and then to share all that with users alongside visual design prototypes during workshops and evaluation sessions. The activities discussed in this report facilitated the involvement of users as active agents in the design process from the initial discovery and prototyping stages through to the stages where concrete specifications and recommendations are proposed

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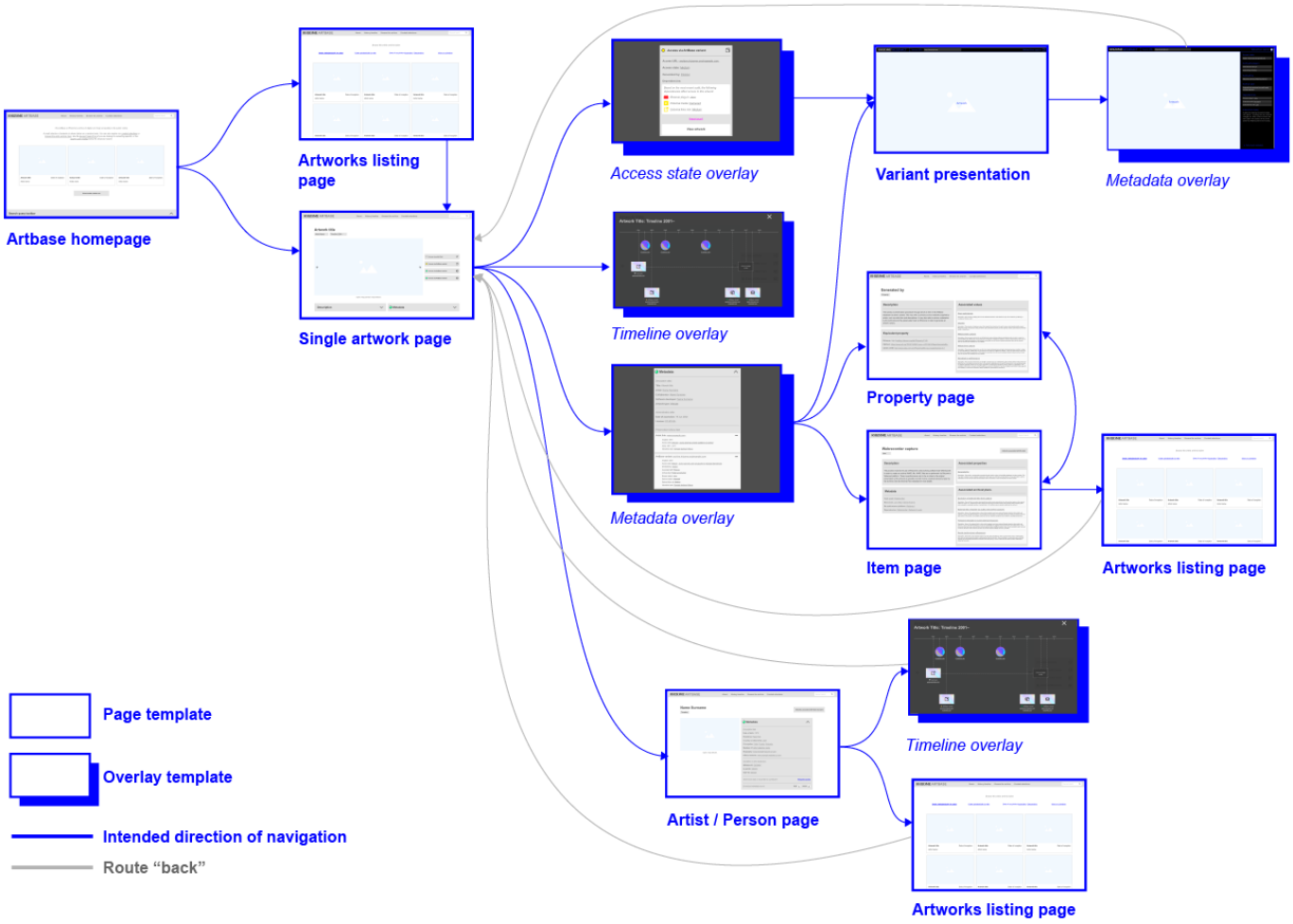
20 This does not mean that the potential for useful insights from such discussions is diminished. Drucker has noted that “the study of the relational features of any material artifact and system puts us squarely into the realm of diagrams and the study of the semantics of relations.” However, she also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

to Rhizome. The report highlights how specific user feedback informed design decisions throughout all stages of the design process. Still, various aspects of designing, working with and making accessible SPARQL-queries and their results via the frontend interface of the linked data database 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.

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 within the 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 hence a priority for design and iterative refinement with users.

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