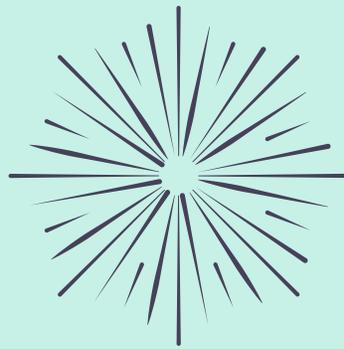
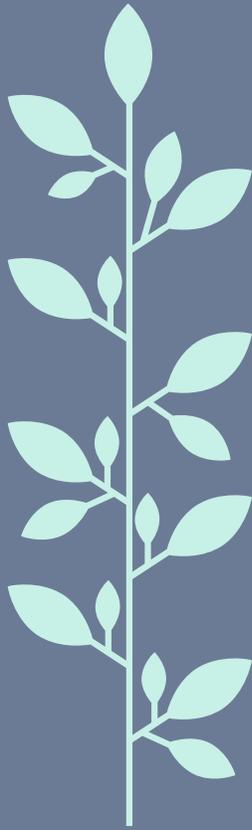


# LIBRARY PUBLISHING INFRASTRUCTURE:

*Assembling New  
Solutions*



# MAR 2021

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## Executive Summary

This report documents the design, methods, results, and recommendations of the [Next Generation Library Publishing](#) (NGLP) project team's 2019-2021 study of library publishing infrastructure gaps and requirements. This research was designed to accomplish two related goals: 1) to reveal and chronicle library publishing stakeholders' current needs, interests, and desires regarding the tools and environments that support their publishing activities, and 2) to develop a meta-understanding of the open-source tools and environments available for publishing, how those tools and environments might be combined and built upon, and where gaps between them might be mitigated through standards, scripts, and documentation. Our project team developed a conceptual framework to document our research questions and methods. We then focused our attention on two intertwined research efforts.

In the first, which we term "Community Engagement," we produced and tested four data gathering instruments to help us to understand and document library publishing stakeholders' needs: an interview script, a focus group script, a workshop map, and a survey. These instruments were deployed between October 2019 and January 2021, in international locations and through both in-person and virtual settings. In all, we conducted 15 interviews, 10 focus groups and workshops, six platform demos, and we received nearly 100 responses to a survey-based "Request for Ideas." We also co-hosted six platform/tool-specific special interest sessions in partnership with the Library Publishing Workflows project and the Library Publishing Coalition. Communities we engaged in this research included a broad range of publishers, librarians, authors, developers, service providers, and administrators.

In the second, which we term "Technical Landscape Scan," we researched more than 100 scholarly communication tools, platforms, and services in order to strengthen our understanding of the tools and platforms currently used to support publishing. To seed this work, we first engaged with existing studies and landscape maps. We developed and refined a data model for capturing and comparing details about open-source publishing tools and environments, and then we built and populated a database-driven catalog of scholarly communication technologies. This work culminated in the 2021 release of the [Scholarly Communication Technology Catalog](#) (SComCat), which documents more than 80 open-source technologies (and growing). The tool provides an overview of the functionality, organizational models, dependencies, use of standards, and levels of adoption of each technology, aiding our team in identifying and understanding the benefits and liabilities of different tool combinations.

We triangulated our findings and determined that the library publishing community seeks a modular set of platforms and components to support a variety of institutional publishing

models. Through our research, we have identified the remarkably consistent needs and desires of library publishers today, including the following:

- Ways to integrate existing platforms and tools rather than building new ones
- Unified web delivery and discovery options that work across those platforms
- An administrative dashboard that can provide central control and reporting options
- Choices among a range of hosted, turnkey solutions
- Community-led, rather than commercial, modes of governance and sustainability for tools, platforms, and service providers

These findings have directly informed the strategy for the implementation phase of the NGLP projects: the NGLP partners are building towards a modular set of platforms and components that offer library publishers and partnering service providers flexible open solutions designed to meet a variety of institutional publishing needs.

This strategy rests on four goals driving the implementation phase of the project:

1. **To integrate open source platforms already widely used** in the community and to produce a modular architecture that allows service providers to mix and match these existing components to deliver hosted solutions geared towards different library publishing community segments
2. **To build a unified web delivery front end** so that library publishers can publish institutional repository and journal content from multiple content production systems in one place
3. **To build an analytics tool that provides a comprehensive view of metrics** from different platforms and across different workflows
4. **To seed a range of hosted solutions and support options** that are reliable and sustainable and meet the needs of different library publishing consortia, institutions, or segments

For this initial build, we are concentrating our efforts on bridging three open-source tools that we selected based on our “Community Engagement” and “Technical Landscape Scan” research findings: two journal publishing platforms ([Open Journal Systems](#) and [Janeway](#)) and one institutional repository platform ([DSpace](#)). These three tools have proven code bases, high or growing adoption across global markets, robust or growing community engagement and governance models, and feature sets and development road maps that are responsive to the stated needs of library publishers.

This report seeks to make all of our research findings available to and usable by other teams—including projects, tool developers, service providers, and communities of practice. We hope many can use this synthesis of our research to inform their understanding of the interests, needs, gaps, and opportunities in the growing library publishing field.

This report begins with an introduction describing the project context and the arc of our research. It defines library publishing and provides an overview of this steadily maturing academic publishing field. We then describe our methodology in detail, including our data sources and data gathering frameworks. We provide an analysis of the data and synthesize both our findings and our recommendations. The report closes with a discussion of the work currently underway to position us to launch pilot implementations in early 2022..

We are grateful for the generous support of this work by [Arcadia](#) - a charitable fund of Lisbet Rausing and Peter Baldwin. We also deeply appreciate all of the diverse stakeholders in library publishing who engaged in our interviews, focus groups, workshops, and other sessions in 2019-2020.

## Introduction

The [Next Generation Library Publishing](#) project (2019-2022) seeks to increase and improve the scholarly publishing pathways available to authors, editors, and readers. Led by [Educopia Institute](#), [California Digital Library](#), and [Stratos](#), in close collaboration with [COAR](#), [LYRASIS](#), and [Longleaf Services](#), this project intends, specifically, to advance and integrate open-source scholarly publishing infrastructure to support library publishers.

**...our team spent more than a year engaging deeply with library publishing stakeholders of all types.**

To establish a strong foundation for the project's development work, our team spent more than a year (September 2019-November 2020) engaging deeply with library publishing stakeholders of all types. Via in-person and virtual interviews, focus groups, workshops, special-interest groups, and a public "Request for Ideas," well over 150 library publishers and related scholarly communication representatives provided concrete data about their publishing infrastructure needs, interests, and challenges. Based on their input, we determined what

functionalities are most essential to their work and what bridges they seek between existing tools.

Simultaneously, our team conducted a technical landscape scan of scholarly publishing tools in order to determine what the current and developing infrastructure elements are, how they can be combined, and where standards and scripts may be useful for helping to bind these tools into formal workflows. We complemented this research by hosting a series of joint sessions with the [Library Publishing Workflows](#) project (2019-2022) to explore particular library publishing tools and platforms and to understand the workflows that librarians used to work within each.

Based on our extensive research, we have identified some core characteristics undergirding library publishers' choices of tools and environments to work within. We have studied and documented the gaps and opportunities library publishers see in the publishing tools currently available to them. We have also noted common pain points for library publishers, including the increasing burden (and sometimes outright barrier) posed by hosting tools and systems locally.

## Next Generation Library Publishing

The scholarly communication landscape is in flux. While most research and scholarship seeks, fundamentally, to advance knowledge broadly and improve society, these goals are often at odds with the profit-seeking practices of many of the large commercial publishers who currently control a significant swath of the scholarly communication infrastructure, including the technologies and services that support the workflows from manuscript ingest to peer review and publication.

There is increasing awareness among members of the scholarly community that this prevailing scholarly publishing system neither aligns with their values nor fulfills their publishing needs. While academic institutions have outsourced the work of their knowledge distribution to private companies at increasing expense since the mid 20th century<sup>1</sup>, there is a growing movement to assert the role of the university as publisher—and, in particular, the library as publisher. Rather than functioning solely as a mechanism for licensing publisher-owned research publications, academic libraries are becoming the locus of their own values-driven publishing programs that aim to reduce inequities both in publishing (e.g., prohibitively high “Article Processing Charges” and market-driven acquisitions decisions) and in the discoverability and availability of scholarly research (e.g., by advancing open access).

In the wake of recent public tussles between universities and commercial publishers over subscription prices and restrictive paywalls, many faculty have begun to voice frustration with the status quo and seek alternative publishing options. Many are discovering that libraries now have over 20 years of experience providing alternative publishing services in support of scholarly research. Library publishers largely operate outside the commercial marketplace, often relying on their home institution to resource their work; they have the advantage of proximity to the scholars and researchers on their campuses and, as such, are poised to recognize and respond to emerging disciplines and new modes of scholarship before the market has caught up; and library publishers frequently attend to fields that are either underfunded or lacking in commercial potential because of size or geographic distribution. Perhaps most importantly, though, library publishers are almost exclusively open access publishers, committed to the open distribution of research without restriction or subscriptions.

These characteristics are also increasingly compelling to a growing community of scholars in well-resourced disciplines who are seeking more autonomy and control over the distribution of their own research or the work of their field. Editorial boards are resigning from commercial journals to “flip” to open access with library publishers. Editors are

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<sup>1</sup> See Fyfe, Aileen, Coate, Kelly, Curry, Stephen, Lawson, Stuart, Moxham, Noah, & Røstvik, Camilla Mørk. (2017, May 25). Untangling Academic Publishing: A history of the relationship between commercial interests, academic prestige and the circulation of research. Zenodo. <http://doi.org/10.5281/zenodo.546100>

reaching out to library publishing programs looking for new platforms that can support their ambitious goals of creating open access journals that rival the best commercial journals in their field. Scholars are seeking alternatives for sharing their research early, rather than waiting for a journal's publication cycle to conclude, or they are looking for ways to publish and get credit for scholarly work that defies traditional genres. In short, library publishers are having a moment; they have a captive audience that is eager to make the leap to institution-based, open access (OA) publishing.

To serve this audience well, library publishers need tools, platforms, and services that can scale quickly and flexibly for a broad array of scholarly publications. This project seeks to understand and define the current state of library publishing, including its most crucial gaps and unmet requirements. What tools do library publishers use most, and what changes or additions to the technical "stack" available to publishers would most improve their ability to grow their programs? What pain points are most shared and how could they be alleviated? What are the most important elements library publishers consider when selecting the tools, service providers, and environments in which they work? We have explored these questions in order to make strategic decisions about where to direct our resources to seed the next generation of library publishing. We also conducted this research with the intention of publishing our findings so that they can inform other developers and teams throughout the library publishing and academic publishing ecosystem.



**...library publishers need tools, platforms, and services that can scale quickly and flexibly for a broad array of scholarly publications.**

## Section 1: Methodology

### Data Sources

Our team used a mixed methods research design, gathering both quantitative and qualitative data using multiple instruments. We engaged in active data creation using interviews, focus groups, workshops, special-interest sessions, and a survey. We also gathered and coded data about open source (OS) scholarly communication tools and technologies in a scan of relevant documentation.

This section begins with a description of the data framework we built and refined to unite our research instruments and methods. It then provides a brief overview of each component of our research. As described in “Data Analysis” below, we intentionally designed our research instruments and approaches to enable us to triangulate between data sources in order to check our own findings throughout this process.

### Data Framework

Our project work began with the creation of a data framework through which we defined our core research questions and developed our methods of inquiry to answer them. This work was intended to provide a strong foundation and scaffolding for our research and to ensure that we would reach clarity around what library publishers most need in order to scale up and support their operations, as well as how best to meet those needs using existing open-source publishing tools, standards, and platforms.

Our core research questions included the following:

- 1) What are the most common publication types that library publishers support?
- 2) What current workflows and tools are library publishers using, and to what degree are these shared vs. unique/bespoke?
- 3) What are the pain points reported by library publishers, and do these converge around specific themes?
- 4) What ideal use cases can communities imagine for a “next generation library publishing” suite or service?
- 5) What OS tools are used most heavily to support publishing?
- 6) What can we know about each OS tool in terms of code base, user community, governance, sustainability (business), road map, technical debt, etc?

Our methods of inquiry deliberately incorporated both qualitative and quantitative sources, which we generated using a range of instruments. We knew that we needed to engage directly and deeply with library publishing stakeholders (especially library publishers, but also authors, developers, service providers, and administrators) using qualitative methods to identify their current operations and workflows, as well as their needs, pain points, challenges, and opportunities in publishing workflows. This qualitative data would help us to identify the most pressing challenges and barriers in the library publishing landscape today. We determined that a series of focus groups and interviews could help us to refine our understanding of specific library publishing challenges and begin developing use cases, and that a subsequent series of focused workshops could provide us with the opportunity to reimagine library publishing with small groups of stakeholders. We conceptualized this research as a unified “Community Engagement” effort.

We also knew that we needed quantitative information about library publishing practices (e.g., the publication types and the range of tools used by library publishers) and about the broader set of OS publishing tools and technologies currently available. This quantitative data needed to be structured to enable interrogation, faceting, and filtering to enable us to better understand our development options and opportunities. To address this need, we sought to identify and use existing documentation of library publishing practices, tools, and technologies. We also planned to create a data model and database structure to support our data queries and to permit this “Technical Landscape Scan” to be useful well beyond the project itself.



**Lto R: Monica McCormick, Oya Rieger, Michelle Wilson**  
NGLP Workshop (Feb 2020)

We recognized a circular dependency and reciprocity between the qualitative (Community Engagement) and quantitative (Technical Landscape Scan) elements of our research, and we planned for regular check-ins and recalibration across these two research channels. We structured the work to include ongoing triangulation of findings, and we continually refined our approaches via feedback and guidance from the full project team and with the Advisory Board.

## Documentation Review

Early in the project, we reviewed data gathered in an extensive annual survey conducted by the [Library Publishing Coalition](#) (LPC), an Affiliated Community of [Educopia Institute](#). We relied primarily on the survey data collected for its seventh-annual [Library Publishing Directory 2020](#),<sup>2</sup> which included information about the work of just over 150 library publishers across the globe. This data helped us to assess the types of publications, platforms and technology, and services offered by library publishers. It helped to provide a strong foundation for our Community Engagement inquiry and allowed us to move quickly into the creation and testing of instruments for focus groups, interviews, and special interest group sessions.

For the Technical Landscape Scan, our team researched more than 100 scholarly communication tools, environments, and services. We began with a scan of previously published work including the [2019 Census of Scholarly Communication Infrastructure Providers](#) (Skinner, 2019), the [Bibliographic Scan of Digital Scholarly Communication Infrastructure](#) (Lewis, 2020), the [Mind the Gap](#) catalogue and report (Maxwell, 2019), and [400+ Tools and Innovations in Scholarly Communication](#) (101 Innovations in Scholarly Communication) (Kramer and Bosman, 2015). We began to build our data model, first defining entities and properties sufficient to describe relevant technical components and the relationships between them. We knew that in addition to technical and organizational information, we would need to define and capture data about the adoption, maturity, and sustainability levels of these tools. Wherever possible, we sought to rely on existing and standard values rather than inventing new ones (e.g., using Technical Readiness Levels<sup>3</sup> to gauge maturity).

As we continued to define the data model, we also engaged with the Joint Roadmap for Open Science Tools ([JROST](#)), Global Sustainability Coalition for Open Science Services ([SCOSS](#)), Invest in Open Infrastructure ([IOI](#)), and other groups that are working to promote systems-based perspectives and mappings of Open Source tools.

Paul Walk ([Antleaf](#)) led the development of a database tool (essentially a set of spreadsheets with referential-integrity constraints imposed on them to enable controlled lists of values that could be viewed in lookup tables), and a browsable web interface. We mapped the data from the [Mind the Gap](#) catalogue and report (Maxwell, 2019) into this

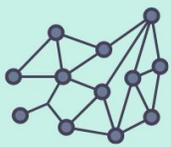
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<sup>2</sup> *Library Publishing Directory 2020*. (Edited by Library Publishing Coalition Directory Committee). Dataset: <https://librarypublishing.org/directory-year/directory-2020/> and publication, available at: <https://docs.lib.purdue.edu/libpubdir/7> We also reviewed data from the last seven years of Directory publications.

<sup>3</sup> See NASA Technical Readiness Levels: [https://www.nasa.gov/directorates/heo/scan/engineering/technology/txt\\_accordion1.html](https://www.nasa.gov/directorates/heo/scan/engineering/technology/txt_accordion1.html), and see also the adaptation of NASA's work by the European Commission for its Horizon 2020 Programme: [https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014\\_2015/annexes/h2020-wp1415-annex-g-trl\\_en.pdf](https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf)

format. In late 2020, Consultant Sarah Lippincott worked with our team to evaluate the database tool and its web interface, and to assess the appropriateness of the data points collected and displayed for each entity. Where necessary, data was corrected and expanded to include all of the fields included in the database tool. Thereafter, the tool, interface, and entries were vetted by the full project team and by the Advisory Board.

Our documentation work culminated in the production and February 2021 release of the [Scholarly Communication Technology Catalog](#) (SComCat, source code available on [Github](#)), an open access database of scholarly communication open technologies. In SComCat, we have documented more than 80 technologies, where the term "technologies" is defined to include software and some essential running services. The tool provides an overview of the functionality, organizational models, dependencies, use of standards, and levels of adoption of each technology.



**The Scholarly Communication Technology Catalog (SComCat) is an open access database of scholarly communication open technologies.**

## Focus Groups

The project team developed a focus group protocol in October 2019, and scheduled its first four focus groups to take place in in-person and virtual settings. The focus group instruments were developed by Katherine Skinner, Catherine Mitchell, and Kristen Ratan. They were designed to help our project team surface: 1) the functionality that is essential to the work of library publishing; 2) the bridges library publishers most need between existing tools to improve their workflows; and 3) the principles to which library publishers want their publishing tools, platforms, and services to adhere.

Each session was limited to 10 participants and lasted up to two hours. A focus group script was produced to ensure consistency across focus group experiences, and focus groups were designed to include a selection of questions from a 10-question common base. Participants were invited to join these sessions according to their affiliation with either a project (virtual workshop with the Library Publishing Workflows project team) or an event (Public Knowledge Project's 2019 International Scholarly Publishing Conference; Coalition for Networked Information Fall 2019 Membership Meeting).

We hosted a total of four focus groups with twenty-nine participants in three locations: virtual (November 7, 2019), Barcelona, Spain (two sessions, November 22, 2019), and Washington D.C., USA (December 9, 2019). Katherine Skinner and Kristen Ratan served as the lead facilitators of these sessions (see Appendix A: NGLP Instruments and Protocols).

## Workshops

A workshop protocol was developed by the team in late 2019, and half-day workshops were hosted in two locations: San Francisco (February 13, 2020) and New York City (February 27, 2020). A total of 17 participants engaged in these in-person sessions. Each began with a problem-space brainstorming session to identify and rank the most pressing problems faced by library publishers, and then shifted to breakout groups charged with tackling the top problems identified. Breakout groups were



charged with coming up with at least three concrete ideas that could be enacted by the NGLP project in its development work phase. Kristen Ratan and Catherine Mitchell designed and facilitated these in-person workshops.

The COVID pandemic required the final three workshops, which were scheduled in conjunction with the Library Publishing Forum in May 2020, to be combined and held virtually on May 5, 2020. Our team developed a modified workshop protocol that utilized three break-out rooms to allow the Library Publishing Forum session to accommodate the large number of participants and to provide the full three workshop experiences we had hoped to host in person. A total of 46 participants engaged in these three workshops, each of which focused on a specific thematic topic. One focused on Strategies for Sharing Infrastructure and Services; the second focused on Technical Improvements to Shared Infrastructure, and the third focused on Community Engagement. Kristen Ratan, Catherine Mitchell, and Katherine Skinner facilitated these virtual workshops (see Appendix A: NGLP Instruments and Protocols).

## Interviews

Kristen Ratan developed an interview protocol in January 2020 with the goals of reaching key community members and thought leaders in the field. Kristen Ratan, Catherine Mitchell, and Dave Pcolar led a total of 15 one-hour interviews with leaders across the library and campus-led publishing landscape between January-March 2020. Each interview began with a short introduction to the NGLP project and invited the interviewee to share a brief initial impression of the project concept. Each then asked a set of questions that included 1) the interviewee's status and experience as a user/owner/consumer of publishing infrastructure; 2) what they believe is working and isn't working in library publishing; 3) what they would most like to see funded for big impact in the field; and 4)

who else should the project team talk to. Interviewees were selected to represent a variety of perspectives in terms of geography, institution/program size, publishing formats, and general perspectives. The interviews were conducted in confidence and the data merged into the data analysis sheet (See Appendix A: Report Copy of NGLP Synthesis of Community input).

The NGLP project also partnered with an IMLS-funded project to undertake several joint research initiatives during this project. As part of this partnership, The Library Publishing Workflows project (Educopia, 2019-2022) contributed data from hour-long interviews conducted by Brandon Locke and Melanie Schlosser with 19 representatives of 12 active library publishing programs of varying sizes and types in the U.S. and Canada. These interviews, hosted virtually between November 2019 and March 2020, focused on the specific publishing workflows used by each institution, including the tools, platforms, vendors, and technical service providers that comprise the publishing process, as well as pain points and steps the publishers wish they could include but are not currently able to. Many of the library publishers shared multiple workflows, shedding light on the different processes and contexts in each publishing program, and the way that different approaches and pieces of technology may be employed by a single publisher (see Appendix A: NGLP Instruments and Protocols).

## **Special-Interest Sessions**

Also in partnership with the IMLS-funded Library Publishing Workflows project (Educopia, 2019-2022), our teams have co-hosted six special interest sessions focused either on a specific platform/tool (Bepress, Open Journal Systems, DSpace, Janeway) or on a journal type (student journals, law journals). Depending on the topic, some were limited to the Library Publishing Workflows project partners, while others were open to the Library Publishing Coalition Community. In total, 63 library publishers attended these calls to discuss their processes and workflows, pain points, policies, and feature requests. These confidential sessions were conducted by Brandon Locke, Katherine Skinner, Melanie Schlosser, Kristen Ratan, and Dave Pcolar from September 2020 to January 2021 (see Appendix A: NGLP Instruments and Protocols).

Our team also hosted a series of demonstrations with the open-source platforms and tools that had been cited as the most desirable building blocks by interviewees, as well as focus group, workshop, and special interest session attendees. Sessions were held with six platforms to assess several dimensions of fit with NGLP goals, including platform readiness, community acceptance, sustainability, and values and principles alignment. These sessions were in-depth demonstrations of platform services, specifically for the NGLP team.

## Request for Ideas (a brief survey)

The project team developed an open-ended request for ideas in March 2020, that was issued broadly to stakeholders using major listservs, announcements in blogs, and through individual contacts located through the Library Publishing Directory and through the Technical Landscape Scan. This survey asked a single question: "How should we invest our project funds to improve the scholarly publishing landscape? Please give us your wishes, suggestions, brief project proposals, or information about ongoing projects and initiatives." The open-ended survey was issued using SurveyMonkey on March 31, 2020, and responses were collected through May 11, 2020.

***"I'm really interested in the idea of distributed, interoperable publication networks that allow folks to publish and access scholarly content across disciplines and institutions while still being able to access and publish locally."***

-NGLP Community  
Engagement Participant

The request for ideas was centered on six core themes that had emerged from the focus groups, workshops, and interviews conducted previously:

1. Enhanced, competitive publishing services
2. Open science / open data
3. Shared (multi-institutional) services at scale
4. IR - publishing service integration
5. Growing the library publishing ecosystem
6. Turnkey, hosted solutions

We received a total of 98 responses, ranging from single-sentence wishes to brief proposals. Thirty core concepts and nearly 100 project suggestions covering a wide range of areas from specific application software to financial models emerged from these responses. Respondents identified forty unique technologies being used and described problem areas in workflows, integration, and the management of tools and content (see Appendix A: NGLP Instruments and Protocols).

## Data Analysis

The research team has employed qualitative data and quantitative, descriptive statistics as its primary analytical tools. This approach has provided us with a rich, comprehensive view of the data gathered in the project; it has also enabled us to triangulate between data sources to check our findings for consistency.

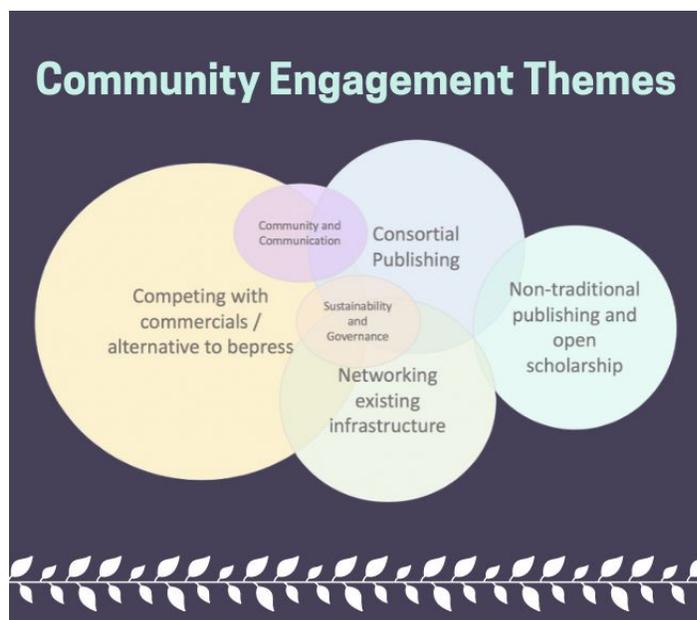
Our team pursued data analysis in two stages of work. In the first, we analyzed the information gathered in each component of our research puzzle: the interviews, focus groups, workshops, and survey; the jointly generated NGLP/LPW data from the workflow interviews and special-interest sessions; and the SComCat database we created and populated. In the second, we analyzed the data across all of these components, synthesizing our findings and testing them against all available data points.

## Community Engagement Research Analysis

Data analysis of the Community Engagement components (interviews, focus groups, workshops, special-interest sessions, and survey) has been conducted primarily by Kristen Ratan, David Pcolar, and Brandon Locke.

Our team assigned a note taker for each of the interviews, focus groups, and workshops, in order to capture detailed and consistent notes. Following each session, we tagged and encoded these notes with several categories of data, including themes and project ideas, as well as technologies and existing projects.

Our combined NGLP/LPW team likewise assigned a note taker for each of the six special interest group sessions we hosted. Because each session focused on a different theme (e.g., a platform/tool or a publication type), we produced an overarching synthesis that shared high-level findings from each session without trying to condense this information via coding.



The workshop/focus group and interview notes as well as the request for ideas results were encoded by Kristen Ratan and Dave Pcolar, identifying project ideas, community needs, platform and content type mentions. Project ideas were given a frequency number based on how often it was raised. Clusters of project ideas were created and a 'Concept' extracted that summed up that cluster. Our team then grouped these project ideas by themes. Themes were also correlated to conceptual areas for broad grouping, such as 'ease of use' and 'common workflows'.

A synthesis of these findings across all Community Engagement instruments was produced by Dave Pcolar and Kristen Ratan (see Appendix B: Coded Data from 2019-2021 NGLP Workshops, Focus Groups, Interviews, and Request for Ideas).

## Technical Landscape Scan Analysis

Data analysis of the Technical Landscape Scan has been led by Paul Walk, Katherine Skinner, Sarah Lippincott, and Kristen Ratan.

Our team built and populated a database-driven catalog of scholarly communication technologies, [SComCat](#). This tool provided our team with normalized, consistent data about the broad set of OS publishing tools and technologies currently available. Our project team engaged with this tool to assess these publishing components and options, including by the function(s) they serve, the code language(s) used, the open-source license type(s), their dependencies, what standards they adhere to and/or utilize, and what level of adoption they currently experience.

Using the Community Engagement findings, we were able to deeply interrogate the publishing technologies that our research surfaced as “high use” or “high demand” elements in the library publishing ecosystem, both according to their technical stability and interoperability possibilities, and also according to the organizational model(s) and community involvement represented by each. Faceting and filtering this data also helped our team to identify and understand the prospective benefits and liabilities of different tool combinations.

Based on this work, our team identified six existing open-source publishing tools that fulfilled the basic criteria emerging from the Community Engagement research. We hosted demo sessions with these tools (organization, developer, and/or community governance members) to make sure our team had all of the information it needed about how these tools look and feel, and also what development activities were planned and/or underway for each. These demonstrations helped to contribute to our understanding of what was possible and most desirable in tool integrations.

## Triangulation

Our team initially planned to engage deeply in data analysis during an in-person, two-day meeting with our project team and our advisory board where we would triangulate sources and make development decisions for the project. This meeting was scheduled to take place in Worcester, MA, adjacent to the Library Publishing Forum in May 2020. The COVID pandemic forced a recalibration of our plans, and the team scheduled and hosted a series of facilitated, synchronous, virtual project team and Advisory Board sessions between May and August 2020.

Prior to each session, attendees engaged in pre-work readings and activities. Each three-hour session included “breakout” working groups and structured activities designed to help us gain traction on development decisions. We blended team-building, structured

activities, small breakout discussions, and incremental “quick-wins” that built up over the course of each session.

Each of these virtual sessions was devoted to a theme. The first session (May 8) closely examined the values and principles synthesized from more than 200 sources and considered how to use them to assess the ways that tools, service providers, and other entities active in library publishing adhere to academic values and principles. The second meeting (May 14) brought together all of the components of community engagement research we had conducted, including the workshops, focus groups, interviews, and request for ideas survey. We also integrated Educopia’s “Library Publishing Workflows” project (IMLS, 2019-2021) findings-to-date into this conversation. We synthesized our research findings and established the top priorities for focused funding and project work and drafted the Architectural Workflow Model for the end-to-end hosted systems we plan to produce in year two of this project. Meeting three (May 21) was used to refine the technical workflow for the hosted systems and to interrogate the readiness of the hosts (CDL, LYRASIS, and Longleaf) and the existing publishing components that the Technical Landscape Scan and the Community Engagement Research surfaced as our top candidates to work with in the next project phase. The fourth session (June 8) was used to sketch out a first set of work packages that we were ready to commit to funding, and to establish our end-to-end system expectations, including requirements.

These full-team and Advisory Board meetings gave us the requisite time and space to both interrogate and integrate our findings across the whole breadth of research we had conducted (see Appendix C: NGLP Data Analysis and Development Decision Meeting Agendas).

## Section 2: Findings

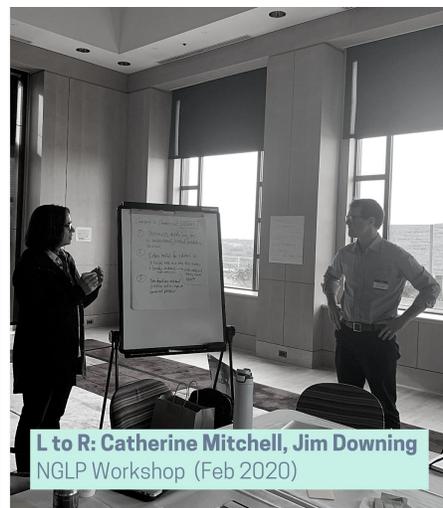
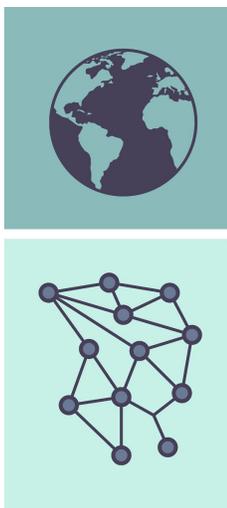
### Summary

The purpose of the NGLP project is to increase library publishers' capacity to undertake and deliver mission-driven publishing activities. As we undertook our research, particularly on the Community Engagement trajectory, we sought to identify particular library publishing clusters or "use cases" with shared technical needs. Our team identified three such segments of the library publishing community:

- Programs looking for turnkey hosted solutions
- Programs seeking to create a hybrid mix, including both self-hosted open source and third party hosted solutions
- Programs seeking to offer end-to-end hosted solutions to a state system, consortia, or other grouping of library publishers

Notably, participants in our Community Engagement research agreed that their most pressing need was to improve their support framework for journal publishing. While individual library publishers and library publishing stakeholders discussed a range of additional content types that were of interest to them, including OERs, monographs, preprints, and datasets, participants repeatedly came back to journals as their core and still unresolved need. Specifically, they shared that they wanted to compete more effectively with commercial journal publishers and that to do so, they needed to offer more compelling journal publishing platforms and tools to faculty and editors and students.

Pain points expressed across interviews, focus groups, workshops, and the survey were surprisingly consistent. Participants often expressed concerns about how to manage multiple journals without bringing up separate instances of software for each, and they wanted ways to brand and display journals both in collections and individually. They sought ways to understand the performance of their journals, both as multi-journal collections and as single journals. They wanted to quickly and professionally generate performance information both for their program's internal use and to share with editors, authors and institutional administrators. Across the board, respondents talked about the undesirable lock-in challenges that many publishing



L to R: Catherine Mitchell, Jim Downing  
NGLP Workshop (Feb 2020)

platforms present, particularly in hosted solutions, and they urged us to think about how to provide library publishers with more choices by decoupling components and building modular systems rather than creating or expanding “all in one” approaches.

Throughout our research process, library publishers and service providers consistently cited their need to offer flexible solutions to meet a variety of institutional publishing needs as a “highest-priority” desire. This does not mean that they want to meet diverse needs with bespoke workflows or publications. The library publishers and other stakeholders we talked with are largely interested in building a solid publishing foundation and base that enables them to offer journal publishing programs that are competitive with commercial solutions. They also want to be able to scale up with limited resources, and to produce institutionally specific collections and publishing channels (by institution, department, or project, for example). Ideally, this publishing foundation would also be extensible to other content types in the future. They cited a strong preference for building tools that bridge and combine existing open source solutions rather than choosing one or two systems to build out in monolithic or embedded forms.

## Detailed Findings

The high level findings above were derived by analyzing the coded data from each of the Community Engagement elements (interviews, focus groups, workshops, and special interest sessions, and survey) to identify and characterize the 150 project ideas that emerged from the community engagement work. Each project idea had only one concept (the most relevant one) applied. The 19 resulting concepts and definitions are summarized in Table 1 below.

**Table 1: Summary: Ideas Based on Community Engagement Research Responses**

Concept	Definition
Make library publishing and IR services better than commercial	To better compete with commercial publishers and platforms, these projects would improve library publishing in the areas of more customization, better user experience, editorial and administrative dashboards, better PDFs, integration between IRs, but also based on open source and with better service and support
Common workflows and tools for experimental publishing	Support for workflows, tools, and standards/PIDs for non-traditional objects, publications, and formats, including data-driven, media-rich, digital humanities, born digital, open research outputs, grey literature
Shared publishing services	Shared, consorial, and networked resources and services

	for editorial, production, marketing, and development resources to be able to lower costs and improve scalability
Low-cost, fully hosted, shared publishing and IR platform	An end-to-end and cost-effective turnkey solution for those seeking an alternative to Digital Commons, other hosted services, or having to run open source technologies in house
Migration tools and help	Technologies, services, and even a swat team to make migration easier and to help with a large migration effort, for example, off of Digital Commons
Increase interoperability and sustainability of existing platforms	Map existing open source tools and technologies and build bridges, APIs, and other methods of connecting them. Assist with the paths towards sustainability.
Expand metadata and PID programs	Increase adoption of persistent identifiers, such as DOIs and ORCIDs, and their application to a wider range of outputs and people, adoption of MetaData 2020 as a standard and improving metadata interoperability between platforms
Shared data platforms and services	Increasing library solutions for data sharing and storage, create data trusts and meta-search layer for data repositories
Improving the fairness of assessment and credit	Improve ways of assigning credit, of handling peer review, credentialing a wider range of non-traditional digital objects, and assessment tools for OER
Increase cross-role/function collaboration	Build on the proximity of library publishing to faculty and students and learn more, reach out to different roles across scholarship to help campus-based publishing meet their needs in a way that commercial publishing cannot
Networked repositories with publishing overlay	Invest in a shared, multi-tenant IR infrastructure where individual institutions can plug in whatever journal or book publishing platforms they choose
Tracking and increasing open access	Invest in ways to help societies and other publishers flip to open access, improving IR support for open access
Better agreements and contracts	Templates and models for MOUs, agreements and contracts, annotation to explain the differences and why they are important
Establish consortial governance	Describe and help adoption of models for how

and business models	institutions can publish on shared infrastructure
Improve discoverability	Better and more automated integration with library discovery tools, cross-institutional search tools
Training and onboarding publishing functions and roles	Assisting newcomers, faculty, and others to understand publishing
Track and explore business models	Investigate and report on consortial business models, methods of sustainability for open infrastructure
Better self-hosted OS	Decrease complexity of running open source technologies within an institution, expand IRs into publishing functions
Networked archiving	Shared archiving, raising awareness of the need on campuses, and increasing self-archiving

These concepts were applied to the suggested projects that emerged from the combined community input. This allowed the NGLP team to generate an initial informational map of the wide range of community needs and desires. The top six concepts were selected to act as guideposts to help narrow and refine the scope of the NGLP strategy and are listed in Table 2 below.

**Table 2: Top six concepts ranked by frequency**

<b>Concept</b>	<b>Frequency</b>
1. Make library publishing and IR services better than commercial	23
2. Common workflows and tools for experimental publishing	20
3. Shared publishing services	20
4. Low-cost, fully hosted, shared publishing and IR platform	18
5. Migration tools and help	11
6. Increase interoperability and sustainability of existing platforms	6

From these concepts, the team was able to extract and generalize to higher-level themes to further refine the scope of the NGLP project. Themes coordinated closely with concepts but often incorporated several concepts at once. Project ideas and suggestions that had been tagged with concepts were cross referenced with any themes that applied. Some projects had multiple themes that were relevant, resulting in 197 theme tags across the 150 project ideas. There were six overarching themes that emerged from our Community Engagement

research data, listed in Table 3.

**Table 3: Six themes that characterize the community input across 197 project ideas or suggestions ranked by frequency**

<b>Theme</b>	<b>Frequency</b>
A. Non-traditional publishing and open scholarship	52
B. Competing with commercials	50
C. Networking existing infrastructure	33
D. Consortial publishing	31
E. Community and communications	22
F. Sustainability / Governance	9
TOTAL APPLICATIONS OF THEMES TO 150 PROJECT IDEAS	197

The community input offered guidance outside of project ideas and suggestions, including the product and content types for which support was most needed and the existing open-source platforms most discussed. Below are additional parameters that influenced NGLP strategy.

### **Content types/conduits (in order of community emphasis)**

- Institutional repositories (IRs)
- Journals
- Non-traditional objects, open scholarship outputs, grey literature, digital humanities work
- Books
- Open Educational Resources (OER)

Of these, IR and journal platforms were identified as most important and in the most need of immediate improvement.

### **Specific platforms mentioned most**

- OJS (>50%)
- DSpace
- Janeway

## Refining Project Direction

Strategic planning meetings were held in May and June 2020 with the project team and members of the Advisory Board to refine the analysis of concepts and themes and to further sharpen the focus of the project (see “Triangulation” section above; see also Appendix C: NGLP Data Analysis and Development Decision Meeting Agendas). After extensive discussion, the team decided to focus on three themes: A) Competing with commercials and providing alternatives to commercial products, B) Networking existing infrastructure, and C) Consortial publishing. These themes closely overlapped with the most frequent concepts and also complemented each other. The theme of non-traditional publishing (items such as databases, digital humanities projects, and software) was also of great interest but based on extensive research into both the user needs and the technical building blocks currently available, we determined that this project needed to focus first on producing a solid journal and IR library publishing infrastructure. Once this element is built and tested, it can incorporate additional formats and forms of publishing.

During the Fall of 2020, we solidified our project development strategy and goals, as described in more detail below. We also sought to select at least two open-source tools (one publishing, one IR) that we could build upon in this project as modular components. Based on our Community Engagement findings, our team considered six existing open source technologies as potential publishing and IR foundation blocks. All six were cited by library publishers as prospective technologies of interest and/or in current use. All six also adhered to the core values and principles enumerated by our research participants through such traits as “openness” and their inclination towards “community-governed practices”.

**"Using the SComCat tool and demonstration sessions held with each of these technical components, we selected three technologies as the initial modular components we are building in the NGLP project: DSpace (IR) and OJS and Janeway (publishing)."**



Using the SComCat tool and demonstration sessions held with each of these technical components, we selected three technologies as the initial modular components we are building in the NGLP project: DSpace (IR) and OJS and Janeway (publishing). These three tools underpin many library publishing efforts around the world today, and after an in-depth review, our research team shares the user communities’ confidence in their feature sets, business models, responsiveness, adoption rates, and engagement strategies.

## Section 3: NGLP Strategy and Plans

### Summary

Library publishers have been clear and consistent about their needs throughout the NGLP Community Engagement research process. The NGLP team has prioritized the following for this project:

1. Integrating existing open source content delivery and publishing platforms and focusing the project's budget for software development that fills gaps and builds integrations
2. Enabling diversification of service options, supporting mission-aligned and community governed service providers to offer turnkey and supported solutions based on open infrastructure
3. Improving tools for multi-journal/consortial publishing
4. Filling a significant analytics gap by creating robust reporting across open source platforms
5. Allowing for more advanced and unified digital publishing and discoverability regardless of content source (specifically across IR and journal content)
6. Investigating supporting infrastructure for metadata
7. Studying how best to support migration to the new and emerging hosted services that come from this effort.

These seven needs provide the basis for the NGLP project's strategy and inform our 2020-2022 development and implementation work. In our development project phase (December 2020-December 2021), NGLP will assemble a modular set of platforms and components that offer library publishers and partnering service providers the ability to flexibly offer solutions to meet these institutional publishing needs.

Based in these seven needs, the NGLP project's strategy rests on four goals:

1. To integrate open source platforms already widely used in the community and to produce a modular architecture that allows service providers to mix and match these existing components to deliver hosted solutions geared towards different library publishing community segments
2. To unify web delivery so that library publishers can publish institutional repository and journal content from multiple content production systems in one place
3. To provide a comprehensive view of metrics from different platforms and across different workflows

4. To seed a range of hosted solutions and support options that are reliable and sustainable and meet the needs of different library publishing consortia, institutions, or segments

The library publishing community expressed a desire to begin with journal support and integrated journal and IR solutions, and then to expand from this strong foundation to include other types of publications and workflows in the future. Our development work will seek to ensure that this intended extensibility is supported.

Our vision is to offer the community a modular suite of open-source platforms and components that can be combined flexibly to meet the needs of different stakeholder groups, depending on whether their need is a new journal solution or a combined IR and journal solution. To meet the explicit requests by library publishers to increase choice and not unnecessarily bind our work to any single existing solution, we will develop layers of tools that can incorporate different IR and journal publishing platforms.



**Our vision is to offer the community a modular suite of open-source platforms and components that can be combined flexibly to meet the needs of different stakeholder groups...**

## NGLP Technical Roadmap

The synthesized findings from the NGLP team's varied research instruments and processes have now informed our technical development roadmap. NGLP will support the use of existing open source technologies by building new components that improve cross-content web delivery and discovery and provide cross-platform data analysis. NGLP will also invest in integrations between existing and new tools and study how best to support migration from existing tools into the new architecture. A critical piece of the success of this project will be seeding an ecosystem of mission-aligned service providers as many library publishers are not equipped to host and run their own open source software.

### New software development

To meet the identified needs, we have commissioned the build of two software components as described below. We have also undertaken extensive planning with several initial service providers who will pilot these tools and help us to assess how they can be used to meet the needs of our three primary library publishing communities: 1) programs looking for turnkey hosted solutions; 2) programs seeking to create a hybrid mix, including both self-hosted open source and third party hosted solutions; and 3) programs seeking to offer end-to-end hosted solutions to a state system, consortia, or other grouping of library publishers.

The first software component NGLP is building is a cross-content web delivery and discovery platform that can pull in content from journal manuscript submission systems, such as OJS and Janeway, and combine it with content from other sources, such as institutional repositories, for a multi-leveled branding and content display and search. In this web delivery and discovery platform, OJS, Janeway, and DSpace will serve as the initial platforms for submission, review and/or curation of content (“input”). Some library publishers will also use the web delivery (“output”) functions that these tools provide. Others may wish to combine content in the new unified web delivery platform that NGLP is commissioning.

The second component NGLP is commissioning is a cross-platform administrative dashboard that can pull activity and usage data from multiple platforms and offer reports that provide insight into an institution’s full publishing program. This project will provide publishers with more comprehensive and refined analytics that offer end-to-end visibility into their publishing programs. The analytics tool will be able to pull data from both input and output platforms into a single view and offer reports that can be used by library publishing administrators, editors, authors/readers, and other stakeholders.

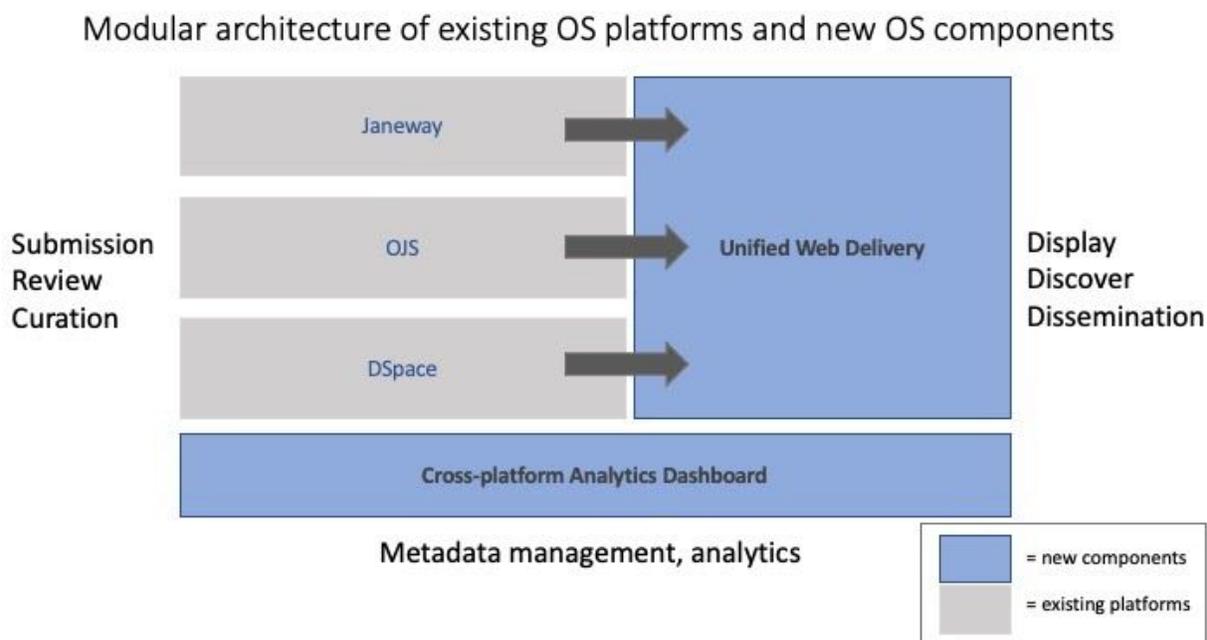
## **Integrations with initial existing OS partner platforms**

The library publishing community clearly and consistently stated that it wanted to use existing open-source solutions when possible. Additional platforms and tools may be added and combined with the commissioned new component builds.

## Architectural Vision

The goal is to provide modular architecture that allows library publishing to use (or continue to use) existing open source platforms while augmenting their program to include integrated content delivery and better analytics.

Figure 1: Overview of modular architecture showing the three existing OS platforms feeding content into a unified web delivery component under development by the NGLP team and an analytics dashboard that pulls data from the three OS platforms and the web delivery front end into a single tool.



## Components and integrations

The two custom development projects that NGLP has commissioned to be built will pull both content and analytics data from OJS, Janeway, and DSpace. NGLP has contracted with [Cast Iron Coding](#) to develop the Web Delivery Platform and with [Cottage Labs](#) for the Analytics Dashboard.

Web Delivery Platform core features

- Provide a clean and modern base design with templating options for customizing the look and feel across journal and IR content
- Support collections of content by different forms of metadata that can include content from IRs and journals

- Offer editors and curators tools to collect content and assign templates and branding to meet the needs of different institutional stakeholders
- Offer readers tools to work with and interact with content post-publication
- Facilitate research in new ways through data interactivity, rich media, and other content enhancements
- Collect and store usage data for third party analytics
- Offer clear navigability and discoverability of content
- Build the underlying infrastructure needed to support hosting and service provision

#### Admin/Analytics Dashboard core features

- Mine and analyze data from existing and new open source publishing workflow and web delivery tools to provide a comprehensive picture of IR and journal publishing
- Merge and normalize data across multiple platforms and content types
- Provide an administrative dashboard that can track journal and IR content through ingest, editing/production, and display and archiving
- Produce administrative reports and data for analytics and visualizations using standard analytics tools
- Feeding analytics back to be displayed on content on the web delivery platform for authors and readers

## **Service layer - building an ecosystem**

Respondents to our Community Engagement research clearly indicated a growing preference for hosted, turnkey solutions, and many cited the increasing complexity of hosting software locally. Even programs that currently host their own open source platforms indicated that they would prefer to shift to a hosted solution if an option met both their technical needs and their business model requirements, particularly those concerning community governance and control.

The final phase of this project will pilot hosted, turnkey solutions based on the technical components NGLP is building. Rather than piloting a single instance of the NGLP tools, we are working with three separate service providers on specific use cases that will both demonstrate and actualize the NGLP model.

The success of these pilot projects is predicated not just on their technical implementations but also on their business and community model implementations. A related research effort undertaken by the NGLP team is exploring how to create community hosting models

that align explicitly and demonstratively with academic values. As documented in the October 2020 report issued by this team, [Living Our Values and Principles: Exploring Assessment Strategies for the Scholarly Communication Field](#), our work strongly encourages service providers to align with the values and principles of the library publishing community. To this end, NGLP has produced a draft [Values and Principles Framework](#) and [Assessment Checklist](#), which were issued for public comment in July-August, 2020 on CommonPlace (hosted by the Knowledge Futures Group). We are currently testing an iteration of this Assessment Checklist with the project partners.

The NGLP project includes three initial service provider partners: California Digital Library, Longleaf Services, and LYRASIS. Each will pilot a solution based on the NGLP tools and model to a specific set of stakeholders to test the modular architecture in early 2022.

#### CDL: Enhancing an established consortial library publishing program

The University of California campuses coordinate their library publishing programs consortially through the California Digital Library (CDL). CDL has an extensive publishing program with 80+ journals and over 300,000 items in its repository, including ETDs, grey literature, and postprints collected under the UC Open Access policies. CDL plans to upgrade its current eScholarship publishing and repository infrastructure by using components of the NGLP modular architecture and, as such, will provide an example of an established consortium enhancing an existing library publishing program using these tools.

#### Longleaf: Creating a new consortial library publishing program

Longleaf Services, a nonprofit organization established by The University of North Carolina Press to provide services to campus-based publishers, will use an assembly of components in the NGLP modular architecture to pilot a new, unified service for journal publishing for the University of North Carolina System. A subset of the 16 UNC System campuses will participate in this initial pilot, including UNC Wilmington, UNC Charlotte, UNC Asheville, and NC A&T State University.

#### LYRASIS: Offering an end-to-end integrated IR and journal service

LYRASIS, an experienced service provider for open source platforms, will pilot a unified journal plus IR solution that uses the open source and community-governed NGLP components. This new service will be geared towards the needs of library publishers worldwide who are interested in a new end-to-end, turnkey hosted solution.

One of the explicit goals of this project is to create an ecosystem of mission-aligned service providers who are well positioned to address the needs of library publishers across a broad range of use cases. We believe that our three founding service providers lay the groundwork for this kind of flexibility. They will demonstrate a variety of solution types, including consortial-based, centralized, and integrated journal/IR services; state system-based, shared journal publishing services, and non-profit membership

organization-hosted publishing/IR services for the broader community of library publishers. We expect this community of service providers to continue to grow over time as new opportunities arise; we have, in fact, already begun those conversations with candidate organizations in Europe.

## Section 4: NGLP Implementation and Upcoming Work

With component development underway and existing OS platform integrations under discussion, the NGLP team is engaging in a mix of technical, community-building, and organizational work to prepare for the 2022 pilots with partnering service providers.

Throughout 2021, we will be working in development cycles for both the Web Delivery and Discovery tool and the Analytics Dashboard. Integral to this work will be additional engagement with the three modular technologies (OJS, Janeway, DSpace) to build appropriate connection points between each tool and the NGLP elements. CDL, Longleaf, and LYRASIS will each be testing and helping to identify refinements for the new components we are building as they prepare to host their own instances for their pilot communities. The work will be conducted in the open so that the community can follow along and participate.

Upcoming NGLP work also stretches well beyond software development and platform integration. We will continue to add new entity listings to [SComCat](#), and our new editorial processes will help us to evaluate and implement suggestions for improvements, corrections, and additions to this tool, recognizing that its data will necessarily change over time.

**Outlining clear expectations for reciprocity and revenue sharing between service providers and open source components will help to alleviate the unpaid dependencies that are so common in our current environment.**



We are also establishing new working groups on governance and sustainability that will engage deeply with our initial business modeling and governance findings and help us to expand and improve them. With these working groups, we will seek to establish fair, transparent relationships between NGLP service providers and the open source technologies on which they will depend. Outlining clear expectations for reciprocity and revenue sharing between service providers and open source components will help to alleviate the unpaid dependencies that are so common in our current environment.

We will also be studying how best to track and make more visible the ways that tools, platforms, and service providers align with academic values and principles, including openness and interoperability; transparency; equity, diversity, and inclusion; access to knowledge; representative governance; and fiscal and organizational sustainability. We will continue to build and refine the Values and Principles Assessment Framework with feedback from both the project team and the public review.

While there have been scheduling and logistical challenges related to COVID-19, the NGLP project has had only minor delays and anticipates strong delivery on the goals within the final year of the grant period, which ends in March 2022. With our community-based research as a strong foundation, we are engaged in the work of addressing the well-articulated needs of the library publishing community with major technology projects, and we are poised to embark on the important work of situating these technologies within a sustainable, values-driven framework. There are busy times ahead for the project, but we feel confident that our work is founded on a deep understanding of the library publishing landscape, its challenges, and its vision for the future.

## Section 5: Bibliography

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## Section 6: Appendices

### Appendix A: NGLP Instruments and Protocols

[Focus Groups](#)

[Workshops](#)

[Interviews](#)

[Special Interest Sessions](#)

Request for Information - [Survey email](#) and [Survey instrument](#)

### Appendix B: Coded Data from 2019-2021 NGLP Workshops, Focus Groups, Interviews, and Request for Ideas

[NGLP Community Input Synthesis](#)

[LPW/NGLP Community Calls Synthesis](#)

### Appendix C: NGLP Data Analysis and Development Decision Meeting Agendas

[Consolidated Agendas](#)