LG-250163-OLS-21, The Private Academic Library Network of Indiana

Private Academic Library Network of Indiana, Inc. (PALNI) Hyku for Consortia: Removing Barriers to Adoption, March 2021 Proposal to IMLS

Project Narrative

Introduction - The Private Academic Library Network of Indiana (PALNI) as lead applicant, in partnership with the Pennsylvania Academic Library Consortium, Inc. (PALCI), requests an IMLS National Leadership Grant for Libraries for $248,050 to fund a 24-month project to increase the flexibility, accessibility, and usability of the multi-tenant repository platform system, Hyku. This project will extend our previous work and improve the national digital repository infrastructure by enhancing an open-source platform suitable for access to a broad range of types of materials, addressing needs articulated by diverse stakeholders and consortia and reducing barriers to adoption. In addition to technology development, we will develop an operational toolkit geared toward the administration of consortially-owned and managed repository services that is agnostic of any specific technology. The toolkit will provide guidelines, information, and other materials to support the development of similar services in other consortia.

Statement of National Need

Project Significance - Repositories are an important piece of library infrastructure that provide open access to a wide array of digital materials, including those created by an institution and its students, faculty, staff and researchers. Repositories are also used by cultural heritage institutions and other organizations to provide access to digitized special collections. Libraries unable to deploy Institutional Repository (IR) services on their own, due to costs or other constraints, are looking increasingly to consortia to serve this role. As a result, many consortia are actively seeking solutions that scale to support the repository needs of groups of libraries in an affordable and flexible way. Existing commercial repository services, such as BePress, have proven too costly for many institutions, and today's open source systems lack the configuration options necessary for efficient and easy-to-use services at consortial scale. To counter significant, widespread, and prolonged cuts to library budgets and continued consolidation of commercial repository services and software, library consortia are working together to develop unified strategies for repository services.

In a 2017 meeting of the ICOLC (International Coalition of Library Consortia) community organized by PALNI and PALCI staff at the ALA-MidWinter event, representatives from more than 20 consortia gathered to discuss consortial repository service offerings. Some attendees sought new solutions, while others shared stories of existing solutions that had failed to scale to consortial needs, resulting in a cessation of consortial services. Attendees voiced the need for open source solutions to meet shared needs at a scale that was sustainable for consortia. After a thorough environmental scanning process, we found there were no viable repository solutions available that would support the desired multi-tenant use case without significant technical development.

Hyku Fills the Gap - In our extensive scan of existing repository solutions (See Supporting Document - *PALNI Collaborative Institutional Repository: Activities and Opportunities*), PALNI and PALCI staff identified Hyku (https://hyku.samvera.org), a product developed by the open-source Samvera community, to have the highest long-term potential as an affordable, scalable consortial solution. Hyku is a Ruby on Rails application based on Hyrax, an open-source Samvera-powered repository. Hyku was developed to be a "turnkey, feature-full repository application product" that would take the best features found in the Hyrax community and codify them into a single application using commonly adoptable components. Hyku is therefore far more accessible to institutions without the resources or capacity to run their own complex software platform. Hyku is the only Samvera-based application to handle multi-tenant

deployment, making it ideal for consortial adoption. While Hyrax is the more customizable and feature-rich repository application in the Samvera family, it requires significant technical work to build and configure, and can only support a single-tenant use case that does not scale to meet consortial needs. Features developed for Hyrax may be adopted by Hyku, but additional work is required to adapt them to the multi-tenant environment. The Hyku for Consortia project builds functionality supporting the multi-tenant implementation of Hyku and contributes the necessary administrative configuration, governance, and software development needed to use Hyku effectively across groups of institutions with a variety of needs.

The Hyku and Hyrax tools are maintained by the Samvera community, named after the framework used to build Hyrax and Hyku (formerly known as "Hydra in a Box"), and each comes with an active and highly organized community of adopters. We have become active in the Hyku and Samvera community, regularly attending meetings and participating in shared development planning in order to coordinate efforts with other users.

Notch8, a web development firm with substantial Hyku expertise and a leader of and major contributor to the Samvera community, has created a multi-tenant Hyku instance for shared use by our two consortia as a production-ready service through our previous IMLS-funded project (LG-36-19-0108-19, https://www.hykuforconsortia.org). The service, now in production, is called "Hyku Commons" (https://hykucommons.org). It contains several publicly available tenants created during a 2019-2020 pilot phase, and there are many more in development.

Hyku has proven itself to be a viable and user-friendly open source tool for multi-tenant repository management in its ability to create repositories and manage users across groups. And while Hyku meets many requirements and offers great potential for scaling repository infrastructure, barriers to adoption remain for consortial member libraries that diminish the scalability and adoptability of the Hyku platform.

Addressing Identified Limitations and Feature Disparity - Through the course of our work developing Hyku, both within our consortial groups and in the Samvera development community, we have found that Hyku is an attractive option for low-cost repository hosting. Our member libraries' staff indicated they liked the user interface with its streamlined approach to the upload of materials, and consortial staff appreciate the quick and easy deployment of new tenants. We have also found that we can provide a viable service at a relatively low cost to our libraries in comparison to other commercial and open source solutions because of Hyku's multi-tenancy. Many libraries are unable to start or sustain hosted repository services and staffing due to cost. In Hyku, we have developed what we feel is a sustainable service and will continue to adapt and revise our business and operational models to ensure it remains so.

We have learned that barriers to migration from commercial platforms and overall use of the Hyku platform stem primarily from the lack of 1) customization options for metadata flexibility, 2) administrative functionality, and 3) front-end usability features. These issues are explained in greater depth below. These identified barriers to adoption are pronounced in the consortial community, and are likely to be obstacles to implementation for others outside of the consortial space as well. Development in these areas will make Hyku more attractive to a diverse group of institutions, including our own member libraries, and the libraries of other types of consortia. This project is designed to increase Hyku's adoptability, thereby solidifying Hyku as a sustainable, flexible, affordable, and overall viable choice for long-term repository management.

At present, individual Hyku repository tenants lack the flexibility to adequately address use cases for metadata creation for diverse content types. Self-submission and simple Dublin Core metadata are available today, but custom code development is required each time adjustments are needed for complex or granular materials and metadata. Our previous IMLS-funded project worked on the creation of two new "worktypes" — the Hyku term for the digital object model, including metadata, for a type of material. The process to create these worktypes, and the lack of ability to further customize them at the library tenant level (e.g. to create a controlled vocabulary used in only one tenant) has shown that this approach will not scale to our needs, and further development is required to support scaled implementations and flexible, per-tenant metadata customization.

Piloting institutions have also reported multiple inefficiencies in managing their repositories through the available administrative tools, and are often dissatisfied with the front-end presentation of their materials in Hyku. Libraries have traditionally built their repositories of scholarly and cultural digital content with a number of mature, commercially available solutions such as Digital Commons or CONTENTdm, or some pay a service provider to host open source software like DSpace or Islandora. In order to adopt the more sustainable and scalable Hyku service through our collaboration, we need to improve Hyku to offer parity in some of the key features offered by other platforms. For example, functionality for batch import and export of materials needs further development to work properly and scale for a multi-tenant implementation of Hyku. On the front-end, the current platform cannot natively display files that are not renderable in the IIIF image viewer, meaning that most files, including PDFs, have to be downloaded and opened in a separate program. This project aims to meet the needs of these use cases, which are real barriers to widespread adoption that were identified through our user research to date.

These issues exist in particular for Hyku, but are applicable to all Hyrax-based applications. The features we develop in this project could therefore have an even broader impact, just as our project will benefit from the features created by others in the open source community. We have already begun discussion in the Samvera community about coordinating development for our project alongside other initiatives to avoid duplication of effort. However, even if a needed feature is addressed through development of the underlying Hyrax technology stack elsewhere in the community, the adjustment needed to adapt it to Hyku needs programmer support. This project will allow us to create new Hyku features critical for adoption that will typically be compatible with Hyrax, or modify existing features for the single-tenant Hyrax application to work in a multi-tenant Hyku environment.

So far, information about these challenges has been identified from pilot testing and discussions with our consortial users, which has resulted in a list of specific tweaks and fixes for Hyku. Broader and more consistent research is needed to fully flesh out the specifications for features prioritized for development. Some gap analyses has been done, such as the one provided by Texas Digital Library's 2018 Hyku Pilot Final Report (http://hdl.handle.net/2249.1/87490) and Lyrasis's 2017 HykuDirect Pilot Project Gap Assessment (see supplemental documents), however, both are out of date at this point. In addition, we've participated in ongoing, coordinated conversations about desired improvements in the Samvera Hyku Interest Group, which includes developers (Notch8, Ubiquity Press), users, and prospective adopters as its participants. This group works together to contribute to the maintenance and development of Hyku, and coordinates the development of improvements in order to avoid duplication of effort. And as part of our previous grant project, we engaged a volunteer from the Samvera community to develop an accessibility study of Hyku Commons. These sources demonstrate a need for Hyku improvements to increase its viability as an option for accessible repository hosting.

Hyku for Consortia: Removing Barriers to Adoption will build on the outputs of previous and ongoing efforts to identify challenges, and produce a current, comprehensive, systematic gap assessment focusing on barriers to Hyku adoption in consortia. This will expand on current analyses and informal needs evidence currently being gathered and categorize and prioritize developments based on that analysis. In this way, our project is complementary to other Samvera projects related to both Hyku and Hyrax, including Arcadia-funded "Advancing Hyku[1]" (University of Virginia Library, Ubiquity Press, and the British Library), IMLS-Funded "Bridge2Hyku[2]", and the proposed IMLS-funded "New Heights for Hyrax", by helping with shared development planning based on a solid research background.

Building on Consortial Success with Hyku - To date we've used a phased approach/strategy to development of Hyku to suit the needs of our consortial constituents. Our approach has had three major steps:

1. Getting started, finding partners, and standing up a multi-tenant instance (completed through a self-funded initiative in 2018);
2. Focusing on improving multi-tenancy and adding features critical for supporting widespread adoption (e.g. theming/interface options for varied repository types and additional worktypes to support library content creation) (funded by our previous IMLS project);
3. And now, with this newest phase, addressing remaining barriers to adoption. This approach has gained momentum by building on previous efforts and interest, and will allow us to further scale up from a product that is a promising repository platform option to one that is fully-functioned and ready for consortial adopters with more complex needs and consortia that need more guidance.

In addition to the research and technology development outline above, we will also further develop our operational model throughout the grant period. As budgets tighten and libraries' capacity for running repository services diminishes, partnerships like the PALNI-PALCI collaboration serve as a potential model for sharing costs and human resources in many different consortial environments. In our previous grant project we focused on the benefit of cross-consortial collaboration. We have found that many other library consortia are eager to explore meaningful partnerships in the repository space for greater shared benefit. Over the previous three years we have spent hours speaking with many different consortia interested in learning about our project and how it could be applied in their own environment, including several seeking to partner directly. Others have been interested in how our two consortia have worked together to leverage available resources in a mutually beneficial model.

To address the needs expressed by other consortia in developing similar initiatives, we will develop a Consortial Toolkit for Repository Services that will comprise materials such as organization and staffing models, workflows, documentation and onboarding examples, and policy frameworks. These will be shared with the consortia community for feedback and collaboration, eventually creating a replicable service model and addressing broader aspects of the national need for affordable access to repository services. The Toolkit will work hand-in-hand with the technology we are developing, but will also be applicable to other repository infrastructures, thereby extending our efforts to the ultimate shared goal of increasing sustainable and scalable models for repository services among consortia. The process of building the toolkit will also bring together a community of practitioners to discuss and share best practices. This will influence and strengthen the toolkit we create, but will provide the opportunity for more consortia to become involved and participate in this area.

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[1] https://advancinghyku.io
[2] https://bridge2hyku.github.io/about

Project Design

PALNI and PALCI have been developing Hyku's open source multi-tenant repository platform based on Hyku since 2017, and contributing our development efforts back to the community at-large. From the beginning, the ability to deploy and set up a basic production service was feasible, but we found many features were needed for it to meet the needs of a successful consortial implementation.

Over the past four years we have become active members and contributors to the Samvera community. We are active in Samvera interest groups (Hyku Interest Group, Metadata Interest Group, Repository Managers Interest Group) and are actively working with other contributors, particularly those from the *Advancing Hyku* project to jointly plan and develop future work. The community of Hyku contributors are further developing an open and transparent feature board in GitHub that will allow anyone to see what features are being planned and worked on to encourage more efficient collaborative development.

In our previous IMLS funded grant project, Hyku for Consortia, we worked specifically on features that increased the ability of consortia to work together to share administrative functionality and costs, including increasing the options for independent theming and branding of individual tenant installations, more robust, shared permissions and roles so that work could be done collaboratively across tenants, and an initial operational business and funding model to support a shared implementation. Project materials created from our previous grant are on our project website and we will continue to host information about the collaborative, non-technical, work there (http://hykuforconsortia.org). We also launched our initial production service of the software at Hyku Commons (http://hykucommons.org).

Goals & Outcomes - We envision this project as the final phase of development efforts required for a full-scale launch of Hyku as a repository solution for consortia, which will remove remaining barriers to adoption based on the feedback we will gather from users and potential users of Hyku. It includes three major goals:

1. Produce a current, comprehensive, systematic gap assessment defining barriers to Hyku adoption;
2. Complete several tightly-scoped development sprints for high priority features in close collaboration with the Hyku and Hyrax development communities; and
3. Provide a toolkit for consortia and groups of libraries considering a collaborative repository solution.

Project Workstreams - The work will fall into three concurrent workstreams:

1. Research and Requirements Development
2. Technology Development
3. Operational and Business Model/toolkit Development

Workstream 1: Research and Requirements Development - during this phase of work we will conduct research into potential barriers to adopting Hyku, focusing specifically on three areas (while accepting "other" categories of feedback regarding adoption potential): metadata flexibility, digital object presentation in the user interface, and accessibility/usability, particularly for administrative workflows. To accomplish this we will set up structured interviews, focus groups, usability tests, and other similar research activities with current Hyku Commons users and other key demographic groups (consortia staff, libraries with repository solutions, libraries underserved by current technology availability) early in the grant period. We will invite a diverse set of subjects for this research, including participants from

institutions of varied types, sizes, geographic area, and economic capacity, particularly ensuring participation from underrepresented groups. These sessions will explore issues preventing the subjects from using Hyku successfully. It will take into account their goals and definitions of success to ensure that we fully understand their needs and capture the full breadth of use cases that Hyku could address.

Some of our findings may be relevant to the base Hyrax code. Others will be more Hyku specific, only problems in the multi-tenant community. As an example, in a single-tenant Hyrax installation it is easy to define specific, local controlled vocabulary lists for any metadata field. However, in Hyku, this functionality is only available at the universal level, meaning each tenant must share the same metadata templates and controlled vocabulary. Our research is therefore likely to highlight problems that have not been widely surfaced in the Samvera community to date, since most community members work on single tenant installations of Hyrax and Hyku. Our research will be shared with the broader community including both the anonymized data and the barriers we identify through analysis. The findings from this research will be added to the accessibility research we have completed during the previous grant, user feedback gathered from Hyku Commons piloting institutions, as well as other accessibility or gap analysis done by others in the community. We are planning to hire a User Experience (UX) consultant to help us with designing these activities and later in analyzing the results.

Using all of the data, past and present, we will then identify specific changes and enhancements that would remove barriers to adoption. Data will be anonymized and coded and identified barriers will be grouped and ranked in order of priority and feasibility. This work will take place over the first year of the grant and will feed into iterative phases of technology development beginning in the second quarter of the grant period.

Workstream 2: Technology Development - In this workstream we will collaborate with our partners at Notch8 to deliver enhancements and changes to Hyku, shared with the larger Samvera community, based on what our research shows are the barriers to adoption. We will work in close collaboration with the Samvera community to use our resources most efficiently and create new features or adapt existing ones to our environment.

We anticipate starting with a small work sprint based on a backlog of known issues uncovered during our previous grant-funded project. This work can take place at the same time we are performing research with users and analyzing results and pilot feedback reports (including the accessibility review) to define the requirements and scope of work for future development phases. This will allow us to capitalize on the momentum we have built during the previous pilot period in early 2021. Many of the proposed developments solve workflow and display issues our pilot participants have reported. These include the addition of administrative help text and dropdown menus, enabling greater control over how metadata values are displayed, inclusion of additional sort options for works, embedding of a PDF viewer, and enhanced usability of the user profile feature.

Three phases of work will then be planned for the remainder of the grant, governed under separate development contracts with Notch8 with deliverables and firm deadlines. A specific scope of work/plan will be developed for each phase, consisting of two-month sprints focused on a specific feature or set of features. The UX consultant will work both with the project team and our development partner Notch8, to propose reasonable and feasible feature designs and requirement specifications for each sprint. These plans will be based on the research conducted in the Research and Requirements workstream, but will most likely center on metadata flexibility, administrative workflows, and user interface (based on the user feedback we have received to date).

These smaller sprints will be advantageous in two ways. First, they will allow developers to focus development efforts on one area at a time so that enhancements can be more quickly and reliably delivered to our user community and the Samvera Community. This will allow us to spend our development funds in the most efficient manner since they will be based on solid user research, will be evaluated for feasibility prior to commencing code development, and will also enable us to continuously adapt to work being done by other Hyku and Hyrax community projects at the same time. Secondly, these small to medium developments will allow us to demonstrate value to our member libraries as they will see continual improvement. This will then help us develop our operational model in the areas of communications and training as we assess the impact of improvements, communicate changes effectively, and make sure all member libraries are up to date on the newest developments.

Workstream 3: Operational Model / *Consortial Institutional Repository Toolkit* **Development** - While research and development is happening, we will continue to run the Hyku Commons service in a production-level pilot, adding new pilot participants from two other major library consortia in order to ensure feedback is gathered from a larger community to test the scalability of our program and the relevance of our work. Virginia's Academic Library Consortium (VIVA), and the Louisiana Library Network (LOUIS) will provide up to four piloting institutions from their respective communities. VIVA and LOUIS combined reach over 118 libraries. We anticipate hosting around 25 Hyku Commons tenants between all four partnering consortia. Some tenants will be publicly-available production repositories, and others will be private testing/development tenants.

We will manage the program throughout the grant project using the operational model developed via the previous grant (See Supporting Document for our Preliminary Business Model). Working together we have devised collaborative service and staffing models, financial models, workflows, and documentation materials. We plan to expand this effort with some other key pieces such as a communications plan, development of an active user group and listserv, standard policies and agreements for participation, methods of assessment, and digital preservation planning.

Through the first year of the grant, liaisons from both VIVA and LOUIS will work with PALNI/PALCI to continue to expand, refine and adjust the model in these and other areas based on the feedback and input we receive from our member libraries. In year two of the grant, we will share the documents created to support the repository service program with a wide-range of library consortia who are either interested in, or have already established consortia-based repository services, whether through Hyku or other repository solutions. We will ask reviewers to provide feedback on the broad applicability of our project's approach and documentation, and to identify areas for improvement.

We will then facilitate a series of virtual meetings to discuss the model and compare and contrast with other repository services. We will invite a broad spectrum of consortia, with geographic and economic diversity, representing all types and sizes of libraries, particularly ensuring participation from underrepresented groups. Feedback gathered at these meetings will be disseminated into a report to be shared with participants.

We will then use this feedback to create a *Consortial Institutional Repository Toolkit*. A second meeting will be convened to discuss the draft toolkit and develop a community discussion of the best practices and policies for consortial repository services. The toolkit will be further refined based on this meeting and then launched via our project website and through presentations to the ICOLC community in particular, along with other dissemination possibilities. We will continue to host the toolkit and other outputs at our project website (http://hykuforconsortia.org).

Data Management - To ensure we are effective and efficient and to assess the quality and timeliness of our project we will engage in data gathering and analysis activities throughout the grant period.

At the start of the grant period we will do a baseline survey of the current member library participants in terms of satisfaction with the platform and service overall, as well as details on the type and size of library and the population served. We will also gather data on the number of tenants, size of collections, level of web traffic, and number of current bugs or issues in our development queue. We will then gather the same data metrics on a quarterly basis to be able to analyze our growth, and we will survey our participants annually.

This satisfaction survey will also add to the data we plan to collect in our Research and Requirements phase. All of the data we collect, primarily in the form of interview or focus group transcripts and usability test data will be anonymized, then coded for analysis. Data will be made available in its anonymized form. This initial data set should provide a benchmark from which to assess how well the highest priority barriers have been addressed at the end of the project. At the interim and final phases we will tie our development work to reported issues and demonstrate an impact on removing those barriers.

Finally, the operational model workstream will allow us to gather feedback from a wide spectrum of consortia on the effectiveness and adaptability of our work. We will be gathering input from them during two community meetings from which we will produce two deliverables: a report on the draft toolkit and the gaps that need to be addressed, and a final toolkit for widespread use.

If our model and our development work is successful, we should see increases in the following areas:

- The reported level of satisfaction of our member libraries
- Growth in the size and number of tenant repositories
- Growth in web traffic to repositories
- Diversity of populations and institutions served
- Development and implementation of features that address needs articulated in our user research
- A final ***Consortial Institutional Repository Toolkit*** that addresses the gaps identified in the first community meeting

Project Schedule - A more detailed outline of the project plan can be found in the Schedule of Completion. The work is broken out into the three workstreams identified above, running simultaneously. We believe that the structure of our project, with each workstream informing the others will be highly successful. In particular, our iterative development approach of phases and sprints will allow us to incorporate new community developments and to avoid committing to long-term expensive feature development. Instead, through an agile approach, we will be able to take periodic assessment allowing for redirection if needed. This development will be based on the research gathered and analyzed in the first phase of work, avoiding the potential for developing low-priority or unnecessary features. Finally, testing all of this work along with our operational model in Hyku Commons will provide evidence of success and feedback to guide realignment as necessary.

Budget Summary - The total budget requested is $248,050. We estimate: Total contract expenses for development, UX research support, and project management at $174,000; Hosting, data storage and maintenance at $24,000; Supplies and meeting expenses - $6,000; PALNI staff salary and benefits - $21,500; and indirect costs at 10% or $22,550. We anticipate in-kind contributions of more than $22,000.

Diversity Plan

The *Hyku for Consortia: Removing Barriers to Adoption* project will engage a broad range of stakeholders across multiple consortia and individual libraries of varying sizes and types in our research phase. This will allow us to include a diverse cohort of academic library users during this investigation. The feedback we gather will enable the software to best serve diverse institutions, and especially those facing financial challenges, within many types of communities, providing an affordable platform to collect, highlight, and promote member institutions' varying scholastic and creative output in a variety of media, offering diverse viewpoints.

We will be recruiting participation from consortia and individual libraries at two different times during the project: first during the user research phase and later during the toolkit review phase. In order to increase diversity in these participation groups we will reach beyond our two consortia. We will intentionally recruit participants from consortia including under-represented groups, as well as geographic and economic diversity. We plan to use the network created by the International Coalition of Consortia (ICOLC) as a starting point, since the membership represents thousands of potential participant libraries. We will additionally recruit via other channels with more outreach to diverse communities.

This project will also address an underserved population of users with accessibility needs. Building on an accessibility study of the platform done in 2020, technology developments will also be designed around improvements to the Hyku software's public interface encouraging the use of accessibility best practices repository submissions. Through these efforts, we are striving to provide access to digital resources that everyone can use. The valuable work proposed by this project to make Hyku a more attractive option to libraries will enable increased availability of open access scholarly content to a diverse audience of potential researchers. In doing so, our project will foster and promote equal, equitable, and free access to its hosted content by all users throughout the world.

National Impact

Benefits / Outcomes / Impact - This project's primary audience is consortia or any group of libraries seeking to share the cost and efforts involved in providing repository solutions. At this time, we believe no other solution exists that has more potential impact to libraries to reduce repository administration, staffing, and service costs, while also providing key features/functionality and offering a high degree of innovation potential. Our previous Hyku development grant project funded by IMLS has contributed significantly to Hyku's growth as a flexible, user-friendly, affordable multi-tenant repository platform, offering a solution to the current gap in the landscape of repository options available to libraries. Today's flexible, fully featured, open source repository platforms require a high-level of hosted or in-house support, and come at a high cost. Further enhancing Hyku in the way we propose in this project creates a viable alternative in delivering a flexible multi-use repository platform that is truly affordable to both consortia and individual institutions. This project will continue building Hyku's appeal,broadening its potential community of users to support on-going innovation, development, and sustainability.

Ensuring Impactful Results through Strategic Collaboration - By engaging with the open source Samvera community throughout the grant project, as well as the international consortial community, we will ensure that our project will deliver research findings, open source software deliverables, and toolkit materials that are highly adaptable and meet the needs of these communities and developed with their close collaboration and input.

Potential users of this platform encompass thousands of libraries across the United States and the world. Widespread adoption will lead to a more sustainable environment and efficient access to diverse types of collections and materials. We remain committed to sharing all code produced in this project under permissive open source licenses, allowing for maximum use, re-use, and expansion of the work completed in this project. We have already contributed developments back to the community from our previous project and are known and trusted within the Samvera community.

Sustainability - Since the project partners are committed to offering Hyku to their member libraries as an on-going service, we have a vested interest in sustaining this project. We have put considerable effort into creating an operational model that allows us to run the service with reasonable cost which will be shared back with the community at-large. By the end of the proposed project we will have managed a production-level service for three years and will have the experience and expertise to aid others in similar endeavors. Project partners will continue to communicate with consortia about Hyku as a scalable repository solution and will explore partnership opportunities to co-host Hyku to further reduce costs and share expertise.

Also of national significance is the way this project continues to highlight and bolster the ability of library communities to both develop and deliver repository services to researchers who produce and use scholarly content. The library's evolving role in scholarly communication as agents to preserve and disseminate content is vital, and in scaling up infrastructure options we can enhance that role even more. By making Hyku a more attractive prospect for libraries, consortia, or other institutions to adopt, we are helping to strengthen the national digital infrastructure needed for libraries to provide open access to digital content. In addition, by building the software together with Notch8, a prominent leader of Hyku development in the Samvera community, we demonstrate that a community of libraries and consortia can work together with open source developers to shape products to their needs.

The national impact of this project aligns with IMLS priorities by:

1) Building needed capacity and alternative solutions to improve open public access to information
2) Enhancing, scaling, and removing adoption barriers to to low-cost multi-tenant IR solution previously developed with IMLS funds that will serve the greater consortium community and beyond
3) Developing partnerships across library communities to effectively sustain open source tools and services and contain costs, and providing a toolkit to model best practices for effective repository service collaboration
4) Enhancing the sustainability, interoperability, and accessibility of digital content and collections to provide long-term impact to and value for diverse and evolving user communities
5) Advancing realistic and sustainable approaches for the stewardship of new and complex content types or digital formats, and allowing under-resourced institutions to participate in these efforts
6) Enabling the ethical stewardship of diverse or culturally sensitive digital content and collections through inclusive collaborations, tools, and best practices

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Workstream	Task	2021 Aug	Sep	Oct	Nov	Dec	2022 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2023 Jan	Feb	Mar	Apr	May	Jun	Jul
Workstream 1: Research and Requirements Development	Hire Usability Consultant	▓	▓																						
	Recruit and schedule user studies	▓	▓	▓																					
	Carry out user studies		▓	▓	▓	▓	▓	▓																	
	Analyze results and determine requirements					▓	▓	▓	▓	▓	▓	▓	▓		▓						▓				
	Develop scope of work for phase 1 (sprints 1, 2 & 3)								▓	▓															
	Develop scope of work for phase 2 (sprints 4, 5 & 6)														▓	▓									
	Bring community up to date on completed developments																								
Workstream 2: Technology Development	Sprint 0		▓	▓																					
	Sprint 1										▓	▓													
	Sprint 2												▓	▓											
	Sprint 3														▓	▓									
	Sprint 4																▓	▓							
	Sprint 5																			▓	▓				
	Sprint 6																					▓	▓		
Workstream 3: Operational Model Development	Perform initial baseline satisfaction survey and gather data on repository size and usage.	▓																							
	Finalize pilot participants	▓	▓																						
	Run Hyku Commons using operational model	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
	Quarterly data gathering				▓			▓			▓			▓			▓			▓			▓		
	Annual satisfaction survey	▓											▓												▓
	Finalize draft operational model for review													▓	▓	▓									
	Reach out to consortia to participate in discussions															▓									
	Share operational model with discussion participants																▓								
	Convene meeting with consortia for discussion																		▓						
	Revise and adapt model based on feedback																			▓					
	Develop consortial repository tool kit																			▓	▓				
	Convene second meeting to review tool kit																					▓			
	Revise and adapt tool kit based on feedback																						▓		
	Launch tool kit																							▓	
	Perform final grant data analysis to measure success																								

DIGITAL PRODUCT FORM

INTRODUCTION

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to digital products that are created using federal funds. This includes (1) digitized and born-digital content, resources, or assets; (2) software; and (3) research data (see below for more specific examples). Excluded are preliminary analyses, drafts of papers, plans for future research, peer-review assessments, and communications with colleagues.

The digital products you create with IMLS funding require effective stewardship to protect and enhance their value, and they should be freely and readily available for use and reuse by libraries, archives, museums, and the public. Because technology is dynamic and because we do not want to inhibit innovation, we do not want to prescribe set standards and practices that could become quickly outdated. Instead, we ask that you answer questions that address specific aspects of creating and managing digital products. Like all components of your IMLS application, your answers will be used by IMLS staff and by expert peer reviewers to evaluate your application, and they will be important in determining whether your project will be funded.

INSTRUCTIONS

If you propose to create digital products in the course of your IMLS-funded project, you must first provide answers to the questions in **SECTION I: INTELLECTUAL PROPERTY RIGHTS AND PERMISSIONS.** Then consider which of the following types of digital products you will create in your project, and complete each section of the form that is applicable.

> ### SECTION II: DIGITAL CONTENT, RESOURCES, OR ASSETS
> Complete this section if your project will create digital content, resources, or assets. These include both digitized and born-digital products created by individuals, project teams, or through community gatherings during your project. Examples include, but are not limited to, still images, audio files, moving images, microfilm, object inventories, object catalogs, artworks, books, posters, curricula, field books, maps, notebooks, scientific labels, metadata schema, charts, tables, drawings, workflows, and teacher toolkits. Your project may involve making these materials available through public or access-controlled websites, kiosks, or live or recorded programs.

> ### SECTION III: SOFTWARE
> Complete this section if your project will create software, including any source code, algorithms, applications, and digital tools plus the accompanying documentation created by you during your project.

> ### SECTION IV: RESEARCH DATA
> Complete this section if your project will create research data, including recorded factual information and supporting documentation, commonly accepted as relevant to validating research findings and to supporting scholarly publications.

SECTION I: INTELLECTUAL PROPERTY RIGHTS AND PERMISSIONS

A.1 We expect applicants seeking federal funds for developing or creating digital products to release these files under open-source licenses to maximize access and promote reuse. What will be the intellectual property status of the digital products (i.e., digital content, resources, or assets; software; research data) you intend to create? What ownership rights will your organization assert over the files you intend to create, and what conditions will you impose on their access and use? Who will hold the copyright(s)? Explain and justify your licensing selections. Identify and explain the license under which you will release the files (e.g., a non-restrictive license such as BSD, GNU, MIT, Creative Commons licenses; RightsStatements.org statements). Explain and justify any prohibitive terms or conditions of use or access, and detail how you will notify potential users about relevant terms and conditions.

A.2 What ownership rights will your organization assert over the new digital products and what conditions will you impose on access and use? Explain and justify any terms of access and conditions of use and detail how you will notify potential users about relevant terms or conditions.

A.3 If you will create any products that may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities, describe the issues and how you plan to address them.

SECTION II: DIGITAL CONTENT, RESOURCES, OR ASSETS

A.1 Describe the digital content, resources, or assets you will create or collect, the quantities of each type, and the format(s) you will use.

A.2 List the equipment, software, and supplies that you will use to create the digital content, resources, or assets, or the name of the service provider that will perform the work.

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG, OBJ, DOC, PDF) you plan to use. If digitizing content, describe the quality standards (e.g., resolution, sampling rate, pixel dimensions) you will use for the files you will create.

Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan. How will you monitor and evaluate your workflow and products?

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period. Your plan should address storage systems, shared repositories, technical documentation, migration planning, and commitment of organizational funding for these purposes. Please note: You may charge the federal award before closeout for the costs of publication or sharing of research results if the costs are not incurred during the period of performance of the federal award (see 2 C.F.R. § 200.461).

Metadata

C.1 Describe how you will produce any and all technical, descriptive, administrative, or preservation metadata or linked data. Specify which standards or data models you will use for the metadata structure (e.g., RDF, BIBFRAME, Dublin Core, Encoded Archival Description, PBCore, PREMIS) and metadata content (e.g., thesauri).

C.2 Explain your strategy for preserving and maintaining metadata created or collected during and after the award period of performance.

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content, resources, or assets created during your project (e.g., an API [Application Programming Interface], contributions to a digital platform, or other ways you might enable batch queries and retrieval of metadata).

Access and Use

D.1 Describe how you will make the digital content, resources, or assets available to the public. Include details such as the delivery strategy (e.g., openly available online, available to specified audiences) and underlying hardware/software platforms and infrastructure (e.g., specific digital repository software or leased services, accessibility via standard web browsers, requirements for special software tools in order to use the content, delivery enabled by IIIF specifications).

D.2. Provide the name(s) and URL(s) (Universal Resource Locator), DOI (Digital Object Identifier), or other persistent identifier for any examples of previous digital content, resources, or assets your organization has created.

SECTION III: SOFTWARE

General Information

A.1 Describe the software you intend to create, including a summary of the major functions it will perform and the intended primary audience(s) it will serve.

A.2 List other existing software that wholly or partially performs the same or similar functions, and explain how the software you intend to create is different, and justify why those differences are significant and necessary.

Technical Information

B.1 List the programming languages, platforms, frameworks, software, or other applications you will use to create your software and explain why you chose them.

B.2 Describe how the software you intend to create will extend or interoperate with relevant existing software.

B.3 Describe any underlying additional software or system dependencies necessary to run the software you intend to create.

B.4 Describe the processes you will use for development, documentation, and for maintaining and updating documentation for users of the software.

B.5 Provide the name(s), URL(s), and/or code repository locations for examples of any previous software your organization has created.

Access and Use

C.1 Describe how you will make the software and source code available to the public and/or its intended users.

C.2 Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository:

URL:

SECTION IV: RESEARCH DATA

As part of the federal government's commitment to increase access to federally funded research data, Section IV represents the Data Management Plan (DMP) for research proposals and should reflect data management, dissemination, and preservation best practices in the applicant's area of research appropriate to the data that the project will generate.

A.1 Identify the type(s) of data you plan to collect or generate, and the purpose or intended use(s) to which you expect them to be put. Describe the method(s) you will use, the proposed scope and scale, and the approximate dates or intervals at which you will collect or generate data.

A.2 Does the proposed data collection or research activity require approval by any internal review panel or institutional review board (IRB)? If so, has the proposed research activity been approved? If not, what is your plan for securing approval?

A.3 Will you collect any sensitive information? This may include personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information. If so, detail the specific steps you will take to protect the information while you prepare it for public release (e.g., anonymizing individual identifiers, data aggregation). If the data will not be released publicly, explain why the data cannot be shared due to the protection of privacy, confidentiality, security, intellectual property, and other rights or requirements.

A.4 What technical (hardware and/or software) requirements or dependencies would be necessary for understanding retrieving, displaying, processing, or otherwise reusing the data?

A.5 What documentation (e.g., consent agreements, data documentation, codebooks, metadata, and analytical and procedural information) will you capture or create along with the data? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the data it describes to enable future reuse?

A.6 What is your plan for managing, disseminating, and preserving data after the completion of the award-funded project?

A.7 Identify where you will deposit the data:

Name of repository:

URL:

A.8 When and how frequently will you review this data management plan? How will the implementation be monitored?