

ARKs-in-the-Open: It Takes a Village Sustainability Assessment



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November 2019

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Executive Summary

This document assesses the [ARKs-in-the-Open](#) (AITO) program. Archival Resource Keys (ARKs) are used as persistent identifiers in the open scholarly ecosystem. Since 2001, the California Digital Library (CDL) has served as the incubator for ARK infrastructure, consisting primarily of the specification, a registry of organizations using ARKs, and a global resolver service. To achieve long-term sustainability, the ARK infrastructure must emerge from CDL and mature in partnership with multiple organizations and community participants to guide its future.

In this document, the AITO program is assessed using the [It Takes a Village Guidebook](#) (ITAV). ITAV can be used to assess open source programs by breaking them down into four facets (*governance, technology, resources, and community engagement*) and three phases of maturity: 1. *Getting Started*, 2. *Growing*, and 3. *Stable but not Static*. AITO is in an early phase of each facet, and there are a number of issues to work through if it is to transition to a truly community-supported program.

Summary Recommendations

Assessment staff at LYRASIS (some formerly of DuraSpace) recommend the following activities for the AITO Advisory Group.

We recommend CDL staff communicate the results of this assessment to the AITO Advisory Group and lead a discussion about how to improve community ownership of the objectives of the group and/or whether to continue with the groups.

- Review report, analyze survey data, and conduct catastrophizing activities with the advisory group to inform next steps and gather buy in from early stakeholders
 - Conduct exercise, review working groups, present proposals for change
- Explore grant funding opportunities to fund development of ARK management and resolver tools
- Form critical partnerships, focusing on what ARKs need and who shares its vision
- Consider pathways to create infrastructure to support AITO program growth including resourcing, staffing, fiscal services, and organizational home options

Format

The AITO program is assessed using the [It Takes a Village Guidebook](#) (ITAV). ITAV assesses open source programs by breaking them down into four facets (*governance, technology, resources, and community engagement*) and three phases of maturity: 1. *Getting Started*, 2. *Growing* and 3. *Stable but not Static*. This assessment includes sections on community and each of the four facets. The final section has overall components for success, summary recommendations and suggested pathways for next steps.

Community

Community is the heart of any sustainable program. The open source community is not a monolith and so only by identifying and focusing on the needs of those in the AITO community, and working to identify and serve their needs, can a community supported program be sustainable.

AITO has a goal of becoming a community-supported program perhaps supported by an organizational home. It's important to note that a community supported program is not "owned" by its organizational home. It is "owned" and led by its community with stewardship and support from stakeholder organizations or individuals.

The AITO Roadmap page (<https://wiki.duraspace.org/display/ARKs/Roadmap>) lists these "aspirational items"

We envision an active and involved global community that sustains ARK identifiers as part of the open scholarly and research infrastructure.

- *Sharing responsibility for and automating regular processes, including assignment of organizational NAANs*
- *Creating an active open source project around the N2T resolver code base*
- *Creating and maintaining an open source library of ARK integrations with external systems*

In February 2018, CDL set out to define interested and engaged members of the AITO community by [issuing communications](#) about its intent to improve the sustainability and community ownership of ARK infrastructure via an [Expression of Interest form](#). The form asked for people to opt in to new ARK community activities such as:

- Assembling and consulting with an ARK advisory group
- Developing procedures for shared maintenance of the organizational registry
- Consulting with the wider ARK community on requirements, priorities and models for shared community and infrastructure management
- Guiding the ARK specification through the IETF Informational RFC process
- Participating in an initiative to gauge the scope of ARK usage world-wide

The result was [33 organizations on 4 continents](#) expressing interest in safeguarding the future of ARKs. The types of organizations expressing interest include:

- Academic and academic research institutions (universities)
- National libraries
- National government agencies
- Non-profit organizations
- For profit organizations providing identifier services

From these interested parties, CDL invited stakeholders to participate in an Advisory Group as an interim governance body to establish ownership of ARK infrastructure outside of CDL. The Advisory Group was established in July 2018 and has eight members. CDL also invited Advisory Group members and other interested parties to serve on three working groups: Outreach, Sustainability, and Technical. These groups were established in March 2019.

Based on feedback from program staff and participants on the working groups, they have had varying levels of productivity and success. Recently, working group meetings have been cancelled regularly due to lack of pressing agenda items. It is unclear if the groups are solicited for agenda items before the

decision to cancel is made or if cancellation is a group decision. More about the specific working groups is included in the pertinent facet assessment.

In an effort to learn more about those interested in participating in a community supported future for ARKs, CDL staff surveyed all who opted in to the Expression of Interest (36 people, of whom 22 responded - a 66% response rate) to ask:

- What priorities they would identify for the community
- How they would describe their organization (e.g. library, archive, research lab, educational institution, other)
- Whether their interest in increasing sustainability of ARKs is based on actual use of ARKs or a broader goal to see open initiatives thrive
- Whether they run an ARK resolver locally or access one externally
- What capacity they have to contribute to community efforts, either in-kind or financially

Results to the initial survey are here:

- [report](#)
- [analysis](#)

CDL staff expanded the reach of the survey in September 2019 to all registered ARK users to gather more data to inform the direction of fostering a healthy and decentralized ARK community.

For the small subset of preliminary results received by August, there is somewhat of a disconnect between support for various efforts and activities for which survey respondents would provide funding. The strongest interest from respondents thus far is around the “Effort to promote ARK understanding and usage” and the “Effort to Catalog what ARKs are being used to identify.” The areas of most likely funding support are around “Open source development of ARK resolver software (next generation of NOID &N2T.nt)” and “Open source development of ARK management application (similar to ezid.cdlib.org)”. Of course, this only reflects the initial responses to the survey and the results may be very different when the full results are in. It may speak to different levels of support for core functionality activities and less financial support for advocacy efforts. This can be further explored once the full survey results are received.

While the survey will be extremely beneficial in starting to engage the larger community and gaining a sense of their priorities, it is unlikely that it would provide absolute mandate. At most, it will give a sense of the various interests in the community and enable CDL staff and the AITO Advisory Group to prioritize interests and enable them to focus their sustainability efforts.

Community: Recommendations

- Define the ARK community and their needs: who are they, what do they need, and how are they willing to participate. They need to be identified in order articulate the value proposition.

Facets

Facet: Governance

Governance Overview

“A governance model describes the roles that project participants can take on and the process for decision making within the project. In addition, it describes the ground rules for participation in the project and the processes for communicating and sharing within the project team and community.” Gardler, Ross and Gabriel Hanganu, “Governance Models”

Programs in phase I or “Getting Started” of governance are “generally still working with their original software engineers, program staff, funder, or sponsoring organization.” The AITO program fits this definition. The goal of this phase is to plan and implement the right governance model for the program. It is important to recognize that governance is not one-size-fits-all; there are several different governance models, and the program stakeholders should select a model that meets the needs of the program.

Governance Assessment

AITO has an overall Advisory Group and several working groups focused on Sustainability, Technical issues, and Outreach. The Advisory Group assessment will be included here, and the others will be discussed in the section for their corresponding facets (Resources, Technology, and Community Engagement).

The Advisory Group has been relatively quiet since the working groups have formed as the specifics of outreach, sustainability and technical issues have been shifted to them. This is an opportunity to reconsider the role of the larger advisory group and the working groups.

To assess the effectiveness of the existing groups (four in total), we ask CDL staff to consider the following questions and conduct the governance activity outlined below:

1. Are people attending the meetings?
2. Are the group Charters being followed? For example, are the listed deliverables on track? Are the objectives being met?
3. Have any votes been held any? If so, what information is provided ahead of time? What topics are being voting on? How often is the group voting?
4. How would one characterize discussion in meetings? Is it lively? Quiet? What discussion facilitation methods are being used, e.g. soliciting agenda items from group, roundtable discussions, polls, open discussion time?
5. Have you communicated general roles and responsibilities for participation?
 - a. e.g. Coming to meetings prepared - reading updates, agenda and contribute topics to agenda; letting the chair of the group know if they can't attend and sending an alternate if possible; active participation in discussions; representing not only their organization but bringing the perspective similar peer organizations we could engage with; and participating in working groups.
6. Who is doing the work? Is it getting done in working groups? Or by CDL staff?

Governance Activity: Catastrophizing or Risks

Catastrophizing is a useful exercise wherein we imagine some worst-case scenarios for the program and think about what we would do if they were to occur. This allows us to identify the greatest risks for the program and do some contingency planning. Based on an initial evaluation of the AITO program, some scenarios are included below. It would be a good exercise to conduct with the Advisory Group to get everyone get involved and understand the potential risks or value of keeping or modifying the current governance structure.

Scenario 1: CDL's priorities shift and CDL staff are no longer engaged in the program

Currently, the AITO program and service are hosted at the University of California, but at some point, it may no longer want to have this role. How likely is this scenario in the short, medium, and long term? What are the best options should this occur?

One possible solution is to move the AITO program and service to a new Organizational Home. This possibility is being explored as part of this assessment, but AITO is currently dependent on grant revenue and institutional staff and infrastructure with no clear community-supported model for operational revenue.

Scenario 2: A key stakeholder transitions and is no longer available

Currently, John Kunze is the primary technical resource. As interests and priorities change, what would occur if he were transferred or taken off the program?

Scenario 3: ARKs become irrelevant in an ecosystem of much better known and resourced IDs such as DOI and Datacite

Scenario 4: There is no active technical community to support the software

Scenario 5: Failure to transition to the next phase and turn users into stakeholders. AITO could fail to truly become a community program with adequate engagement.

For the scenarios above, it is helpful to consider the following:

- How would we manage this catastrophe under our current governance structures?
- Who would decide how to solve the problem?
- How might we modify our structure in the future as a result?
- How would we inform and involve our community?

Governance Facet: Recommendations

- We recommend CDL staff consider the assessment questions above and communicate the results of this overall assessment to the AITO Advisory Group and lead a discussion about how to improve community ownership of the objectives of the group and/or whether to continue with the groups. The activity above can be used to help the Advisory Group engage, understand the risks and plan a path forward.

- In addition, we recommend CDL staff discuss with the Advisory Group whether the AITO program needs a formal community-based governance model. To better assess the governance needs of a program, the ITAV guidebook recommends answering the following questions with the governance members:
 1. How are higher level decisions (such as long-term strategy, sustainability models) being made?
 2. Is there tension between functional and technical teams that requires a conflict resolution mechanism?
 3. Do community members receive regular updates about the program?
 4. How is the community engaged with respect to governance and what role do they represent?

These questions can help determine the governance needs of the AITO program, both now and in the future. Should a new governance model be needed, the ITAV guidebook provides several resources that describe existing models such as [this article](#). Other examples previously shared with CDL include: https://docs.google.com/document/d/1RcJnvK5R1Z1Tsd-2c2-yWYWr9o_xK1W4pd0956G88y4/edit# Any new governance model should be drafted and tested before being implemented, and any changes should be communicated to program stakeholders.

Facet: Technology

Technology Overview

Programs in phase I of the Technology facet are typically in the design, pre-release, or early beta testing stage of software development, with a core group of early adopters. AITO seems to fit most appropriately into this phase, though it also shares some characteristics of phase II programs (e.g. it is starting to be used outside the core group of early adopters). The core goal in phase I is to produce a viable product that serves the needs of the community, and then to start to refine the application.

Technology Assessment

A Technical Working Group (WG) was formed with the stated purpose to “oversee development and maintenance of specifications, software, and servers that support infrastructure for the ARKs-in-the-Open (AITO) community. Examples include ARK standardization, code for counting ARKs, and global resolver replication.”

The Technical Working Group has made some progress towards their objectives. Details are available at <https://wiki.duraspace.org/display/ARKs/Technical+Working+Group> . The group seems well positioned and facilitated by John Kunze and we would recommend that it continues with John in his current role.

Highlights of the technology itself include:

- EZID is one of the ARK ID hosts, providing a subscription service
- N2T (name to thing) - intentionally generic <https://n2t.net/>
 - N2T.net is external to EZID (but still run by CDL)
 - With login credentials, EZID, Internet Archive and yamz.net store millions of individual metadata records for ARKs and DOIs

- In partnership with identifiers.org, N2T stores one “resolution rule” record for each of 600+ different kinds of identifier (ISBN, Pubmed, ISSN, Protein Data Bank, Genbank, etc)
- The public (no login required) use N2T primarily to resolve ARKs and secondarily the 600+ other kinds of identifier
- For DOIs, everyone uses the standard DOI resolver, but N2T can do it too
- N2T also hosts the minting of strings that become Internet Archive ARKs and EZID ARKs and DOIs
- String minting functionality is supplied by the NOID software and its next generation, called Egnog (upon which N2T is based). The open source NOID software (2007) is widely used out in the world to mint PURLs, Handles, and other types of IDs
- ARK has a specification, CDL is the maintaining organization for this, but would like this to be more community owned

EZID is based on open technologies but if CDL truly wants AITO to be a community owned program, CDL would need to establish an open source code base and document and support the contribution model in a community owned model. N2T is also open source, but its code base is written in Perl, which make it difficult to recruit co-developers. AITO should explore more community related development practices such as community sprints, releases, licensing, etc. Consider shifting from BitBucket to Github as Github is much more widely used and that may provide a barrier to gaining new code contributors.

Based on discussions with CDL, who are interested in an active, productive open source tool/service that provides the current generation and gets to the next generation of both of the following:

- ARK management -- a UI and API for logged-in users, to create, delete, attach metadata, get link verification reports, do search, download, and expose for third-party harvesting. Currently this is provided by [EZID.cdlib.org](https://ezid.cdlib.org) for about 20 million ARKs. EZID stores ARKs at N2T, available at: <https://n2t.net>.
- ARK resolving -- a service to allow institutions to create, register and manage ARK identifiers. This differs from EZID in there being no UI. Instead the resolver specializes in forwarding identifiers and providing a preservation copy of identifier metadata. This should be a public-facing (no login required) service that is a base URL from which all ARKs can be resolved, including 20M ARKs stored by EZID, 20M ARKs stored by the Internet Archive, and 3000 ARKs from YAMZ.net, plus 600+ rules for resolving the other 3 billion ARKs in the world. Currently this is provided by N2T.net, which also has an API for logged-in users (3 total: EZID, IA, and YAMZ) and a very thin UI. More details are available at: <https://wiki.duraspace.org/display/ARKs/ARK+Identifiers+FAQ%2C+version+0.92#ARKIdentifiersFAQ,version0.92-n2tWhatisN2T?>

Based on discussions with CDL, the requirements seem relatively clear and EZID and N2T have existing codebases to work from. It is difficult to say whether the existing code can be repurposed or if they will need to create a new codebase (informed by the existing code). In either case, this an effort that could be grant funded. The next step would be to identify strong granting agency candidates and start drafting a concrete proposal.

Technology Facet: Recommendations

- Explore more community related development practices such as community sprints, releases, licensing, etc. Shift from BitBucket to Github
- Consider an external tech assessment to further assess the technologies being used
- Identify strong granting agency candidates and start drafting a concrete proposal

Facet: Resources

Resources: Overview

Phase I programs in the Resources facet are characterized by grant or single-organization funding with no long-term plan for ongoing support. There is typically a single owner with a very small number of contributors to the codebase. As a program fully funded by the California Digital Library in the form of half of John Kunze's time and a percentage of Kurt Ewoldsen, AITO would be considered phase I in terms of resourcing.

Resources: Assessment

In order to move forward to the next phase, business and financial sustainability planning is required. What are the ongoing costs for keeping the program running at current levels? What would be needed to grow? What about human resources: does the program need a technical lead, a product manager, a community manager? Some information on costs has been gathered and is available at: <https://wiki.duraspace.org/display/ARKs/ARKs+@+CDL+cost+estimates> Of primary concern going forward is a better understanding of how resources can be sustained.

A Sustainability Working Group (WG) has been formed. Per the wiki, "it determines the most cost-effective way to deliver ARK services that provide value to the community while keeping the required contribution from the community affordable. It conducts an ongoing conversation in the ARKs-in-the-Open (AITO) community about costs and how they will shape the "minimum viable product" and any additional services. This WG is concerned with long-term organizational and financial stability for AITO and ARK infrastructure, whatever that will end up meaning precisely, and its work will be cognizant of legal and tax frameworks (e.g., non-profit organizations)."

The Sustainability Working Group has been meeting but may be having trouble finding its purpose. It is never too early to think about sustainability, but it may not have had enough data and scope to make progress. At this point, the group is still working to identify the purpose and scope of the ARKs-in-the-Open Program and so is unclear about numerous components such as what is the technology, who is the participant base and who would make up the community. This working group may benefit from a pause and pivot in its work. It can be difficult to know how to sustain a program when so many of the core elements are being formulated. This report may provide the opportunity for them to refocus their efforts.

There are multiple possible ways to build sustainable resources for the program, including earned revenue streams, in-kind contributions from multiple organizations, sponsorship or membership

programs for active users, and other arrangements for shared revenue. The right solution may be a mix of these components and the program may need to consider different models over time possibly starting with one and building a more diverse set of revenue sources. Determining the right resource model for AITO will depend on the nature of the community and the needs of the program as identified in other facets.

Questions to consider include: Would users be willing to pay for the service? What about a community-based membership model - would users pay an annual fee to support the ongoing costs of the program? Different resource models could be assessed via discussions with likely users (perhaps identifying these from the survey results). This information can help estimate the capacity for community-based revenue generation.

There are several membership models to consider, but CDL would want to be wary given the level of membership fatigue in the larger academic library community which may be the target audience for the program. If a membership model is to be considered and applied, there would need to be a clearly articulated value for membership. ArchivesSpace is an example of a membership model-based program <https://archivesspace.org/community/types-of-membership>. ORCID is an organization that deals with persistent identifiers and has a membership model: <https://orcid.org/about/membership>. This could provide a good template for a member-based ARK service. ORCID provides access to a Member API and some added benefits described here: <https://orcid.org/about/membership/comparison>. Right now, well-funded organizations tend to set up their own ARK infrastructure, so there would need to be some benefit to using the community supported service instead that would be compelling. Otherwise, there could be some member benefits that apply even when institutions run their own infrastructure. Overall, a fee for service model and membership tied to explicit benefits (such as access to user documentation, member only events, and technical support) has strong possibilities.

Another open question is around the discontinued bundling of ARK and DOI services that CDL previously did for non-University of California clients. Is there a need for a bundled service provider for non-UC clients? If so, there may be opportunities to partner with other organizations to provide these services which could be part of a larger registered service provider program.

Once the business and financial sustainability planning has been completed, it will be possible to determine the best path forward for the program. An analysis of the costs of maintaining the current state vs growth will be particularly useful in this regard because it will allow the program team to evaluate the costs and benefits associated with growth. As an initial goal, building up a reserve fund would help demonstrate the maturity of the program and its capacity for growth.

Resources Facet: Recommendations

- Conduct business planning effort and decide upon a model for revenue. The survey results should help identify potential users/members who can be engaged to help refine the resource model.
- Consider having Working Groups or CDL staff do an ITAV assessment (independently or as a guided process). It could help put some of this into perspective.
- Recommend they ask themselves and community groups:
 - Do we feel we have enough resources?

- If we had more resources, how would we allocate them (base answer on survey responses - priorities). Some potential engagement needs include travel funding, as well as a resource to coordinate meetings, keeping conversations going between meetings and generally foster engagement.

FACET: Community Engagement

Community Engagement: Overview

Programs in phase I of Community Engagement are generally focused on primary stakeholders. Typically, there is no externally focused communications strategy or engagement with a broader open source community. AITO falls into phase I of the Community Engagement facet.

At this stage, it is important to identify the communities you intend to serve, and how they should expect to engage with the program. Will they primarily be users that consume the service, or should they expect to contribute (e.g. code, documentation, governance, etc.)? Community engagement can vary a great deal across programs depending on the needs of the program and the stakeholders.

To reach the next phase of sustainability, there needs to be an explicit goal to formulate a communications and engagement strategy. The communications and outreach strategy should be specific to the community and its needs and “include specific elements, such as creating mailing lists, conducting member forums, giving conference presentations, and committing to regular blog posts.”

Community Engagement: Assessment

An Outreach Working Group has been formed (specifics available at: <https://wiki.duraspace.org/display/ARKs/Outreach+Working+Group>) . As stated on the wiki “The Outreach Working Group (WG) oversees development of the ARKs-in-the-Open (AITO) community, as well as the promotion of awareness, understanding, and adoption of ARKs, the only major persistent identifier scheme that is truly open, decentralized, non-siloed, and non-paywalled.”

Objectives listed are:

1. **Campaign strategy.** Develop a process to gather requirements, priorities and models for shared community and infrastructure management (e.g., consider using the ARK community survey draft created by the BnF).
2. **Communications and Marketing.** Clearly articulate what ARKs are, how they can be used, and why they are essential (the “value proposition”) and implement a plan for promoting their adoption and use. Examples include creating an “ARKs brochure” website using the arks.org domain name (similar to doi.org), keeping a world map of ARK assigning organizations updated automatically via geo-locations in the NAAN registry, organizing events such as the 2018 ARK summit, spreading the word in international conferences, etc.
3. **Counting ARKs.** People want to know how many ARKs there are in the world (as ARKs can be assigned without permission from a central assigning authority), and some organizations may opt to let us harvest stats from them about how many ARKs they have assigned. Work with the

Technical WG to (a) draft requirements for simple summary counts that ARK assigning organizations can voluntarily post and maintain, (b) specify how those counts, once harvested, should be publicized, and (c) recruit organizations to opt in.

The Outreach Working Group has been making progress. At this point, the Counting ARKs effort is well underway. There is an existing email forum, which is perhaps underutilized (<https://groups.google.com/forum/#!forum/arks-forum>) which is an excellent way to facilitate engagement. Other engagement tools include:

- a French-language ARKs discussion forum at <https://framalistes.org/sympa/info/arks-forum-fr>
- a mechanism to express interest in the ARKs-in-the-Open project via <http://bit.ly/2C4fU8f>
- encouragement to: Follow us on Twitter [@CalDigLib](https://twitter.com/CalDigLib) and [@duraspace](https://twitter.com/duraspace). Tweet about the project with hashtag [#ARKsInOpen](https://twitter.com/ARKsInOpen)

Some additional excellent tools and items developed to identify the engage the community include:

- [Map of all Registered ARK organizations](#)
- [New ARKs FAQ](#)

Good foundational work has been done in creating these tools. What is lacking at this point is explicit communications and engagement strategy as well as the resources to execute it. The communications and outreach strategy should “include specific elements, such as ... conducting member forums, giving conference presentations, and committing to regular blog posts.”

Implementing the strategy can take a number of forms, including direct action by the program team and volunteer effort from community members. Users can serve as champions, helping to tell stories and spread awareness of ARKs. Engaging users like this helps build the community and takes some of the burden off the program team. It is also a step toward the second phase of community engagement, which is focused on growing the community and turning users into stakeholders which can be a struggle for many programs but is the heart of long-term sustainability.

Some potential forms of engagement could include a more formal presence at existing conferences - potential for a booth, presentations, coordinating meet ups could occur at meetings such as:

- [Force 11 meetings](#)
- [PIDapalooza](#)
- [American Geophysical Union \(AGU\) Conference](#)
- [Earth Science Information Partners \(ESIP\)](#)

Community Engagement Facet: Recommendations

- Create and implement a Communications and Engagement strategy
- Determine what methods and tools are necessary to have the community grow and engage
- Fund ½ time position for someone to focus on facilitating the community to engage - elements such as creating and managing events (meetings, conferences, meet ups)
- Allocate resources (either funded or in kind) for maintenance and management of tools such as wiki, listserv, etc.

Components for Success with Affiliated Recommendations

This is an opportunity to reflect on work done thus far, evaluate survey results, pause and refocus work. The entire field of what is necessary or important or desirable may be overwhelming. This is an opportunity to focus on next steps and foundation building activities for the long-term sustainability of the AITO program. The program can start with a relatively focused effort and expand later with larger base into lots of other areas of interest.

There are many necessary components for success for a sustainable community supported software program. Overall high-level recommendations are given along with the related facet recommendations previously outlined for each facet.

- Overall Higher-Level Needs and Recommendations
 - Need
 - Clearly articulated vision and mission and goals – what is AITO, what does the community do (i.e. advocacy, education, other?)
 - Variety of resources (financial, technical and engagement)
 - Engaged community
 - Recommendations
 - Review report, analyze survey data, and conduct catastrophizing activities with governance and working groups to inform next steps and gather buy in from early stakeholders
 - Explore grant funding opportunities to fund development of ARK management and resolver tools
 - Form critical partnerships (focus on what you need and who shares your vision). AITO needs may include technical resources, infrastructure, marketing, etc. Create a vision document and potential partnership agreement with key potential partners. The field could include those who have been involved in the advisory group, working groups or identified themselves as those with a strong interest in sustaining ARKs and infrastructure. Examples include National Library of France, Internet Archive, Smithsonian, (with CDL). Develop a strategy for how to pursue those. Consider what components you need that other partners may be able to provide (community engagement, facilitation, etc.).

- Community
 - Need
 - Clearly identified community – who are they, what do they need, how are they willing to participate
 - Recommendation
 - The survey should help with this, but it is likely that additional feedback such as via focus groups or one on one discussions with users and stakeholders will be necessary and helpful in articulating the value proposition

- Effective Governance

- Need
 - Clearly articulated role as well as guidelines around who is eligible to serve; the process for getting on/off; what they decide
- Recommendations
 - CDL staff consider the assessment questions, communicate the results of this overall assessment to the AITO Advisory Group and lead a discussion about how to improve community ownership of the objectives of the group and/or whether to continue with the groups.
 - Discuss with the AG whether the AITO program needs a formal community-based governance model

- Technology

- Need
 - Clearly identified framework and service
 - Dedicated resource for technical leadership
- Recommendations
 - Explore more community related development practices such as community sprints, releases, licensing, etc. if CDL truly wants this to be a community owned program. The EZID site indicates it is based on open technologies but CDL would need to establish a truly open source code base and document and support the contribution model in a community owned model
 - Consider an external tech assessment to further assess the technologies being used
 - Explore more community related development practices such as community sprints, releases, licensing, etc. Consider shifting from BitBucket to Github
 - Identify strong granting agency candidates and start drafting a concrete proposal

- Resources

- Need
 - Means of getting required resources (either in kind or paid) for technology, community engagement, and fiscal services
- Recommendations
 - Conduct business planning effort and decide upon a model for revenue. The survey results should help identify potential users/members who can be engaged to help refine the resource model.
 - Determine what model to pursue – possibility a mix of fee for service model and membership tied to explicit benefits
 - Consider having Working Groups or CDL staff do a full ITAV assessment

- Community Engagement

- Need
 - Ways for community to engage and resources to facilitate
- Recommendations

- Create and implement a Communications and Engagement strategy
- Determine what methods and tools are necessary to have the community grow and engage
- Fund ½ time position to focus on facilitating the community to engage - elements such as creating and managing events (meetings, conferences, meet ups)
- Do groundwork for potential partnerships; details are outlined in other sections but includes identifying potential partners; creating a vision document, and outlining potential partnership agreements with key potential partners
- Allocate resources for maintenance and management of tools such as wiki, listserv, etc.

Pathways

CDL can take a variety of pathways to move forward. Two options are suggested below but of course they can be altered, combined or further discussed.

Pathway 1

- Identify and pursue partnerships to add resources, depth and gather stakeholders. A few strong partners can serve as a foundation for the larger community. Other organizations might welcome the opportunity to take on specific commitments while knowing they are not the only ones responsible. It can serve as a visible commitment to the community that AITO is on a path to community supported software. Some potential roles and organizations are outlined below:
 - BnF (Bibliothèque nationale de France)
 - Strong usage in France and successful conference has been achieved. Could they provide community engagement resources?
 - Internet Archive
 - Could they provide technical resources?
 - Smithsonian
 - Strong and active user. Could they provide technical or financial resources?
 - CDL
 - Committed to ARKs; it needs to demonstrate this to other potential partners. Identifying specific commitments will help other partners. Suggestions include:
 - technical resources (½ John Kunze or alternative)
 - lead resource for grant proposals for development funding
- Identify infrastructure to help support core financial services. LYRASIS can serve as a fiscal sponsor to provide fiscal services for annual rate. Please note, the services outlined below are provided in the interest of giving examples; a more detailed, specific proposal could be prepared for AITO upon request. Fiscal sponsor services include:
 - Maintain AITO funds in a separate financial account
 - Disburse AITO funds at the direction of the designee (including bills, expense reimbursements)
 - Provide regular income statements
 - Other services such as grant writing, legal consultation would be available at an additional cost

Pathway 2

- Identify and pursue partnerships as outlined above.
- CDL commits funding or staffing for the following: ½ time technology staff, ½ time community engagement staff
- Explore organizational home options
 - An organizational home can provide a stable infrastructure to enable community supported software. There are several organizations that can provide organizational home services. LYRASIS Organizational Home components include: leading staff, providing technology and financial resources to help the community grow, providing engineering talent to strengthen and improve the application and respond to the ever-changing needs of the community, and helping to create partnerships with key organizations to expand our community and improve our domain expertise. Please note, the services outlined below are provided in the interest of giving examples; a more detailed, specific proposal could be prepared for AITO upon request. Specific areas include:
 - *Business Infrastructure*
 - Provide an organizational and legal home for the program including business insurance, vendor/banking relationships, business licenses, legal documents, organizational/accounting management, and accounting/transaction infrastructure
 - *Financial Logistics*
 - Maintaining AITO funds in a separate financial account
 - Disburse AITO funds at the direction of the designee (including bills, expense reimbursements)
 - Provide regular income statements
 - Other services such as grant writing, legal consultation would be available at an additional cost
 - *Staffing*
 - New staff could be housed at LYRASIS
 - *Marketing and Conference Support*
 - Event logistics - assistance with the logistics related to AITO events
 - Conference support
 - Marketing support