State of Samvera Technology in 2019 : White Paper

Samvera Roadmap Council, March 2019

Julie Allinson, CoSector - University of London
Benjamin Armintor, Columbia University
Mark Bussey, Data Curation Experts
Jon Cameron, Avalon - Indiana University
Nabeela Jaffer, University of Michigan
Rob Kaufman, Notch8
Steve van Tuyl, Oregon State University
Jennifer Young, Northwestern University

Executive Summary

The paper lays out the current state of Samvera, in terms of its core software and the underpinning architecture. To set the software in context, the paper describes the Samvera community and its organizing structures. The White Paper aims to provide a useful introduction to those new to Samvera, and to act as a positioning document for those wanting to understand where Samvera ia t. Finally it provides a framework for navigating the future.

Introduction

Samvera is a repository solution, a framework, and perhaps most importantly, a community. Samvera (known until 2017 as Hydra) is 10 years old and over that time it has changed almost beyond recognition. The software has changed, the community has grown, many people have come and gone, new faces have joined.

We believe change is good - our software constantly evolves and improves to meet new requirements and adopt new technologies. New people bring new perspectives, and new skills. But change brings with it challenges: how should a small community respond to growing membership? How do we manage increasing software complexity? How do we ensure smaller institutions don't get left behind?

In early 2018, the Samvera community through the Samvera Governance Working Group, delved deeply into evaluating how to restructure the way the community runs and manages itself. The Roadmap Council arose out of a recommendation from the [Samvera Governance Next Steps white paper](https://docs.google.com/document/d/1DtKOO8MJTU7k6svMrvO2lM_ZrMep1-6s0xVOSf05PUI/edit#heading=h.ncu2bwxzzbnz)[1] to facilitate communication among the Product Owners of the Core Components as well as other Samvera solution bundles and Interest Groups. The Council strives to maintain a holistic view of the work being done by the Samvera Community and ensure coordination of that work.

The Roadmap Council is comprised of members from across the community, namely the Core Components Maintenance Working Group; Product Owners of Hyrax and the other main solution bundles (Hyku and Avalon); plus representatives from the Metadata Interest Group and the Repository Managers Interest Group. This paper is the first major output of the Roadmap Council.

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[1]
https://docs.google.com/document/d/1DtKOO8MJTU7k6svMrvO2lM_ZrMep1-6s0xVOSf05PUI/edit#heading=h.ncu2bwxzzbnz

Samvera Software

Samvera is not one single software product; rather, it is a suite of components built and supported by the Samvera Community. In addition, Samvera draws on many more open source components, from the Blacklight discovery application, supported by an overlapping community, to Solr, maintained by the Apache Foundation and used widely and internationally across commerce, education and beyond.

The aim of Samvera, as a community and software stack, is to work together to deliver common core repository functionality, in a way that can be flexibly applied to a range of use cases. This flexibility is core to Samvera, but it can be a challenge to describe when we are used to stand-alone, fully-featured off-the-shelf products.

Figures one and two, below, attempt to show how a 'Samvera' application is made up of multiple pieces. Figure one illustrates the broader set of blocks, whilst figure two explodes out what those blocks contain. The ensuing sections provide more details on each.
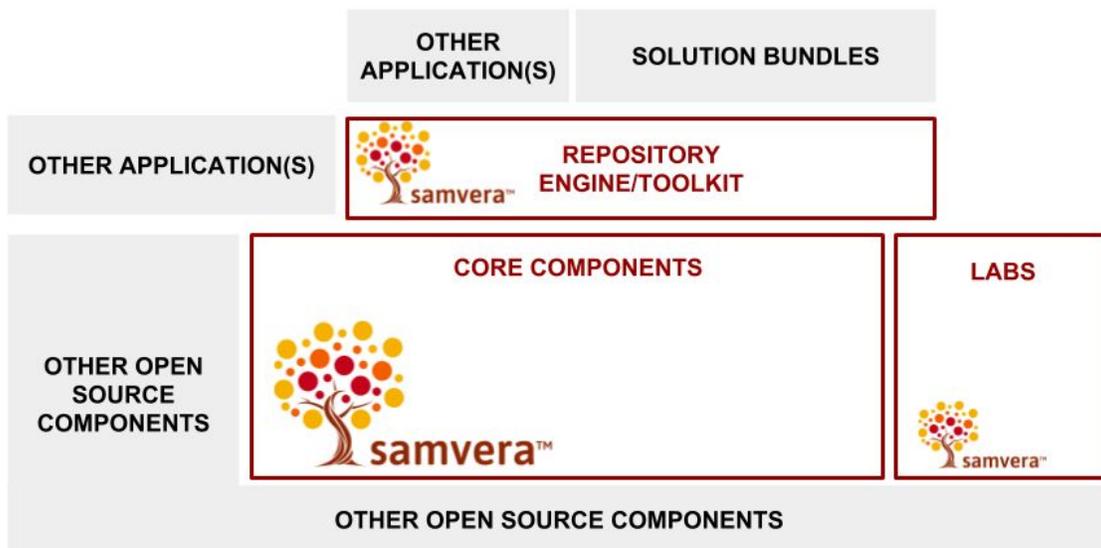

Figure one: the anatomy a Samvera application

Figure two: the anatomy of a Samvera application, exploded

Core Components

Core components are shared, integral components of the Samvera technology stack.

Since early 2018, the Component Maintenance Working Group [2] has focused on maintenance and stability of these components. The group has defined what it means to be a 'core' component of Samvera, set standards code must meet in order to be considered 'core', and assigned product owners to each core component [3]. Importantly, the group has also defined a process for deprecation, to ensure that unmaintained code is either picked up and maintained by a product owner or deprecated.

As of February 2019, the core components are:

Component	Description
active_fedora	A Rails interface to the Fedora repository, akin to ActiveModel
hydra-head	Samvera repository Rails engine
hydra-pcdm	Samvera implementation of the PCDM model

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[2] Component Maintenance Working Group has wiki pages for Phase One, Phase Two, and Phase Three
[3] http://samvera.github.io/core_components.html

hydra-works	A Ruby gem implementation of the PCDM Works domain model based on the Samvera software stack
hydra-derivatives	Derivative generation for Samvera repositories
hydra-file_characterization	Samvera file characterization
hydra-editor	A basic editor for Samvera objects
hydra-role-management	User roles for Samvera users
browse-everything	Rails engine providing access to files in cloud storage
ldp	Linked Data Platform.rb client
noid-rails	Noid identifier services for Rails based applications
om	Opinionated Metadata - allows you to define a "terminology" to ease translation between XML and Ruby objects
questioning_authority	Question your authorities - uniform RESTful routes to query any controlled vocabulary or set of authority terms
rubydora	Fedora Commons version 3 REST API Ruby library
solrizer	A lightweight, configurable tool for indexing metadata into Solr
samvera.github.io	Public website for version controlled Samvera documentation

An important element of the work of the Component Maintenance Working Group is to align core component maintenance work with the needs of Roll-Your-Own implementers and solution bundle roadmaps.

Core components all live in the Samvera Community Github Organisation[4]. To ensure contributions to Samvera core components meet community standards, Samvera provides guidance for developers in the Samvera Community Knowledgebase[5]. In addition, all code contributors must have an Individual Contributor License Agreement (iCLA) on file with the Samvera Community Steering Group. If the contributor works for an institution which has rights over materials that they

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[4] https://github.com/samvera
[5] http://samvera.github.io/

contribute, the institution must also have a Corporate Contributor License Agreement (cCLA) on file.

Hyrax : the engine that drives us

" the goal of Hyrax is to be an opinionated — though configurable — base for both institutional & data repositories and digital collections management repositories"

(Steve Van Tuyl)

Hyrax is a repository-building engine, or toolkit, designed to offer a Samvera-powered repository with a set of common, configurable, core functionalities. For example:

Hyrax Features
Custom work types to fit local needs
Multiple file, or folder, upload
Flexible user- and group-based access controls, including sharing with groups and individuals
Admin dashboard and admin privileges: ● Editing rights to pages where content can be dynamic ● Ability to configure featured works and featured researcher on home page ● Access to range of use and usage statistics User profiles and user dashboard for managing files, including creation of collections
Proxy deposit and transfer of file ownership
Configurable, flexible workflows
Batch upload and editing
Google Analytics for usage statistics
Full-text indexing and searching

Faceted search and browse
Digital preservation functionalities: ● Fixity checking ● Version control ● Characterization of uploaded files

Hyrax uses many, if not all, of the Core Components mentioned above, along with other key community supported resources such as Blacklight,[6] which delivers the repository search and discovery layer.

Hyrax grew out of two former Samvera applications: Sufia and Curation Concerns. Sufia and Curation Concerns offered similar functionality with some key differences. Curation Concerns, for example, supported multiple Work types - something the Sufia user community wanted. It was decided to bring together the two applications in Hyrax. This work was achieved in a relatively short time with community input from a range of stakeholders. Bringing together Sufia and Curation Concerns is a good example of the community's willingness to tackle complex refactoring in order to move the software forward in a more robust and efficient way[7].

Today, Hyrax is a stable piece of software with growing adoption. It is looked after by a Technical Manager (currently Tom Johnson from UC Santa Barbara) and a Product Owner (Steve Van Tuyl from Oregon State University), along with a raft of community contributors. In 2018, a dedicated Hyrax working group made significant improvements on accessibility in Hyrax, among other important Hyrax features.

Samvera Labs

Samvera isn't just dedicated to maintaining current core code - the community also fosters innovation and creativity. In software terms, this often manifests as a shared component in the samvera-labs GitHub organisation[8]. Anyone in the community can create a repo in the labs organisation, in fact they are encouraged to do so. Labs is a brilliant way of sharing experience, inviting contributions from peers and, potentially, taking an idea from experiment to core component. Many of the core components started life in samvera-labs - reaching a level of maturity and use enables code to be put forward for promotion.

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[6] http://projectblacklight.org/
[7] For further information about the merger, see https://docs.google.com/document/d/1bkc2Cik1T3KXFQdS5UrU2XE3Kywd7di2IIjyo-T_Atc/edit#heading=h.hiktkw93nhq4 and https://wiki.duraspace.org/pages/viewpage.action?pageId=87461232
[8] https://github.com/samvera-labs

Ways of doing Samvera

Samvera is a flexible choice that allows adopters to choose from a variety of options according to local needs and factors such as institutional development capacity, resourcing, and technology. Hyrax-based solution bundles—"out of the box" applications written for specific use cases that can be run with little to no customization—are available. While these can be modified in any way as needed, bespoke solutions, either based on Hyrax or on the core components themselves, are also an option. The Samvera community recognizes that most institutions have use cases that are general and those that are unique to them. For institutions who want or require assistance with customizing, implementing, and managing Samvera-based applications, service providers are available with extensive Samvera experience.

Samvera Solution Bundles

Solution bundles refers to repository applications bundled in such a way as to deliver functionality for a specific set of use cases. The Samvera community has two core solution bundles, but others will have been developed locally in institutions. The University of Michigan, as noted below, has developed a publishing application in a way that can be adopted by others.

Solution bundles that sit atop Hyrax, developed for community use, often through initial grant funding:

Avalon

- Avalon is a platform for managing and providing access to large collections of digital audio and video build on Samvera core components;
- Avalon's next release, Avalon 7, will be a fully Hyrax-based solution bundle and will provide components that bring Avalon functionality into existing Hyrax applications

Hyku

- The chief deliverable from the Hydra-in-a-Box project, Hyku is a Hyrax-based solution bundle designed to be easy to deploy and easy to support;
- Hyku offers multi-tenancy to facilitate supporting multiple repositories in one software stack;
- Hyku is optimised for deployment, with docker and AWS templates available.

There are also solutions that sit atop Hyrax and have been developed and supported by a particular institution, but very much open for adoption by the community. A good example is Fulcrum and Heliotrope:

Fulcrum and Heliotrope

- Heliotrope[9] is the codebase behind the Fulcrum publishing platform. Built and maintained by the University of Michigan Library, with grant funding from Mellon, Heliotrope is a Hyrax-based solution for a publishing platform aimed at scholarly publishing of rich multi-media research outputs.

Bespoke Solutions on Hyrax

Hyrax provides the means to build a repository, but no two repositories are exactly the same. Institutions customise to a greater or lesser degree, depending on their needs and available resources. Most of these bespoke solutions are available on GitHub, freely shared for others to see what they have done. The openness of the community means that if you need a feature, you may find that someone else has developed it and is happy to let you re-use their code. The community wiki maintains a list of *in production* and *in development* repositories[10].

Bespoke Solutions from Core Components

Not everyone's needs are met by Hyrax, and for some institutions there is too much in Hyrax that they don't need. Hyrax was designed to meet common needs - "one size fits many" - but it can never be "one size fits all".

When institutions do decide to build a bespoke solution, it's of huge value when they do that in a community-minded way. There are institutions who are active in the community yet have built, or are building, their own bespoke solutions from core components.

Valkyrie

Valkyrie is a gem for enabling multiple backends for storage of files and metadata in Samvera-based repositories. It came out of the Data Mapper Working Group[11] which ran from May - November 2017. In early March 2019 Valkyrie was promoted from samvera-labs to the Samvera GitHub organisation and work is under way to make it a key component of Hyrax. Valkyrie powers Princeton's Figgy[12] (in production) and Penn State's Cultural Heritage repository, CHO[13], (in development). Northeastern, UC Santa Barbara and UC San Diego are all committed to using Valkyrie in their Samvera solutions. As of February 2019 work is happening to use Valkyrie within Hyrax in an ongoing effort to smoothly integrate alternate back-ends as an option. Valkyrie is a success story, demonstrating how a single institution (in this case, Princeton) can start something that quickly gains traction in the community and moves towards community adoption and support.

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[9] https://github.com/mlibrary/heliotrope
[10] https://wiki.duraspace.org/display/samvera/Samvera+Implementations%3A+In-production and https://wiki.duraspace.org/display/samvera/Samvera+Implementations%3A+In-development
[11] https://wiki.duraspace.org/display/samvera/Samvera+Data+Mapper+Working+Group
[12] https://github.com/pulibrary/figgy
[13] https://github.com/psu-libraries/cho

Benefits of Samvera, or the dangers of developing alone

Adopting Samvera, or any community-source software, has inherent challenges. There is inevitably a learning curve and the complexity of understanding someone else's code. There may be features you don't need, or features you need to add. There may be resistance to adopting a particular community's way of doing things, to the programming language or framework - in our case like Ruby on Rails - or to specific components, like Fedora Commons or Solr.

But we believe there are many benefits to adopting Samvera:
- Robust and feature-rich repository solutions backed by the collective strength of the community
- A repository framework designed for flexibility - configurable work types, metadata, workflows and more
- A modular approach that allows a custom-build repository to utilise the same set of components as an off-the-shelf Hyku
- Training and mentoring for staff, guidance in setting up a repository service and a growing suite of documentation
- Use cases and experience from other partners and adopters (and a willingness to share)
- Community of experience over 10 years from different domains: developers, librarians, repository managers, and more …
- Resiliency over time - Samvera keeps on going globally even if local resources aren't available
- Continuous improvement - the codebase is continually evolving, from developers keeping up to date with security patches, to the Hyrax roadmap[14] offering major feature development
- Local institutional development efforts are often shared back, providing new features to the the of the community for free
- Be part of the solution - Samvera is a welcoming and supportive community with a range of ways to get involved
- Peer review - Samvera has an established development methodology and new developers are encouraged to contribute and receive feedback from their peers

Architecture

A 'Samvera' repository is not built on Samvera alone - there are a number of components in the architecture of a Samvera repository. Typically a Samvera repository is backed by a metadata and file store (traditionally Fedora, though Postgresql and other stores are becoming more popular), a search engine (such as Solr or Elasticsearch[15]) and an relational database (Rails supports many out

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[14] https://wiki.duraspace.org/display/samvera/Hyrax+Roadmap

[15] Typically Samvera repositories use Solr and are tightly coupled to Solr. Adopting Elasticsearch is, however, possible and has been achieved by Northwestern University.

of the box, with MySQL and PostgreSQL being the most popular for production). Alongside these, many Samvera repositories use a message broker (such as Redis) and a background job processing application (Sidekiq, Resque etc.), along with a plethora of other open source components.

Fedora Commons (FCREPO)

Fedora is a repository platform for persisting and managing digital objects, and is one of the main components of the Samvera software framework. Based on the data in the [DuraSpace Registry](https://duraspace.org/registry/)[16] and after combining and de-duplicating information on the Islandora and Samvera websites, today it is assumed there are over 450 sites of Fedora distributed in 46 different countries. This data offers a fairly accurate picture of the global distribution of Fedora.

The vast majority of the 450 worldwide installations use Fedora either out of the box or with a custom developed front-end. There are two open-source communities, Islandora and Samvera, that utilize Fedora as part of their application solution bundles. Currently, Islandora has a larger community base and more installations than Samvera.

The global reach of the Fedora and the longevity of the Fedora project has developed a unique situation few library open source communities face. The needs of the Fedora community are varied and the use cases are plentiful. Therefore, the Fedora community has come to realize a one size fits all approach is lacking. To provide options for implementers and maintain the health of the project, work has been done to develop Fedora as an API specification as well as an application. Fedora's recent 5.0 release solidifies the Fedora repository software as a reference implementation of the Fedora API.

As a community-supported project, Fedora is made possible through the combined efforts of a distributed technical team and an active governance group made up of representatives from stakeholder institutions. Over the past year, these groups have developed a structure and process for working together to define and execute a newly developed strategic plan for Fedora. Most recently, this collaboration resulted in the release of Fedora 5.0 and the publication of a formal API specification. These groups are now turning their attention to designing and developing Fedora 6.0, which will feature better performance and scale along with a greater focus on digital preservation via the adoption of the Oxford Common File Layout[17].

PostgreSQL

There are a few adapters for using PostgreSQL as a metadata store in the community. The most popular of these is the Valkyrie project mentioned above. Though there are fewer features when going directly with a relational database for digital asset management, there are clear advantages in

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[16] https://duraspace.org/registry/
[17] https://wiki.duraspace.org/display/FF/2019-02+Fedora+Design+Summary

known scaling performance and a broader more common set of tools and techniques for optimizing large data collections. Hyrax is currently working towards using Valkyrie to allow deposited content to be stored in multiple data storage solutions; this work will ensure Hyrax adopters have flexibility with regard to back-end storage, without sacrificing the ability to collaborate on front-end features.

Apache Solr

Solr is a popular[18], fast, open source enterprise search platform built on Apache Lucene™. Samvera solutions index their metadata into Solr and use Solr to power the search. One of the main advantages to Solr over similar tools like Elasticsearch is the ability to use Blacklight.

Blacklight

Described as 'A multi-institutional open-source collaboration building a better discovery platform framework', Blacklight is an open source discovery platform which can be tailored to provide faceted searching across any type of collection. It is a core component of Hyrax, powering the search interface. The Blacklight and Samvera communities overlap, with many adopters across both, and developers who contribute to both codebases.

Beyond the Core Architecture

The flexibility of the Samvera stack allows for integration with a myriad of other tools and services. For example, there are examples of Samvera repositories minting DOIs with DataCite, utilising ResourceSync (built into Hyrax already), OAI-PMH and SWORD endpoints, and integrating with various authorization frameworks.

To meet preservation needs, Samvera community members have a diverse set of solutions in place. For some, the preservation-related capabilities provided by Fedora Commons are sufficient for the task, including fixity generation and checking, and file versioning. Moving forward, supporting different Valkyrie-conformant metadata and file adapters will likely become the common pattern, as noted above.

For others, integrating a repository solution with external digital preservation services, such as Archivematica, APTrust, or Chronopolis, offers a way of separating management and preservation functions, allowing Samvera to sit within a larger ecosystem of digital object management and preservation. UC San Diego are recent recipients of a Mellon grant to develop tools to enable digital repository platforms to deposit into distributed digital preservation systems[19].

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[18] https://wiki.apache.org/solr/PublicServers

[19] https://ucsdnews.ucsd.edu/pressrelease/uc_san_diego_library_receives_mellon_grant_to_develop_approaches_to_preserving_digital_repositories

Community

This White Paper is principally focussed on the Samvera technology. The technology, however, exists in a symbiotic relationship with the Samvera community and thus, this section lays out the community context[20].

From its inception in 2008, Samvera has been designed to provide a generalizable, portable framework that would meet the digital library needs of cultural heritage and knowledge organizations. Originating as a multi-institutional project spanning three universities (Hull, Stanford and Virginia), and with support from Fedora Commons (now DuraSpace), Samvera has since expanded to include like-minded institutions with similar needs, technical infrastructures and complementary systems. The open and fluid nature of the community means we don't have an exact number for community members, but we know, as of 26th February 2019, there are 205 public github repositories using hyrax, and 825 samvera community slack[21] users (circa 220 active users in the last 30 days posting around 1600 messages a week).
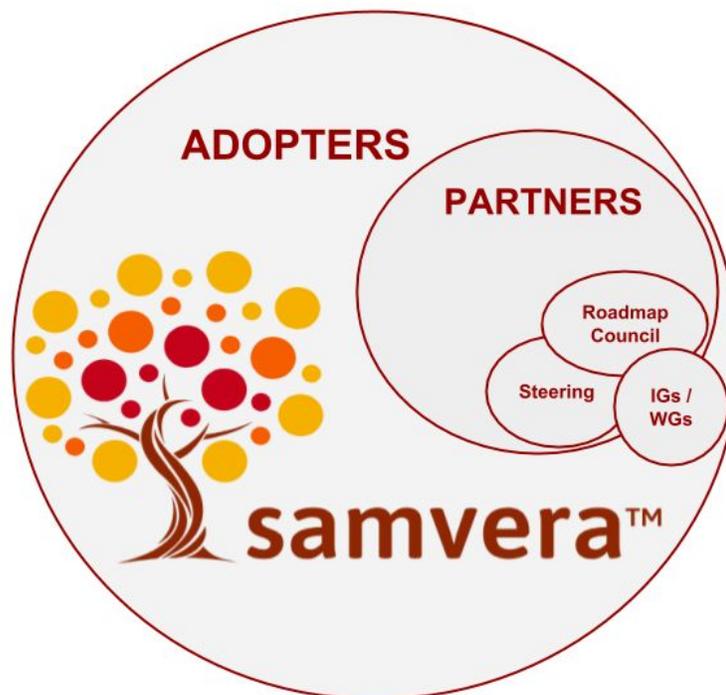
Adopters

Samvera is free and open source software. Anyone can adopt Samvera and those who use Samvera software are considered community members. Members can participate in the community as much or a

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[20] https://wiki.duraspace.org/display/samvera/Samvera+Community+Framework
[21] http://slack.samvera.org/

little as they are able. Adoption, and all kinds of contributions big and small, can build toward Partnership. Adopters can contribute code, documentation, join working and interest groups and can attend Samvera Connect and Virtual Connect.

Partners

Samvera Partners[22] are individuals, institutions, corporations or other groups that have formally committed to contributing to the Samvera community; they not only use the Samvera technical framework, but also add to it in at least one of many ways: code, analysis, design, support, funding, or providing other resources. Samvera Partners collectively advance the project and the community for the benefit of all participants.

Partnership is gained by actively contributing to the community and comes with responsibility and benefits. Partners attend Samvera Partner meetings, and vote in elections and on other matters of importance. Partners are eligible to participate in the governance of Samvera. Partners may provide input on the community and technical direction, and represent Samvera to the broader community. In addition, Samvera Partners are the first to be notified of any known security issues and fixes, shortly ahead of the information being made public.

Steering Group

The Samvera Steering Group[23] is drawn from the Samvera Community. It consists of nine members elected from the Partner institutions. Each year, three members step down in rotation and elections are held to fill the three seats. Steering Group members are elected for three years and may serve no more than two contiguous terms. Steering exists to support the management of the community, and reports to Partners.

Roadmap Council

Key among the governance changes proposed to the community in 2018 was the adoption of a Roadmap Council to help facilitate coordination across major solution bundles, working and interest groups, and core components of the Samvera landscape. While the Roadmap Council[24] is not a governing body, its role is to allow for major sectors of the Samvera community to coordinate development efforts, conversations, and maintenance across all of the variety of participants (individual and institutional) represented in the community. As we move into 2019, the Roadmap Council will help drive conversations about coordination of resources, feed feature requests from across the community into roadmap planning for Samvera components and solutions, and identify community pain points that require community action.

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[22] https://samvera.org/samvera-partners/
[23] https://wiki.duraspace.org/display/samvera/Samvera+Community+Framework#SamveraCommunityFramework-SamveraSteeringGroup
[24] https://wiki.duraspace.org/display/samvera/Samvera+Roadmap+Council

Interest Groups and Working Groups

The Samvera Community is home to a number of active Interest Groups and Working Groups (IG/WGs), focused across the spectrum of community needs and interest. These IG/WGs support both robust discussion and planning as well as taking action on needs highlighted by community discussion (often in Interest Groups) or by shared needs for features, maintenance, and general community organization. To this end, IG/WGs are often represented, explicitly and implicitly, in governance and planning discussions. Examples of this participation include representation of IG/WGs on the Samvera Roadmap Council, active engagement of IG/WG communities on github issue and pull request reviews, and a general increase in integration of IG/WG representatives in development efforts and planning discussions.

Current challenges

Samvera has encountered many of the issues faced by similar open source initiatives including: technology stability, investment trade-offs between new features and maintenance work, maintaining velocity with an ad-hoc all-volunteer developer pool, producing effective documentation with limited resources, providing effective release management and testing, along with many other challenges. As the community has grown, we have developed strategies to deal with a number of these issues and continue to evolve our approaches.

Resourcing

The most difficult aspect for an open-source community relying on volunteer effort is resourcing. Institutional contribution is tied to local capacity and rhythm, and that may not match the aspirations of the community development roadmap. Having said that, the Samvera community works hard to solicit contributions and the software that exists today is completely the result of institutions and individuals giving their time. Grant funding has contributed to the software in significant ways, but the community has never depended on it. Having community roadmaps help organise the 'ask' around community contribution, allowing us to clearly articulate the resourcing needs. The Roadmap Council hope to help in this area, by coordinating the resourcing asks, highlighting any potential for joining up on feature development across roadmaps, and soliciting pain points and requirements from the wider community (from users, repository managers, metadata specialists, etc.) to input into future plans.

Technology Stability

Rather than building every capability from scratch, Samvera integrates a large number of other open source tools and projects so that the community can focus its energy and resources on those problems unique to the cultural heritage digital repository domain. Most notably, we have major dependencies on Ruby, Rails, Blacklight, Fedora, and Solr. Each of these components have undergone major, breaking upgrades during the lifetime of the project. In each case, the community has been able to leverage its learnings (from e.g. Ruby 1.x → 2.x, Rails 3.x → 5.x, Solr 3.x → 7.x, and

Fedora 3.x → 4.x) to make the framework more resilient to low-level API changes by developing better-defined interfaces between components in the stack and enhancing our automated testing practices.

New Features vs. Maintenance

During its early years, the community was heavily focused on new feature development which would extend the capabilities of the framework. At times, this came at the expense of maintenance and/or upgrade paths for existing adopters. As the community has grown, this imbalance is clearly unsustainable and we have adopted a number of strategies to balance efforts with a focus on long term sustainability. At the Partner meeting in Fall 2017, the community chartered the Component Maintenance Working Group. This group works to identify maintenance and other issues needing development attention within the many low-level code libraries that support the higher-level application stack. The group is rechartered every 6 months with working group members identifying the highest priority issues to be addressed over the current iteration of the group. The group has effectively overseen the deprecation of a number of older technology components and facilitated low-level work which has enabled accelerated release of application bundles like Hyrax.

Data migrations are a particular pain point, the move from Fedora 3 to 4 particularly causing some adopters to drop behind. But in the near future, Hyrax's move to using Valkyrie will allow data migrations and code migrations to be decoupled, with either no migration or a straightforward mechanism for migrating data.

Maintaining predictable release velocity

Release velocity falls into two camps: release little and often, or have infrequent major releases. Some adopters prefer the former, some the latter, so making everyone happy is impossible. But significant progress has been made over the last two years in adopting Semantic Versioning (SemVer)[25]. In the past, numbered releases became codenames for new features - for a time Hyrax 3.0 became synonymous with Hyrax on Valkyrie. SemVer challenges us to step away from this kind of shorthand and use versions as a way that allows adopters to choose when to upgrade, and know the likelihood of an upgrade breaking their local customisations. With SemVer, version 3.0.0 would be a major release requiring significant testing and possibly a significant upgrade process; 3.1.0 would be a minor, backwards-compatible release (such as for adding a new feature); whilst 3.0.1 would be a backwards-compatible bug fix or security patch. With SemVer, and a commitment to good release notes, release velocity becomes less problematic as institutions can assess the likely work required for an upgrade against importance of the features in the release.

Release management and testing

A community can often rally more testing resources (with more perspective) than an individual institution can allocate. Samvera already has a robust development and testing process. Code is

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[25] https://semver.org/

always submitted via a pull request and is always peer reviewed before acceptance. Continuous integration tests must be in place, with a high level of test coverage. With ongoing testing processes in place, release testing can focus more on human QA (quality assurance). A group of QA testers has been successfully used to test a particularly complex release of Hyrax, identifying a handful of release-blocking bugs that were quickly fixed.

Documentation

Lack of documentation is a regular criticism of much software, not limited to open source. Writing documentation in the first place, and ensuring it stays up to date is an endless challenge requiring significant resources. Where documentation is concerned, having input from across the community helps make documentation better. The Samvera Community have established a documentation working group, and there is a growing set of documentation on samvera.github.io.

Adopting Samvera

Resourcing

We are often asked about local resourcing needs for running a Samvera-based repository. It's a difficult question with no single answer. In terms of development and operational support:

- If you're a large institution with multiple repository use cases and requirements, and terabytes of data, you'll likely need a multi-person team.
- If you are a small institution or have a contained use case with a relative small set of requirements met largely by current Hyrax functionality, you may need only a half- or a full-time person.
- And if you really have no staff resource available, there are still ways to get involved with a number of service providers offering development and hosting support[26]

Find out More

Samvera offers a lot of resources to get adopters started. There is a growing set of documentation on samvera.github.io[27] and many of the individual gems and solutions have accompanying documentation. [The Samvera wiki](https://wiki.duraspace.org/display/samvera)[28] is rich in information, plus outputs from the many working groups.

There are also virtually turnkey applications for to try out the software. Hyku, as mentioned above, is a fully-featured Hyrax application, with scripts for deployment in AWS and Docker. Nurax, is a

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[26] https://samvera.org/communication/service-providers/
[27] http://samvera.github.io/
[28] https://wiki.duraspace.org/display/samvera

"vanilla-plus Hyrax app for testing and tire-kicking" maintained by Data Curation Experts and offers a Docker script for easy deployment and testing[29].

Finally, get in touch. Join our Samvera Slack[30], attend a virtual tech call[31], subscribe to our email lists [32], join an interest/working group[33] or join us at an event[34].

Samvera 2019 and Beyond

At Samvera Connect 2018, the Samvera Community discussed, at length, plans for upcoming development of core components and major solution bundles. These conversations stemmed from a long-standing understanding that the community needs planning and organization at a level of detail that allows participating institutions to allocate sufficient resources to ensure community stability and progress. This planning is spread across all levels of the community and includes participation from software developers, metadata specialists, repository managers, and administrators.

The Samvera Community's recent and ongoing efforts to coordinate work across the community, along with the community's responses to needs for governance changes, calls for resourcing, and increased participation tell us that the community is strong. We look forward to continuing to grow, innovate, and share our successes in order to propel the Samvera community forward.

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[29] https://github.com/curationexperts/nurax and https://github.com/samvera/hyku
[30] http://slack.samvera.org/
[31] https://wiki.duraspace.org/display/samvera/Notes+from+Meetings+and+Calls
[32] https://groups.google.com/forum/#!forum/samvera-community/join and
https://groups.google.com/forum/#!forum/samvera-tech/join
[33]
https://wiki.duraspace.org/display/samvera/Interest+Group+%28IG%29+and+Working+Group+%28WG%29+Hub
[34] https://wiki.duraspace.org/display/samvera/Events%252C+presentations+and+articles