

Exclusive SPN Hosted Emulation Services Pilot Summary

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Overview

SPN has an opportunity to partner with [the Emulation as a Service Infrastructure \(EaaSI\) Program of Work](#) to explore the feasibility of offering scaled, high-quality emulation services to members at a consortial rate. Based on needs the community has expressed during the two-year seed-funded period (2019 - 2020), we are proposing a pilot project to investigate interest in and possible structures for a potential service. Our initial assumption about the structure of this pilot is that SPN would standardize emulation services by acting as a single “customer” and thereby streamlining invoicing, evaluation, onboarding, and documentation activities for SPN members.

This pilot proposal outlines the goals and structure for an exclusive, one year testing pilot of the EaaSI beta hosted service for participants in SPN member organizations. If such an arrangement would be attractive to both SPN member organizations *and* to the EaaSI

program of work, the pilot program would begin in January 2021 and run until December 2021.

During this pilot, SPN would act as the first point of contact for EaaS Hosted Emulation Services for its members, standardizing and overseeing EaaS onboarding, and synthesizing feedback/data from members in order to inform the EaaS development roadmap and service design.

Goals of the SPN Exclusive Hosted Services Pilot:

- Determine ways of standardizing and scaling software and environment configuration workflows across participating SPN member organizations.
- Determine the level of SPN staff support and associated costs that would be required to make an ongoing partnership with EaaS feasible.
- Determine whether a partnership between the EaaS Hosted Emulation Service and SPN helps to reduce time, expense, and complexity of managing software preservation and emulation vendor services for SPN members, while ensuring that member organizations are actively shaping the landscape of available services.
 - This exclusive SPN pilot also addresses EaaS Phase II program goals to concentrate available staff time on developing a stable service rather than stretching available staff time across varied streams of prototyping work and user management. Specifically, this pilot allows EaaS network management and market cultivation staff (Meyerson, Skinner, Anderson, and Gates) to leverage the existing community of organizations invested in software preservation and emulation to better understand both institutional and end user needs, and to apply that understanding to building a more useful suite of emulation services.
- Determine whether an ongoing partnership between SPN and EaaS is desirable, and if so, develop a more robust, data-driven fee structure that will directly inform the membership fee structure for SPN moving forward.

About EaaS

Defining EaaS

EaaS is made up of a number of components that the EaaS team is managing, supporting, and funding in different ways:

1. **The core EaaS software** provides an improved user interface for the EaaS system with support for extensive metadata capture, search, and browse of emulation

resources, user and content access management and the Universal Virtual Interactor (UVI) algorithms and automation features. You can read about the features of EaaSI core below in the [EaaSI Features](#) section. This software is open source and we have released a dockerized version that can be installed locally if you have the capacity and support.

2. **The EaaSI Network** -- The EaaSI software includes the ability to configure a network of EaaSI installations that can share installation media and pre-configured emulated computers with related documentation. The EaaSI team at Yale is seeding the network with a large number of software titles pre-configured in working emulated computers. Accessing an EaaSI network greatly simplifies engagement with emulation as it avoids each organization having to acquire, install, configure and document legacy software and instead gives them access to working versions via a simple replication process. EaaSI network access is currently limited to non-profit cultural heritage organizations in the United States that provide public access to collection materials due to copyright restrictions. However SPN is actively pursuing partnerships and funding that will expand participation to other legal jurisdictions.

EaaSI Features

Manage

- User Management and Authentication
 - Manage users and permissions with pre-configured roles
 - Authenticate users with standard protocols (OAuth2 / OpenID Connect)
- Import Software
 - Acquired installation media from your collections
 - Supported media types: ISO, Floppy, Files (arbitrary file sets)
- Import Content
 - Software-dependent, born-digital materials
 - Supported media types: ISO, Floppy, Files (arbitrary file sets)
- Import Environments
 - Import existing virtual machines from other emulation/virtualization platforms (VirtualBox, VMWare, etc) or disk images of system drives

Search and Discover

- Keyword search node and network resources
- Facet results based on common/useful metadata properties
- Bookmark frequently used resources
- Resource card browsing
 - Sort through and select available resources based on relevant metadata
- Quick Action menu to perform common tasks while browsing resources

Interact

- Run emulation Environments
- Mount Software and Content resources in emulation
- Take screenshots of emulation Environments and download to your computer
- Download documents from inside Environments as PDF
 - **Environment OS must support PostScript printing
- Securely connect to the live internet from emulated Environments
 - Access open source code repositories
 - **Environment OS must support TCP/IP networking

Create

- Save changes you make to existing environments while maintaining access to all previous versions of that environment
 - Snapshot-based storage lowers total data costs
- Create brand new environments from OS installation media
- Automatic version control of environments to allow for viewing revision history and reverting to previous states

Network

- Publish Environments and Software
 - Expand a growing network of cultural heritage and research data orgs building off of each other's work and cutting redundancy
- Save Environments from other nodes to access your content and fulfill your use cases
- View and use a collective pool of software installation media

Pilot Details

EaaSI Hosted Pilot Roles

Nodes

Nodes are institutions that maintain their own collections of environments, software, and content and use EaaSI to connect to a network that includes access to software and emulated software environments shared by other member institutions, including Yale University Library's seed collection.

Together, EaaS nodes comprise a cohort, or an intentional learning community. The EaaS node cohort represents several distinct organizational types, collecting concentrations and designated user communities. Working with these various organizations, the EaaS project staff will identify common pain points, gaps and potential areas of improvement that will shape the design of the EaaS network and infrastructure.

Staff

Pilot Leads

Ethan Gates - EaaS User Support

Jessica Meyerson - EaaS Community Training and Evaluation

Benefits of SPN Hosted Emulation Services Pilot Participation

- Access to the software existing in other institutional collections
- Ability to download, modify, share, and customize environments in the network
- Training on Emulation-as-a-Service Infrastructure platform
- Learning from and contributing to a growing community of practice for emulation and software preservation
- Shared knowledge base for emulation including node-only forum, templates, and guides
- Shaping the design and direction of emulation services

Pilot Services Summary

User Support

EaaS provides support services to train and empower users to configure emulation environments, install software, and provide access to their digital materials. If you need help navigating EaaS workflows or figuring out how to use an old system or application, our team and comprehensive documentation are here to help.

Technical Support

As a hosted service provider, the EaaS program is committed to providing a consistent and reliable service. Our team conducts routine maintenance to ensure availability of the service and provides expert support for any technical issue that impacts your use of EaaS.

Research & Development

The EaaS system is consistently evolving to add new features and adapt existing ones according to the needs of our users. We strive to build a quality product and user

experience that is responsive to emerging requirements and use cases. In this capacity, the EaaS team works with our users to identify and verify new features through communication, research, and user testing.

Software Configuration

As part of its commitment to the EaaS network, the Yale University Library node has configured and contributed numerous pre-configured emulation environments. We hope that this growing collection of environments, as well as contributions from other nodes, featuring popular operating systems and applications will meet the needs of most users. Yet, we know there will be content objects that require environments and software not yet in the system and that not all users will have the time or experience to configure a corresponding environment. The EaaS team offers our expertise in legacy software and computing environment configuration in response to requests for resources not in the environment. Should YUL or another node not have a copy of the requested software, the EaaS team will make an effort to locate and purchase the title for inclusion in the network.

Expectations for Pilot Participants

Activities

- Participation in a monthly call with all pilot participants
- Use of EaaS ticketing system and forum infrastructure for questions and issues
- Participation at each stage of the pilot
- Tracking use and internal capacity over the duration of the pilot

Time Commitment

- Staffing (avg. 2-4 hrs per week for the duration of the pilot)
 - Project Lead (Primary Contact/Product Owner)
 - Other roles or functions that we recommend as a local advisory group:
 - Digital Preservation Librarian, Archivist, etc
 - Metadata Coordinator
 - Sys Admin/IT

Timeline

NOTE: While the SPN Exclusive Hosted Emulation Services Pilot is scheduled to run for the duration of 2021, we are sensitive to unforeseen circumstances out of our control.

Therefore, the last two months of 2021 are reserved as flex time, should we need it.

- **Phase 1: Identifying SPN pilot nodes** (August 1 to November 1)

- EaaS/SPN Team
 - Confirm pilot nodes
 - Review materials that will be used for pilot onboarding
 - Create the new onboarding material
- **Phase 2: Pilot prep** (October 5 to November 11)
 - EaaS/SPN team
 - Confirming all interested organizations and identifying individual testers from each organization
 - Creating accounts for all pilot testers
 - Polling and scheduling for recurring meetings and events
 - Begin drafting formal testing protocol
 - Pilot node staff
 - Complete pre-pilot survey (November 2 - 11)
- **Phase 3: Onboarding SPN pilot nodes** (January 18 - March 19)
 - EaaS/SPN team
 - Send out onboarding activities
 - Synthesize data
 - Finish drafting the formal testing protocol
 - Pilot node staff
 - Complete onboarding activities, potentially including:
 - The “why’s” of software preservation and emulation for your organization
 - Spot-check software inventory
 - Scenarios for use and access
- **Phase 4: EaaS Hosted Service Formal Testing** (April 5 - May 10)
 - EaaS/SPN team
 - Send out testing protocols
 - Provide ongoing user support
 - Pilot node staff
 - Complete testing protocols, potentially including:
 - Documentation feedback
 - Feature testing/bug reporting
 - UX/UI feedback
 - Data gathering
 - End user/patron testing
- **Phase 5: Open Sandbox Period + Pilot Roundtables** (June 1 - August 31)
 - EaaS/SPN team
 - Synthesize data
 - Provide ongoing user support
 - Organize and host roundtables
 - Pilot node staff

- Unstructured testing and feedback
 - Participate in roundtables
- **Phase 6: Wrap-Up and Report-Outs** (September 1 - October 31)
 - EaaS/SPN team
 - Write up findings, recommendations, and next steps
 - Pilot node staff:
 - Review and comment on findings, recommendations, and next steps

Pilot Measures, Data and Documentation

One benefit of a structured EaaS Hosted Emulation services pilot, is that we can decide up front what to measure based on our stated goals for the pilot. In the two tables below, you can find more detailed information about what we plan to measure, how data from that measure will advance the pilot goals, and how we plan to collect data on these measures.

Pilot nodes will contribute to data collection efforts through a combination of onboarding exercises, formal testing, and user activities that are documented by system logs within the EaaS platform itself or within the commercial cloud provider that EaaS is using to host the platform. All pilot data will be retained for the duration of 2021, after which time, qualitative data from onboarding and testing will be retained by SPN, and all system and server log data documenting user activity in the platform will be deleted.

The EaaS team is actively working on automated procedures for export of individual node metadata and objects from the platform. However, for the 2021 pilot, there is no automated mechanism for export. Should a pilot node choose to discontinue their participation in the EaaS network after the pilot, the EaaS team will generate a copy of the associated data and metadata related to their collection. Any software shared to the network during the pilot will remain in the network. If a node decides to leave the network and does not need a copy of the metadata and data, the EaaS team will provide confirmation of the deletion of metadata and data from the node's hosted storage.

SPN:

Thing to measure	How to measure
Impact on SPN staff	• Additional time needed to take over the onboarding function • Tracking EaaS requests that come into SPN staff over the course of the pilot

Impact on participating organizations and community reactions; recommendations regarding the relationship to EaaSI beyond the pilot period, as well as a more general model for pilot testing software curation tools.	• Brief surveys at the beginning and end of the pilot • Data synthesis from onboarding activities and testing • Translating responses from pilot roundtables
Wear and tear/usage of the website and other community infrastructure	• New accounts created • New material uploaded and published on the site • Additional time coordinating the subset of community members that are participating in the pilot.
Who is using the pilot - and how do they engage with EaaSI > what can the pilot tell us about "emulation and software curation readiness"? Are participants interested for collection development purposes, or are they actively ready to reuse software, or????	• Designated participants from each member organization and their roles • Number of accounts created • Types of accounts and roles assigned - ◦ you would get a sense of much access they are providing based on the number of access v. admin users ◦ Is it three admins or is there a group of configuration users that they bring in ◦ What is the arrangement of use and users within that institution • Activities or events within individual user accounts ◦ Uploads/imported items ◦ Events like "starting an emulation project"

EaaSII:

Thing to measure	How to measure
Cloud infrastructure usage and costs per organization	User sessions • Minutes/hours of usage • Concurrent users • Server logs from the cloud service provider • Downloaded monthly on a per org basis ◦ Storage ◦ CPU use
User engagement with the EaaSI platform	• Number of accounts created • Types of accounts and roles assigned - ◦ you would get a sense of much access they are providing based on the number of access v. admin users ◦ Is it three admins or is there a group of configuration users that they bring in ◦ What is the arrangement of use and users within that institution ◦ Uploads/imported items ◦ Events like "starting an emulation project" • As a less robust option - Google Analytics • Sessions started
Additions to the network	• How much are people using already published environments and how much are they creating their own thing? • When they use and create derivatives of what's already there ◦ Are they adding new things to the derivative ◦ Are they adding new metadata • Is the derivative model working in getting people to the thing they need • How useful is the network in terms of meeting content needs (based on what is already in the system) - do we need to target and configure titles we don't already have • Editing within the system triggers technical things
Impact on EaaSI staff	• Support time ◦ Logging hours? ◦ Logging tickets? • Troubleshooting

	○ Logging hours? ○ Logging tickets? ● Onboarding ○ Deployment time ○ Initial training ○ Data gathering and collation
Qualitative/periodic evaluations about perceptions of cost, value, what's working and what's not working with network management (these will likely form of participant surveys or focus groups)	● Technical and governance challenges as system and user base scale up ○ How does it scale? ● Cost modeling ○ How much do orgs value it in principle? ○ How much do orgs value it in dollars? ● Documentation & Training ○ What is working with user documentation and training and what is not? ○ How do we improve our patterns for training and education on the EaaS platform and emulation concepts once it's clear how much that will be addressed by the UI updates v. user documentation and supplemental training? ● User experiences ○ Where are our assumptions wrong about how people intend to use the system? ○ Use cases that orgs are actually using the service for? ● Troubleshooting ○ What questions can be handled by a user manual or support ticket, and what questions should be more broadly considered core knowledge for digital and software preservation practitioners? ○ Expectations and FAQs of typical users ● What is in-scope for EaaS hosted emulation services and what is not?
Web management	Webmaster-type tasks like domain management and certificate renewal

How to Participate in the Pilot

For more information about joining SPN in order to participate in the Hosted Emulation Services Pilot, please complete and submit your [SPN membership agreement](#) to jess[dot]farrell[at]educopia[dot]org by *October 30, 2020*.

For more information about the Hosted Emulation Services Pilot, and any information provided in this summary document, please contact jessica[at]educopia[dot]org