Participants:
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1. What is the value proposition or business case that you have presented to decision makers and/or funders about the value of your digital stewardship program?

Are community-governed libraries important in a democratic society? If yes, then libraries need tools and programs to build and preserve web based collections locally. As more of our intellectual heritage moves to the web it becomes critical to protect this material for current and future readers. Libraries are using LOCKSS to do just this. With publisher permissions, libraries are building and preserving local web based collections. The LOCKSS Program, working with over 100 publishers, is preserving all formats and all genres of materials (ejournals, books, web site, manuscripts, images, sounds, movies, etc.). LOCKSS works both by providing digital preservation infrastructure and by building communities who are working together to preserve their heritage.

LOCKSS enables publishers and librarians to continue to play the critical roles they have played in society for hundreds of years. Publishers permit their content to be preserved by libraries that select this content as valuable for their community. Both parties welcome LOCKSS as an affordable, decentralized, distributed system that ensures important materials are safeguarded from the wide variety of threats that endanger digital content (environmental, technical, human, economic).

LOCKSS has three unique values that set it apart from other digital preservation approaches:

- The key threat to digital preservation is lack of funding. When tough times come, if the digital preservation system cannot be maintained, all content is lost. LOCKSS was carefully engineered to rigorously squeeze out costs while simultaneously meeting strict performance requirements. This increases the odds that materials will be preserved over long periods of time; it keeps available maximum dollars for publishers to produce and libraries to acquire new intellectual property.
- The LOCKSS team assumes that libraries and publishers play key roles in a democracy. LOCKSS balances libraries and publishers needs and requirements and does not compete with either of them. LOCKSS enables libraries to have custody of the collections while ensuring that publishers can see all uses of their content as long as they are online. This means that LOCKSS does not replace library collections by centralizing content storage, and LOCKSS delivers the original version (the intellectual content and the historical context) of the publisher intellectual property to readers.
- LOCKSS scientists have influenced digital preservation discussion and conversations; our community led in no small part by the Library of Congress is considering more sophisticated issues surrounding threats to all parts of the system. This is required if we wish to ensure monies are prudently spent to build digital preservation systems.

2. What would be the consequences if LOCKSS did not exist?

Currently, the LOCKSS Program is the only instantiation of a distributed preservation system. Content held under centralized systems is prone to deliberate and accidental tampering. In a centralized system, the content can be altered without anyone being alerted. This is extremely unlikely in a decentralized system and is one of the vital societal benefits of traditional community-based libraries. LOCKSS is the only deployed tamper-evident digital preservation system. LOCKSS technology distributes the information to a number of repositories and most importantly, each repository is: under separate administrative control and, loosely coupled to all the other repositories. Changes in one repository do not impact the other repositories. The LOCKSS system notices and flags all changes to the content whether those changes are deliberate or accidental.

Society is vulnerable to malicious destruction of content. Government documents provide a stark example of potentially at risk content; see George Orwell novel, 1984, in which history is erased and rewritten by an anti-democratic regime. The dangers are just as real for other content such as materials with political or religious views (gay rights) or scientific/medical value (drug patents).

One instance of LOCKSS saving web-published content from catastrophic loss occurred recently. *World Haiku Review* is a freely available journal that offers a vivid story of accidental content damage and loss. Several years ago, *World Haiku Review* was selected for LOCKSS preservation by Harvard University. Last semester, a Stanford University student approached the Stanford Library reference desk. *World Haiku Review* was offline. She needed access to the content. Just by coincidence, the Stanford reference librarian knew that *World Haiku Review* was preserved in the LOCKSS system, although public access had not yet been configured. The student got her poetry. More importantly, because LOCKSS preserves the authentic version of titles (the intellectual content and the historical context) LOCKSS worked with this publisher to bring *World Haiku Review* back online.

3. How would you describe your business model, i.e. operational strategy?

The LOCKSS technology is being used in two major programs each with different business models: the LOCKSS Alliance and the CLOCKSS initiative. CLOCKSS is an implementation of the technology known as a Private LOCKSS Network. This is defined as a small number of libraries implementing the LOCKSS technology to preserve materials that have some set of restrictions (access rights, copyright, local interest). The CLOCKSS program is sustainable because, as mentioned above, the LOCKSS technology is very cost effective, and one way to achieve sustainability is to keep costs low.

LOCKSS alliance library membership fees support the LOCKSS Program, an entrepreneurial unit of the Stanford University libraries. The LOCKSS Program has received support from the National Science Foundation, the Mellon Foundation, Sun Microsystems, Hewlett Packard Labs, Intel Labs, and Harvard Computer Science Department. The member publishers and libraries support the CLOCKSS Initiative; this group aims to raise a capital fund to offset long-term support. The Library of Congress NDIIPP program is funding Stanford University to work with their national network and build the nation distributed digital preservation infrastructure.

The primary beneficiaries of our work are people who will want to read about today, tomorrow.

Institutions who are making payments and supplying content to the LOCKSS Program are supporting continued development and maintenance of the LOCKSS software, systems and collections. Libraries are building and preserving local collections on site. They are not paying for access to collections; LOCKSS is not a subscription service. LOCKSS is digital preservation infrastructure that all libraries big and small are able to implement and leverage. Publishers are participating to ensure that the content that readers read now (intellectual content and historical context) will be the content readers will read in the future.

LOCKSS is open source software; this is a key survival tactic. We are guarding against a pitfall that is well known in the software industry – technology produced by a central team of experts is likely to suffer from ossification, irrelevance, and increasing costs over time.

The LOCKSS Program facilitates direct relationships between libraries and publishers. We do not come between these players; LOCKSS is not a third party service. The publishers have a direct relationship with libraries running LOCKSS boxes. CLOCKSS, as a Private LOCKSS Network, has a different structure. All CLOCKSS members have signed one agreement; CLOCKSS is not a series of bilateral agreements.

A society under pressure will have higher priorities (food, housing, medicine) than digital preservation. Digital preservation must be very inexpensive; it must not be a budget line item. Any other approach risks losing materials e.g. when budget pressures arise; digital preservation may cease to be funded.

A potential measure of the maturity of a business model is to determine what the ratio is between what the program costs to run and how much money is being brought in outside of soft money (which cannot be depended upon). By that calculation, LOCKSS is pretty mature. The less expensive the digital preservation system, the easier it is to sustain over time.

4. What are the costs associated with your program?

Most of the costs associated with running the LOCKSS Program are support for the Stanford University based staff. This group develops and maintains the software and the network. The staff also provides a wide range of services for LOCKSS, CLOCKSS, and private LOCKSS networks and facilitates relationships with publishers, both extremely large and extremely small.

LOCKSS has not categorized digital preservation costs in terms of lifecycle or workflow, and we are unlikely to do so in the near future so for a couple of reasons:

- It is currently impossible to make informed predictions about the future costs of digital preservation, as processes are continually being improved and re-engineered, hence expenses associated with these processes are in flux. LOCKSS preserves web-based materials that are in transition between the established paper-based model of publication and innovative web publishing of the future. The structure of genres such as e-journals is in transition as publishers move through their horseless carriage phase and into fully exploiting web capabilities.
- The LOCKSS program enables libraries to build collections in support of their role as memory organizations. These preserved materials are housed in libraries that each have very different processes, procedures and associated costs.

LOCKSS therefore will not be pursuing the LIFE model of calculating lifecycle costs for digital stewardship. Our understanding of the field leads us to believe that:

- Currently too many digital preservation processes are informed by their relationship with print; these processes will either need to be wholly overhauled or they will fail over time
- Estimates of future costs are typically based on predicted events whose likelihood we believe is exaggerated. For example, predictions are made about future obsolescence of *on-line published* digital *formats* based largely on the obsolescence history of *off-line* digital *media*, and of *non-publishing* formats. This history is not applicable to the web formats the LOCKSS system preserves. These formats will become obsolete very slowly, if at all. Good, open source tools will be available for migration if they do, Discounted cash flow calculations mean postponing the costs of format migration has a huge effect on the business model of preservation. For more details see http://blog.dshr.org/2007/05/format-obsolescence-prostate-cancer-of.html

5. What do you think is involved in establishing a stable economic model for your program?

LOCKSS believes that stability for any individual digital preservation system lies eliminating ALL central points of failure: economic, technical, social, political, administrative, etc. In short, a stable economic model for LOCKSS is the same as a stable economic model for all preservation systems. Stability is increased as the burden and risk is dispersed among a network of partners. LOCKSS succeeds when a large number of libraries choose to work together by allocating small amounts of their time and resources toward their shared belief in the importance of not only preserving content, but building collections at the local level. With librarians around the country seeking out at-risk web-based content to preserve, and spreading copies of that content among member libraries, a stable and effective system can function without overtaxing the resources of any one body.

The Library of Congress NDIIPP program, leading by example, is key to our goals. The Library of Congress understands ownership of assets is key to this nations future. Collections are assets. The LOCKSS Program is working with LC to facilitate collections development communities to take responsibility collecting and preserving at risk content and to facilitate digital preservation and collection development best practices.

6. Are you interested in what others are doing?

LOCKSS is very interested other digital preservation activities and we are particularly grateful for the community NDIIPP has built. People who would otherwise not be aware of each other's activities are reaching out to each other for help and advice.
