The Finnish National Digital Library: a national service is developed in collaboration with a network of libraries, archives and museums

The National Digital Library (NDL), as a project, aims to ensure Finnish cultural and scientific electronic materials are managed to a high standard, are easily accessible and securely preserved well into the future. The NDL is one of the key pieces of digital research and cultural infrastructure under construction in Finland.

The National Library Finland (NLF) is responsible for the development of the public interface service Finna, which is part of the NDL and will also act as the national aggregator for Europeana. The NLF has decided to develop this comprehensive service based on open source components, and the development of the software is in the hands of experienced developers. In terms of challenges, the greatest challenge has to be constructing and co-ordinating the mechanisms to enable organizations' participation.

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National Digital Library (NDL)

The NDL[1] in Finland is the Ministry of Education and Culture's way of improving the availability and usability of the electronic materials held by libraries, archives and museums, and of developing a long-term preservation solution for the materials.

As a project, the NDL is also a part of the development of national electronic services and infrastructure. It is one of the public administration projects defined in the Ubiquitous Information Society action plan, which implements the Government Resolution on the Objectives of the National Information Society Policy 2007-2011[2].

In order to benefit learning and research nationwide and offer new possibilities for creative industries and artists, the NDL project aims to ensure that culture, heritage and history is safely stored, easily accessible and actively used.

An additional target is to improve the productivity of participating organizations. This joint solution reduces any overlap in the costs of digitization, management and distribution of electronic materials, releasing resources for other tasks and consequently making the use of public funds more effective. At the same time, the impact and benefits gained from the creation and maintenance of library, archive and museum information resources will multiply as the materials form a common, easy-to-use national entity.

The Ministry of Education and Culture has appointed both an executive committee and a steering group for NDL. The board of the NLF has appointed a consortium group to steer the development of the public interface service (Figure1).

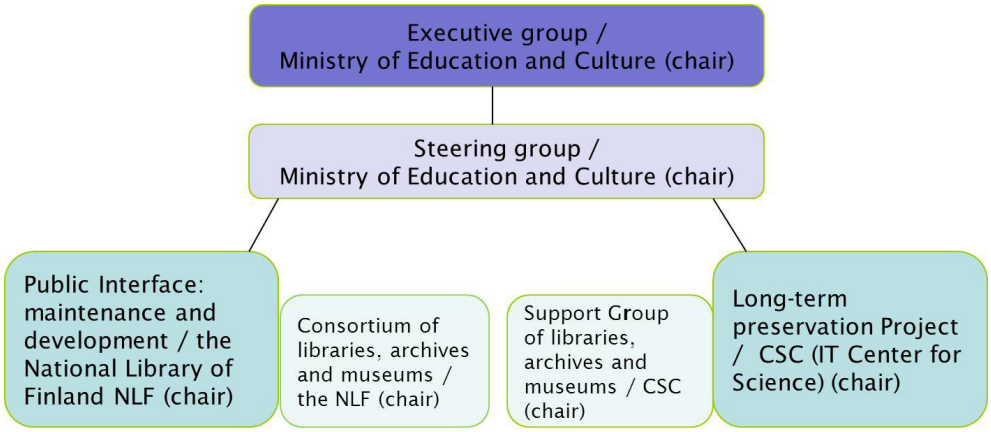

Figure1. Governance model of the NDL

Enterprise architecture (EA)

Enterprise architecture was launched in 2010 and updated at the end of 2012. This document describes the project's enterprise architecture using the Finnish government's EA design method[3].

The project's enterprise architecture describes how the various elements – organizational units, people, processes, information and information systems – relate to each other and function as a whole (Figure 2).

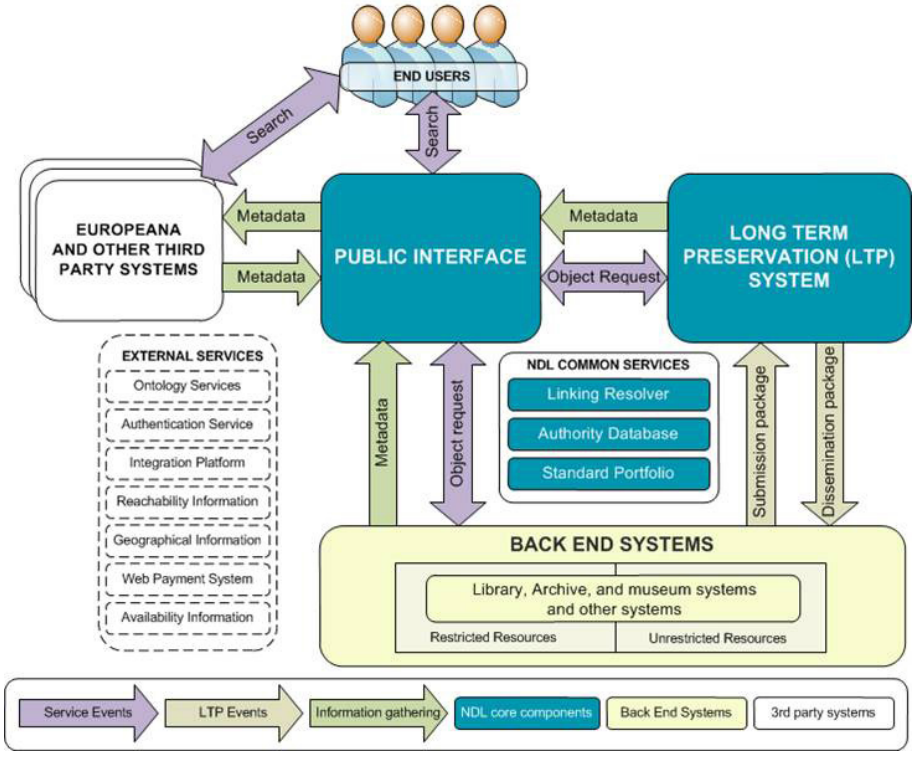

Figure 2. NDL's enterprise architecture

Enterprise architecture is subdivided into four areas:

- business architecture: the project's services, stakeholders and processes
- data architecture: the key glossaries being used, the central information resources and the relationship between information categories and systems
- application architecture: the content of the information system portfolio
- technical architecture: the technology portfolio, reference architectures and interfaces.

The standard portfolio appended to the document contains key information from the EA perspective. It defines the standards used in the project and describes the grounds given for incorporating them as part of the enterprise architecture. The EA helps in developing the public interface and the preservation system, and also supports individual organizations and sectors in their IT-development activities.

Public interface: Finna

The public interface of the NDL is a shared online service for Finnish libraries, archives and museums that ensures access to their printed and electronic resources and services. The NLF is responsible for developing forms of co-operation in the network of libraries, archives and museums, as well as creating the NDL public interface service, Finna.

At the beginning of 2012, the NLF decided that the public interface would be based on open source software (OSS), choosing OSS to promote national and international collaboration in developing the interface. The public interface will be created iteratively through several phases of development (using an agile development method) together with the archives, libraries and museums. The first phases in 2012 involved the construction of features according to the requirement specifications gathered earlier.

There will be further development of the service throughout 2013, with the addition of new functionality according to the needs of the participating organizations. The development will be overseen and co-ordinated by the NLF, which allows its clients to follow the development process, contribute to it and provide feedback according to the principles of agile software development. The NLF also acts as a central service unit that is further responsible for the training of staff in the network of archives, libraries and museums.

The new software solution has enabled rapid progress to be made and most of the functions have already been implemented. The first demonstrations presented de-duplication handling, interoperability of the component parts, visualization of the archive hierarchy and various other features. These convinced the participant organizations that the end result would meet their high expectations. The public interface architecture consists of several modules (Figure 3). The public interface Finna moved to beta-production in December 2012.

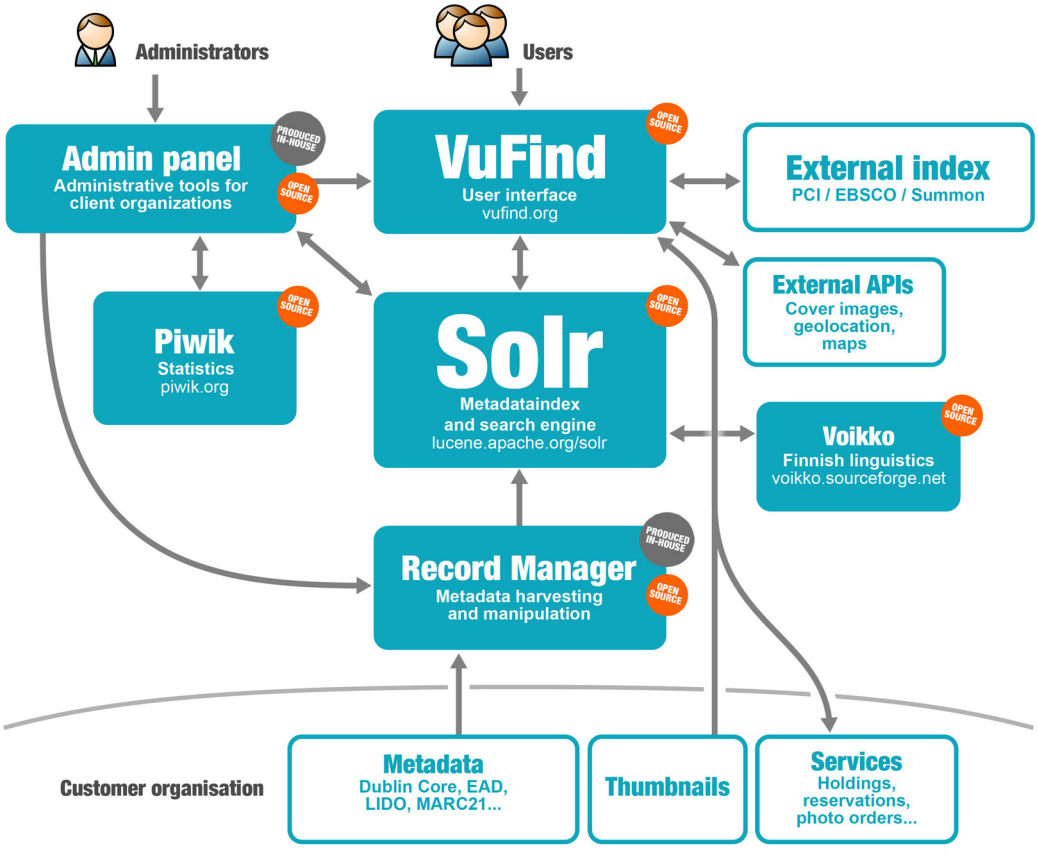

Figure 3. Public interface architecture

A couple of the so-called first wave customers started to use the public interface in late 2012 and the remaining organizations will follow early in 2013. The first wave consists of ten organizations, among which the three sectors – libraries, archives and museums – are represented. The first implementation of Finna will give an overview of how the fully developed service will function and look. In the first implementation, there will be about 6 million records. Once all NDL organizations are in production, there will be about 80 million records.

Preparations for the second wave of organizations started in 2012, but the actual installation, training and implementation of customized organizational user interfaces will start at the beginning of 2013. There will be dozens of organizations representing the three sectors in the second wave. Later on, new organizations will be gradually incorporated.

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A paradigm shift: from closed systems to open solutions

For some time, a paradigm shift has been occurring in the development of data systems both in Finland and abroad. This shift is allowing the expanded use of OSS, making it the best solution in many cases. Open source based solutions have often emerged when no appropriate off-the-shelf software has been available for a specific purpose.

Currently, there are a huge number of ongoing OSS projects, such as Linux and FreeBSD (operating systems); Apache (web server), Perl, PHP, and Python (programing languages); PostgreSQL and MySQL (database systems); Firefox (web browser), Thunderbird (e-mail application) and LibreOffice (which contains a word processor, spreadsheet, and graphics/ presentation programmes packaged together). Finna is based on OSS since it encompasses VuFind, Solr, and the 'Admin panel' is based on the Zend framework.

Many drivers are behind the success of OSS, such as:

- the advent of the internet: one driver of open source development is the availability of the modern internet to serve as a mechanism for the growth in open source development communities, as outlined by The World Information Technology and Services Alliance (WITSA)[4]. This growth is necessary for successful development and continued improvements in programmes like the NDL
- software licence cost: there is a perception that open source software products cost less than products developed by companies following a closed source software development model. Both software development models are in flux today as each works to serve the needs of customers by focusing on different pricing models; licensing is only part of the total value equation
- flexibility: supporters frequently argue that because the source code is viewable to all, the underlying technology can be used in many innovative ways, offering a flexible platform to meet present and future software needs
- global innovation: with many more developers able to view the source code, supporters argue that the pace of innovation is greater as the barriers to software modification are lower
- security: it is argued that source code transparency promotes more secure software because a wider group of people may inspect the software for flaws
- customer involvement: supporters suggest that open source development models may provide more opportunities for customer-driven innovation than the traditional proprietary approach.

The NLF has extensive experience using OSS in its core operations. Finnish online material is harvested or archived automatically using the Heritrix software developed by various important national libraries such as the Library of Congress and the National Library

of France. The digital repository services Doria and Theseus are also based on an open source platform (DSpace) and serve close to 40 higher education institutions and other organizations.

The decision to use open source solutions in the development of the public interface is in accordance with Finnish national policies. It also facilitates national and international co-operation in the development.

How to manage the development

According to Markus et al[5], open source projects have four interrelated co-ordination mechanisms: managed membership, rules and institutions, monitoring and sanctions, and reputation, that keep them on track despite the obvious potential for chaos. In addition, Markus et al claim that the shared culture of open source (mutual values and assumptions) form the essential preconditions for the above-mentioned four governance mechanisms. In other words, the shared cultural knowledge and enabling technology make it possible for the open source community participants to collaborate successfully in order to develop software.

In the Finnish model, organizations have participated actively in defining the requirements and specifications of the software. This means that the needs of the different domains are all expressed there. Additionally, when organizations join the consortium, they sign an agreement with the NLF. In the agreement, the responsibilities of the organization and the NLF are defined. The membership of the consortium is managed, its meaning is described and the rules are defined. As the organizations have the chance to participate in the development of Finna, the commitment to the co-operation grows. Finna is a national demonstrator project and the success of the project means also the success of the whole networks' effort.

Increasing involvement of archives, libraries and museums nationwide

Finna will become a core infrastructure of services, which organizations that use Finna will provide to their own customers. The landscape of these services is wide, since these organizations vary greatly in size, location, customer base, and many other aspects.

The development of the software is fundamentally in the hands of the developers. However, the developers of Finna do not necessarily have specialist knowledge of the underlying needs of each library, archive, or museum service. One of the greatest challenges has therefore been, and continues to be, how to construct and co-ordinate the mechanisms to enable the various organizations to actively participate. One of the first steps has been the establishment of the conclusive governance and policy model for Finna development. The active element in the governance model is the consortium group, which consists of the representatives from the consortium, i.e. representatives from Finnish archives, libraries, museums, and some interest groups. Alongside this, we have developed more dynamic instruments and practices that ensure the involvement of each consortium member in questions relevant to their needs. Our permanent concern is how to provide flexible, impartial, but also reasonable management of Finna development initiatives arising from the field.

Collaboration on a larger scale tends to bring along new forms of activity – and further collaboration[6,7]. The NDL project, and especially its public interface, Finna, have encouraged all participating organizations to engage themselves in Finna development, from being eager information sharers ('What is this Finna all about?') to being active contributors ('We intend to create this-and-this as part of Finna.'). In order to secure their own (customers') interests, which are naturally the most valuable input of their knowledge, they have not only invested their resources in active participation to working groups and seminars, but also in actual software development, testing and usability activities.

The increase in and intensification of co-operation between different organizations has been discernible right from the beginning of the project. There has been an increase in co-operation both between the library, archive and museum sectors and within each individual sector. Co-operation between sectors has its roots in two areas: in the planning of joint services and in the added value created for users when different materials become accessible via a single service. Collaboration is supported through transparent management and decision-making processes as well as through agile development of the software. The three sectors are represented in the management groups, working groups and ad hoc groups. All documentation is available in wiki areas, which makes it easy for the large network to follow the development and decision-making processes. Intensifying co-operation between sectors is motivated by an easier and more efficient use of joint services as systems, description rules and other practices become more uniform.

"… the NDL is the most extensive co-operation project between libraries, archives and museums in Finland."

To date, the NDL is the most extensive co-operation project between libraries, archives and museums in Finland. Its impact will be visible in many ways in the operation of these organizations. The development of the NDL requires commitment and partnership. As system services are developed jointly, it also provides a better basis for finding joint solutions to other challenges in the operating environment.

References

1. The National Digital Library – Enterprise Architecture: http://kdk.fi/images/stories/tiedostot/NationalDigitalLibrary_EnterpriseArchitecture.pdf
2. Ubiquitous Information Society Advisory Board - Government Resolution on the Objectives of the National Information Society for 2001–2011: http://www.arjentietoyhteiskunta.fi/files/38/periaatepaatos_tietoyhteiskuntapolitiikan_tavoitteista_engl_.pdf (accessed 22 Jan 2013).
3. The National Digital Library: http://www.kdk2011.fi/en (accessed 22 Jan 2013).
4. 'Statement on Open Source Software: Recent Developments and and Public Policy Implications', available on The World Information Technology and Services Alliance (WITSA) website: http://www.witsa.org/papers/index.htm#5 (accessed 31 January 2013).
5. Markus, M, Manville, B and Agnes, C, What Makes Virtual Organizations Work?, *Sloan Management Review*, 2000, Fall, 13–20.
6. Waibel, G, Collaboration Contexts: Framing Local, Group and Global Solutions. Report produced by OCLC Research, 2010, Dublin, Ohio, OCLC: http://www.oclc.org/research/publications/library/2010/2010-09.pdf (accessed 22 Jan 2013).
7. Zorich, D, Waibel, G and Erway, R, *Beyond the Silos of the LAMs Collaboration Among Libraries, Archives and Museums*. Report produced by OCLC Programmes and Research, 2008, Dublin, Ohio, OCLC: http://www.oclc.org/programmes/reports/2008-05.pdf (accessed 22 Jan 2013).

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