EIFL and IDS webinar on DSpace repositories

with Nason Bimbe (IDS), Andrew Mwesigwa (Makerere University), Hilton Gibson (Stellenbosch University) and Felix Rop (ADLC)

Challenges

Fine-tuning OA repositories

Interoperability with other institutional systems, e.g. integration with e-learning platforms;

Embedding new applications, e.g. mobile phone/tablet interfaces, research object level metrics, etc.;

OA repositories are more user-friendly for researchers and enable easier sharing of research output.

EIFL Plans for 2016-2017

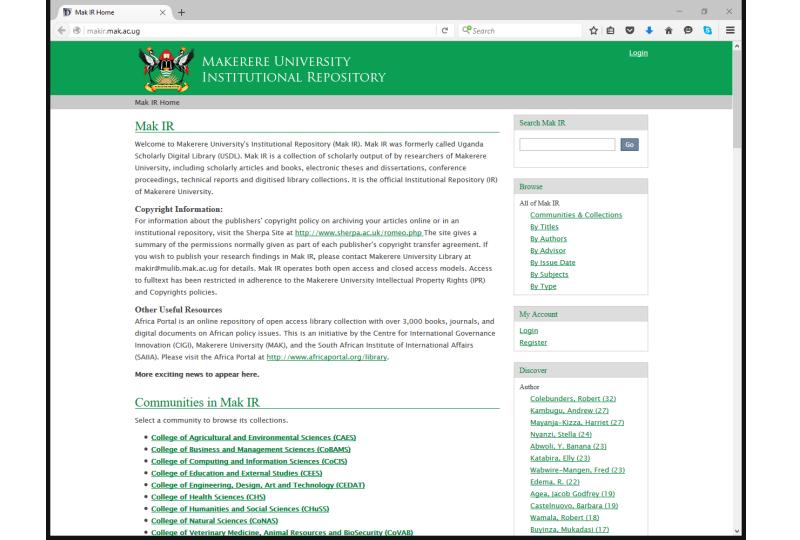
"Next generation" OA repositories

Keeping up-to-date with the latest technology & policy developments; reinforcing local capacity in the management of OA repositories:

Develop check-lists on current requirements for OA repositories (infrastructure & policies).

Conduct an **audit of current OA repository developments** (infrastructure and content) & provide **good practice recommendations**.

Organize webinars & other knowledge sharing activities.



Capacity Building For Sustainable Digital Information Services In An Academic Library

The repository content and the repository infrastructure require support teams, to ensure that the repository is properly maintained, now and in the far future

In the context of the library, the operational team provides information services, that are supported by the technical team using information systems, which are built and maintained in co-operation with the information technology department.

INFORMATION DOMAINS

SERVICES

SYSTEMS

TECHNOLOGY

Director

The director need not be a full time appointment, however someone at the director level should be made responsible.

Excellent written and verbal communication skills.

Doctorate in library or information science.

Academic journal publication and/or institutional policy development about "open scholarly communication and preservation".

Expert understanding of open access digital repository content management.

Expert with metadata standards for academic publishing.

<u>Professional understanding of digitisation technologies.</u>

Professional understanding of web 2.0 communication technologies.

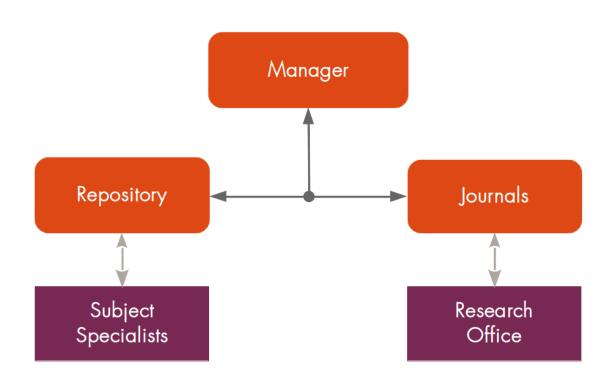
Familiarity with repository software.

Familiarity with desktop computer operations.

Familiarity with open access digital repository systems management.

Familiarity with the operations of the internet and how to use it securely.

INFORMATION SERVICES



Operational Manager

This is a full time appointment.

Core Skills

Excellent written and verbal communication skills.

Bachelors degree in library or information science.

Major or Masters in "open scholarly communication and preservation".

Expert understanding of open access digital repository content management.

Expert with metadata standards for academic publishing.

Expert with digital curation.

Expert with digitisation technologies.

Professional understanding of web 2.0 communication technologies.

Professional understanding of <u>repository software</u>.

Familiarity with open access digital repository systems management.

Familiarity with desktop computer operations.

Familiarity with the operations of the internet and how to use it securely.

Specialist Skills

Expert with the management of Open Research Repository Systems.

Expert with the management of Open Journal Publishing Systems.

Expert with the management of Open Conference Publishing Systems.

Expert with the management of Open

<u>Data Management Systems</u>.

Expert with the management of Open <u>Educational Resource Systems</u>.

Repository and Journal Librarians - 2 each

These are full time appointments.

Core Skills

Professional written and verbal communication skills.

Technology certificate in library or information science.

Major in "open scholarly communication and preservation".

Expert with <u>repository software</u>.

Expert with desktop computer operations.

Expert with metadata standards for academic publishing.

Expert with digital curation.

Expert with digitisation technologies.

Professional understanding of open access digital repository content management.

<u>Professional understanding of the operations of the internet and how to use it securely.</u>

Professional understanding of web 2.0 communication technologies.

Familiarity with open access digital repository systems management.

Specialist Skills

Expert with the operation of Open Research Repository Systems.

Expert with the operation of Open

Journal Publishing Systems.

Expert with the operation of Open

Conference Publishing Systems.

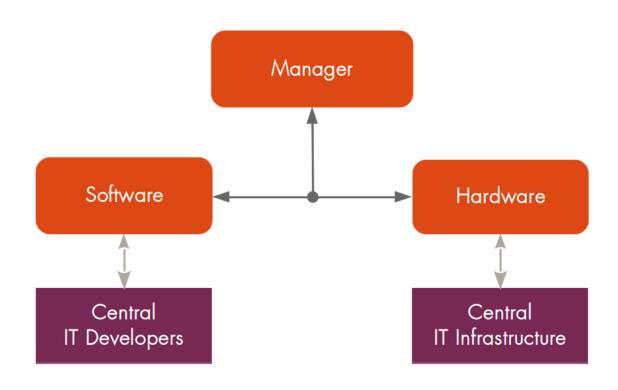
Expert with the operation of Open

Data Management Systems.

Expert with the operation of Open

Educational Resource Systems.

INFORMATION SYSTEMS



Technical Manager

The technical manager should ideally be appointed internally from within the technology support division of the institution.

The technical manager is **NOT** currently technically skilled, since technology is evolving at a very rapid pace, but rather the manager is aware of the current technologies and how to effectively deploy them.

The technical manager should know how to lead an information technology team by making use of the specialised skills of the team and current technologies to achieve the information systems goals of the open scholarly communication office.

This person should have extensive experience in designing and implementing information technology infrastructure and software systems that fit the "business case" of the institution.

This position does not need to be full-time, rather the position can be shared with the central IT department, however a person from top management must be made responsible for the long term maintenance and operation of the open scholarly communication office's information systems needs.

The person appointed should also be a <u>very good communicator</u> and be able to "bridge" the LIS and ICT worlds. In other words, the person can inform the library about ICT and vice versa, the person can inform ICT about the library, thereby creating a vital two-way communication "bridge".

In addition, though not strictly required, it would be very advantageous if the technical manager was personally supportive of <u>open systems</u> and open <u>access</u>. Most importantly, this person can assist the library in the transition to a new digital era and can help the ICT department transition to the new digital information services era. Also see: http://wiki.lib.sun.ac.za/index.php/List of Repository Software

Web 2.0 Software Technologist or Web 2.0 Application Specialist or Java Webapp Developer These are current technology

specialists whose expertise may be shared with the central IT department.

Core Skills

Expert Java programming skills

Expert XML programming skills

Professional **SQL** programming skills

Professional **HTML** programming skills

Professional **CSS** programming skills

Professional PHP programming skills

Familiarity with the **Tomcat** java webapp server

Familiarity with the LAMP stack webapp server

Specialist Skills

Expert **DSpace** software programming skills.

Expert **EPrints** software programming skills.

Expert PKP software programming skills.

Expert Open Data software programming skills.

Expert Open Educational Resources software programming skills.

Web 2.0 Hardware Technologist or Web 2.0 Infrastructure Specialist or Ubuntu Linux System Administrator These are

current technology specialists whose expertise may be shared with the central IT department.

Core Skills

Expert with the **Ubuntu** Linux server operating system

Expert with the **Tomcat** java webapp server

Expert with the **LAMP** stack webapp server

Expert with <u>virtualization</u> and <u>cloud</u> services

Professional **BASH** programming skills

Professional TCP/IP networking skills

Familiarity with a major vendors server hardware

Familiarity with a major vendors <u>networking hardware</u>

Specialist Skills

Expert <u>DSpace</u> infrastructure support skills.

Expert **EPrints** infrastructure support skills.

Expert PKP infrastructure support skills.

Expert Open Data infrastructure support skills.

Expert Open Educational Resources infrastructure support skills.

What else can these teams do for the library and the institution?

These same teams, with their skills, are then also capable of enabling other open systems for the institution, for example:

An open journal system

An open conference system

An open research data management system

An open research collaboration system

An open educational resources system

An open bibliography system

An open library management system

How do you build these teams?

References

http://wiki.lib.sun.ac.za/index.php/SUNScholar/Capacity Building

http://staff.lib.sun.ac.za/~hgibson



IDS OpenDocs: A case study for the EIFL and IDS Webinar on DSpace

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Introduction



- COAR (Confederation of Open Access Repositories) discusses a number of profiles needed for sustainable practices for populating repositories and these are:-
 - Incentives: promoting the benefits of repositories through advocacy and metrics, as well as the adoption of policies/mandates that require deposit
 - Integration: amalgamating repository services with other institutional services like research information systems and research biographies
 - Mediation: implementing tools, workflows, and agreements that ease and simplify the deposit process
- This webinar therefore I hope is a contribution in a practical way as a starting step to begin tackling some and if not all the areas highlighted in the profiles identified above.

https://www.coar-repositories.org/files/Sustainable-best-practices_final2.pdf

About IDS



- The Institute of Development Studies (IDS) is a leading global institution for research, teaching and learning, and impact and communications, based at the University of Sussex.
- British Library for Development Studies (BLDS), the IDS Library, which strives to improve the visibility, accessibility and 'readability' of research, in particular of that published in developing countries, both current and historical, which often remains unseen by an international audience, who could benefit from a wider range of perspectives. This is done through: -
 - Provision of core library services
 - IDS Institutional Repository
 - Digitisation and BLDS Digital Library
 - Document Delivery service

About IDS OpenDocs



- OpenDocs is the IDS Digital Repository setup in 2010 and has two main communities BLDS Digital Library and IDS Research Community.
 - BLDS Digital Library hosts collections of existing Southern research materials, available within BLDS and from partners that have agreed to be part of the DL, that were/are digitised, Creative Commons licensed, and are made freely available. It has over 4,800 items.
 - IDS Research Community hosts publications by IDS Researchers and those from partner research centres and consortia. It has over 2,700 items.
 - Together usage is over 250k downloads and over 150k views a month split 50/50 from both 'Southern' and 'Northern' based users.
- OpenDocs is now the default digital content store for all open access full text content produced by IDS and now including those from the IDS flagship journal 'IDS Bulletin' (on OJS) which is going Open Access this Year.
- The platform is based on DSpace, an open source digital repository software, from Duraspace.

OpenDocs: Architecture

- Institute of Development Studies
- Runs on a virtual server managed by Microsoft Windows Virtualisation Server Hyper-v
- Software stack is composed of: -
 - Debian a Linux flavour
 - PostgreSQL
 - OpenJDK
 - Tomcat
 - Apache Webserver used as a (HTTP) Proxy using mod_jk proxy (mod_proxy is much easier to use though).
- We are on DSpace 4.2, soon upgrading to 5.4 in the next couple weeks
- Installation structure is based on separation of 'concerns' through the use of the Overlay facility, which allows separating the core DSpace code from your own helps with customisation and upgrades.

TIPS

- DSpace is well tested in a Linux, PostgreSQL environment unless otherwise, use this environment.
- Always run your repository with the latest software versions.
- We found putting Apache Webserver in front of Tomcat works very well and makes the platform stable and possibly scalable.
- Always use 'Overlays' to add you own code to change the behaviour of your DSpace.
- If possible use version control to manage your changes.
- Use profiles in the top-level POM for easy management between Development and Production systems.

Business Continuity



- OpenDocs runs on a virtual server therefore, a copy of the whole virtual machine is taken every night. This copy can be used for restore purposes if there are any problems by simply rebuilding the virtual machine from the copy.
- OpenDocs as one of the many ICT services in IDS, is included in the overall IDS's ICT Business Continuity Plans managed by central ICT team – CATS (Computer And Technical Services)

TIPS

- It is important to have a Business Continuity Plan which would cover: -
 - Backups/Restore procedures
 - Policies for disaster recovery

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Persistent Identifiers



- Persistent identifiers (PIs) are simply maintainable identifiers that allow us to refer to a digital object. Persistent identifiers are also persistently actionable (that is, you can "click" them); however, unlike a simple hyperlink, persistent identifiers are supposed to continue to provide access to the resource, even when it moves to other servers or even to other organisations. http://www.ariadne.ac.uk/issue56/tonkin#sthash.2eyvo7yu.dpuf
- With OpenDocs, we are not subscribed to the Handle Service hence we use the service's base URL together with the handle attributes for this.
- We will soon be using Digital Object Identifiers (DOIs) to compliment our handle system setup.

TIPS

- It is important to make sure that Handle functionality is well configured.
- If you not subscribing to the Handle Service, make sure that handle setting in the dspace.cfg or build.properties is set as thus: -

```
handle.canonical.prefix = ${dspace.url}/handle/ //uncomment
#handle.canonical.prefix = http://hdl.handle.net/ //comment
```

Otherwise, your content URIs will not be resolving correctly – i.e. they resolve to a dead end. <u>This is very</u> important because content harvested through OAI-PMH uses the URI as the Resource Locator Address.

Interoperability



"Each individual repository is of limited value for research: the real power of Open Access lies in the possibility of connecting and tying together repositories, which is why we need interoperability. In order to create a seamless layer of content through connected repositories from around the world, Open Access relies on interoperability, the ability for systems to communicate with each other and pass information back and forth in a usable format. Interoperability allows us to exploit today's computational power so that we can aggregate, data mine, create new tools and services, and generate new knowledge from repository content."

https://www.coar-repositories.org/activities/repository-interoperability/coar-interoperability-project/a-case-for-interoperability/

- Out of the box, DSpace provides the following facilities for interoperability purposes: -
 - Open Access Initiative Protocol for Metadata Harvest (OAI-PMH)
 - RSS (Rich Site Summary) Feeds
 - (REST) Application Programming Interface (RESTAPI)
 - Semantic Web, based on the Resource Definition Framework (RDF)
 - SWORD (Simple Web-service Offering Repository Deposit) which allows digital repositories to accept the deposit of content from multiple sources in different formats
 - Digital Object Identifiers (DOIs) and ORCID (Open Researcher and Contributor ID) can compliment these protocols.
- In IDS, we use OAI-PMH to enable OpenDocs interoperate with the corporate website (FarcryCMS) and also the Resource Discovery Tool (VuFind).
- We will also be adding RIOXX metadata application profile. RIOXX from JISC was developed with input from HEFCE (UK) to help repositories comply with the open access policy as mandated by RCUK.

TIP

Make sure you enable the appropriate webapps for interoperability more especially OAI-PMH. OpenDOAR relies on

it.

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Local Customisation



- Make the DSpace your own through local customisation
 - The 'Look and Feel' through modifications to the CSS
 - Extend metadata fields for your institution's specifics
 - Enhance the display fields for items
 - Add extra search facets
 - Add your own Item Types, Languages, Subjects, Licenses, etc.
 - Make your DSpace UI multi-lingua if needed
 - Add a responsive UI for example Mirage 2
- We have done all for OpenDocs except for the last two.
- We have a bi-directional link with the LMS (Koha) for items that are also listed in the catalogue.
- After the upgrade, we will enable Mirage 2.
- We will also be adding the ability to 'stream' the BitStream in addition to downloading, which will be helpful especially for our users with limited bandwidth. This functionality will be based on the module from
 Opinion

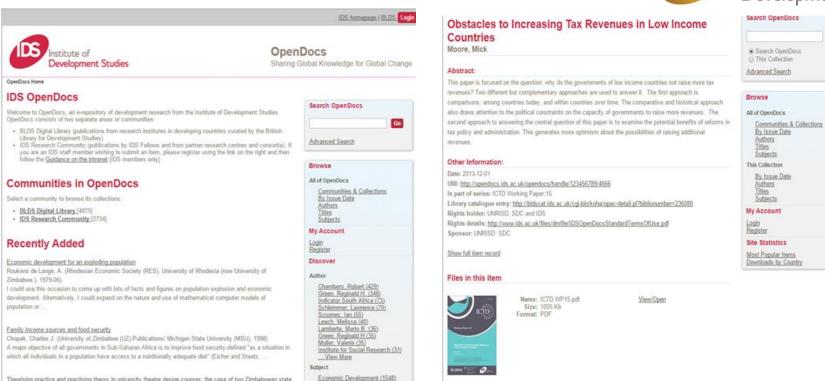
TIPS

- Always customise your Dspace installation to suit your institution branding and way of working.
- Using mobile access (small screen form factor) is prevalent in developing countries, therefore it is important
 that your DSpace has a Responsive User Interface like those based on Twitter's Bootstrap Framework such as
 Mirage 2.
- Assess all default configuration settings to see if they meet you needs.

OpenDocs: Screen shots



Go



Home page

Item detailed page

Discoverability



- It is important to make sure that your DSpace and its content is easily discoverable on the web.
- There are various ways and tools available to help achieve this.
 - Use sitemaps so that your DSpace can be indexed by Google and other search engines
 - As of DSpace 1.8, integration with Google Scholar comes 'out of the box'
 - But you need to register with Google to have your content in Google Scholar
 - Use 'Repository of Repositories' such as OpenDOAR, the CORE at the Open University in the UK, etc.
 - Metadata (including full text for some) will be harvested and made searchable within these type of repositories
 - Use your other web presence channels and/or your collaborator's web presence channels
 - Could be other websites, social platforms, etc.
- At IDS, we use all the above for OpenDocs.

TIPS

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- Setup your sitemaps generation as a Cron job.
- Make sure that filter media ('breaking words in documents') is setup as a Cron job.
- Make sure you setup a robots.txt file and placed in the ROOT for your DSpace to aid search engine web crawlers.
- If you can, register your DSpace with Google Scholar.
- Always register your DSpace with all known 'reputable' aggregators Repository of Repositories.

Analytics



- Knowing how much 'stuff' is in your DSpace and how also it is used, and from where is crucial to help in securing the sustainability of your platform.
- Therefore having good and 'accurate' statistics of your repository is good for advocacy, buy-in, business case building.
 - At best you should know: Number of downloads and views; Geo-location of where these are coming from; and Content analysis such how many items are in the repository (by various dimensions i.e. by item type, subject, language, etc.)
- Dspace provides a number statistics such as number of downloads, number of items, number of failed logins, etc. (all the data is available in the SOLR indexes these can be queried directly as well.
- Use Google Analytics (registration required) or Piwik (an open source web analytics) to collect information about site
 visits. Standard GA (JavaScript based) has limitation in capturing downloads.
- As of DSpace 5, there is integration with Google Analytics via GA API, statistics are therefore accessible in DSpace.
- Third party tools you could consider: -
 - Content Usage Analysis (CUA) module a DSpace add-on from @Mire (not open source)
 - MyDash from Harvard University a standalone Open Source web application (https://github.com/oscharvard/mydash)
 - Altmetrics such as those from Altmetrics.com or PlumX.
- At IDS, We use mostly CUA coupled with Standard Google Analytics as a compliment.

TIPS

 Assess what sort of insights you want from your Dspace and setup/acquire the appropriate visualisation and analysis tools.

OpenDocs: Screen shots



OpenDocs



Sharing Global Knowledge for Global Change OpenDocs Home → Commentary on The Sorry State of M&E in Agriculture; Can People?centred Approaches Help?' Most Popular Items Search OpenDocs ▼ Entire repository ▼ All regions ▼ All time Go File downloads ▼ Abstract views Sum Search OpenDocs **Building Tax Capacity in Developing Countries** 45.354 This Collection Will Changes to the international Tax System Benefit Advanced Search 32 705 Low-income Countries? Human Resource Development Practices and Challenges in Public Sector: Evidence from Selected 28 699 567 29.266 Browse Regional Public Bureaus in Tigray Regional State. All of OpenDocs Inequality, Social Cooperation and Local Collective Communities & Collections 28 686 341 29,027 Sustainable rural livelihoods: practical concepts for the 25 598 19,652 45,250 Subjects A Common Sense Approach to the Right to Food 24.465 309 24,774 This Collection By Issue Date Sustainable Rural Livelihoods: A Framework for 16 689 34.134 Five Fingers or One Hand? The BRICS in Development Subjects 16,539 My Account MQSUN Mixed Methods Report: Impact Evaluation of 178 15 228 the DFID Programme to Accelerate Improved Nutrition Register for the Extreme Poor in Bangladesh, Phase II Site Statistics Does Tourism Contribute to Local Livelihoods? A Case Study of Tourism, Poverty and Conservation in the 15.032 196 15 228 Most Popular Items Indian Sundarbans MQSUN Determinants of Child Undernutrition in 13.350 Bangladesh Literature Review 10.287 6.546 16.833 FDI and economic growth: evidence from Nigeria 9.771 1.069 10.840 Financial Performance Evaluation: A case study of 844 10,581 Awash International Bank S.C Credit Management: A Case Study of Wegagen Bank Share Company in Tigray Region 610 9.653 Rural appraisal: rapid, relaxed, participatory 9,086 The Future of Knowledge Sharing in a Digital Age: Exploring Impacts and Policy Implications for 8 561 1.149 9.710 Gender and Food Security: Towards Gender-Just Food 8 831 and Nutrition Security Gender and Food Security In Brief 8.377 Total number of files downloaded: 3 103 857 Total number of abstracts viewed: 2.290.840 Contact Us | Send Feedback | IDS Disclaimer and Cookies | OpenDocs Policy

Item Statistics

Community/Collection Statistics

Policies



- Policies are crucial in the success of your Repository in terms of content archiving, copyright, usage (what is
 acceptable use of the content), take downs, preservation and so on.
- The next slides will consider: -
 - Archiving
 - Copyright
 - Types of OA Policies
- For these you can read the slides yourselves at your own time.
- At IDS, we have an archiving policy (not formal though), copyright, usage and take down which are easily accessible by anyone.

TIPS

- Make sure appropriate policies are setup.
- Setup a mechanism of updating them as you learn more and also to take in the changes happening in the environment (be at local, national, global levels).
- Make sure the policies you setup are not creating 'pain points' in your processes and objectives but instead are enablers.
- Plan on how they will be advocated for, disseminated, implemented and monitored.

Policies: To consider - Archiving Institute of Development Studies



- Mandatory self archiving/deposits
 - requests or encourages researchers to self-archive their publications in an open access institutional repository.
- Voluntary self archiving/deposits
 - requires that researchers self-archive their publications in an open access institutional repository.

Note: Data from Australia obtained by Arthur Sale shows that only mandatory policies result in high levels of self-archiving.

Policies: To consider - Copyright (50)



- Traditionally, in most cases authors are required to relinquish copyright to journal publishers in return for having an article published.
- Not incompatible with an institutional self-archiving policy, as the majority of publishers, even if they demand copyright to be transferred, will allow a copy to be deposited in an Open Access repository.
- Where publishers do not allow this, the article can be deposited in the repository under restricted access
- A growing number of authors are retaining copyright, and are often encouraged to do so by their institution where the author usually assigns the publisher a "licence to publish".
- Normally done through the addition of an "author addendum" to a publisher's copyright transfer agreement (CTA), which the publisher requires the author to sign (and which normally transfers copyright to the publisher).
- Example: Harvard, Stanford and MIT all require authors to retain their own copyright.
- Consider embargo period.
 - Even where publishers permit self-archiving of the author's final version of an article, may still impose an embargo period during which Open Access is not permitted.
- Varies considerably from publisher to publisher and discipline to discipline.
 - may be as short as 3 months for some science journals or very long.
 - up to 24 months in the case of certain journals in the fields of humanities and social sciences.

Policies: Basic Types for OA



- Type 1: Immediate deposit with immediate Open Access
- Type 2: Later deposit after the embargo period
- Type 3: Immediate deposit with optional access

Type 1: Immediate deposit with immediate Open Access



- Requires authors to deposit their articles upon acceptance for publication, once the final corrections have been made, and to make their articles openly available immediately through the repository.
- This policy results in immediate Open Access.
- However, because some journals do not permit immediate Open Access, has the disadvantage that it restricts the choice of journals in which an author can publish.

Type 3: Immediate deposit with optional access



- Requires immediate deposit, but if the article is submitted to a journal with an embargo, then the policy permits access to be open only at the end of the embargo period.
- During that period, however, article's metadata (title, authors, affiliation, abstract, references) should be openly
 available at all times (publisher embargoes cannot be applied to metadata, which are not subject to copyright).
- Complies with publisher embargoes but at the same time ensures that all the required research outputs are compiled in the repository at the earliest opportunity that is.
- If a publisher embargo must be accommodated, the deposit process allows the author to enter the date on which the embargo will be lifted and the full text of the paper can be made openly available.
- During the embargo period, the metadata (title, author names, affiliation, and abstract) of the article are Open Access (only the full text is closed) so that indexing services like Google can find and index the article.
 - Therefore, it is known to exist, even if the full text is not available Open Access until the end of the embargo period.
 - Potential readers can email the author for a copy of the article or, if they have access to the journal through a subscription, they can find the published version. Either way, the article is being used and its impact is increasing.
- DSpace repository software have a "request a copy" button for articles contained in the repository, so that when the full-text is under an embargo, would-be readers simply click on this button and an email is sent to the corresponding author with a request for a copy of the article by email.
 - This is a "fair use" or "fair dealing" fulfilment of a personal request from an interested would-be user.



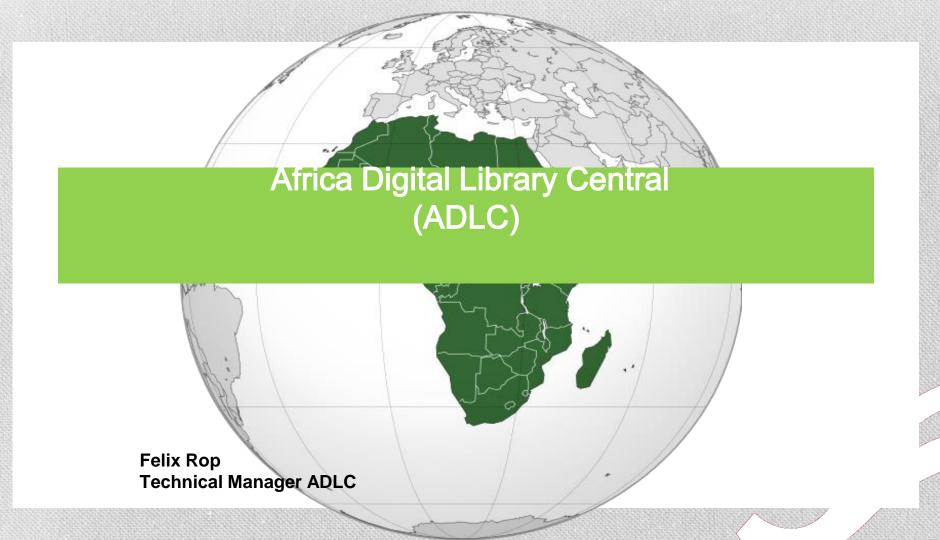
Thank you

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January 2016



Objectives

- Brief History (ADLSN - ADLC)
- ADLC Mandate
- ADLC Today
- Aspirations





ADLSN: A Living Regional Community

ADLSN Brief History



Initial network: South African Greenstone Support Network
To promote and provide training to use this popular open source digital
library software to set up digital collections and repositories

US funding + eIFL FOSS support led to a series of projects:

To pilot and implement the network extension in collaboration with champion institutions & professionals



Royal Tropical Institute



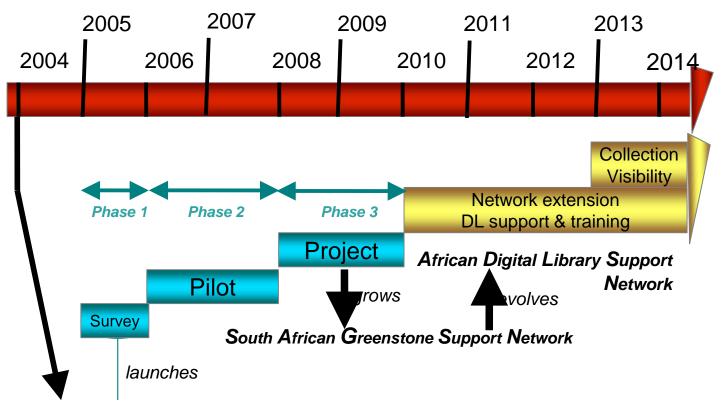




"Train-the-trainer" approach

Spreads to other Southern, then Eastern and Western African countries

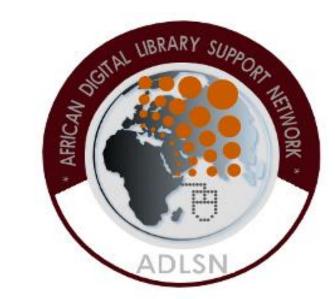
From SAGSN → ADLSN

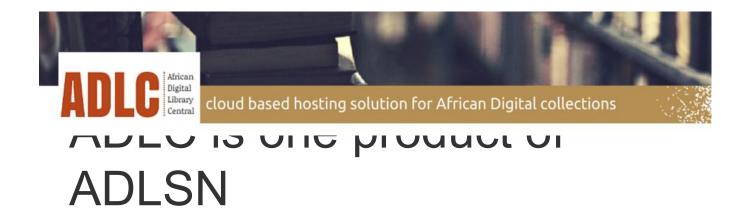


First idea: Greenstone Support Organisation for Africa

ADLSN Today

A community of African practitioners and other interested actors with a common goal of supporting the preservation and dissemination of local content in digital form



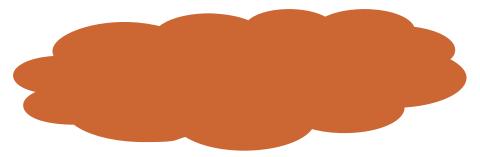


ADLC MANDATE

- 1. Facilitate Access
- 2. Organize training and provide resources
- 3. Provide community support

Collection Visibility Project

African Digital Library Central Hosting platform



- Increase global access for poorly visible collections, due to:
 - Insufficient and/or unreliable technical infrastructure
 - Lack of expertise, awareness, strategy

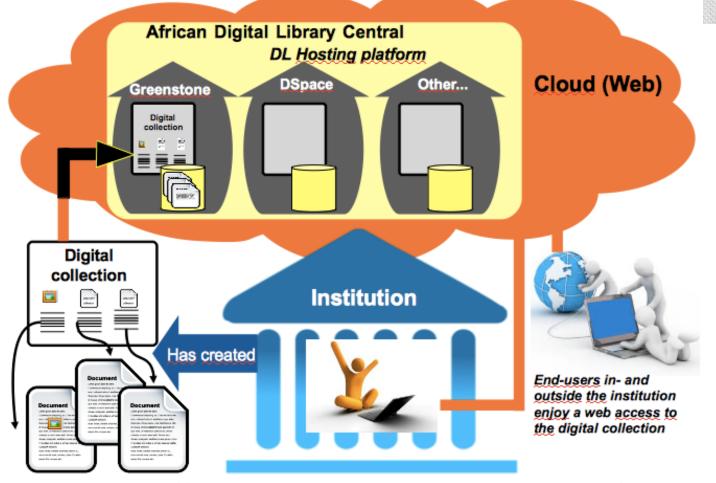
African Digital Library Central

Today.....

- A web platform ('in the cloud') set up to host various digital libraries and repositories technologies: Greenstone, Dspace, Omeka...
 - Remote management for collection's administrator of the institution
 - Seamless access for institution's end users
 - Measurement of impact with analytical tool to track

... and we plan...

 To encourage and assist the development of institutional and national sustainable hosting solutions



A digital collection of full documents, <u>created by an institution</u>, <u>is hosted by the ADLCentral platform in the cloud, with one of the DL management tools available.</u>

Demonstration http://ds.adlc.info/

Final words



Recommendations



Reinforce infrastructural and hosting capabilities to unlock the African digital knowledge

Set up a Working Group to create an African-wide policy for data centers to take up the hosting challenge of local content

ADLSN's Collection Visibility project can support with contribution of experiences and lessons learned

Conclusion



A growing and lively African community is now more than ever getting together and generating more digital content.

Local and distributed initiatives – like ADLSN – are to continue to enhance the efforts of this movement.

And a pan-African coalition for pan-African challenges like hosting infrastructure could act to assure the world wide success of this community.

Thank you

ADLSN management info@adlsn.org



Twitter

Facebook

Website

LinkedIn Group