Next generation repositories: Scaling up repositories to a global knowledge commons

Conference or Workshop Item

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Next Generation Repositories
Scaling up repositories to a global knowledge commons

Kathleen Shearer, Eloy Rodrigues, Andrea Bollini, Alberto Cabezas, Donatella Castelli, Les Carr, Leslie Chan, Chuck Humphrey, Rick Johnson, Petr Knoth, Paolo Manghi, Lazarus Matizirofa, Pandelis Perakakis, Jochen Schirrwagen, Tim Smith, Herbert Van de Sompel, Paul Walk, David Wilcox, Kazu Yamaji
The current scholarly communication system is broken!
A global knowledge commons based on a network of open access repositories
But... repository systems are using old technologies developed over 15 years ago that do not support the functionalities we need.
Next Generation Repositories

Major strategic priority for COAR

Working Group launched in April 2016

Aim: to identify functionalities and architectures for the next generation repositories within the context of scholarly communication
The aim of this activity is to develop a **global network** of repositories that allows **frictionless access** to open content and encourages the creation of **cross-repository added-value services**.
Current repositories

Services we can develop with repositories today

Conceptual layer
- Batch discovery
- Interoperability
- Metadata

Persistence layer

...
Services we can develop with repositories today

Interoperability CORE to the IRs mission. (Crow, 2002 - SPARC’s position paper on IRs); (COAR, 2011 - The Case for Interoperability for Open Access repositories)
Importance of interoperability

Lack of interoperability in the scholarly communication system is a major barrier to innovation.
User stories

• Data mining
• Discovering metadata that describe a scholarly resource
• Discovering the identifier of a scholarly resource
• Discovering usage rights
• Resource syncing and notification
• Recognizing the user
• Commenting & annotating
• Providing a social notification feed
• Recommender systems for repositories
• Preservation
• Peer-review
• Comparing usage

Current repositories

Services we can develop with repositories today

Persistence layer

Interoperability

Metadata

Next generation repositories

Services we can develop with the next generation repositories

Conceptual layer

Usage interactions and metrics
Comments
Peer-reviews
Messages
Global sign-on

Metadata
Content
Links between resources
Notifications

Discovery mechanisms
Batch
Notification

Interoperability

Persistence layer
“...making the **resource**, rather than the repository, the **focus** of services and infrastructure.”
Behaviours and Technical Recommendations

• Exposing Identifiers
• Discovery Through Navigation
• Interacting with Resources (Annotation, Commentary, and Review)
• Resource Transfer
• Batch Discovery
• Collecting and Exposing Activities
• Identification of Users
• Authentication of Users
• Exposing Standardized Usage Metrics
• Declaring Licenses at the Resource Level
• Preserving Resources

November 28, 2017
Supporting technologies

- **Notification protocols**: AMQP, Kafka, WebSub, Webmention, Linked Data Notifications, Activity Streams
- **ResourceSync**
- **Signposting**
- **ETag**
- **HTTP Signatures**
- **IPFS**
- **ORCID**
- **OpenID Connect**
- **Activity Streams 2.0**

- **SUSHI**
- **SWORD**
- **Sitemaps**
- **Social Network Identities**
- **Web Annotation Model & Protocol**
- **WebID**
- **WebID/TLS**
- **WebSub**
- **Webmention**
- **IIIF**
- **COUNTER**
- **Creative Commons Licenses**
### User stories and priority areas

<table>
<thead>
<tr>
<th>Discovery and exposing resources</th>
<th>Batch</th>
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Three vertical discovery mechanisms

- **Batch** – Transferring bulk data
- **Navigation** – Helping robots to find resources in repositories by means of navigation
- **Notification** – Enabling robots to subscribe to changes in repositories
Visualize technologies and behaviour
Priority technologies: Signposting & ResourceSync
Signposting is an approach to make the scholarly web more friendly to machines by exposing relations as Typed Links in HTTP Link headers.

Signposting is now implemented in DSpace-CRIS and OJS. DSpace 7 plans to provide Signposting support.
Influência da garantia institucional sobre o risco de crédito

Nascimento, Marcos Aurélio (2009)
Publisher: Contabilidade, Gestão e Governança
Journal: Contabilidade, Gestão e Governança
Languages: Portuguese
Types: Unknown
Subjects:

O presente artigo discute a análise do crédito ao consumidor sob os aspectos pessoais - caráter e capacidade - passando pelos demais 'cs' do crédito – capital, condições e colateral - como complemento da análise. Com base em uma pesquisa de campo, buscou-se identificar fatores que justificavam um tratamento diferenciado para consumidores que dispõem de garantias institucionais. Este tratamento diferenciado poderia ser materializado por taxas de juros menores ou linhas de crédito mais atraentes para o cliente de menor risco. Trata-se de uma pesquisa sob a ótica do tomador de recursos que, invariavelmente, vai de encontro ao interesse das instituições financeiras. A política de crédito das instituições financeiras deve ser estabelecida de forma a recompensar, também, a garantia institucional, na medida em que esta concorre para a redução do risco de crédito. Admitindo-se que há uma relação direta entre a taxa de juro e risco de crédito, pode-se inferir que quanto menor o risco menor a taxa de juro, portanto, a recompensa esperada pelo menor risco é aplicação de uma taxa menor.
A license link type has been proposed to drive this information
Successor of the OAI-PMH protocol and much more...
 Faster, reliable and scalable
 Allows real-time notification (and recovering of missed messages)
 Drives resource synchronization: content and metadata are both managed

- Discoverable
- Self-described
- Incremental

Efficient synchronization of large number of resources
A Next Generation Repository...

» manages and provides access to a wide diversity of resources
» is resource-centric
» is a networked repository
» is machine-friendly
» is active (notify other systems, allow local active interaction)
Active Repository Pattern

• Repositories as pro-active components in an event-driven scholarly system
• Publishing ‘events’ (e.g. adding a new item) to one or more notification hubs
• Third-party systems ‘subscribe’ to these notifications
• Modest software development

http://www.paulwalk.net/2015/10/19/the-active-repository-pattern/
Notification services

- Descriptive metadata
  - Described by
  - About
  - Overlay content
    - Described by
    - Creates
    - Interacts
  - Creates
    - Interacts
    - Described by
  - Described by
    - Activity metadata
      - Described by
Repositories and notification hubs

Metadata changes hub ➔ peer review hub ➔ comments/annotations hub

Repositories and notification hubs
Ongoing work and next steps

1. Implementation of technologies in repository platforms
2. Development of network or hub services
3. Ongoing monitoring of new technologies, standards and protocols
1. Implementation of technologies in repository platforms

• Already progress – several platforms are implementing NGR recommendations
  • OpenAIRE – Europe
  • National Institute of Informatics (NII) - Japan
  • US Next Generation Repositories Implementers Group
  • CARL Open Repositories Working Group - Canada

• Meeting of repository platforms at Open Repositories 2018
2. Support the development of network or hub services

- 2 days of meeting of Repository Networks, May 14 & 15, 2018 in Hamburg, Germany to discuss NGR functionality and international alignment

- Pilot Projects 2\textsuperscript{nd} half 2018 (Open Peer Review, Common Standards for Usage Statistics, Recommender Systems)
3. Monitoring of new technologies, standards and protocols

COAR Next Generation Repositories Editorial Group

Andrea Bollini  Kathleen Shearer
Rick Johnson  Herbert Van
Petr Knoth  Paul Walk de Sompel
Paolo Manghi  David Wilcox
Eloy Rodrigues  Kazu Yamaji
How to contribute?

Support the implementation of the identified behaviours and technologies in your community (DSpace, Eprints, Fedora, Dataverse, Samvera, etc., etc.)

Join the conversation on GitHub
https://github.com/coar-repositories/ngr