



### **ResourceSync – An Introduction**



Todd Carpenter Executive Director, NISO Wolfram Data Summit Thursday, September 6, 2012 With thanks to Herbert Van de Sompel and Robert Sanderson (LANL)

#### @TAC\_NISO Twitter Highlights

- Presenting this afternoon on the ResourceSync project at Wolfram Data Summit #wolframsummit
- I'm pre-tweeing my slides during #rsync presentation. Slides will be posted later today #wolframsummit
- NISO mission develop & maintain technical standards related to information, documentation, discovery & distribution of content #wolframsummit
- Machines don't talk like people do. Then again some people don't talk like other people do, particularly teenagers #wolframsummit
- So where did the ResourceSync project start? #NISO approached OAI about updating the PMH protocol. #wolframsummit
- The #NISO / OAI ResourceSync project was possible through the generous support of the Alfred P. Sloan Foundation. Thank you! #wolframsummit
  - What is RSync trying to solve (1/2): Source Server has resources that change. Destination servers want to leverage some/all of Source #wolframsummit
- What is RSync trying to solve (2/2): How to sync on ongoing basis in near-real-time & at web scale with as little system overhead as poss #wolframsummit
- RSync studied # of existing protocols to determine protocols that best meet needs. Bias against developing new spec from scratch. #wolframsummit
- The goal of ResourceSync is to find the model that most efficiently distributes the content, while limiting the tax on the source system. #wolframsummit
- Very early days in process of standards development. Still in incubation stage. Consensus & adoption phases coming '13 & beyond #wolframsummit
- Draft alpha specification of ResourceSync posted in August, Team meeting in Sept to review comments #wolframsummit



## About



Non-profit industry trade association accredited by ANSI

Mission of developing and maintaining technical standards related to information, documentation, discovery and distribution of published materials and media

125+ Member organizations

Volunteer driven organization: 400+ spread out across the world

Represent US interests to ISO in the areas of Information & Documentation

## Standards are familiar, even if you don't notice

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#### Machines don't talk like people do

Sometimes I wish you had a little green light that would blink on and off like the computer, so I could tell whether you're processing anything or if you've just frozen up.

#### September 6, 2012

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## How did we get here?

- OAI–PMH Protocol
  - Developed in 2001 (v 1.1, v 2.0 2002)
  - Developed by Herbert van de Sompel, Carl Lagoze, Michael Nelson, and Simeon Warner
  - Fairly wide adoption in scholarly community
- In spring 2011, NISO approached OAI to discuss updating PMH Protocol
- Response was "Let's try something else more in line with more modern

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# Agreement to launch RSync as a NISO standards initiative

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Partnership on grant application

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OAI team comprised core technology team

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Vetting & education by NISO

## Special thanks are due to...



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## ResourceSync Working Group

Herbert Van de Sompel (Chair) Los Alamos National Laboratory

**Todd Carpenter (Co-Chair)** National Information Standards Organization (NISO)

**Nettie Lagace** National Information Standards Organization (NISO)

Manuel Bernhardt Delving B.V.

Kevin Ford Library of Congress

Bernhard Haslhofer Cornell University

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Martin Klein Los Alamos National Laboratory

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Carl Lagoze Cornell University

Stuart Lewis Joint Information Systems Committee (JISC)

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Peter Murray Lyrasis

Michael Nelson Old Dominion University David Rosenthal Stanford University

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Christian Sadilek Red Hat

Shlomo Sanders Ex Libris, Inc.

Robert Sanderson Los Alamos National Laboratory

Sjoerd Siebinga Delving B.V.

**Ed Summers** Library of Congress

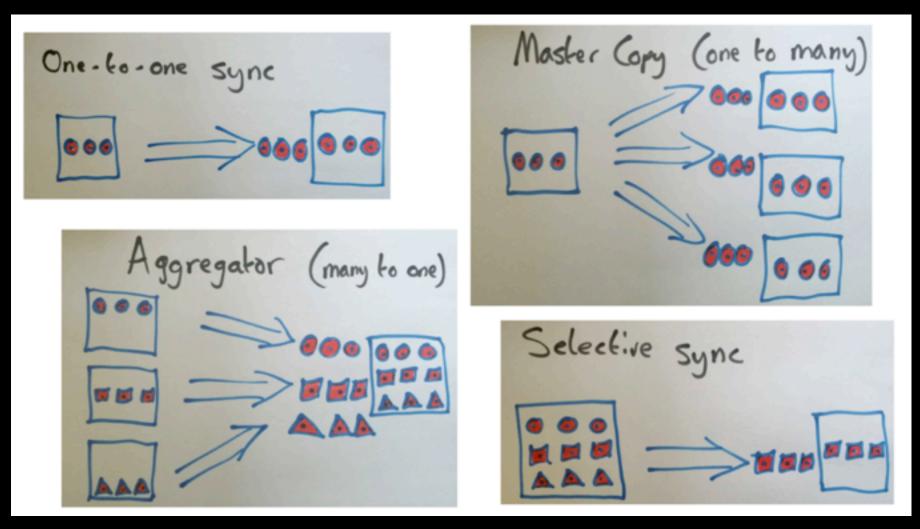
Simeon Warner Cornell University

Jeff Young OCLC Online Computer Library Center

#### What are we trying to do?

- Synchronize web resources things with a URI that can be dereferenced and are cache-able
- Improve on web synchronization methods
- For small websites/repositories (a few resources) to large repositories/datasets/ linked data collections (many millions of resources)
- That change slowly or rapidly
- Focus on needs of research and cultural heritage organizations, but aim for generality

### Use Cases



### More Use Cases

XML meterdate harvesting 

Large data files 

Protected Resources 

Statistics collection 

## Not (yet) Use Cases (i.e.: Out of Scope)

- Bidirectional synchronization
- Destination-defined selective synchronization (query)
- Bulk URI migration

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## Use cases differ

How good is the synchronization?

#### Perfect∢······> Good enough

How fast is the synchronization?

#### Fast **{**------> Fast enough

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## 3 distinct needs regarding resource synchronization

Baseline matching: An approach to allow a Destination that wants to start synchronizing with a Source to perform an initial catch up – Dump.

Incremental resource synchronization: An approach to allow a Destination to remain up-to-date regarding changes at the Source.

Audit: An approach to allow checking whether a Destination is in sync with a Source – Inventory.

=> All 3 are considered in scope for ResourceSync

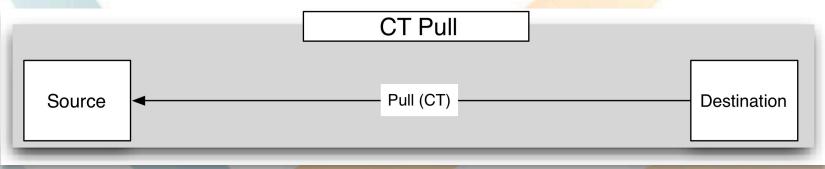
#### **Incremental Synchronization**

Change Notification (CN) Alert that something happened (create,update,delete)

Content Transfer (CT) Transfer of just the change or the full resource

## Trivial versus Optimal

Trivial Approach – Retrieve & Compare



Optimal Approach – push only the change to only the destinations monitoring the resource

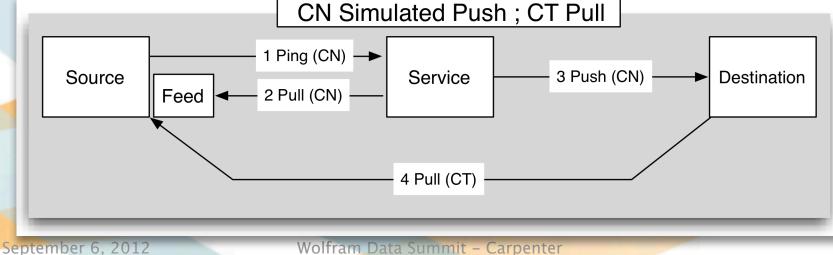
	CT Push	
Source	Push (CT)	→ Destination
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### More advanced option

Feed Extension Solution:

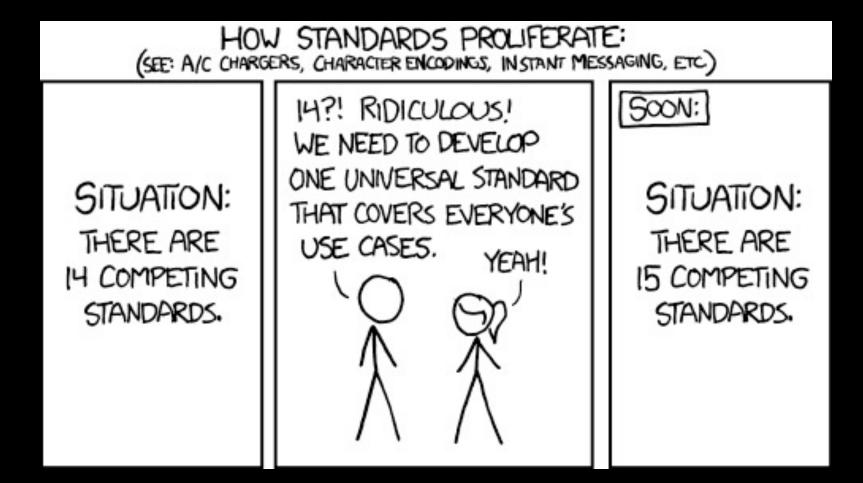
Continue the Feed paradigm, but introduce aggregating service and ping notification to re-pull (simulated push)

Only advantageous if Source already supports a Feed



#### Change Notification – Protocols

Atom PubSubHubbub (PuSH) XMPP PubSub extension **BoSH** (XMPP over HTTP) Comet / HTTP Streaming Open an HTTP connection and keep reading from it **Bayeux Protocol** Long Polling Keep HTTP connection open until a message, then reopen **BoSH**, Bayeux option **WebSockets** NullMQ / ZeroMQ XMPP over WebSockets?



http://imgs.xkcd.com/comics/ standards.png/

## **RSync Alpha**



Open Archives Initiative ResourceSync Framework Specification

#### ResourceSync Framework Specification - Alpha Draft 13 August 2012

#### This version:

http://www.openarchives.org/rs/0.1/resourcesync Latest version:

http://www.openarchives.org/rs/resourcesync

#### Previous version:

none

#### Editors (in alphabetical order):

Bernhard Haslhofer, Cornell University Information Science Martin Klein, Los Alamos National Laboratory Carl Lagoze, University of Michigan Michael Nelson, Old Dominion University Robert Sanderson, Los Alamos National Laboratory Herbert Van de Sompel, Los Alamos National Laboratory Simeon Warner, Cornell University

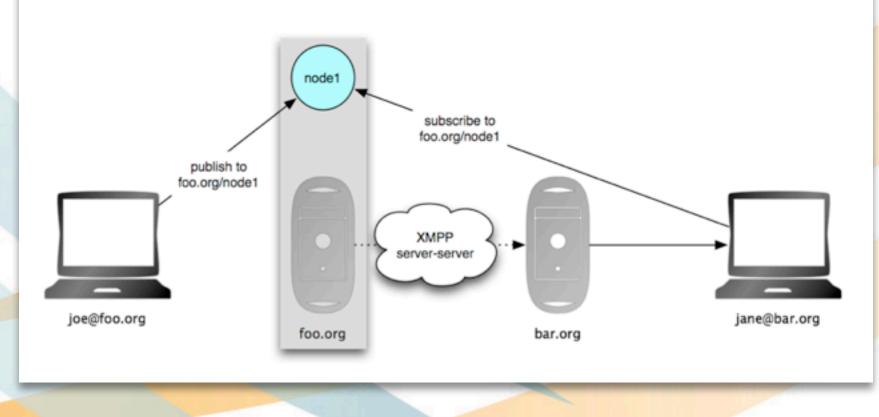
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#### A Framework Based on Sitemaps

- Developing a Modular framework allowing selective deployment
- Sitemap is the core component throughout the framework
- Introducing extension elements and attributes:
  - In ResourceSync namespace (rs:) to accommodate synchronization needs
  - In XHTML namespace (xhtml:) mainly to accommodate discovery needs
- Reuse Sitemap format for Change Sets (both current and historical) and for manifest in Dump

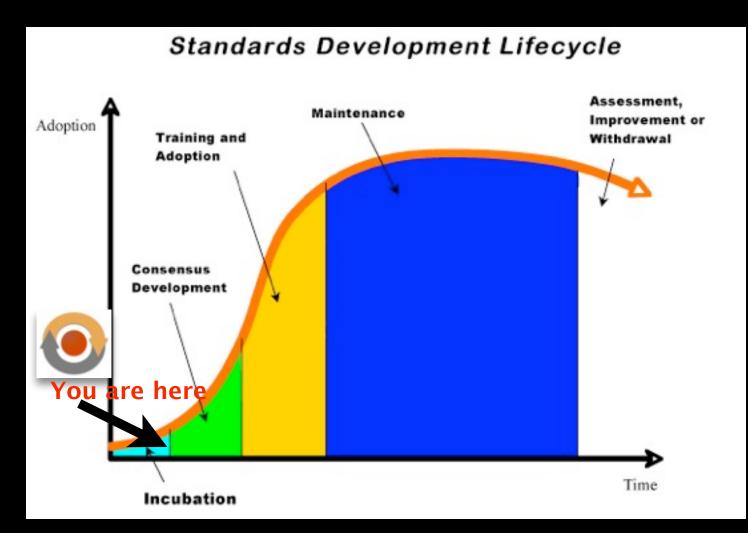
### Communications structure

Pushing Change Sets via XMPP PubSub



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## The lifecycle of standards



## Timeline

- Project Launch = November 2011
- Approved work item = December 2011
- Working Group formed = February 2012
- Webinar on project = March 2012
- JCDL meeting, Washington DC = June 2012
- Alpha = September 2012
- Team meeting, Denver, CO = September 2012

   forthcoming D-Lib article
- Beta/Draft for trail use = ?? December 2012
- Comment period = ?? December 2012 March 2012
- Training = ?? May July 2013
- Approval = ?? December 2013

## More information

Background webinar (March 6, 2012) recording

First draft spec: <u>http://www.openarchives.org/rs/</u> 0.1/resourcesync

Simulator code on github <u>http://github.org/resync/</u> <u>simulator</u>

NISO workspace <a href="http://www.niso.org/workrooms/">http://www.niso.org/workrooms/</a> resourcesync/

List for public comment coming soon

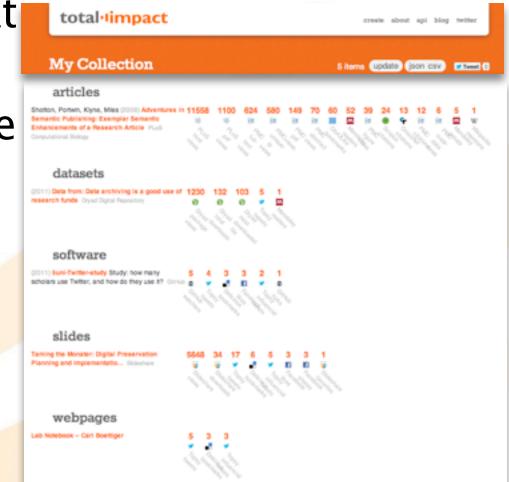
### Standards for Data/Exchange: New Work areas?

Many potential areas for work in sharing of data including:

- Author/Contributor disambiguation & other issues
- Data Equivalence How does one know that this thing and that are equivalent (i.e., contain same data)?
- Systemic metadata
   What is the form of this information?
   What are its structural components?
- Archival issues
   Storage, physical level, metadata, but also migration issues
- Bibliographic information for discovery, delivery and reuse
- Bibliometrics / Assessment & impact
- Rights issues Ownership, recognition, sharing, privacy

## What are appropriate metrics?

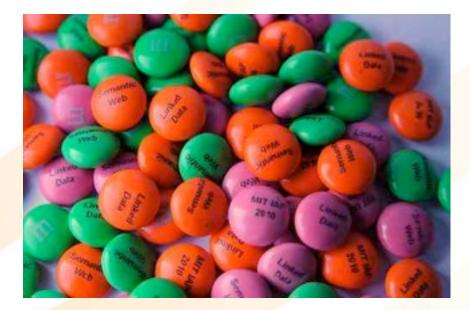
- For datasets, what is a download?
- How does one use compare with another?
- Citation ecosystem needs to develop
- Data papers?



## Data Equivalence

Basically, is an Excel file equivalent to a text file?

Creation of a highlevel conceptual model of data description A "FRBR" for data Defines the distinctions between states & transformations of data **Basis for identification** & description



#### Thank you!

#### Todd Carpenter Executive Director tcarpenter@niso.org

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