



# Resource Access for the 21th Century

*a NISO-STM Initiative*

STM Innovations  
6 December 2017

Julia Wallace  
RA21 Project Director

# What is RA21?

- RA21: Resource Access for the 21<sup>st</sup> Century
- Joint initiative of the International Association of STM Publishers (STM) and the National Information Standards Organization (NISO)
- Aimed at optimizing access protocols across key stakeholder groups
  - Corporate and university subscribers, libraries, software vendors, publishers, identity federation operators, etc.
- Purpose: To facilitate seamless user experience beyond IP address recognition, supporting network security and user privacy

# Late 20th Century: from print to digital

- Imitate print experience for libraries and users
- Optimized for ease of use and removal of barriers to encourage migration from print to digital
- IP address recognition became the *de facto* industry standard for site access



# Early 21st Century: digital and remote



- Technology evolved
- Growing diversified scholarly eco-system
- Multiple entry points, e.g. mobile and remote access
- Changing user expectations and behavior
- Significant growth of usage outside of corporate/campus networks



# RA21 Problem Statement

- IP-based access management increasingly problematic
- No seamless access from any device, location, or search engine
- Inconsistent and confusing patchwork of access solutions while off of the corporate/campus network (e.g. VPN servers, Proxy servers, Shibboleth)
- Increasing volume of illegal downloads and piracy
- Lack of user data to develop user-focused, personalized services

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## Palladium-Based Electrocatalysts for Alcohol Oxidation in Half Cells and in Direct Alcohol Fuel Cells

Claudio Bianchini<sup>†</sup> and Pei Kang Shen<sup>‡</sup>  
Istituto di Chimica dei Composti Organometallici (ICCOM-CNR), Via Madonna del Piano 10, 50019 Sesto Fiorentino, Italy, and The State Key Laboratory of Optoelectronic Materials and Technologies, School of Physics and Engineering, Sun Yat-Sen University, Guangzhou 510275, P.R. China

*Chem. Rev.*, 2009, 109 (9), pp 4183–4206  
DOI: 10.1021/cr9000995  
Publication Date (Web): July 17, 2009  
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\* To whom correspondence should be addressed. C.B.: phone (office), +39 0555225280; fax, +39 0555225203; e-mail, claudio.bianchini@iccom.cnr.it. P.K.S.: phone (office), +86-20-84036736; fax, +86-20-84113369; e-mail, stsspk@mail.sysu.edu.cn., † Istituto di Chimica dei Composti Organometallici (ICCOM-CNR), ‡ Sun Yat-Sen University.

Biography

Claudio Bianchini received his "Laurea" in Chemistry from the University of Florence in 1973. Currently, he is the Director of the Institute of Chemistry of Organometallics of the Italian National Research Council (ICCOM-CNR) in Florence (Italy). He is the author of ca. 430 publications in qualified international journals or specialized books, of 43 patents and relative extensions, and of more than 200 presentations in international chemical meetings. His fields of

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Chem. Rev. 2009, 109, 4183–4206 4183

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The State Key Laboratory of Optoelectronic Materials and Technologies, School of Physics and Engineering, Sun Yat-Sen University,  
Guangzhou 510275, P.R. China*

*Received March 12, 2009*

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**1. Introduction**

*Direct alcohol fuel cells (DAFCs)* are attracting increasing interest as power sources for portable applications due to

kinetics of any alcohol are much slower and still H<sub>2</sub>-fueled *polymer electrolyte fuel cells (PEMFCs)* exhibit superior electrical performance as compared to DAFCs with comparable electroactive surface areas.<sup>2,3</sup> Increasing research efforts are therefore being carried out to design and develop more efficient anode electrocatalysts for DAFCs.

The most common DAFC is the *direct methanol fuel cell (DMFC)*, of which there exist also commercial devices with powers spanning from a few watts to 100 W.<sup>4,5</sup> The large majority of DMFCs, either monoplanar cells for laboratory testing or commercial stacks, operate in acidic media with anode catalysts containing Pt and make use of solid electrolytes constituted by proton exchange membranes of the Nafion family.<sup>6</sup> These DMFCs, however, suffer some disadvantages: CO poisoning of the Pt-based catalysts, effective methanol crossover, degradation of the membrane, and corrosion of the carbon materials and cell hardware.<sup>4</sup> As a result, the fuel utilization and the cell voltage are lower than expected and an excess of Pt loading, often alloyed with Ru or Sn, is required for long lasting applications. Overall, these drawbacks, together with the relative toxicity of methanol, are boosting research aimed at using other alcohols as fuels in DAFCs. Indeed, several higher molecular weight alcohols and polyalcohols are featured by high solubility in water, low toxicity, high boiling point, high specific energy, and the capacity of some of them to be renewable. Included in this group are ethanol, ethylene glycol, and glycerol. The former can be massively produced from biomass feedstocks originating from agriculture (first-generation bioethanol), and forestry and urban residues (second-generation bioethanol). Ethylene glycol can be produced by heterogeneous hydrogenation of cellulose, while glycerol is a byproduct of biodiesel production and, as such, is inexpensive and largely available. These alcohols, however, are difficult to oxidize on platinum or platinum alloys. In particular, no known anode catalyst based on platinum has demonstrated the capacity to produce acceptable power densities in either a *direct ethanol fuel cell (DEFC)*<sup>1</sup> or a *direct glycerol fuel cell (DGFC)*,<sup>1</sup>



2



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The main navigation bar includes links for "Browse the Journal", "Articles ASAP", "Current Issue", "Submission & Review", "Open Access", and "About the Journal". The article title is "Palladium-Based Electrocatalysts for Alcohol Oxidation in Half Cells and in Direct Alcohol Fuel Cells" by Claudio Bianchini\*† and Pei Kang Shen\*‡. The article is from *Chem. Rev.*, 2009, 109 (9), pp 4183–4206. The DOI is 10.1021/cr9000995. The publication date is July 17, 2009. The copyright is © 2009 American Chemical Society.

The "Article Options" section on the right side of the page lists several options: "PDF (2409 KB)", "PDF w/ Links (0 KB)", and "Full Text HTML". The "PDF (2409 KB)" option is circled in red. Other options include "Abstract", "Figures", "References", and "Citing Articles". Below the article options, there is a "Add to ACS ChemWorx" button and a list of additional actions: "Add to Favorites", "Download Citation", and "Email a Colleague".

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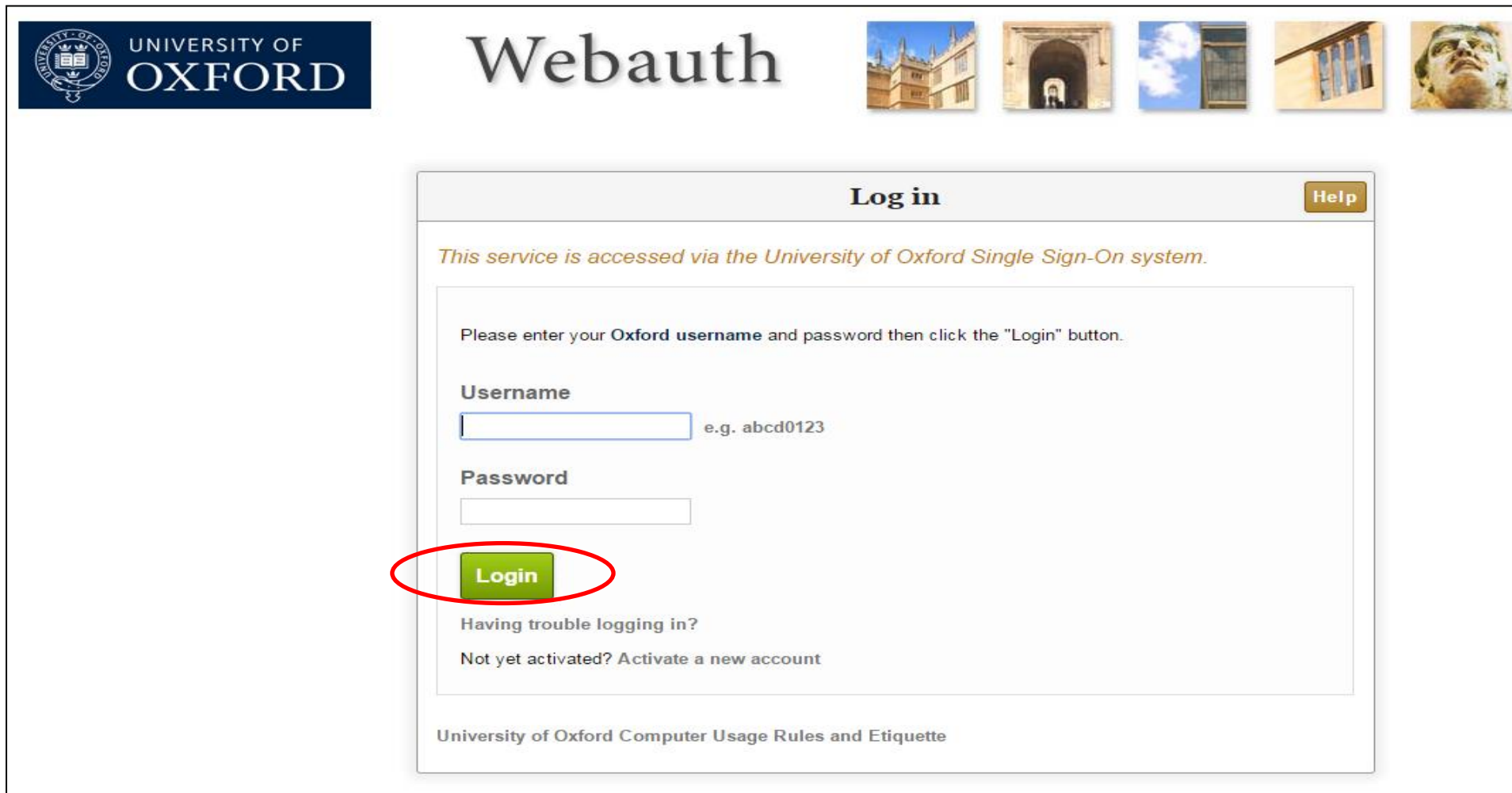
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On the right side of the screenshot, there is a large number "5" and a mouse cursor icon pointing to the "University of Oxford" entry.

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*This service is accessed via the University of Oxford Single Sign-On system.*

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*Chem. Rev.* 2009, 109, 4183–4206 4183

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6

## RA21 Principles: It must be open

- The solution cannot be proprietary
- The solution should be (reasonably) easy to implement
- The solution must be vendor neutral
- Should not create tremendous amounts of new work, implementation cost, or ongoing maintenance.
- Should allow for gradual implementation

➤ **RA21 will develop Best Practice recommendations**

➤ **RA21 will not develop a specific technical solution or one industry-wide authentication platform**



# Three Pilots

## Corporate Pilot

## Academic Pilots:

- **Privacy Preserving Persistent WAYF (P3W)**
  - A shared discovery service based on storing information in the browser
  
- **WAYF Cloud**
  - A shared discovery service based on centralized information sharing

Pilots working together on:

- **User experience and a reference UI**
  - **Privacy and security issues**

# RA21 Timeline

- Q3 16 – approval STM Board, taskforce, use cases, guiding principles
- Q4 16 – first public presentations on RA21, first workshop
- Q1 17 – staff hiring, project adoption by NISO
- Q2-Q4 17 – workshops and outreach
- Q1 18 – round-up pilots
- Q2 18 – 1st draft best practices
- Q3 18 – publication of project results

**Anticipated Long-Term Outputs arising from RA21:  
Operational User Communities**

# Who's Involved

## Steering committee

- Chris Shillum, **Elsevier** (Co-chair)
- Meltem Dincer, **Wiley** (Co-chair)
- Gerry Grenier, **IEEE**
- Laird Barrett, **Springer Nature**
- Ralph Youngen, **ACS**
- Dan Ayala, **Proquest**
- Don Hamparian, **OCLC**
- Leif Johansson, **SUNet**
- Ann West, **InCommon**
- Andy Sanford, **Ebsco**
- Josh Howlett, **Jisc**
- Rich Wenger, **MIT**
- Peter Brantley, **UC Davis**
- Helen Malone, **GSK**
- Todd Carpenter, **NISO**
- Eefke Smit, **STM**
- Ann Gabriel, **Elsevier** (RA21 Outreach Committee)

## Outreach & Communications committee

- Michelle Brewer, **Wolters Kluwer**
- Sam Bruinsma, **Brill**
- Angela Cochran, **ASCE**
- Ann Gabriel, **Elsevier** (Chair)
- Don Hamparian, **OCLC**
- Robert Kelshian, **American University**
- Tim Lloyd, **LibLynx**
- Judy Luther, **Informed Strategies**
- Matt McKay, **STM**
- Jonathan Morgan, **ACS**
- Jean Shipman, **Elsevier**
- Lauren Tulloch, **CCC**
- Keith Webster, **Carnegie Mellon University**

## Staff

- Julia Wallace, **Project Director**
- Heather Flanagan, **Coordinator Academic Pilots**
- Jenny Walker, **Coordinator Corporate Pilot**

## Combined with our Multi-stakeholder Advisory Group & Pilot Participants:

- Over 65 organisations from key stakeholder communities are represented within RA21



# Resource Access for the 21th Century

## *Position Papers*

Heather Flanagan, RA21 Academic Pilot Coordinator

# RA21 Position Papers

- What are position papers?
  - short, targeted documents describing agreed upon best practices that can be implemented today
- Who is the target audience?
  - IT managers and leaders

# Recommendations to Identity Providers and Federation Operators

- need for more complete metadata records from Identity Providers (IdPs) in SAML-based federations
  - this will allow Service Providers (SPs) to offer end users a better user experience
- review session management configuration to (potentially) support logins once per business day and offer a seamless experience for all SPs

# Recommendations to Content Providers

- normalize the language used on user-facing authentication pages
- basic presentation of login options to the user
- making use of the MDUI hints (esp. logos) offered by the IdP

## (Possible) Future Papers

- Additional papers may be developed
  - looking for early wins and consensus on specific items
- These papers, along with the other outputs of the project, will wrap up in a final package that will be fed through the NISO standards process



# RA21 Corporate Pilot: *A Customer Perspective*

**Helen Malone**

**Director, Information  
Hub**

6<sup>th</sup> December 2017



# Objectives for the RA21 Corporate Pilot

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- Test **Single Sign On** access with pilot publishers
- Improve the **user experience** at pilot publisher sites
- Explore ways to capture **granular usage statistics**

# Corporate Pilot: Pharma Companies & Publishers



abbvie

 - **BASF**

Roche

gsk



 **NOVARTIS**

 **ACS**  
Chemistry for Life®

**SPRINGER NATURE**

**WILEY**

# Example of a Potential New Access Model: Inside the Corporate Network



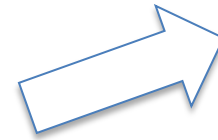
## Step 1:



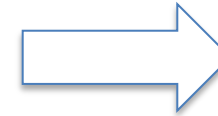
**Enter your work email address:**

**Or find your company name:**

No personal information stored



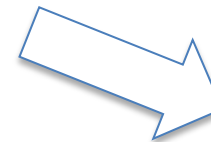
sciencedirect.com



acs.org



springernature.com



wiley.com

**Example: 90-day cookie for  
future 1-click access**

**SSO  
(eg Ping Federate)**

# Example of a Potential New Access Model: Outside the Corporate Network



## Step 1:

Enter your work email address:

*Helen.J.Malone@gsk.com*


Or find your company name:


*GSK*

No personal information stored

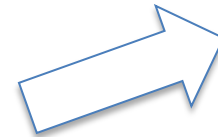
## Step 2:

**GSK Login Page**

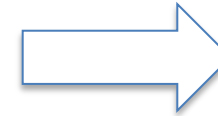
 Username

 Password

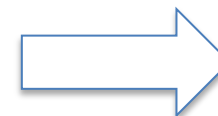
Login »



sciencedirect.com



acs.org



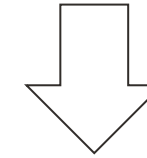
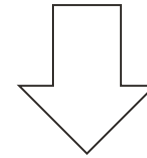
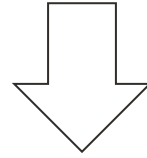
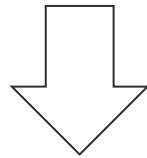
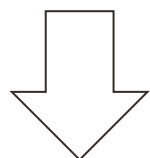
springernature.com



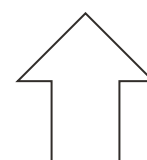
wiley.com



# Easy Set Up between Companies and Publishers?



One Corporate Federation

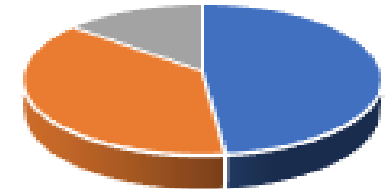


# Usage Statistics: Knowing what and when our users download

1. User **Login ID** or Email Address

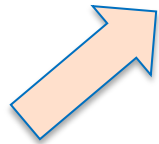


Monthly **Automated**  
Secure File Transfer



Meaningful **Usage**  
Reports

2. Publisher **Bibliographic** Info  
3. Publisher **Date / Time** Stamp



# Usage Statistics: An additional attribute

---



**User Level Statistics**



# Working Together in Partnership



## Phased Approach to Implementation



## User Experience

December 6, 2017

Ralph Youngen, Director, Publishing Systems Integration,  
American Chemical Society  
RA21 Steering Committee Member

# RA21 User Experience

***“You have to start with the customer experience and work your way back to technology.”***  
***— Steve Jobs***

# RA21's User Experience Challenge

- Today:
  - Awesome user experience on campus
  - Awful user experience off campus
- Tomorrow:
  - Consistent user experience anywhere on any device
- **Challenge:**
  - **On campus user experience will become slightly less seamless**

# RA21's User Experience Goals

- Improve the Where Are You From (WAYF) User Experience
  - Encourage consistency across all publisher websites
- Reduce the number of times a user encounters the WAYF
  - Share users' preferred identity providers across publishers subject to both user privacy and publisher confidentiality concerns

# RA21 UX Development Across the RA21 Pilots

- Corporate Pilot
  - Developed prototype
  - Tested prototype

Check access

Enter institutional email or Search institution

Check access

Back

General Access

Institution Email

Institution Name

Institution name or

publications  
 are overly repetitive  
 (x for one session)

address that will

collected

Institution  
 company

should I use?

# RA21 UX Development Across the RA21 Pilots

- UX work that began under Corporate Pilot is continuing as a single track across both the P3W and WAYF Cloud pilots
  - Heavy emphasis on how to accomplish cross-publisher sharing of prior identity provider choices

## RA21 UX Demo

*Warning: Work in Progress!*

# Pilot Approaches to Cross-Publisher Sharing

## P3W vs. WAYF Cloud

	Sharing Approach	User Experience Impact	Security/Privacy Impact
<b>P3W</b>	Prior identity provider choices are stored in local browser storage.	Tradeoff between UX options at publisher site and browser compatibility. May require iFrames or other approaches that stretch browser compatibility.	Less impact. Only IdP choices stored. All data stored in local browser.
<b>WAYF Cloud</b>	Prior identity provider choices are stored in a centralized service.	Less impact. Prior identity provider choices are retrieved via backend call to centralize service.	Potential concern. Requires trusted third party to protect data. May not be compatible with privacy regulations.

### Evaluation Criteria:

- UI/UX Flexibility
- User Privacy
- Publisher Privacy
- Browser Compatibility
- Implementation Complexity
- Transparency
- Resilience
- Etc.



# Questions?



RA $\rightarrow$ 21



# The P3W Pilot

## Privacy Preserving Persistent WAYF

December 6, 2017

Chris Shillum  
VP Identity and Platform Strategy, Elsevier  
RA21 Co-chair

# P3W Pilot Goals

## To improve current SAML (Shibboleth) Identity Provider (IdP) discovery process

- Incorporate additional “WAYF hints” such as email domain and IP address into federation metadata
- Use both browser information and shared metadata hints to narrow down IdP options for the user without tracking the user
- Improve sign-in flow by using smart search and asking for minimal information up front
- Implement consistent, familiar UX across participants
- Enable cross-Service Provider persistence of WAYF choice using browser local storage

## Pilot participants

SUNet (lead)

Geant (project management)

American Chemical Society

CANARIE

EBSCO

Elsevier

Johns Hopkins

LibLynx

myunidays

OpenAthens

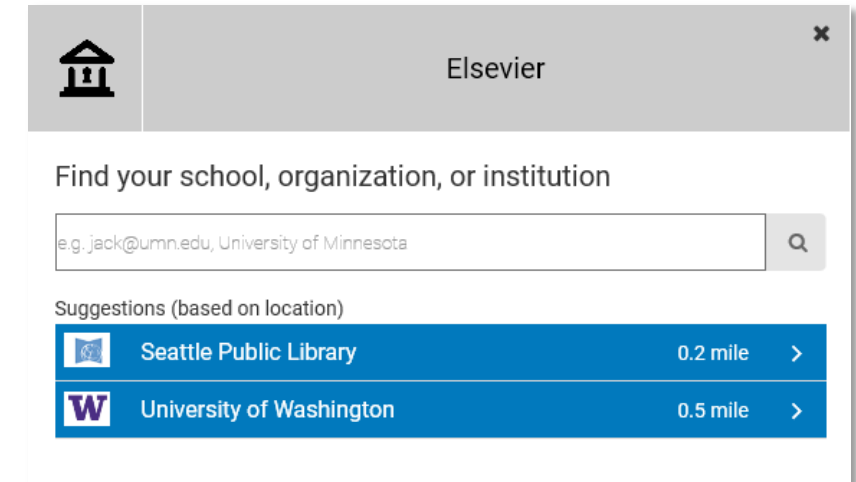
ProQuest

University of Nottingham

# P3W Components

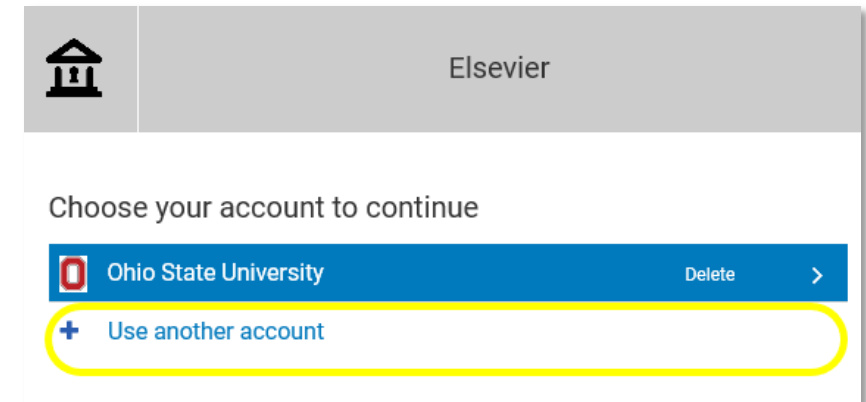
## IdP Search

- “Smart” search service making use of IdP metadata and browser hints and knowledge of which service providers work with which IdPs



## IdP Choice Persistence

- Remembers previously used IdPs in browser local storage
- Gives user control over which service providers they share this information with



Services may be used separately in deep integration model

# P3W Integration models

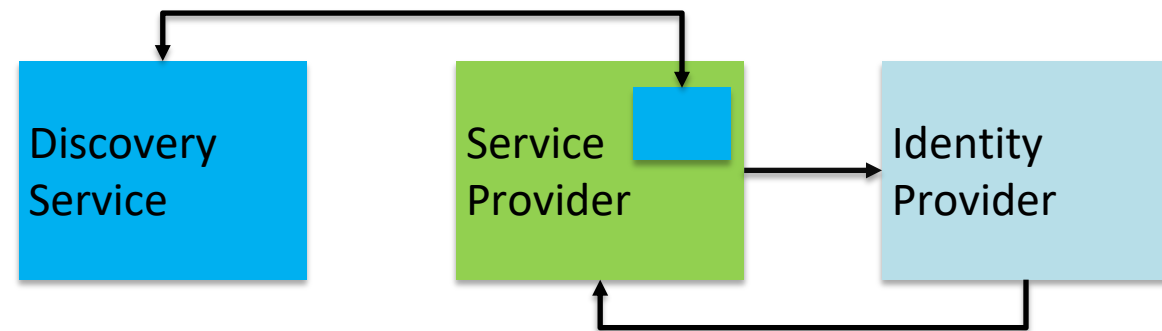
## Central discovery service

- Service provider redirects user to central site to handle IdP selection
- Very simple integration model for SPs



## Deep integration

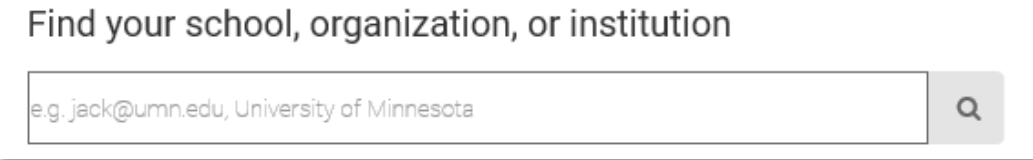
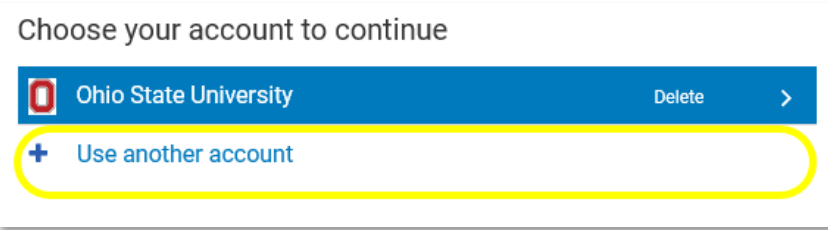
- Service provider integrates search and/or IdP choice persistence into their own UI using shared Javascript
- Allows for more seamless UX



## UI Flow – User Perspective

- Step one: discovery service checks the browser's local store and displays the last IdP (or set of IdPs) used by the user.
- Step two: if the local browser store is empty, or if the user chooses not to use any of the IdPs offered, the user will be presented with a search interface or a list of IdPs

# Preserving Privacy

	Technique	Challenge
 <p>Find your school, organization, or institution</p> <p>e.g. jack@umn.edu, University of Minnesota</p>	Full email address (if entered) does not leave the browser: Only domain needs to be shared with discovery service and only IdP choice needs to be shared with service provider	Need to define and test a standardized UI that makes this clear to users
 <p>Choose your account to continue</p> <p>Ohio State University Delete &gt;</p> <p>+ Use another account</p>	IdP preference is stored locally in the browser, retrieved using centrally served javascript, not on a central server	Need to ensure that this model is compatible with latest browser initiatives to tighten up cross-domain communication

# Challenges

- **Architecture for deep integration option**
  - There are several different models for integration, e.g.
    - iFrames to render part of UI
    - iFrames for inter-domain messaging
  - Need to find right balance between UI consistency and flexibility and browser security model
- **Local accounts**
  - Most SPs need to support a variety of integration models
    - Local usernames/passwords
    - Non-federated IdPs
    - Need to ensure that these options can be smoothly accommodated in the UI flow
- **IdP Metadata**
  - Need IdPs to ensure necessary information (email domains, logos, etc) is accurately and consistently included in federation metadata
  - Need feedback process when metadata is incorrect, incomplete or inconsistent



# Progress and Next steps

- **SUNet's pyff.io pilot platform has been extended to support:**
  - Cross-domain shared settings based on browser local store and hidden iFrame messaging
  - Low-level discovery client API
  - jQuery widget to provide customizable discovery API
- **Several other pilot participants are now working to integrate with this service in a sandbox environment**



# The WAYF Cloud Pilot

December 6, 2017

Meltem Dincer  
VP, Platform Capabilities, Wiley  
RA21 Co-chair

# WAYF Cloud Pilot Goals

## To provide a seamless user experience as close as possible to IP Authentication

- Eliminate steps users have to repeat at every publisher
- Leverage existing organizational systems/protocols for user authentication
- Create an infrastructure for sharing WAYF data amongst publishers
  - Embrace OpenSource Software development
  - Establish easy integration points with service provider platforms
- Look to form a potential industry standard for WAYF data exchange
  - Data Format
  - Modern Interface Specification

## Pilot participants

Atypon

OpenAthens

RINGGOLD

SAGE

Silver Chair

UC Davis


Wolters Kluwer


WILEY

# Desired User Access Experience

## Private Experience

Log In

 Continue with Facebook

 Continue with Google

Email \_\_\_\_\_


Password \_\_\_\_\_

Remember Me [Forgot Password?](#)

[Log In](#)

## Target Institutional Experience

Log In

 Continue with  
University of Wassamotta

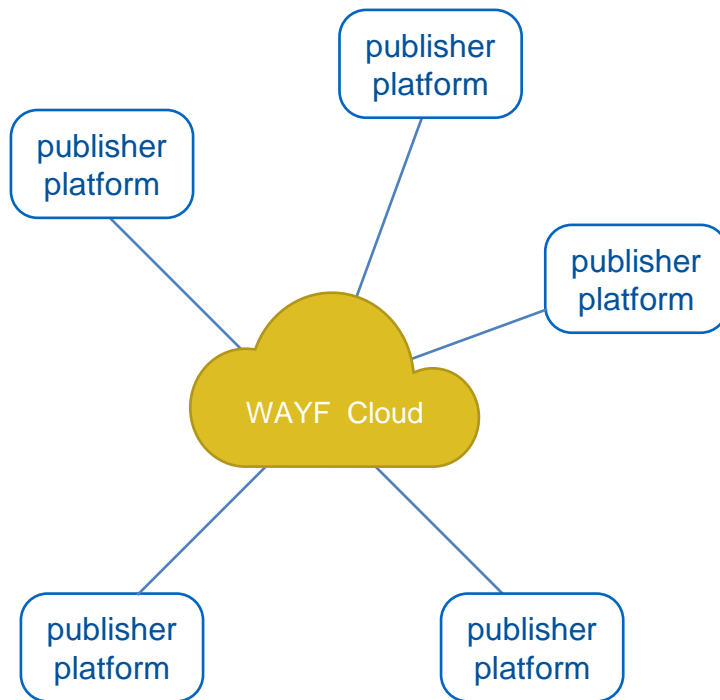
Email \_\_\_\_\_

Password \_\_\_\_\_

Remember Me [Forgot Password?](#)

[Log In](#)

# The WAYF Cloud at a glance



## What is it?

- Data Format Definition
- Interface Specification
- a server component

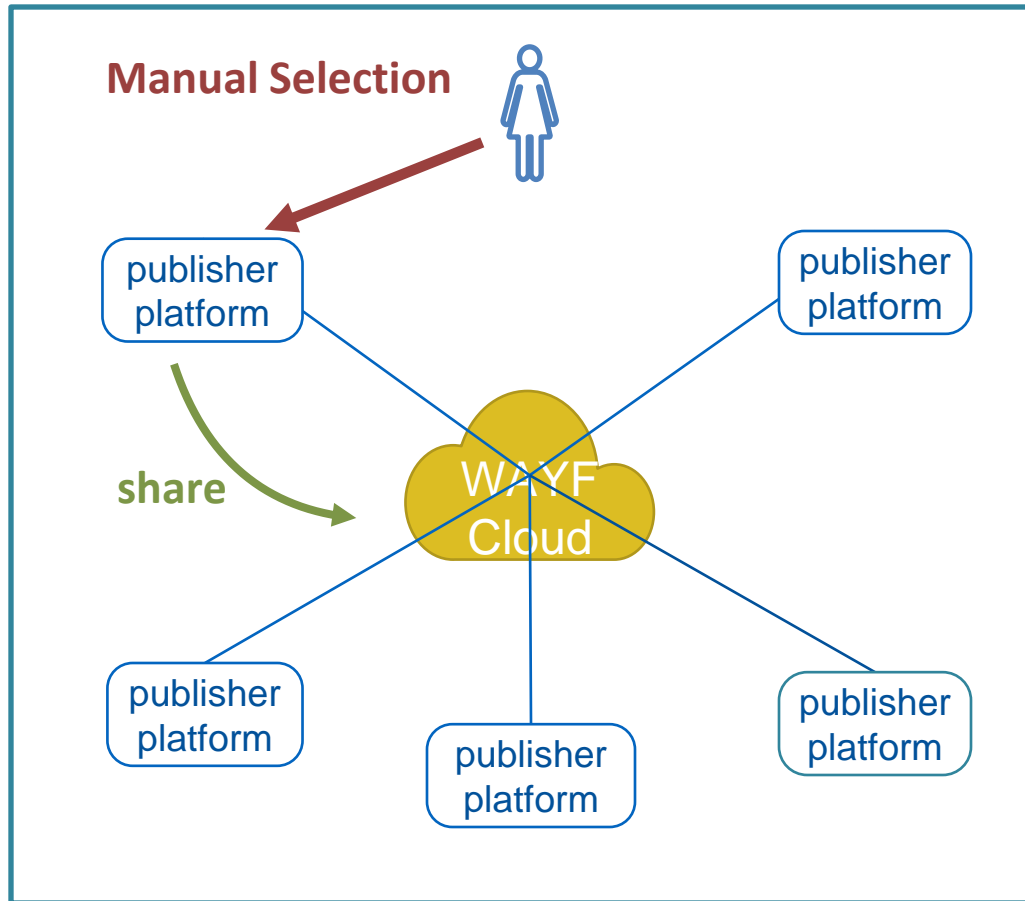
## What does do?

- allows platforms to communicate with each other by
  - storing data **shared** by the platforms
  - **servicing** the data back to the platforms

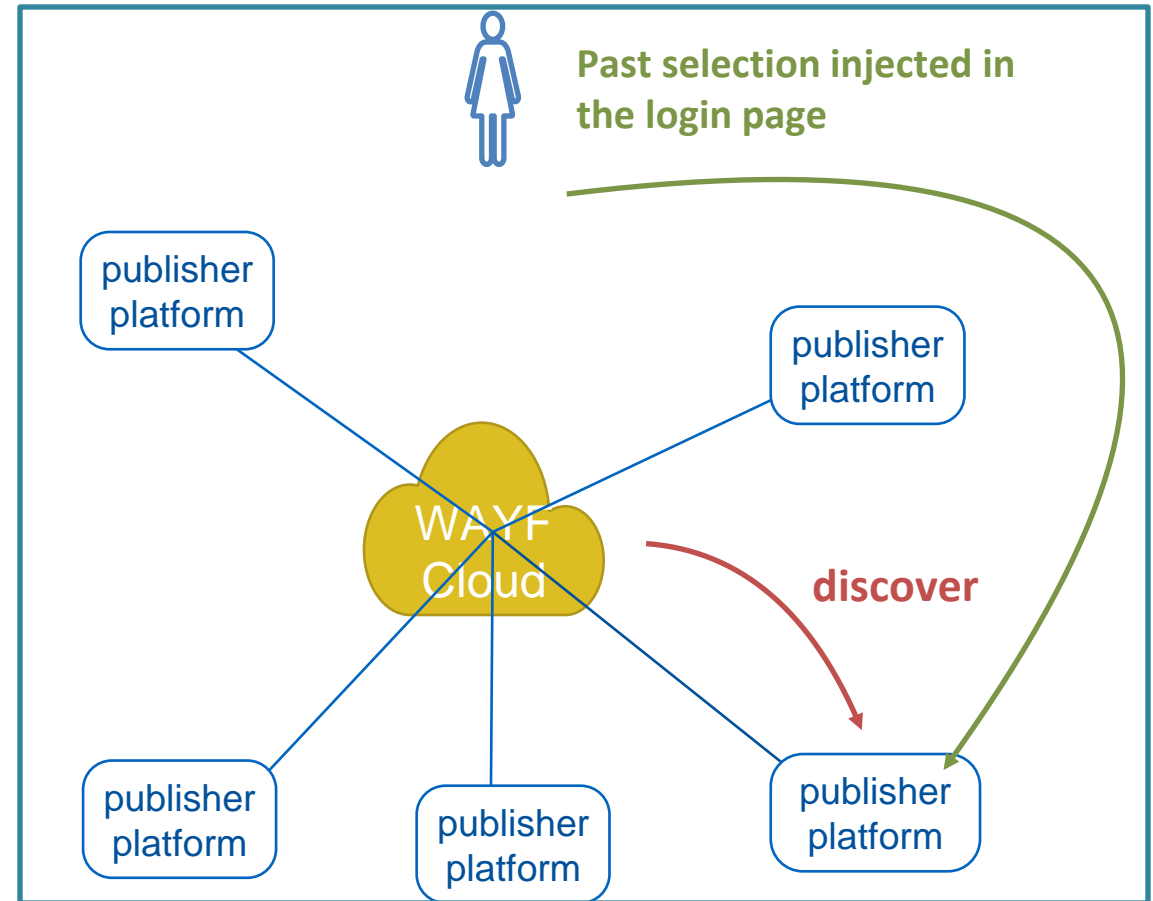
## Architecture:

- Shared Infrastructure
- Decentralized **Trust Model**

# How does it work?



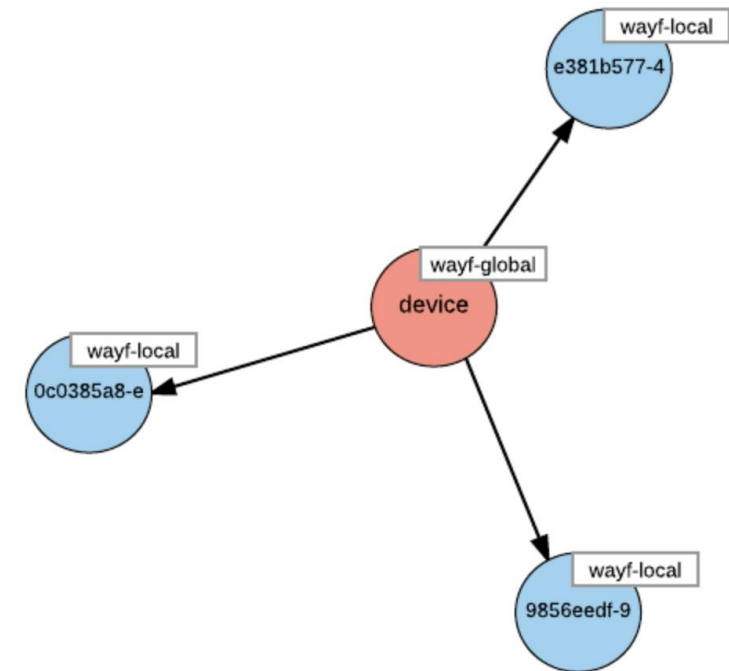
First visit



Second visit

# WAYF Cloud Components

- **WAYF Cloud Widget:**
  - Transfers the unique identifier of the device in the domain of the service provider
  - Service provider simply incorporates the WAYF Widget URL into relevant HTML pages
- **WAYF Cloud API**
  - Interface used by the service providers to Create, Discover, Share and keep up to date a user's WAYF history
- **WAYF Cloud**
  - Centralized service that assigns a global ID to the device and maintains the relationships with the local IDs
  - The global ID is stored at the device in the form of a cookie and its carried in all requests made by this device (i.e web browser) to the WAYF Cloud server.
  - Uses the information provided by the WAYF Widget to build relationships between a user's global ID and the different local IDs used by the different service providers for this device
  - **The relationship enables the seamless user experience**



# WAYF Cloud Challenges

- Security/Privacy
- Maintaining an open sourced common code base
- Operating a shared service



# RA21 – Security & Privacy – For all pilots

## **Privacy Track (non-technical)**

- Analyze data collected for intended use and storage to ensure compliance with data privacy regulations (GDPR, GLBA, etc.)
- Perform privacy impact assessments
- Validate privacy controls are commensurate with data values per best practices

Final Results: Recommendations for privacy controls

## **Security Track (technical)**

- Assess pilot against information security & web development best practices:
  - Adherence to W3C web development standards
  - Secure coding practices
  - Vulnerability management
  - Penetration testing
  - Authentication standards

Final Results: Recommendations for following W3C standards with proper security controls

# Operating an open sourced shared service

## Development

- Contributor License Agreement and documented contributing process
- Copyright ownership
- Organization to receives the contributions
- Governance
- Development process
- Release process
- Testing process

## Run Time

- How do we know what's running is what's on GitHub?
- Who runs the service?
- Who takes the responsibility for failure?
- Who owns the data?
- How and who manages SLAs (performance, security, privacy, etc.)?

# Progress – Development

Open Sourced  
Licensed under Apache v2.0

The screenshot shows a GitHub repository page with the following details:

- Repositories:** 5, **People:** 5, **Teams:** 0, **Projects:** 0
- wayf-cloud:** Java, 3 stars, 1 fork, Apache-2.0 license, updated 2 hours ago.
- wayf-access:** JavaScript, Apache-2.0 license, updated 3 days ago.
- wayf-client-node:** JavaScript, Apache-2.0 license, updated 22 days ago.
- wayf-admin:** JavaScript, 1 fork, Apache-2.0 license, updated on Sep 14.

API documentation web-site for vendors  
interested in integrating with the WAYF Cloud

The screenshot shows the WAYF Cloud Hub website with the following content:

- WAYF Cloud** logo and navigation links: [About](#), [Platform Integration](#)
- The WAYF Cloud Hub** title
- Text: "Welcome to the WAYF Cloud hub. You'll find high level project information, as well as comprehensive guides and documentation to help you integrate your platform with the WAYF Cloud."
- Buttons: [LEARN MORE](#), [GET STARTED](#)
- Footer: [Home](#) dropdown, [Search](#) input
- The Challenge** section:
  - Text: "Universities, academic institutions, and other organizations typically use Identity Management systems to provide their members access to a variety of content and services."
  - Text: "In an environment where users from different organizations can access the same resources, the content and service providers are challenged"

# Progress - Sandbox

- Sandbox system & working demo  
<https://wayf-cloud-sandbox.literatumonline.com>

WAYF Cloud Inspector

Browser: Firefox (version: 57)  
Operating System: Mac OS - 10.13  
Last seen at Red Publisher (a few seconds ago)

Forget me

Identity Providers    Activity

	Organization	Last Used	
DC	Delta College	a few seconds ago	delete
UoA	University of Alpha	a few seconds ago	delete

About the WAYF Cloud

Red Publisher

Choose your Account

$\delta$	Delta College	x
$\alpha$	University of Alpha	x

More options

© 2017 Red Publisher

# Working Groups and Next Steps

- Privacy & Security – Face to face workshop on Dec 8th
- Interface Specification / Realization
- Testing & Usability Evaluation
- Operating the shared service

# Questions?



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