

Enabling OpenAthens-Single Sign-On (SSO) Remote Access Authentication to e-Resources: A Case Study

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ABSTRACT

Accessing the library's subscribed electronic resources remotely by users has always been a challenge for the library. KMC Health Sciences Library, Manipal relied on proxy-based authentication to remotely cater its e-resources to library users. To enhance the secure usage of electronic resources and to provide user-friendly authentication, the library has considered a Single Sign-On (SSO) remote access through OpenAthens. The article demonstrates the setup process of OpenAthens and the various steps involved in the transformation of the library from proxy-based authentication. The single sign-on setup at the library has benefited users in having a single set of credentials to access all the library e-resources, reducing the hassle of remembering multiple login credentials. Features such as cloud hosting, granular usage reports, and the admin dashboard gave complete hold on the usage of library e-resources. Although OpenAthens has its merits, the setup process involved challenges in the integration of existing library-subscribed e-resources. This article provides insight into the step-by-step process of enabling OpenAthens, addresses troubleshooters, and makes recommendations to libraries looking towards SSO remote access.

Keywords: Proxy; Electronic resources; Secure usage; KMC health sciences library; MAHE

1. INTRODUCTION

Academic libraries advocate for a well-equipped library and resources made available to their patrons around the clock. Print resources in academic libraries are only available to users during the library's operating hours. As a result, digital resources have become increasingly important in academic libraries. Digital resources are explained in simple terms as an acquisition of knowledge to promote learning and enhance the quality of life by relying on digitally convenient books, journals, magazines, newspapers, and other materials using information communication technology tools¹. Digital resources have revolutionised the traditional library system; the speedy nature and the comprehensive access to the updated information in a global manner caught the interest of patrons. Digital resources give a greater emphasis on access and not on collection⁶.

1.1 Remote Access Service

A library provides a variety of services to the end-users, and a remote access service is one such service

that allows patrons to retrieve library materials away from the library premises. A remote access service is a process of connecting remote users to the library subscribed resources mediated through an application or VPN (a virtual private network). Authentication in the library helps maintain and manage information for customers managing the information to customers by providing services such as uninterrupted access without compromising security, standards, and privacy⁴. Patrons can access library-subscribed electronic resources using a local area network on a computer steadily within the campus. However, providing remote access to distant users who reside away from the campus to access library's subscribed content is restricted due to copyright issues and vendor agreements.

1.2 Authentication Methods

1.2.1 Proxy Authentication

Proxy-based authentication mechanisms are widely used in libraries nowadays because of their ease of adoption. The proxy systems are cost-effective and help libraries secure their subscribed content⁵. Proxy-based authentication system uses a computer/ application as a

gateway between the client and server. When a client sends a request for information, the proxy application detects the client's identity, acts as a gateway, and processes the request⁷. (Iles, 2015). Examples include EZProxy, WAM Proxy, Oracle Proxy.

1.2.2 Non-Proxy Authentication

There are many non-proxy authentication systems, which can be either single-factor or multifactor systems, such as a biometric system or login through Facebook. A popular non-proxy authentication system that has been widely discussed around the world in recent years, is single sign-on access.¹⁰ Single sign-on access is a value-added service provided by the libraries to allow end-users to get their hands-on library electronic resources, which are licensed and subscribed content using a single set of credentials. Examples include OpenAthens, FusionAuth, Duo Security, JumpCloud.

2. LITERATURE REVIEW

Inman and Tatterson⁸ opined that OpenAthens authentication allowed remote access to library resources and its introduction increased the number of users, and the article found that most users happened to be graduates. Li,¹¹ *et al.* pointed out that OpenAthens offered user-friendly access to the off-campus users. OpenAthens provided benefits such as searching through the library websites, continuous access, and single institutional login credentials to access library subscribed resources securely. Ruenz¹⁷ compared the user experience of using EZProxy and OpenAthens and found that OpenAthens provided a superior online experience. The article concluded that OpenAthens maintenance is easier compared to EZProxy. Romano¹⁵ and Jayakanth,⁹ *et al.* explained that the OpenAthens system provided benefits like single sign-on, customisation, and detailed reports of usage. The author also emphasised that OpenAthens mitigated user privacy issues faced while using EZProxy and provided secure authentication, seamless user experience, and complete control by providing accurate statistics of remote users.

Rosenfeld J. & Enoch T.¹⁶ elaborated on managing the EZProxy server. The article was based on a discussion done in the workshop about the service's ins and outs. Here, detailed data on the usage of the EZProxy server was given, and methods that can be used to bridge the gap between the patrons and the accessibility of this service and to identify the concerns regarding the security of the system. Colquitt³ depicted that diverse resources are required to provide information for various subject field users and information services to access international journals are dispensed through EZProxy. The study discussed the problems associated with accessing international journals and how a single sign-on system provided seamless access to remote users. Nurse¹³ *et al.* and Clamon T.² analysed library resource data of EZProxy and OpenAthens systems to find the extent of use of online library resources by distance learners. In his conclusion, the author highlighted that OpenAthens reduced the

challenges faced by university libraries in understanding the shift from print to digital resources and competed with standard digital libraries of the world.

Radha & Reddy¹⁴ stated that the technologies are based on a single sign-on approach. With the help of the single sign-on method, the user can get permission only once for all the software available on the applications and the user needs to log in only once for all the sessions and not multiple times. The author concluded that there is an increase in productivity as mobility increases. Mikesell¹² examined the experiences of libraries in implementing a proxy-based authentication system. The article brings up various problems involved in implementation and solutions to the issues that the colleges have undertaken during the process of implementation.

3. BACKGROUND OF THE STUDY

Remote access to library subscribed resources was introduced in KMC Health Sciences Library, Manipal Academy of Higher Education (MAHE), Manipal, way back in 2013. Library resource access service provision away from college premises i.e., Off-campus remote access was enabled through EZProxy authentication.

EZProxy allows patrons to access library subscribed resources securely. It is a web proxy server used by libraries to give access to users residing away from the campus using an IP address of their personal computers to authenticate the restricted access of the library content. EZProxy is a URL rewriting program; it works by altering the URLs within the web pages provided by the vendors of the subscribed resources.¹⁹

The proxy-based solutions have some limitations, such as:

- Only the "organisation" is recognised
- All users are anonymous members of the organisation
- No categorisation of users is possible
- No granularity of statistics
- Users must register for personalisation, e.g., saved searches
- No accountability if users breach the license agreement

To overcome the limitations of EZProxy the library is now looking to upgrade to enhance the quality of the remote access service provided to the users.

4. PROBLEM STATEMENT

The KMC Health Sciences Library has considered implementing OpenAthens SSO based remote access to library subscribed content securely to authentic patrons. The enabling process is complex and novel to the librarians as academic libraries are still on the verge of developing. The study elaborates the enabling process and challenges encountered during the implementation and paves a way to easy understanding to those librarians looking to facilitate SSO through OpenAthens in their respective libraries. The present study is entitled "Enabling OpenAthens-Single Sign-On (SSO) Remote Access Authentication to e-Resources: A Case Study".

5. OBJECTIVES

To explain the rationale for choosing SSO over proxy authentication in KMC Health Sciences Library, MAHE, Manipal.

- To describe the migration process from proxy authentication to SSO, specifically via OpenAthens.
- To analyse the challenges encountered during and after the implementation of SSO via OpenAthens.
- To discuss the benefits of OpenAthens after the implementation of SSO.

6. METHODOLOGY

The methodology involved conducting a literature search on institutions that have implemented OpenAthens, to identify best practices and potential challenges. In addition, the KMC Health Sciences Library’s librarian was consulted to gather information on the library’s collection and the reasons behind the decision to upgrade from the existing proxy authentication system. Finally, input from experts was sought to evaluate the suitability of OpenAthens for the library’s collection and services.

7. DISCUSSION

The technological advancements in the library have changed drastically to provide better services. This section elaborates in detail on the setup process of OpenAthens and highlights various challenges and benefits encountered in the process.

7.1 SSO Vs. Proxy

The proxy authentication implementation process was complicated, especially integrating the electronic resources for patrons’ access and the librarian had no control over the unauthentic usage. It is imperative to know the added advantages of SSO over Proxy. The differences gave a clear idea of why SSO has been the chosen one (Sewell, 2008)¹⁸. Table 1 depicts the merits of SSO compared to Proxy-based authentication available in the market.

7.2 Why Choose OpenAthens

The leading SSO access authentications in the market are OpenAthens and Shibboleth. Shibboleth is an open source software package system for federated identity management in libraries. Even though both are SSO authentication systems, OpenAthens has marginal advantages over Shibboleth in adoption in the KMC Health Sciences Library. Table 2 elaborates on the reasons for choosing OpenAthens over Shibboleth.

7.3 OpenAthens

OpenAthens is provided by JISC, a non-profit British information technology company, and is a popular identity and resource access management service used in libraries. It offers a single sign-on service, enabling end-users to log in just once with

a single set of credentials to access all the library-subscribed electronic resources. OpenAthens is a value-added service that reduces the hassle of logging in multiple times on different databases and allows remote access.

Table 1. Comparison of features between SSO and Proxy

Features	SSO	Proxy Authentication
Single Sign-on Access	✓	✗
SSO with federated resources	✓	✗
Creating user groups	✓	✗
Admin dashboard	✓	✗
Two-factor authentication	✓	✓
Personalization	✓	✗
User Management	✓	✗
Cloud hosting	✓	✗
IP Recognition	✗	✓
Permission sets	✓	✗
SAML integration	✓	✗
Resource link generator	✓	✗
Statistics by individual user	✓	✗
Statistics by user groups	✓	✗
Statistics of resource usage	✓	✗
Statistics reporting	✓	✓
Global standards	✓	✗
User friendly	✓	✓
Setup process	simple	IT help required
Maintenance	Lifetime	One time
Updates	Continuous	Manually updated

Table 2. Comparison of features between OpenAthens and Shibboleth

Features	OpenAthens	Shibboleth
Single Sign-on Access	✓	✓
Support	✓	✗
Statistics of the individual user	✓	✗
Statistics of resource	✓	✓
Cloud hosting	✓	✗
Admin dashboard	✓	✗
Maintenance	✓	✗
Global standards	✓	✓
Interoperability	✓	✓
User friendly	✓	✗

8. OPENATHENS SETUP

The OpenAthens setup process was initiated with suggestions from the experts, checking out the reviews, and considering the merits of OpenAthens. The library has decided to contact the OpenAthens team to conduct a meeting to discuss setup requirements.

8.1 Account Creation

The setup process of OpenAthens began with creating an account; there is a provision to register using the existing institutional directory or create a new account. KMC Health Sciences Library uses Azure active directory as an identity provider and this active directory is used to integrate with OpenAthens.

8.2 Azure Integration/ User Integration with OpenAthens

OpenAthens account creation was completed, and the integration of the Azure directory was next in line. Integration of the directory was no easy task and it required technical support help for configuring. Following are the steps in configuring the Azure directory to OpenAthens:

- The configuration process began with access to the Azure portal and OpenAthens admin interface, and access to the domain was kept ready.
- To add the new application in OpenAthens, the active directory was clicked, and enterprise applications were chosen, followed by all applications.
- Metadata as an XML link from the certificate section from Azure is saved.
- Users and groups are created to set up authorised members that can access OpenAthens.
- OpenAthens settings are configured by logging in to the admin domain.
- To manage the connections, a saved azure XML metadata link is added as a SAML connector.
- Display the name for the mapping field entered using UPN (user principal name), which is Azure’s standard value.
- A unique subject name ID is set to generate the link.
- The link from the relying party tab is copied and saved to finish the final steps of setup.
- To complete the azure integration, the single sign-on mode is selected and the link from the party tab is added and saved.

8.3 Creating User Attributes

User attributes refer to the library user groups. The technical department of the library does attribute mapping; in the KMC Health Science Library, there are mainly two attributes created that are custom-made.

- Faculty attribute
- Student attribute

The permission sets of the users and their identities

are added in bulk copying from spreadsheets of the active directories and there is also provision for individual add-ons by the librarian.

8.4 Resource and Tool Integration

The names of databases and the links, content providers of journals/books, and their emails are provided. The e-resource providers are contacted by OpenAthens to make it part of the access via OpenAthens.

8.5 Re-Director Links

Re-director links enable users to access resources directly on the landing page once they have signed in. In cases where resources are not compatible with OpenAthens, the links are integrated with an IP redirector bypass. OpenAthens provides a link generator for redirector links, which enables librarians to maintain a single set of links for both remote and on-site access. This is done by encoding a specified target URL and adding it to the domain address.

8.6 Trial Access

The trial was provided to the library for three weeks; during this period, the library was allowed to check for functionality and smoothness of the workflow. Trial access included an admin and limited users to monitor the ease of accessing the library subscribed content remotely.

8.7 Live Setup

The integration of users and subscribed resources was completed during the trial period and the live setup was made available to the registered users on 1 October 2021. The users are informed about the OpenAthens setup in the library. The users were sent a personal mail explaining how to access e-resources using Single sign-on via OpenAthens, a step-by-step manual is provided along with the link to access OpenAthens. For additional assistance, contact details were provided in the manual.

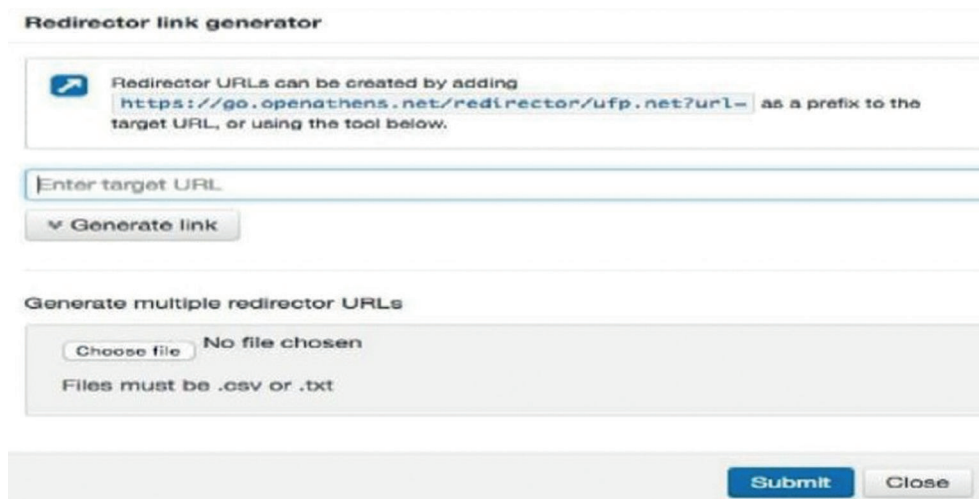


Figure 1. Re-director link generator.

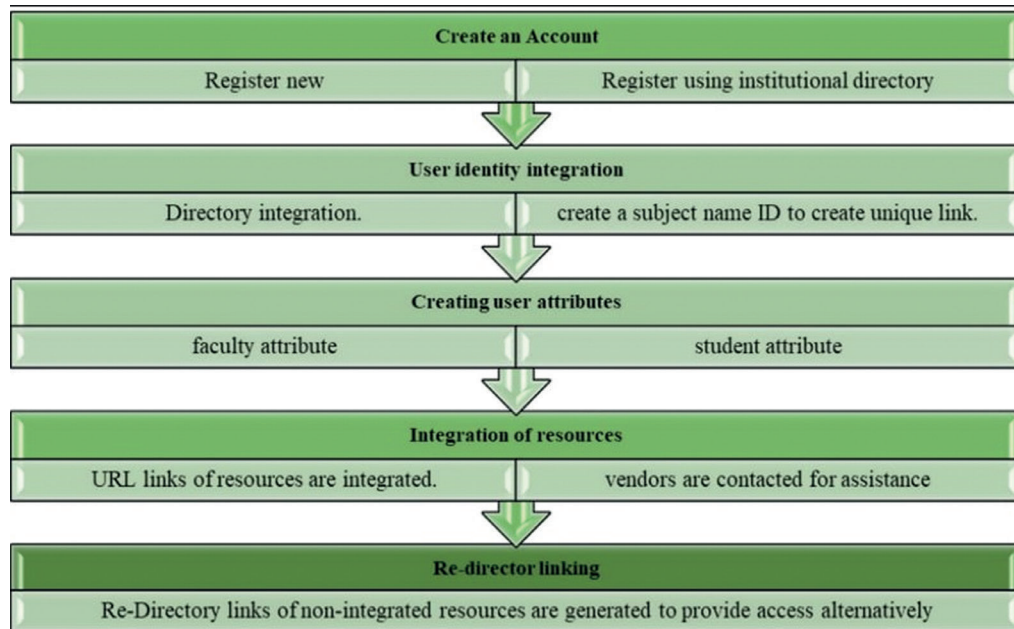


Figure 2. Steps involved in OpenAthens setup.

9. CHALLENGES

Implementation of OpenAthens in the library involved various challenges during the implementation and post-implementation as well. The transformation from proxy to single sign-on required the collaboration of the institution's IT staff and technical support from the service provider.

9.1 Challenges during the Setup Process

- Generation of re-director links and adding resource URLs by proxy links was a complicated process and needed technical support to complete the process.
- Integrating bulk user identity using Azure active directory raised concerns about security issues which took weeks to resolve.
- A custom-made OpenAthens sign-in page had to be created for the recognition of the institution as drop-down information.
- Generation of re-director links to the resources that are not compatible with OpenAthens needed technical support from the publisher's end.
- Despite the migration to OpenAthens, the proxy system is still in use as a backup mechanism.

9.2 Challenges after the Setup

- Updating the users about the migration to OpenAthens and educating them about the transformation was a mammoth task for library staff.
- Inadequate staff training and insufficient time for the process of implementation and the complexity of the process of generating re-director links baffled the library staff.
- Integration of resources into OpenAthens from the publisher's end created a barrier to information access to the users.
- No intimation has been provided for the resources access snapping out of OpenAthens unless the user

finds it and updates the library staff.

- Not all platforms support OpenAthens. So, the library staff had to find alternatives to keep up with the workflow.

With all the challenges mentioned during the setup process and post-setup, OpenAthens has been successfully enabled and provides a user-friendly experience.

10. POST-ENABLING BENEFITS

OpenAthens was set up in the library aided in following additional benefits to overall service improvement.

- Single login credentials to all the library-licensed subscribed content made librarians' work easier.
- Admin has complete control over library resource management and user management without contacting IT support.
- Digital library resources are securely accessed by authentic users only.
- Detailed statistics of users reduced the hassle of unauthorised access.
- Granular usage statistics of resources helped the library in better purchase decisions.
- Cloud-based hosting saved space and eliminated complications associated with server maintenance.
- Personalisation of the admin page helped in creating user attributes.
- User-friendly interface where the user gets to search the required documents directly from search engines.
- Constant support from the OpenAthens technical team helped maintain uninterrupted library workflow.

11. RECOMMENDATIONS

- Libraries looking to install the OpenAthens system should create a checklist to ensure the setup process doesn't disrupt electronic resource access in the library.

- Check if the library needs an upgrade.
- Verify if there are enough resources to integrate with OpenAthens.
- Inform the vendors and the publishers about the revamping process of the library authentication system and seek their support in integrating.
- Create user attributes and merge pre-existing user directories with OpenAthens.
- Always have a backup mechanism to support the library during the enabling process.

12. CONCLUSION

OpenAthens isaworld standard remote access authentication system for academic libraries. Enabling OpenAthens has improved service quality of remote access service in KMC Health Science Library and served patrons with secure usage of subscribed and licensed resources of the library appropriately. Despite the challenges faced in enabling OpenAthens, the set-up has enabled the librarian to have complete control over the library electronic resources. The patrons now enjoy seamless access to all subscribed content without compromising their privacy with single login credentials. The findings of the study may motivate librarians who are looking to implement OpenAthens for more secure usage of electronic resources in academic libraries.

REFERENCES

1. Blansit, B.D. Beyond password protection: Methods for remote patron authentication. *J. Electronic Resources in Medical Libraries*, 2007, **4**(1–2), 185–194. Doi: 10.1300/J383v04n01_17185.
2. Clamon, Travis. Authentication via OpenAthens: Implementing a single sign-on solution for Primo, Alma, and EZproxy. *ELUNA 2018 Annual Meeting*, Spokane, Washington, 2018. <http://documents.el-una.org/1641/> (Accessed on 10 February 2023).
3. Colquitt, M.E. The sun shining in the middle of the night: How moving beyond IP authentication does not spoil the fun, ease, or privacy of accessing library resources. *Proceedings of the Charleston Library Conference*, 2019. 391–394. Doi: 10.5703/1288284317204.
4. Dixon, P. Ethical issues implicit in library authentication and access management: Risks and best practices. *J. Library Administration*, 2008, **47**(3–4), 141–162. Doi:10.1080/01930820802186480.
5. Holzschuher, F. & Peinl, R. Proxied authentication in single sign-on setups with common open source systems-an empirical survey,2015. <https://subs.emis.de/LNI/Proceedings/Proceedings251/43.pdf> (Accessed on 10 February 2023).
6. Hoogland, M.A. Options for accessing online electronic resources in difficult fiscal times. *J. Electronic Resources in Medical Libraries*, 2021, **18**(1), 1–19. Doi: 10.1080/15424065.2021.1875944.
7. Iles, R. & Erturk, E. Case study on cloud based library software as a service: Evaluating EZproxy,2015. https://www.researchgate.net/publication/284285073_Case_Study_on_Cloud_Based_Library_Software_as_a_Service_Evaluating_EZproxy#fullTextFileContent (Accessed on 09 February 2023).
8. Inman, M. & Tatterson, R. Electronic resource usage during the pandemic: A snapshot using OpenAthens. *Serials Review*, 2022, **48**(3–4), 217–221. Doi: 10.1080/00987913.2022.2108676.
9. Jayakanth, F.; Byrappa, A.T. & Visvanathan, R. Off-campus access to licensed online resources through Shibboleth. *Information Technology and Libraries*, 2021, **40**(2). Doi: 10.6017/ITAL.V40I2.12589 (Accessed on 10 February 2023).
10. Kohonen Timi. OpenIG SSO authentication implementation for web portal, 2018. <https://urn.fi/URN:NBN:fi:amk-201404174453> (Accessed on 10 February 2023).
11. Li, H.; Holly, C. & Goodrich, T. OpenAthens implementation: A two-phased move at our library. *Serials Review*, 2022, **48**(3–4), 201–205. Doi: 10.1080/00987913.2022.2106817.
12. Mikesell, B.L. Anything, anytime, anywhere: Proxy servers, Shibboleth, and the dream of the digital library. *Journal of Library Administration*, 2004, **41**(1–2), 315–326. Doi: 10.1300/J111v41n01_22.
13. Nurse, R.; Baker, K. & Gambles, A. Library resources, student success, and the distance learning university. *Information and Learning Science*, 2018, **119**(1–2), 77–86. Doi: 10.1108/ILS-03-2017-0022(Accessed on 13 February 2023).
14. Radha, V. & Reddy, D.H. A survey on single sign-on techniques. *Procedia Technology*, 2012, **4**, 134–139. Doi: 10.1016/j.protcy.2012.05.019.
15. Romano, J. & Huynh, N. OpenAthens odyssey: Challenges of implementing federated authentication for a multi-institutional user population. *J. Medical Library Association*, 2021, **109**(4), 648–655. Doi: 10.5195/jmla.2021.1170.
16. Rosenfeld, J. & Enoch, T. Beyond “set it and forget it”: Proactively managing your EZproxy server. *Serials Librarian*, 2019, **76**(1–4), 30–34. Doi: 10.1080/0361526X.2019.1551041.
17. Ruenz, M.M. Remote authentication: One library’s journey on offering EZProxy and OpenAthens. *Internet Reference Services Quarterly*, 2022, **26**(3), 153–167. Doi: 10.1080/10875301.2022.2067283.
18. Sewell, R.R. Managing consortium resource access using Athens authentication. *J. Electronic Resources in Medical Libraries*, 2008, **5**(2), 109–122. Doi: 10.1080/15424060802064220.
19. Tetiana, Y. E-LibUkr portal: A case study of Shibboleth and EZProxy in Ukraine, 2019. <https://silo.tips/download/e-libukr-portal-case-study-of-shibboleth-and-ezproxy-in-ukraine#> (Accessed on 13 February 2023).

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