

# On e-Infrastructure for SSO in R&D and Education Organizations of Republic of Moldova

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**Abstract**—The development of e-Infrastructure suppose the presence of some elements. It is widely acknowledged that Authentication and Authorization Infrastructures (AAIs) play a crucial role in supporting research and in providing a distributed virtual environment where scientific resources can be stored, accessed and shared. In the present paper we discuss a relative simple and cost-efficient way to establish an Identity Provider for a R&D organization using open-source technologies, existing cheap cloud solutions and experienced providers with certified ISO qualifications.

**Keywords**—Single Sign-On; e-Infrastructure, Authentication and Authorization Infrastructure

## I. INTRODUCTION

According to European e-Infrastructure Reflection Group, the main objective of the e-Infrastructure initiative is to support the creation of a political, technological and administrative framework for an easy and cost-effective shared use of distributed electronic resources across Europe. Particular attention is directed towards grid computing, storage, and networking [1]. One of the elements of this e-infrastructure is the secure authentication across services, which is closed connected to the ease of deployment of identity management and collaboration tools within the research community. Among recommendations of the above mentioned AAA study [2] is to "lower the adoption entry level of existing infrastructures for new users and providers and support communities to benefit from existing AAIs" and the recommended action is to "consider ways to offer ready-to-use solutions that hide technical complexity from the users." The present paper is dedicated to a possible solution to the recommendation.

## II. THE PROBLEM

There are some available web-services in Republic of Moldova available for academic community, like *Expert Online* and *National Bibliometric Tool* [3, 4], more services are expected in the future. There are about 6000 researchers in about 50 home organizations. There are too many users to keep up to date and to manage by the service. Users also may need additional services, like library resources, data sharing, etc. There are also about 102000 students in about 30 universities and about 260000 high-school students in about 500 lyceums. Many of them use the same services: library resources, data sharing and so on as shown in Fig. 1

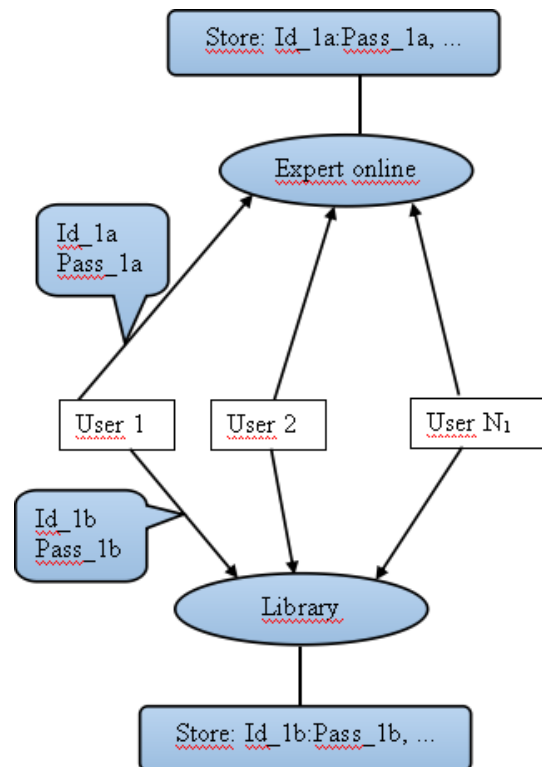


Fig. 1 Services and Users.

So, evident problems of such organized access to services has many deficiencies: users have to remember multiple credentials, at least one per service, each service provider have to maintain a storage of user credentials and all other user assistance on recovering user credentials, etc.

The commonly accepted solution to the problem is to separate user-credentials management from service providers [11]. So, a possible solution implies to use a new category of service providers - Identity Providers (IdPs) as in Fig. 2.

The web-service must become a Service Provider (SP). Each organization has to deploy an Identity Provider (IdP). Establish a connection between SP and IdP. With the increase of IdPs increase also the technical complexity for SPs. So a traditional solution requires to have a federation of IdPs and SPs and each SP will maintain connection to the federation as IdPs do too. The hard part in the identity management

infrastructure is creation and management of IdPs since SME as well as research institutions and other public sector enterprises usually do not have specialized IT staff to perform this task.

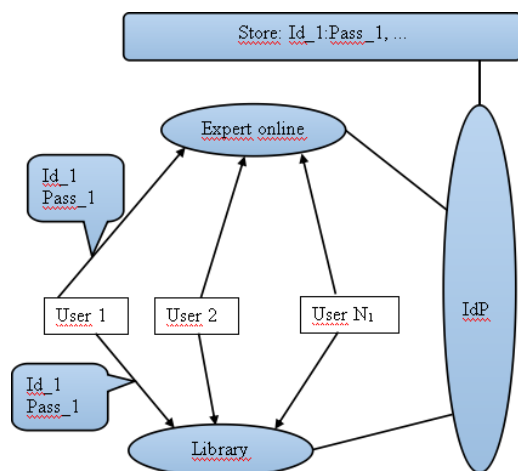


Fig. 2. Service, Users and Identity Provider

The present paper deals with deploying IdPs of R&D organizations.

### III. THE SOLUTION

Usually home R&D organizations are small and their business is not related to ICT. Their resources available for ICT tasks are limited and are not sufficient for management of information systems. So solution can be a service offered by some third party which does not imply complex technical requirements. We propose to use as a basis a virtual machine located at Information Society Development Institute that already manages the ACADEMICA network of the Academy of Sciences of Moldova. The proposed solution can also be used independently on other virtual machine services such as Digital Ocean or Amazon Web Services.

#### A. Open-source tools

To establish an Identity Provider we propose to use the following open-source tools:

- Ubuntu 14.04 server [5] - a popular free open-source Linux OS,
- Apache2 [6] - a versatile web-server,
- OpenLDAP [7] - can be used independently as Domain Controller and it actually stores and manage all user credentials,
- phpLDAPadmin [8] - software for web-based management of OpenLDAP server mentioned above,
- MySQL [9] - may be useful for other goals involving storage of information,
- SimpleSAMLphp [10] - a PHP-based Security Access Markup Language (SAML) software which is an award-winning application written in

native PHP that deals with authentication led by UNINETT (Norwegian NREN).

#### B. Benefits of the proposed solution

Since the proposed solution is not left totally at the home organization level it is possible to take measures to harmonize it with the requirements already existing in European area such as: IDEM requirements, eduGAIN requirements, attribute harmonization, etc. It also can support the single sign-on facility and experience for its end-users.

### IV. FURTHER WORK

We suppose to work in the future on developing a virtual appliance to ease further deployment and management of built identity providers, to be able to store them using cloud technologies like Ubuntu OpenStack. This will enable the additional features of the already deployed identity provider service: *elasticity, backup, migration*. Other benefits are also available.

### V. CONCLUSION

Using open source software and cheap cloud virtual servers like those offered by Digital Ocean it is possible to build and manage in a cost-efficient manner an Identity Provider for R&D organizations of any size which would be ready to integrate in any available e-Infrastructure.

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