

Single Sign On (SSO) System with Application of Central Authentication Service (CAS) at Manado State Polytechnic

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Abstract: Integrated information systems are an essential requirement in the digital era. However, the number of currently available/running applications at the Manado State Polytechnic (Polimdo) with different accounts makes it difficult for users to access or remember their accounts. Based on this condition, it is necessary to have a solution for implementing a Single Sign On a system that allows users to have one application for several applications. The purpose of this research is to integrate all applications currently running at Polimdo to provide effective and efficient conditions for the utilization of each application. The expected result is a system developed according to user needs so that the utilization of the application can be effective.

1 INTRODUCTION

In the current era of technological development, the world of information is increasingly dynamic. Because it is supported by technology and the use of the internet, which is increasing rapidly and increasing, according to Emarketer (2013), internet users (www) will increase from 26.3% in 2012 to 30.7% in 2016 for the Asia-Pacific region. In Indonesia, internet users reached 63 million users in 2012. It is estimated that an increase of 30% in 2013 was 82 million users, according to the Association of Indonesian Internet Service Providers (APJII).

The Internet is one form of the development of information and communication technology (ICT). ICT has a significant role in the world of education. In the Ministry of National Education's ICT blueprint, there are at least seven functions of ICT in education: learning resources, learning aids, learning facilities, competency standards, administrative systems, decision support, and infrastructure. Utilization of the internet network in previous research by Saroinsong et al. Design and Implementation of Integrated Software Research and Community Service at Manado State Polytechnic (Saroinsong, 2017).

Utilization of the internet network at the Manado State Polytechnic already has an internet network to support education and creativity in quality, quality teaching and learning processes, as well as facilitate

communication and exchange of information in an academic environment. Many applications require authentication in the Manado State Polytechnic's existing infrastructure. Among them are e-learning learning media, campus mail, and educational information systems. However, existing web applications are still not entirely appropriately integrated. This influences the number of different login systems for each application at the Manado State Polytechnic because users must log in to each application.

In previous studies, a single sign-on (SSO) method based on the Lightweight Directory Access Protocol (LDAP) has been researched by Dian Novera from Bina Darma University. The research resulted in one username and one password that can make it easier for users because they don't need to use many accounts and memorize many passwords. However, LDAP-based SSO has limitations where users still have to log in to each application. With that, the author will test the integration of all applications into a web portal for further development with the CAS (Central Authentication Service)-based SSO method in the Manado State Polytechnic environment.

In a study by Binu et al., a Single Sign On (SSO) is an authentication mechanism that allows users to log in once and access services from various SPs in the same session. SAML is generally used as a Single Sign-On protocol. The study proposes a Secure

Dynamic-ID-based scheme using a smart card or crypto card that does not require a verification table and implements the Single Sign On feature using the SAML protocol, thus enabling users to enjoy all MSE features along with SSO.

Furthermore, the research pane, Jian Hu et al., stated that frequent verification is an obstacle faced in constructing campus networks. To overcome these problems, they integrated the application of the B/S architecture with the Single sign-on (SSO) system. As a result, a unified personnel database has been created using an LDAP server and created dynamic groups to manage the database.

Single Sign On (SSO) is a system where users only need one username and password to access and use services on all existing applications. Central Authentication Service (CAS) based on the CAS Protocol is one part of the SSO product. CAS is used to deal with communication problems between different applications. With the Site on CAS on SSO on all existing applications at the Manado State Polytechnic, who can form application integration in the form of a web portal. Users only need to log in once to be able to use all the applications in the web portal. Users also do not need to memorize many accounts, just one account. Thus the organization and integration of user data can be facilitated so that the security of user data is more guaranteed because the place used for storing user data becomes systematic and centralized.

Therefore, one of the solutions to the problems obtained for the centralized user authentication system to access all applications at the Manado State Polytechnic is expected to be implemented by conducting SSO Technology Analysis with the application of CAS at the Manado State Polytechnic, where this research can help users more efficiently and safely in accessing all existing applications.

From the explanation of the background above, what can find problems can be discussed and studied together? The authors formulate the problem in this study, namely the use of Single Sign On System Technology Analysis (SSO) with the Central Authentication Service (CAS) application to access web applications. Centrally in the system within the Manado State Polytechnic.

2 PROPOSED METHOD

2.1 Action Research

Action research aims to develop the most efficient work methods so that what can reduce production

costs and the productivity of institutions can be increased. Action Research, or Action Research, according to Davison, Martinsons, and Kock, is action research that describes, interprets and explains a social situation or, at the same time, makes changes or interventions with the aim of improvement or participation. The stages of research that are part of this Action Research are:

1. Diagnosing: Identifying existing problems in previous research becomes the basis for groups or organizations so that further changes occur.
2. Action Planning: Understanding the main problem, then developing an appropriate action plan to solve the existing problem.
3. Action Taking: This action plan is expected to solve the problem at the implementation stage.
4. Evaluating: The implementation results are evaluated after the implementation period is deemed sufficient.

Specifying Learning: This stage is the final part that has been passed after the criteria in the learning principle so that the research can end by reviewing the stages.

2.2 Data Collection

In the data collection method, the authors obtain data and information in the following ways:

1. Observation: Researchers directly reviewed the Manado State Polytechnic for the UPT-IT, which is the centre of the campus information system.
2. Interview: At this stage, questions are submitted to UPT-IT Manado State Polytechnic to get accurate and direct information and data from sources who know about the research conducted by the author.
3. Literature: In this literature study, data is obtained by searching and obtaining materials on the internet, libraries and journals and books that are by the object to be studied by the author.

2.3 Design System

The design of the Single Sign On (SSO) system in this study is described by using a flowchart, as shown in Figure 1. Starting with login access to the system, it will then be checked if the user is registered or not. If not, it is necessary to input the application username and password and proceed to the SSO registration and

synchronization process. If registered, you will input data as an SSO username and password. The next step is authentication, and access authorization will then be followed by a display to the system.

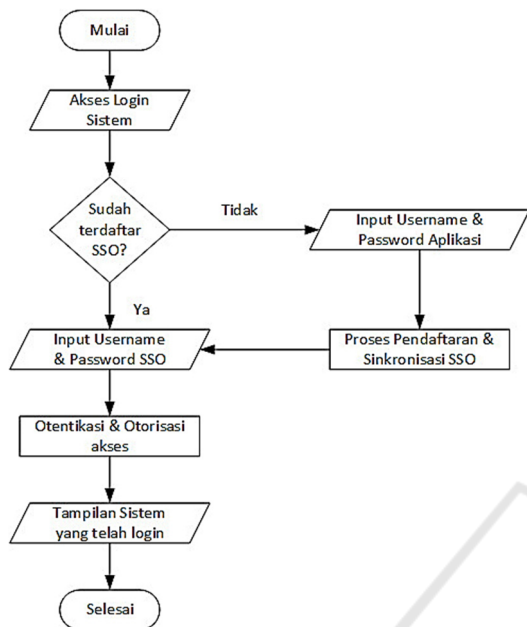


Figure 1: Flowchart System Single Sign On (SSO).

Furthermore, the depiction of the use case in the Single Sign On (SSO) System is shown in Figure 2.

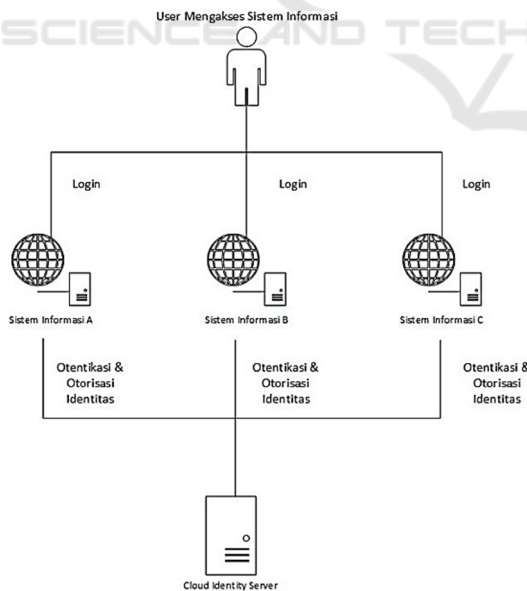


Figure 2: Usecase Single Sign On (SSO).

Figure 2 illustrates a user who can log into several information systems. All authentication and identity authorizations are stored on one server.

Figure 3 shows the context diagram of the Single Sign On (SSO) System. First, the user needs to register to the system so that they can store the data in the user database. Furthermore, the user can perform the login process and who will authenticate the data first.

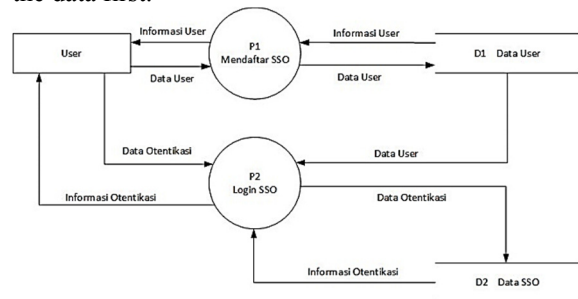


Figure 3: Single Sign On (SSO) Context Diagram.

The server specifications used in this study are presented in table 2.

Table 1: Server Specifications.

No	Name	Specifications
1	Monitor	14 Inch FHD IPS Anti Glare
2	Processor	AMD Ryzen 3 3200U (2.6GHz up to 3.5GHz)
3	Graphics	Radeon Vega 3 Graphics
4	Memory	8GB DDR4
5	Storage	512GB SSD

3 RESULT

The study's results of testing Single Sign On (SSO) First, they test the organizational information system using Google email as Single Sign On authentication. Figure 4 shows the login display of the system.

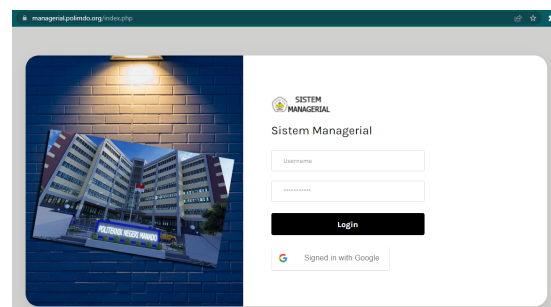


Figure 4: Managerial System Login Display.

If the option to log in with Google is selected, a display will appear, as shown in Figure 5.

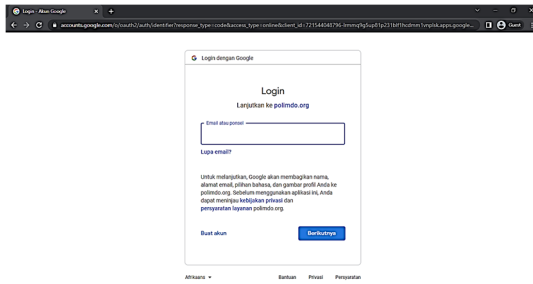


Figure 5: Google Login Page.

If the email is not connected to any account, a message will appear that there is no account connected to the email, and then you must activate Single Sign On in the settings menu.

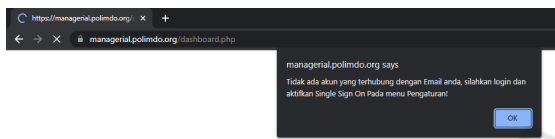


Figure 6: Email not connected to SSO.

Emails linked to more than one message will appear stating that more than one account is linked to that email, so it is necessary to log in and change the email in one of the accounts. As shown in figure 7.

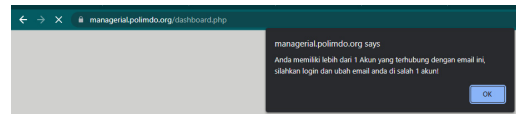


Figure 7: Email connected to more than one account.

If you have more than one account connected to the email that has been used, you must use another email, as shown in Figure 8.

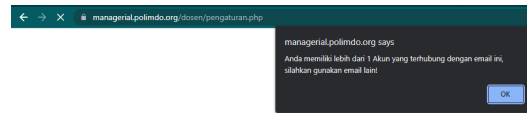


Figure 8: Multiple accounts are linked by email.

If you change your email to an email that has never been used, a description will appear, as shown in Figure 9.

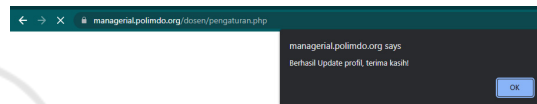


Figure 9: Change the mail with an email that has never been used.

The results of this study are also presented in the form of a test table, as shown in table 2.

Table 2: System Testing.

Testing Scenario	Test Method	Expected Results	Test Result	Conclusion
SSO login with the condition that you have added Google email data to the organizational information system and there is no duplicate email on other accounts.	Press the "Signed in with Google" button, then log in using the google account that has been registered in the organizational information system.	Displays the page according to the access rights and with the appropriate account session	Correct	Normal
SSO login with the email condition added is not registered in the organizational information system.	Press the "Signed in with Google" button, then log in using a google account that never registered in the organizational information system.	If no account is connected to your email, please log in and activate Single Sign On in the Settings menu.	Correct	Normal
SSO login with email conditions registered in 2 different accounts but have the same email	Press the "Signed in with Google" button, then log in using a google account that never registered in the organizational information system.	If you have more than one account linked to this email, please log in and change your email in one of the accounts!	Correct	Normal
After successfully logging in, change the email with the email that has been registered in another account	Login to the organizational information system, then open the settings menu and change email with an email that another account has used.	Please use another email if you have more than one account linked to this email.	Correct	Normal
After successfully logging in, change the email to an email that has not been registered in another account	Login to the organizational information system, open the settings menu and change email with an email not used by another account.	Successfully updated profile, thank you!	Correct	Normal

SSO makes it possible for users to perform logins that can be accepted by several separate applications. With the SSO method, admins can manage users centrally.

4 CONCLUSION

The results of research on creating a Single Sign On (SSO) system based on the Central Authentication Service (CAS) at the Manado State Polytechnic can be divided into several parts.

1. The implementation of Single Sign helps portal users On because it can make it easier for users. Users do not need to use multiple accounts, only by using one account that the system has authenticated.
2. Single Sign On also helps organise users because the Lightweight Data Access Protocol (LDAP) is used as a single data user.

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