

Optimization *Control Access User Use Access Control List* Based Mikrotik On Amami *Event Organizer*

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ABSTRACT

Technological developments are not only used as a medium for disseminating information but can also be used as a medium for marketing products and services. Amami event organizer is one of the companies engaged in providing services for exhibition events in the city of Cirebon in particular, this company has utilized internet services as part of their service marketing strategy. This study aims to optimize user access control using a Mikrotik-based Access Control List (ACL) to enhance network security and efficiency. Therefore, we need a method that can control internet access effectively and efficiently, the solution is to use the access control list method. The access control list method is a method that is specifically designed to carry out rules in determining the number of packets that may be used and passed by the router or should not be passed. Based on the results obtained from hypothesis testing, it is found that the T count is 37.291 and the comparison of the T table value is 1.724. So with the results that have been found, it can be concluded that Ho is rejected and H1 is accepted. It can be concluded that optimizing user access control by using access control lists can work effectively and is well received by the amami event organizer company. In conclusion, the implementation of ACL using Mikrotik proves to be an effective solution for optimizing user access control and strengthening network security in organizational environments.

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INTRODUCTION

Access control is part from step Work something mechanism in management source Power network that can used in a way structured and accurate. Mechanisms and procedures from the concept that will used in research This is optimization network *internet* with utilise *access control list* as control *user* uses service mikrotik , where every *user* will restricted and supervised activities Then cross the network so that it doesn't occurrence accumulation of usage data *bandwidth* exceeding capacity every *user* (Chaidir & Wirawan, 2019; Hafizhan et al., 2020; Pattipeilohy, 2019; Simanjuntak & Suharyanto, 2019). Access control also has many models of mechanisms that regulate something subject to be able to access based on type which objects will and can accessible , there is three type main access model control namely : *Discretionary* as access control that allows users give permission to other users to accessing data, *Mandatory* can also it is said as a security label attached to the subject and object certain , and *nondiscretionary* or normal called *role-based access control* is policy based on rights and permissions granted to

group or role , not to users individual (Dirgantara & Mardianto, 2019; Gunawan & Simorangkir, 2019; Saputra & D., 2019).

Internet usage data in the company Amami *Event Organizer* in the month January 2021 obtained writers, including is as following:

Table 1. Internet Usage Data

No	Device	Amount	Access	Port	Throughput	Packet Los
1.	PC	7 Unit	Browsing	LAN	1024kbps	4%
2.	Laptop	3 Unit	Browsing	WLAN	512kbps	29%
3.	<i>Smartphone</i>	± 30 Unit	Browsing	WLAN	512kbps	40%

Source: Amami Event Organizer 2021

Based on information Table 1 Usage *device*, number of devices, services, ports, *throughput* and *packet loss* running during month January 2021, explained that *device* used *user* are 3 types namely PCs, laptops, and *smartphones*. Then amount *units* also vary, services access used Not yet controlled with good. Meanwhile distribution *bandwidth* not yet utilized with good proven amount *packet* loss generated Still in a word Enough many and very No effective for used in term long. Control access *user* becomes condition must for Then cross internet network for security in utilise internet services become more comfortable and safe. Amami Company Martana Nusantara still Not yet do optimization control access *user* with utilization of Mikrotik media in services the internet, because That restrictions access *user* still Not yet enforced with good (Pamuji & Iswahyudi, 2020). This is naturally can harm company If Keep going continuously No prosecuted continue with good. Then required A configuration that will be do control access in a way intensive and strict control the later will grouping restrictions access services that are not permitted for passing by in traffic cross company internet network (Musril, 2019).

Root problems encountered in the research This is as following not yet done optimization control access *user* uses Mikrotik as part from facility internet services in the company. Ongoing optimization at the company Still use control manually on the fiber optic router provider service *internet service provider* that is carried out with system restrictions access only with blocking IP address that is not known.

METHOD

The approach used in study This is approach quantitative approach quantitative is approaches that can interpreted in positive philosophy which refers to a population or certain samples. According to Mulyadi (2019) in the study with approach quantitative

usually done with amount specified sample based on existing population and use formula certain in accordance with amount population found.

Study quantitative is methods for test theories certain with method research connection between variables. According to Mulyadi (2019) explains that study quantitative is systematic research to parts and phenomena as well as its relationships and aims develop a systematic model or theory related hypotheses with matter real.

Method Data Collection

In technique data collection is available stage 4 stages explanation stage technique data collection as following:

1. Observation

Observation done with come to subject research that aims for know optimization management medium *bandwidth* walking. Use technique observation useful in measure weaknesses What only those who are there in the field that will developed by the author. Type observations used is *participant observation* (Prasanti, 2018).

2. Interview

Interview done for know use complete data and efforts in get accurate data from the right data source. In conversation between second split party for obtain appropriate data purpose of the interview in study This is interview structured Where interview done direct to respondents and submit questions that have been asked planned previously (Prasanti, 2018).

3. Questionnaire

Questionnaire is technique data and information collection with convey a number of question written for answered in a way written pulaby respondents. The questionnaire is also a technique efficient data collection when researchers understand variables measured and expected by respondents (Angreni & Sari, 2018).

Table 2. Methods Likert Scale Assessment

Statement Positive		Statement Negative			
Very Agree	(SS)	5	Very Agree	(SS)	1
Agree	(S)	4	Agree	(S)	2
Not enough Agree	(KS)	3	Not enough Agree	(KS)	3
No Agree	(TS)	2	No Agree	(TS)	4
Very No Agree	(STS)	1	Very No Agree	(STS)	5

Source: Data Processed

4. Studies Documentation

In the research This studies document done with method stage recording to documents and data that are considered relevant in accordance with facts and can support

research. The documents contained in the form of writing notes daily, regulations, policies and others (Prasanti, 2018).

Data Analysis Method

Data analysis is the process of simplifying data in more forms easy read and implemented. For simplify research data become something more information simple and more easy understood. Then in study This data management process includes:

1. Population

Population according to Amin (2020), is an area for generalization consisting of from objects and subjects that have quality and characteristics certain conditions determined by researchers for studied and then withdrawn conclusion. Population no only just about the number of objects and subjects studied will but covering all characteristics properties possessed by objects and subjects (Amin, 2020).

2. Sample

Sample is part from the number and characteristics possessed by the population. If population big and researchers No Possible learn everything that exists population for example Because limited funds, manpower and time, then researchers can use samples taken from population (Amin, 2020).

For sampling that will be used must based on amount population owned formula *Slovin* will used in determination the number of samples to be determined. After the number of samples is obtained then stages furthermore is with do testing statistics use *SPSS software* which will later will produce mark validity, reliability, normality and hypothesis.

3. Data Reduction

This is the data obtained from field and number Enough many for That so need noted in a way thorough and detailed. Such as has it was stated that the longer the researcher down to field then the amount of data will the more many complex and complicated. For That need quick done data analysis through data reduction. Reducing data means summarize select the main things focusing on the important things looking for themes and patterns (Watkins, 2017b, 2017a)

4. Data Presentation

After the data is reduced then step furthermore is display data. In study qualitative data presentation can be done in form description short chart relationship between categories *flowcharts* and the like. According to Nugroho, the most frequent used for presenting data in study qualitative is text that is narrative (Nugroho et al., 2022; Yanto & Pravitasari, 2020).

The results obtained from data reduction is used as supporting data research where results data presentation is displayed on the background behind problem between results presentation of data later processed with a number of stages testing among them is validity test.

Validity Test

Validity test aim for show tool measuring can measure in accordance with criteria that have been determined. As for the validity test done with make a number of grid instrument question based on relevant theories and consult the result to a number of parties the formula is as following:

$$r = \frac{N(\Sigma XY) - (\Sigma X \Sigma Y)}{\sqrt{(N \Sigma X^2 - (\Sigma X)^2)(N \Sigma Y^2 - (\Sigma Y)^2)}}$$

with provision If calculated R value < R table then tested variables invalid (Muna, 2018).

Reliability Test

Reliability test aim know something tool measuring can give results consistent (reliable) and can measure give relative results the same If done different measurements time. Coefficient *Cronbach's alpha* is coefficient the most common reliability used For evaluate *internal consistency*. *Cronbach's alpha* can interpreted as coefficient correlation between testing scale the with testing or scales that have the same items (Muna, 2018). The formula is as following:

$$\alpha = \frac{k}{k-1} \left(\frac{\Sigma \alpha \frac{2}{i}}{\alpha \frac{2}{y}} \right)$$

Information:

- $\alpha \frac{2}{i}$ = variance score question to – i , with i = 1,2,3, ...
- α = coefficient reliability
- $\alpha \frac{2}{y}$ = variance total score
- k = number item question

Normality Test

Normality test used for know what is the condition of the data? normally distributed or no. Use statistics parametric requires data every variables to be analyzed must normally distributed (Kamaliyah, 2017). Function distribution on normal probability is found through table so that data is needed transformed value standard. Difference maximum in form price absolute.

$$L = \text{Sup } |F(Z) - S(Z)|$$

Become test statistics (*sup* = *suprimum*)

It is in the table special for testing hypothesis

Reject H_0 if L count > L table

Accept H_1 if $L \text{ count} < L \text{ table}$

RESULTS AND DISCUSSION

System Analysis Walk

Based on from results observations that have been finished done by the author in do study for study thesis this then found discussion in a way detailed about analysis problems that occur at the company Amami related *event organizers* regarding optimization control access current *user* walk in the company (Sutarti et al., 2020). There are a analysis accurate about restrictions access *user* for control any *user* can access Then cross corporate internet network Not yet can controlled with good and limitations to access *user* still Not yet enforced. Then for that is necessary attention special for find a good formula as the solution that will be can do optimization with Good so that the performance process in Then cross network company expected effective for used with term long time. Here This is description topology *physical activity* that is running including as following:

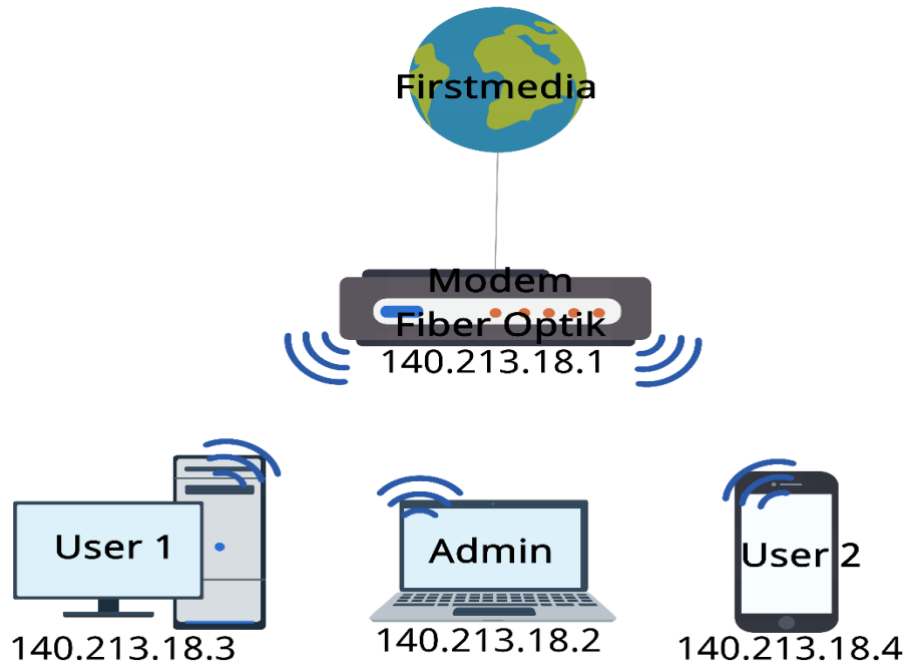


Figure 1. Topology Flow Walk

In the explanation related Figure 1 regarding channel topology *physical* running explain about mechanism distribution internet allocation that is still utilizing *fiber optic* modems as base from distribution running internet *bandwidth* only with utilise network *wireless* at the company without discriminate type the network used including like utilize LAN media (Purnama, 2019).

Design The System to be Implemented

In design optimization *control* access *user* use *access control list* is done a number of stages among them design topology as channel Work optimization *control* access *user*

created so that Can used later by the company Amami martana archipelago. The following This description short about applied topology writer as part from implementation optimization access *control user* uses *access control list* as following:

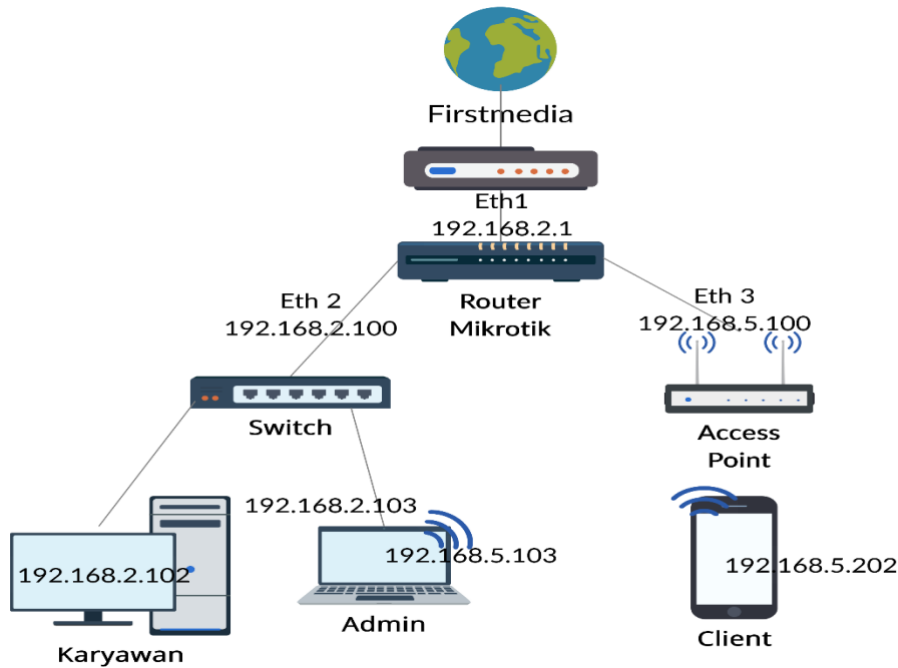


Figure 2. Topology New

In the explanation related Figure 2 regarding channel topology created explain that method Work from distribution allocation internet network created namely divided into 2 types usage the first using LAN as base utilization connected internet services with *routerboard* media to *the switch* which will later will distributed diversity *PCs* and laptops used in companies amami. While the second one utilize media *access points* as connector between user *device* with existing internet services at the company (Laksono & Nasution, 2020).

Optimization Control Access User

Based on results from optimization control access *user* For do restrictions access *user* in the past cross existing internet network in the company Amami *event organizer*, there is a number of stages channel in configuration that utilizes Mikrotik , including is as following:

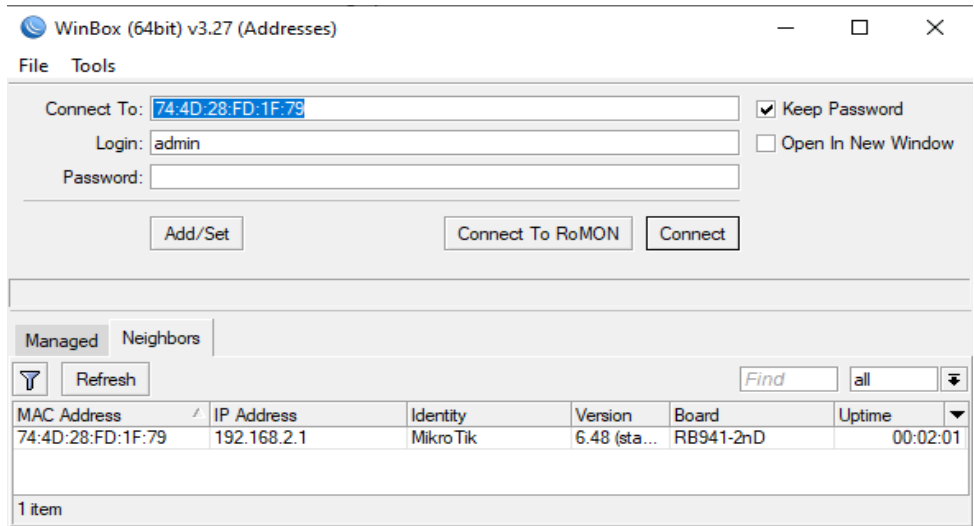


Figure 3. Mikrotik Login Session

First of all *refresh* until *ip address/mac address* proxy can be detected by winbox. Here the writer uses Winbox version latest v3.27. After the *IP address/MAC address* has been detected, steps further are to click the *connect* knob so that it will be redirected to view the Mikrotik interface.

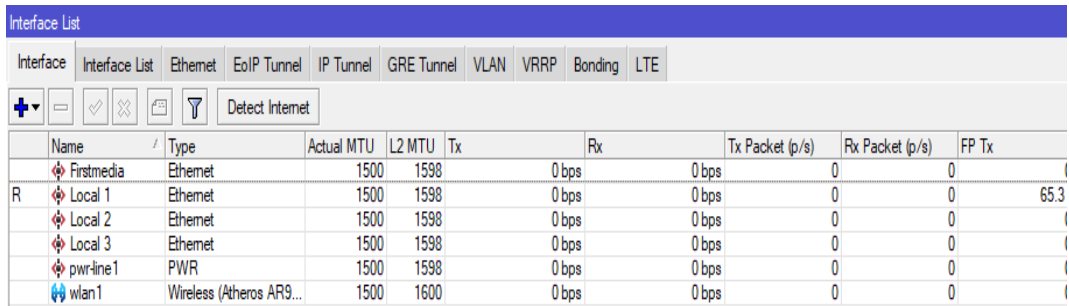


Figure 4. Mikrotik Interface

Change the name of the *Interface* to be more descriptive to make it easier to configure. Use the *enter* method to go to the *Interface* menu, *general* tab, then change the name of *Ether1* to *Firstmedia*, *Ether2* to *Local 1*, *Ether3* to *Local 2*, and *Ether4* to *Local 3*.

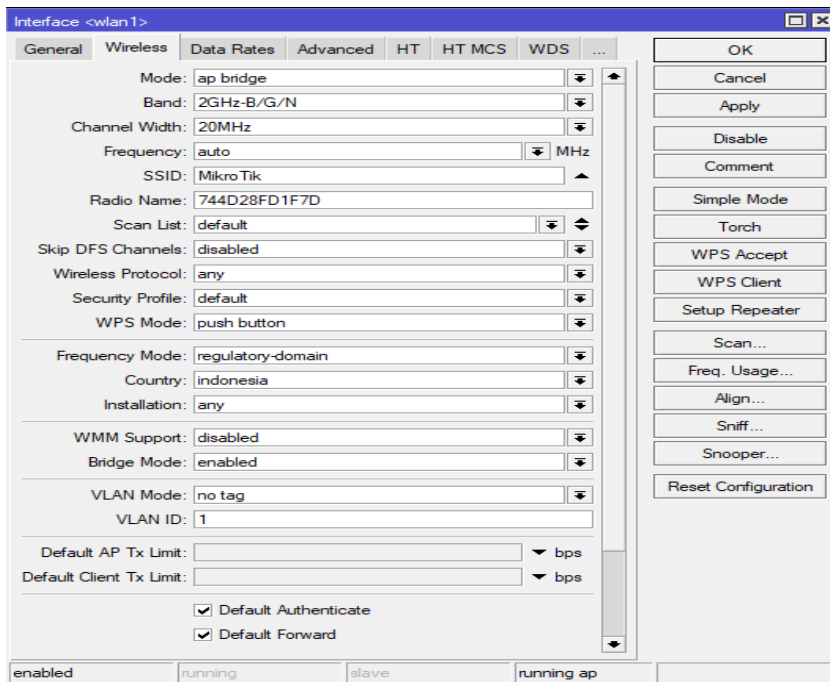


Figure 5. Interface wlan1

Activate *Interface wlan1* and use *AP Bridge mode* fill in the SSID with Name *Mikrotik*.

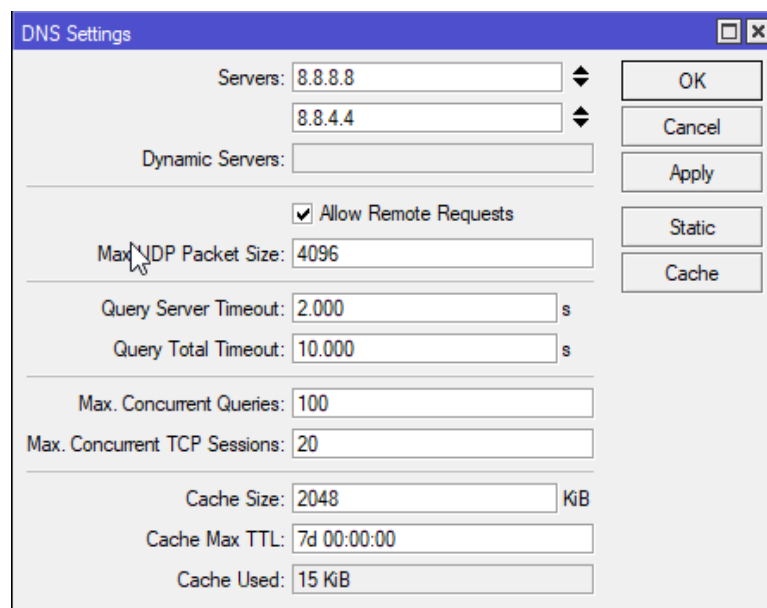


Figure 6. DNS Settings

Setting, enter go to the IP, DNS, *Settings menu*, enter DNS speedy or Can using Google DNS 8.8.8.8 / 8.8.4.4. Enable *Allow Remote Requests*.

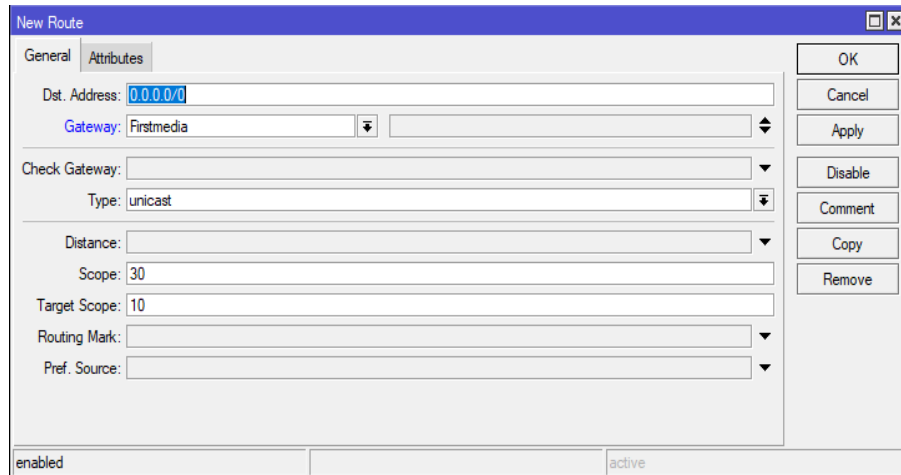


Figure 7. Route Setting

Setting IP Route with method enter Go to the IP, Route, NAT menu, select Gateway = Firstmedia (Ether1). The Gateway function is do protocol *converting* so that two architecture network different computers can communicate.

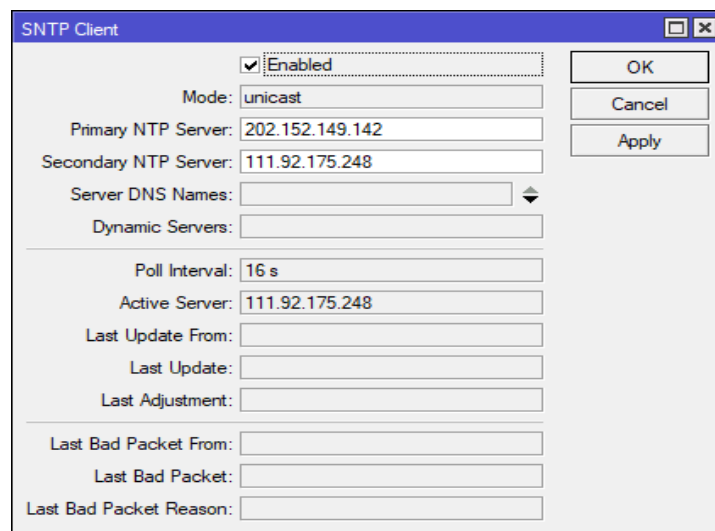


Figure 8. SNTP Client

SNTP Client enter Primary and Secondary NTP Server.

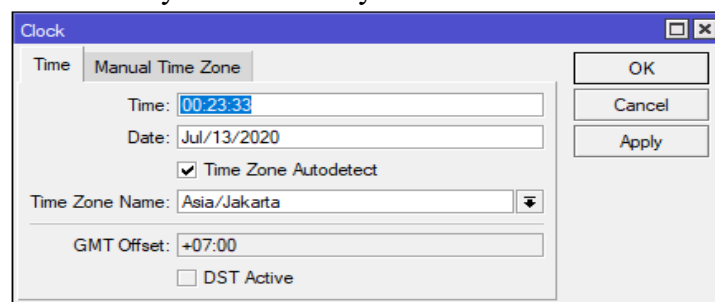


Figure 9. Clock

Set the time and date Mikrotik with method enter to the System menu, adjust *clock* Mikrotik to GMT+7(Jakarta) with method enter go to the *System* menu, *Clock*, select *Time Zone: Asia / Jakarta*.

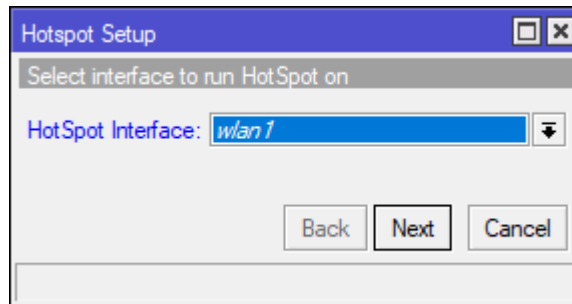


Figure 10. Hotspot Interface

configuration *hotspot* use *hotspot setup wizard*. Steps First that is enter Go to the IP menu, *hotspot*, *hotspot setup*, select *hotspot interface*, *wlan1*, isi IP address from *wlan1*, and check *masquerade network* (Permadi, 2019).

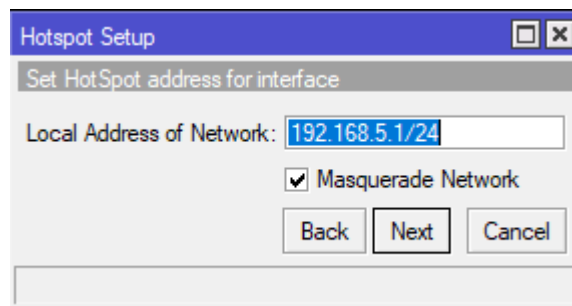


Figure 11. IP Address Settings

Determine the range of IP addresses to be used given to the User (DHCP Server).

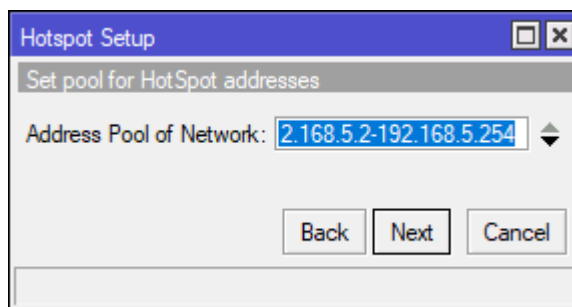


Figure 12. IP Address Pool Settings

Input IP address 192.168.5.2-192.168.5.254. So in a way automatic user will given an IP automatically by the DHCP Server between the IP ranges.

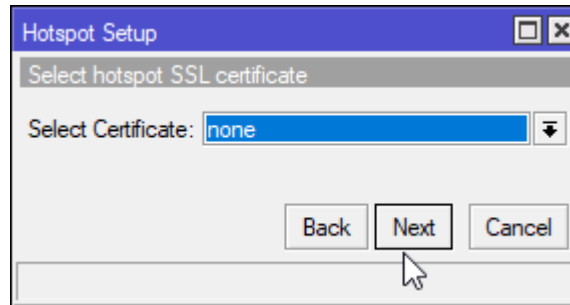


Figure 13. SSL Hotspot Setting

Choose SSL certificate, just select none, then next.

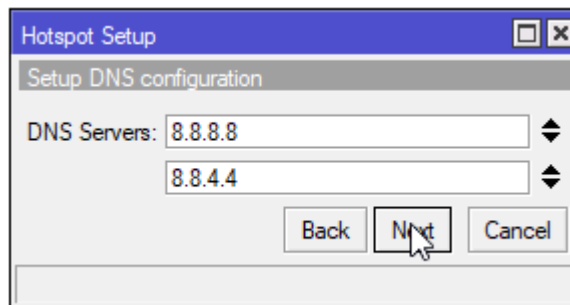


Figure 14. DNS Name Setting

Enter DNS *the server* that will replace address *IP* from *local wifi* as *URL page login*. If No filled so *URL page login* will use *IP address* from *local- wifi*, then next.

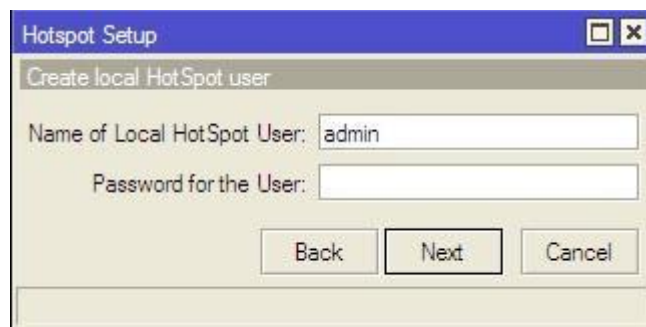


Figure 15. User Hotspot Settings

Input category Name *user* and *password* later will accessible to each *user*.

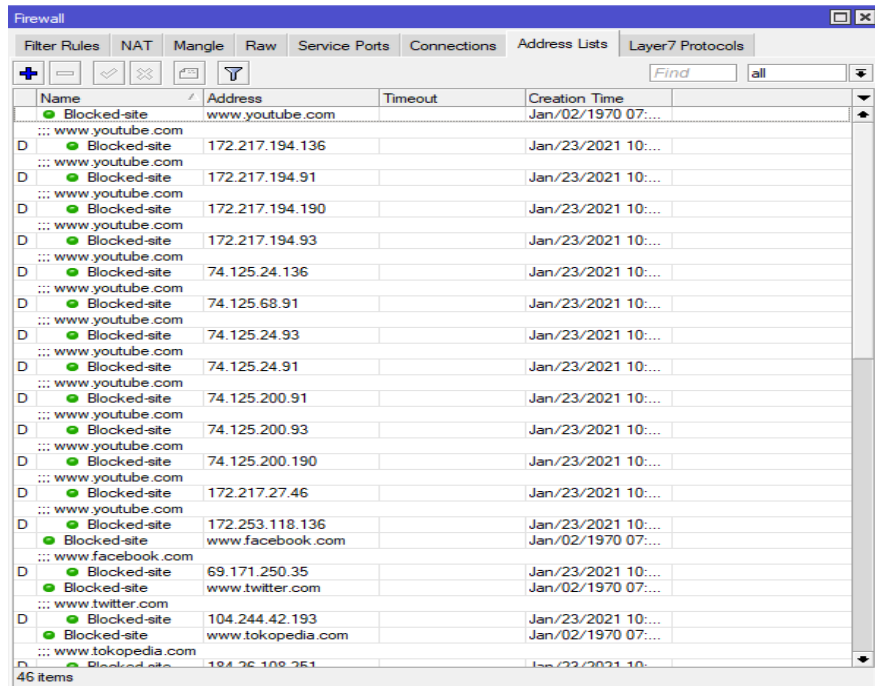


Figure 16. Address List Block

Make addition regexp Can done in the Layer 7 Protocol menu. After you add regexp , you can do filtering with define Address Lists in the filter rules you create or diverted to mangle for make address list of sites to be blocked. Login to IP, Firewall, Address List then We add.

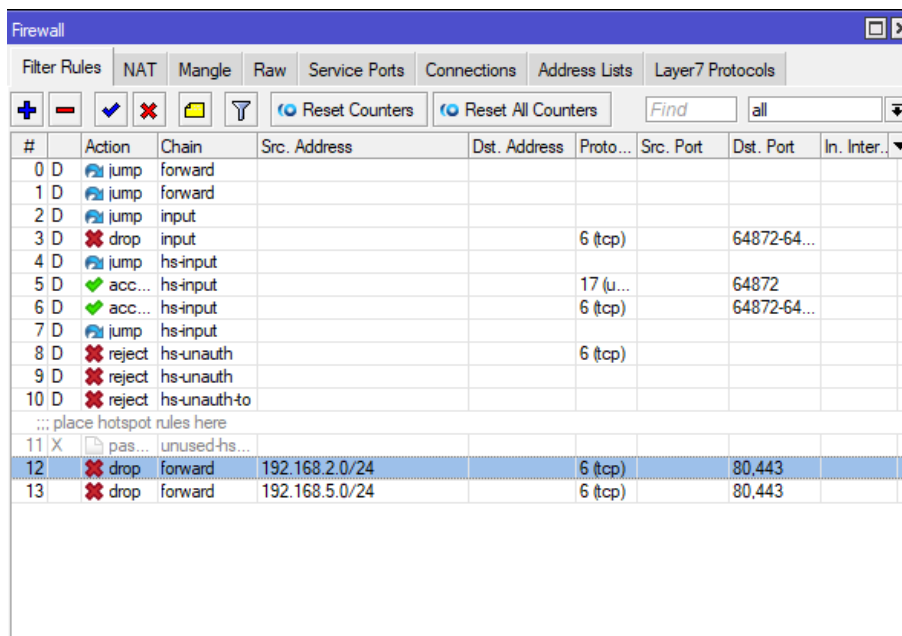


Figure 17. Filter Rules Configuration

Creating our Address Lists enter to Filter Rules For as marker something connection from the Address List. Enter to IP, Firewall, Filter Rules. add configuration:

Create a rule (click red + sign) with parameters as following:

On the *General tab*:

Chain = forward

Src. *address* = 192.168.2.0/24

Protocol = 6 (tcp)

Dst Port = 80,443

On the *Advanced tab*:

Etc. *Address List* = Blocked-site

On the *Action tab*:

Action = drop

Then click *Apply* and *OK*.

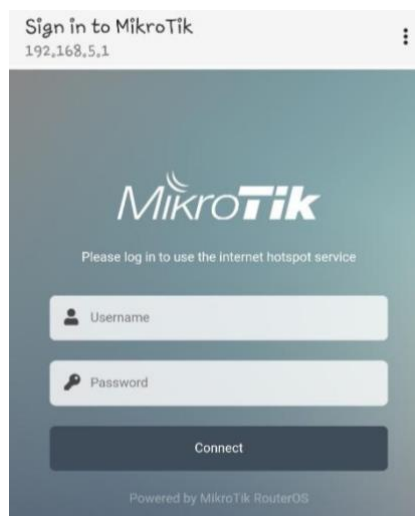


Figure 18. Hotspot Login

Hotspot Already succeed created connect *devices* on existing *hotspots* created. Open *the browser* and access desired *web request* page will diverted to page *login hotspot* MikroTik. Login with *Username: admin* and *password: admin*.

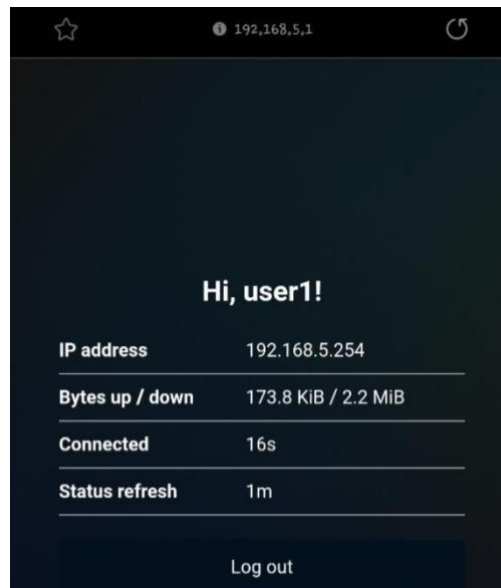


Figure 19. View User Login

This is its appearance end from allowed login sessions for access corporate internet services Amami event organizer.

CONCLUSION

Based on the discussion presented above, it can be concluded that the optimization of user access control using the Access Control List (ACL) method implemented through MikroTik is effective in managing and regulating user access to corporate internet services in accordance with organizational needs. This approach enables the categorization of users, which significantly supports the company in monitoring and controlling internet usage more efficiently and appropriately. Furthermore, the implementation of ACL-based access control demonstrates strong performance in enhancing network security by providing reliable restrictions and ensuring that the company's internet infrastructure remains well-protected and accountable.

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