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Research paper

Comparative Analysis of Mikrotik Site Filter Using Address List Techniques, Layer7 Protocols, Web Proxy, Mangle and DNS Static

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Abstract

Filtering techniques on Mikrotik routers can be done in various ways. Whether or not a technique in filtering can be seen from passing or not a package that has been defined. Development of filtering techniques in a router more and more, in line with the rapid development of hardware development. The researchers conducted an analysis comparison site on the proxy filter using that technique 5 Address List, Layer7 Protocols, Web Proxy, Mangle and Static DNS. The experiment was done by blocking youtube.com site and facebook.com and implemented on router Mikrotik RB750. From the experiment 5, the filtering technique shows the results of success, with different filtering output behaviors as well as the different block flow mechanisms of each filtering technique.

Keyword*: Address List, Layer7 Protocols, Web Proxy, Mangle, Static DNS.*

1. Introduction

Today's network of computing has become one of the things that are rooted in various aspects. In recent years, many companies are trying to complement its business with technology computer network. The goal is diverse, there is a goal to save time, energy and cost, to monitor the state of the business place using IP camera, access data in branch offices, and so forth. One technique that a network admin implements in an office environment, to restrict access to certain sites or websites. Admin is required to define a packet data criteria to RouterOS Mikrotik, that the data packet is a traffic to a site or website that should not be accessed. Filtering techniques on Mikrotik routers can be done in various ways. Whether or not a technique in filtering can be seen from passing or not a package that has been defined. Development of filtering techniques in a router more and more, in line with the rapid development of hardware development.

Some research was done on site filtering and comparison analysis of site filtering such as research conducted by (Hersatya, 2013) entitled "*Implementation of Layer 7 Layer Protocols Mikrotik*". The results of this study discuss the configuration of a router in the cafe Mach.Net Semarang with Layer 7 Protocols which aims to restrict users from accessing and using programs that should not in a cafe.

Another second study refers to the issues raised by (Suyetno, Tedyyana, & Son, 2017) entitled "*Comparison of Site Filter And Bandwidth Management On Proxy Server And Web Proxy On Mikrotik*". The result of this research is knowing the current system with Mikrotik system in blocking site and bandwidth management using PEST method and internet service quality from proxy server and web proxy at Mikrotik, doing QOS using some trial scenario with packet loss amount 0% and 0%, jitter 22 ms and 11 ms, throughput 3 ms and 54 ms, latency 20 ms and 9,03 ms.

Another third study refers to the issues raised by (Mohd Siddik, 2017) entitled "*Implementation Mikrotik Router Board 750 As Firewall Block Site on LAN Network*". This research explains how the process of block sites using Mikrotik Routerboar hardware 750 that is used as a firewall, which will be implemented on the LAN.

Based on the results of the comparative analysis filtering sites and sites that have been described above, then do further research with the title "*Comparison analysis of site filters on Mikrotik using Address List techniques, Layer7 Protocols, Web Proxy, Mangle and DNS Static*". The object used in this research is the Site Filtering Techniques on the computer device. 5 filtering technique for the site to its comparative analysis that the Address List, Layer7 protocols, Web Proxy, Mangle and Static DNS. The resulting output is the result of analysis and comparison of the five Address List techniques, Layer7 protocols, Web Proxy, Mangle, and DNS Static on MikroTik routers. Then the research method used is the experimental method. According to Sumantri (1999: 157) experimental method (experiment) is a demand of the development of science and technology in order to produce a product that can be enjoyed by society safely and in learning involving students by experiencing and proving their own process and experiment result.

2. Result and Discussion

2.1. Design of Site Filtering Architecture

This site filtering architecture consists of a client and a server, the client consists of computer LAN, as well as the Router Mikrotik that acts as a server. The client will be connected to the router that has implemented the filter technique. For the design of the site filtering architecture can be seen in Figure 1.

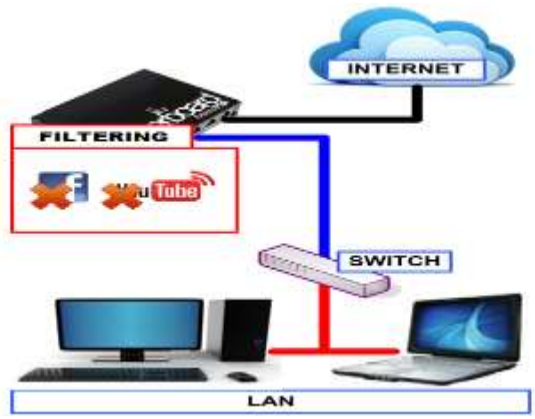

Figure 1:. Designing Site Filtering Architecture

2.2. Implementation and Testing

Implementation and testing of *Address List techniques, Layer7 Protocols, Web Proxy, Mangle* and *Static DNS* performed on Mikrotik Router. Testing five techniques were conducted to determine how the performance of these techniques in the filtering of sites/content. In this test will be seen the results based on the output outer browser against site filtering. The first stage of testing will be done using the Address List technique. Further testing continued with the technique Layer7 Filtering, then next with engineering testing Web Proxy and Mangle Technique, and finally with DNS Static technique.

2.2.1. Address List Techniques

On testing site filtering with Address List Technique done with the following steps:
Login Mikrotik Via Winbox, then open facilities Address List (*IP → Firewall → Address List*), pres who sign [+] to create new Firewall Address List.

Figure 2:. Display of Site Filter Technique Configuration with Address List

From the example above the author did block the site facebook.com & youtube.com so that can't be an accessed alias in the drop, the criteria is dropped the destination IP listed on the address list. Any additional sites will be blocked, just add it in the Address List only, then must create a rule filter that aims to block all connections from the client under the router that access the destination IP on the Address List.
/ ip firewall filter
add chain = forward dst-address = 192.168.130.0 / 24 protocol = tcp dst-port = 443 dst-address-list = sosmed-arif action = drop comment = "www.youtube.com"
Perform the test by going to youtube .com/facebook.com in the browser, and clien when accessing sites that just loading until the error "*This site cannot be Reached".*

Figure 3:. Display Testing Successful Site Filtering with Address List

2.2.2. Layer7 Protocols Technique

Before passing the test it is necessary to note that Layer7 is a matcher in the router, tasked with finding patterns in TCP, UDP, or ICMP connections using "regex pattern". The use of layer7 techniques is worth noting that many connections will burden the memory resources on the router Mikrotik.
On testing site filtering with Layer7 Protocols Technique done with the following steps:

1. Login Mikrotik Via Winbox, open Layer7 facilities Protocols (*IP → Firewall → Layer7 Protocols*) then press the [+] sign to create a new Firewall L7 Protocols. After that, specify "*regex pattern*" which indicates a URL containing facebook.com or youtube.com.

Figure 4:. Display Configuration Site Filtering Techniques with Layer7 Protocols

2. After making the "*matcher*" above, proceed to set the "action" of the matcher. In this example, the author will block facebook.com & youtube.com so that can not be an accessed alias in the drop.

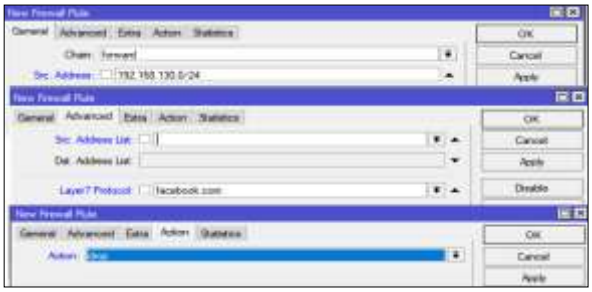

Figure 5:. Configure Site Filtering Techniques with Layer7 Protocols techniques

Perform testing by opening youtube.com/facebook.com site on the browser, and proven on client side when accessing the test site charge only loading until error *"This site can not be reached".*

Figure 6:. Display Success Testing Site Filtering with Layer7 Protocols Technique

2.2.3. Testing Proxy Web Techniques

Please note that all HTTP traffic from the client that has been transferred to the web proxy, In this study, the author can make settings blocking website access that is not allowed in access by the client. On testing site filtering with technique Web Proxy is done with the following steps:

1. Login Mikrotik v he Winbo k then open to *Menu IP → Web Proxy → General tab → Access → Click Add [+]*, then Invert Selection option on Action: deny for blocking a website URL that contains the word "youtube".

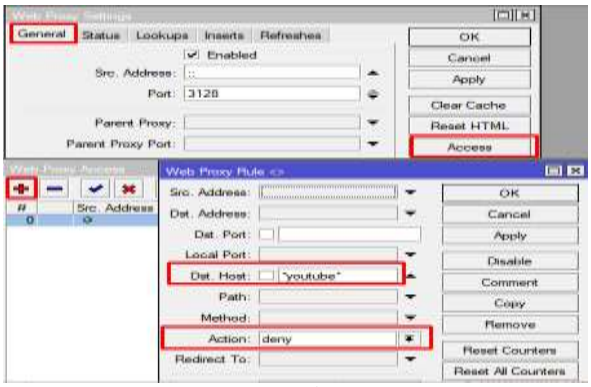

Figure 7:. Display Site Filtering Configuration with Web Proxy

2. Experiment with youtube.com access on client browser then will be done filtering their site.

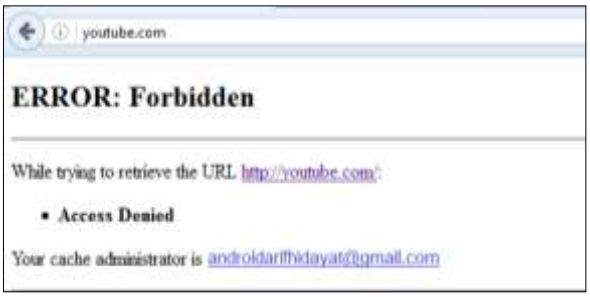

Figure 8:. Display Success Testing Site Filtering with Proxy Web Techniques

2.2.4. Testing of Mangle Technique

In testing site filtering with mangle Technique done with the following steps:

1. Login Mikrotik Via Winbox, to make a new setting, click on IP *menu → Firewall → and select Mangle* Tab, then in mangle tab click [+] sign to make the setting. In the general tab the contents of the chain with forwarding, then in Src. Address fill with network IP network which will be in the block, here writer use 192.168.130.0/24 or if use more than one network fill only 0.0.0.0/0 (applies to all network). Advanced tab content with the name of the site in the block, for example here the author writes youtube.

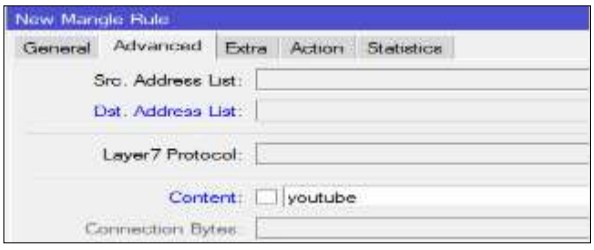

Figure 9:. Display yt-blok on Address List

2. As for the Action tab, fill in the action field with add dst to address list, and to Address list with a name for the IP list of the blocked site.

Figure 10:. Display yt-blok on Address List

3. To check whether or not to successfully configure the mangle, try to access the site in the block, then let stand until the loading process is complete, then check in Mikrotik on IP menu > Firewall > Tab Address List.

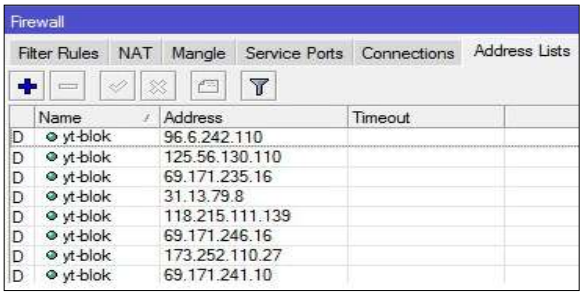

Figure 11:. Display yt-blok on Address List

4. If the Address List tab is contained in the form of IP Address address, then the configuration mangle successful. After mangle, do the creation of a new Filter Rules, Fill chain with forward. On Advanced tab contents *Dst.Address* List with the list name that has been created previously. Then Fill in the Action column with *Reject* and Reject with: *icmp* network unreachable, and finally Click OK.

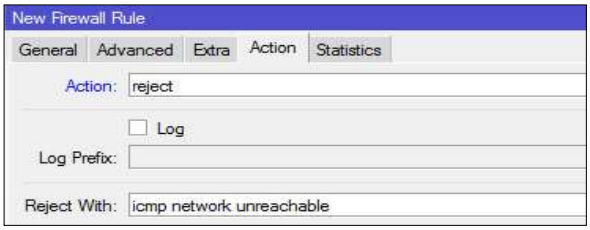

Figure 12:. Display Configuration Site filtering with Mangle Technique

5. Perform an address 's access to a site listed on the Address List (Etc. Address), eg youtube.com it will automatically be directed (Chain: Forward) with Reject Action) response and the browser will be loading continuously to the accessed website (just loading no site view).

Figure 13:. Display Success Filtering Results Using Mangle Techniques

2.2.5. Testing of Static DNS Techniques

In testing site filtering with Static DNS Techniques done with the following steps:

1. Login Mikrotik Via Winbox, then u to configure an entry in *IP menu → DNS → Static* and select [+] sign.

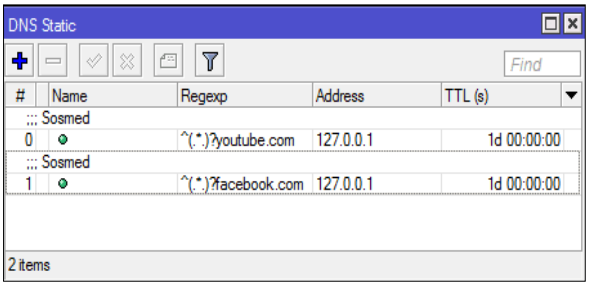

Figure 14: Display Configuration Site filtering with static DNS techniques

2. Make sure the client computer, in its DNS configuration to IP Mikrotik, or can force client connections to keep using Mikrotik DNS even on LAN Card settings client computer using another DNS IP with DNS forwarding script below:
   /ip firewall nat
   *add action = redirect chain = dstnat comment = *
   "Redirect DNS to DNS MikroTik" dst-port = 53
   *protocol = tcp *
   to-ports = 53 add action = redirect chain = dstnat dst-port = 53 protocol = udp to-ports = 53
3. If the client accesses a website or a pre-set domain with Static DNS Mikrotik, then the browser will see only *"This site can't be reached*" because the domain is redirected to IP Loopback (127.0.0.1) instead of the original IP/deflected.

Figure 15:. Successful Views of Site Filtering Results Using Static DNS Techniques

2.2.6. Application Testing Results

From the site-filter testing on Mikrotik as mentioned above, the results of the analysis as shown in Table 1. are obtained.

Table 1:. Results of Comparative Analysis of 5 (five) Site Filtering Techniques

Site Filtering Techniques	Nama of Site Blocked Youtube.com Facebook.com
Address List	When user access youtube.com then only loading until error *"This site Can not be Reached".*
Layer7 Protocols	When the user accesses youtube.com in the browser, the browser will appear only loading until the error *"This site Can not be Reached".*
Web Proxy	When users access youtube.com in the client browser then it will be filtering there a site with output in browser *"Access denied"*
Mangle	When the user access youtube.com then the browser will be loading blank continuously (*Respons Reject and loading no site view*).
DNS Static	When user accessyoutube.com then will appear output "*The Site can't be reached"*, for the youtube.com domain directed to the IP Loopback.

Based on Table 1. it is known that the five telnet filtering sites are successfully used for site filtering/site blocking. In this experiment, the author did filtering youtube.com site and facebook.com.

3. Conclusion

Based on the research that has been done above can be taken the conclusion, among others:

1. From the research resulted a comparison analysis Site Filter on Mikrotik using *Address List Technique, Layer7 Protocols, Web Proxy, Mangle and DNS Static*. The five filter techniques of the site successfully blocked youtube.com, and facebook.com with different filter outputs.
2. With the test site with MikroTik filter technique, it can be used as a lawyer in order in terms of blocking the site. How to block can be said to be easy, fast and varied, so the maker or manager of the network do not have to worry will take a long time to implement it.

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