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IMPLEMENTATION OF INTERNET CLIENT WITH 3 LINE ISP USING THE FAILOVER RECURSIVE GATEWAY METHOD

By
Muhammad Khaerudin[1], Dedi Setiadi[2], Andy Achmad Hendharsetiawan[3], Dimpo Sinaga[4], Danang Djoko Susilo[4]
[1.3]Faculty of Computer Science, Bhayangkara University.
[2.4]Faculty of Computer Science and Design, Marsekantara Suryadarma Aerospace University.
[5]Indonesian Taxation College
Email: muhammad.khaerudin@dsn.ubharajaya.ac.id, dedijahsy@gmail.com
andy.achmad@dsn.ubharajaya.ac.id, dnagas1@yahoo.co.id, danang@stpi-pajak.ac.id

ABSTRACT

With a huge need for the internet, administrators sometimes use more than one ISP (internet service provider) so that the internet needs of their users can be met. Administrators sometimes provide an alternative by separating internet routes based on sub-sub-sections, for example sub-section A has a small bandwidth but is used by many users and sub-section B has a lot of bandwidth but is used for a few users only and 1 other ISP is only used for backup when there is a problem for ISPs 1 and 2, This can cause waste and network administrators will have difficulties when monitoring the network This is done by looking at the web browser if there is any trouble on the device. Network administrators can't always keep an eye on the networks they manage because of a lot of other work to do. Failover is a technique that applies multiple paths to reach a network goal. However, under normal circumstances, only one link is used. The other link serves as a backup and will only automatically move the internet source from the main link to the backup link using the recursive gateway modede. To monitor the network, it will use the netwatch tools available on mikrotik and use the Telegram application as a message receiving medium, so that administrators can find out in real time when there are devices that are offline or experiencing problems on the internet network.

Keywords: Implementation, Failover, Telegram Monitoring, Netwatch

PENERAPAN KLIEN INTERNET DENGAN PENYEDIA LAYANAN INTERNET (ISP) 3 LINE MENGGUNAKAN METODE GATEWAY REKURSIF FAILOVER

ABSTRAK

Dengan kebutuhan internet yang sangat besar, administrator terkadang menggunakan lebih dari satu ISP (penyedia layanan internet) agar kebutuhan internet pengguna mereka dapat terpenuhi. Administrator terkadang menyediakan alternatif dengan memisahkan rute internet berdasarkan sub-sub-bagian, misalnya sub-bagian A memiliki bandwidth kecil tetapi digunakan oleh banyak pengguna, sedangkan sub-bagian B memiliki bandwidth besar tetapi hanya digunakan oleh sedikit pengguna, dan 1 ISP lain hanya digunakan sebagai cadangan jika terjadi masalah pada ISP 1 dan 2, Hal ini dapat menyebabkan pemborosan dan administrator jaringan akan kesulitan saat memantau jaringan. Hal ini dilakukan dengan memeriksa browser web jika ada masalah pada perangkat. Administrator jaringan tidak selalu dapat memantau jaringan yang mereka

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kelola karena banyak pekerjaan lain yang harus dilakukan. Failover adalah teknik yang menggunakan jalur ganda untuk mencapai tujuan jaringan. Namun, dalam kondisi normal, hanya satu jalur yang digunakan. Link lainnya berfungsi sebagai cadangan dan akan secara otomatis mengalihkan sumber internet dari link utama ke link cadangan menggunakan mode gateway rekursif. Untuk memantau jaringan, akan digunakan alat Netwatch yang tersedia di Mikrotik dan aplikasi Telegram sebagai media penerima pesan, sehingga administrator dapat mengetahui secara real-time ketika ada perangkat yang offline atau mengalami masalah pada jaringan internet.
Kata kunci: Implementasi, Failover, Pemantauan Telegram, Netwatch

INTRODUCTION

The need for the internet is currently very high and has become a mandatory thing with various uses such as finding information or the latest knowledge articles or playing online games. This leads to increased internet traffic and workload on the internet service provider's servers. Especially on a very small network, it will greatly disrupt network traffic and cause the internet connection to be disconnected. With the high need for internet use among these users, it is hoped that there are solutions or various alternatives for internet users to be able to access the internet easily and without any interruption of connection interruptions

With a huge need for the internet, sometimes administrators use more than one ISP (internet service provider) so that the internet needs of their users can be met and the results are satisfactory. Administrators sometimes provide an alternative by separating internet lines by departments. To overcome this problem, a solution has arisen to use three ISPs and make the Router board microtik as traffic management. Along with the development of internet users, in order for the internet network to be truly optimal, in addition to IP Address settings, it is also necessary to regulate routing and network traffic load so that it becomes stable and the needs of all users are met. One solution that can be used to maintain the quality of the internet connection is to divide the load and connection into several lines or links. The application is used as a system that manages the monitoring process of network functions and performance which includes density and traffic.

By using failover with the Recursive gateway method. Failover is a technique that applies multiple paths to reach a network goal. However, under normal circumstances, only one link is used. The other link serves as a backup and will only automatically move the internet

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source from the main link to the backup link using the recursive gateway modede. Recursive gateway is a method of checking gateways that are not directly connected to the router used. By using the scope and target scope parameters in the routing configuration. By default, the router will provide the value of the scope and target scope for each type of routing which are also different in value, later the three ISPs can run simultaneously without burdening each other by separating the path according to the content and port of each site accessed. took the title "Implementation of Internet Client with 3 Line Isp Using the Recursive Gateway Failover Method and Telegram Monitoring Using Netwatch

RESEARCH METHODS

In this study, the system to be built is an implementation of recursive failover using 3 internet connections from three different provider connections. Each ISP will be directed or mapped based on the content that has been filtered on microtik, so that at each ISP there is no traffic spike when the internet is being used by each client. This recursive failover system is to handle if there is a break or trouble on one of the internet connection lines that can occur at any time and there is a system that monitors if there is a device or host that is disconnected in one network, so that administrators can quickly make repairs. The parameters used to measure the success of recursive failover and separation of internet traffic and network monitoring on the 3 ISP lines are (a). Comparison of the amount of connection traffic load on each ISP, (b). System behavior in the event of a disconnection on one of the ISPs, (c). Monitoring of client traffic limitations configured through a simple queue on microtik, (d). Telegram messages that enter the administrator if there are problems in one network that experience problems on the network or disconnect, and (e). The Dude client is designed as an access point device monitoring.

The topology that will be built is the star topology, where each node will be connected to the switch to be able to communicate with other nodes or connect to the internet. In a star topology, each device on the network connects directly to the hub by using a network cable (usually an Ethernet cable). The hub or switch is responsible for directing data traffic in and out of the network, as well as regulating communication between connected devices. For access to the internet using the services of several ISPs, each ISP can run simultaneously, so

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that internet use can be more effective and reduce queues at each ISP.

RESULTS AND DISCUSSION

The network monitoring system using a mikrotik router utilizes the netwatch feature which is a built-in mikrotik router to test the network connectivity of each host. If there is a disruption or change in the network, the system will send a message in the form of a notification via telegram to the administrator's smartphone in real time so that the administrator can check the network condition at that time. The performance of the monitoring system starts after all network devices are active. If all network devices are active, then the monitoring process is already running. Through the mikrotik facility, the admin can check the network condition on the computer. The next process is to check the network condition through the telegram bot menu. If there is no change or checking through the telegram bot, telegram will not receive any notification from mikrotik.

In configuring a microtic router for the network we have, the most important thing to consider is the security of the router. As a network admin, it is mandatory to protect or secure the router from irresponsible outside parties. Steps to take to secure a microtic router include

a. Change the username and password of the mikrotik router

The Mikrotik router has a factory-built username and password, namely username: admin, and password: (blank). We should disable the default username password, delete it or change it, so that it is not used by others.

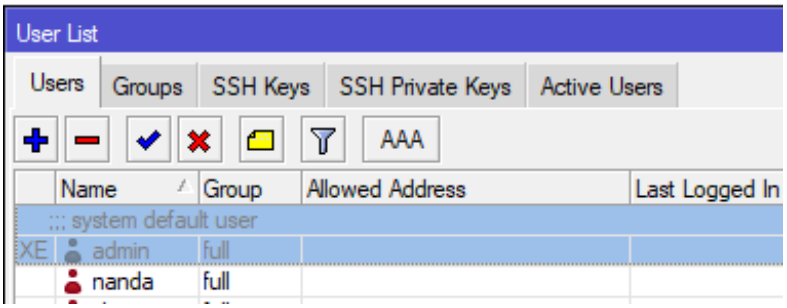

Figure 1. User Management Image

b. Change or Turn Off Unused Services

Change the default port or limit only a few IP addresses to those ports

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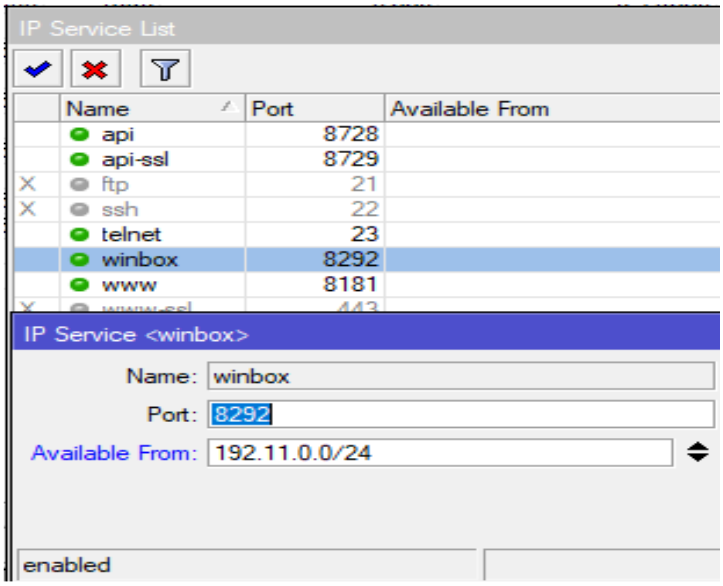

Figure 2. Remote Service Router Management Images

The service on the Mikrotik Router is already open by default, so we have to anticipate some of the services that we use to remotely to the router

c. Creating Rules to Prevent BruteForce

Brute Force Login is a method of attacking a system by trying all possible passwords. From the user side, of course, the information log will be very annoying because the log will record all activities that occur on the router, including clients who try to log in to the router. Then from the router side, of course, it will also burden the resources of the router when there are many clients who want to access the router (Bruteforce). The steps that we can take to secure the router from bruteforce attacks are to close unused services or we can also mark the IP address of the attacker and then drop it, then we can take advantage of the firewall feature on the router

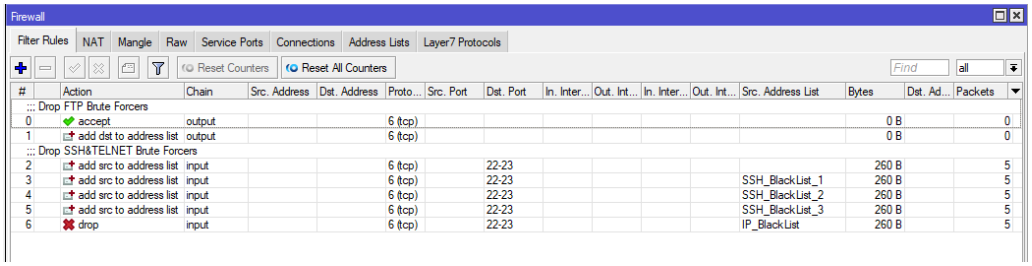

Figure 3. Picture of Telnet Bruteforce Prevention Rule

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Configuring Revursive Failover and Telegram Monitoring

a. NAT Configuration

After performing the IP and DNS configurations, you must then add the NAT configuration. NAT is useful for clients to connect to the internet, as well as protect internal IP addresses from external networks and secure internal networks from direct attacks and can allocate IPs globally

b. Mangle Configuration

Mangle is useful for marking a package, where the marking is done according to the conditions and conditions we want. After that, the tagging results will be used for specific needs based on the selected action

c. Raw Configuration

RAW is a firewall table similar to a filter table, which handles packet filtering. This Raw will later be used to separate traffic by using the content parameters contained in Raw.

d. Routing Settings

Next, it will map the route or connection path based on the routing mark that has been made on the mangle. The first routing mark will use the gateway of ISP 1, the 2nd routing mark will use the gateway of ISP 2 and the routing mark 3 will be routed to the gateway of ISP 3.

e. Recursive Failover Creation

The check-gateway mechanism can only monitor the nearest gateway (ISP), so if there is a problem in the ISP 1 line, the data packet will still be passed to ISP 1, because the router still considers ISP 1 reachable. The effect is that failover doesn't run properly so we still can't access it. For this there is a routing setting to create a failover automatically. In addition to distance and check gateways, we can use the scope/target scope parameters to create a recursive gateway, so that check-gateways can monitor gateways/IP addresses on the internet, for example to 8.8.8.8. By default Check-gateway can't see the status of 8.8.8.8 because it's not the nearest gateway. It is in this condition that scope and target-scope

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changes can be applied, usually to the main gateway routing rule. Thus, check-gateways can monitor IP 8.8.8.8 which in the rule seems to be a direct gateway. So when the check-gateway fails to PING to 8.8.8.8, the internet gateway will be redirected to the backup link. For the record, this mechanism is only to help the check-gateway monitor the link, while if the original traffic is tracerouted, it still passes through the ISP link/gateway. So distance and check gateway ping are absolute requirements in failover

f. Configure Netwatch as Telegram Push Notifications

The Netwatch tool works by sending an ICMP message to the device once every 1 minute (the default), then if the device does not respond within a 1000ms period it will be considered down. In the Netwatch tool, there are two tabs, namely the UP tab and the Down tab. These two tabs can be used to determine what actions to use. The actions that will be used will also be very flexible, because the actions that will be used later are in the form of scripts. To get information about changes in link conditions on a host

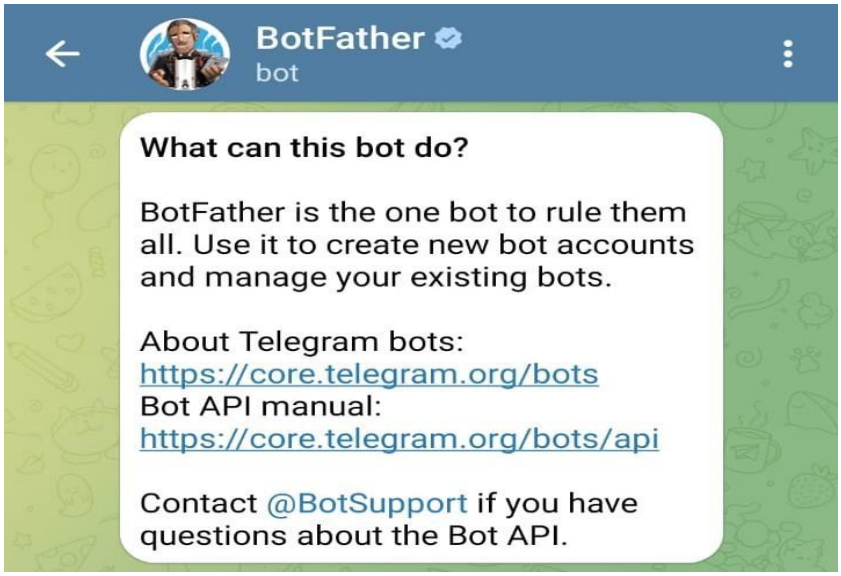

Figure 4. Botfather Initial Appearance Images

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Figure 5. Reply Image When Successfully Creating a Telegram Bot

Furthermore, to be able to send notifications, you need to find out the chat-id bot, how to do it by accessing the Bot API in the browser link : https://api.telegram.org/bot(TOKEN_BOT)/getUpdates

Then remote the router and create a netwatch rule in the Tools->Netwatch->Add menu. On the host tab there are several parameters that can be defined:

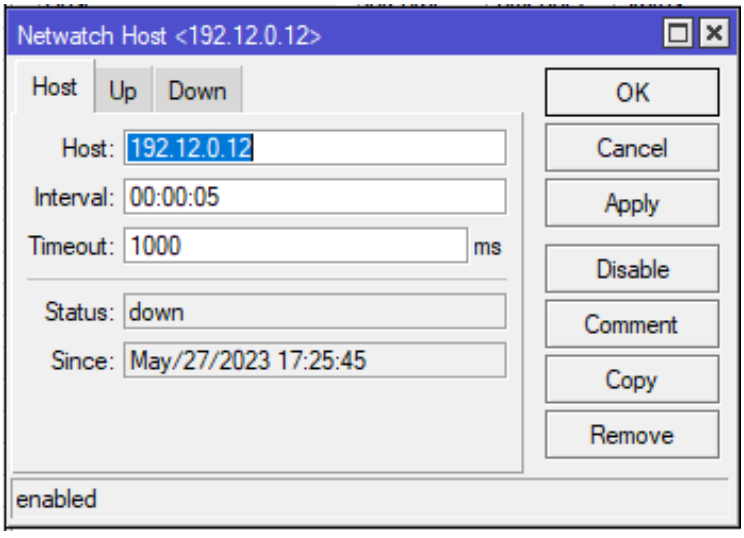

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Figure 6. Netwatch Host Images

The netwatch rule will monitor the host with IP 192.12.0.12. The current status of the host is in a down state, if at a specified interval the router will successfully ping the host then the status will change to up. In order for netwatches to be able to send notifications when there is a change in host conditions, it is necessary to add scripts to the up and down tabs. Sricpt on the up and down tabs will be executed when the host changes.

Netwatch functions to monitor the condition of a host at a certain interval. The netwatch tool works by sending ICMP messages periodically to the intended host, in which case it will be combined with the telegram bot as the message sending medium

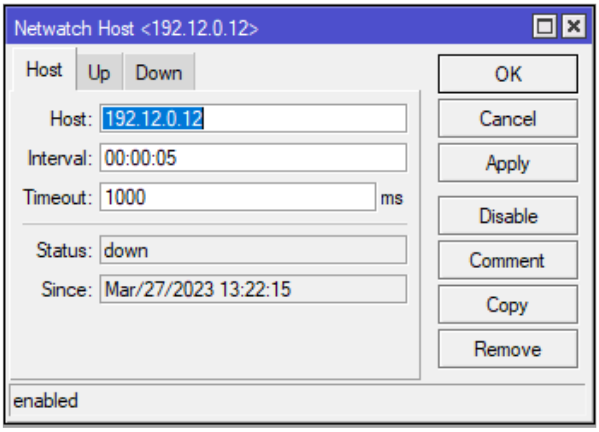

Figure 7. Netwatch Configuration Images

A host can be a single IP address, such as 192.12.0.12, which is the unique IP address of the host you want to monitor. This IP address can be a local address on an internal network or an external address on the internet. Intervals are measured in milliseconds (ms) and can be configured according to network needs. The smaller the interval value, the more often the netwatch will ping the target host to check its availability. Timeouts are measured in milliseconds (ms) and can be configured according to network needs. Proper timeouts allow the netwatch to quickly determine whether the target host is offline or online.

The status can change dynamically according to the host's response to the ping performed by the netwatch. When a netwatch pings a host, it waits for a response from the host within the specified timeout (timeout). If the host responds within the specified time, the host state is considered active. However, if the host does not respond within the allotted time,

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the host state is considered unavailable. Since is a parameter used to determine since when the host state started being monitored or logged. By using since in the netwatch configuration, you can set the start time or reference when host health monitoring starts

CONCLUSION

The results of the recursive failover configuration that have been made display the expected results, which can be seen in figure 4.42 of the interface shutdown test on ISP1, after the ISP1 interface is turned off, the internet will automatically move to ISP2, and vice versa. for down time if seen in the image is only 4 seconds if pinged after turning off the ISP1 interface. The results of the configuration of traffic separation using content and mangle are successfully carried out as seen in figure 4.38 when we access content content it will be directed through the ISP1 interface, in figure 4.39 if we access youtube content it will be directed to the ISP2 interface, and in figure 4.40 if we access whatsapp content it will be directed to the ISP3 interface. And the results of the configuration of netwatch as a messenger to the telegram application have been successfully carried out, seen in figure 4.44 when there is a device that is online, netwatch will send a message to the telegram application and seen in figure 4.45 when the device is offline, netwatch will give a message again to indicate that the device is down or troubled.

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