OPTIMIZATION ACCESS OF HOSTING SERVICES TO SUPPORT STUDENTS ORGANIZATION ACTIVITY

(CASE STUDY APPLIED SCIENCE DEPARTMENT OF TELKOM UNIVERSITY)

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Abstract

Web hosting is a service that can be used for publishing information from student organization of university. But network topology at university generally implement captive portal for authentication and bandwidth management. User access in intranet is often constrained by limiter in bandwidth management when user access hosting server. The objective of this study is to design new topology to optimize access from intranet to hosting server by involving routing priority and ACL of DNS. Based on result testing, implementation of new topology can increase throughput that proves the increasing of network performance.

Keywords : *hosting, routing , dns*

1. Introduction

An university generally has students organization to accommodate hobbies and activities of the students. As organization, it has information that should be published. Web hosting is a solution to accommodate online information from students organization [8]. To get web hosting services, university needs to build a hosting server that allocated in farm server.

Network topology of university generally uses captive portal to authenticate user and implement bandwidth shapping [1][2][9]. However, implementation of bandwith shapping causes throughput limitation when user access hosting services [6]. Therefore, combination routing priority and ACL DNS can be used to solve the problem. The purpose of this study is to design new topology to accomodate intranet access to farm server.

2. Simulation Details

Existing topology of case study can be shown below :

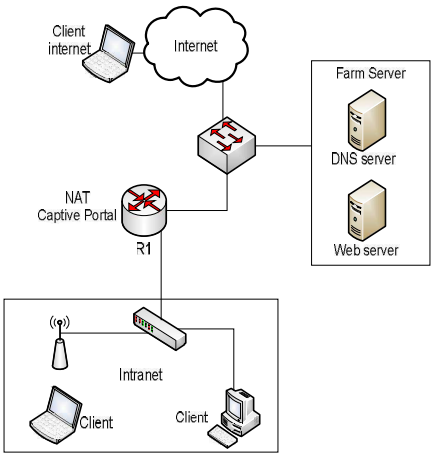

Figure 1 Existing topology

In existing topology, user access to internet and farm server must be through router R1 while bandwidth shapping implement on router R1. The consequence of that condition, maximum throughput for all access is appropriate with maximum bandwith in bandwidth shapping about 512 kbps, whereas access to farm server does not need limitation. The new topology that shown below can be one of the solution for the problem above.

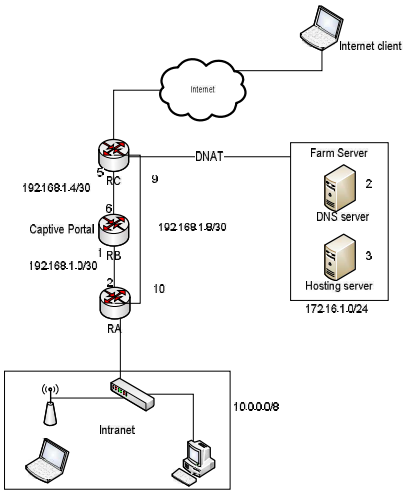

Figure 2 Envisioned topology

Envisioned topology involve mechanism as follows :

- Routing
  Static routing is used to build two route, intranet to server farm and intranet to internet.
- Destination Network Address Translation (DNAT)
  DNAT is mechanism to translate IP Public to IP Private so user in internet can access server in local network [6]. DNAT also can be combined with Access Control List (ACL) on router to increase network security.
- SNAT
  Function of SNAT is the opposite of DNAT. SNAT is mechanism to translate IP Private to IP Public so user in intranet can access server in internet.
- Hosting Server
- ACL DNS Server (BIND)

Steps to build envisioned topology are :

1) Configure Routing, SNAT and DNAT
   In this study, Mirotik is router used to build simulation because Mikrotik has captive portal that easy to configure and integrated monitoring system. Mikrotik integrated monitoring system can show active users, bandwidth users, address users, etc. The assumption that the IP Public is 222.110.10.0/29 with spesification as below:

Table 1 : Address Spesification

IP Public	Fuction
222.110.10.1	Gateway ISP
222.110.10.2	SNAT
222.110.10.3	DNAT to DNS Server
222.110.10.4	DNAT to Hosting Server

Configuration for each router is as below [4] :

RA :

```
ip route> add gateway=192.168.1.1
ip route> add dst-
address=172.16.1.0/24
gateway=192.168.1.9
```

RB :

```
ip route> add gateway=192.168.1.5
```

RC :

```
ip route> add gateway=222.110.10.1
ip route> add dst-
address=10.0.0.0/24
gateway=192.168.1.10

ip firewall nat> add action=dst-nat
chain=dstnat
dst-address=222.110.10.3/32
to-addresses=172.16.1.2

ip firewall nat> add action=dst-nat
chain=dstnat
dst-address=222.110.10.4/32
to-addresses=172.16.1.3

ip firewall nat> add action=src-nat
chain=srcnat src-
address=172.16.1.2/32 to-
addresses=222.110.10.3

ip firewall nat> add action=src-nat
chain=srcnat src-
address=172.16.1.3/32 to-
addresses=222.110.10.4

ip firewall nat> add action=src-nat
chain=srcnat src-address=10.0.0.0/8
to-addresses=222.110.10.2
```

Mikrotik captive portal feature must be activated on router RB.

2) Install and Configure Hosting Server
   Installation of hosting server consists of :
   - Installation Operating System Ubuntu.
   - Installation of hosting control panel ZPanel [5].

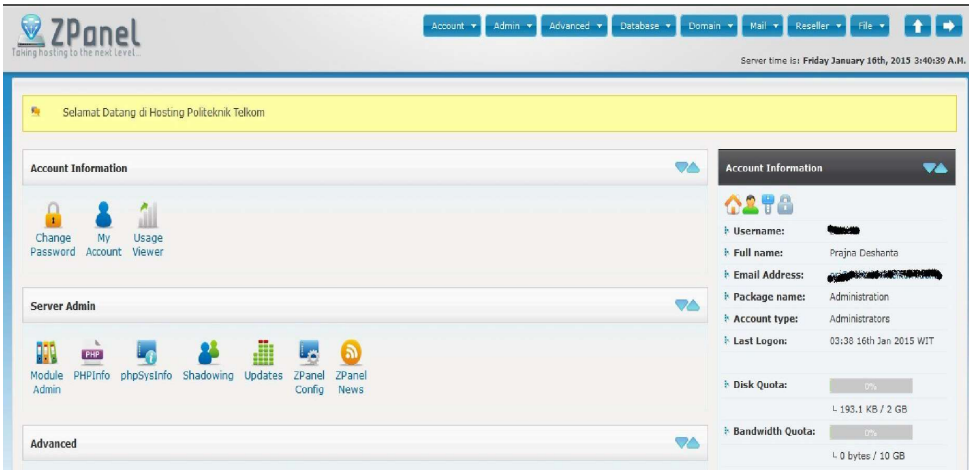

Figure 3 Hosting control panel ZPanel

After installation, quota must be configured in admin hosting control panel. Every student organization has 100 MB of quota.

3) Install and Configure DNS Server

In this study, BIND is used for DNS Server. It is installed on different machine with hosting server. Traffic engineering is done by classifying traffic from intranet and internet with Access Control List (ACL) in BIND. Configurations for classifying traffics are [7]:

```
acl internals {
      10.0.0.0/8;
      }

view "internal"  {
  match-clients { internals; };
  recursion yes;
  zone "domain.ac.id" IN {
       type master;
       allow-query { any; };
       allow-update { none; };
       file "domain.internals";
              };
};

view "external"  {
 match-clients { any; };
 zone "domain.ac.id" IN {
       type master;
       allow-query { any; };
       file "domain.externals";
  };
};
```

In internal forward zone refers to file domain.internals with content as below :

```
$TTL     300
@ IN SOA ns1.domain.ac.id.
mail.domain.ac.id. (
        20100205 ; Serial
        3600      ; Refresh
        900      ; Retry
        1209600    ; Expire
        86400 )    ; Minimum

@        IN      NS      domain.ac.id.
         IN      A       172.16.1.2
band     IN      A       172.16.1.3
basket   IN      A       172.16.1.3
futsal   IN      A       172.16.1.3
ksr      IN      A       172.16.1.3
lsyami   IN      A       172.16.1.3
pmk      IN      A       172.16.1.3
robotic  IN      A       172.16.1.3
taekwondo IN     A       172.16.1.3
tenismeja IN     A       172.16.1.3
himatek  IN      A       172.16.1.3
himaka   IN      A       172.16.1.3
hmmi     IN      A       172.16.1.3
dpm      IN      A       172.16.1.3
```

In external forward zone refers to file domain.externals with content as below :

```
$TTL     300
@ IN SOA ns1.domain.ac.id.
mail.domain.ac.id. (
     20100205 ; Serial
     3600      ; Refresh
     900      ; Retry
     1209600    ; Expire
     86400 )    ; Minimum

@        IN      NS      domain.ac.id.
         IN      A       222.110.10.3
band     IN      A       222.110.10.4
basket   IN      A       222.110.10.4
futsal   IN      A       222.110.10.4
ksr      IN      A       222.110.10.4
```

```
lsyami    IN      A       222.110.10.4
pmk       IN      A       222.110.10.4
robotic   IN      A       222.110.10.4
taekwondo IN      A       222.110.10.4
tenismeja IN      A       222.110.10.4
himatek   IN      A       222.110.10.4
himaka    IN      A       222.110.10.4
hmmi      IN      A       222.110.10.4
dpm       IN      A       222.110.10.4
```

3. Result and Discussion

Request of DNS service from local network (10.0.0.8/8) uses mapping of subdomain from file domain.internals that uses IP Private. In different condition, request of DNS service from internet uses subdomain mapping from file domain.externals that uses IP Public. Access from local network will be served by IP Private and uses network 192.168.1.8/30 as route. So user from local network will not be limited by bandwith shapping at captive portal and ISP router.

Testing can be done to observe influence of new topology on performance. Throughput is parameter used to measure it.

$$\text{throughput} = \frac{\text{number of packet}}{\text{time to transfer packet}} \quad (1)$$

The scenario of testing, a file is prepared in hosting server and user download file on http. Thoughput is noted when scenario is run in existing and envisioned topology. Result of testing is shown below :

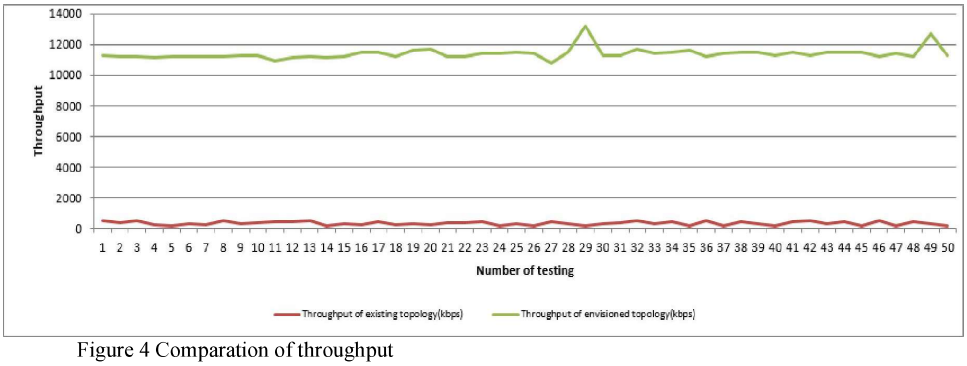

Figure 4 Comparation of throughput

Tabel 2 : Comparation of Throughput Average

Topology	Throughput Average
Existing	338,92 kbps
Envisioned	11392 kbps

Based on testing, throughput new topology is better than existing topology when user accesses hosting server.

4. Conclusion

Optimizing access can be done by routing priority and ACL DNS method. Based on testing result, throughtput average of envisioned topology increases about 33 times than existing topology because routing priority and ACL DNS bypass bandwith shapping for intranet access but it keep captive portal function for internet access. It proves about performance improvement.

5. References :

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