BAB V
IMPLEMENTASI SISTEM

Bab ini membahas tentang implementasi dari sistem yang kami buat. Implementasi ini akan dibagi ke dalam beberapa bagian, yaitu bagian implementasi load balancing PHP, implementasi load balancing database, dan implementasi database utama.

1. **Implementasi Load Balancing PHP**

Implementasi load balancing php ini berfokus pada pembagian beban request situs web pada server-server php. Adapun implementasi load balancing php sebagai berikut :

1. **Konfigurasi NGINX**

Pada implementasi load balancing php ini, NGINX berlaku sebagai web server dan load balancer. Konfigurasi NGINX untuk situs web ppdbjatim.net akan ditampilkan pada Kode Sumber 5.1 dan 5.2 berikut:

```
user www-data;
worker_processes auto;
pid /run/nginx.pid;
include /etc/nginx/modules-enabled/*.conf;
worker_rlimit_nofile 100000;
events {
        worker_connections 20000;
}

http {

        ##
        # Basic Settings
        ##

        ##
        # SSL Settings
        ##
```

```
        ##
        # Logging Settings
        ##

        ##
        # Gzip Settings
        ##

        ##
        # Virtual Host Configs
        ##
}
```

Kode Sumber 5.1. Konfigurasi pada nginx.conf

Konfigurasi lengkap nginx.conf dapat dilihat pada Lampiran 1.

```
# Default server configuration
#
upstream ppdb-jatim {
        least_conn;       # Metode load balancing yang dipilih
        ##
        # IP dari worker-worker php
        ##
}

##
# Konfigurasi cache
##
```

```
server {
        listen 80;
        ##
        # Seluruh servername untuk ppdbjatim.net
        ##
        access_log off;
        return 301 https://$host$request_uri;
}

server {
        ##
        # Konfigurasi SSL
        ##

    root /var/www/ppdb-jatim-2020/public;
        index index.php index.html index.htm index.nginx-debian.html;

        ##
        # Seluruh servername untuk ppdbjatim.net
        ##



        # Konfigurasi untuk keseluruhan website
        location / {
                #auth_basic "Mohon tunggu sejenak";
                #auth_basic_user_file /etc/nginx/.htpasswd;
         proxy_read_timeout 180;
         try_files $uri $uri/ /index.php;
                location = / {
                        access_log off;
```

```
                }
                location ~ \.(ttf|otf|gif|svg|js|css|ico)$ {
                        access_log off;
                        error_log off;
                }
        }

        ##
        # Konfigurasi halaman-halaman khusus pada ppdbjatim.net
        ##

        location ~ \.php$ {
                ##
                # Konfigurasi php-fpm
                ##


                ##
                # Konfigurasi cache untuk halaman-halaman tertentu
                ##
        }

        client_max_body_size 50M;
}
```

Kode Sumber 5.2. Konfigurasi website ppdbjatim.net di NGINX

Konfigurasi lengkap website ppdbjatim.net di NGINX dapat dilihat pada Lampiran 2.

2. Konfigurasi php-fpm

Konfigurasi php-fpm ini dilakukan pada setiap worker php dari situs web ppdbjatim.net. Konfigurasi tersebut akan ditampilkan pada Kode Sumber 5.3 berikut:

```
; Start a new pool named 'www'.
; the variable $pool can be used in any directive and will be replaced by the
; pool name ('www' here)
[www]

; Unix user/group of processes
; Note: The user is mandatory. If the group is not set, the default user's group
;       will be used.
user = www-data
group = www-data

; The address on which to accept FastCGI requests.
listen = 9000

; Set permissions for unix socket, if one is used. In Linux, read/write
; permissions must be set in order to allow connections from a web server.
listen.owner = www-data
listen.group = www-data

; Choose how the process manager will control the number of child processes.
pm = dynamic

; This value sets the limit on the number of simultaneous requests that will be
pm.max_children = 256

; The number of child processes created on startup.
; Note: Used only when pm is set to 'dynamic'
; Default Value: min_spare_servers + (max_spare_servers - min_spare_servers) / 2
pm.start_servers = 128
```

```
; The desired minimum number of idle server processes.
; Note: Used only when pm is set to 'dynamic'
; Note: Mandatory when pm is set to 'dynamic'
pm.min_spare_servers = 8

; The desired maximum number of idle server processes.
; Note: Used only when pm is set to 'dynamic'
; Note: Mandatory when pm is set to 'dynamic'
pm.max_spare_servers = 128
```

Kode Sumber 5.3. Konfigurasi php-fpm ppdbjatim.net

Konfigurasi lengkap website ppdbjatim.net di NGINX dapat dilihat pada Lampiran 3.

2. Implementasi Load Balancing Database Hasil Ranking

Implementasi load balancing database ini berfokus pada pembagian beban request hasil ranking pada tiga server database dengan bantuan HAProxy. Adapun implementasi load balancing database hasil ranking sebagai berikut:

1. Konfigurasi HAProxy

Pada implementasi load balancing database ini, HAProxy berlaku sebagai load balancer. Konfigurasi HAProxyuntuk situs web ppdbjatim.net akan ditampilkan pada Kode Sumber 5.4 berikut:

```
global
        log 127.0.0.1   local0
        log 127.0.0.1   local1 notice
        chroot /var/lib/haproxy
        user haproxy
        group haproxy
        daemon
```

```
defaults
        maxconn 20000


listen mysql-cluster
        bind :3306
        mode tcp
        balance leastconn
        timeout client  60s
        timeout server  60s
        timeout connect         60s
        server melon8 10.130.104.45:3306
        server melon9 10.130.104.169:3306
        server melon10 10.130.97.175:3306
```

Kode Sumber 5.4. Konfigurasi HAProxy

2. Konfigurasi Database Hasil Ranking

Konfigurasi database MariaDB ini berada di server Melon-08 sampai dengan Melon-10 sebagai server database hasil perankingan. Detail konfigurasinya akan ditampilkan pada Kode Sumber 5.5 berikut:

```
#
# This group is read by the client library
# Use it for options that affect all clients, but not the server
#


[client]
# Default is Latin1, if you need UTF-8 set this (also in server section)
default-character-set = utf8mb4


# socket location
socket = /var/run/mysqld/mysqld.sock
```

```
# Example of client certificate usage
# ssl-cert=/etc/mysql/client-cert.pem
# ssl-key=/etc/mysql/client-key.pem
#
# Allow only TLS encrypted connections
# ssl-verify-server-cert=on

# This group is *never* read by mysql client library, though this
# /etc/mysql/mariadb.cnf.d/client.cnf file is not read by Oracle MySQL
# client anyway.
# If you use the same .cnf file for MySQL and MariaDB,
# use it for MariaDB-only client options
[client-mariadb]
```

Kode Sumber 5.5. Konfigurasi 50-client.cnf pada server database hasil ranking

3. Implementasi Database Utama

Implementasi database ini berfokus pada konfigurasi satu database agar mampu menerima banyak request read dan write dalam satu waktu. Adapun detail konfigurasi database utama ppdbjatim.net akan ditampilkan pada Kode Sumber 5.6 berikut:

```
# MariaDB database server configuration file.
[client]
port            = 3306
socket          = /var/run/mysqld/mysqld.sock

[mysqld_safe]
socket          = /var/run/mysqld/mysqld.sock
nice            = 0

[mysqld]
```

```
#
# * Basic Settings
#

skip-name-resolve

#
# * Fine Tuning
#

#
# * MyISAM Configuration
#
# This replaces the startup script and checks MyISAM tables if needed
# the first time they are touched. On error, make copy and try a repair.

#
# * Query Cache Configuration
#
# Cache only tiny result sets, so we can fit more in the query cache.

#
# * Logging and Replication
#
# Error logging goes to syslog due to /etc/mysql/conf.d/mysqld_safe_syslog.cnf.
#
# we do want to know about network errors and such
log_warnings            = 2
#
# Enable the slow query log to see queries with especially long duration
```

```
# The following can be used as easy to replay backup logs or for replication.

#
# * InnoDB Configuration
#

[mariadb]
log_bin             = /var/log/mysql/mysql-bin.log
server_id=1
log-basename=master1
binlog-format=mixed
binlog_do_db=jatim2020

[mysqldump]
quick
quote-names
max_allowed_packet     = 64M

[mysql]
#no-auto-rehash          # faster start of mysql but no tab completion

[isamchk]
key_buffer                  = 16M

#
# * IMPORTANT: Additional settings that can override those from this file!
#   The files must end with '.cnf', otherwise they'll be ignored.
#
!include /etc/mysql/mariadb.cnf
```

```
!includedir /etc/mysql/conf.d/
```

Kode Sumber 5.6. Konfigurasi my.cnf pada server database utama

Konfigurasi lengkap website ppdbjatim.net di NGINX dapat dilihat pada Lampiran 4.