REST API Implementation on Android Based Monitoring Application

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Abstract. Applications on internet are generally made with a several languages programming and must be able to run well on operating systems, even different devices. REST API is an architecture designed on a web service that has been widely accepted by the public for simple use in mobile cloud paradigm. RESTful web service works by identifies a URI (Uniform resourced Identifier) and then modify it with GET, POST, PUT or DELETE command that can be represented in several languages programming. Mobile applications nowadays are not separated from daily life community through the ease and development of technology that is increasingly rising. Monitoring is a systematic data collection activity regarding an ongoing activity. Monitoring of University of Trunojoyo Madura dormitory activities is needed so that student character education can run optimally. Constraints that have been encountered are all process monitoring is still done manually, so it required a monitoring application to facilitate monitoring data process become more qualified and simplify the entire user that occupant, caretaker or manager in conduct of monitoring entire activity in the dorm.

1. Introduction
Web service is a standard in distribution division of data and processes between multiple applications and services that exist on internet. Applications on internet are generally made using several of languages programming and should be able to run well on operating systems, even different devices [1]. Web service utilization is to solve problem in integration between processes and data on current exchange of separate information, as well as data security level can be can be handled properly. The architecture that is generally used in building a web service is REST and SOAP. REST API is defined as an architectural tool designed on web services that focus on system resources such as transfer & request data using http [2]. REST has been widely accepted by public for simple use in mobile cloud paradigm [3]. REST web service works by identifying the URI and then modify it with GET, POST, PUT or DELETE command which can be represented on some language programming such as XML or JSON [4]. Various applications made by utilizing REST API such as patients’ health records [5], US environmental protection agency’s human well-being index (HWBI) that characterizes human wellbeing using social, economic and ecological data [6], Smart water meters that can automatically collect detailed usage water [7], and association rule mining services that used to find frequent patterns from huge data [8]. Several studies suggest that SOAP based services are heavy to consume on mobile devices so that Restful Web Services are more suitable for mobile applications [9] even to [10] shows that REST with JSON has shown better performance compared to SOAP.

Mobile applications nowadays are not separated from daily life community through the ease and development of technology that is increasingly rising [11]. Development process of mobile applications is become much easier through new technologies [12]. At present, mobile is a part of web service technology that offers personalized services and can communicate peer-to-peer [13]. Various mobile app that is develops may be a native app and a web app which both run on devices mobile with utilizing web service technology [14].
Monitoring is a systematic data collection activity regarding an ongoing activity. Monitoring is generally carried out to inform the development and achievement of these activities. Monitoring of University of Trunojoyo Madura dormitory activities is needed so that student character education can run optimally. The monitoring process that has been done is attendance routine, attendance nonroutine, violation, and a record of licensing both return and certain activities. Constraints that have been encountered are all these processes are still done manually, so it is often found cheating like manipulation attendance activities are carried administrators, the process of absenteeism is not done regularly after the activity, as well as there is a buildup of used paper that cannot be avoided.

A monitoring application is a solution to facilitate the monitoring data process become more qualified [15]. The aim to this is to build applications monitoring for University of Trunojoyo Madura dormitory using architecture of REST API that can be used in several devices, make it easier throughout user that are inhabitants, administrators and managers in conduct of monitoring entire activity in the dorm.

2. Methodology

Web services are built using the PHP and MySQL programming languages as a database that stores data in applications on internet servers. REST API required to manage access to the data on the web and of action s to app mobile android. The web service flow in monitoring application of University of Trunojoyo Madura dormitory can be seen in Figure 1.

![Figure 1. Web service flow.](image)

| Proses  | Information            |
|---------|------------------------|
| GET     | Take a list of monitoring data |
| POST    | Monitoring data         |

Each request contained in JSON is adapted to the monitoring application features and University of Trunojoyo Madura dormitory activities as in Table 1 that uses the GET method to retrieve monitoring data and the POST method to display monitoring data.

3. Result and Discussion

3.1. Backend

Controller is main thing in calling web services that will play a role when user accesses web service that was created. REST API architecture uses HTTP protocols such as the GET method, POST method, PUT method and DELETE method. In the dormitory monitoring application using the GET and POST methods.

```php
<?php
require_once('..//koneksi.php');
if($_SERVER['REQUEST_METHOD']=='GET') {
    $sql = "SELECT * FROM warga";
    $res = mysqli_query($koneksi_database,$sql);
```
3. The use of GET method

In Code Program 1, the use of the GET method is to take the data contained in the database that is used as a controller, the result of the access of a RESTful API in JSON array that will be processed much further to facilitate the processing of monitoring data.

```php
<?php
require_once('../koneksi.php');

$ID_WARGA = $_POST['ID_WARGA'];
if($_SERVER['REQUEST_METHOD'] == 'POST') {
    $sql = "SELECT * FROM penilaian_warga where ID_WARGA = '$ID_WARGA' ";
    $res = mysqli_query($koneksi_database,$sql);
    $result = array();
    while($row = mysqli_fetch_array($res)){
        array_push($result, array('SKORE_WARGA'=>$row[2],'KEPUTUSAN'=>$row[3] ));
    }
    echo json_encode(array("value"=>1,"result"=>$result));
}
mysqli_close($koneksi_database);
```

**Code Program 2.** The use of POST method

In Code Program 2, an example of using the POST method is to display data contained in a database in JSON array format which will be further processed to facilitate the processing of monitoring data.

3.2. Frontend

The monitoring application of University of Trunojoyo Madura dormitory activity is a Frontend application that can be accessed through an android mobile application for clients.

```java
package com.dormitory.skripsi.API
import retrofit2.Retrofit
import retrofit2.converter.gson.GsonConverterFactory

class APIResponse {
    val url: String = "http://asrama.pasarin.web.id/admin/api/"
    fun response(): APIClient {
        val retrofit: Retrofit =Retrofit.Builder().baseUrl(url)
            .addConverterFactory(GsonConverterFactory.create())
            .build()
        return retrofit.create(APIClient::class.java)
    }
}
```

**Code Program 3.** Access URL

Code Program 3 which is the access URL in the Frontend section to be able to access the webservice, it is necessary to use the domain URL of the internet page that is the server so that the webpage, database is connected to the mobile application.

```java
package com.dormitory.skripsi.API
import retrofit2.Call
import com.dormitory.skripsi.model.ResponseJSON
import okhttp3.MultipartBody
import okhttp3.RequestBody
import retrofit2.http.*

interface APIClient {
    @FormUrlEncoded
    @POST("loginWarga.php")
    fun loginWarga(  
        @Field("NAMA_WARGA")NAMA_WARGA: String,
        @Field("ID_WARGA")ID_WARGA: String
    ): Call<ResponseJSON>
}
```

**Code Program 4.** API Client
Program Code 4 which is an API Client on part Frontend to be able to display the data that is the server then set interface API Client on application mobile

Figure 2 is the interface of client login, application monitoring dorms can be accessed using REST API is a web service that can facilitate the process of processing the data and not concerned about technological differences.

4. Conclusions

Based on the research above can be concluded that technology web services using the REST API on application monitoring of University of Trunojoyo Madura dormitory can facilitate both client and server in access application using method GET, POST, PUT and DELETE in JSON to facilitate in developing of dormitory application monitoring. In addition, using web service on monitoring application can facilitate process of dormitory monitoring data.

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