

Build Meeting Room Management Website Using BaaS Framework : Usergrid

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Abstract—Baas (Backend as a Service) is a model for providing web app and/or mobile app developers with a way to link their applications to backend cloud storage and APIs exposed by backend applications while also providing core features like integration, user management, and push notification. Baas technology keep growing from time to time and getting more advance in function but easier in use.

This document will explain a whole process from learning until implementing a website, in this case will be a meeting room management website, using BaaS technology. One of the biggest player in BaaS industry for now is Usergrid. Usergrid is an Apache backend-as-a-service project built with Java. It's been around since 2011 and is actively developed and maintained. Usergrid project is very well documented and also have an active forum that makes this project widely used by many users around the world. Meeting room management website is a system that can be very useful for many company to manage their rooms, schedule and employers in order to get the most effective way to use company's resources for daily work activities. And with using Usergrid as a BaaS in the development processes we hope this website can be developed in short time but also have a comprehensive functionalities.

Keywords—Backend as a Service; website development; Apache Usergrid; meeting room management website; BaaS framework;

I. INTRODUCTION

IT products not only used by big company or used for business purpose only nowadays. Maybe a few years ago IT products such as mobile apps or website become something that looks very sophisticated and an expensive technology so it's only used by a large-scale company to help their business system, but now those perspective seems irrelevant anymore. People is getting used to utilize IT products such as mobile app or website to help them in their works or maybe just for daily activities. This situation makes need of IT product gaining significantly, event a company whose business areas not related to technology or maybe just a single person still have a need of IT product support.

These condition makes IT engineer who capable to build an IT products get many opportunities. But in other hand this condition also makes many opportunities become more alike one to another, many projects build a typical kind of website or application with common functionalities. That's right maybe it seems easier to develop those kinds of project, but still as a

developer we know event we already know how to build it but still we have to start over and build all those common functionalities from beginning. Copying some code from another project's resources that have been done before was an alternative that maybe every developer ever done, but in many cases this alternative isn't a good thing because it's often broke the ethic code or previous project's contract that usually makes the project resources copyright taken by the product owner not the developer. Maybe this situation become one from many reasons why cloud technology stack service businesses have a positive trend until now. From IaaS (Infrastructure as a Service), PaaS (Platform as a Service) to BaaS (Backend as a Service) keep growing in capabilities, competitors and users.

BaaS (Backend as a Service) or also known as MBaaS (Mobile Backend as a Service) can be an answer for development problem that mentioned before. With this framework developers can build apps or webs not servers. Whether they need to support one app or a hundred, this technology can become their backend to support full functionalities for their projects. Get projects to production in record time and stop wasting cycles writing server-side code.

II. THEORIES

A. Backend as a Service Technology

Backend as a Service or BaaS also known as Mobile Backend as a Service is a cloud computing service model that serves as the middleware that provides developers with ways to connect their Web and mobile applications to cloud services via API and SDK. BaaS features include cloud storage, push notifications, server code, user and file management, social networking integration, location services, and user management as well as many backend services. These services have their own APIs, allowing them to be integrated into applications with relative ease. Providing a constant way to manage backend data means that developers don't have to develop another backend for each service that the applications use or access. Some BaaS features are similar to those of other service models like SaaS, IaaS and PaaS, but BaaS is unique in specifically addressing the needs of Web and mobile applications

B. Apache Usergrid

1. Description

Usergrid is an Apache's opensource BaaS project that released to public on September, 2014. Usergrid composed of an integrated distributed NoSQL database, application layer and client tier with SDKs for developers looking to rapidly build web and/or mobile applications. It provides elementary services such as user registration & management, data storage, file storage, queues and also retrieval features such as full text search, geolocation search and joins to power common app features. It is a multi-tenant system designed for deployment to public cloud environments or to run on traditional server infrastructures so that anyone can run their own private BaaS deployment. Or in sum we can describe Usergrid is a multi-tenant Backend-as-a-Service stack for web & mobile apps, based on RESTful APIs.

2. Features

The latest Usergrid version 2.1.0 already have some features that very useful for developers such as user management, data collection, file storage, full SDKs and ease development.

User management feature will help developers with many functions such as sign up users, log in, reset passwords and more, in just one API call. Developer can put users in groups, assign roles or permissions, let users follow each other and access everything via OAuth 2.0, without writing a single line of server code.

Data collection feature will be very useful if developer can express data in JSON, so Usergrid can store it. Underneath everything is stored in a standard Cassandra instance, but Usergrid have added the ability to retrieve data via an SQL-like syntax, manage collections and connections between entities.

Usergrid's file storage feature is well designed feature because Usergrid's asset storage can handle anything from text files to videos of several terrabytes, with automatic content-detection and full URL access control. In the back, everything goes Amazon S3 or other preferred cloud file store.

So far there are 13 full SDKs that Usergrid provide, they are Android, .NET, HTML5-JavaScript, Java, NodeJS, Python, Swift, iOS, Perl, PHP, PHP5 Ruby-on-Rails and Ruby. With these SDKs, developer doesn't need to worries about their development fields.

And ease development in Usergrid means developer get operational predictability, all the benefits of the JVM, and easy extensibility because of Usergrid build on standard Java components, such as Jersey, Jackson, Apache Cassandra and Lucene.

C. Website Development

Web development is a process of works that involved in developing a web site for the internet or an intranet. It can range from developing the simplest static single page of plain text to the most complex web-based internet applications, electronic businesses, and social network services. A more comprehensive list of tasks to which web development commonly refers, may include web engineering, web design, web content development, client liaison, client-side/server-side scripting,

web server and network security configuration, and e-commerce development. But in most general definition, web development covers processes from backend developing, frontend developing and deployment.

III. IMPLEMENTATION

For this project we built a sample website which use Usergrid's features to implement some function for the backend. This website's goal is to help a company, venue or building management to manage their room allocation system for every event that will use a room in specific time for specific subject (person, division, group, etc). For additional this website also can facilitate events to have a meals or drink while it held, have sort and select mechanism to find appropriate room, give information about the meeting room's details such as location, image, room's arrangement and room's schedule. And all these features function implemented using Usergrid's SDK.

Usergrid's PHP SDK is used in this project, you can see this full SDK in :

<https://github.com/apache/usergrid/tree/master/sdks/other/php>

To use this SDK in this project we include it in our directory tree.

```
1 <?php
2 session_start();
3 include_once 'autoloader.inc.php';
4 usergrid_autoload('Apache\Usergrid\Client');
5 $client = new Apache\Usergrid\Client('socif_project','booking');
6
7 ?>
```

Figure 3.1. config.php

```
<?php
/**
 * Licensed to the Apache Software Foundation (ASF) under one
 * or more contributor license agreements. See the NOTICE file
 * distributed with this work for additional information
 * regarding copyright ownership. The ASF licenses this file
 * to you under the Apache License, Version 2.0 (the
 * "License"); you may not use this file except in compliance
 * with the License. You may obtain a copy of the License at
 *
 * http://www.apache.org/licenses/LICENSE-2.0
 *
 * Unless required by applicable law or agreed to in writing, software
 * distributed under the License is distributed on an "AS IS" BASIS,
 * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
 * See the license for the specific language governing permissions and
 * limitations under the License.
 */

function usergrid_autoload($class) {

    if (strpos($class, '\\') !== FALSE) {
        $path_parts = explode('\\', $class);
        if ($path_parts[0] == 'Apache') {
            $lib_path = realpath(dirname(__FILE__) . '/../lib/vendor');
            $class_path = $lib_path . '/' . join('/', $path_parts) . '.php';
            if (file_exists($class_path)) {
                require_once($class_path);
            }
        }
    }
}

spl_autoload_register('usergrid_autoload');
```

Figure 3.2. autoloader.inc.php

After we configure and include the SDK now we can use all function that available in SDK. Start with using the user management feature we will use login authentication function, to make this website can widely and easy to use so we will use Facebook authentication mechanism that also will show us that Usergrid can be combined with any other API without causing

any problems.

```

<div class="col-md-4 col-md-offset-4">
<div class="panel panel-body">
<?php
    $fb = new Facebook\Facebook([
        'app_id' => $app_id, // Replace (app-id) with your app id
        'app_secret' => $app_secret,
        'default_graph_version' => 'v2.2',
    ]);

    $helper = $fb->getRedirectLoginHelper();

    $permissions = ['email']; // Optional permissions
    $loginUrl = $helper->getLoginUrl($permissions, $permissions);

    echo '<a href="' . htmlspecialchars($loginUrl) . '" class="btn btn-primary col-md-12">Log in with Facebook</a>';
    >>
</div>
</div>

```

Figure 3.3. login.php

```

<?php
include 'config/config.php';
define('FACEBOOK_SDK_V4_SRC_DIR', __DIR__ . '/facebook-sdk-v5/');
require_once __DIR__ . '/facebook-sdk-v5/autoload.php';
ini_set('display_errors', 1);
$app_id = "1348784941859694";
$app_secret = "c6f83ad543de8af1b568e11d863b2e";
$fb = new Facebook\Facebook([
    'app_id' => $app_id,
    'app_secret' => $app_secret,
    'default_graph_version' => 'v2.2',
]);

$helper = $fb->getRedirectLoginHelper();

try {
    $accessToken = $helper->getAccessToken();
} catch (Facebook\Exceptions\FacebookResponseException $e) {
    // When graph returned an error
    echo 'Graph returned an error: ' . $e->getMessage();
    exit;
} catch (Facebook\Exceptions\FacebookSDKException $e) {
    // When validation fails on other local issues
    echo 'Facebook SDK returned an error: ' . $e->getMessage();
    exit;
}

if (!isset($accessToken)) {
    if ($helper->getError()) {
        header('HTTP/1.0 401 Unauthorized');
        echo 'Error: ' . $helper->getError() . "\n";
        echo 'Error Code: ' . $helper->getErrorCode() . "\n";
        echo 'Error Reason: ' . $helper->getErrorReason() . "\n";
        echo 'Error Description: ' . $helper->getErrorDescription() . "\n";
    } else {
        header('HTTP/1.0 400 Bad Request');
        echo 'Bad request';
    }
    exit;
}

// Logged in
echo '<h3>Access Token</h3>';
var_dump($accessToken->getValue());

```

Figure 3.4. fb-callback.php

Then we also use data collection feature, for this feature we use it to access data and enter a data to implement sort and search for rooms function. The figure below show us how to read from data collection, doing any query, print them onto website and entry data into data collection.

```

htmlspecialchars();
$tanggal = date('d/m/y', strtotime("-1 day"));
$data = array('ql' => "select * where ruangan" . $ruangan . get('uid') . " AND tanggal" . $tanggal . " AND (jumlah" . $j . " AND selesai" . $s . ")");
$rooms = $client->get_collection($data);
// Looping data
foreach ($rooms as $room) {
    $roomId = $room->get('id');
    $nama = $room->get('nama');
    $jumlah = $room->get('jumlah');
    $selesai = $room->get('selesai');
    $fasilitas = $room->get('fasilitas');
    $keterangan = $room->get('keterangan');
    $minuman = $room->get('minuman');
    $makanan = $room->get('makanan');
    $ruangan = $room->get('ruangan');
    $tamu = $daftar_tamu;
    $tanggal = $tanggal;
    $harga = $harga;
    $pembayaran = $pembayaran;
    $user = $SESSION['uid'];
}

```

Figure 3.5. form_booking.php

```

$daftar_tamu = $_SESSION['daftar_tamu'];
$body = array(
    "name" => $_POST['nama'],
    "bentukruangan" => $_POST['bentuk_ruangan'],
    "jumlah" => (int)$POST['jam_mulai'],
    "jamselesai" => (int)$POST['jam_selesai'],
    "jumlah" => (int)$POST['jumlah'],
    "fasilitastambahan" => $_POST['fasilitas_tambahan'],
    "keteranganmakanan" => $_POST['makanan_keterangan'],
    "keteranganminuman" => $_POST['minuman_keterangan'],
    "makanan" => $makanan,
    "minuman" => $minuman,
    "ruangan" => $ruangan->get('uid'),
    "tamu" => $daftar_tamu,
    "tanggal" => $_POST['tanggal'],
    "harga" => (int)$POST['harga'],
    "pembayaran" => $_POST['pembayaran'],
    "user" => $_SESSION['uid']
);

```

Figure 3.6. finish_booking.php

With using Usergrid we can develop backend for this

website in shorter time than usual, and all its functionalities works perfectly with standard php-html-css format. For the frontend we built it using HTML and CSS, figures below show us how the website looks like:

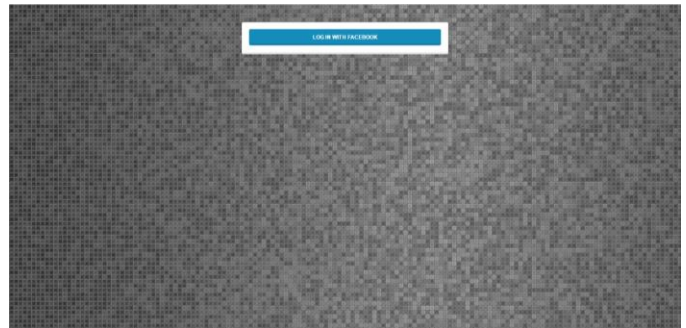


Figure 3.7. Pre-Login Page

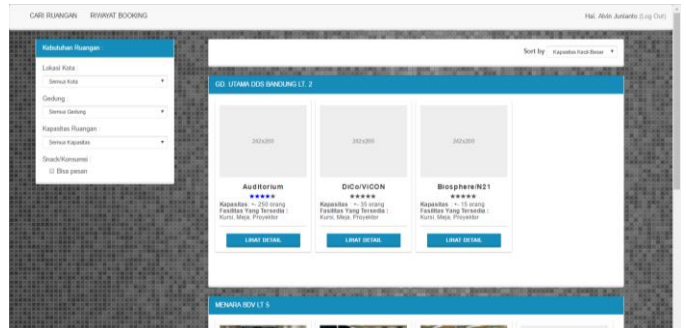


Figure 3.8. Home Page

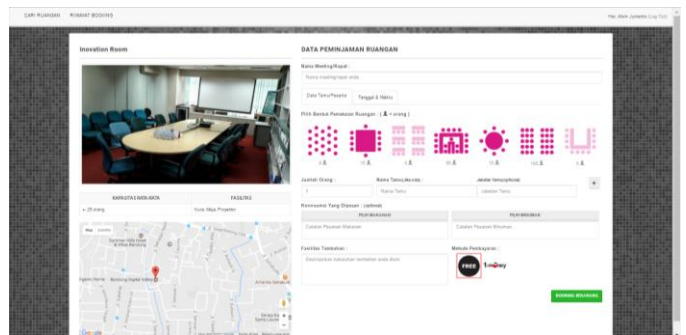


Figure 3.9. Booking Details Tab

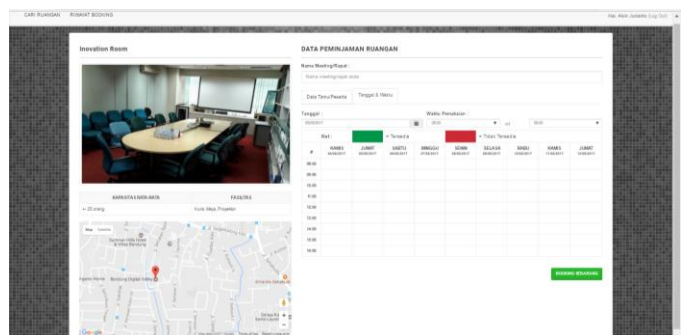


Figure 3.10. Booking Schedule Tab

We can't show you detailed step by step with full explanation or complete source code about this project in this document, because it will took more than 4 page which is the max limit for this assignment is 4 pages. But you can access this project and read the readme for the explanation by accessing :

<https://github.com/alvinjunianto/SociffinalProject>

IV. CONCLUSION

BaaS is a powerful technology which developer can use to build any IT projects. With using backend as a service we can build a software easier but still well functionate, using this technology we can save our time in developing some general function that we often use. We haven't explore all SDKs that provided by Usergrid but for PHP SDK we briefly can say it already useful in many function but still there are still some function that you must pay attention at if you want to use it such as push notification and creating a chart because it still has technical issue about those functions. If you want to try another BaaS technology you can also try to use Kinvey or Mesosfer.

ACKNOWLEDGMENT

I would like to thank God for Thy blessings throughout writing this document. I also would like to express my sincere gratitude to Dessi Puji Lestari ST,M.Eng.,Ph.D , Dr. Ir. Rinaldi Munir, MT, and Dr. Eng. Ayu Purwarianti, ST.,MT,. for the guidance throughout the semester in Socio-Informatics course. And the last one, I would like to thanks everyone that not directly involved in this learning project but still supported me until I finished writing this document.

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STATEMENT

I hereby declare that this paper is my own work and not a copy, translation, nor plagiarism of somebody else's work.

Bandung, May 5th, 2017



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