­­MINISTRY OF EDUCATION AND TRAINING

FPT UNIVERSITY

Capstone Project Document

Cloud-based Backend as a Service for Building Mobile Applications

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| Nhóm 7 | |
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| Ext. Supervisor | N/A |
| Capstone Project code | CSBM |

-Ho Chi Minh, *11-05-2016*-

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**Definitions, Acronyms, and Abbreviations**

|  |  |
| --- | --- |
| Name | Definition |
| BE | Back-end |
| PF | Parse Facebook |

# **A. Introduction**

## **Project Information**

- Project name: **Cloud-based Backend as a Service for Building Mobile**

**Applications.**

- Project code: **CSBM.**

- Project type: **Web Application and Mobile Framework.**

- Start date: **11-05-2016.**

- End date: **21-8-2016.**

## **Introduction**

In this document, we introduce a solution for mobile developers. Developing mobile applications is more and more popular and cloud computing also extremely develops. The combination is very complex to build the effective application on smartphone. Based on our researches and analysis, we proposed a cloud-based backend as a service for mobile developers.

We provide a service that includes website application and mobile framework, which helps mobile developers to develop their application quickly, easily to change, and flexibility in modification. Somethings supported the developer building their application without worrying about the backend services.

## **Current Situation**

When developing mobile applications, developers need to concern too much about back-end such as: creating service support push notification, creating and managing database mobile… Most modern mobile applications store data and interact with other services on the internet. User accounts, shared content, documents and purchases; these things all need to be stored somewhere else, and cloud is a good solution. There is a cloud-based backend as a service of Facebook named “Parse” (https://www.parse.com), however the “Parse” is shutdown in first month 2016…

## **Problem Definition**

Cloud-based backend as a service:

* Advantages:
* Parse, Firebase… are well-known and already had much users.
* Disadvantages:
  + Parse (http://parse.com/) is shutdown in first month 2017.
  + CloudKit (<https://developer.apple.com/icloud/>) is limited to iOS and require user to use iCloud.
  + Firebase (<https://www.firebase.com/>) hasn’t push notification

Common mobile development:

* Advantages:
* Taking control everything front mobile layout to back-end component.
* Disadvantages:
* Mobile developers need to have the knowledge about web service or wait provided services from web service developer.
* Mobile developers hard to focus on creating user experience.
* Mobile application development is waste of time on building API.

## **Proposed Solution**

Our proposed solution is to develop the Cloud-based Backend as a Service named “CSBM” to support mobile developer manage application data via our provided framework and only focus on creating extraordinary user experiences. We’ll take care of the rest.

### **5.1. Feature functions**

* Web application: design for developer to manage data and configuration of their mobile application.
* Server: parse data from client side to store and sync data with our NoSQL cloud database.
* Mobile framework: provide framework for mobile developer to interact with our database.

### **5.2. Advantages and Disadvantages**

* Advantages:
  + Real-time database: data is stored in cloud database and synced to all connected clients in real-time.
  + Push notification: auto push notification to all connected client after data is changed.
  + Mobile framework for developers to interact with their data on server database.
* Disadvantages:
  + Security: users only manage their data while the security is based on the service provided.
  + Application downtime: users can’t control downtime when CSBM server has problem.

## **Functional Requirements**

* **Server component**
  + Parse data from client dashboard to system storage.
  + Notify to connected client.
  + Sync database to server automatically.
* **Web component**
  + Manage applications.
  + Manage data.
* **Mobile framework** 
  + Provide framework for mobile.

## **Role and Responsibility**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Full Name | Role | Position | Contact |
| 1 | Kiều Trọng Khánh | Project Manager | Supervisor | khanhkt@fpt.edu.vn |
| 2 | Nguyễn Mạnh Hùng | Developer | Leader | hungnmse61388@fpt.edu.vn |
| 3 | Nguyễn Hữu Lộc | Developer | Member | locnhse61312@fpt.edu.vn |
| 4 | Vũ Văn Quyết | Developer | Member | quyetvv61071@fpt.edu.vn |
| 5 | Phạm Bảo Toàn | Developer | Member | toanpbse61011@fpt.edu.vn |

*Table 1: Roles and Responsibilities*

# **B. Software Project Management Plan**

## **Problem Definition**

### **Name of this Capstone Project**

* Official name: Cloud-based Backend as a Service for Building Mobile Applications.
* Vietnamese name: Dịch vụ đám mây hỗ trợ developer xây dựng mobile application.
* Abbreviation: CSBM.

### **Problem Abstract**

At the moment, not much mobile developer use BaaS (Backend as a Service), they must build a back-end for many difference mobile platform. This situation makes developer can focus on creating extraordinary user experiences, and then the effective of build a mobile application is always not best liked developer hope.

Besides, currently there are Parse (<http://parse.com/>), Cloud-Kit (<https://developer.apple.com/icloud/>), Firebase (<https://www.firebase.com/)>,... But they have not provided developers a good way to build a mobile application. Cloud-Kit is limited to iOS and require user to use iCloud. Firebase hasn’t push notification. Parse is stop service provider in first month 2016 and is shutdown in first month 2017, but many developers create applications with Parse, if Parse shutdown, they will have difficulty in finding another BaaS like Parse.

For the goal that improving the develop, we provide a service which base on Parse Server, to make easier and developers can focus on creating extraordinary user experiences. By using Parse Server, we develop a website to create new applications, and a service to sharing data between a user’s different devices. The service also haves push notifications, if either of those are important to developer applications, our service will likely save develop time.

### **Project Overview**

* + 1. **Current Situation**

Below are the problems encountered in this project:

* + **Disadvantages:**
    - Parse source code was developed with Node.JS that nobody in team has much knowledge about.
    - Parse source code not public function to allow users create new application.
    - All member need to study operation mechanism of Parse.
    - Team hasn’t much knowledge about how to code and build a framework.
  + **Advantages:**
    - The server is ready to run based on Parse source code.
    1. **The Proposed System**

To resolve the Node.JS knowledge problem, we can use Node.JS Tutorial from <http://www.tutorialspoint.com/nodejs/> for understanding how Node.JS work. We also find the necessary help from Node.JS development forum to solve this problem.

We must to know what dashboard send request to server to create a new application to write a function allow developer can create new application from our service dashboard.

According to technology researches, we found out that Node.JS and Angular.JS can help us resolving the problem of study operation mechanism of Parse. We must have knowledge about Node.JS and Angular.JS, then we can improve our service.

We can research on internet to study more about code and building framework but it takes a lot of time.

* + - 1. ***Web Site(Dashboard)***

Main web application is a place for developer to create a new application or register account to use main function of the service website. Developer also can use this website to management our data.

* For developer
  + - Create a new application: Developer can create a new application.
    - Manage data: Create/Edit/Remove developer data in application.
  + For guest
    - Register: User can register new account to use the service.
      1. ***Mobile Framework***

This framework is use for Developer’s mobile Application, which is provided a API with backend designed for Android and iOS.

#### **Boundaries of the System**

* This service is built basing on real process of Facebook’s Parse.
* The complete product includes:
  + A web application that allow:
    - Register account to use main function of the system
    - Create a new application
    - Manage data
  + Mobile Framework that allow:
    - Provide API
    1. **Future Plans**

Currently, the service only provided on two platforms: iOS and Android. Besides that, the service use PF Server, so the users only manage their data. We design the server to make its easily to maintain with more functions and run on more platform:

* Provided on multiple platform.
* Provided users security their applications: Users know a security that protect their data while using the service.
  + 1. **Development Environment**
       1. ***Hardware requirements***
* For server

|  |  |  |
| --- | --- | --- |
| Hardware | Minimum Requirements | Recommended |
| Internet Connection | 512Kbps | 4 Mbps |
| Operating System | Ubuntu Server 12 LTS | Ubuntu Server 14.04.2 LTS |
| Computer Processor | Intel® CORE i3 Quad core 2.1 GHz | Intel® CORE i7 Quad core 2.4 GHz |
| Computer Memory | 1GB of RAM | 4GB of RAM or more |

*Table 2: Hardware Requirement for server*

* For website development

|  |  |  |
| --- | --- | --- |
| Hardware | Minimum Requirements | Recommended |
| Internet Connection | 512Kbps | 4 Mbps |
| Operating System | Ubuntu Server 12 LTS | Ubuntu Server 14.04.2 LTS |
| Computer Processor | Intel® CORE i3 Quad core 2.1 GHz | Intel® CORE i7 Quad core 2.4 GHz |
| Computer Memory | 1GB of RAM | 4GB of RAM or more |

*Table 3: Hardware Requirement for website development*

* For mobile framework development

|  |  |  |
| --- | --- | --- |
| Hardware | Minimum Requirements | Recommended |
| Internet Connection | 512Kbps | 4 Mbps |
| Operating System | Ubuntu Server 12 LTS | Ubuntu Server 14.04.2 LTS |
| Computer Processor | Intel® CORE i3 Quad core 2.1 GHz | Intel® CORE i7 Quad core 2.4 GHz |
| Computer Memory | 1GB of RAM | 4GB of RAM or more |

*Table 4: Hardware Requirement for mobile framework development*

1. **Project organization**
   1. **Software Process Model**

The project is developed under Scrum model.

Scrum is an iterative and incremental agile software development methodology for managing product development. It defines “a flexible, holistic product development strategy where a development team works as a unit to reach a common goal”, challenges assumptions of the “traditional, sequential approach” to product development, and enables teams to self-organize by encouraging physical co-location or close online collaboration of all team members.

Scrum adopts an empirical approach – accepting that the problem cannot be fully understood or defined, focusing instead on maximizing the team’s ability to deliver quickly, to respond to emerging requirements and to adapt to evolving technologies and changes in market conditions.

* 1. **Roles and responsibilities**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Full name | Role in Group | Responsibilities |
| 1 | Kiều Trọng Khánh |  | * Specify user requirement * Specifying the business * Control the development process * Give advices on techniques, solutions and business analysis support |
| 2 | Nguyễn Mạnh Hùng | Team Leader, BA, DEV, Tester | * Managing process * Researching solutions and techniques * Assigning task for members |
| 3 | Nguyễn Hữu Lộc | Team Member, BA, DEV, Tester | * Researching solutions and techniques |
| 4 | Vũ Văn Quyết | Team Member, BA, DEV, Tester |  |
| 5 | Phạm Bảo Toàn | Team Member, BA, DEV, Tester |  |

*Table 5: Roles and Responsibilities Details*

* 1. **Tools and Techniques**

|  |  |
| --- | --- |
| Tool / Technique | Name / version |
| Development tool |  |
| Backend Technology | Node.JS |
| Frontend Technology | Angular.JS |
| iOS Framework Technology | Objective-C |
| Android Framework Technology | Java |
| DBMS | MongoDB |
| Source control |  |
| Modeling tool |  |
| Document tool | Microsoft Word 2016 |

*Table 6: Tools and Techniques*

1. **Project Management Plan**
   1. **Software development life cycle**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **Description** | **Deliverables** | **Resource needed** | **Dependencies and Constrains** | **Rick** |
| **Requirement Analysis** |  |  |  |  |  |
| **Design** |  |  |  |  |  |
| **Implementation** |  |  |  |  |  |
| **Testing** |  |  |  |  |  |
| **Maintenance** |  |  |  |  |  |

* 1. **Phase Detail**
     1. **Phase 1: Requirement Analysis**
     2. **Phase 2: Design**
     3. **Phase 3: Implementation**
     4. **Phase 4: Testing**
     5. **Phase 5: Maintenance**
  2. **All Meeting Minutes**

Refer to Meeting Minutes folder.

1. **Coding Convention**

Summary:

* Naming Convention:
  + Variable names should be short yet meaningful. The choice of a variable name should be designed to indicate to the casual observer the intent of its use.
  + Methods should be verbs, in mixed case with the first letter lowercase, with the first letter of each internal word capitalized.
* Declarations Convention:
  + One declaration per line is recommended since it encourages commenting