DUY TÂN UNIVERSITY

International School

Capstone Project 2

CMU-SE 451 – C2SE.12

Architecture Design

Version 1.1

Date: March 6th, 2021

Learn English Together

Submitted by

Ha, Le Thanh

Hieu, Le Xuan

My, Ngo Ngoc

Thong, Doan Trung

Approved by

MSc Huy, Truong Dinh

Proposal Review Panel Representative:

_____

Name Signature Date

Capstone Project 2- Mentor:

_____

Name Signature Date

PROJECT INFORMATION

Project acronym	LET		
Project Title	Learn English Together		
Start Date	26 Feb 2021	**End Date**	08 Jun 2021
Lead Institution	International School, Duy Tan University		
Project Mentor	MSc Huy, Truong Dinh		
Scrum master / Project Leader & contact details	Ha, Le Thanh Email: lethanhhadtu@gmail.com Tel: 0334002818		
Partner Organization	Duy Tan University		
Project Web URL			

Team members	Name	Email	Tel
	Ha, Le Thanh	lethanhhadtu@gmail.com	0334002818
	Hieu, Le Xuan	xuanhieu.le.1999@gmail.com	0399706614
	My, Ngo Ngoc	ngongocmy851999@gmail.com	0764497391
	Thong, Doan Trung	doanthong002@gmail.com	0886428208

DOCUMENT APPROVALS

The following signatures are required for approval of this document.

Ha, Le Thanh Student ID: 2321122516 *Scrum Master*	Signature	Date
Hieu, Le Xuan Student ID: 2321124665 *Team Member*	Signature	Date
My, Ngo Ngoc Student ID: 2321124970 *Team Member*	Signature	Date
Thong, Doan Trung Student ID: 2321124144 *Team Member*	Signature	Date

REVISION HISTORY

Version	Date	Comments	Author
1.0	March 18th, 2021	Initial Release	Ngo Ngoc My
1.1	March 21th, 2021	Update Current Status of Art	Ngo Ngoc My

TABLE OF CONTENT

1. Introduction 5
1.1. Purpose 5
1.2. Document reference 5
2. Project reference 5
2.1. Project Overview 5
2.2. Business Driver 6
2.2.1. Business problem 6
2.2.2. Business need 6
2.2.3. Project goals 6
3. Architecture Drivers 6
3.2. System Context 7
3.3. Architecture Driver Specification 8
3.3.1. Use Case Entities 8
3.3.2. Operational Use Case 9
3.4. Quality Attributes 13
4. Constraints 14
4.1. Business Constraint 14
4.2. Technical Constraint 14
5. High-level Architecture 15
5.1. Component and Connector View (C&C view) 15
5.1.1. Prose 16
5.1.2. Role and Responsibility of Elements 17
5.2. Module View 18
5.2.1. Prose 18
5.2.2. Role and Responsibility of Elements 18
5.3. Allocation View 21
5.3.2. Prose 22
5.3.3. Role and Responsibility of Elements 23

1. Introduction

1.1. Purpose

This specification covers following:

- Brief specification of the project, high level requirement, system context for the system.
- Use case diagram, detail quality attribution.
- Architecture presented by various architecture view types: Component and Connect tor view, Module view and Allocation view.

1.2. Document reference

No	Reference
1	C1SE.12_ProductBacklog_ver1.1.docx
2	C1SE.12_UserStory_ver1.1.docx
3	C1SE.12_ProjectPlan_ver1.1.docx

Table 1: Document Reference

2. Project reference

2.1. Project Overview

- Project name: **Learn English Together**
- Development team

Full name	Position
Ha, Le Thanh	Scrum Master
Hieu, Le Xuan	Scrum Member
My, Ngo Ngoc	Scrum Member
Thong, Doan Trung	Scrum Member

2.2. Business Driver

2.2.1. Business problem

2.2.2. Business need

- Community helps each other learn English.
- Application can learn vocabulary, listen for beginners.
- Application that make learning more efficient by learning in groups.
- The application can interact with others and support each other in learning.
- The application can help, share and inspire others to learn English.

2.2.3. Project goals

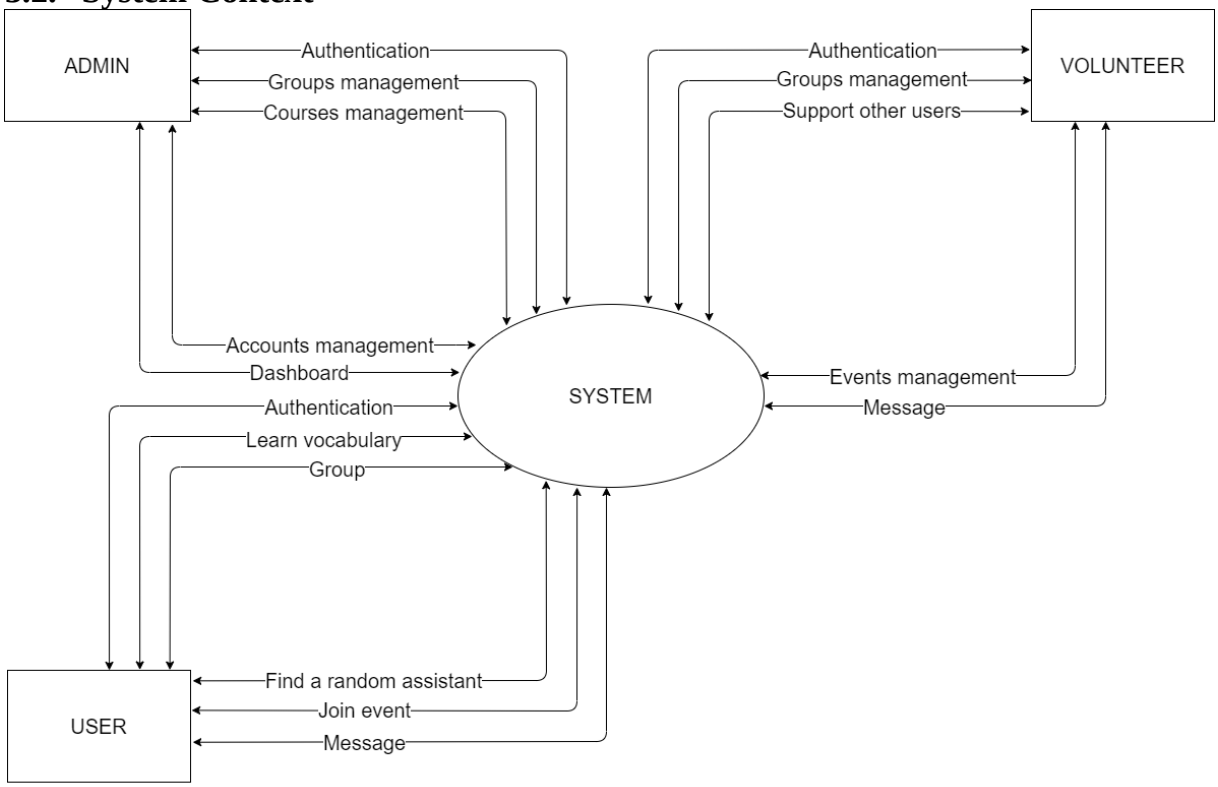
LET is an application system that supports and helps lost learners learn English in a natural and exciting way. Learning a new language is like learning your mother tongue, language needs to come naturally. The system will be a community of people with similar interests in learning English, helping and supporting each other to learn English. Good people will tutor friends who are weaker than me to learn English. From there will create a community together to learn and improve English.

3. Architecture Drivers

3.1. High-level Requirements

Refer to C1SE.12_ProductBacklog_ver1.1

3.2. System Context



- **Admin:**
  - Admin can authenticate identity (login / logout)
  - Admin can manage groups in the system.
  - Admin can manage accounts in the system (Add, change roles, lock accounts)
  - Admin can create management courses (add default course, edit default courses, block course)
  - Admin can view dashboard chart statistics

- **Volunteer:**
  - Volunteer can authenticate identity (login / logout)

- Volunteer can manage groups created by them (create, teaching online, create quiz, manage users in group, change group, delete group)
- Volunteer can receive random assistance from the user in need of assistance (video, audio, text)
- Volunteers can manage their events (create event, online conference, change event, delete event)
- Volunteers can interact privately with other users through message

– **User:**

- User can authenticate identity (login / logout)
- User can learn vocabulary
- User can join groups (Study online, take quizzes, review old lesson transcripts, interact with team members)
- User can find random helpers (video, audio, text)
- User can join events
- User can interact privately with other users through message

3.3. Architecture Driver Specification

3.3.1. Use Case Entities

ID	E01
Title	Admin
Description	Admin is a person who managing the system.
Provides Assumptions	Admin is the management of the entire system
Requires Assumptions	Already have a default account
Identified Use Cases	UC01, UC02

ID	E02
Title	Volunteer
Description	Volunteer is a teacher who using the system

Provides Assumptions	Provide person information (optional)
Requires Assumptions	Connect the internet
Identified Use Cases	UC03 to UC5

ID	E03
Title	Student
Description	Student is a learner who using the system
Provides Assumptions	Provide person information (optional)
Requires Assumptions	Connect the internet
Identified Use Cases	UC05 to UC09

3.3.2. Operational Use Case

ID	UC01
Title	Login
Description	Login into system
Entities Involved	E01
Precondition	Admin is already has default account.
Primary Flow	1. Navigate to Admin System website 2. Choose “Use with Admin” button. 3. Navigate to Login page 4. Fill the form with the default account of the admin 5. Click on “Login” button
Post Conditions	Already have default account.
Alternate Flows	In step 4 of the Primary Flow, if [Email]/[Username] or [Password] is incorrect, the system will prompt manager “email or password is incorrect” or “username or password is incorrect”, respectively. In step 1, 2, 3, 5 of the Primary Flow, if the system has problem, it will show error message.

ID	UC02
Title	Manage groups account courses in the system
Description	Create, Edit, Delete data from database of the system
Entities Involved	E01
Precondition	Successful logged in the admin website
Primary Flow	1. Click on [Manage Table] on Sidebar 2. Choose the Table to manage 3. Click on "Add …" button to create new record 4. Click on "Delete …" button to delete all the record had chosen 5. Click on "Edit" icon to show edit modal
Post Conditions	
Alternate Flows	In step 1 of the Primary Flow, if the system has problem, it will show error message. In step 2 of the Primary Flow With [Edit]/[Add] option, if the input field be empty, the system will prompt manager "This field not be empty". With [Delete] option, the system will prompt user "Do you want to delete this account?". Click "OK" to delete or click "Cancel" to drop.

ID	UC03
Title	Create, change and delete group
Description	Create, change or delete groups that you manage
Entities Involved	E02
Preconditions	Access the website
Primary Flow	1. Open Learning English Together on browser. 2. Press [Group] on menu bar to navigate the group page. 3. Click the plus sign to add the group 4. For each group you want to change, press the edit button and press the delete button if you want to delete the group
Post Conditions	
Alternate Flows	In step 1, 2, 3 of the Primary Flow, if the system has a problem, it will show error messages. In step 3, 4 of the Primary Flow: System will send message "Error link" if link is not exist anymore.

ID	UC04
Title	Live Stream
Description	Live stream to teach
Entities Involved	E02
Preconditions	Access the website
Primary Flow	1. Open Learning English Together on browser. 2. Press [Group] on menu bar to navigate the group page. 3. Click to select the topic then click to select group 4. Start streaming to teach
Post Conditions	
Alternate Flows	In step 1, 2, 3 of the Primary Flow, if the system has a problem, it will show error messages. In step 3, 4 of the Primary Flow: System will send message “Error link” if link is not exist anymore.

ID	UC05
Title	Create, change and delete event
Description	Create events for everyone to discuss you can change or delete the event you create
Entities Involved	E02
Preconditions	Access the website
Primary Flow	1. Open Learning English Together on browser. 2. Press [Event] on menu bar to navigate the group page. 3. Create events on this page 4. For each event you want to change, hit the edit button and hit the delete button if you want to delete the event
Post Conditions	
Alternate Flows	In step 1, 2, 3 of the Primary Flow, if the system has a problem, it will show error messages. In step 3, 4 of the Primary Flow: System will send message “Error link” if link is not exist anymore.

ID	UC06
Title	Join group
Description	Create, change or delete groups that you manage
Entities Involved	E02

Preconditions	Access the website
Primary Flow	1. Open Learning English Together on browser. 2. Press [Group] on menu bar to navigate the group page. 3. Choose the topic you want to join then click the join button
Post Conditions	
Alternate Flows	In step 1, 2, 3 of the Primary Flow, if the system has a problem, it will show error messages. In step 3, 4 of the Primary Flow: System will send message “Error link” if link is not exist anymore.

ID	UC07
Title	Chat room
Description	Create, change or delete groups that you manage
Entities Involved	E02
Preconditions	Access the website
Primary Flow	1. Open Learning English Together on browser. 2. Press [Group] on menu bar to navigate the group page. 3. Click to select the topic then click to select group 4. Press to join class and chat
Post Conditions	
Alternate Flows	In step 1, 2, 3 of the Primary Flow, if the system has a problem, it will show error messages. In step 3, 4 of the Primary Flow: System will send message “Error link” if link is not exist anymore.

ID	UC08
Title	Vocabulary
Description	Create, change or delete groups that you manage
Entities Involved	E02
Preconditions	Access the website
Primary Flow	1. Open Learning English Together on browser. 2. Press [Course] on menu bar to navigate the group page. 3. Choose vocabulary course you need to learn
Post Conditions	

Alternate Flows	In step 1, 2, 3 of the Primary Flow, if the system has a problem, it will show error messages. In step 3, 4 of the Primary Flow: System will send message "Error link" if link is not exist anymore.

ID	UC09
Title	Quiz
Description	Create, change or delete groups that you manage
Entities Involved	E02
Preconditions	Access the website
Primary Flow	
Post Conditions	1. Open Learning English Together on browser. 2. Press [Group] on menu bar to navigate the group page. 3. Click to select the topic then click to select group 4. Click to join the class and take the test
Alternate Flows	In step 1, 2, 3 of the Primary Flow, if the system has a problem, it will show error messages. In step 3, 4 of the Primary Flow: System will send message "Error link" if link is not exist anymore.

3.4. Quality Attributes

Quality attribute: Usability	**ID**: QA01
Stimulus	Manager interacts with the website. User interacts with the website.
Source(s) of the Stimulus	User, Manager
Relevant Environment	Runtime
Artifact Stimulated	Website
Response	System should response fast with smooth animation
Response Measure(s)	System should response within 4 seconds

Quality attribute: Security	**ID**: QA02
Stimulus	Users do not want to disclose sensitive information illegally
Source(s) of the Stimulus	System
Relevant Environment	The system is online, connected to network
Artifact Stimulated	System Database, Server
Response	

Response Measure(s)	

Quality attribute: Modifiability	**ID**: QA03
Stimulus	Manager want to update account or information
Source(s) of the Stimulus	Manager
Relevant Environment	Runtime
Artifact Stimulated	Website
Response	The system should responses to updated information
Response Measure(s)	System should response within 3 seconds

4. Constraints

4.1. Business Constraint

- Project will be started on: Feb 26th, 2021.
- Project will be finished on: May 25th, 2021.
- Project will be finished in 90 days (2880).

4.2. Technical Constraint

- Programming language: JavaScript
- Library: Hook, Redux, React hook form, Font awesome, Material ui, Express.js.
- Technology: ReactJs, Nodejs, Polling, Elasticsearch, Redis, WebSocket, Mail gun.
- Database: Mongo dB.
- Version Control System: GitHub
- Team Management: Trello, Zalo, Google drive
- Develop tools: Visual Studio Code

Environments:

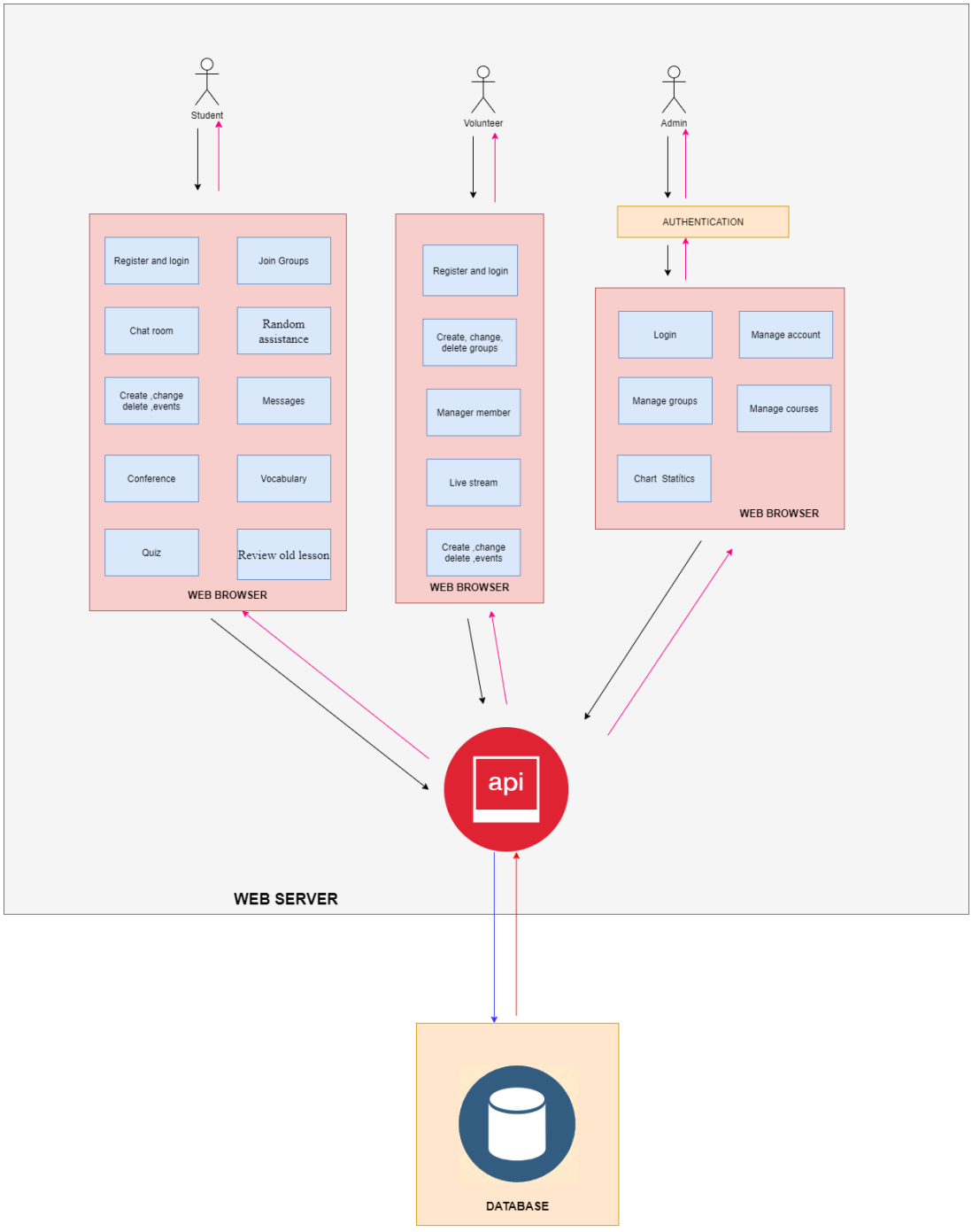
- Internet Connection
- Operation System: Google Chrome, Microsoft Edge, CocCoc, Firefox

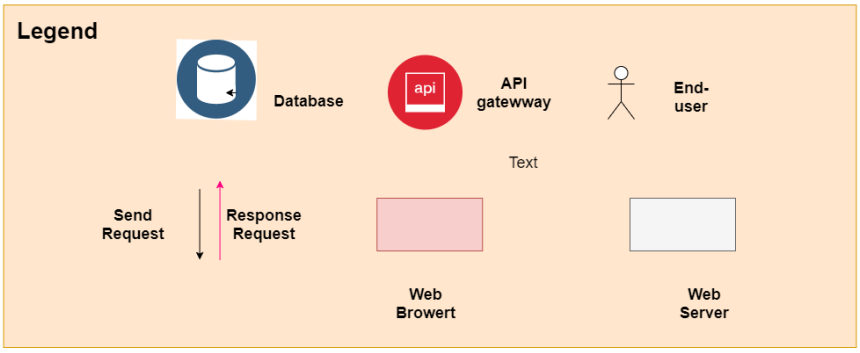
Other Constraints:

- Resource: 4 people.
- Budget: Limited.
- Time: The project must be completed within 03 months.
- These features are not available in the first version of the product.

4. **High-level Architecture**
5.

5.1. Component and Connector View (C&C view)


Student
Volunteer
Admin
AUTHENTICATION
Register and login
Join Groups
Chat room
Random assistance
Create ,change delete ,events
Messages
Conference
Vocabulary
Quiz
Review old lesson
WEB BROWSER
Register and login
Create, change, delete groups
Manager member
Live stream
Create ,change delete ,events
WEB BROWSER
Login
Manage account
Manage groups
Manage courses
Chart Statitics
WEB BROWSER
api
WEB SERVER
DATABASE


Legend
Database
api
API gatewway
End-user
Text
Send Request
Response Request
Web Browert
Web Server

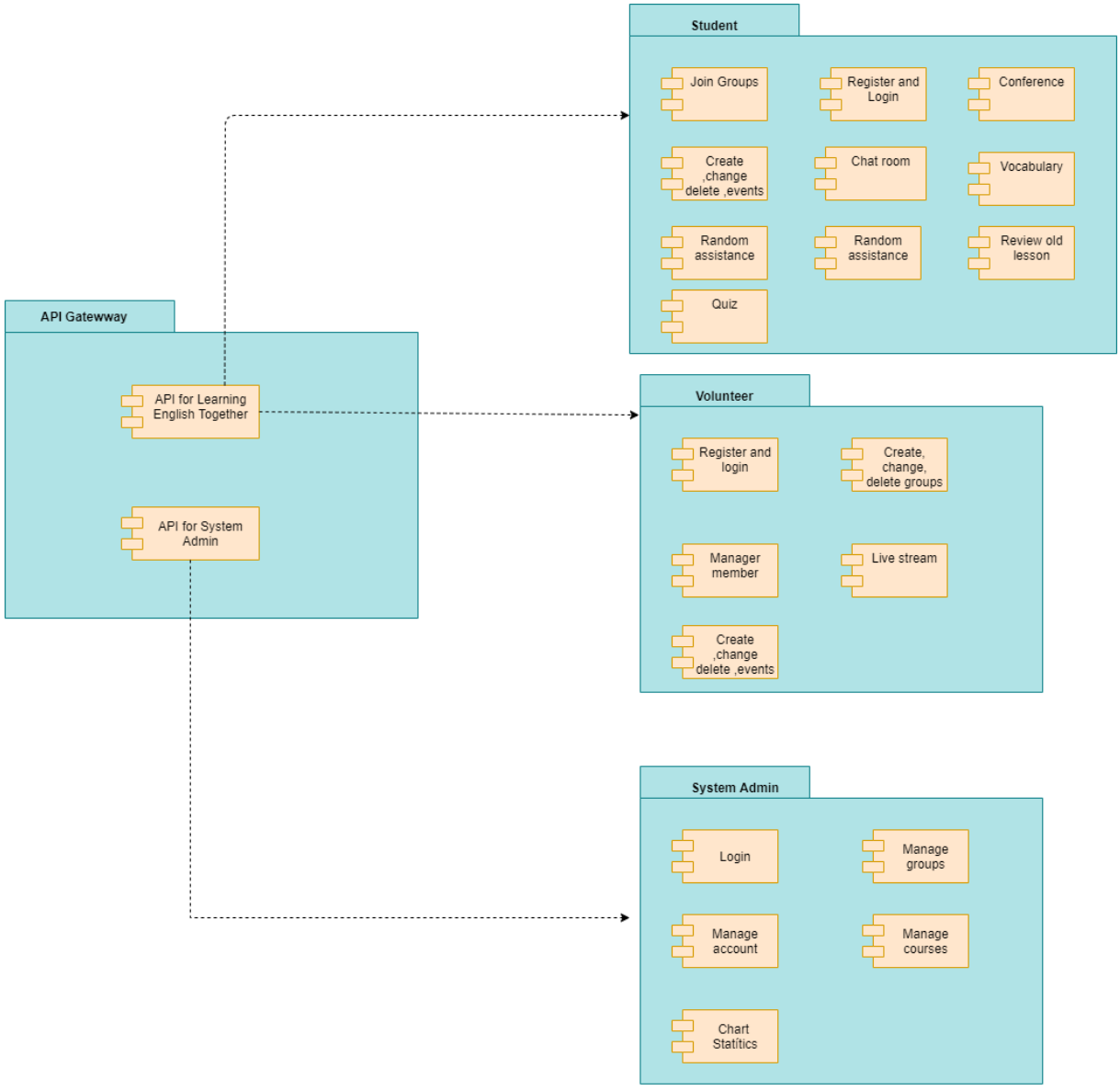
5.1.1. Prose

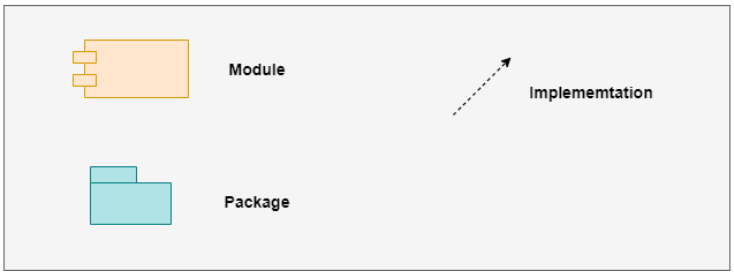
End-User here is Manager or User uses our system via Web browser, respectively. When users access the system, users will use the features provided. When client-server sending a service request, they will be able to use the system through API Gateway which the main communicate with return all data is retrieved by querying to Database.

5.1.2. Role and Responsibility of Elements

- **End-User** will responsible for sending the request and receiving the response.
- **Authentication** will receive the request from Manager and checks to see if Manager's credentials match the one in a database of authorized users or in a data authentication server. Then, the request is sent to the Web Browser for processing with the respective Manager.
- **Web Browser** is responsible for processing the End-user's request. It will receive the request from the End-user and present it to the manager as a Website. It includes two modules with different purposes.
- **API Gateway** is responsible for collecting requests from End-User to process by communication to Database by reading and writing data.
- **Database** is a place that stores data and manipulation data of the system. The database will access the Database to take the data to handle some user requests.

5.2. Module View





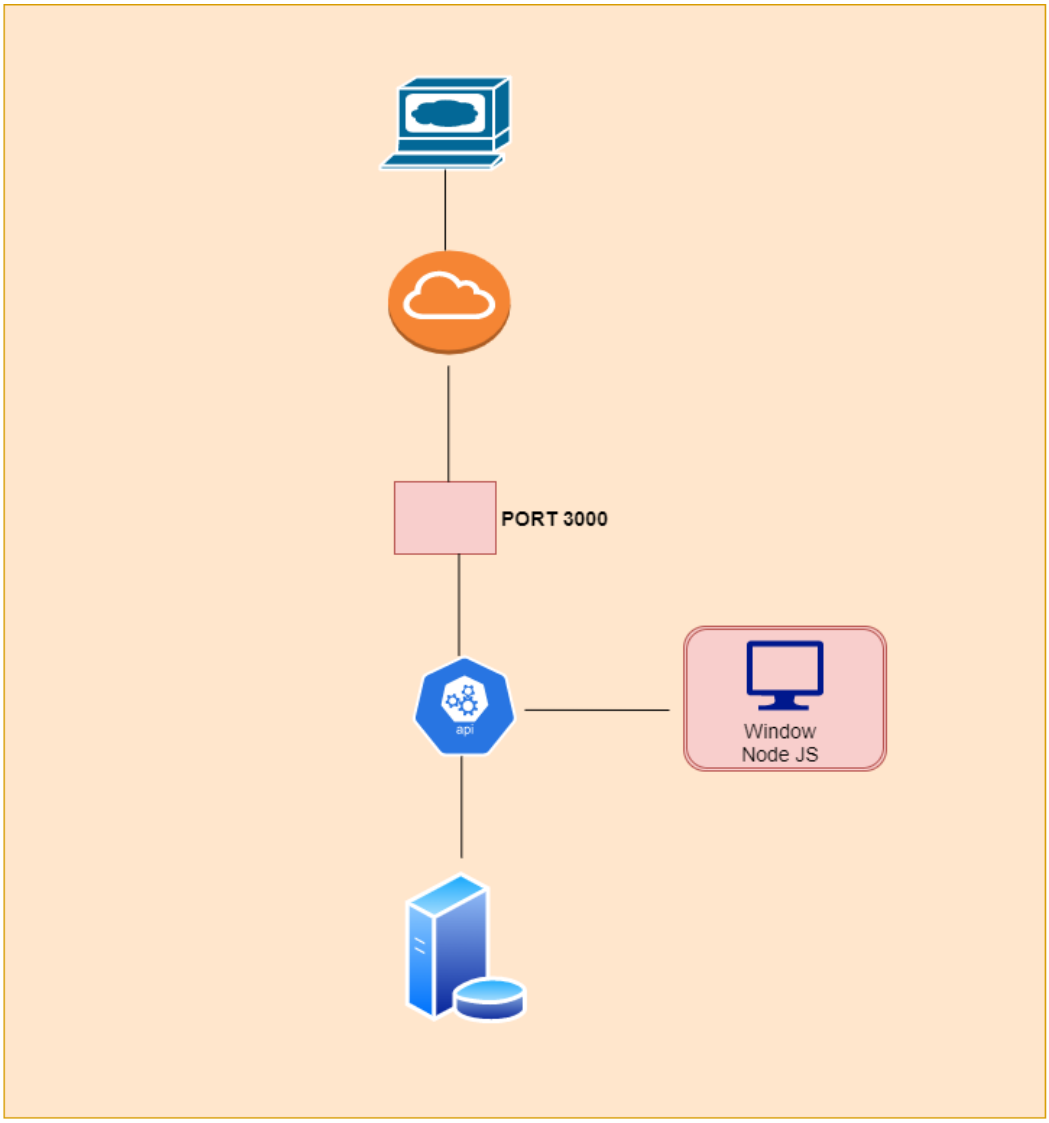
5.2.1. Prose

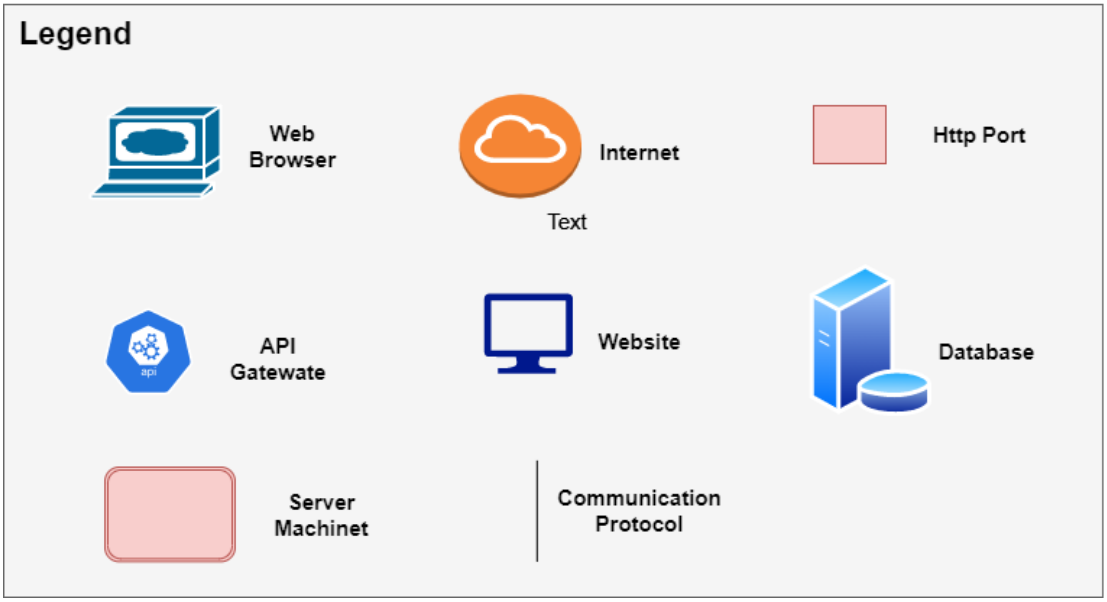
- To process and authorize request from the user, packages which responsibility for interacting with the user, are tied up together to authorize the association between user and data. All requests come from users firstly will be received by API Gateway. Then, API will handle the request and get necessary data from Database and response respectively.

5.2.2. Role and Responsibility of Elements

- **System Admin package** responsibility for operating the data which was received from API module and presenting to manager as a Website. In this package includes a module with purpose is manage data table from the database.
- **Learning English Together Website package** responsibility for operating the data which was received from API module and presenting to user as a website. In this package includes six modules with different purposes.
- **API Gateway package** responsibility for collecting request from user or manager to process by communication to Data Access module to query data and responding to Learning English Together Website package or System Admin as JSON file. This package includes two modules with different purposes
  - *API for Learning English Together Website module* includes queries which relate to the requests from user to operate the functionals in the Website.
  - *API for System Admin module* includes queries which relate to the requests from manager to operate the functionals in Website.

5.3. Allocation View


PORT 3000
api
Window
Node JS


Legend
Web
Browser
Internet
Http Port
Text
API
Gatewate
Website
Database
Server
Machinet
Communication
Protocol

5.3.2. Prose

- End users here are respectively Managers or Users using our system through a Web browser. All requests are processed in a Central Web Server, data access is only made between the Web Server and the Database Server. All transactions between the user and the system will be deployed on Firebase through the API call.

5.3.3. Role and Responsibility of Elements

- **Web Browser** is an interface for managers to interact with the system and submit their requests.
- **API Gateway** is responsible for collecting requests from End-User to process by communication to Database by reading and writing data.
- **Database** is a place that stores data and manipulation data of the system. The database will access the Database to take the data to handle some user requests.
- **Internet** is the communication environment between the website and the server.
- **Website** is the place to receive and process requests from end users.
- **Server machine** is a computer program or device that provides a service to another computer program and its user