DUY TÂN UNIVERSITY

International School

Capstone Project 2

CMU-SE 451 – C2SE.12

Database Design

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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		
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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	Approval
1.0	March 15th, 2021	Initial Release	Ngoc My Ngo	
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TABLE OF CONTENT

1. Introduction

The Database Design maps the logical data model to the target database management system with consideration to the system's performance requirements. The Database Design converts logical or conceptual data constructs to physical data constructs (e.g., tables...) of the target Database Management System.

1.1 Purpose

The purpose of the Database Design is to ensure that every database transaction meets or exceeds its performance requirements. This document takes into account data and transaction volume to produce a schema and environment that will meet necessary performance.

1.2 Scope

The Database Design Document has the following objectives:

- To describe the design of a database, that is, a collection of related data stored in one or more computerized files that can be accessed by users or developers via a DBMS.
- To serve as a basis for implementing the database and related software units. It provides the acquirer visibility into the design and provides information necessary for software development.

1.3 Introduction about MongoDB

MongoDB is a NoSQL database which stores the data in form of key-value database and can be installed across different platforms like Windows, Linux etc. pairs. It is an **Open Source**, **Document Database** which provides high performance and scalability along with data modelling and data management of huge sets of data in an enterprise application.
MongoDB also provides the feature of Auto-Scaling. Since, MongoDB is a cross platform like Windows, Linux etc.

A Document is nothing but a data structure with name-value pairs like in JSON. It is very easy to map any custom Object of any programming language with a MongoDB Document. For example: **Student** object has attributes **name, rollno** and **subjects**, where subjects are a List.

Document for Student in MongoDB will be like:

```
{
        name : "Stduytonight",
        rollno : 1,
        subjects : ["C Language", "C++", "Core Java"]
}
```

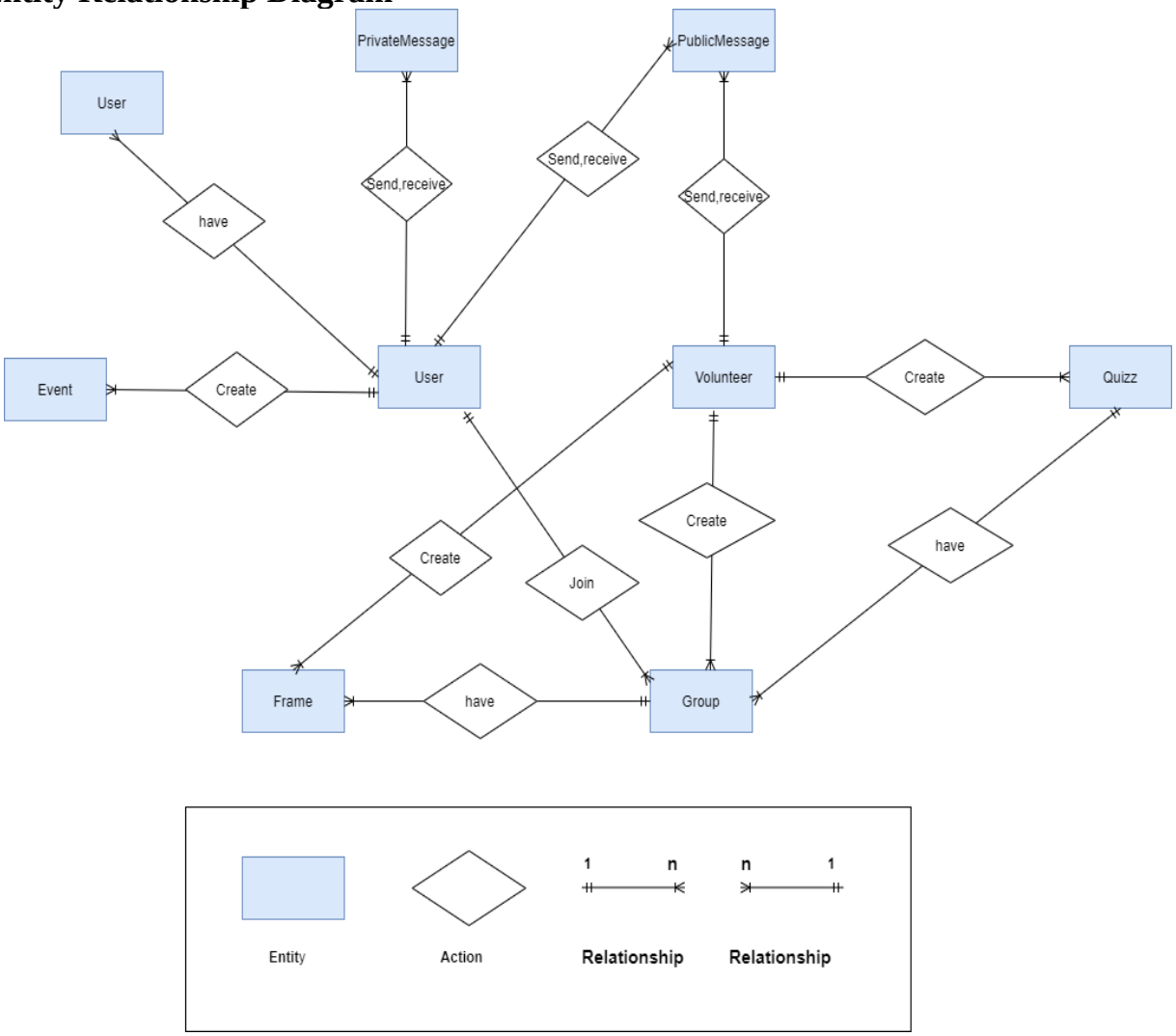
We can see, Documents are actually JSON representation of custom Objects. Also, excessive JOINS can be avoided by saving data in form of Arrays and Documents(Embedded) inside a Document.

2.Database Diagram

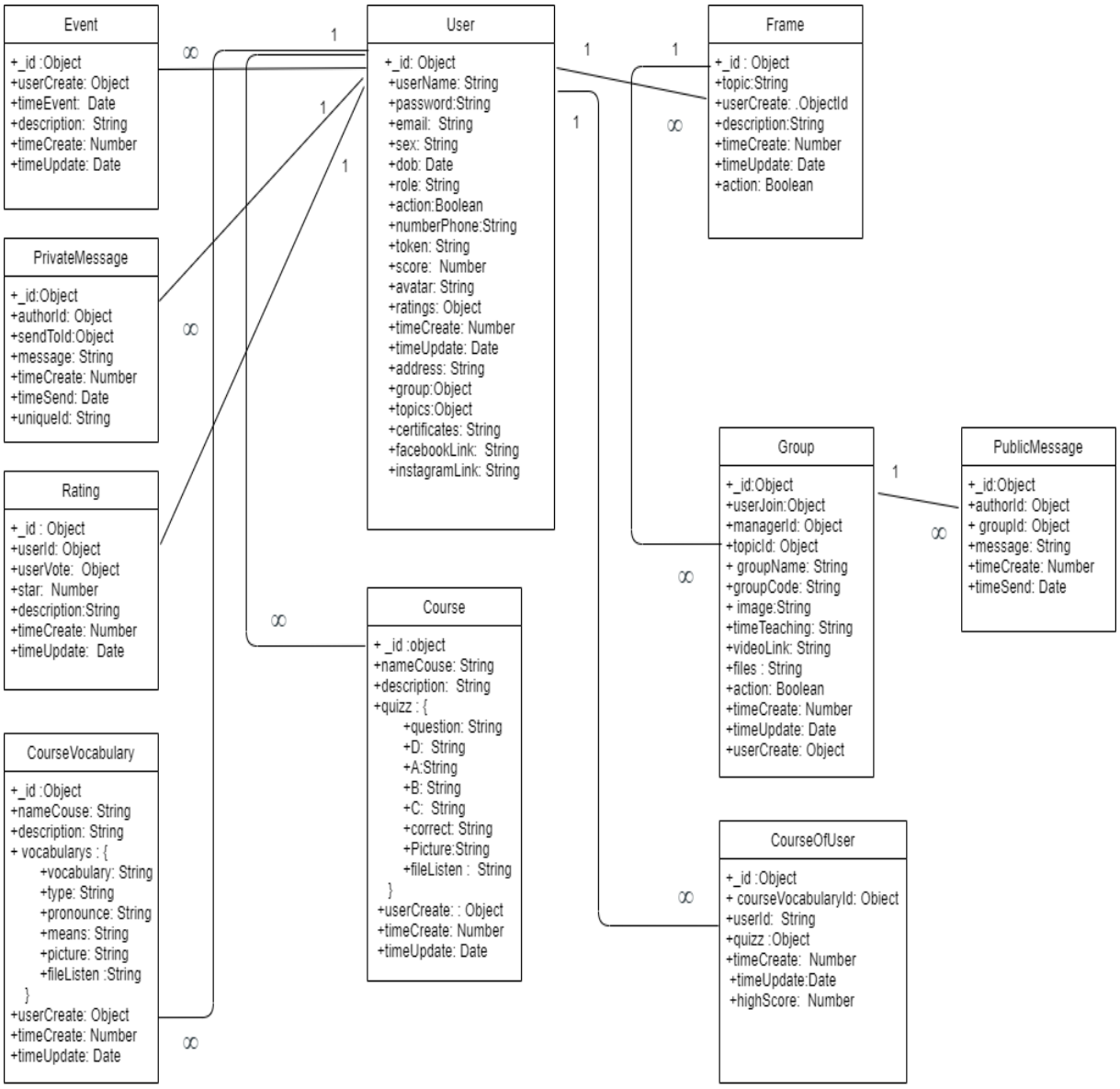
2.1 Table Overview

Table Name	Short Description
Group	This table shows group information including all related fields.
User	This table shows member information including all related fields.
Frame	This table shows topic of a group.
PrivateMessage	This table shows messages between members.
PublicMessage	This table shows messages between User in the group.
Quizz	This table shows quiz of the group.
Event	This table shows all the events for the website.

2.2 Entity Relationship Diagram



2.3 Table Relationship Diagram



3. Database Design for Sprint

3.1 Table Group

Group				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary Key	the MongoDB driver automatically generates an ObjectId
2	userJoin	Object		Id user join group
3	managerId	Object		Id manager group
4	topicId	Object		Id topic group
5	groupName	String		Name of group
6	groupCode	String		Code group
7	image	String		Avatar of group
8	timeTeaching	date		Time teach
9	videoLink	String		Link join group when live stream
10	files	String		Files are uploaded to the group
11	action	Boolean		Action of group
12	timeCreate	Date		Time Create
13	timeUpdate	Date		Time Update
14	userCreate	Object		Id User Create Group

3.2 Table User

User				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary key	Id Mongodb Create
2	userName	String		Name of user. Display on website.
3	password	String		Password of user. password after saving to db will be encrypted
4	email	String		Connect with user and help user get their password back. Its value must be unique in the collection
5	sex	String		Sex of user.
6	dob	Date		Date of birth of user

7	role	String		user authorization. Three type: 1. Admin 2. Volunteer 3. Student
8	action	Boolean		Status of user
9	numberPhone	String		Phone of user
10	token	String		Token of user device
11	score	String		User's score when participating in learning on the web
12	avatar	String		Avatar of user. Save the path to cloud nary. Display on website.
13	ratings	Object		Rank of user
14	timeCreate	Date		User Time create
15	timeUpdate	Date		User Time Update
16	address	String		Address of user
17	group	Object		All group user actives
18	topics	String		Topics that users participate in learning
19	certificate	String		Certificate of user
20	facebookLink	String		The link to the user's personal Facebook
21	instagramLink	String		The link to the user's personal Instagram

3.3 Table Frame

Frame				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary key	Id Mongodb Create
2	topic	String		Name Topic
3	userCreate	Object		Id User Create
4	description	String		Content Topic
5	timeCreate	Number		Time Create
6	timeUpdate	Date		Time Update
7	action	Boolean		Status of Topic

3.4 Table PrivateMessage

PrivateMessage				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary key	Id Mongodb Create
2	authorId	Object		Id Sender
3	sendToId	Object		Id Receiver
4	message	String		Content Message
5	timeCreate	Number		Time Create
6	timeSend	Date		Time when message is sent
7	uniqueId	Number		Private Message ID

3.5 Table PublicMessage

PublicMessage				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary Key	the MongoDB driver automatically generates an ObjectId. It is ID of message.
2	authorId	Object		Id of Sender
3	groupID	Object		Id of the group that the user joins
4	message	String		Content of message
5	timeCreate	Number		Time when message is created
6	timeSend	Date		Time when message is sent

3.6 Table Events

Event				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary key	the MongoDB driver automatically generates an ObjectId. It is ID of event.
2	userCreate	Object		Event ID
3	timeEvent	Date		Event Time
4	description	String		Event Content
5	timeCreate	Nummber		Time when event is created
6	timeUpdate	Date		Time when message is updated

3.7 Table Course

Course				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary key	the MongoDB driver automatically generates an ObjectId. It is ID of course. Each course will create 1 course by id
2	nameCourse	String		Name of courrse
3	description	String		descriptions of the courses you take
4	quiz	String		
	question	String		questions of the test
	D	String		multiple choice answer plan
	A	String		multiple choice answer plan
	B	String		multiple choice answer plan
	C	String		multiple choice answer plan
	correct	String		the correct answer to the question (A, B, C, D)
	picture	String		simulation image of the question
	fileListen	String		audio file of the question
5	userCreate	Object		Id of user create course
6	timecreate	Number		Time when user is created course
7	timeUpdate	Date		Time when user is updated course

3.8 Table CourseVocabulary

CourseVocabulary				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary key	the MongoDB driver automatically generates an ObjectId. It is ID of course. Each course will create 1 course by id
2	nameCourse	String		Name of course
3	description	String		descriptions of the courses you take
4	vocabularys	String		
	vocabulary	String		vocabulary
	type	String		from that kind of vocabulary (v, n, adv, adj...)

	pronounce	String		Write down the pronunciation of that word
	means	String		meaning of the word
	picture	String		simulation image of the vocabulary
	fileListen	String		pronunciation of words
5	userCreate	Object		Id of user create course
6	timecreate	Number		Time when user is created course
7	timeUpdate	Date		Time when user is updated course

3.9 Table CourseOfUsser

CourseOfUsser				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary key	the MongoDB driver automatically generates an ObjectId. It is ID of course.
2	coursevocabularyId	Object		Id of course vocabulary
3	userId	Strin		Id of user join course
4	quizz	Object		Id of course vocabulary
5	timeCreate	Nummber		Time when user is created
6	timeUpdate	Date		Time when user is updated
7	highScore	Number		the user's score is achieved when learning vocabulary

3.10 Table Rating

Rating				
Id	Field	Type	Constrain	Description
1	_id	Object	Primary key	the MongoDB driver automatically generates an ObjectId. It is ID of event.
2	userId	Object		id of user
3	userVote	Object		id of other people to vote for you
4	star	Number		star when you reach the highest rank in the leaderboard
5	description	String		Description of rating
6	timeCreate	Nummber		Time when event is created
7	timeUpdate	Date		Time when message is updated

4.Hardware and software Requirements

This section provides an overview of hardware and software requirements. Below are descriptions of the technological components of the Easy English Website:

Attributes of Easy English WEBSITE	
Attributes	**Descriptions**
Database	MongoDB
Software	Reactjs, Nodejs, Polling, Elasticsearch, Redis, Websocket, Mail gun
Hardware	Computer
Library	Hook, Redux, React hook form, Bootstrap 4, Fontawesome, Material ui, Express.js.