Iteration 2: Identify structures to support

The 2nd iteration will focus on detail implementation of some core parts of the system which are,again, the course management system and the database server that store and retrieve the data that will be carried out during the actual making process.

Step 2 Establish Iteration Goal by Selecting Drivers

The goal is to identify structures to support primary functionalities which are the management system and data server. Understanding the structures required allows better understand the system a whole which allow better work distributions among all members (CRN-4),and also give better insight on how to carry out database complexities more effectively (CRN-1). It is in term future enhance information organization (CRN-2).

In this iteration, the primary focus on:
UC-1
UC-2
UC-3
UC-5
UC-6
UC-7
UC-10
UC-14

Step 3 Choosing one or more Elements to refine

The elements need to be refined are modules in each of the layers in both client and server side from iteration 1. Detail of each modules in the layer is describe and outlined which aids in supporting the functionality of the system.

Step 4 Choosing one or more design concepts

The design concept and patterns used for this iteration is related to provide sufficient functionality of the core system. The primary design pattern selected is web application with potential four-tier deployment. The load balanced cluster is also used.

Pattern	Rationale
Web application reference architecture	It is required to use web browser (CON-1) to access all information. There is no application required on the client side and only simple UI

	is required for the application (QA-4) In addition, multiple platform is required as per CON-1 thus high portability is needed . The application requires high response time so multiple user can connect, access and retrieve information(CON-2). Discarded alternatives: Rich Internet application (RIA): RIA is not needed since only simple UI is required for the design (QA-4) . In addition, more time is required for the development for interface has limited request. Furthermore, there is no processing required on client side making RIA less favourable. Mobile application and Service application: It is only required to be used on web client making those two option less desirable.
Three-tier deployment	The three tier system allows better separation between client, web and data applications so there is minimum interaction and interference between them. The performance the system thus will not hindered. Discarded alternative: Nondistritubed deployment: Although, it has not less server required than three tier system, since all request are done in same server, the performance could be hindered which is not ideal. Two-tier deployment: There is a data storage centre thus need a database server. Four-tier deployment: With the addition cost of server, security is enhanced. Nevertheless, web and application server, in this case, can be in one as both of them are on the same domain.
Load balanced cluster	The load balancer allows clients to connect to

	server without experiencing any latency issue during peak period as the server load will be equally distributed among all servers. Hence, its facilitates multiple connections (CON-2)
Extended relational	The high complexities and large data information stored in database (CON-5) could be achieved using extended relational. It provides good scalability and extensibility so multiple query using different views can be retrieved efficiently (UC-3, UC-7, UC-8, UC-14, UC-15, UC-16). The user does not require a lot of real-time processing so extended relational is ideal for the database. Discarded alternative: Traditional relational: lacks of scalability and extensibility which extended relational provides. Data refinery: Most of the user only requires data storing and retrieving (UC-3, UC-7, UC-8, UC-14, UC-15, UC-16), and raw data is preferred for keeping integrity of the student grade.

Step 5 Instantiate Architectural Elements, Allocate Responsibilities, and define interfaces

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Design Decisions and Location	Rationale
Creating basic extended relational diagram for the database	Initializing database design can give a general overview of how each table in the database is connected and provides further understanding and assessing user cases (UC-2, UC-5, UC-7, UC-9, UC-14, UC-15,UC-16)
Component that support the primary use cases	The major Component are identified in the client and server side so user cases can be incorporated. In addition, further detail for each individual component and module can

	be outline later by other members for better workload distribution (CRN-4)

Step 6 Sketch Views

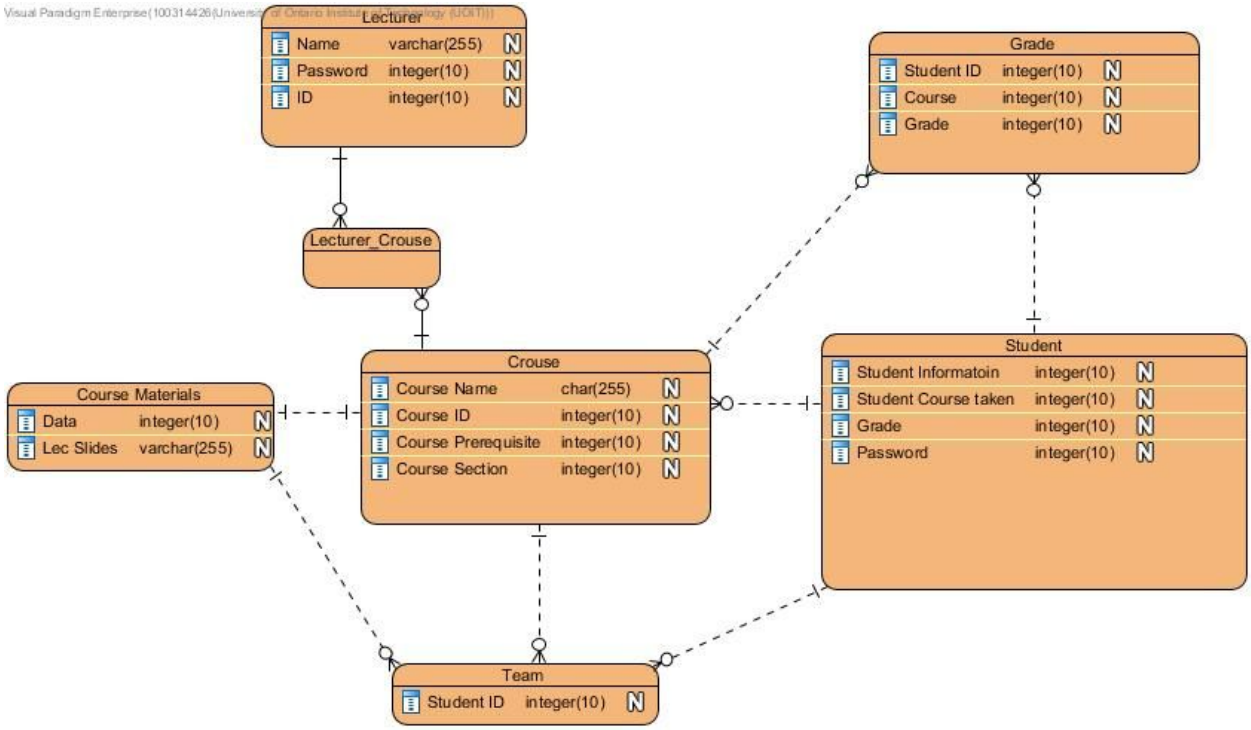

Figure 1: Basic extended relational diagram for the database

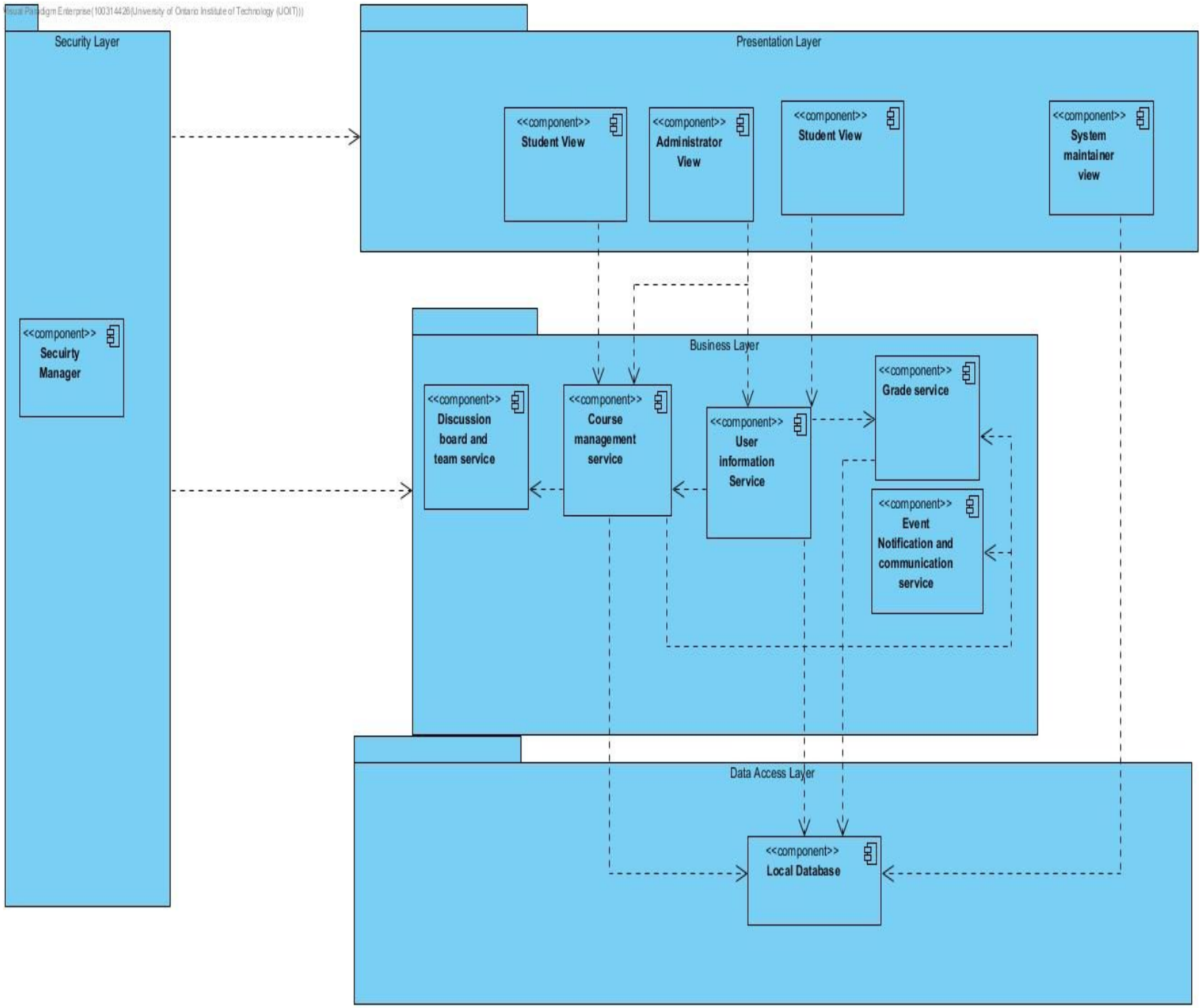

Figure 2: Component that support the primary use cases

Element	Responsibility
Lecturer View	The lecture view allows user to perform any

	kind of course managing including update files to course (UC-5), create groups and send manage (UC-6, UC-8), doing any sort of creating,modifying of the course (UC-7). In addition, it can provide enrollment requirements for the course selected (UC-9). Furthermore, It gives the functionality of managing teams (UC-10)
Student View	THe student view allows user to perform course adding, dropping as well as view course information and requirement (UC-2, UC-3). It allow send message and discuss course materials with others (UC-4, UC-16)
Administor View	The administor view allows user to perform all the functionality by the lecturer view with an addition of managing file sizes and student sizes (UC-12, UC-13)
System maintainer view	The minatiner view allows user to perform database backups (UC-11)
Course Management Service	The course management service provides functionality including adding, dropping courses and link to individual student, send request to discussion board and team service to perform required action, allocating spaces, display course information and requirements and well as well allowing making, edit, copying existing or new courses. It also sends information via event notification and communication service. The service also communicate with grade service to provides adding and editing grade.
Discussion board and team service	The discussion board and team service allows creating teams and discussions that use by both student and lecturer
User information service	THe user information service provides students the access to its own files for viewing and modification. In addition, it access the course management service to perform some limited actions such as adding dropping courses, as well as participate in team and discussion. Furthermore, it allows the communication with grade service to

	display information for the particular student
Grade service	The grade service provides displaying grade for student, and adding and editing for lecturers.
Event notification and communication service	The event notification and communication service allows two way communications between student and student, student and lecturer
Local Database	The database contain all information associated with either student, lecturer and any information, files and update related to course.
Security manager	The security manager handles security aspects such as authorization, authentication and direction to respective view.

Step 7: Perform Analysis of Current Design and Review Iteration

Not Addressed	Partially Addressed	Completely Addressed	Design Decisions Made During the Iteration
		UC-1	The login is completely managed by security manager and perspective views
		UC-2	The system now provides a dedicated service to performing adding/dropping courses via course management service and user information service.. All information is sent and stored in local database
		UC-3	The course information is now provided by course management service
	UC-4, UC-6		The discussion and team service provides basis for allowing discussion board, but the actual mechanism has yet to be determined

	UC-5		The course management service provides functionality to perform file upload and organization.
		UC-7	Course related content can be created, modified using course management service.
	UC-9		
	CU-10		
		CU-12, CU-13,CU-14	The managing the spaces and managing of courses is done via course management service
	QA-1		The security manager determines user login and assign privilege based on user type
	QA-2		As stated in iteration 1 a cloud service for the web server will be used which will keep downtime to a minimum.
		QA-4	The using of web application architectures ensure simplicity and usability of the system
	QA-6		The extended relational database system provides good scalability and extensibility as well as interoperability so extraction of the data from the database becomes manageable
	QA-8		Using of DBMS provides high maintainability to the database
		QA-10	Both web application architecture and extended relational database are scalable and extensible
		CON-1	Using the web application architecture ensured the system is accessed through web browser
	CON-2		The use of a cloud server helps fulfill this concern.

CON-3			No decisions have been made yet.
	CON-4		With a 3 tier database we can add massive amounts of information and testing can be done without being a detriment to the users since it won't affect downtime. The layers can be separated so the testing can be done on one layer without interrupting the other.
	CON-5		With a 3 tier database we can add massive amounts of information and testing can be done without being a detriment to the users since it won't affect downtime. The layers can be separated so the testing can be done on one layer without interrupting the other.
	CRN-1		The basic relational database is designed and further improvement is required
	CRN-2		By properly identifying primary and foreign keys we can eliminated any conflicts within the tables in the database
	CRN-3		Languages have been considered and have been taken into account with respect to the knowledge of the developers.
	CRN-4		With the database structure and basic architecture been designed, the work can be distributed to complete individual part of the system.