Tunsian Republic

Private Higher School of Engineering and Technology

INTEGRATED DEVELOPMENT PROJECT REPORT

Presented as part of the Integration Development Project

Elaborated by

Chaima Khemili

Hedi Boughanmi

Lilia Gaiji

Mariem Souilem

Taha Jelassi

Youssef Ben Romdhane

Design and development of a Web / Mobile application for IRMC

Academic Year 2017 - 2018

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List of abbreviations

- **2TUP** = **T**wo **T**rack **U**nified **P**rocess
- **IRMC** = **I**nstitute **R**esearch **C**ontemporary **M**aghreb

General Introduction

Nowadays technology brought forth a worldwide revolution in every aspect of our lives. This notion affected us either directly or remotely by numeric technologies, and the effect is growing exponentially every day. So, to cope with these changes, traditional ways of doing things are getting rarer.

In this context many companies and other entities are switching their desks and buildings to computer based on applications and servers, where they can execute the exact same tasks with much less resources, expenses and time.

Esprit students of information technology are honored today to apply their knowledge in several developing technologies in order to embody the idea of our client which aims to create an application that manage sinister claims, delivering to the beneficiary of services the ability to create in real time a sinister in an online platform from his available device, the process must be secured and reliable.

In this project we must also be able to work in group, and to apply the 2TUP method to organize our efforts, divide our project to sprints, and to assess the advancement of our work.

Chapter 1

Preliminary study

Outline

Introduction

In this first chapter we present the company. We will also mention the motivations that motivated us to do this project and we will explain the problem and the objectives set. We will discuss the solutions proposed to meet these objectives.

1.1 Presentation of the company

The Institute for Research on Contemporary Maghreb (IRMC) is a research center in the humanities and social sciences, with a regional vocation, based in Tunis. It is one of the 27 French research institutes abroad (IFRE) and is under the supervision of the Ministry of Foreign and European Affairs and, since 2000, the Ministry of Higher Education and Research, and the National Center for Scientific Research (CNRS) of which it constitutes a mixed unit (USR 3077)

Figure 1.1: IRMC

1.2 Study of the existing

The directory of Tunisian documentation centers is an online tool offered by the IRMC's Documentation Services . Listening a hundred documentary structures via individual data sheets (type, domains, access, contact, etc.) and a geolocation system, this service is accessible to any user; Its objective is to overcome the lack of a directory of documentary structures in Tunisia.

The computerization of the fund started in 1987. Regular acquisitions during the 1980s have made it possible to update the research work, and to bring together Tunisian or Maghreb and Arabian university publications.

The computerized catalog contains descriptions of books and brochures (28,500 books), articles of journals and collective works and titles of periodicals (including 90 subscriptions). The computerized catalog that is used in 2018 is lacking details and new technologies tools.

1.2.1 Critical of the existing

However, The IRMC's documentation services is using Excel Although in the majority of cases, Excel remains the most appropriate tool to achieve some precise tasks: allows a great flexibility and offers a remarkable degree of automation ... However, poorly used, it can introduce considerable administrative red tape: broken formulas, miscalculations that lead to decisions based on bad information, less secure, bugs encountered when processing large files, the fact that only one user can use it at a time, not dynamic ...

B	C	D	E	F	G	H	I	J
ar_TN	specialisee	Centre de recherches, d'études, de documentation	CREDIF	Av. du Roi Al	2092	Tunis	36.839841,1	http://www.credif.org.tn/
ar_TN	Mediatheque	Médiathèque Charles de Gaulle de l'Institut Françai	IFT	1 rue d Athè	1000	Tunis	36.8010725	http://www.mediatheques.ir
ar_TN	generaliste	Bibliothèque nationale de Tunisie	BNT	Bd du 9 avril	1000	Tunis	36.7945432	http://www.bnt.nat.tn/
ar_TN	archives	Archives nationales de Tunisie	ANT	122 Bouleva	1030	Tunis	36.7944745	http://www.archives.nat.tn/
ar_TN	associative	Association de Sauvegarde de la Médina	ASM	24, Rue du T	1006	Tunis	36.8008663	http://www.asmtunis.com/
ar_TN	associative	Association des études internationales	AEI	Souk el Attar	1006	Tunis	36.797889,1	http://www.aei-tn.org/tn/in
ar_TN	associative	Association tunisienne d'études et de recherches su	ATERPIT	Souk El Attar	1006	Tunis	36.797889,1	www.aterpit.org
ar_TN	privee	Beit el Bennani		Bab Mnara, 1	1008	Tunis	36.795196,10	.168912
ar_TN	generaliste	Bibliothèque Attarine		20 Souk al A	1008	Tunis	36.797889,1	http://www.bnt.nat.tn/
ar_TN	specialisee	Bibliothèque de la ville de Tunis (Dar Ben Achour)	BVT	46-52, rue d	1006	Tunis	36.802249,10	.166858
ar_TN	specialisee	Bibliothèque diocésaine de Tunis		9 Rue Sidi Sa	1008	Tunis	36.798925,1	http://bibsr.ucoz.com/
ar_TN	specialisee	Bureau d'étude URBACONSULT de Chabbi Morched		70 avenue d	2000	Tunis	36.824487,10	.136303
ar_TN	numerique	Campus Numérique Francophone de Tunis	CNF	Institut Natio	1080	Tunis	36.845628,1	http://www.tn.refer.org/
ar_TN	specialisee	Center for Arab Women Training and Research Cent	CAWTAR	Centre Urbai	1003	Tunis	36.840168,1	http://www.cawtar.org/
ar_TN	specialisee	Centre d'Information des Nations Unies de Tunis	UNIC	41 bis avenu	1003	Tunis	36.83098,10	http://www.unictunis.org.tn
ar_TN	ministere	Office national de la famille et de la population	ONFP	Rue Salahedc	1082	Tunis	0	http://www.onfp.tn/Default.
ar_TN	specialisee	Centre de documentation européenne	EUI	Délégation d	1053	Tunis	36.83204,10	www.eeas.europa.eu/delegat
ar_TN	specialisee	Centre de la Ligue des Etats Arabes		Rue des Lacs	1053	Tunis		http://www.arableaguetunis
ar_TN	publication	Centre de Publication Universitaire	CPU	Campus Univ	1010	La Manouba	36.815297,1	http://www.cpu.rnu.tn/defa
ar_TN	specialisee	Centre des Musiques Arabes et Méditerranéennes	CMAM	Palais Ennejr	2026	Sidi Bou Saïd	36.869631,1	http://www.cmam.nat.tn/
ar_TN	specialisee	Centre d'Etudes Juridiques et Judiciaires	CEJJ	8 Rue El Mec	1002	Tunis	0	http://www.cejj-justice.tn/in
ar_TN	specialisee	Centre National d'Art Vivant Zoubeir Turki Maison c	CNAV	68 av. Taïeb	1002	Tunis	36.816826,10	.176192
ar_TN	specialisee	Centre national de la communication culturelle	CNCC	31 rue Sidi b	1006	Tunis	36.798611,10	.170077
ar_TN	universitaire	Centre National Universitaire de Documentation Sci	CNUDST	1, avenue de	1000	Tunis	36.799303,1	http://www.cnudst.rnrt.tn/
ar_TN	Mediatheque	Cité des Sciences de Tunis	CST	Bd Mohamed	1004	Tunis	36.849664,1	http://www.cst.rnu.tn/fr/
ar_TN	specialisee	Club Culturel Tahar Haddad		20, Rue du T	1006	Tunis	36.801903,10	.168074
ar_TN	universitaire	Faculté de Droit et des Sciences Economiques et Pol	FDSEPS	Cité Erriadh	4023	Sousse	35.806798,1	http://www.fdseps.rnu.tn/

Figure 1.2: Directory of Tunisian documentation

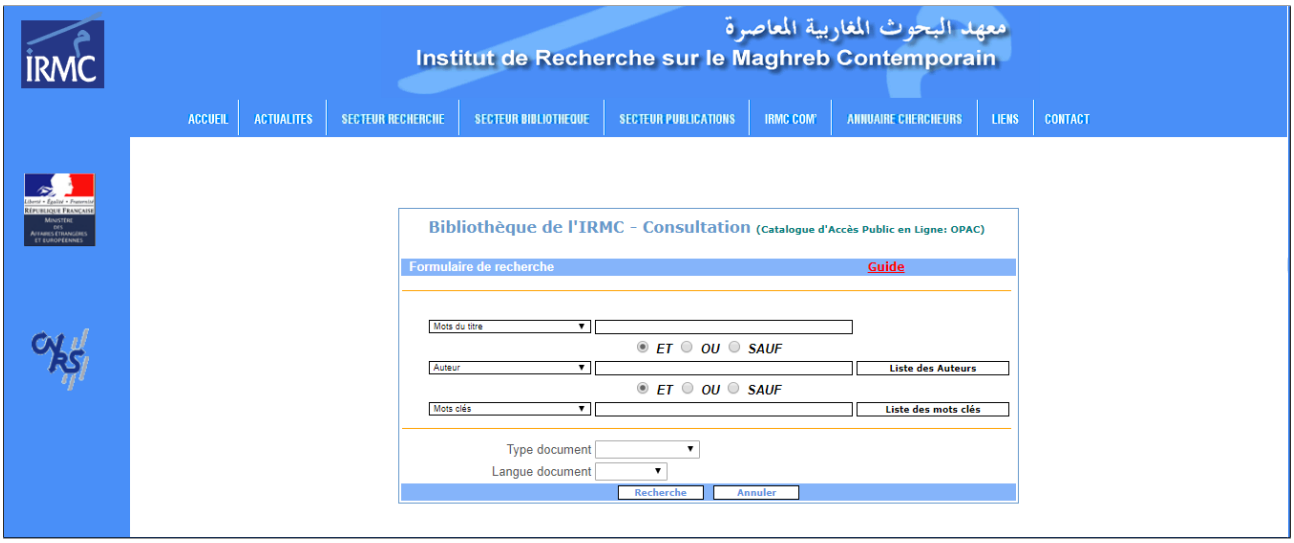

Figure 1.3: IRMC Catalog

1.2.2 Objectives

In order to correct the anomalies mentioned above and to meet the needs of the users, we propose to design an application offering the user a better directory service as well as the fast, efficient handling of IRMC informations

1.3 Adopted methodologies

A software engineering methodology refers to all stages and their sequence in the process of developing a computer application. Its purpose is to enable ensure compliance between business needs, application code and product final.

For this reason we must adopt a development methodology that we are going to respect throughout the project to achieve our application. Today the object modeling industry standard is UML (Unified Modeling Language). UML is defined as a graphical and textual modeling language. Our choice was unified process oriented (PU or UP for Unified Process) as a method of development.

The unified process is iterative and inertial, driven by use cases, focused on architecture and risk-oriented

1.3.1 Choice of development method

In order to control the risks and bring our project to a successful conclusion due to its complexity, we have opted for the 2TUP process that follows the Y-life cycle for several reasons. In fact the 2TUP gives great importance to the technology which is important for our project.

1.3.2 Presentation of the 2TUP methodology

2TUP (2 tracks unified process), or T2UP, is a software development process that implements the Unified process method. 2TUP proposes a development cycle in Y, which dissociates the technical aspects of the functional aspects. Therefore, if the technology evolves during the course of the project, if there is a modification technical need, the technical branch can be treated and then reintegrated into the project easily. Similarly, if a new feature arises, only the functional branch will be treated without touching the other limb. From Figure 1.4, we will

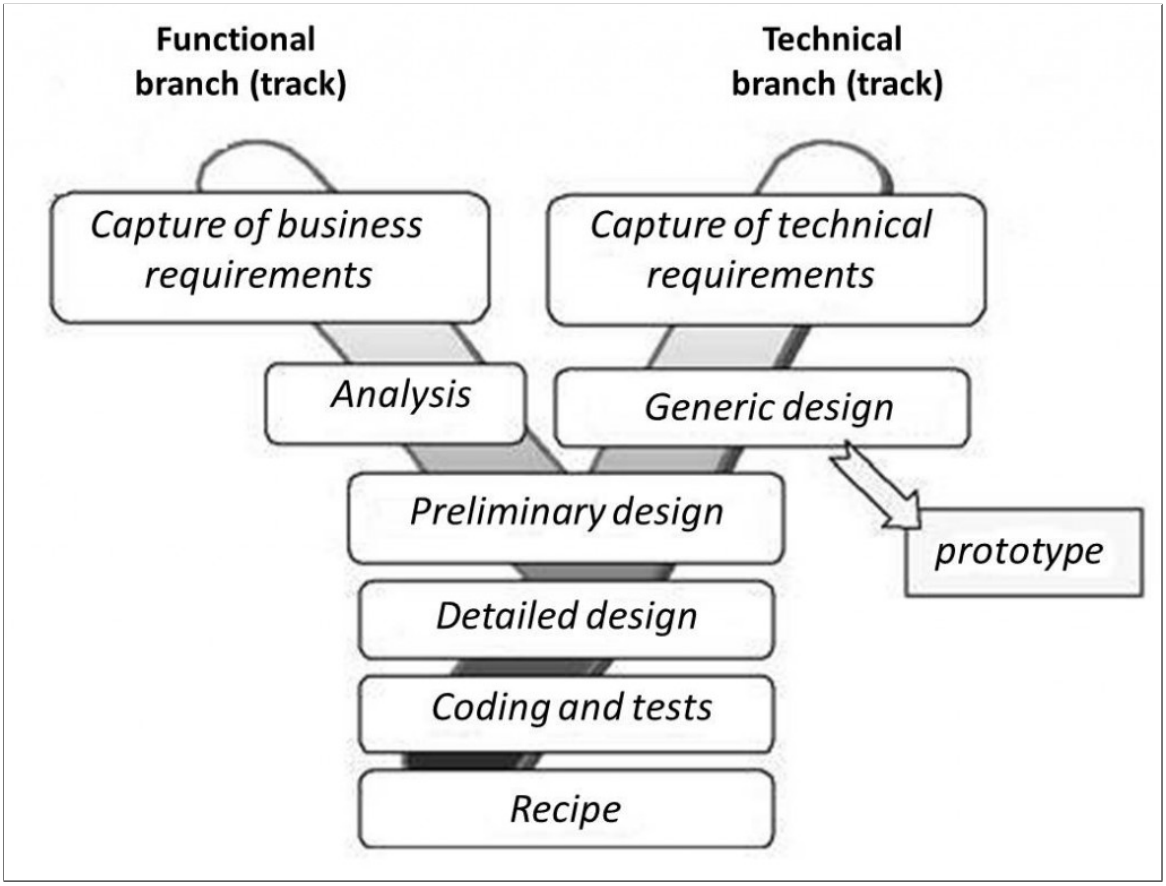

Figure 1.4: 2TUP Methodology

notice that 2TUP is essentially composed of three steps :

- a functional branch: which is based on information gathering, understanding of the business and the capture of business needs;
- a technical branch: which capitalizes the technical know-how and / or constraints These techniques are independent of the functions to be performed;
- The implementation phase: it brings together the two branches, in order to deliver an adapted to needs.

Conclusion

In this chapter we have presented the company, the critical study of the existing and specify the methodology to follow to meet our needs. In the next chapter we will define the functional branch of the 2TUP method that will be used to put the project in context.

Chapter 2

Analysis and requirements specification

Outline

Introduction

In this chapter, we will first present the main actors and their roles. Then we define the functional and non-functional needs of the application in the functional branch. Then we will present the system use case diagram. Finally, we will present the second branch of methodology namely the technical branch

2.1 Functional branch

2.1.1 Capture needs

2.1.1.1 Identification of actors

- Webmaster : This is the main actor. He has all the rights of access. He must be able consult, modify and delete libraries, research Centers, searchers. He has the possibility Add, delete, and approve events, job offers, scolarships and proposed searchers. The administrator is the only one who can add,modify, delete videos and reviews. Consult the history of the operations made on the application and manage other users;

- Guest : This actor can search or consult libraries, research Centers on the map, suggest and consult scolarships and job offers. Consult and research reviews and watch videos and video-conferences;

- Searcher : He has the same privileges as the guest with extra advantages like being involved in a team of searches within a colaborative space.

2.1.1.2 Functional requirements

The functional requirements come from the specifications of the project. These are the required needs by the end user. They are the features and actions that the system must obligatorily carry out.

The application must meet the following functional requirements:

- Management of research centers : The system should allow users to consult the list of diffrent research centers on map and allow editing and deleting for users with permissions required;

- Event management : The system should allow users to consult the list of Events (Scolarships, Job proposals) with the possibility to collect diffrent events from various resources,

search and filter existing events according to all available criteria and allow editing and deleting for users having the required permissions;

- User Management : User management is an essential need for the security of the application. The system should allow users with the required permissions to approve other users and grant them specified roles;
- Domain management of research centers : The system should allow the webmaster to add, modify, delete and assign diffrent domains to specefic research centers;
- Management of videos and documents : The system should allow the webmaster to add, modify, delete and index videos and documents.

2.1.1.3 Non-functional requirements

Non-functional requirements are requirements that do not specifically concern the system behavior. These needs are not explicitly requested by the user, they contribute to the improvement of applciation such as safety, reliability, maintainability and extensibility. The application must meet the following non-functional needs:

- Performance : Because of the large amount of data, the application must be efficient and respond to user requests in minimal time;
- Ergonomics : The application must be easy to access and does not require a time learning. It will have simple interfaces, ergonomic and easy to use;
- Security : The application must be secured against unauthorized action.

2.1.2 Diagram of use cases

After the specification of the functional requirements of the users, we will present themain features of the system as a use cases that identifies the actors who interact with this system while clarifying their roles.

Figure 2.1 illustrates the general use case diagram of our system, We will notice the inclusion links that link the different use cases, which shows that the use case they are heading to should be executed. first.

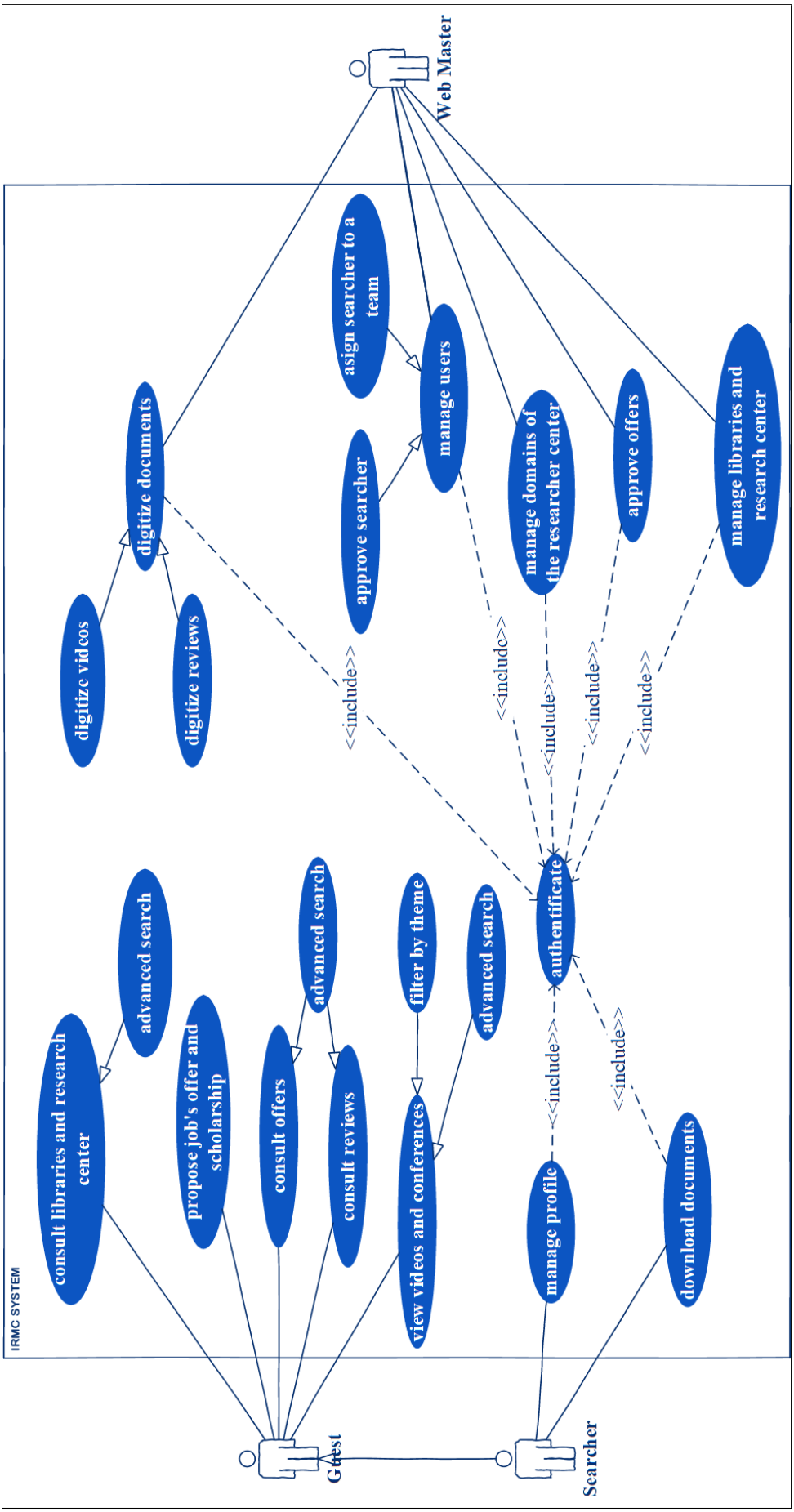

Figure 2.1: Use Cases Diagram

2.1.3 Internal specifications

Technology	Module	Code	Functional requirments	Assigned to
JEE	Event Management	JEE01	Create new event	
		JEE02	Update event	
		JEE03	Remove event	
		JEE04	Consult events	
		JEE05	Collect events with RSS	
	Research Centres Management	JEE06	Create new center	
		JEE07	Update center	
		JEE08	Remove center	
		JEE09	Consult center	
		JEE10	Search for centres	
		JEE11	Allocate centres on Map	
	User management	JEE12	Create new user	
		JEE13	Update user	
		JEE14	Remove user	
		JEE15	Approve user	
	Domain management	JEE16	Create new domain	
		JEE17	Update domain	
		JEE18	Remove domain	
		JEE19	Sort domain with most centres	
	Video management	JEE20	Upload a new video	
		JEE21	Update a video	
		JEE22	Archive a video	
	Document management	JEE23	Upload a document	

		JEE24	Share a document	
		JEE25	Archive a document	
		JEE26	Delete a document	
Mobile	Event Management	Mob01	Search for events	
		Mob02	Consult events	
		Mob03	Locate events on map	
	Research Centres Management	Mob04	Search for centres	
		Mob05	Locate centres on map	
		Mob06	contact centres	
	User management	Mob07	Consult other searchers profile	
		Mob08	Manage profile	
	Document management	Mob09	Consult documents	
		Mob10	Add to favorites	
	Video management	Mob11	Consult videos	
		Mob12	Add to favorite playlist	
	Domain management	Mob13	Consult available domains	
		Mob14	Sort domain with different criteria	
.NET	Research Centres Management	.NET01	Asign research center to a domain	
		.NET02	Approve proposal for extra domains	
		.NET03	Collect information with flux RSS	

	Event Management	.NET04	Consult event statistics	
		.NET05	Approve events	
	User management	.NET06	Contact user	
		.NET07	Assign user to a team of searchers	
		.NET08	Manage profile	
	Document management	.NET09	Add a tag to a document	
		.NET10	List document by a specific tag	
		.NET11	Search for document by different criteria	
	Video management	.NET12	Search for video by different criteria	
		.NET13	Assign tags for videos	
		.NET14	Archive videos	
		.NET15	Index videos by themes	

Table 2.1: Internal specifications

2.2 Technical Branch

The Technical Study is an essential step in the 2TUP method, in this step we have to choose the best technologies that lead us to realize the application and reach the customer needs. We chose JAVA to develop web services and consume them later on other plateform, in our case .Net and mobile application.

2.2.1 Development languages

2.2.2 Why Java ?

We chose JAVA as the language to develop the web services of the application. First of all JAVA is portable, so just install the JVM on the deploy machine for the application to work, then the popularity of this language increases our chance of find solutions quickly to problems encountered during the development phase.

2.2.3 Why .Net ?

Developing applications using .Net framework is very robust and highly secure with great quality. .Net platform reduces development time, creates quality, reliable, and scalable applications that ensure smooth functioning of complex business applications. Hence it helps customer to improve their business easily.

2.2.4 Why Web Services ?

REST Services are very important for us to minimize the coupling between client and server components in a distributed application.

This may be our case also when the server is going to be used by many different clients that we do not have control over. It's also the case when we want to update the server regularly without needing to update the client software.

Conclusion

In this chapter we have specified the needs to which our system must respond, this which was helpful to us to show our purpose and needs. Finally, we still have to develop a good design to ensure the proper functioning of the system. That's how we can start the next chapter on step-by-step design safe.

Chapter 3

Conceptual study

Outline

Introduction

In this chapter, we will present the architecture of the application and then we will move at the system design stage which will be illustrated by the class diagram.

3.1 Application Architecture

In this step, we will merge the functional branch and the technical branch.

3.1.1 2-tier architecture

In a 2-tier architecture, still called client-server, the client machine is content to delegate data management to a specialized service. This type of application makes it possible to the power of computers deployed in a network to provide the user with a rich interface, while ensuring data consistency, which remains centrally managed.

3.1.2 N-tier architecture

The N-tier architecture is composed of three elements, or more precisely three layers. Indeed, it is more appropriate to speak of functional layer where each of them is attached an element / logical entity.

In the 3-tier model or N-tier, three layers must be distinguished:

- The presentation layer (or display) associated with the customer that is actually "light" in the since it does not assume any processing functions unlike the Client / model Server or 2-tier;
- The functional layer linked to the server, includes the application server or server intermediary, which in many cases is a web server with application extensions;
- The data layer linked to the database server (DBMS).

3.1.3 Choice of architecture

Our choice fell on the N-tier architecture for the following reasons:

- Since our client must be lightweight and only have to connect to the server, we chose a more advanced architecture than 2-tier architecture;
- This architecture is much more flexible than 2-tier architecture.

Our application is service oriented, it is composed of a MYSQL database, by a .NET application and a JAVA application that contains a set of web services who will be queried by .Net and mobile Clients.

Figure 3.1 shows the architecture of the application.

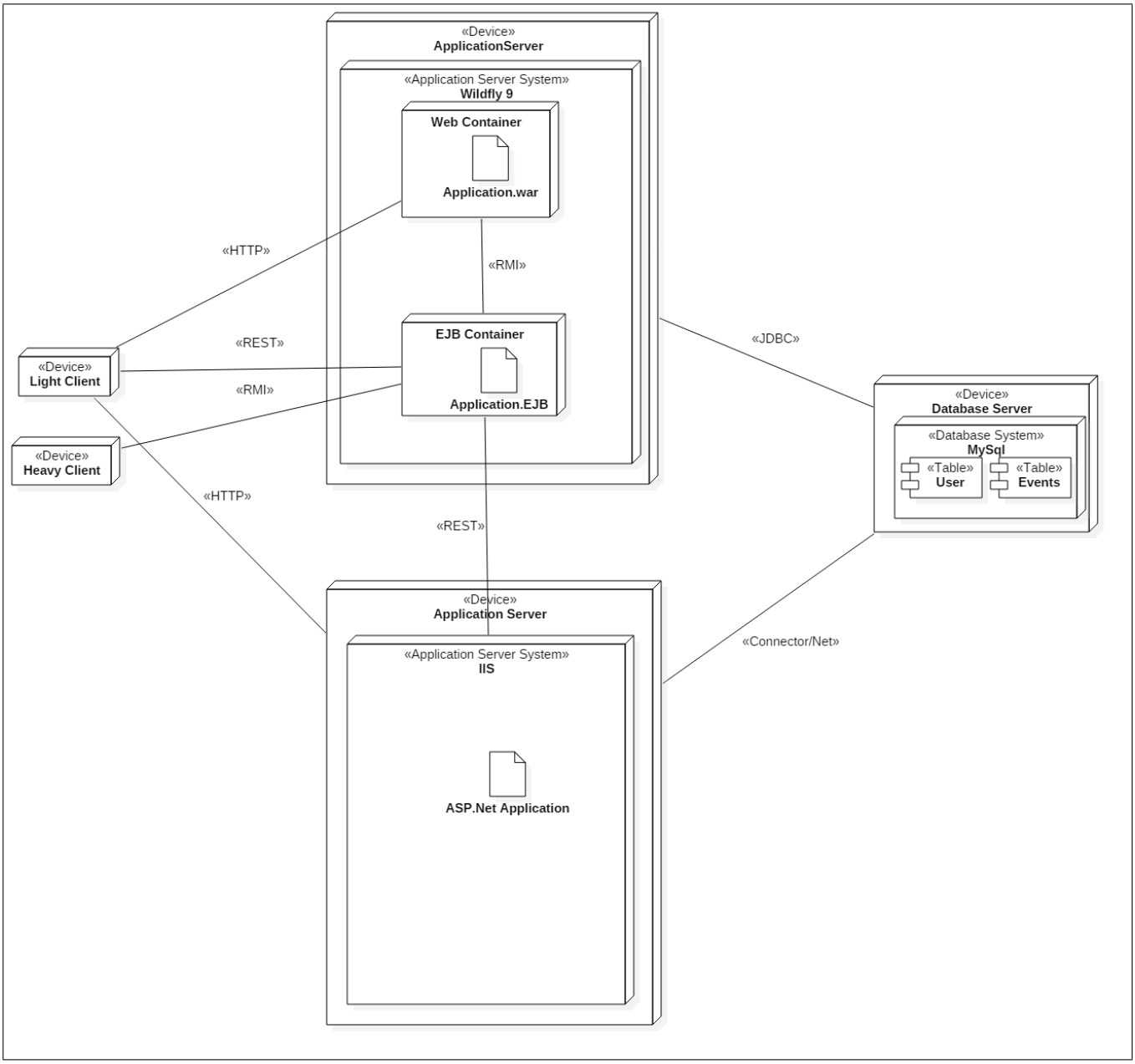

Figure 3.1: Deployment Diagram

3.2 Class diagram

The class diagram presents the central point in an object-oriented development. In analysis, it aims to describe the structure of entities handled by users.

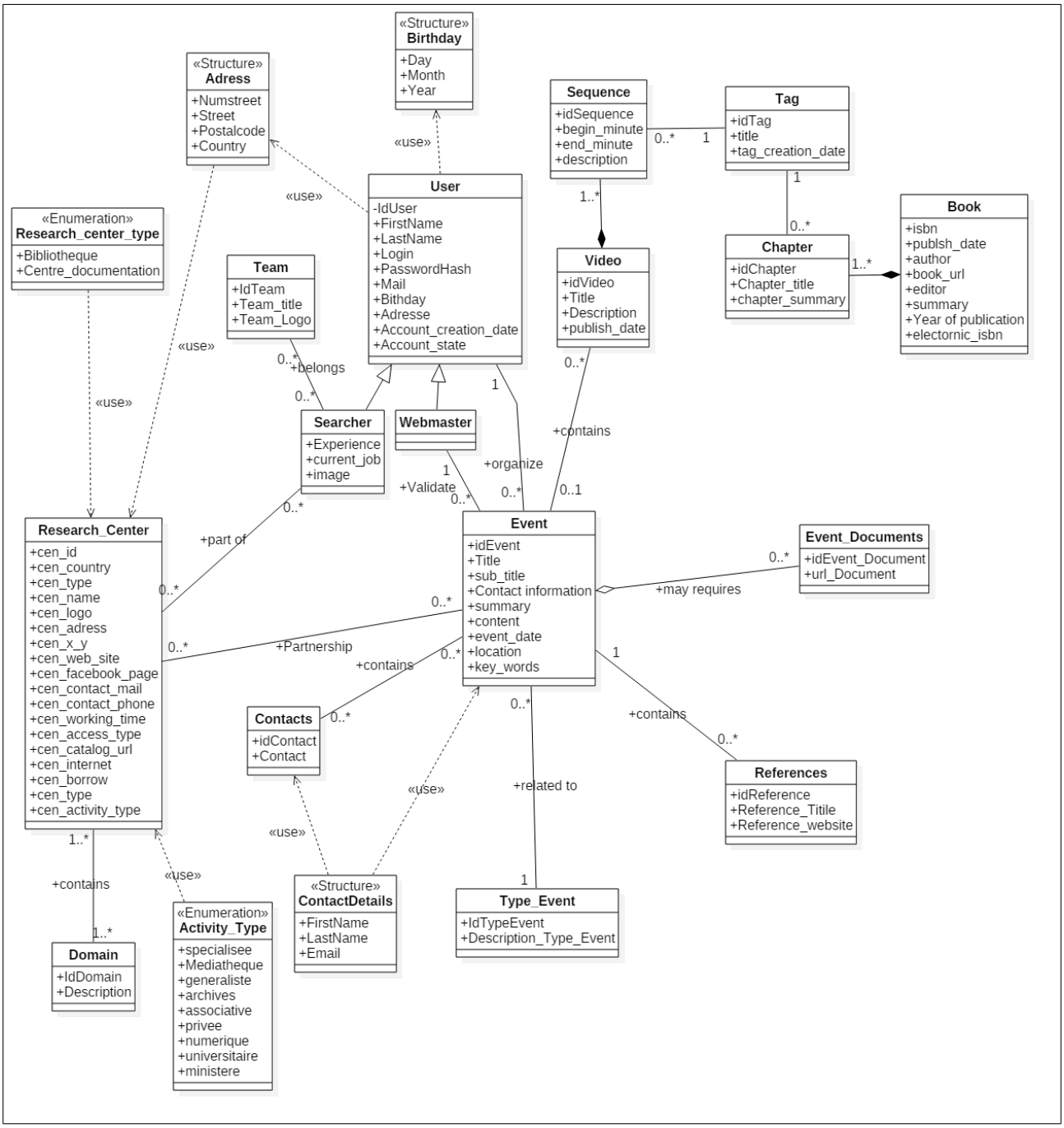

Figure 3.2: Class Diagram

Conclusion

During this chapter we realized the design that encompasses all the features major to achieve. The need for such a study is very useful during the implementation phase.

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[2] knowtex

`http://www.knowtex.com`