



## Building the Legal Knowledge Graph for Smart Compliance Services in Multilingual Europe

### D5.3 Intermediate demonstrator for pilot 3

<b>PROJECT ACRONYM</b>	Lynx
<b>PROJECT TITLE</b>	Building the Legal Knowledge Graph for Smart Compliance Services in Multilingual Europe
<b>GRANT AGREEMENT</b>	H2020-780602
<b>FUNDING SCHEME</b>	ICT-14-2017 - Innovation Action (IA)
<b>STARTING DATE (DURATION)</b>	01/12/2017 (36 months)
<b>PROJECT WEBSITE</b>	<a href="http://lynx-project.eu">http://lynx-project.eu</a>
<b>COORDINATOR</b>	Elena Montiel-Ponsoda (UPM)
<b>RESPONSIBLE AUTHORS</b>	Pascual Boil (CUATRECASAS), Elsa Gómez (CUATRECASAS)
<b>CONTRIBUTORS</b>	Artem Revenko (SWC), Andis Lanzdins (Tilde), Elena Montiel-Ponsoda (UPM)
<b>REVIEWERS</b>	Pieter Verhoeven (DNV.GL), Christian Sageder (openlaws)
<b>VERSION   STATUS</b>	V1.0   Final
<b>NATURE</b>	Demonstrator
<b>DISSEMINATION LEVEL</b>	Public
<b>DOCUMENT DOI</b>	10.5281/zenodo.3557689
<b>DATE</b>	29/11/2019 (M24)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780602

VERSION	MODIFICATION(S)	DATE	AUTHOR(S)
01	First version TOC	31/10/19	Pascual Boil (CUATRECASAS)
02	Starting introduction, pilot objectives and Annex 1	4/11/19	Pascual Boil (CUATRECASAS)
03	Use case description, global architecture schema and screenshots	8/11/19	Pascual Boil (CUATRECASAS)
04	Complete document (first draft ready for reviewers)	12/11/19	Pascual Boil (CUATRECASAS)
05	First review by DNV GL	13/11/19	Reviewer, Pieter Verhoeven (DNV GL)
06	First review by openlaws	13/11/19	Reviewer, Christian Sageder (openlaws)
07	Review and content comments	20/11/19	Reviewer, Elena Montiel-Ponsoda (UPM)
08	New complete version including grammar and readability review	25/11/19	Pascual Boil (CUATRECASAS)
09	Second review DNV GL, openlaws and UPM	28/11/19	Reviewer, Pieter Verhoeven (DNV GL) Reviewer, Christian Sageder (openlaws) Reviewer, Elena Montiel-Ponsoda (UPM)
10	New complete version including reviewers comments and final adjustments	29/11/19	Pascual Boil (CUATRECASAS)

## DISCLAIMER

This document does not represent the opinion of the European Community, and the European Community is not responsible for any use that might be made of its content. Neither the Lynx consortium as a whole, nor a certain party of the Lynx consortium warrant that the information contained in this document is capable of use, nor that use of the information is free from risk, and does not accept any liability for loss or damage suffered by any person using this information.

**ACRONYMS LIST**

M&A:	Mergers and Acquisitions
QA / Q&A:	Question and Answer
LATAM:	Latin America
MVP:	Minimum Viable Product
IT:	Information Technologies
API:	Application Program Interface
LKG:	Legal Knowledge Graph
SSO:	Single-Sign-On
DBMS:	Data Base Management System
KM:	Knowledge Management
SME:	Small Medium Enterprise
NLP:	Natural Language Processing
AD:	Active Directory
PPT:	PowerPoint presentation
QADoc:	Question Answering from Document
EntEx:	Entity Extraction
TimEx:	Time Expressions
MT:	Machine Translation
NMT:	Neural Machine Translation

## EXECUTIVE SUMMARY

This deliverable summarises the intermediate results of the Lynx use case developed for labour law. Section 1, provides an introduction to some of the difficulties that lawyers or legal experts encounter when working with legal documents from different jurisdictions in multiple languages. In this use case, we aim to demonstrate how semantic technologies and the use of knowledge graphs can contribute to assist lawyers (and non-lawyers) in accessing and processing international legislation.

How to apply these technologies and how to simplify the interaction of users to legal data by providing an easy-to-use interface, are some of the challenging aspects that we face in this pilot.

Section 2 describes our use case in more detail, focusing on the main objectives of a law firm like Cuatrecasas, and how the solution built in Lynx can help its clients and prospects. We explain our envisioned solution by:

- a) Providing detailed information of the functional requirements derived from several functional meetings;
- b) Showing the prototype of the user interface that resulted from additional meetings and design-thinking sessions with key users: labour partners, senior lawyers involved in international operations and recurring services for global customers, and labour experts from the Knowledge Management (KM) team.

In this intermediate demonstrator, we describe the core of the solution, also known as the Minimum Viable Product or MVP for short. This includes a description of the core architecture and main components. To better illustrate it we include (i) screenshots of the application in its current state and a video to demonstrate the real interaction of the user with the system, and finally (ii) a report on test cases we are working on to improve the quality of the results.

The report is supplemented with four annexes, which provide additional information and context:

- I. "Sample of real questionnaires", based on previous real international operations
- II. "Legal Knowledge Graph in the labour use case", putting our use case in the context of the global LKG
- III. "Different laws in Spain", summarizing the type of laws and their hierarchy
- IV. "Chatbots, QA and Semantic Search working together", an analysis of these different technologies and how and why to combine them.

**TABLE OF CONTENTS**

1	INTRODUCTION .....	5
2	USE CASE DESCRIPTION .....	7
2.1	OBJECTIVE OF THE PILOT .....	7
2.2	INTERNAL USE (CUATRECASAS LAWYERS).....	8
2.2.1	General description and functional overview .....	8
2.2.2	Functional requirements .....	9
2.2.3	Prototyping and first user interface definition.....	12
2.2.4	MVP (Alpha version) .....	18
2.2.5	Current status of our pilot .....	19
2.3	EXTERNAL USE (DIRECT ACCESS FOR CLIENTS' LEGAL DEPARTMENTS) .....	20
3	PILOT ARCHITECTURE.....	21
3.1	COMPONENTS.....	21
3.1.1	DATABASE SERVER (DATABASE) .....	22
3.1.2	WEB SERVER (FRONT-END APPLICATION).....	22
3.1.3	LYNX SERVICES (INDIVIDUALLY EXTERNALLY EXPOSED).....	24
4	USER INTERFACE .....	26
4.1	APPLICATION DEMO (ALPHA VERSION) AND EVIDENCES.....	26
4.1.1	COMMENTED SCREENSHOTS .....	26
4.1.2	LINK TO VIDEO DEMO .....	28
4.1.3	USER VALIDATION AND TRAINING FEEDBACK.....	28
5	OUTLOOK .....	32
	ANNEX 1 – SAMPLES OF REAL QUESTIONNAIRES.....	34
	ANNEX 2 – LKG IN THE LABOUR USE CASE .....	36
	ANNEX 3 – DIFFERENT TYPES OF LAWS IN SPAIN.....	38
	ANNEX 4 – CHATBOTS, QA AND SEMANTIC SEARCH WORKING TOGETHER .....	41

## 1 INTRODUCTION

Companies are affected by different local regulations. Almost all of these regulations are published in local sources, and most of them are only available in their official local languages. This problem is further accentuated at European level: although there is a common regulation and regulatory framework, the extent to which European directives have been transposed can differ greatly.

Cuatrecasas is a full service law firm, which, although leading in Spain and the Iberian market, also provides global legal advice to international companies. As many of our clients are international companies, we have to deal with many languages and country laws and regulations.

Our pilot focuses on labour law, which typically involves several international operations because of our clients' geographical expansion (e.g., mergers & acquisitions and due diligence). In large corporations, geographical expansion and differing workers' rights are a common problem, as the regulations of each country differ. Other large companies, although not international, can still face the same problems with sectorial or geographical national agreements.

This labour law use case can be extended to other legal practices like tax, intellectual property rights (IP) or data privacy and personal data (recently regulated in the GDPR directive at European level but with global impact). The problem regarding cross-border regulations every day is more frequent in a more globalized economy, where the level of regulation, the number of laws and the frequent changes they undergo are also increasing yearly.

In this project, we aim to cover two use cases that have no significant functional differences between them. The first one is targeted at Cuatrecasas lawyers ("the internal use case") to enable a more efficient access to legislation across jurisdictions; and the second use case ("the external use case"), intended at Cuatrecasas clients, providing their internal legal department teams or even their human resources department, a direct and secure access to legislation.

Summary of the two use cases:

- (1) **Support tool for our internal lawyers**, to advise clients on their international business, as well as international mergers and acquisitions (M&A) that commonly involve several law firms specialised in their local laws.
- (2) **External service for our clients to be directly use without intermediaries** (global organisations)

We envisioned the same technical solution (Figure 1) for both use cases with minor differences between them. Our solution resembles a Legal Chatbot in the sense that it relies on a user interface specially thought for non-legal experts (non-lawyers or simply junior lawyers or paralegals).

The final global solution could be a "smart" natural language search tool for lawyers, where results are texts or excerpts directly extracted from the law ("technical" legal language). However, a chatbot-like interface offers the ideal interaction scenario for non-legal experts, relying on a question answering system that simplifies the access to regulatory sources and helps them interpret the legal content. Combining the semantic search and Q&A chatbot interface in the same application will be one of our main challenges. (Additional information about this topic is available in Annex 4).

## ENVISIONED USE CASE

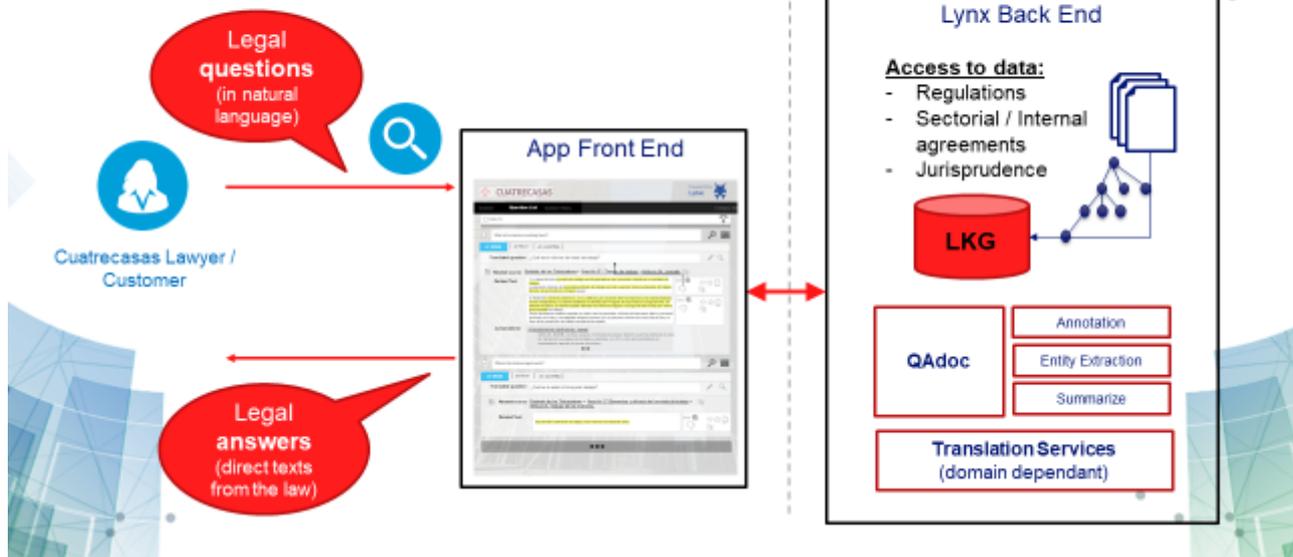


Figure 1. Envisioned use case schema

In recent years, the legal sector has sought to use user-centric technology to democratise access to justice. For us, legal chatbots have the potential to open up access to justice for everyone. For this reason, in Cuatrecasas, we have decided to research and develop a pilot test inspired by legal chatbots as “legal assistants” to evaluate the latest technology; and how it can help improve our legal services and the provision of legal advice to our clients more efficiently.

Relying on our previous experience with chatbot platforms (Microsoft Azure bot services and Google cloud with DialogFlow), we know that they tend to focus on Q&A models, which require to put huge human effort on manually identifying precise questions and answers. This model is valid and probably efficient for many limited-knowledge environments that do not go through many changes. However, it is not the ideal solution when addressing “laws” in multiple countries and languages, because to the big amount of different regulations in the world and how often they change. Trying to cover all potential legislation queries through a predefined list of question and answers is not realistic to be done and for sure not efficient in economics terms.

Because of the abovementioned limitations, in Lynx we devise a solution based on semantic search technologies combined with a Q&A system trained with Machine Learning techniques on a specific domain, the legal domain in this case. The idea of being able to use smart semantic search (based on semantic similarity algorithms) combined with the classical Q&A systems is key for the future success and sustainability of this use case. In this regard, we assume that with an 80-20 “pareto” distribution of our SME efforts, we think we will be able to give “intelligence” to more than 80% of the simple legal questions directly covered by semantic search, and without investing a huge amount of time on training effort by experts. Our underlying aim is to only dedicate additional resources to work on specific tailored-made question-answers if our firm can deliver additional value by “interpreting” the law for our clients.

## 2 USE CASE DESCRIPTION

### 2.1 OBJECTIVE OF THE PILOT

With the labour law pilot, we aim at achieving two main objectives:

- To provide users with potential answers related to his/her legal questions involving several jurisdictions and natural languages. We regard users as legal experts that are to interpret the results provided by the system in his/her own language (we do not expect the system to replace the legal expert).
- To improve efficiency in searching and accessing legal documents from different jurisdictions, and contribute to an enhanced understanding of the results (and facilitate comparison between jurisdictions). To enhance our company solutions to better position the company in the legal market, not only as an innovative, but also as a more global law firm.

Achieving these purposes will translate into an increase of efficiency in task performance in both internal processes of the law firm and external interactions with our clients.

For the second year in a row, Cuatrecasas has received the Financial Times award for the most innovative law firm in Europe. This project is yet another opportunity to enhance our existing legal services through the use of technology, and even to generate new business through the delivery of legal products that really add-value to our customers.

However, this is only a pilot project, and there is much work to be done to further enhance the product, focusing on our clients' needs in terms of languages and jurisdictions.

This pilot, as a part of the LYNX project, will cover a subset of languages (English, Spanish, German, and Dutch) and jurisdictions (Europe, Spain, Germany, Austria and Netherlands). However, it is worth mentioning that the typical international operations assessed by Cuatrecasas would cover a wider range of jurisdictions, frequently involving even non-EU countries, which are out of the scope of this project. For this reason, once the pilot is validated, future work will involve the adaptation of the technologies to additional languages and jurisdictions, but as a pilot, we should be able to evaluate several things:

Technology:

- Evaluating the current status of neural machine translation being trained on highly specialised texts of the legal domain
- Testing semantic technologies (NLP, Q&A) and contributing towards improving the current Q&A/chatbot solutions to build a custom solution that can be almost self-maintained
- Checking the viability and sustainability of the Legal Knowledge Graph as part of the Lynx platform. Finding an independent way of having open access to legal resources, ensuring that it is a service that can be provided in a real business environment

Business:

- Assessing the level of accuracy of the retrieved answers and the time it saves to a lawyer who is not expert in the jurisdiction involved. As an internal tool to be used in international M&A operations dealing with legal multi-country questionnaires, this would be very useful for those jurisdictions we do not have specialised lawyers
- Evaluating with current and potential customers, and how much should be they willing to pay for it. We will also carry out a market analysis to find out which other segments (sectors and parties) could be also interested in this solution (e.g., SME', individual lawyers and small law firms)

## 2.2 INTERNAL USE (CUATRECASAS LAWYERS)

### 2.2.1 General description and functional overview

For the internal use case, as a first step, we are aiming to develop an application for our internal lawyers (from the Labour Practice) to improve their efficiency.

This application should be executed internally (inside the corporate Cuatrecasas network) where our users are identified (automatically) into our domain. At this stage, implementing an additional user authentication interface is not necessary.

Cuatrecasas provides a range of services to clients, including (i) specific operations, which typically involve a project with a limited scope and period; and (ii) general legal advice, which is usually categorised by practice area (e.g., labour, tax and corporate) due to the different legal specialization required. Also, our lawyers may work on more than one matter, as well as for multiple clients, at a given time.

For this reason, the system must provide lawyers with the tools they need to organise and optimise their tasks, enabling them to configure and save their favourite options (more common/default): personal or client/company.

Although Cuatrecasas has offices in multiple countries, our firm's official languages are Spanish, English and Portuguese. Despite our specialisation in the Spanish and Portuguese jurisdictions, we now offer global international coverage to our clients, with a focus on LATAM (Latin America). Our typical clients are big (Spanish and Portuguese) companies with business around the world, as well as international companies with subsidiaries or business interest in Iberia or LATAM.

Countries usually publish their laws in their own official languages. The main problem non-local lawyers usually face is accessing and understanding foreign local laws and regulations, which are not often available in other languages.

For this internal use case, we assume that our users are legal experts. Often, they are junior lawyers who are tasked to investigate external regulations. Currently, these lawyers have to contact our internal Knowledge and Innovation Team to find out about (i) the legal particularities of a specific country/jurisdiction; (ii) the legal sources available; and (iii) whether we have any preferred local lawyers who can be contacted, if necessary. These lawyers are accustomed to use legal databases and other information resources (e.g., big players like LexisNexis, Thomson Reuters and VLEX). Although they know the specific technical and legal words used in laws and legal documents, they only know them in their own language and in English, not in other languages.

As lawyers, they are accustomed to work with legal documents and are familiar with the structure and organisation of laws.

We are envisioning a system/application where the user submits a legal question regarding labour law and workers' regulations, specifying one or more jurisdictions. The system should then return the most relevant information based on the direct texts of the law, including the following:

- The most precise answer possible (when the question is specific, asking for a value, data and name).
- The paragraph(s) related with the topic/question, where the possible answer appears as part of the text [ideally highlighted].

- Providing the context by showing the article (and section) from which the paragraph(s) is extracted, showing the number and title, and allowing the user to view the full text of the article and law, which the user should be able to access and download.

Complex legal questions are almost impossible to answer by only highlighting parts of the law. Context and additional information are often needed. These are sometimes difficult to incorporate into a question and are not always easy to find in law. **Our system is designed to be used as an intelligent search tool, providing legal guidance to lawyers** that can help substitute some of their less-value work.

### 2.2.2 Functional requirements

As part of the functional analysis and scope definition of the future application, we have inventoried a list of functional requirements.

This list of requirements is prioritised and grouped by functional modules (Login, Configuration and Q&A). We prioritised these modules based on meetings with key users, where priority was given to information that is key to specifying the MVP (Minimum Viable Product) with the basic and valuable functionality.

Id	Functional description	Priority/Importance	Module
REQ01	The user should be able to write a legal (labour-related) question in all of the supported languages. The system will then return the possible answers based on the related law (selection of laws or regulatory documents from possible jurisdictions).	HIGH [MVP]	Q&A
REQ02	The user will be able to select (1 to N) jurisdictions/countries to ask/work with (from the available jurisdictions for this project).	HIGH [MVP]	Q&A
REQ03	The system will be able to identify the language used in the question. If no other rule or personal setting is defined, the system should show the results in the user's language.	MEDIUM	Q&A
REQ04	The system will allow users to save personal settings, which should be default when they use the application. However, users should be able to change these options for specific questions. Some of the PERSONAL SETTINGS should include DEFAULT LANGUAGE (for answers), DEFAULT JURISDICTIONS and DEFAULT DOCUMENTS/LAWS.	MEDIUM	CONFIGURATION /DEFAULTS
REQ05	Users can work with different clients (CLIENT SETTINGS). The system will allow users to save specific configuration/defaults for each client, as well as to change this configuration at any time when using the application. The priority rule to apply these default settings would be 1 <sup>st</sup> CLIENT and 2 <sup>nd</sup> PERSONAL. Therefore, if the client configuration is selected, it should be applied, and the personal settings will be selected automatically when applying the client settings is not possible.	LOW	CONFIGURATION /DEFAULTS
REQ06	The Q&A execution is restricted to a regulatory set of documents (country laws and other regulatory/compliance documents). Users should be able to select (add or remove) their "subset of the	MEDIUM	CONFIGURATION /DEFAULTS

	<p>Legal Knowledge Graph” to do their search/question-answer.</p> <p>This subset will be created by filtering the full LKG by Type of Document (“Law” by default), Country/Jurisdiction, Company (*), Sub-type of Law, Legal Domain/Specialisation (“Labour” by default).                  (*) The default configuration will be the labour law of the selected jurisdictions [MVP].</p>		
REQ07	<p>Users should be able to upload their own documents (e.g., internal company agreements and sector-specific agreements) to the LKG (we assume that LKG will allow public and private documents, which will be secured and classified so they can be filtered). Document formats will be mainly PDF and MS Word (e.g., doc and docx).</p>	LOW	CONFIGURATION /DEFAULTS
REQ08	<p>The system should be able to show different level of answers:</p> <p>(1) Related paragraph(s) (direct result list) and the article and section it belongs to, as well as the document (names/titles) [MVP], as well as allowing access to each part of the document (i.e., article and section) [MEDIUM MVP].</p> <p>(2) In these paragraphs, the system should highlight the text that most relates to the question [LOW].</p> <p>(3) The system should be able to show specific personalised answers (it will not be texts/parts of the law), and it will be based on pure question-answer rules. Specific and personalised answers will not always exist (hard manual work). However, when they are, they must be the first results that show for the user (i.e., ‘sponsored results’) and they must be highlighted [LOW].</p> <p>(4) The most precise answer should be shown first (when the question asks for a concrete value in the document (a date, a number, legal authority name, ...) [MEDIUM]</p>	MEDIUM	Q&A
REQ09	<p>The system will also return relevant (and recent) case law related (jurisprudence) to the question (by article–legal topic equivalent) in the different jurisdictions.</p>	MEDIUM-LOW	Q&A
REQ10	<p>TEXT AND DOCUMENT (TRANSLATION) requirements. The user will be able to view:</p> <ul style="list-style-type: none"> <li>• Full document (ideally in its original format), and be able to print it out ...</li> <li>• Full Translated document</li> <li>• Complete article text (local language), as well as translated into the other languages</li> <li>• Paragraph text (local language), as well as text translated into the other languages</li> <li>• In all content, the minimum options for languages/translations should be (i) own/user language, (ii) English, and iii) local document/jurisdiction language.</li> </ul>	MEDIUM	Q&A
REQ11	<p>The user will be able to mass upload questions from an Excel file (QUESTION LIST). The system should be able</p>	HIGH	Q&A

	to show the results in the application, while also providing the option to generate the results in an Excel file.		
REQ12	QUESTION HISTORY. The system will save all the results and interactions, and users will be able to navigate back from previous question-answers.	MEDIUM	Q&A
REQ13	The system will allow users to export all or a selection of the question-answers in an Excel sheet.	LOW	Q&A
REQ14	Users could rate the answers (expert users) to be able to provide feedback and improve the internal algorithm.	LOW	Q&A
REQ15	Users should be able to mark answers as “favourites,” which they could use for future analysis.	LOW	Q&A
REQ16	Users will be able to COPY (to clipboard) the paragraph result so they can paste it in other documents (e.g., Excel, Word or emails).	LOW	Q&A
REQ17	SSO. Internal users (Cuatrecasas) do not need to enter any additional usernames or passwords into the system. The application will need to be integrated into the Cuatrecasas authentication system (Microsoft AD).	HIGH	LOGIN

### 2.2.3 Prototyping and first user interface definition

An envisioned use case representation and draft user interaction design is described in this section. We have included into this intermediate deliverable some parts of the presentation we used to present to our key users the when final work was done on the design thinking activities with them.

All users should be validated in the system. Although external users will need a username and password, this screen (Figure 2) will be skipped for internal users because Single-Sign-On (SSO) will be implemented in our Active Directory (AD).

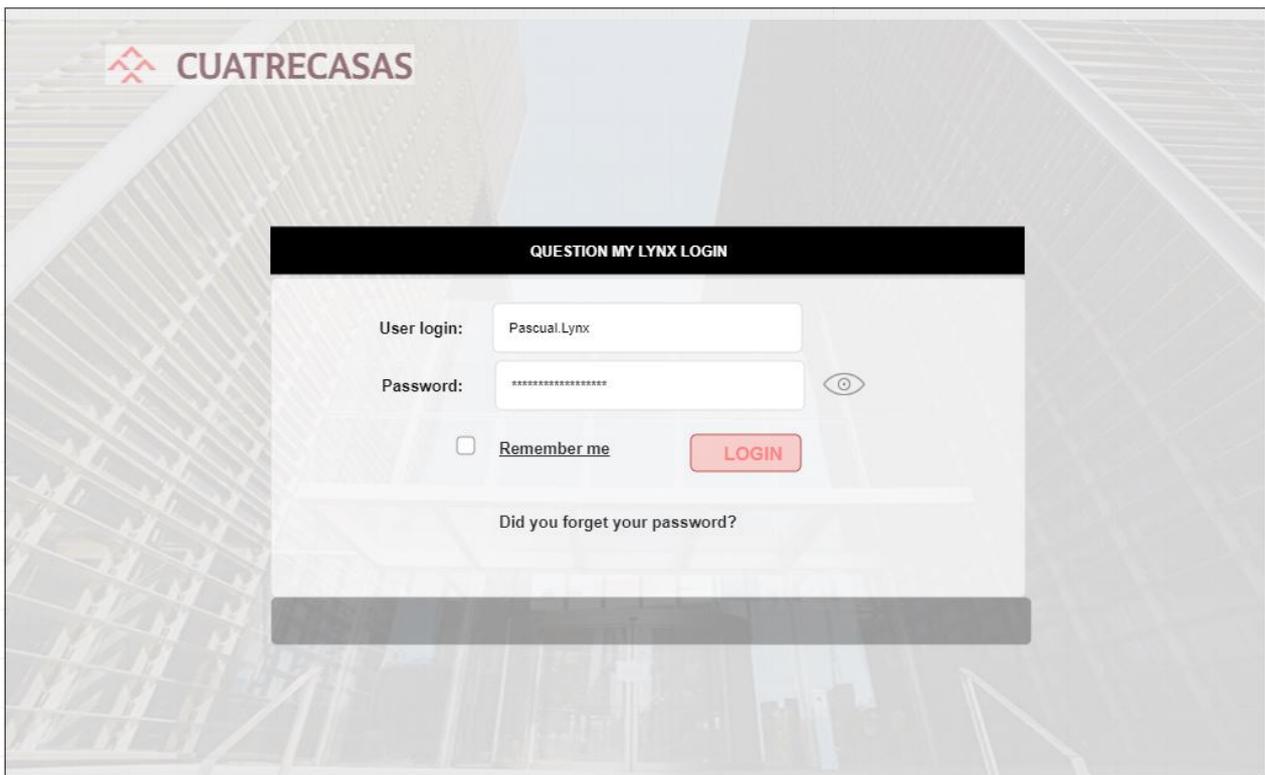


Figure 2. First visual prototyping PPT. Login screen

The Q&A module is where users can raise new questions in the “search bar” with the magnifying glass icon.

The results are separated into different tabs by country/jurisdiction. In these tabs, the question is translated into the selected local country language. The results are grouped by articles of the law, from which the system returns the paragraphs that specifically relate to the question. The system highlights the most relevant part of the answer.

Several options are provided to the user: “copy feature” (to clipboard) and “rate the answer,” as well as options to visualise and translate each content result.

We can see these Q&A functionalities, regarding individual questions in Figure 3.

Figure 3. First visual prototyping PPT. Question and Answers screen

Questions History (Figure 4) is a feature that enables users to navigate and retrieve all their past interactions with the application. Users can navigate through, and visualise the details on each interaction and do a mass export to Excel.

Figure 4. First visual prototyping PPT. Question History screen

Question List (Figure 5) or the mass question upload, is a key feature in M&A deals when we receive a lot of questions to check, as well as answers against multiple jurisdictions. To better understand this feature, see Annex 1, which provides several examples from real questionnaires.

This feature enables users to upload and batch process multiple questions into a formatted Excel file.

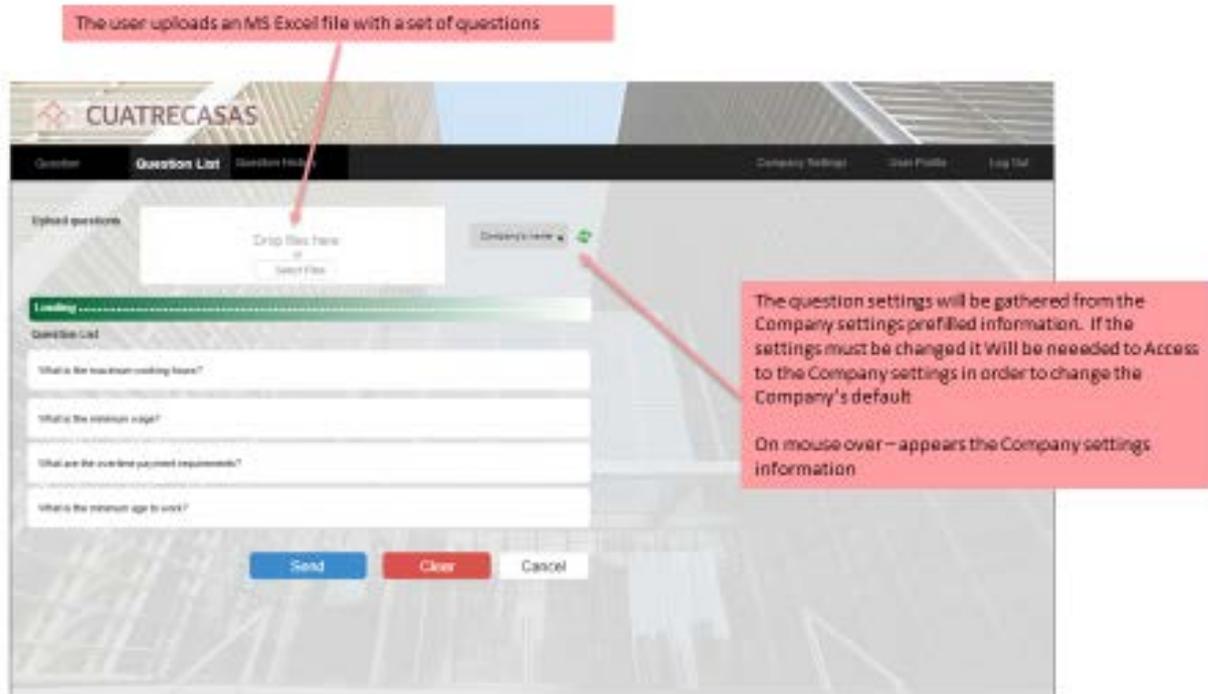


Figure 5. First visual prototyping PPT. Questions List Management

Users can also create multiple questions in Excel manually and preview or modify the content of the Excel file containing the previously uploaded questions.

Once the file has been processed, the system visualises the results automatically (Figure 6).

### Result Page(1/3)

After uploading a question list, then appears the this result pages

Result page view: JURISDICTION SPAIN

- On mobile view, you can see the Complete settings card.
- Click: Access to the Complete Settings option.
- Change from original to translated source direct link
- Answer score
- The user can rate the answer – bad answer
- Audio and Reading from the related text answer.
- Favorite answer per question.
- Copy related and information.
- Change from original to translated source

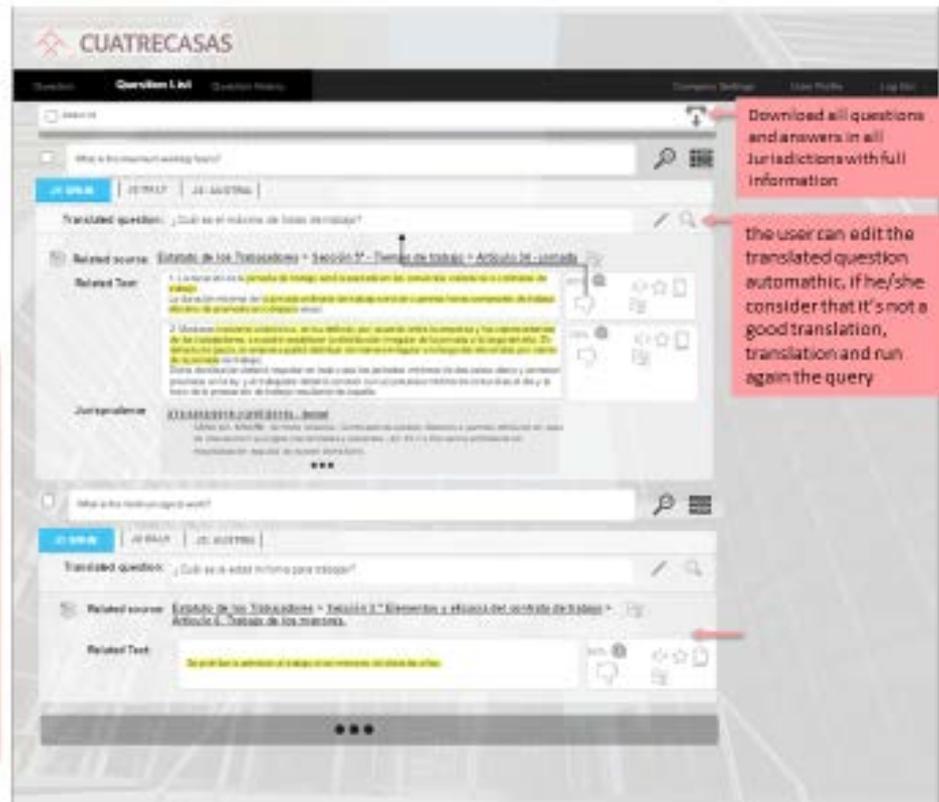


Figure 6. First visual prototyping PPT. Questions List results and other options

### Result Page (2/3)

Result page view: JURISDICTION ITALY

!!!! It's possible to have one question in one jurisdiction and other question in another jurisdiction. The example doesn't show this possibility.



Figure 7. First visual prototyping PPT. Questions List results and other options

Result Page (3/3)

Result page view: JURISDICTION AUSTRIA

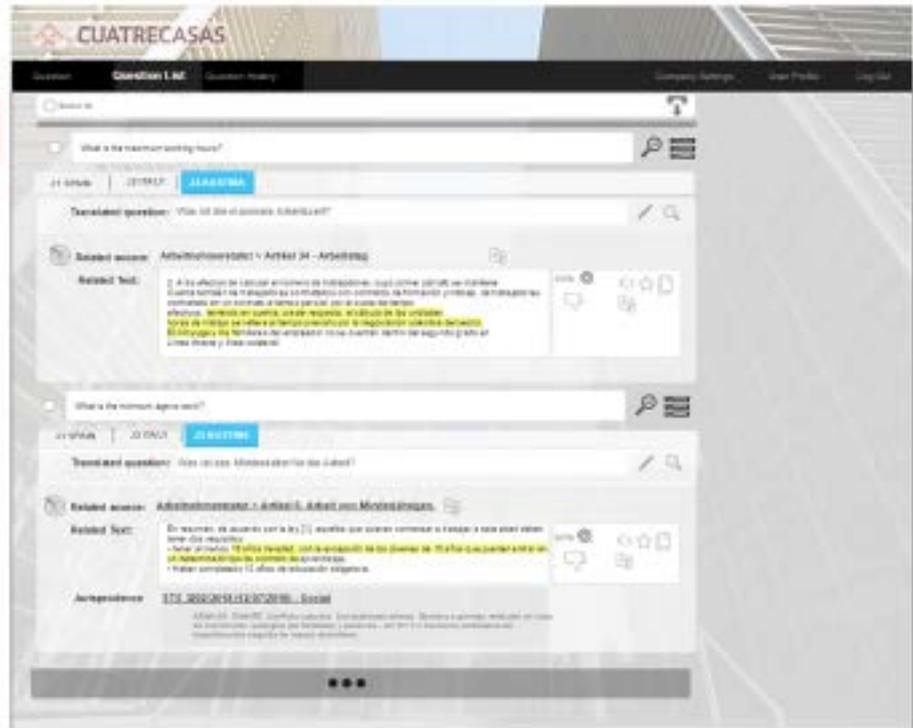


Figure 8. First visual prototyping PPT. Questions List results and other options

The Configuration and Settings module enables users to save defaults and preferred values as personal preferences (PERSONAL SETTINGS), as well as for companies (COMPANY SETTINGS). Figure 9 presents some draft idea about Company settings.

- One user can have more than one Company
- There is a default Company concept
- For each Company is required:
  - Work Center: offices in different countries in which there is relevant information for narrow the answers. The Jurisdiction Will be filled once the Country is selected.
  - Source by jurisdiction: in that place Will appear all documents uploaded on each jurisdiction to be selected or not by the end user. This document list by jurisdiction Will appear once all jurisdictions are defined for each work center. The Company source documentation: if the Company has documents that wants to include in the dataset.



Figure 9. First visual prototyping PPT. Company settings draft

As our clients and potential users are typically large corporations, they have to manage multiple users and their access rights. To do this, (i) a User Management module to create users (internally linked to our internal Active Directory); and (ii) a feature for delegating users into a client administrator or power user, as well as internally at the practice/operation level for big teams is designed.

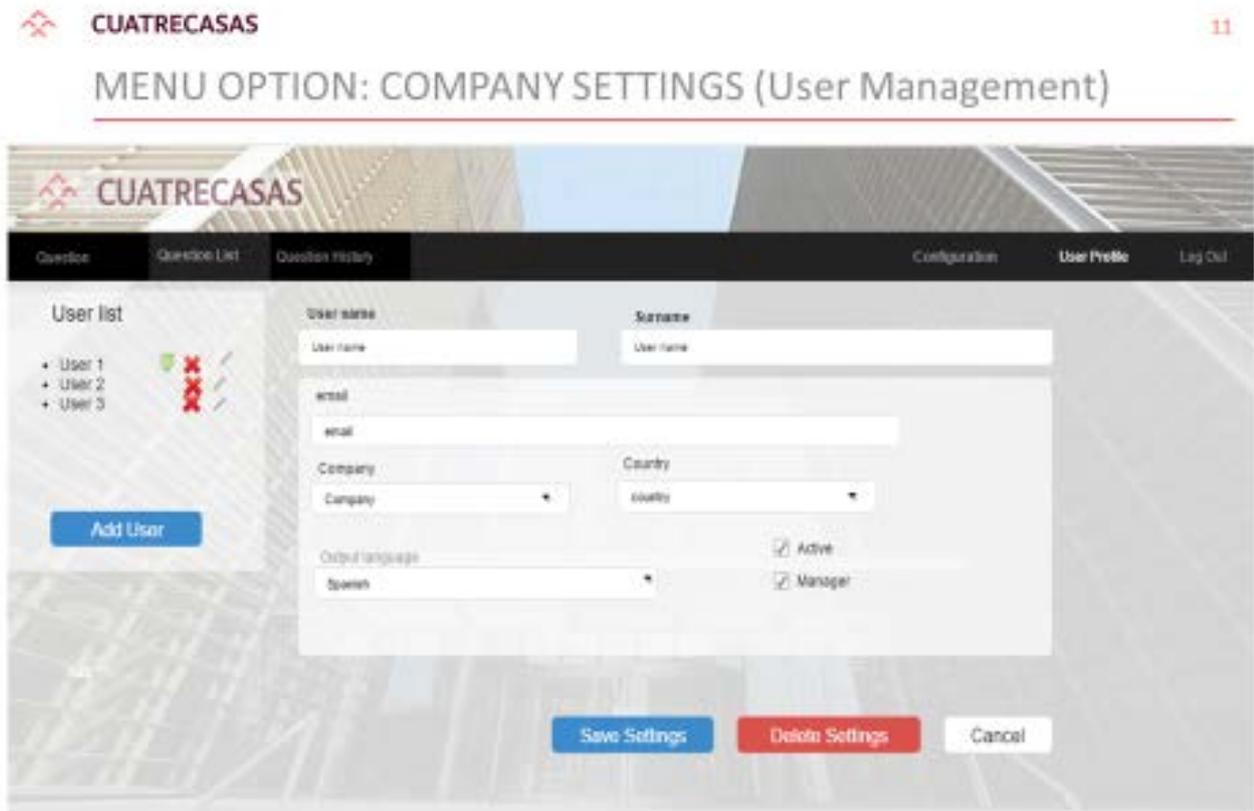


Figure 10. First visual prototyping PPT. User Management draft

## 2.2.4 MVP (Alpha version)

The defined MVP were set as the target deliverable status in this intermediate demonstration deadline. However, because of the different levels of maturity of the Lynx services and their modules, we have restricted its function slightly.

We summarize this Alpha version requirements in Figure 11, as the agreed scope for this intermediate deliverable in the last Plenary Meeting in Venice.

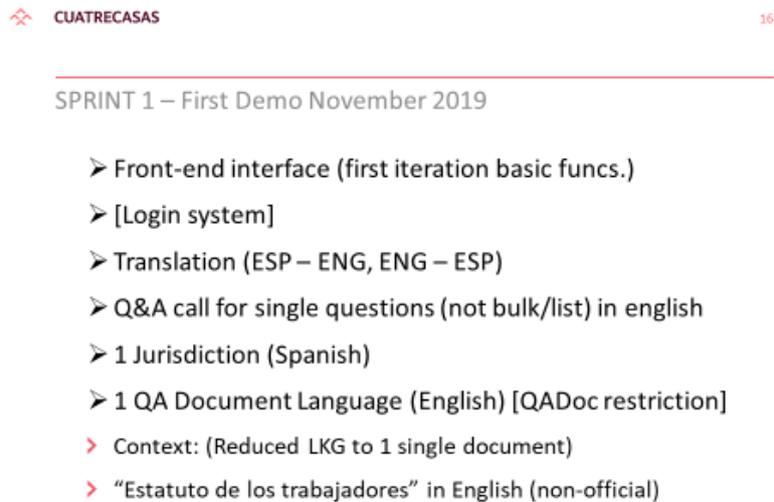


Figure 11. Functional scope requirements for intermediate version of pilot 3

Main restriction:

- QADoc module (a Lynx service) is still not able to work with non-English languages (it only allows questions in English related to English documents).

We decided to create the front-end application and to continue assuming that we are working with a single document repository (virtual subset of the LKG with only the “Consolidated version of the Spanish Workers Statute” – officially translated by *La Junta de Andalucía*). We will wait until QADoc is connected to the LKG document manager with multiple contents to validate a more complex scenario with different laws.

Languages:

- The system will allow users to write questions in Spanish or English.
- The results will be in English (QADoc returns results in English, which helps for validation purposes), but the user will be able to have the results translated into Spanish.

### 2.2.5 Current status of our pilot

Activities we are currently working on:

- **Interface design:** we are working with key users (senior labour lawyers and labour knowledge experts) to determine their requirements and to workshop the user interface design.
- **Front- and back-end development:** we are working on development tasks to implement requirements by importance/priority. We started with front-end development and are now focused on several back-end aspects (database modelling and implementation).
- **QADoc service:** we are working with SWC by giving our tests and feedback (to improve the accuracy of results), sending more example question sets and explaining and detailing the possible answers and the content to show or highlight. We are working hard to change the original SWC QADoc Module's design (based on Poolparty software). The first version of the SWC module was focused on providing specific answers that always pointed to the text. It directly defined the text parts as values, which were based on standard-named entity extraction recognition and semantic similarity algorithms. This version was limited because it did not consider other elements of a given document's structure, such as article and section titles, which contain important concepts that help contextualise the answer as part of the document as a whole.
- **Translation service:** we are providing Tilde with professionally translated legal documents, which it can use as examples to improve their domain-specific dictionaries and algorithms, as well as providing feedback on translation services. Participating in defining the final architecture model that enables users to manage public documents and client-specific (private) documents. We are thinking of a hybrid combination environment with a general/basic instance of the Lynx platform and services (including the public LKG). A combined on-premise instance for each use case will probably be needed, too. This decision, and the security guarantees of the final cloud platforms, will greatly affect our final application's architectural complexity.
- **Final architecture model:** we are participating in defining the final architecture model that enables users to manage public documents and client-specific (private) documents. We are thinking of a hybrid combination environment with a general/basic instance of the Lynx platform and services (including the public LKG). A combined on-premise instance for each use case will probably be needed, too. This decision, and the security guarantees of the final cloud platforms, will greatly affect our final application's architectural complexity.

### 2.3 EXTERNAL USE (DIRECT ACCESS FOR CLIENTS' LEGAL DEPARTMENTS)

Creating an external version of our application for clients (or prospective clients) is not a high priority. Some aspects of the Lynx platform will have to be assessed first, such as performance, accuracy and future use. Once they have been assessed, (in special about the accuracy level), we can think of implementing a pilot for some of our current clients. If this is not possible within the Lynx project timeline, we will consider it as a future phase.

The external version differs from the internal version in the following ways:

- **ARCHITECTURE:** The solution will be accessible on the internet (outside of the Cuatrecasas network).
- **SECURITY:** The system has to be highly secure, guaranteeing high levels of availability, security and privacy. Before going live externally, an external hacking service to test the system should be mandatory.
- **LOGIN:** Users will need a special identification (username and password) with a “remember password” feature.
- **USER MANAGEMENT AND DELEGATE USER MAINTENANCE:** The system should provide a mechanism to manage internal users from the client company, with different roles (client admin).
- One client can have access to different company configurations (1:N) (e.g., to big companies/groups by their different local companies or subsidiaries).
- **Q&A IMPROVEMENTS:** At this stage, several aspects are of key importance:
  - “Recommended answer” for introducing specific Cuatrecasas’ answers for common questions.
  - Chatbot interaction, with a “refine or supplement information” feature.
  - Improve accuracy of the results and emphasise the importance of providing a “precise answer” as much as possible.
- In addition, we could simplify/reduce certain features that are of less interest to users (e.g., RATING ANSWERS and QUESTION LIST (mass upload)).

### 3 PILOT ARCHITECTURE

#### 3.1 COMPONENTS

We have identified three main components as part of the pilot architecture (see figure 11):

- The Application Front-end
- The Application Database
- The Lynx platform and Services

In this document, we focus on the application, which is specific to the Cuatrecasas use case that needs to be developed and implemented in our system under our internal corporate IT rules and standards.

We are working with other partners to develop some of the Lynx Services that are of particular importance for our use case. These services were initially designed for general purposes. We are working towards improving their functionality for our specific use case and improving their models based on our context-specific content and providing feedback from people (lawyers) who are experts in their fields.

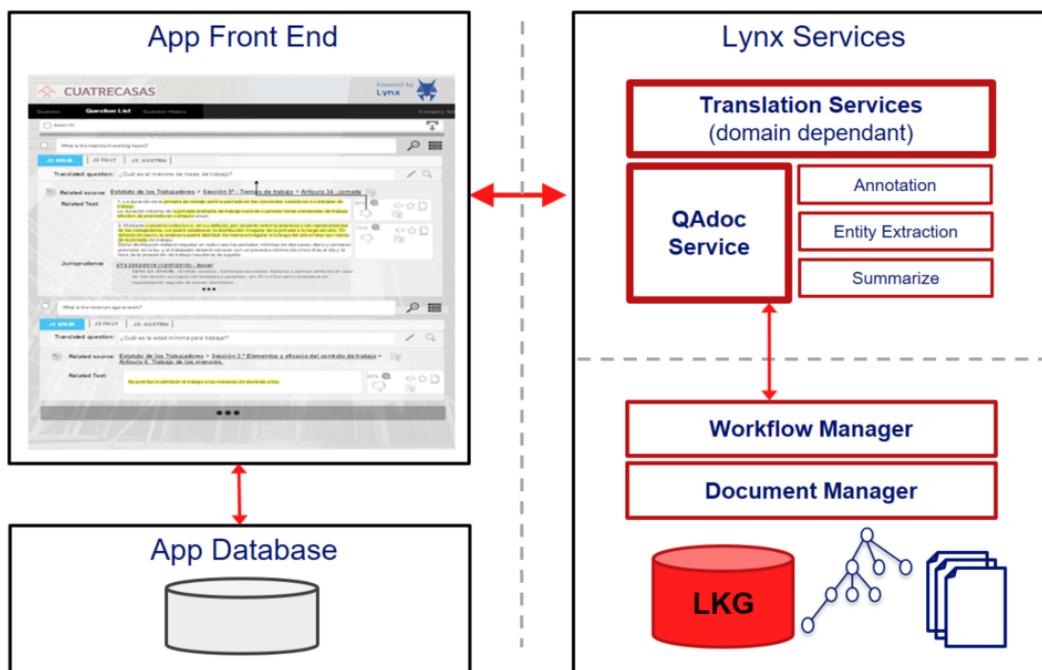


Figure 11. Basic components schema

Currently, the architecture of our pilot consists of two elements (Application and Database), both of which are installed “on site” in the Cuatrecasas network. We connect to the Lynx platform through published “final” Lynx Services.

### 3.1.1 DATABASE SERVER (DATABASE)

The Database instance is located in a central Database Server (shared by different internal applications). Currently, it is located in our development environment [SRVSQL4DEV] in Azure (private cloud).

The DBMS is Microsoft SQL Server 2016.

The operating system version is Windows Server 2016.

Our preliminary Data Model:



Figure 12. Data model high level visualization (20-11-19)

### 3.1.2 WEB SERVER (FRONT-END APPLICATION)

The web server is also located in a shared web server. This server is also located in our development environment [SRVWEBINTBDEV] in Azure.

The web server used is Microsoft IIS 7.

The operating system version is Windows Server 2016.

Tools and technologies used for the development:

- ASP.NET C# Core 2.2 as a main programming language
- MS Visual Studio 2017 as a developing environment
- MS TFS (Team Foundation) for versioning and code-organisation

- Bootstrap 4.0 (\*) as a responsive web design (RWD) framework
- JQuery 3.3.1 as a JavaScript library
- DevExtreme 18.2.7 JavaScript UI controls library (part of DevExpress)

We pay particular attention to logical security (e.g., to prevent hacking activities, we obfuscate (mask) identifiers in all our URLs). Using our tools, we have special solutions to prevent the most common vulnerabilities of web applications like XSS or SQL-INJECTION.

We are implementing two **User Authentication** methods: (i) for internal users, SSO based on ADFS; and (ii) for external users, username and password.

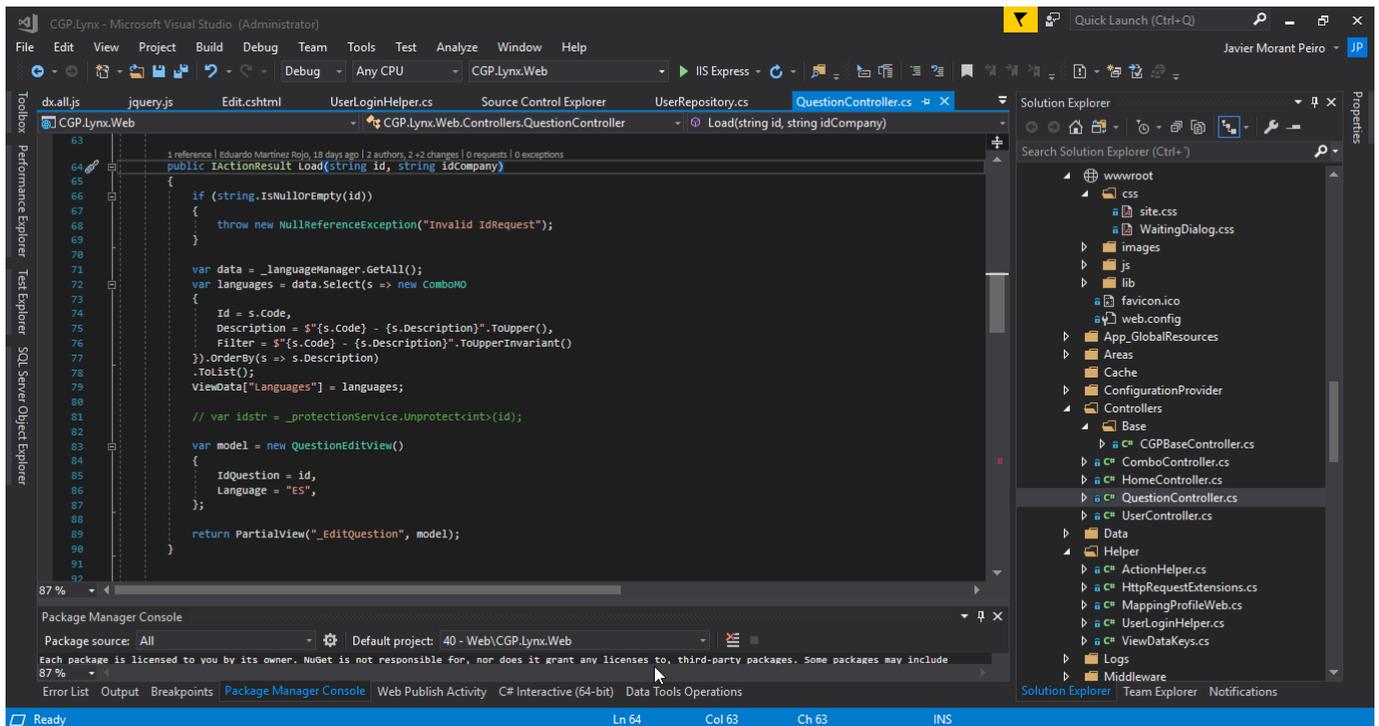


Figure 13. Screenshot 12-11-19 Visual Studio Cuatrecasas Lynx project)

### 3.1.3 LYNX SERVICES (INDIVIDUALLY EXTERNALLY EXPOSED)

Lynx services currently being used:

- **QADoc Service (SWC)**
  - The QADoc Service receives a question in natural language. It then aims to find a document from which it can extract a precise answer to the question. The service is developed as part of Task 3.4 (described in deliverable D3.4).
  - This “macro-service” also uses other Lynx Services, including **Entity Extraction (EntEx)**, also **Cross-lingual Search Service (SEAR)** and **Temporal Expression Extraction (TimEx)**.
  - As labour law contains many time expressions, **TimEx** is a particularly important service in our case. For example, expressions for deadlines or regulated procedures are common in the labour context, such as “something has to be done 10 days after the contract is signed,” “the probationary period does not exceed six months,” or “the cost of dismissing an employee is 20 days per worked day.”
  
- **Neural Machine Translation Service (TILDE)**
  - The translation service provides the Lynx platform and LKG and their demonstrators with automated machine translation by using the Tilde MT cloud platform. Currently, the translation service provides support for a runtime scenario and an endpoint for the Lynx platform asynchronous process in the background. Neural Machine Translation (NMT) systems were trained for the language pairs selected by the demonstrator. In the domain (labour law), specific legal and business data was gathered and processed before training the NMT systems on a mix of broad-domain and in-domain data to be able to translate both in-domain and out-of-domain texts. For more information, see deliverable D3.2 Intermediate translation services.

Other services or parts of the Lynx platform that we expect to integrate in the next stages:

- **Document Manager (DCM) and the LKG**
  - The document manager (also referred to as DCM) is a central part of the Lynx platform, as it is where the documents are stored and maintained. Its basic functions include storing documents and their annotations, particularly regarding maintaining their synchronisation, providing read and write access, as well as updates of documents and annotations. The document manager can be queried in terms of annotations (e.g., “which documents mention this entity?”), as well as in terms of documents (e.g., “what are the contents/annotations of document X?”). The interface includes a set of APIs to manage the following resources within the Lynx platform: collections, documents and annotations.
  
  - DCM is responsible for storing the Legal Knowledge Graph (LKG) and the documents once they have been processed through the different workflows. For more information, see WP4 documentation, deliverable D4.4.
  
- **Workflow Manager (WM)**
  - The WM is responsible for the effective orchestration of the micro-services to carry out workflows. Workflows are combinations of both parallel and sequential tasks, which are specified using Directed Acyclic Graphs. For more information, see WP4 documentation, deliverable D4.4.

- **Summarization Service (Summ)**
  - Summarises documents with state-of-the-art methods.
  - We have to determine whether it would be worth adding a “summary of results” feature, which would aggregate some of the results (relevant/recent case law as key information-summary from the result list or a summary of the results individually).

## 4 USER INTERFACE

### 4.1 APPLICATION DEMO (ALPHA VERSION) AND EVIDENCES

In this section, our main goal is to show the current state of the application.

We have divided this in 3 subsections:

1. “Commented Screenshots” to visualize main parts of the application commented the currently available functionality.
2. “Link to video demo” a recorded video to show the application working in real-time.
3. “User validation and training feedback” to illustrate with a real example, the kind of feedback we are doing and interchanging with partners (in this case SWC responsible for the QADoc module and service).

#### 4.1.1 COMMENTED SCREENSHOTS

When accessing the application, the internal user (PBB in the example) is recognized and auto-validated through a SSO mechanism that integrates with our internal AD, skipping the login screen.

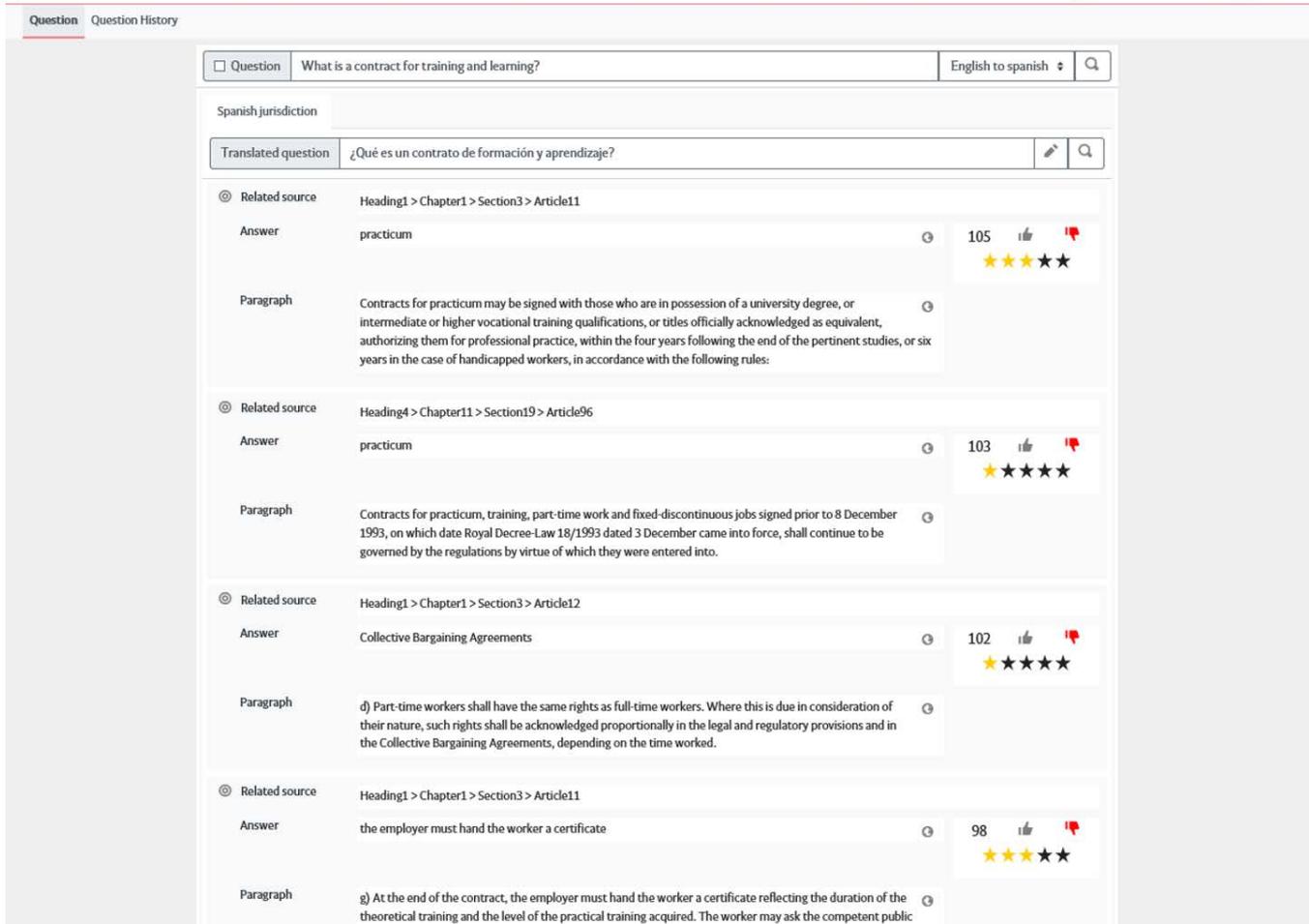
Firstly, a home screen is presented (we are considering to directly go to the “Question” part in future). Once clicked on the “Question” option in the top menu, the Q&A environment is entered.

In this example (Figure 14) we entered a question in English, and we choose to have a translation “English to Spanish”, this translation does not affect to the results because currently the QADoc service is only working with questions in English over documents also in English.

Once the question is launched, using the magnifying glasses “Execute search” action the system is sending all parameters to the QADoc service and receiving results that are being parsed and showed to provide additional functionality to the user.

The retrieved results from the QADoc service are individual paragraphs from the document complemented with a most concrete answer. The first part is showed to the user as “Paragraph” and the second is presented today as “Answer”. The QADoc is also giving and additional information: a number that shows the level of accuracy/trust of its answer and we order by this field and we are directly visualizing this value to help on the validation and feedback process.

The different results (paragraphs and answers inside) are grouped by “Article” and show the localization/path into the document structure. This is especially useful in this validation stage.



The screenshot displays the Lynx application interface. At the top, there is a navigation bar with 'Question' and 'Question History' tabs. Below this, a search bar contains the question 'What is a contract for training and learning?' and a language selector set to 'English to spanish'. A 'Translated question' section shows the Spanish equivalent: '¿Qué es un contrato de formación y aprendizaje?'. The main content area lists four 'Related source' entries, each with an 'Answer' and a 'Paragraph' section. Each entry includes a count of responses (e.g., 105, 103, 102, 98) and a star rating system. The first entry has a rating of 5 stars, while the others have 4 stars. The paragraphs contain detailed legal text in Spanish regarding contracts for practicum and collective bargaining agreements.

Figure 14. Screenshot 20-11-19 Alfa version with core MVP functionalities

At result or paragraph level, we have also implemented two functionalities:

- The “Translation” option (through the “world icon”) that allows the user to visualize the paragraph text translated (limited to “Spanish” due to the limitations in this current stage).
- The “Rate the results” functionality, initially defined simply as a “like” and “dislike” has been transformed into “Stars rating” functionality to provide most detailed feedback about the quality level on the answers.

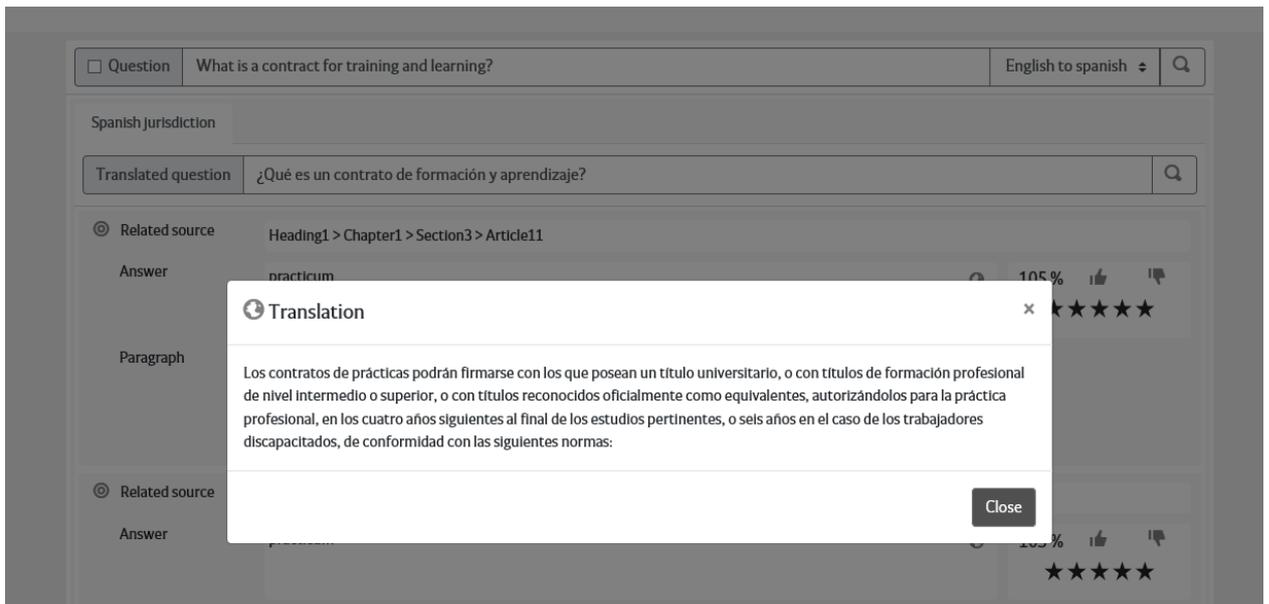


Figure 15. Screenshot 20-11-19 Alfa version. Translate paragraph functionality

#### 4.1.2 LINK TO VIDEO DEMO

To evaluate and demonstrate real current status of our pilot, we have recorded a user interaction showing the MVP working in real-time.

<https://delicias.dia.fi.upm.es/lynx-nextcloud/index.php/s/ZPgrR5rNriZag95>

Password: Lynxproject1

#### 4.1.3 USER VALIDATION AND TRAINING FEEDBACK

With the preliminary version of the application, we have been able to contribute to our legal experts' test and validation activities.

Below is one example of detailed feedback, which explains not only what the expected results should be, but also indicates the key parts of the document that are not currently being considered by the QADoc Service.

In Figure 16 (below), we provide an example of feedback provided to train and improve the QADoc module.

Question
What is the maximum working hours?
DE - GER
Q

Spanish Jurisdiction
English Jurisdiction
Austrian Jurisdiction

Translated question
¿Cuál es el número máximo de horas de trabajo?
Q

⊙ Related source
[Heading1](#) > [Chapter2](#) > [Section7](#) > [Article37](#)

Answer
fourteen

126
👍
👎

★★★★★

Jurisprudence
Should any Regional Government not be able to hold one of its traditional festivities because a sufficient number of national holidays does not coincide with a Sunday, for the year that such occurs, it may add one more recoverable holiday, up to the maximum of fourteen.

⊙ Related source
[Heading1](#) > [Chapter1](#) > [Section3](#) > [Article11](#)

Answer
k

123
👍
👎

★★★★★

Jurisprudence
k) The training contract shall be presumed of common or ordinary character should the employer fail to fulfil the totality of his/her obligations as regards theoretical training.

⊙ Related source
[Heading1](#) > [Chapter2](#) > [Section7](#) > [Article37](#)

Answer
fourteen

113
👍
👎

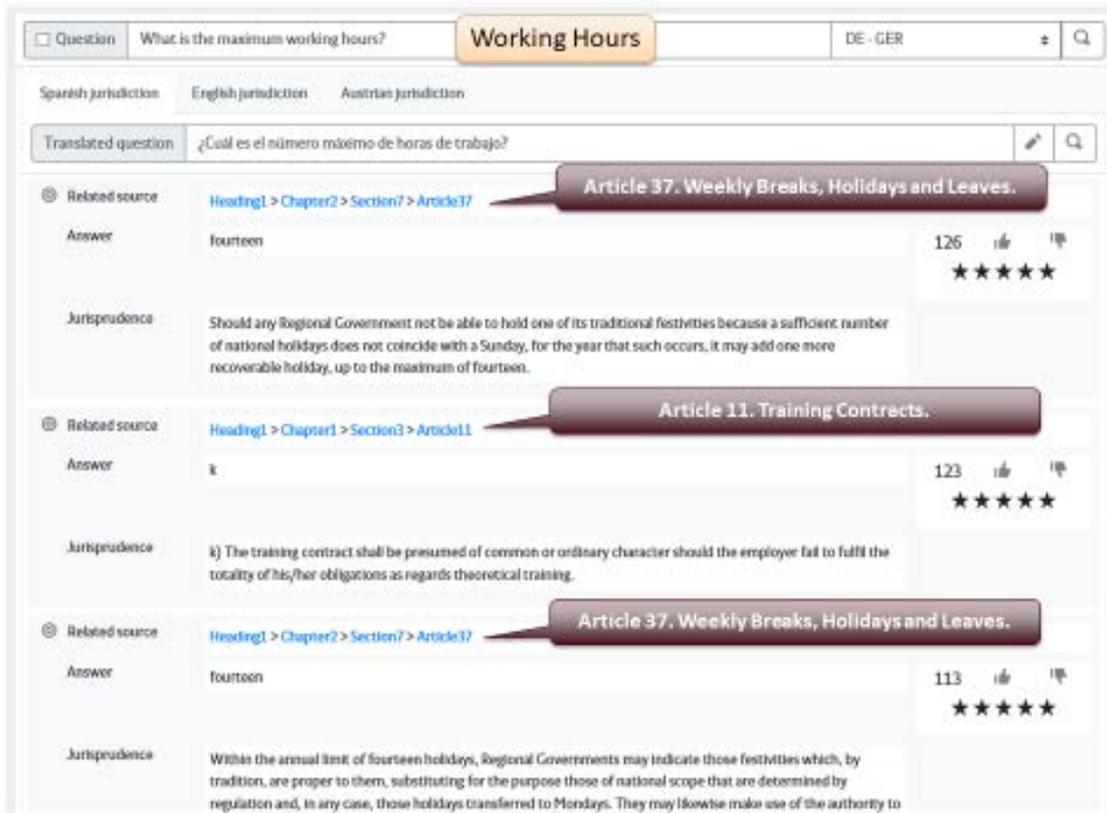
★★★★★

Jurisprudence
Within the annual limit of fourteen holidays, Regional Governments may indicate those festivities which, by tradition, are proper to them, substituting for the purpose those of national scope that are determined by regulation and, in any case, those holidays transferred to Mondays. They may likewise make use of the authority to

Figure 16. Screenshot 16-10-19 (part of the Test and Feedback for QADoc)

We are collaborating with SWC (and openlaws) to improve accuracy. Based on the content of the law, we are also helping them to (i) identify the ideal results to be returned, and to (ii) determine the best way to manage and present these results.

We provided detailed feedback in PowerPoint format, not only indicating the right answers, but also providing information on how to prioritise answers or discard results based on the context we can deduce from the documents' structure (articles and sections). Figure 17 (below) shows how the descriptions of the articles are not related to the main concept of the question.



Question What is the maximum working hours? Working Hours DE-GER

Spanish jurisdiction English jurisdiction Austria jurisdiction

Translated question ¿Cuál es el número máximo de horas de trabajo?

**Related source** [Heading1 > Chapter2 > Section7 > Article17](#) **Article 37. Weekly Breaks, Holidays and Leaves.**

**Answer** fourteen 126   
 ★★★★★

**Jurisprudence** Should any Regional Government not be able to hold one of its traditional festivities because a sufficient number of national holidays does not coincide with a Sunday, for the year that such occurs, it may add one more recoverable holiday, up to the maximum of fourteen.

**Related source** [Heading1 > Chapter1 > Section3 > Article11](#) **Article 11. Training Contracts.**

**Answer** k 123   
 ★★★★★

**Jurisprudence** k) The training contract shall be presumed of common or ordinary character should the employee fail to fulfil the totality of his/her obligations as regards theoretical training.

**Related source** [Heading1 > Chapter2 > Section7 > Article17](#) **Article 37. Weekly Breaks, Holidays and Leaves.**

**Answer** fourteen 113   
 ★★★★★

**Jurisprudence** Within the annual limit of fourteen holidays, Regional Governments may indicate those festivities which, by tradition, are proper to them, substituting for the purpose those of national scope that are determined by regulation and, in any case, those holidays transferred to Mondays. They may likewise make use of the authority to

Figure 17. Commented screenshot (part of the Test and Feedback for QADoc)

In following slides, we also show the potentially good answers based on the information provided by experts. In this example, we explain the key information in the texts of Spanish labour law that relates directly to the concepts behind the user's question. In this exercise (Figure 18), for each paragraph, we indicate the different types of results that the system will provide: precise answer (in bold red) and part of the sentence that the use could consider as relating directly to the question (in bold) to be highlighted by the front-end application.

CUATRECASAS

Working Hours
Working Time
The Working Day

3

---

Section 5. Working Time  
Article 34. The Working Day.

1. The duration of the working day shall be that agreed upon in the collective bargaining agreements or work contracts. **The maximum duration of the ordinary working day shall be forty hours a week of actual work on average in the yearly computation.**

Section 5. Working Time  
Article 34. The Working Day

2. The irregular distribution of the working day throughout the year may be established through collective bargaining or, in its absence, through agreement between the company and the workers' representatives. Said distribution must, in any case, respect the minimum periods of daily and weekly rest provided for in this Law. **The actual number of ordinary working hours may not exceed nine daily**, unless another distribution of daily working time is established by collective bargaining or, in its absence, agreement between the company and the workers' representatives, respecting, in any case, the rest period between working days.

**Workers less than eighteen years of age may not work more than eight actual hours a day**, including, as applicable, the time devoted to training and, if they work for several employers, the hours worked with each of them.

Figure 18. Explanation slide (part of the Test and Feedback for QADoc)

## 5 OUTLOOK

### STATUS AND ROADMAP

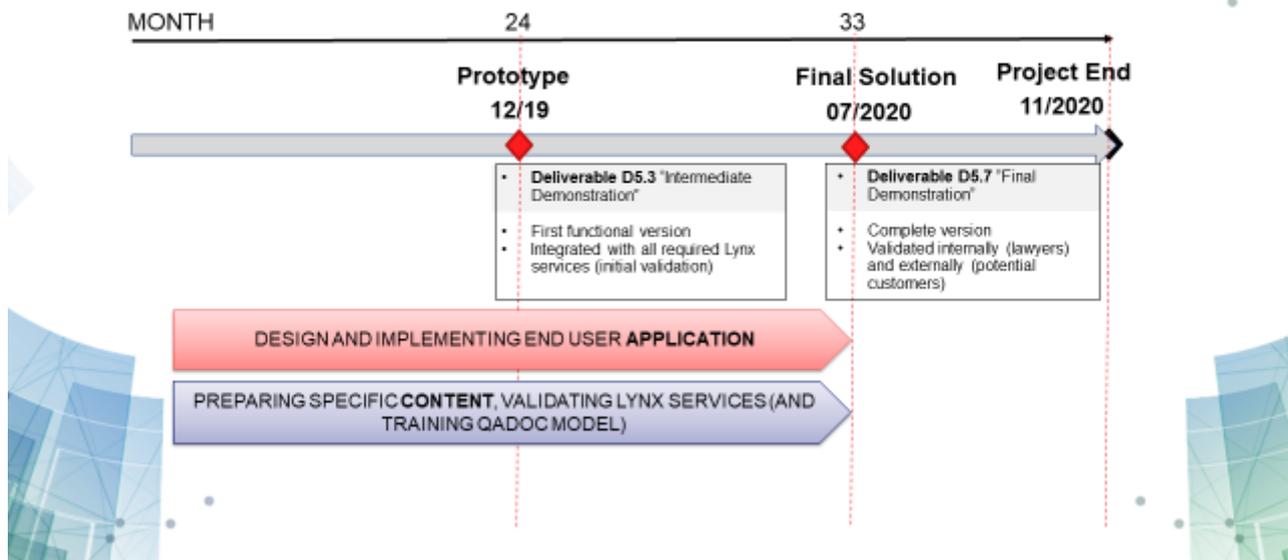


Figure 19. Pilot roadmap (high level deliverables deadlines)

To conclude this deliverable, the most specific short-to-medium term action points in our pilot are briefly mentioned in the following:

1. QADoc improving accuracy of results (SWC) (most important action for implementation of pilot)
  - Continue to provide detailed feedback and provide more examples
2. TRANSLATION services intensive test and detailed feedback (TILDE)
  - Spanish-English and English-Spanish [first phase]
  - Start testing with other languages [second phase]
3. LKG metadata, law and legal content types and classification (UPM)
  - Provide classification from Spanish laws (CC-UPM)
  - Evaluate and find equivalences in other jurisdictions (CC-UPM-openlaws)
4. CASE LAW AND LEGAL CHANGES
  - Through analysis and evaluation of how to obtain this information in different jurisdictions (UPM- openlaws)
  - Design and pilot implementation based on Spanish and EU laws
5. Final LYNX ARCHITECTURE
  - Determine how to manage private documents (local/private + public LKG)
  - Synchronisation tasks/issues
  - Technical architecture requirements to deploy and maintain a local on-premise Lynx instance (if needed)
6. WORKFLOW details for our use case

- Population WF details and special requirements
- Determine whether to use QA WF (we do not plan on using it/final decision needed)

#### 7. LYNX SERVICES (EXTERNAL) DEFINITION

- Specific Final Services definition (input, output)
- Testing with synchronous and asynchronous methods

#### 8. APPLICATION DEVELOPMENT

- Continue implementing functionality (focus on internal use case)
- Combine synchronous and asynchronous methods

#### 9. TESTING AND USER VALIDATION

- Testing: Unit test, Functional and Content Expert
- Testing Performance

## ANNEX 1 – SAMPLES OF REAL QUESTIONNAIRES

We have hundreds of real examples with questions regarding labour law, usually relating to international M&A operations, some led by us, but most led by other firms.

We sometimes have a long questions list, as in this first example: a big US technology company would like to open a new R&D centre in Europe. They create a list with approximately 200 questions to evaluate 5 countries (the UK, Spain, Italy, Germany and the Netherlands) and 20 related exclusively to conditions to contract students as interns/trainees.

In the second example (below), there is a short list of questions, but they have to be evaluated against more than 50 countries (international industrial company that is evaluating the acquisition of another big company with delegations and factories around the world).

Confidential information  
Draft subject to review  
02/06/2015

<u>Coun-try<sup>1</sup></u>	<u>Em-ployees</u>	<u>Rep-re-sent-atives</u>	<u>Obligations on the Merger decision</u>	<u>Date</u>	<u>Obligations on change of employer<sup>2</sup></u>	<u>Date</u>
Austria	56	0	ACI has to inform employees on the Merger.  Employees cannot block the operation. Infringement could entail fines.	Before the shareholders' agreement on the merger.	ACI has to inform affected employees on the transfer.  Employees cannot block the operation. Infringement could entail fines.	Usually one month before the transfer takes place.
Belgium	277	1	ACI has to inform and consult with the workers' representative.  Employees cannot block the operation. Infringement could entail fines, damages, and could constitute a criminal offence.	Before the shareholders' agreement on the merger, consultation should last 1 week.	ACI has to inform and consult with the workers' representative.  In practice, there is only one information and consultation process with the works council, relating to both the merger and its consequences for the employees.  From an HR perspective, ACI could inform the employees.  Employees cannot block the operation. Infringement could entail fines, damages, and could constitute a criminal offence.	Before the shareholders' agreement on the merger, consultation should last 1 week.

## ANNEX 2 – LKG IN THE LABOUR USE CASE

In this annex, we try to conceive how the LKG from our labour law pilot perspective could be. We envision an LKG where we could find the following:

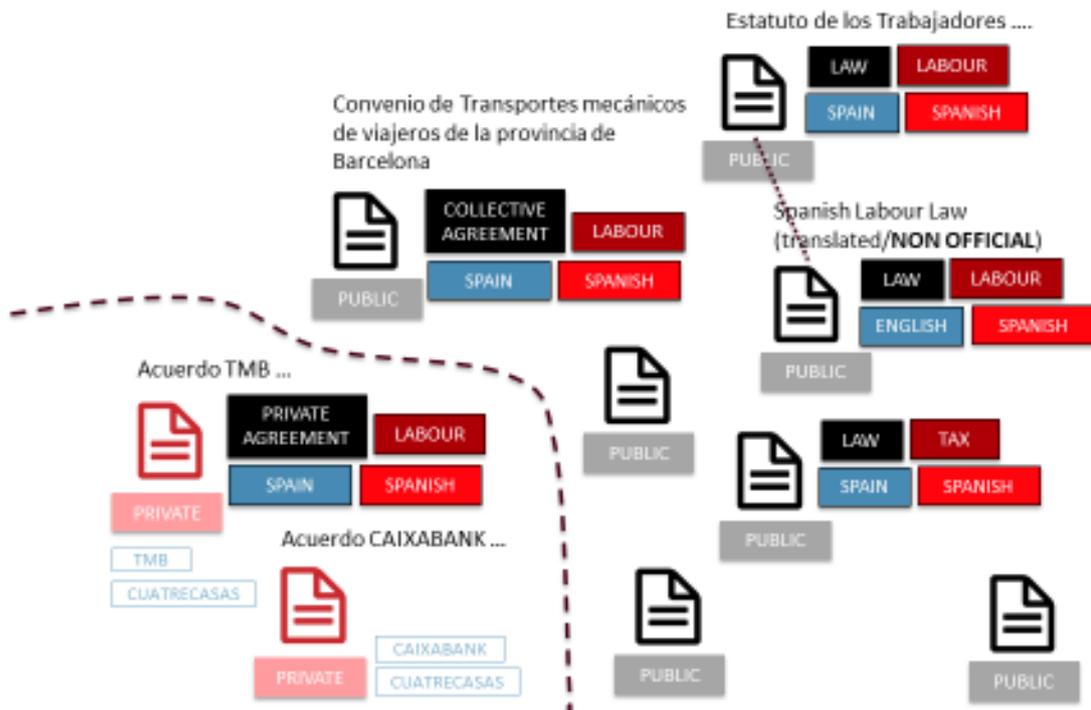
- Documents/content of different types (e.g., laws, contracts, labour sector agreement, and company agreement) for different use cases in the legal and regulatory/compliance ecosystem, as well as for different business contexts (e.g., labour, geothermal and real state). We define this as metadata classification.
- Documents with different levels of security. We assume that LKG will have plenty of public documents and legal resources, as well as private ones.

In the two diagrams below, we illustrate how we could pass from the general LKG (which shows the part related to the labour domain) to one specific application execution logical subset of the LKG for the use case of one specific company (TMB).

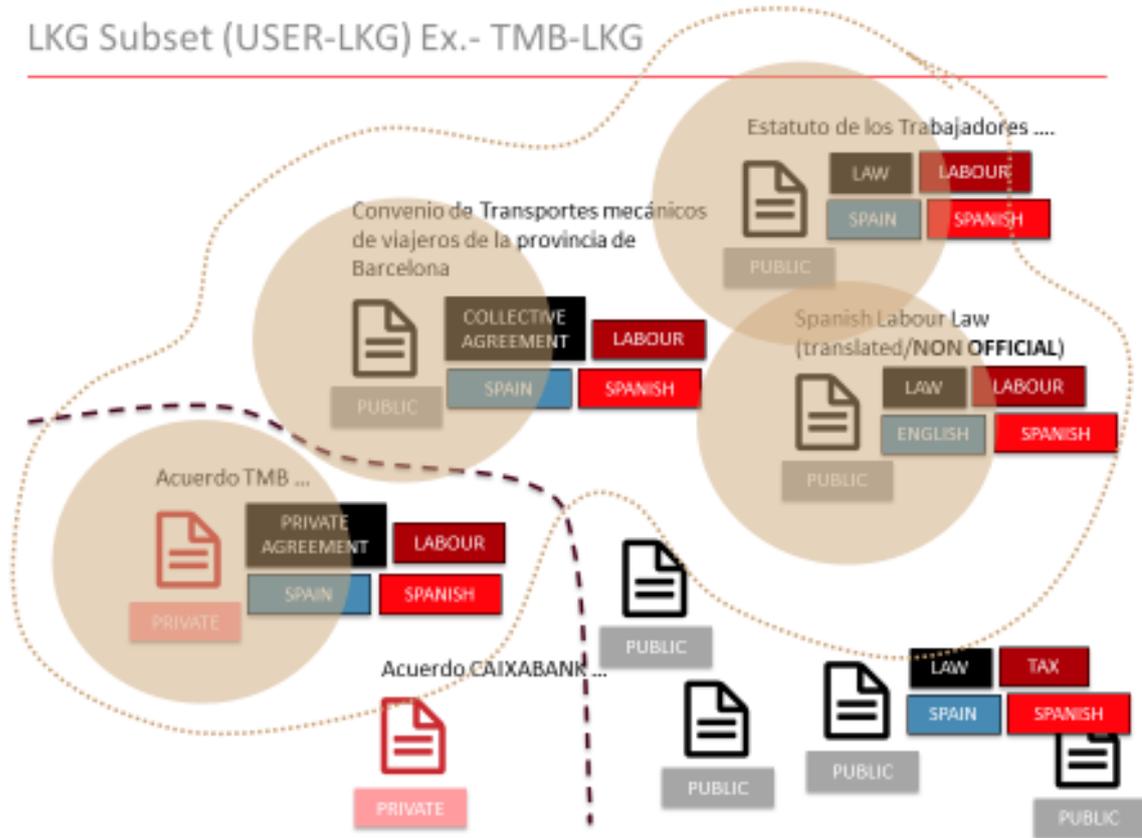
 **CUATRECASAS**

12

### LKG Representation – LABOUR USE CASE REQUIREMENTS



## LKG Subset (USER-LKG) Ex.- TMB-LKG



## ANNEX 3 – DIFFERENT TYPES OF LAWS IN SPAIN

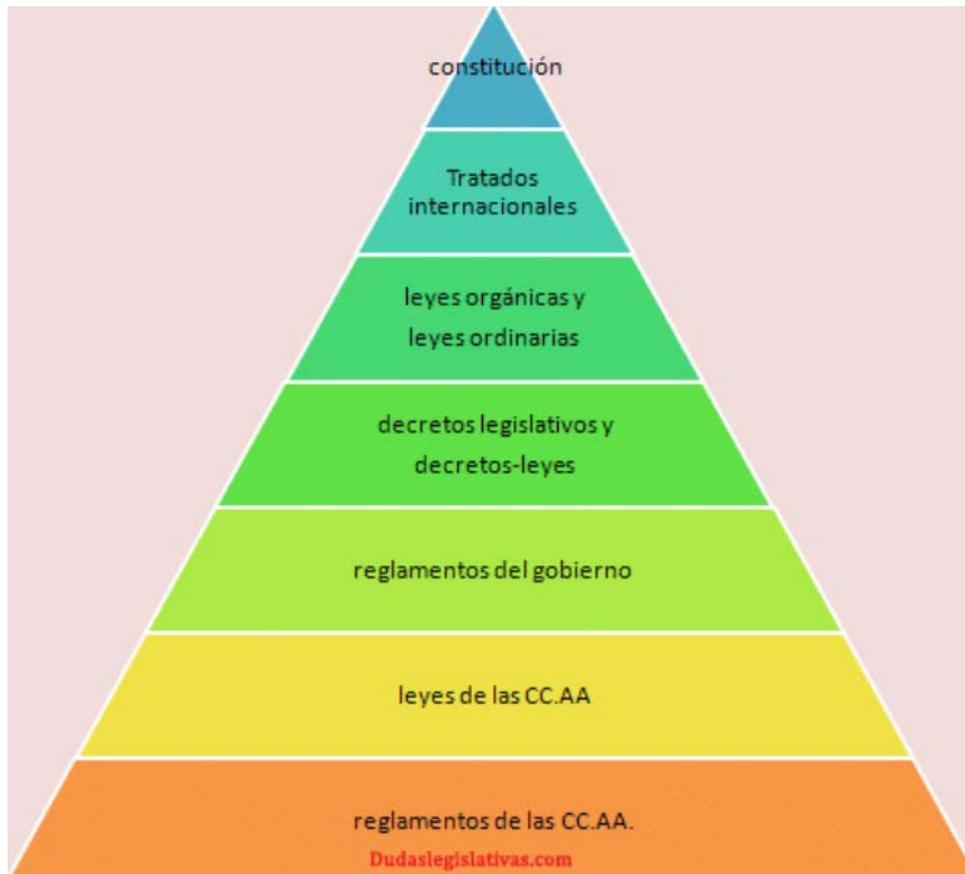


Figure X. Pyramid of the legislative hierarchy (Spain)

### Definition of Law

Laws are defined as written legal documents that prevail against any normative source. The creation of every law is the result of the expression of the popular will. The approval and publication of laws correspond to the legislative branch. Once approved, they become part of the legal system.

Every law is a legal norm that serves to regulate social and human behaviour. At the state level, the competent body is the General Courts. At the autonomous level, the Legislative Assemblies are in charge.

### Types of laws in Spain

In Spain, laws are organised in a hierarchical structure. Where a law is placed in this hierarchy depends on the rank or organ from which it emanates. If a law contradicts a law higher up in this hierarchy, the contradictory law is considered invalid.

Hierarchy of laws in Spain:

▪ **1978 Constitution (*Constitución Española*) and international treaties**

The Constitution, international treaties and all community regulations are at the same level in the hierarchy. However, depending on who is speaking on the matter, they may say that one is higher in the hierarchy than the other. However, they all exist on the same level.

▪ **Organic laws (*Leyes orgánicas*)**

Organic laws are regulated in article 81 of the Spanish Constitution. These laws regulate fundamental rights and public freedoms, approving the statutes of autonomy and the LOREG of the general electoral system.

Along with those established in the Constitution, organic laws include the regulation of emergency, exception and siege states (state of martial law), as well as the regulation of the ombudsman. Their approval, modification or repeal is carried out by an absolute majority of the members of Congress.

▪ **Ordinary laws (*Leyes ordinarias*)**

Ordinary laws are at the same level as that of organic laws, although they can be considered below them in the legislative hierarchy. They regulate matters that are not reserved for organic law, and to be approved; only a simple majority of each of the chambers is needed.

▪ **Basic laws (*Leyes de base*)**

Basic laws are regulated in article 82 of the Constitution, and they delegate to the Government the power to dictate norms with the rank of law. These laws deal with matters that are not included in any of the other above laws.

The object and scope of the legislative delegation must be specified in the basic law. Under article 83 of the Constitution:

- (i) a basic law cannot be modified by the law itself; and
- (ii) issuing regulations retroactively is forbidden.

▪ **Other laws**

Other laws included in the same range as the previous ones:

- Basic laws: laws that the state dictates (legislative power) to develop the autonomous communities through their own laws. Several references are made to this type of law in article 149 of the Constitution.
- Framework laws: laws that are issued by the state but are intended to transfer powers to the autonomous communities, which are the exclusive property of the state. Consequently, the field of action is expanded and competencies are increased. The framework laws are indirectly regulated by article 151 of the Constitution. This type of law can never be used as basic legislation, as it requires the autonomous community to be developed.
- Harmonisation laws: these laws are regulated in article 150.3 of the Constitution. They are primarily intended to serve the national interest. They are received by the autonomous communities and are mainly

used to harmonise (modify) the provisions of the autonomous community where the state has a particular interest.

Standards in Spain:

There are norms that are not established by the legislative power (General Courts) and are equal to the law. These norms are created by the Government or Legislative Assemblies, which develop matters that are not reserved for organic law.

▪ **Legislative decrees (*Decretos legislativos*)**

Legislative decrees develop delegated matters. The Government passes these decrees granted by the legislative power under the basic/ordinary laws. They are regulated in article 85 of the Constitution.

▪ **Decree law (*Decreto ley*)**

The decree law has an important function. The Government passes a decree law in an extraordinary or urgent situation.

They cannot regulate matters that affect:

- the state's basic institutions;
- rights, duties and freedoms;
- the regime of the autonomous communities; or
- general electoral law.

These decrees are submitted immediately to debate and vote by the Congress of Deputies within 30 days from the date they are promulgated. They are regulated in article 86 of the Constitution.

Royal decrees differ from other decrees in that they are signed by the King for sanctioning.

(\*) See original complete document (in Spanish) in <https://dudaslegislativas.com/tipos-de-leyes-y-jerarquia-normativa/>

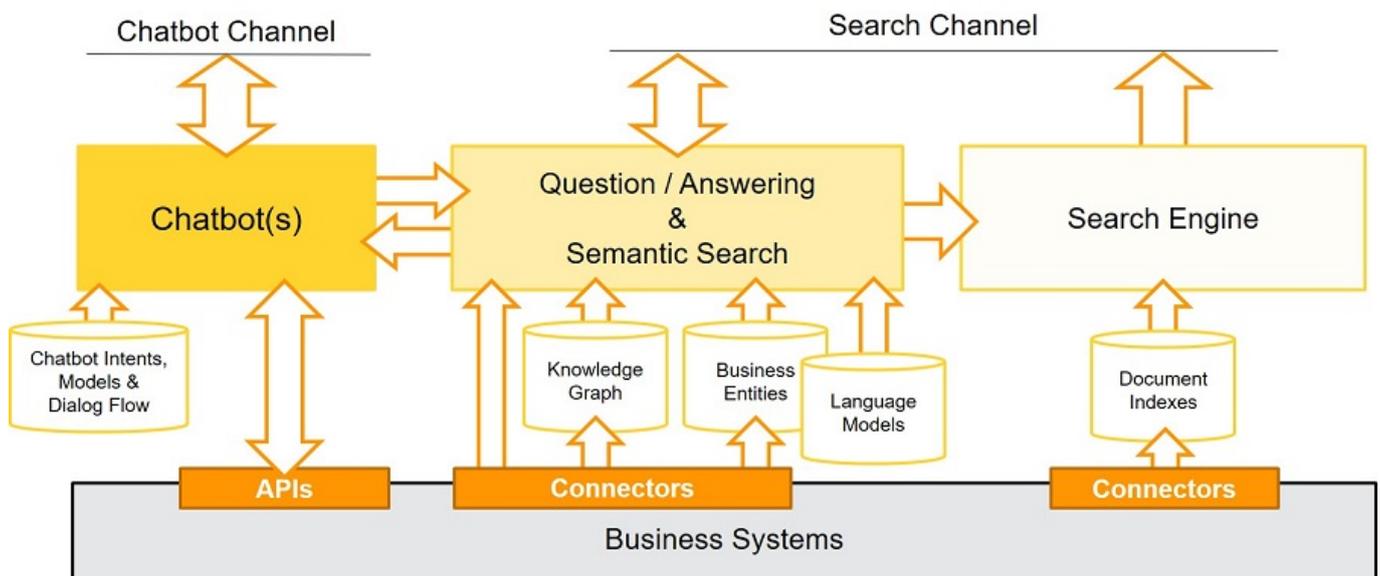
## ANNEX 4 – CHATBOTS, QA AND SEMANTIC SEARCH WORKING TOGETHER

### About Legal Chatbots

Chatbots are a hot topic right now in many industries, including in law. In recent years, there has been a lot of hype around chatbots such as DoNotPay (<https://donotpay.com>), helping people get legal help without a lawyer or even talking to a real person. The field of legal chatbots has since expanded and now encompasses a diverse group of bots that use different methods and have different target audiences.

### Chatbots, Question Answering (QA), and Semantic Search – How Do They Work Together?

Chatbots handle deep dialogs and specific domains while QA systems handle broad domains of knowledge. However, chatbots and QA systems can be complementary depending on the interface where the user starts to look for information (a search box first or a chatbot interface first). Semantic search and search engines can be used as fallbacks. Based on costs, the depth of knowledge, and other potential criteria required by your organization, an assessment could help you select one or a combination of these solutions.



The architecture diagram above showcases how chatbots, QA, and search interact with the business system and each other to create a fully integrated, intelligent knowledge system within the enterprise.

- **Chatbots** provide deep dialogs to help perform specific tasks.
- **QA systems** interface with business systems and knowledge graphs to answer questions.
- **Semantic search** understands what you are searching for and returns highly-targeted documents or records.
- **Search engines** find documents that best match the list of words and tokens from the user.

Using AI and NLP techniques to merge content sources and create knowledge graphs, we can then leverage chatbots, QA, and search to deliver holistic knowledge and understanding of the enterprise to the user. This is where we think the industry is heading to.

(\*) See original complete document in <https://www.searchtechnologies.com/blog/search-chatbot-question-answering>