



Readers: Evaluation And DEvelopment of Reading Systems

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CHIST-ERA meeting, 19 March 2015, Madrid



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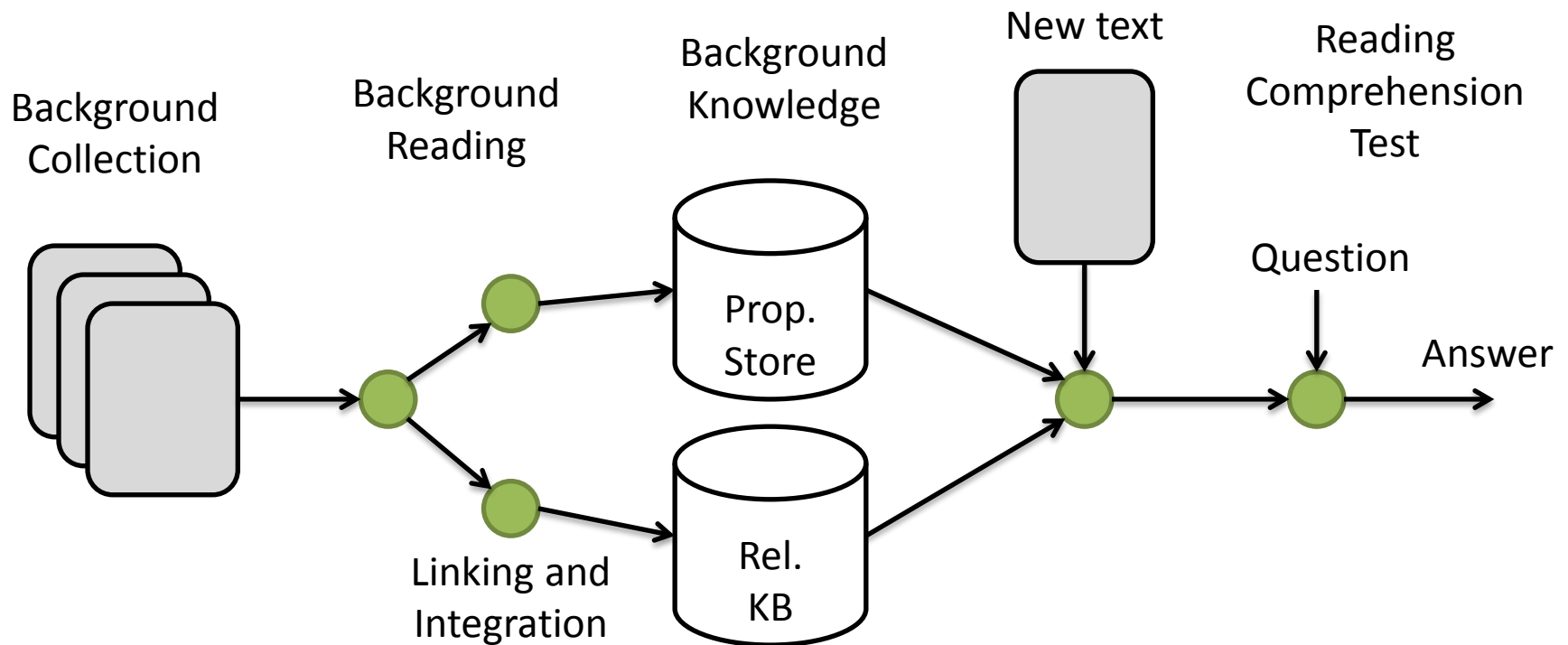
Starting date

- **January 1st, 2013**
 - Kick-off meeting, Madrid, January 22-23, 2013
 - Different starting dates of partners ...
 - U. Edinburgh, UK (EPSRC EP/K017845/1)
 - October 1st, 2012
 - Synapse Développement, France (ANR-12-CHRI-0004-03)
 - November 1st, 2012
 - UNED and UPV/EHU, Spain (MINECO PCIN-2013-002-C02)
 - July 1st, 2013



Project Overview

● Reading Technology (READERS)





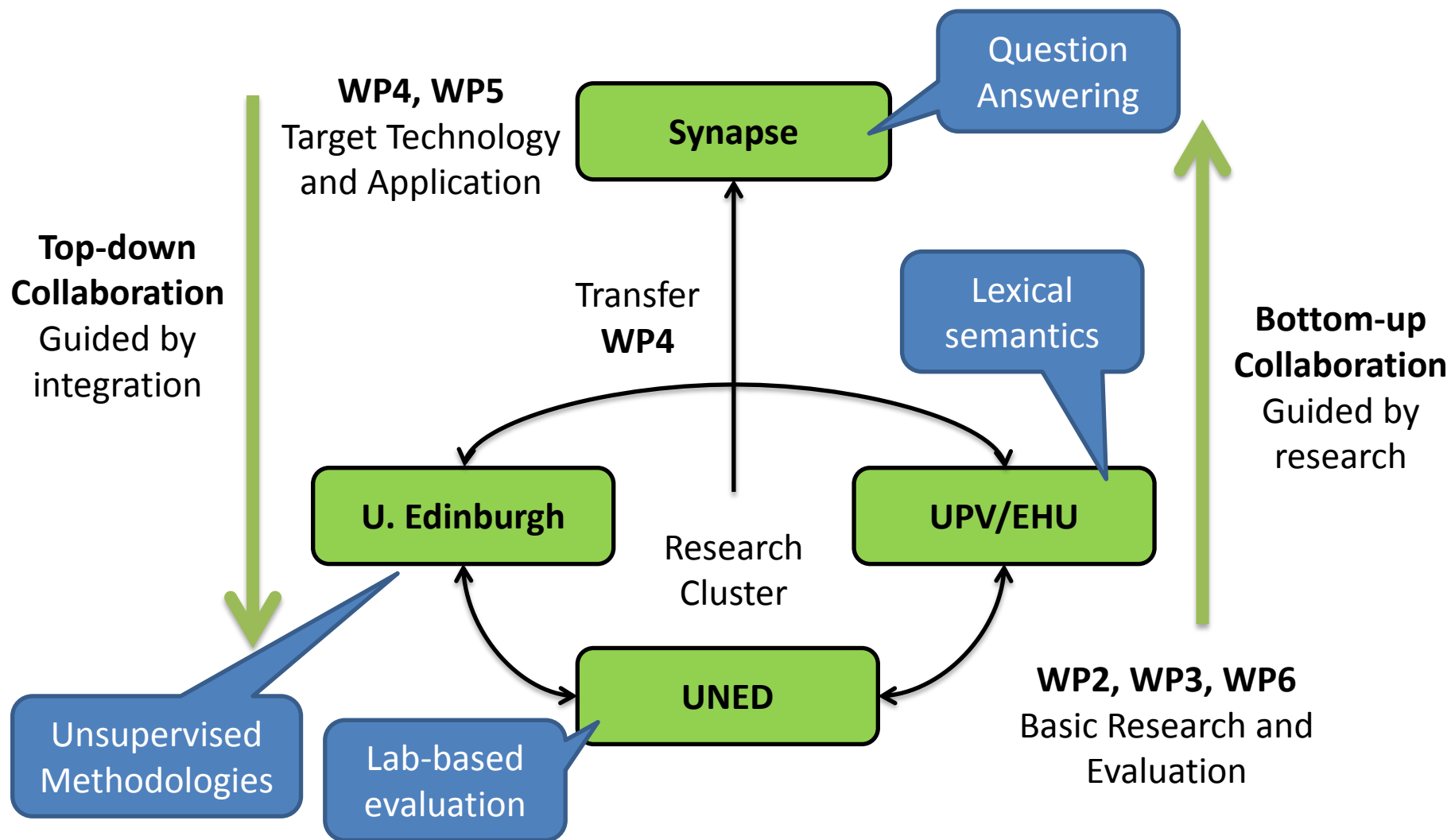
Challenges

- Background Reading
 - Induction of semantic roles
 - Build propositional background knowledge bases
- Knowledge Linking and Integration
 - Acquired background knowledge
 - Existing Knowledge Bases
- Read a single document
 - Bringing the background knowledge
 - Required to answer questions about the doc.
- Develop evaluation methodologies for Machine Reading

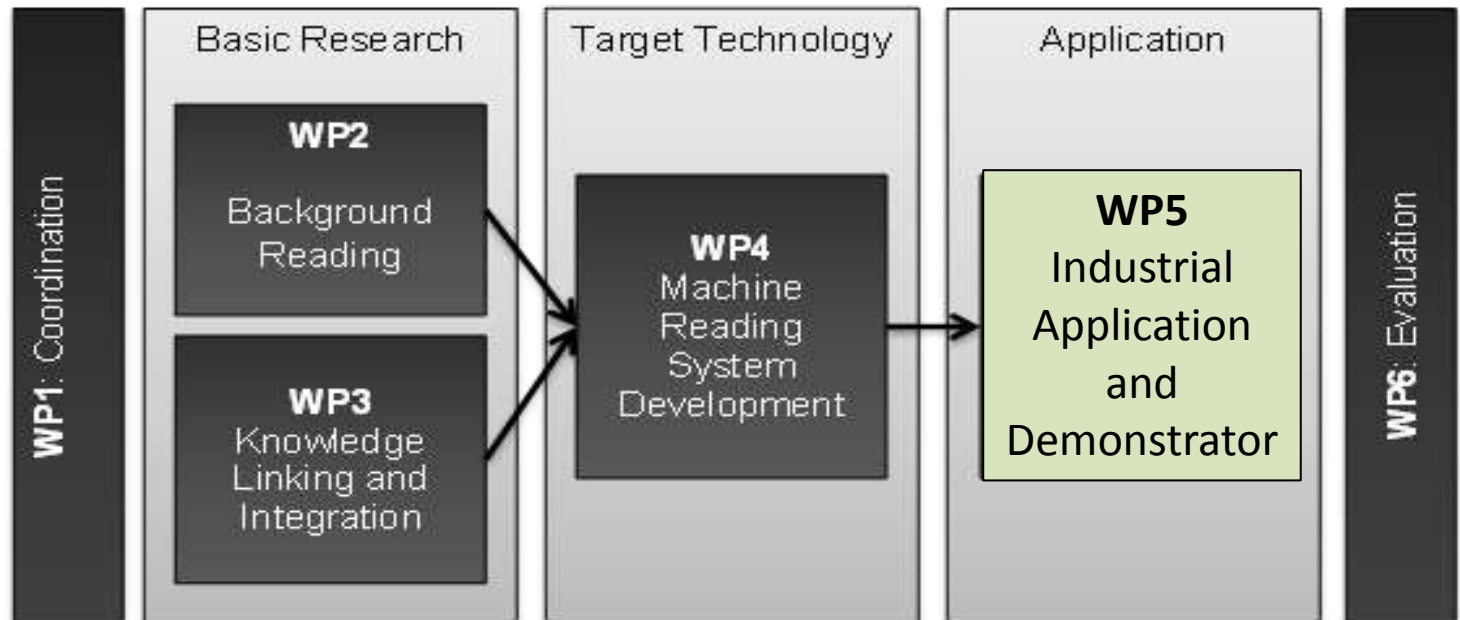
Consortium

Country	Institution/Department	Principal Investigator	Co-investigators
Spain	UNED (coordination)	Anselmo Peñas	Henry Anaya
United Kingdom	U. Edinburgh	Maria Mirella Lapata	Kristian Woodsend
France	Synapse Développement	Patrick Séguéla	Dominique Laurent Baptiste Chardon
Spain	UPV/EHU	Eneko Agirre	German Rigau

Consortium



Workplan



person-month	WP1	WP2	WP3	WP4	WP5	WP6	total
1 (UNED)	8	12	1	2	1	12	36
2 (U. Edinburgh)	2	20	6	4	2	2	36
3 (Synapse Développement)	2	0.5	0.5	66	20	3	92
4 (UPV/EHU)	2	1	18	1	1	1	24
total	14	33.5	25.5	73	24	18	188

Financial status

N°	Partner	Person.months (planned)	Total costs	Percentage of requested budget
1	UNED	18 / 36 (50%)	33,796.25 €	35,57 %
2	U. Edinburgh	17.2 / 36 (48%)	£ 189,140.95	51 %
3	Synapse	69 / 92 (75%)	315,375.00 €	61 %
4	UPV/EHU	12 / 24 (50%)	10,999.00 €	11 % (*)
	Total	116.2 / 188 (62%)		

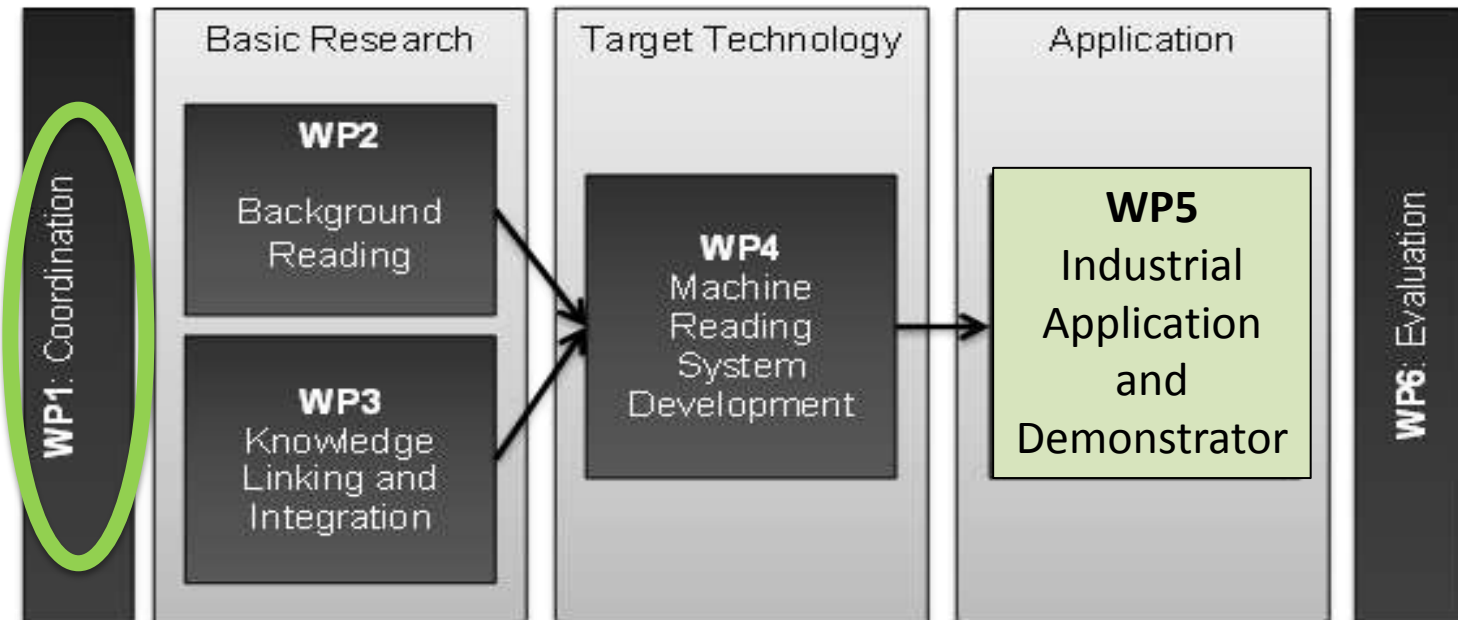
No strong deviation from initial plan

Note:

(*) Most of the UPV/EHU development will happen in 2015

Spanish partners received the approval for funding at the end of 2013

Workplan





WP1 Coordination

	Task leader
WP1 Coordination	UNED
1.1 Work plan monitoring	UNED
1.2 Reporting and Dissemination	UNED
1.3 Collaboration with third parties and Community building	UNED

	Deliverable	Month of delivery	Title of deliverable
✓	D1.1	M12	1 st annual report
✓	D1.2	M24	2 nd annual report
	D1.3	M36	Final report

Management – meetings

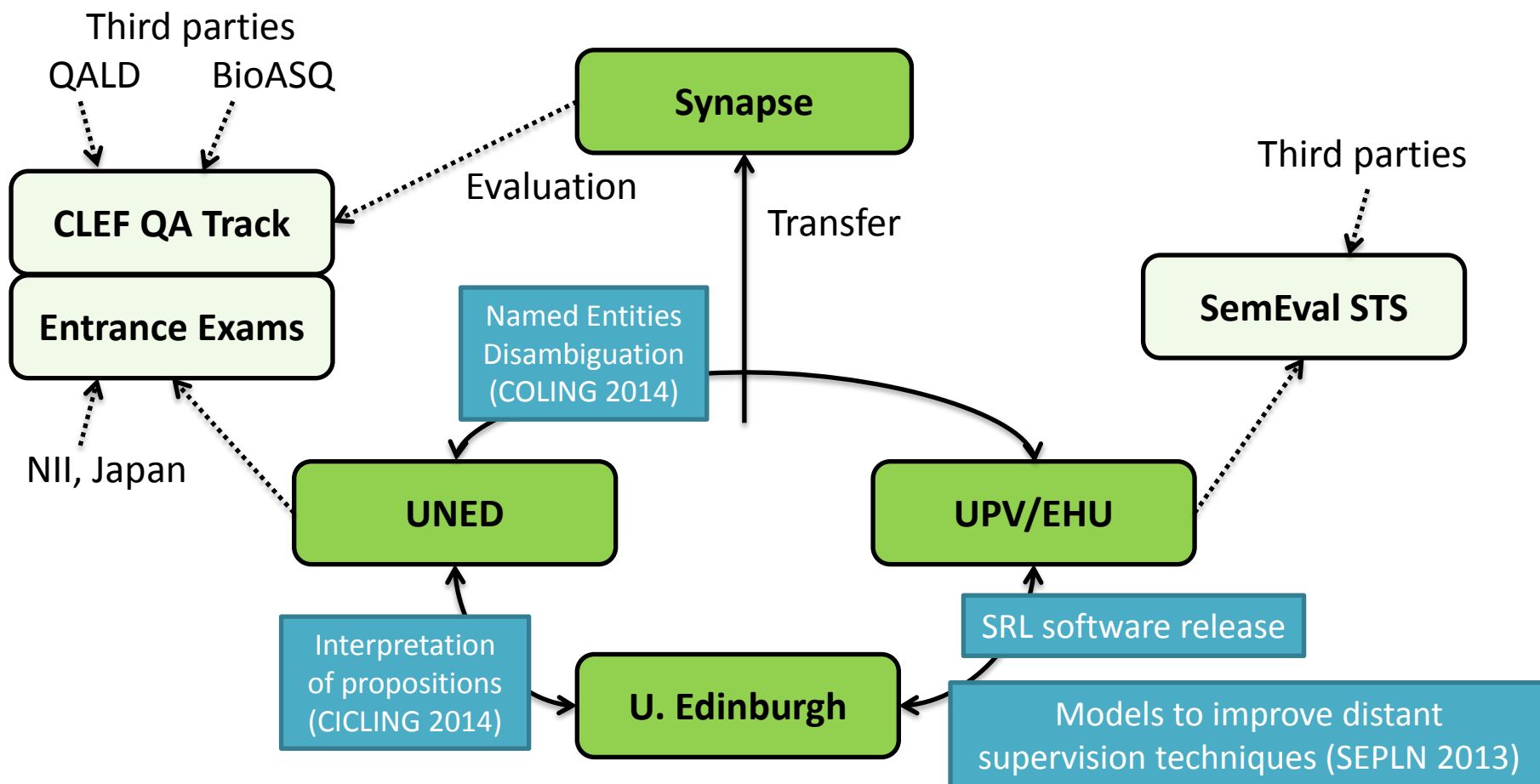
- Kick-off meeting, Madrid, January 22-23, 2013
- 1st Annual meeting, San Sebastian, January 21-22, 2014
- 2nd Annual meeting, Toulouse, January 22-23, 2015
- Monthly phone conference of the Technical Coordination Committee (TCC)
 - Integrated by Work Package Leaders (WPLs)

N°	Date	Location	Attending partners	Purpose
1	22-23/1/2013	Madrid	UNED, ED, Synapse, UPV/EHU	Kick-off meeting
2	22/2/2013	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
3	15/3/2013	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
4	26/4/2013	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
5	31/5/2013	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
6	27/6/2013	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
7	13/9/2013	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
8	13/12/2013	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
9	10/1/2014	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Preparation of annual meeting
10	21-22/1/2014	San Sebastian	UNED, ED (via Skype), Synapse, UPV/EHU	1 st Annual meeting
11	28/2/2014	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
12	28/3/2014	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
13	30/5/2014	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
14	11/7/2014	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
15	3/10/2014	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
16	7/11/2014	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
17	12/12/2014	Phone Conf.	UNED, ED, Synapse, UPV/EHU	Progress report by WP Leaders
18	22-23/1/2015	Toulouse	UNED, ED (via Skype), Synapse, UPV/EHU	2 nd Annual meeting

Milestones

No of Milestone	Delivery month	WP involved	Title
✓ M1	M12	WP2	Initial Proposition Store
✓ M2	M24	WP2, WP4	Semantic Role Labelling Software release
M3	M36	WP3, WP4, WP6	Machine Reading system
M4	M36	WP4, WP5	Industrial demonstrator release

Collaboration



Collaboration

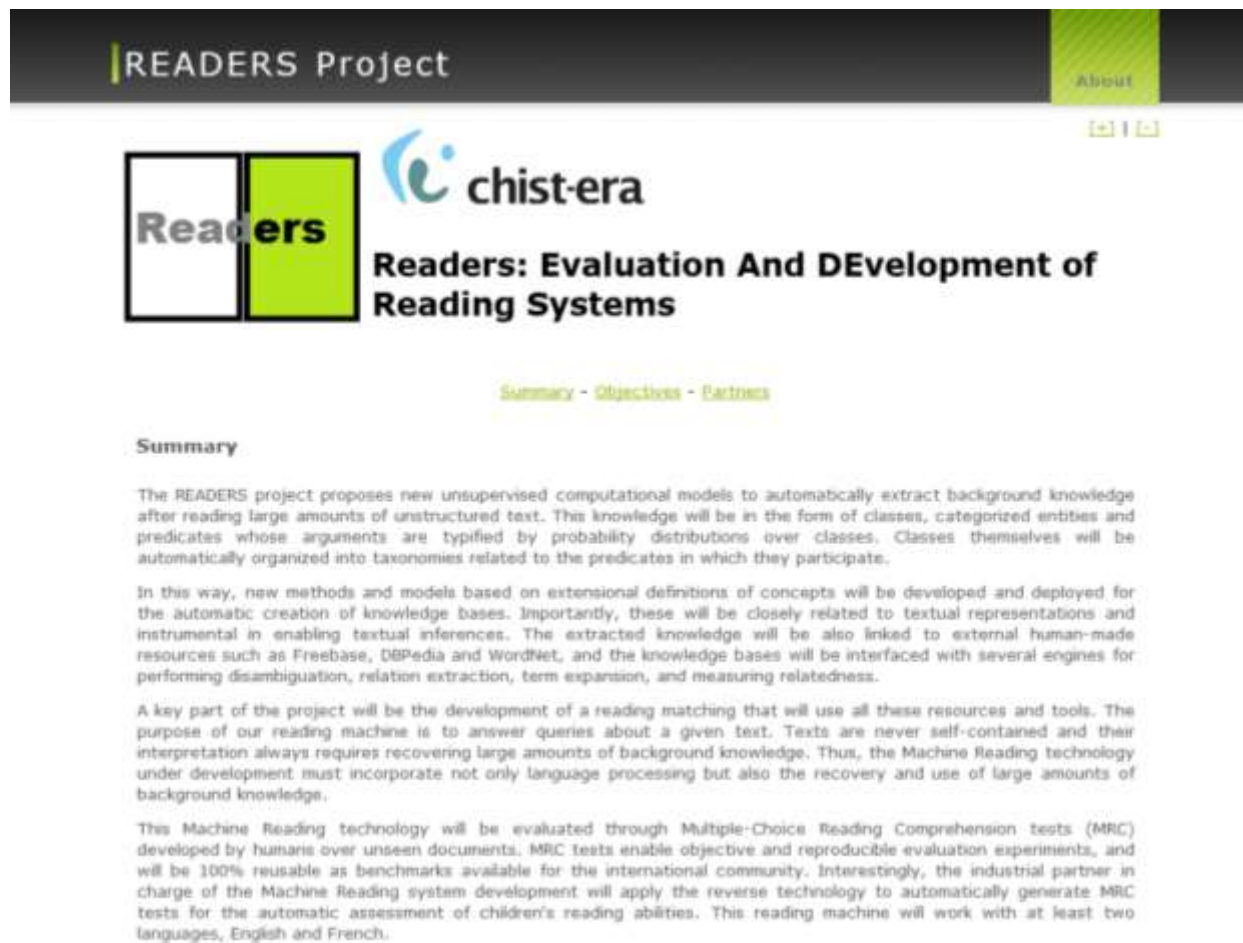
- Third parties
 - Creation of a new evaluation space, namely CLEF QA Track 2014 (with QALD and BioASQ)
 - Coordination with the Japanese National Institute of Informatics (Prof. Noriko Kando) to co-organize the “Entrance Exams” challenge
 - STS Task at SemEval-2014: Semantic Textual Similarity
- Exchange
 - Bernardo Cabaleiro (UNED)
 - 1st Internship in Edinburgh: 10/9/2012 – 10/12/2012
 - 2nd Internship in Edinburgh: 1/6/2014 – 31/7/2014
 - Oier Lopez de Lacalle (UPV/EHU)
 - Postdoc at Edinburgh until 2014

Dissemination

- 25 Scientific papers
 - Multiple partners
 - 2 conferences (COLING 2014, CICLING 2014)
 - Collaboration with third-parties
 - 8 conferences (CLEF 2013-2014, *SEM, SemEval 2013-2014)
 - Single partners
 - 2 journals (JAIR, IEEE-TKDE)
 - 9 conferences (EMNLP 2014, ACL 2013, TAC, CLEF, ...)
- Press release
 - http://www.synapse-developpement.fr/presse/CP_Entrance_Exams.pdf
 - 2 articles published so far:
 - <http://www.info-utiles.fr/modules/news/article.php?storyid=11009>
 - http://www.decideo.fr/Synapse-Developpement-franchit-une-etape-decise-dans-la-comprehension-d-un-texte-ecrit-par-un-ordinateur_a7413.html
- READERS presentation at the French exhibition “Salon de l’Innovation en Traitement Automatique des Langues” in TALN 2014

Management – web site

Website: nlp.uned.es/readers-project/



READERS Project [About](#)

  **Readers: Evaluation And DEvelopment of Reading Systems**

[Summary](#) - [Objectives](#) - [Partners](#)

Summary

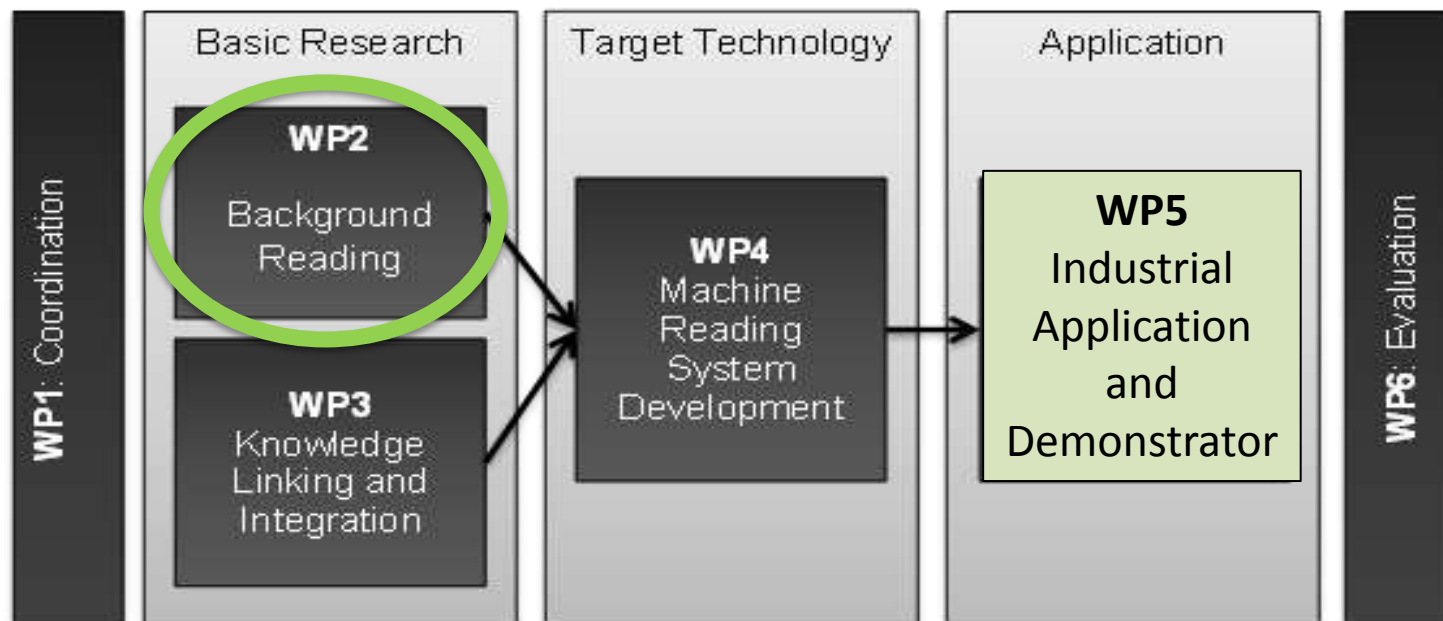
The READERS project proposes new unsupervised computational models to automatically extract background knowledge after reading large amounts of unstructured text. This knowledge will be in the form of classes, categorized entities and predicates whose arguments are typified by probability distributions over classes. Classes themselves will be automatically organized into taxonomies related to the predicates in which they participate.

In this way, new methods and models based on extensional definitions of concepts will be developed and deployed for the automatic creation of knowledge bases. Importantly, these will be closely related to textual representations and instrumental in enabling textual inferences. The extracted knowledge will be also linked to external human-made resources such as Freebase, DBPedia and WordNet, and the knowledge bases will be interfaced with several engines for performing disambiguation, relation extraction, term expansion, and measuring relatedness.

A key part of the project will be the development of a reading matching that will use all these resources and tools. The purpose of our reading machine is to answer queries about a given text. Texts are never self-contained and their interpretation always requires recovering large amounts of background knowledge. Thus, the Machine Reading technology under development must incorporate not only language processing but also the recovery and use of large amounts of background knowledge.

This Machine Reading technology will be evaluated through Multiple-Choice Reading Comprehension tests (MRC) developed by humans over unseen documents. MRC tests enable objective and reproducible evaluation experiments, and will be 100% reusable as benchmarks available for the international community. Interestingly, the industrial partner in charge of the Machine Reading system development will apply the reverse technology to automatically generate MRC tests for the automatic assessment of children's reading abilities. This reading machine will work with at least two languages, English and French.

Workplan



WP2 Background Reading

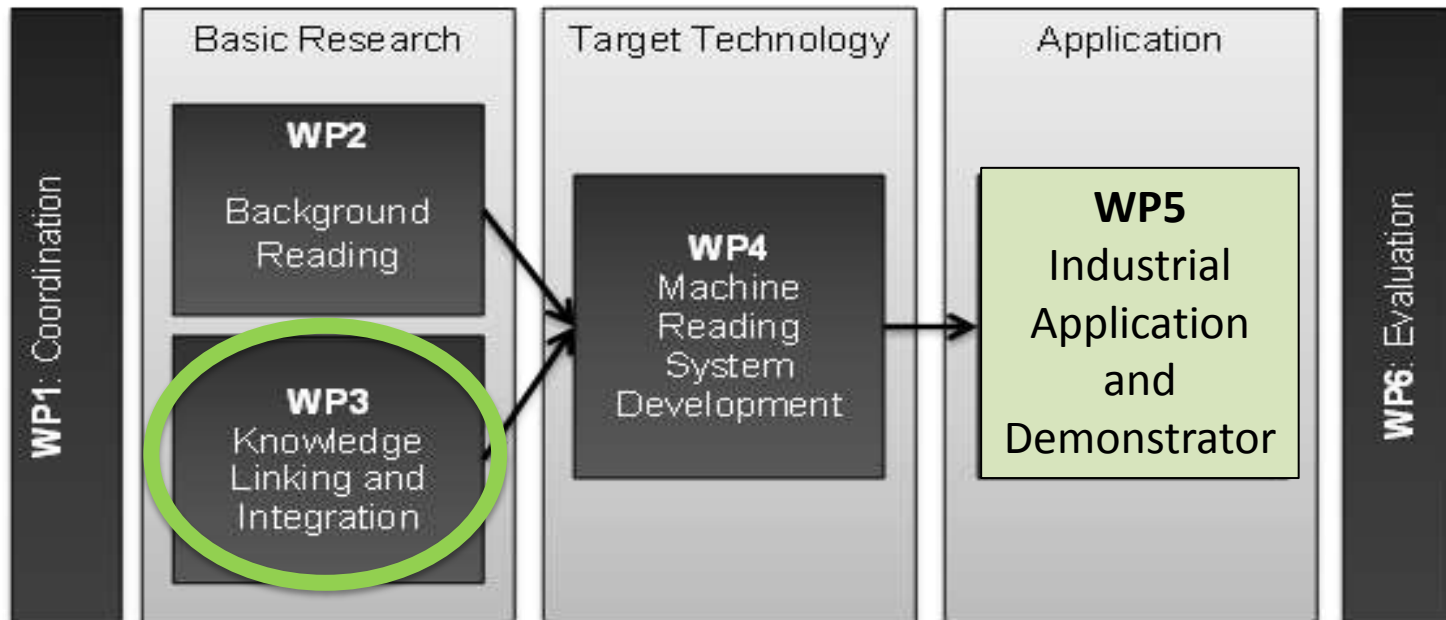
	Task leader
WP2 Background Reading	ED
2.1 Processing of document collections	UNED
2.2 Generation of Proposition Stores	UNED
2.3 Robust Semantic Role Labeling (SRL)	ED
2.4 SRL for multiple languages	ED
2.5 SRL without parsing	ED
2.7 Learning to read	UPV/EHU
2.8 Background Knowledge Base creation	ED

	Deliverable	Month of delivery	Title of deliverable
✓	D2.1	M12	Initial Proposition Store
✓	D2.2	M24	Semantic Role Labelling component
	D2.3	M36	Open IE and knowledge base construction

WP2 Outputs

1. A novel deterministic algorithm for implicit Semantic Role Labeling (ACL 2013)
2. A method to employ distributional word representations gathered from unlabelled data in Semantic Role Labelling (EMNLP 2014)
3. Confirmation that “one sense per discourse” (OSPD) and “one sense per collocation” (OSPC) hypotheses hold for Named-Entity Disambiguation (COLING 2014).
4. Use Proposition Stores to automatically unfold transfers of meaning in eventive propositions (CICLING 2014)
5. Predicate Matrix, a new lexical resource resulting from the integration of FrameNet, VerbNet, PropBank and WordNet (GWC 2014) (LREC 2014)

Workplan



WP3 Knowledge Linking and Integration

	Task leader
WP3 Knowledge Linking and Integration	UPV/EHU
3.1 Preparation of Knowledge Bases	UPV/EHU
3.2 KB interface for disambiguation	UPV/EHU
3.3 KB interface for relation Extraction	UPV/EHU
3.4 KB interface for similarity, relatedness and expansion	UPV/EHU
3.5 Knowledge Base population	UPV/EHU
3.6 Taxonomy Induction	ED

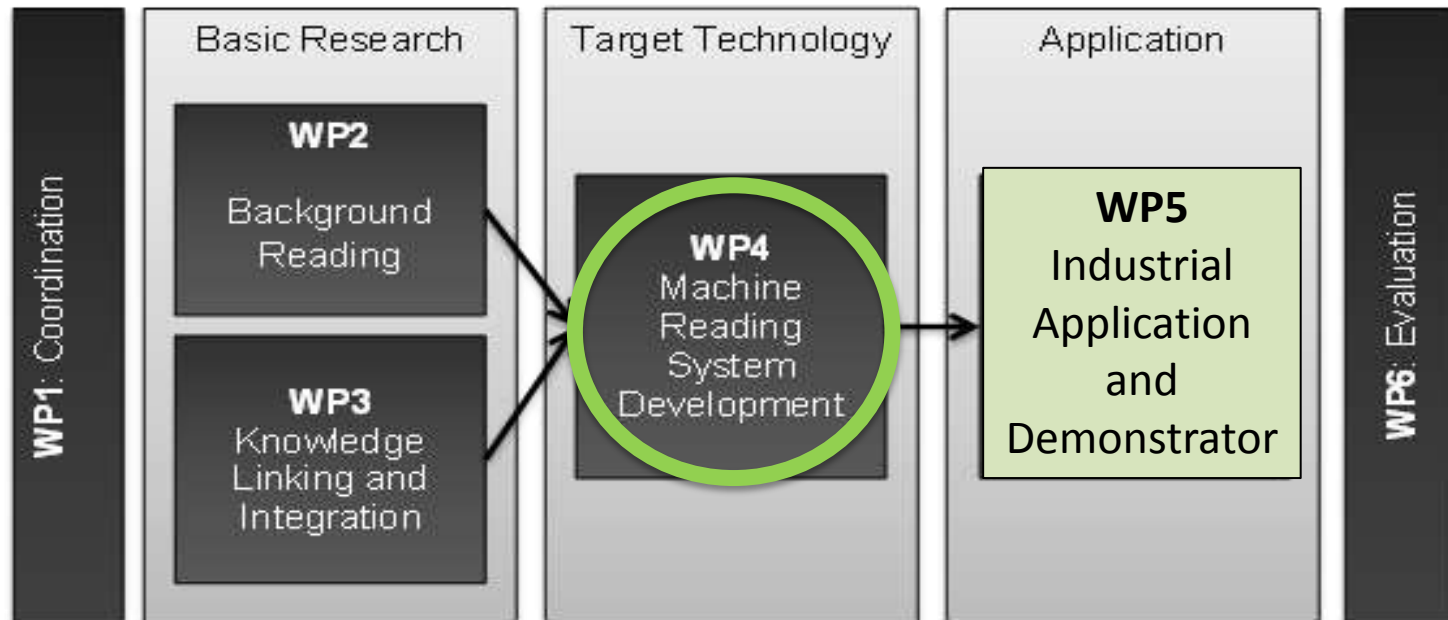
Deliverable	Month of delivery	Title of deliverable
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D3.1	M6	Design of knowledge linking and integration
D3.2	M30	Results of knowledge linking and integration

WP3 Outputs

1. Development of systems for Entity Linking, Slot Filling and Temporal Slot Filling for Knowledge Base Population (TAC KBP 2013) (ERD 2014) (TAC KBP 2014)
2. Algorithms for finding related words to a given a set of input words (CogALex 2014)
3. Methods for tweet filtering based on topic models (CLEF RepLab 2013)

Workplan



WP4 Machine Reading System Development

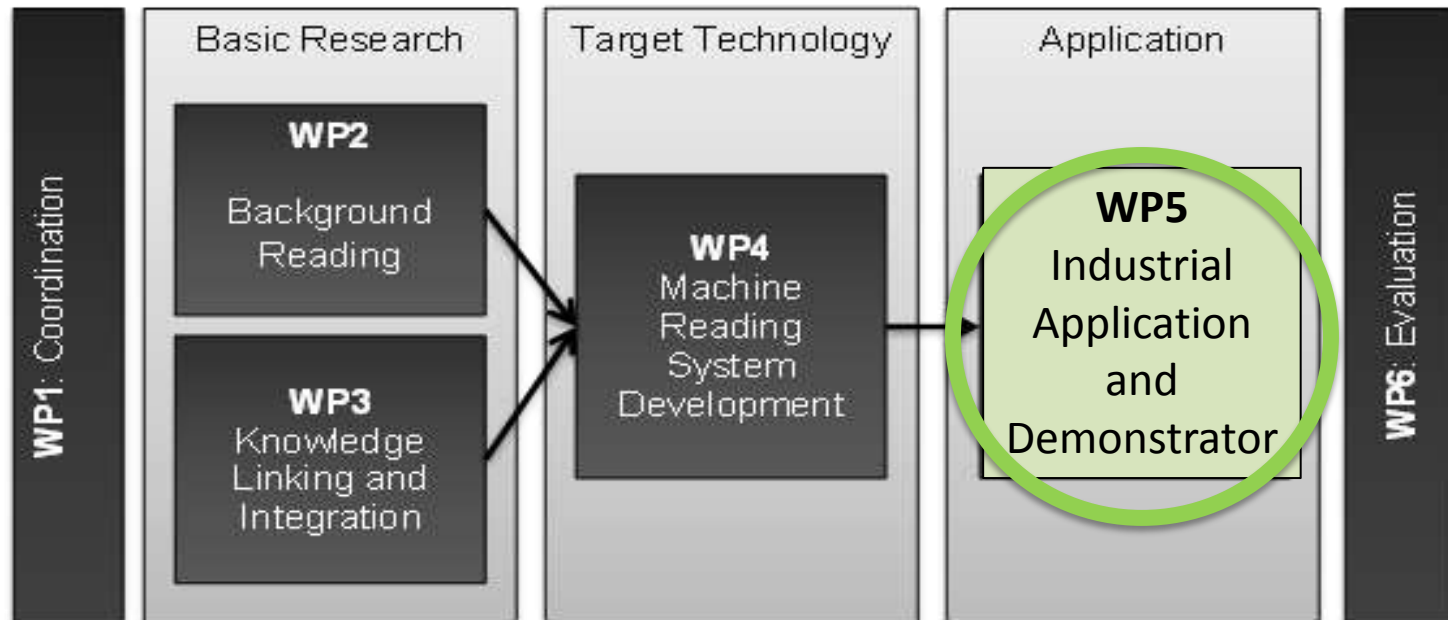
	Task leader
WP4 Machine Reading System Development	SD
4.1 Development of Multilingual platform	SD
4.2 Development of French Reading Machine	SD
4.3 Development of English Reading Machine	SD
4.4 Software release	ED

	Deliverable	Month of delivery	Title of deliverable
✓	D4.1	M12	Storing format in Knowledge Base
✓	D4.2	M24	Multilingual platform with beta-version
✓	D4.3	M24	SRL Software release
	D4.4	M36	Multilingual platform with final version
	D4.5	M36	Taxonomy induction software release

WP4 Outputs

- Release of Semantic Role Labelling Software
 - <http://nlp.uned.es/readers-project/demos.html>
- Machine Reading system
 - based on a deep syntactic and semantic analysis with anaphora resolution
 - Representing the analysis into sophisticated structures based on Clause Descriptions
 - Efficient representation and storing of millions of documents linguistically analyzed
- Competitive evaluation
 - Participating with this Reading Machine in CLEF 2014 Entrance Exams campaign (CLEF QA track)
 - English and French languages
- Best results among all participants both in English and French
 - In French, READERS system got 59% accuracy showing that it can pass the entrance exams

Workplan



WP5 Industrial Application and Demonstrator

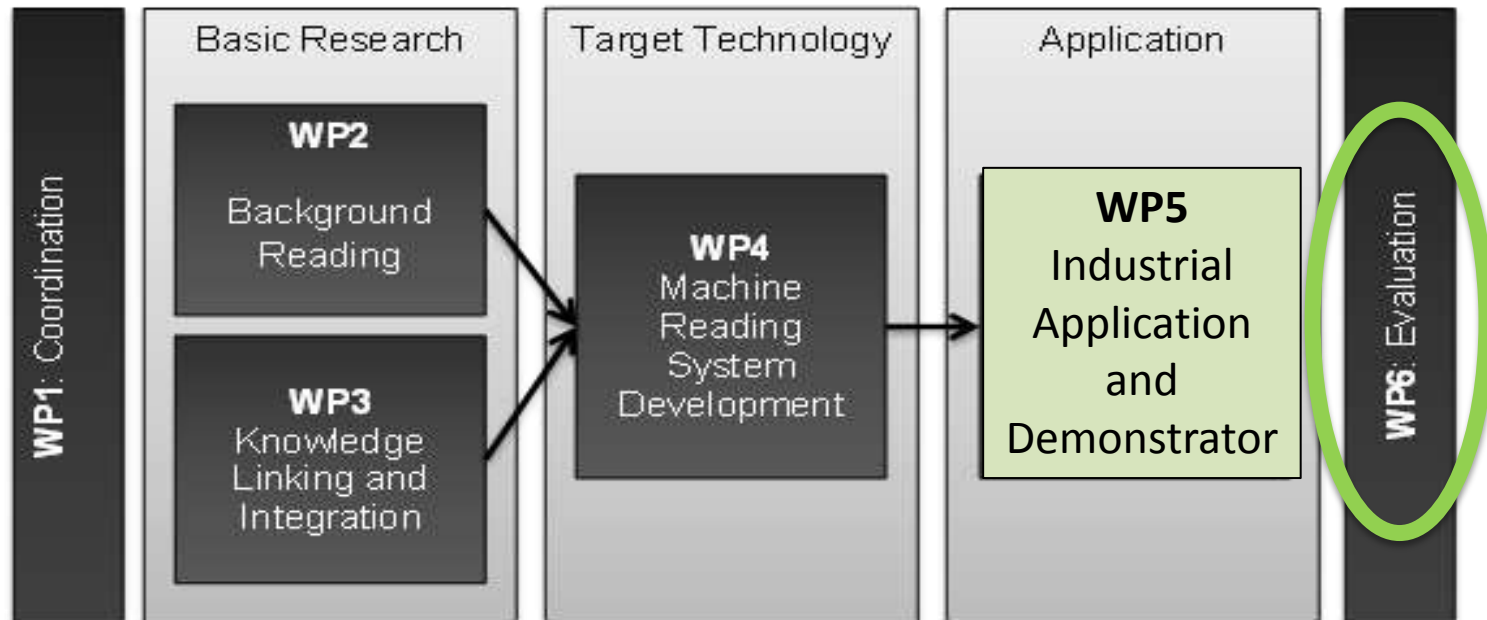
	Task leader
WP5 Industrial Application and Demonstrator	SD
5.1 Build use cases of interest for the industry	SD
5.2 Design the demonstrator of the Readers technology	SD
5.3 Demonstrator Release	SD

Deliverable	Month of delivery	Title of deliverable
✓ D5.0	M6	New definition of WP5
✓ D5.1	M12	Report on building comprehensive business case
✓ D5.2	M24	Report on the design of the demonstrator and the use case
D5.3	M32	Demonstrator Release

WP5 Outputs

- Building of comprehensive use cases
 - on top of Machine Reading technology
 - with added value for each customer workflow
- Promote its demonstrators through a real world example
 - Building a use case with the EADS Company (Airbus)
 - Iterative process where prototypes are proposed and illustrated through comprehensive mockups
- A final use case was chosen: management of aircraft maintenance documentation (“Aircraft on Ground”)
- Synapse begun its implementation:
 - <http://syn-web01.synapse-fr.com/DemoReaders/index/text.aspx>

Workplan



WP6 Evaluation of Machine Reading

	Task leader
WP6 Evaluation of Machine Reading	UNED
6.1 Definition of the campaign exercises and goals	UNED
6.2 Evaluation methodology and resources	UNED
6.3 Activation of the campaign exercises	UNED
6.4 Assessment and comparison of systems results	UNED
6.5 Workshop	UNED

	Deliverable	Month of delivery	Title of deliverable
✓	D6.1	M12	1 st Report on the lab-based evaluation
✓	D6.2	M24	2 nd Report on the lab-based evaluation
	D6.3	M36	3 rd Report on the lab-based evaluation

WP6 Outputs

1. Methodology for evaluating validation technologies, measuring impact on Question Answering performance (IEEE TKDE 2015)
2. General coordination of the Question Answering for Machine Reading (CLEF QA4MRE 2013) and CLEF QA Track 2014
 - Two workshops have been organized so far:
 - QA4MRE 2013, CLEF 2013, Valencia.
 - CLEF QA Track 2014, CLEF 2014, Sheffield.
3. Organization of CLEF 2013 and 2014 Entrance Exams exercises on Reading Comprehension
 - In collaboration with NTCIR and Todai Robot project (Japanese National Institute of Informatics)
4. Organization of *SEM 2013 and SemEval 2014 task on Semantic Textual Similarity (STS)



Valorization

- Synapse presented READERS to the Innovation Works department of EADS
 - They decided to integrate READERS technology in a core process of the company:
 - Management of the Eurocopter maintenance documentation (“Aircraft on Ground”)
 - They were convinced that Machine Reading technology could improve the maintenance process
 - Including huge interaction flows between customers and company
- Synapse is developing the core technology for future demonstrators to its customers
- UPV/EHU delivers a disambiguation software
 - Continuously updated including result of READERS project activity (<http://ixa2.si.ehu.es/ukb>)
- New project proposal was presented to FET-Open 2014 Call



Readers: Evaluation And DEvelopment of Reading Systems

Thanks!