

LKMS/Mnemosyne: Semantic Web technologies and Markup techniques for a Legal Knowledge Management System.

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The issue: handling the knowledge cycle

What a lawyer does?

- ... (re)build documents ...
 - based on knowledge

It is not just in the docs, it is around

• Documents in Context

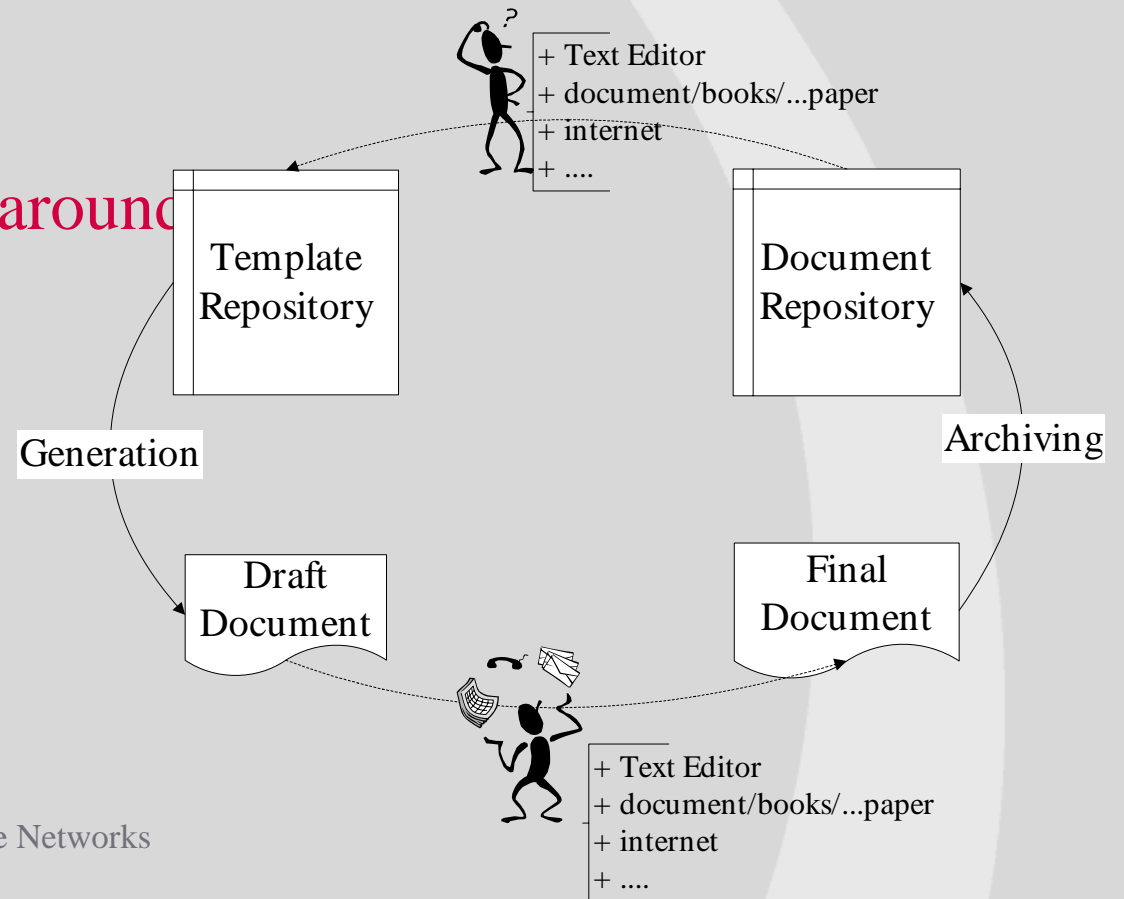
- Why and When
 - Explicit (within documents)
 - Implicit
 - From the process
 - From Background knowledge

• People in Context

- Who and Why.
 - From Workgroup
 - To Social Networks
 - To Knowledge Networks

• Going inside the process

- Enabling building a culture of **Knowledge Sharing**,
- to leverage a firm **collective wisdom**

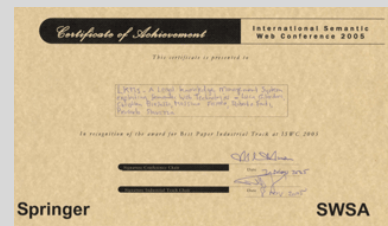


Key Issues

- **Consolidating collective wisdom!**
 - Documents + Context
 - Sharing Repository - Documents – in the wider sense
 - Semantic Markup - By Document Content - By Process Context
 - Intelligent Drafting - Codified Corporate Knowledge
 - Ease Sharing
 - Ease of usage; adding as a snap
 - Tailored Interfaces - Exploiting Background Knowledge
 - Collecting Context
 - From document content. Markup By Automatic Information Extraction
 - From process – who did what
 - Internal AND External Knowledge
- **Semantic Web & Markup Technologies as a core toolset**
 - RDFs ontologies as a glue
 - Web Services architecture
 - XML based assembly & interface tailoring

LKMS/Mnemosyne - Baseline

- LKMS: **L**egal **K**nowledge **M**anagement **S**ystem / Mnemosyne (*Μνημοσύνη* the personification of Memory)
- A web based repository where lawyers can SHARE and retrieve
- “Legal oriented”: tools supporting specific legal processes
- Jointly developed by Quinary and Toffoletto&Soci since 2002
 - Partly supported by EC Sponsored project DotKom
 - Ongoing R&D partly within EC project X-Media
 - Best Industrial Paper at ISWC 2005



LKMS/Mnemosyne - features

- **Advanced sharing environment**
- **‘Conventional’ stuff**
 - Nodes taxonomies (used to organize material & process)
 - Docs + Urls + Notes management – upload/download/search
 - People activity tracking
- **With advanced features**
 - Legal Process Support - Integrated Document Assembly and case management (shown later)
 - Legal Docs automatic drafting: from conditions to structured documents
 - XML drafting – based on Exari technology Consolidation of law firm knowledge
 - Integrated process – seamless context gathering
 - Rich ontology base metadata (shown later)
 - RDF(s) annotations repository
 - Semantic annotation to leverage structural context
 - Automatic Information Extraction
 - Advanced sharing features
 - Who did what / tracking / also relevant ... - based on interactions
 - Linking Inside and Outside Knowledge – News watching, spidering, KZilla
- **Based on an open architecture**
 - Java based, portable, web services
 - Tailorable – ontology driven - web interface
- **Demo / Details available for interested people**
- **More on advanced sharing features in a forthcoming paper (Ekaw 06)**

Ontology Based Annotations

- SemantiK
 - a “generic” platform for high-level access to an RDF knowledge base,
 - a knowledge integration layer, supporting user or agent annotations
 - a web service architecture supporting extraction agents
 - a web GUI for maintenance of RDF annotations – tailored to end users (Lawyers)
- A legal Ontology – Legal SemantiK
 - **Laws:** most of the subdivision of the Italian legislation:
 - law’s (different kinds) articles, articles’ subparts (refs to Nir ‘Articolato’ – simplified)
 - **Legal Documents:**
 - Contracts, Legal Opinions and Sentences ,
 - plus supporting entities, like tribunals, judges, Italian high court decisions, etc.
 - **Juridical Concepts:**
 - ‘legal keywords’ as normally used by lawyers, relevant matters.
 - **Focus:** not on structuring docs but on enriching with annotations; the ‘final user’ (Lawyer) perspective
 - Building annotations (manually – GUI issues – AND automatically)
 - Integration – partial matches, normalisation
- A legal references extractor

Semantik - supporting rich annotations

The screenshot shows a Netscape browser window with a search dialog box open. The dialog box contains the text: "No instance of class 'Magistrato' matches the query: 'D'Agostino'". Below this, there is a search input field with "D'Agostino" and a "Search" button. A message says "If you could not find matches, add a new Element:" followed by a bullet point: "Add New : init form with D'Agostino".

The background page is a legal document from "Giustizia.it" (Ministero della Giustizia). The document title is "Sentenza n. 10157 del 26 maggio 2004". The text includes "NATURA NON PATRIMONIALE DEL DANNO DA DEQUALIFICAZIONE PROFESSIONALE" and "SVOLGIMENTO DEL PROCESSO".

Annotations are present in the document:

- A red box labeled "Ontology Driven Fuzzy Match" points to the search input field in the dialog box.
- A red box labeled "Wrappers & Brokers for IE tools" points to the "Riferimenti" section of the document, which lists articles like "Art. 1175 c.c.", "Art. 1218 c.c.", "Art. 1223 c.c.", and "Art. 1226 c.c.".

SemantiK – better search

Semantic(K) Links

Full Text + Semantic Search

Semantic(K) Queries / Services

Knowledge Management @ Quinary

katadmin HOME KAT ALL NEWS SEARCH QUIT

Senese

Everywhere in KM GO NormeInRete

#	Rank	Created Inserted	Author	Title
1.	6%	04/03/04	Rosselli F.	Corte di Cassazione, Sentenza, del 04/03/2004, n. 4462 SELEZIONI INTERNE DEL PERSONALE - OBBLIGO DI MOTIVAZIONE DELLE SCELTE Category: root > Cassazione 2004 26/10/04 - katadmin - http://www-org.giustizia.it/cassazione/giurisprude... : 18Kb -
2.	4%	26/05/04	D'Agostino G.	Corte di Cassazione, Sentenza, del 26/05/04 NATURA NON PATRIMONIALE DEL DANNO DA DEQUALIFICAZIONE PROFESSIONALE Category: root > Legal 26/10/04 - katadmin - http://www-org.giustizia.it/cassazione/giurisprude... : 28Kb -

K@... 1.9.6-dev

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Knowledge Management @ Quinary

katadmin HOME KAT ALL NEWS SEARCH QUIT

Everything about: **Corte di Cassazione, Sentenza, del 04/03/2004, n. 4462**

[Corte di Cassazione, Sentenza, del 04/03/2004, n. 4462](#)

Tipo Sentenza della Corte di Cassazione

Autorita' Corte di Cassazione

Massima SELEZIONI INTERNE DEL PERSONALE - OBBLIGO DI MOTIVAZIONE DELLE SCELTE

Numero 4462

Data 04/03/2004

Estensore Rosselli F.

Presidente Senese S.

Knowledge Management @ Quinary

katadmin HOME KAT ALL NEWS SEARCH QUIT

Everything about: **Senese S.**

[Senese S.](#)

Tipo Magistrato

Cognome Senese

Nome S.

Referring resources:

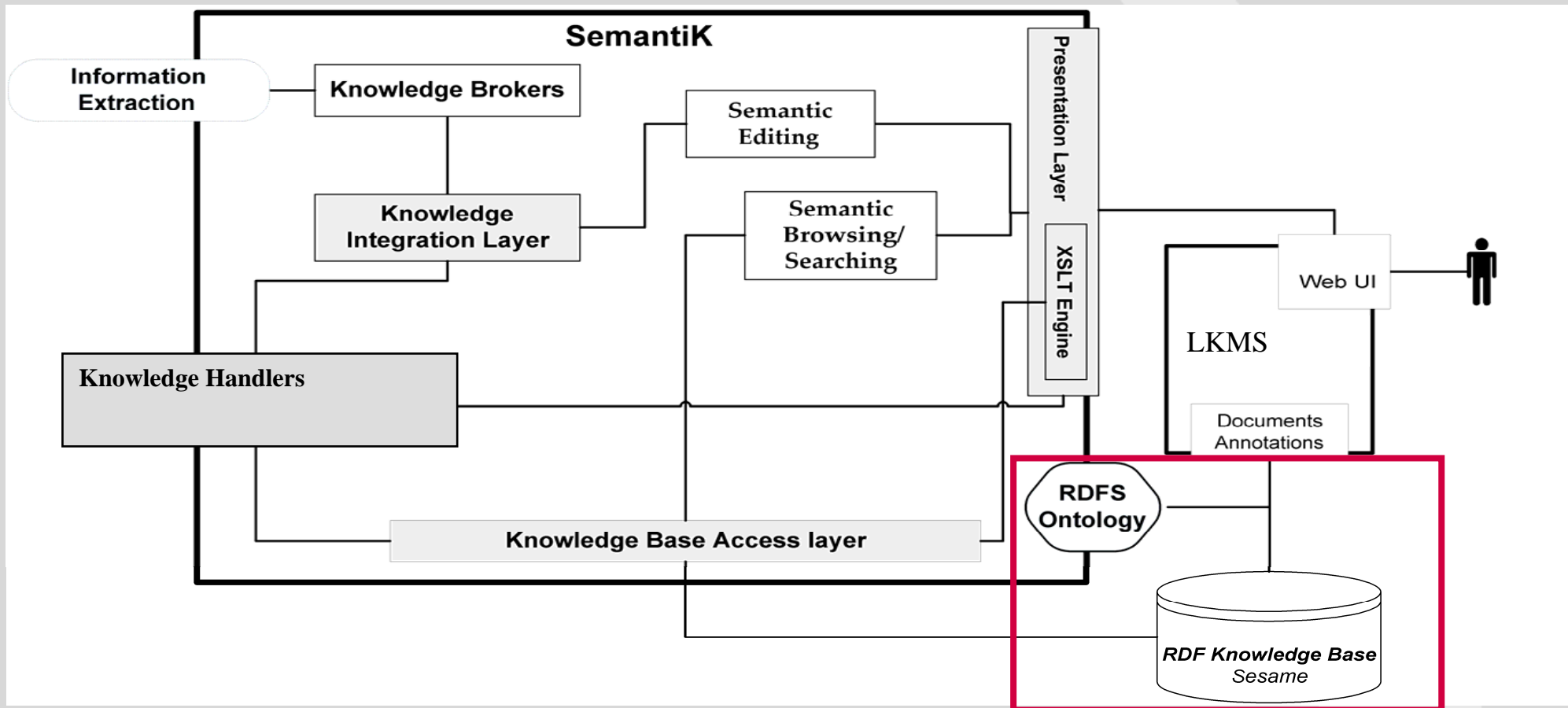
[Corte di Cassazione, Sentenza, del 04/03/2004, n. 4462](#)

Presidente Senese S.

[Corte di Cassazione, Sentenza, del 26/05/04](#)

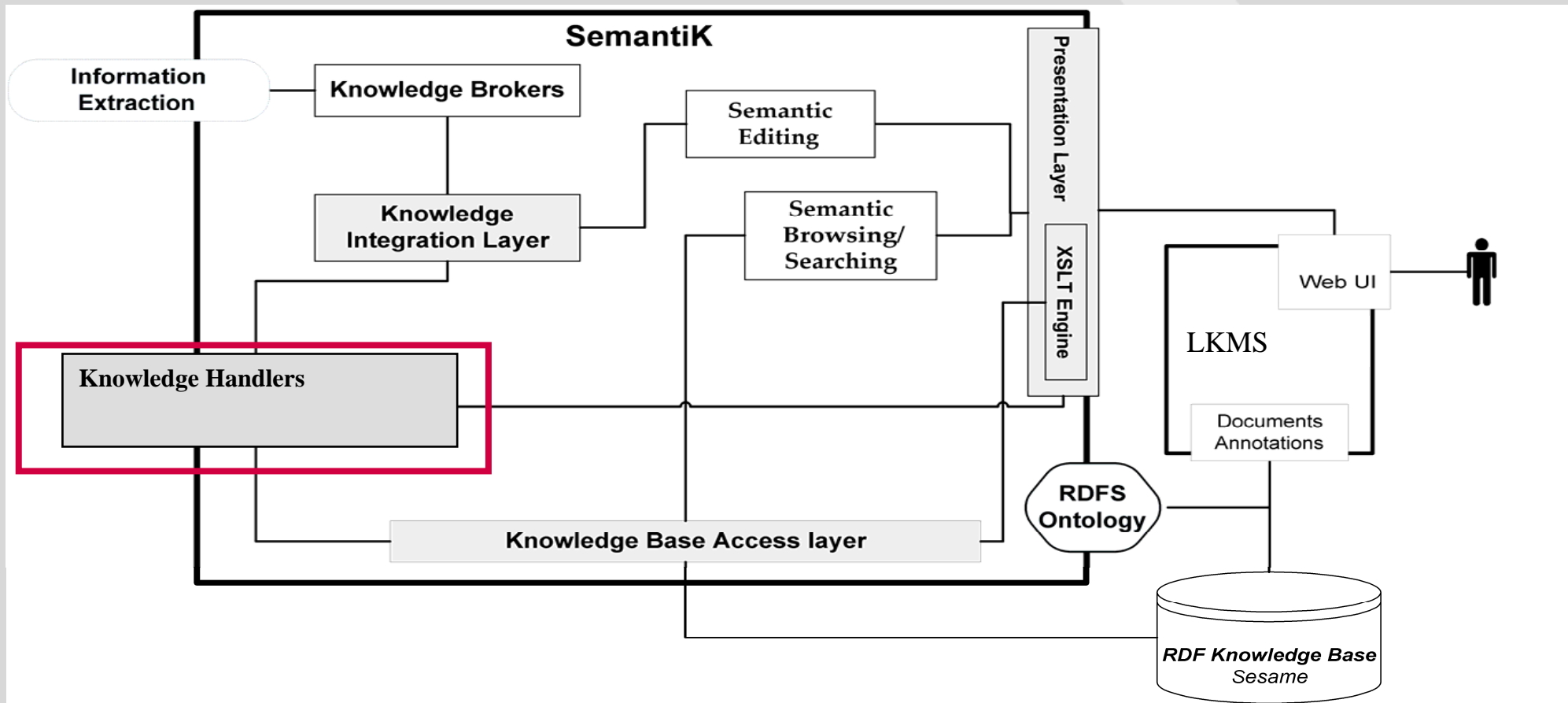
Presidente Senese S.

A look inside SemantiK - architecture



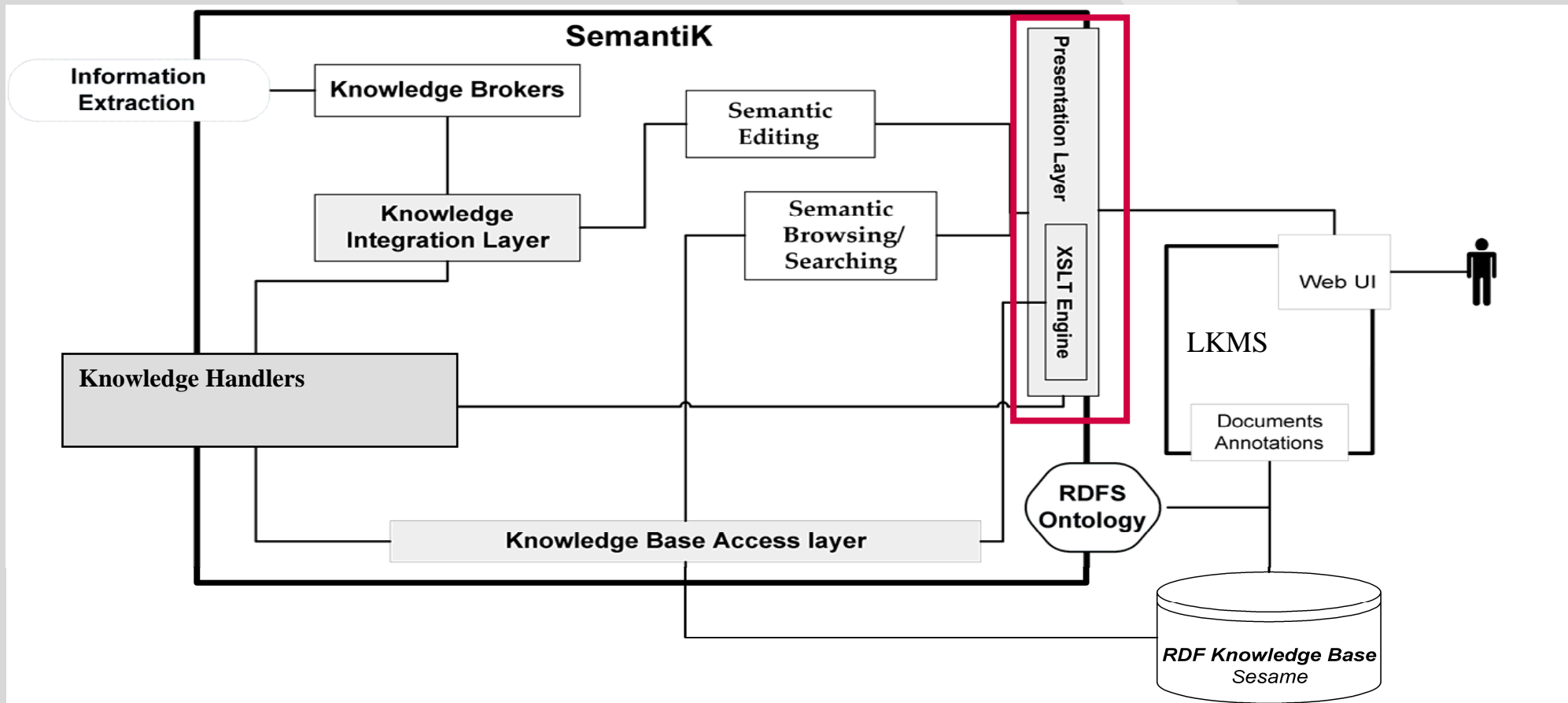
Search and inference operations over the annotations are performed against **Sesame RDF** database.

A look inside SemantiK - architecture



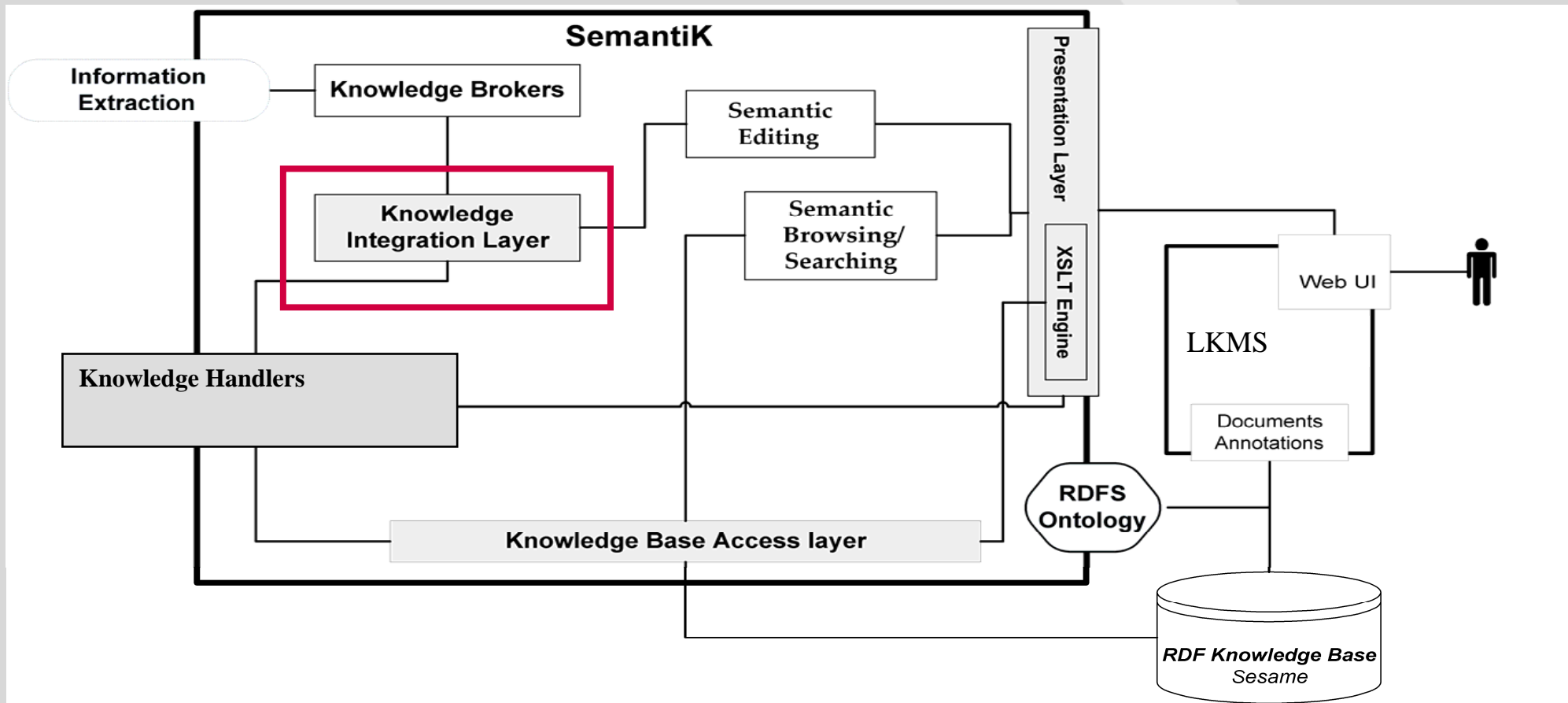
A **Knowledge Handler** is in charge of handling actions regarding specific ontology classes (I.e. for matching specific class attributes)

A look inside SemantiK - architecture



The Presentation Layer is in charge of showing the annotations to the user (viewing and editing tasks). Rendering is done with XSL + CSS technology.

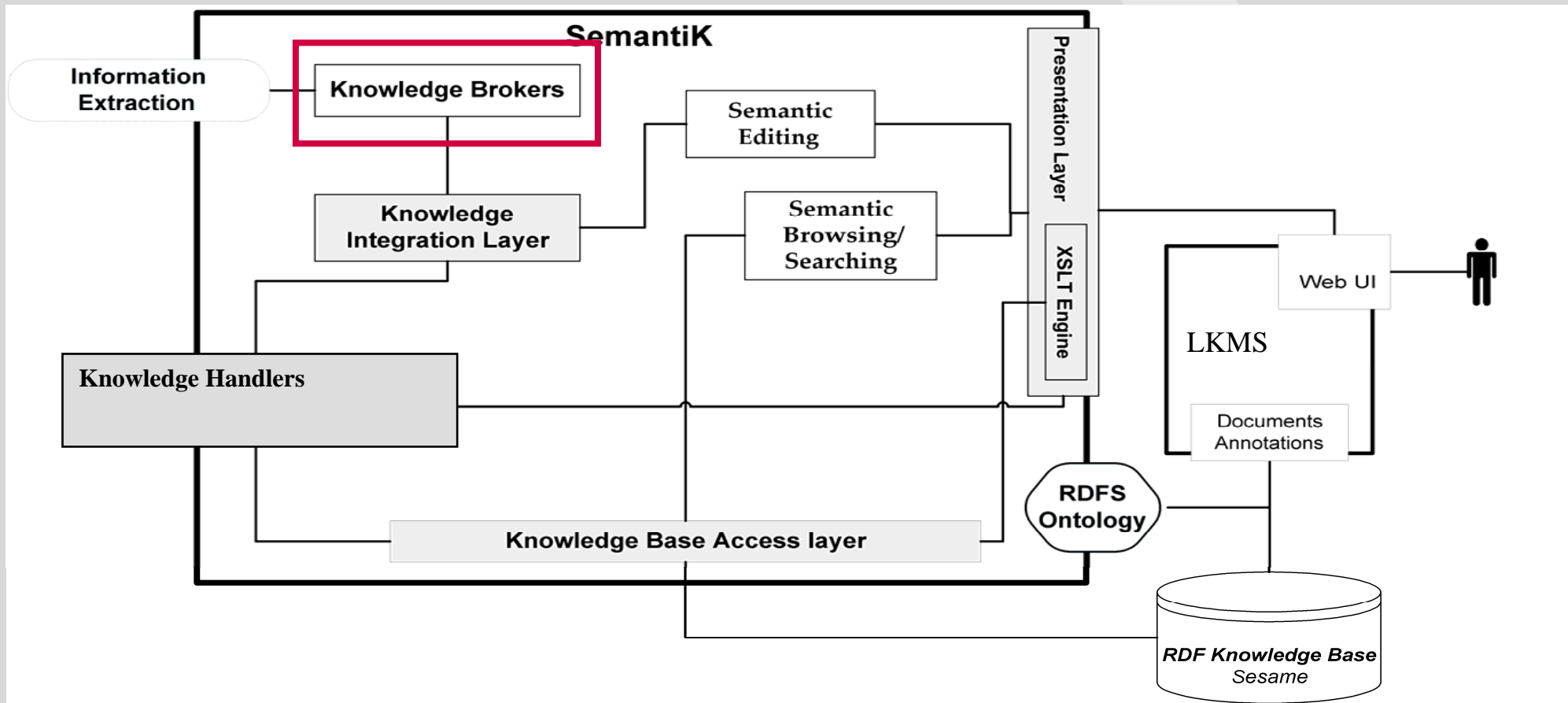
A look inside SemantiK - architecture



The **Knowledge Integration** component matches user inputs with existing resources, detects conflicts between the KB and to-be-inserted annotations, drives manual annotation wizards.

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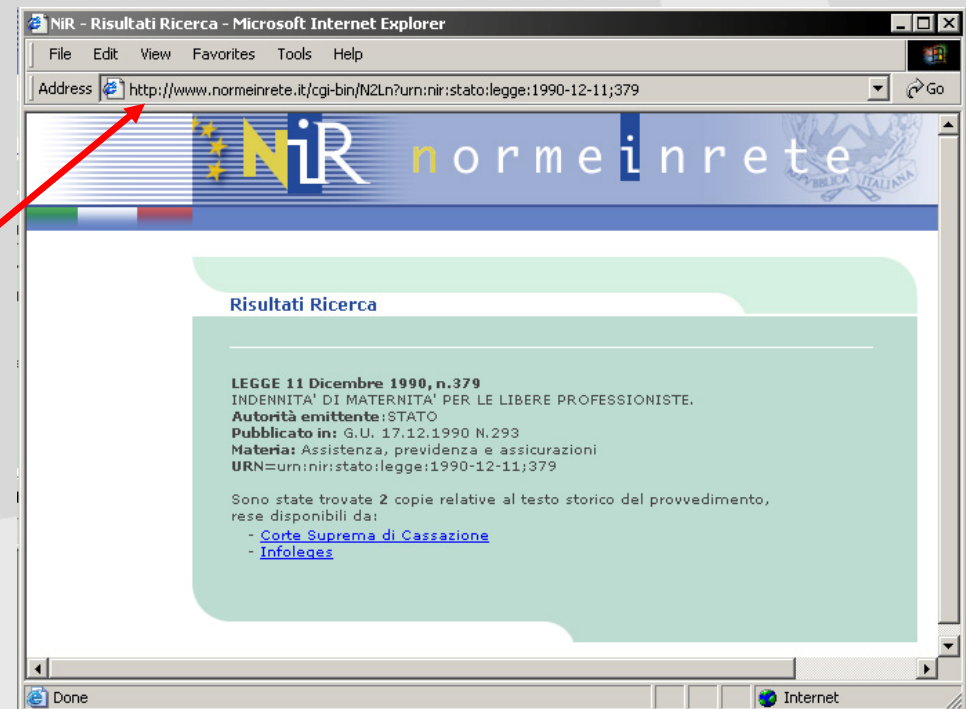
A look inside SemantiK - architecture



A **Knowledge Broker** is an interface to an external IE component, in charge of extracting annotations from the documents automatically.

Legal SemantiK – Knowledge Handlers

- User input is dispatched to the right Knowledge Handler, depending on the range of the property in context, such as to find and match legal documents by number and date, as opposed to judges, matched primarily by name and surname
- The Knowledge Handler for a law is also able to compute URNs, standard unique identifiers used to build hyperlinks to external resources, such as the Norme In Rete site



Legal SemantiK– Complexity hiding

Semantic annotation wizards: exploiting ontology constraints.

KNOWLEDGE CREATE LEGAL DOCUMENT SEARCH

Insert a File Document

Type:

- Documento Generico
- Atto Giudiziale
- Giurisprudenza
- Decreto ...
- Ordinanza ...
- Sentenza ...
- Normativa
- Circolare
- Convenzione Internazionale
- Legge Comunitaria ...

<< BACK NEXT >> CREATE

KNOWLEDGE CREATE LEGAL DOCUMENT SEARCH

Edit Document

Tipo **Sentenza della Corte di Cassazione**

Autorita' Corte di Cassazione Remove

Massima

Numero 13988

Data 26/09/2002

Estensore Ravagnani Remove

Presidente Search:

Fonte di cognizione Search:

Estremi di Pubblicazione

Sezione Search:

Parti

Esito Choose here

Pubblico Ministero

Riferimenti

Art. 23 Legge del 1953-03-11 n. 87 Remove

Legge del 1970 n. 300 Remove

KNOWLEDGE CREATE LEGAL DOCUMENT SEARCH

Corte di Cassazione, Sentenza, del 26/09/2002, n. 13988

[Corte di Cassazione, Sentenza, del 26/09/2002, n. 13988](#)

Tipo **Sentenza della Corte di Cassazione**

Autorita' [Corte di Cassazione](#)

Numero 13988

Data 26/09/2002

Estensore [Ravagnani](#)

Esito [Cassa Con Rinvio](#)

Riferimenti [Art. 23 Legge del 1953-03-11 n. 87](#)

[Legge del 1970 n. 300](#)

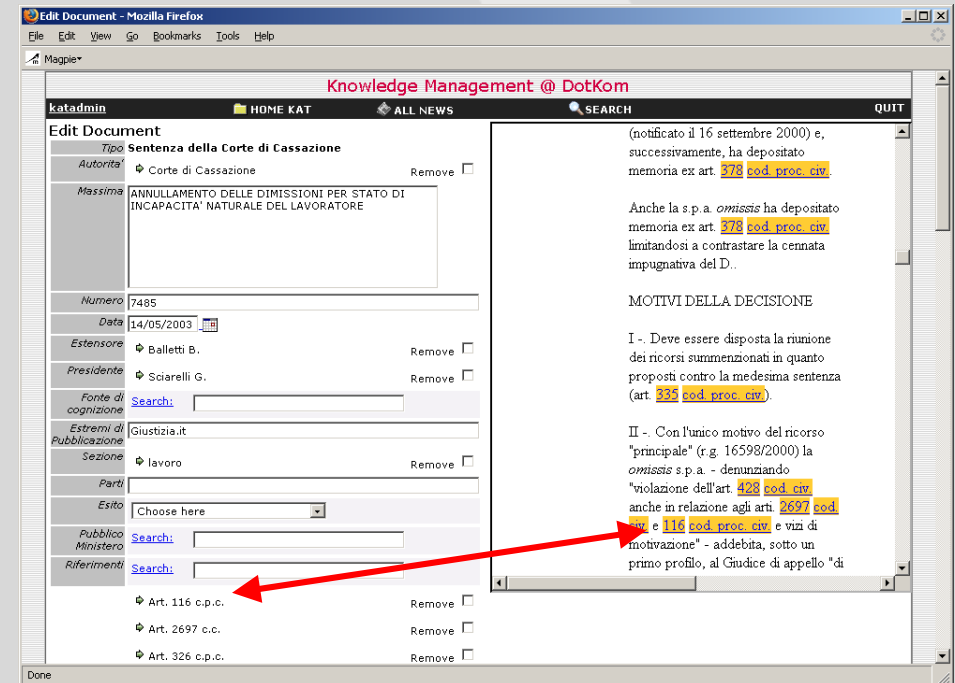
Inserted: 18/11/04 12:30 by [katadmin](#)

Last updated: 25/01/05 14:40 by [katadmin](#)

URL http://www.giustizia.it/cassazione/giurisprudenza/cass/13988sen_02.html

Legal SemantiK – Annotation Extraction

- Automatic tagging by a Information Extraction application
 - Legal References (laws, sentences) from any document.
 - Document specific metadata for Sentences
- References highlighted on text
 - offset to the document as XPointers
- Cross referencing & search through RDF
 - R&D From DotKom, XMedia
- ‘Standard Module’ based on GATE/JAPE
- Experimental ones with Adaptive Methods
- IE application functionalities are exposed as Web-Services
- Each IE engine is mediated in SemantiK by a Knowledge Broker



Semantik – Raw numbers

- Semantik extension to LKMS has been deployed during fall 2004 at our first customer (50 lawyers). Since then part of the core system
 - The system hosts currently about 50.000 documents.
 - All new documents and part of the old ones are being manually annotated with semantik
 - Automatic IE is going in production since last spring
- Deployed in 2005 at another Italian major law firm (200 users)
 - Automatic IE currently under evaluation
- Sentence archival services at AGI – since April 1°, all material going through automatic extraction (about 95% accuracy)
- Same architecture underlying non legal environments:
 - Quinary (our own intranet)
 - A major Italian utility company
 - EC Project X-Media

Sample from AGI service

https://km.giuslav.it - Search Results - Archivio Sentenze di Merito

AGI Avvocati Giuslavoristi Italiani

[Utente: agi] :: [Carica un Documento](#)

Cerca: Filtro per:
Cerca tra: (Nome de

Riferimenti Art. 1 Decreto Legislativo del 06/09/2001, n. 368 - Disciplina dei contratti a termine

[94] Documenti trovati.

#	%	Data	Autore	Titolo
1.	7%	24 mar		Tribunale di Milano, SVOLGIMENTO Con ricorso ritualmen 16.6.2004 veniva assi livello CCNL industria tempo determinato de applicazione ... DECISIONE Il ricorso è fondato. Il 7.6.2004 per il period quanto ...
2.	7%	18 mag		Tribunale di Milano, SVOLGIMENTO illegittimità di apposi SVOLGIMENTO Con ricorso depositat assunto dalla conveni 15.1.2005 ai sensi dell'art.1 per il l. n.368/01 per la sostituzione temporaneamente inidonei allo svolgimento delle mansioni di recap
3.	7%	16 mar		Tribunale di Milano, SVOLGIMENTO illegittimità di apposi SVOLGIMENTO Con ricorso depositat assunto dalla conveni 15.1.2005 ai sensi dell'art.1 per il l. n.368/01 per la sostituzione temporaneamente inidonei allo svolgimento delle mansioni di recap

Password:

Se sei socio AGI e non hai ancora ricevuto la password rivolgiti a [Valentina Dattilo](#)

Explorer 6 - Firefox - Safari 1.2

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Browse Resources - Microsoft Internet Explorer

Tutto su: **Corte di Cassazione, Sentenza del 02/07/1980, n. 4199**

Corte di Cassazione, Sentenza del 02/07/1980, n. 4199

Tipo	<input type="checkbox"/> Sentenza della Corte di Cassazione
Numero	4199
Data	02/07/1980

Riferito in

[Sentenza del Tribunale Monocratico]

- [Tribunale di Milano, sez. Lavoro, Sentenza del 04/04/2005](#) (as Riferimenti)
- [Tribunale di Milano, sez. Lavoro, Sentenza del 10/04/2006](#) (as Riferimenti)
- [Tribunale di Milano, sez. Lavoro, Sentenza del 19/12/2005](#) (as Riferimenti)
- [Tribunale di Milano, sez. Lavoro, Sentenza del 23/09/2005](#) (as Riferimenti)

Vai alla pagina : 1

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http://www.normeinrete.it - NiR - Risultati Ricerca - Microsoft Internet Explorer

NiR **normeinrete**

Risultati Ricerca

LEGGE 18 Aprile 1962, n.230
DISCIPLINA DEL CONTRATTO DI LAVORO A TEMPO DETERMINATO.
Autorità emittente: STATO
Pubblicato in: G. U. 17.05.1962 N.125
Materia: Occupazione, lavoro e professioni
URN=urn:nir:stato:legge:1962-04-18;230

Sono state trovate 2 copie relative al testo storico del provvedimento, rese disponibili da:
- [Corte Suprema di Cassazione](#)

SemantiK – Evaluation & Directions

- Qualitative evaluation from law firms with very good judgments and strong support from law firm management
- Formal Quantitative evaluation of automatic IE results performed within DotKom EC Project
 - IE extraction of legal references on a corpus of 1200 documents,
 - 5800 references to a total of 250 laws, 1150 articles to laws.
 - average precision > .85, recall ranging between .70 and .80.
- Recent experiments on about 800 court sentences (informal measures)
 - About 80%-90% accuracy at start
 - About 95% after some extension
- Ongoing R&D
 - Extending coverage (International law) & performance
 - Better management of ontology lifecycle, very large scale and multiple media (within EC sponsored X-Media)

The drafting Component

- A contract (or any document) as a XML structured clause set

- Logic Components

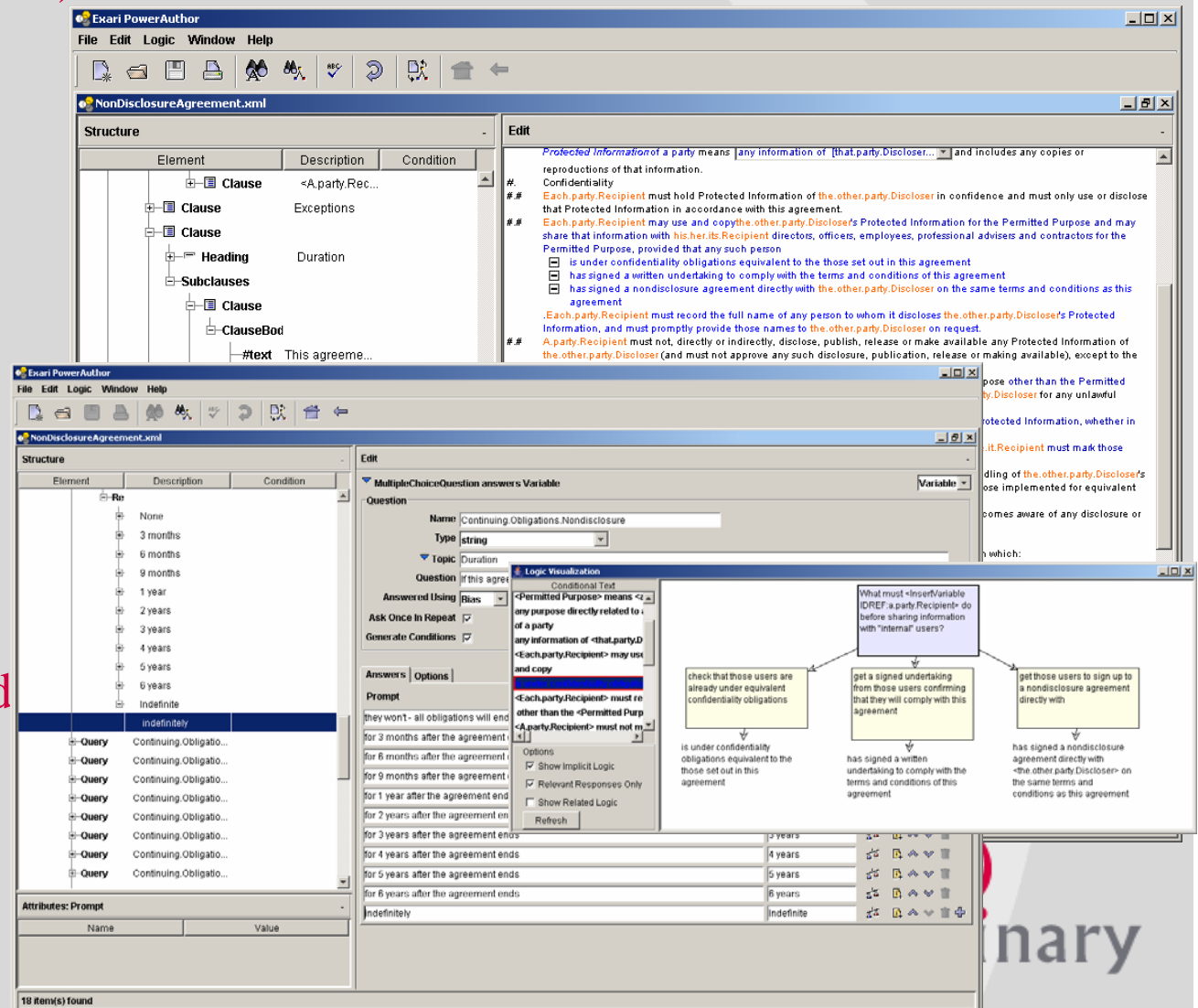
- Conditions
- Smart Phrases
- Variables
- Queries/Calculation

- A specialised XML editor

- Full fledged XML editor
- Binding text to logic
- Style based L&F

- Able to import from Word

- Also importing styles



KM > Juris Sources > Giurisprudenza - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://k.quinary.it:8085/KATBrowser5/tree.jsp?scriptnodeLocalID=...

Magpie

Lawyer Knowledge Management @ ...

BROWSE KNOWLEDGE CREATE LEGAL DOCUMENT SEARCH QUIT

Go To Node... GO

Search for...

Giurisprudenza

[3] Docs in this Node and Subnodes [0]

#	Date	Author	Title
1.	23/01/03	Morcavallo U.	Corte di Cassa 23/01/2003, n...

KM: Interview Document: Progetto ; 2 - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://k.quinary.it:8085/KATBrowser5/Interview_c... cassazione

Magpie

Knowledge Management @ ...

Lawyer BROWSE KNOWLEDGE CREATE LEGAL DOCUMENT SEARCH QUIT

INTERVIEW DOCUMENT (SpeedLegal)

Progetto ; 2

Download saved document:

Review/Revise your Answers.

Connected with:

CASE: QUINARY

TEMPLATE: Contratto a Progetto

DERIVED BY: Previous version Differences from previous version

VERSION: 2

CREATED: 08/11/04 17:32 by: katadmin

LKMSSpeedLegal - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://k.quinary.it:8085/SmartPrecedentServi... cassazione

Magpie

Acrobat

di seguito, «Il Collaboratore»

ad una consulenza specializzata per l'attività di

ificativa esperienza nel settore del ed

errealizzare il Programma richiesto,

propria disponibilità a collaborare per un periodo

massima autonomia circa le modalità ed i termini di

quinary Knowledge Management System @ TOFFOLETTO powered by SPEED

Document NOT LOADED

>> Load Progetto.xml

> Version used to

> Latest version (

Answers ✓ LOADED

Answers from Progetto

Done

quinary Knowledge Management System @ TOFFOLETTO powered by SPEED

Contratto di collaborazione a Progetto o Program
collaborazione coordinata e continuativa, di prest
e d'appalto - Vers. 1.0 in progress...

Oggetto

L'oggetto del contratto consiste in un'«Opera» o in un «Servizi

Opera

Servizio

«Servizio»

ale denominazione va utilizzata
nel caso di contratti d'opera,
d'appalto o di collaborazione
coordinata e continuativa, qualora
l'oggetto del contratto sia
costituito da un servizio (cfr.
.....)

Done

ur un'una clausola «2» una, comunque, dovrà essere concluso entro tr

3.2 Il mancato rispetto del termine di cui alla clausola precedente compo
somma di Euro JF 5.000 JF, a titolo di penale ai sensi dell'art. 1382 Cod. c
del danno u

3.3 Ciascuna pa
comunicazio

4. Impedimenti

4.1 In caso di i

4.2 Durante il
diritto ad alo

4.3 Durante ta
Viceversa, n
aloun comp

4.4 Il Collabor
impediscono
altra person
comunque, e

5. Corrispettivo

5.1 Il compenso
obbligazio

5.2 Un account sul compenso verrà composito JF Mai JF, oltre I.V.A. JF, a fronte della presentazione di idonea documentazione fiscale.

5.3 Il saldo verrà composito in un'unica soluzione JF al momento della definitiva accettazione del JF JF Programma JF, ai sensi

For the question

Vuoi prevedere un termine essenziale entro il quale l'opera deve essere completata?

You said

Si

AND

For the question

Vuoi che la violazione del termine da parte del collaboratore sia sanzionato con una penale?

You did NOT say

No

si conviene quanto segue.

1. Premesse

1.1 Le premesse fanno parte integrante del presente accordo.

2. Oggetto

2.1 Il Collaboratore si impegna a prestare la propria attività al fine di realizzare il Programma che costituisce l'oggetto del presente accordo, consistente

2.2 I parti convengono che, nella realizzazione del Programma, il Collaboratore dovrà attenersi ai seguenti criteri:

Page 2 Sec 1 2/8 | At 4.8" Ln 18 Col 36 | REG TRK EXT OVR | Italian (Italy)

http://k.quinary.it:8085/SmartPrecedentServer/control/SmartPrecedent/revistText?id=21@/files/logic/Progetto_0_lgc#MCO_Termine_Penale.SI&returndest=Claus...

About

- **Quinary**

- Since 1985, named after: P. Hatt, N Foote "American Economic Review" May '53:
 - *quaternary* - advanced services in the financial sector
 - **quinary** - everything 'advanced' in the technology and R&D areas
 - towards an economy of professional services and knowledge exchanges
- A long history providing advanced ICT solutions built around Knowledge Technologies
- Since 2000 R&D efforts towards Knowledge and Law
- <http://www.quinary.com>

- **Toffoletto e Soci**

- A leading Italian Law firm, since 1927 specializing in Employment Law. Member of the IusLaboris international alliance.
- <http://www.toffoletto.it>; <http://www.iuslaboris.com>

- **LKMS/Mnemosyne**

- a Knowledge Management System tailored for the legal profession
- <http://mnemosyne.quinary.com>

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