Communication Environment for Judicial Network in Europe and Western Balkans

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Abstract: Due to cross-border crimes rise, the EU is working on the development of international judicial cooperation between Member States. Increase of illegal immigration, trafficking of drugs, weapons and human beings, and the advent of terrorism, made necessary a stronger judicial collaboration between States. Particular attention is paid on judicial collaboration between Western Balkans and the EU. CARDS program is a suitable evidence of it. Judicial cooperation includes mutual recognition of judicial decisions, cooperation in investigations, approximation of penal legislation of involved states, including the penalties. During the investigations, prior to an international request for warrant of arrest, an exchange of information on criminal offences and administrative infringements takes place between magistrates belonging to different countries.; this create new need for judicial cooperation environment supporting a cross-border judicial cooperation between EU and Countries of enlarging Europe.

1. Reference frame and objectives.

An efficient cross-border judicial cooperation is a key success factor for fighting against the globalisation trend of criminal and terrorist organisations. Their borderless and networked structures and capabilities to use IT and communication technologies constitute serious challenges for judicial organisations fighting against them. Investigations are borderless and may cover different countries, in Schengen and non Schengen areas. While at national level specific departments operate on the whole national territory (DNA in Italy for fight against mafia is an example), barriers across borders are still present: different judicial procedures are in force, paper is widely used. This is quickly changing.

EU is pushing interconnected judicial systems, with relevant investments in IT infrastructures and electronic management of judicial cases. The EU Council of Ministers adopted on 29 May 2000 the Convention on Mutual Assistance in Criminal Matters, creating EUROJUST[15], and on 13 June 2002 a framework decision on the European Arrest Warrant in substitution of extradition [1]. Council Decision of 12 February 2007 established for the period 2007-2013 the Programme 'Criminal Justice' (2007/126/JHA), with the objective to strengthen judicial cooperation in criminal matters.

Geographically included in the EU, Western Balkans countries have judicial IT infrastructure less developed than in the EU. Complex judicial cooperation procedures are in force, whilst the presence of criminal organisations in the area is not negligible. Three actions are in progress, with the support of the EU: deployment of IT infrastructures, implementation of pilot actions for cross-border judicial

cooperation, development of judicial cooperation agreements. The first action is addressed through specific funding programmes: Montenegro implemented the PRIS system (the Montenegrin Judicial IT system) through CARDS program. The second action is supported through joint pilot projects. The third action is driven by the National Institutions.

Pilot projects aim to generate shared experiences and more effective and secure information exchange. JWeB [15] project (2007-2009), funded by the European Commission in IST Program, has the objective to implement a secure, Web based **Judicial Collaboration Platform (JCP)** supporting cross-border investigations on criminal matters through the integration of Computer Supported Cooperative Work (CSCW), secure information exchange, videoconference and advanced knowledge management. The Italian and Montenegrin Ministries of Justice are consortium members.

This paper presents an overview of the ongoing path to JCP application to cross-border investigation activities, describing the approach, the first achievements and the open points. The paper targets International Cooperation Offices, IT departments of the Ministries of Justice, Investigating Judges, Public Prosecutors' Offices, Judicial Police and the Liaison Magistrates.

2. An overview on Judicial Cases management.

Justice systems in Europe are dominated by two procedure models: **adversarial** and **inquisitorial**. In **inquisitorial model** questionings and examination of evidences during the preliminary investigations are the most decisive for finding out the truth; the judge is in charge of investigations. In **Adversarial model** the judge does not conduct investigations and suspect formal accusation by the prosecutor closes investigations and starts the trial. The evidence is built in the courtroom.
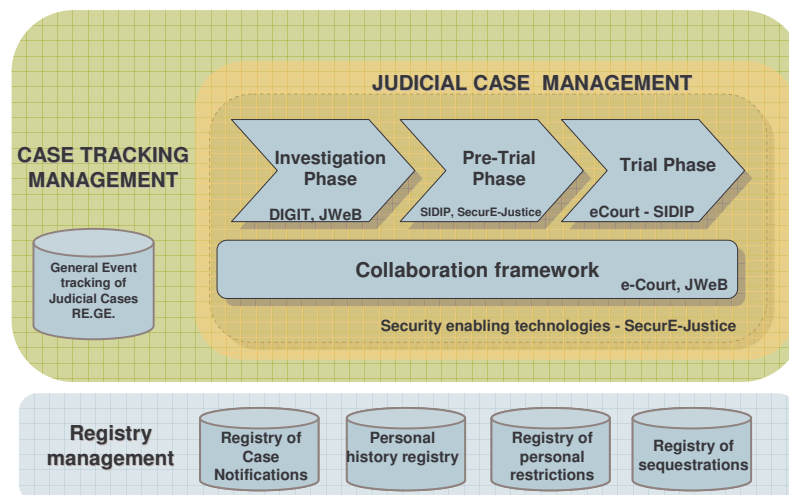

Figure 1: the judicial case model (Italian example)

Both models share common phases, actors and activities (figure 1): case tracking, register management, judicial case management, cross-border cooperation. In details:

- **Case tracking management** provides a complete tracking of all judicial events during judicial case lifetime. Italy implements an electronic register named RE.GE (general judicial register);
- **Judicial case management** supports case information collection and management; JCP in JWeB project covers the area of cross-border cooperation.
- **Register systems** contains information about the measures.

Cross-border judicial cooperation has a complex workflow (figure 2), involving different

procedures; the request (letter of rogatory) need to be acknowledged by the receiving judicial authority before granting assistance. Mutual judicial assistance may be requested mostly:

- to hand over to requesting State **objects** that have been obtained by criminal means;
- to temporarily transfer **a person** held on the territory of another Member State;
- to hold **hearings and interrogations** by videoconference or telephone conference;
- to request another Member State **documents** and to intercept **telecommunications**.
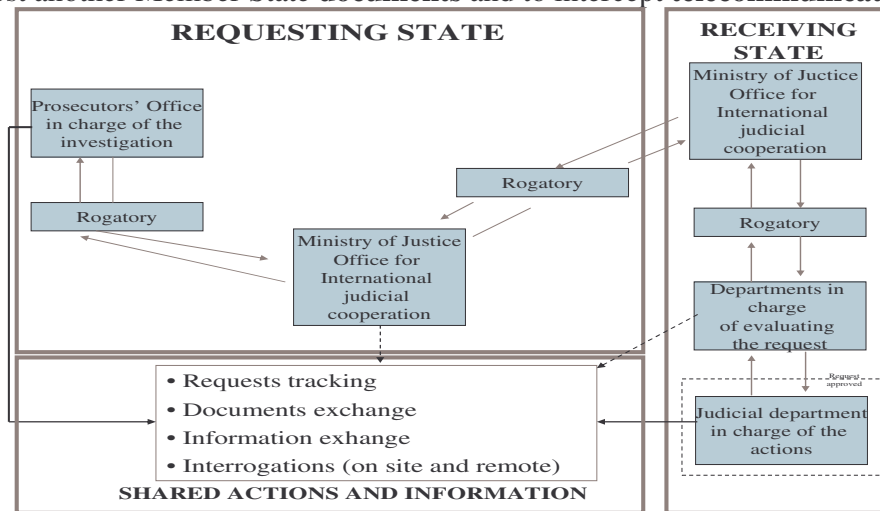

Figure 2:overview of judicial cooperation between EU and Western Balkans area (non Schengen)

Different workflows for requests sending and acknowledgment are in force in Schengen and non Schengen (figure 2) areas, but in both cases the actors and the support technologies are quite similar, opening the way to joint IT services.

3. The approach to JCP for cross-border investigations support.

A collaborative workspace for cross-border judicial cooperation implements judicial investigation workflows and workgroups in Schengen and non Schengen areas. It has to allow secure information exchange, straightforward user interface, easy data retrieval, seamless integration with procedures and systems already in place, according to the following requirements:

- A **Judicial Case** is a **secure private virtual workspace** accessed by judicial actors that need to cooperate according to a letter of rogatory, usually requesting documents, evidences and remote interrogations.
- **JCP must guarantee non-repudiation,** e.g. *it has to provide proof of the integrity and origin of data,* both in an *unforgeable relationship,* which can be verified by any third party at any time. This implies an authentication *that can not subsequently be refuted*. Secure identity management, strong authentication, mutual acknowledge of digitally signed document are key issues.
- **JCP services** are on-line services, supplying various collaborative functionalities to the judicial authorities in a secure communication environment. Secure access is a key issue in JCP.
- **User profile.** Access to JCP services is based on predefined access rights, linked to procedures.
- **Mutual assistance** during investigations creates the only shared part of investigation folder.

Starting from these assumptions, JCP has been developed in separate steps. The **first step** has been the analysis of judicial work and data flows. Four areas have been analysed: investigation, cross-border

cooperation, court management, and security. The analysis shaped the workgroups in figure 3, with different actors, needs and roles according to judicial procedures. Workgroups are linked to judicial organisations, making possible the definition of homogeneous modules (court, investigations, transnational cooperation). Public Prosecutors, Judicial Police, Investigating Judges, Magistrates' Clerks constitute for example the investigation workgroup, with the support of International Judicial Cooperation Offices and Liaison Magistrates belonging to External relations workgroup.
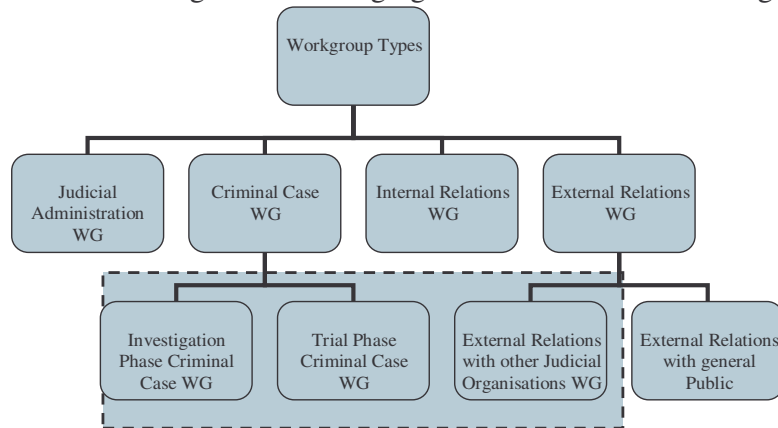

Figure 3: judicial workgroups

In the **second step** the case studies have been implemented through pilot projects. IST program supported **e-Court** (e-folder 2001-2003 [6] [9]), and **SecurE-Justice** (secure communication platform, 2004-2007 [10]) projects. JCP pilot systems have been tested in Poland and Italy. These projects generated two relevant follow-up: the **SIDIP** [16] project by the Italian Ministry of Justice, and the JWeB project. Supported by the ERDF structural fund, SIDIP system manages pre-trial and trial proceedings, with the forecast to equip more than 100 courtrooms in 2007-2008.

As **third step,** JWeB project is extending JCP services to cross-border investigations, having as a case study the judicial cooperation between Italy and Montenegro. Secure document exchange, biometric digital signature for non repudiation, and videoconference are the core applications.

4. The Judicial Collaboration Platform (JCP)

4.1 – The collaboration platform and the services

JCP (figure 4) is a module of a judicial infrastructure distributed on the territory. The platform is organised on three layer (presentation, business, persistence) and supports the following main services:

- **Group Manager** Service, managing the judicial case membership;
- **Document Manager** Service, providing a multi-function repository, holding documents organised in a folder tree structure. The repository contains also transcriptions and interrogations reports;
- **Calendar** service, supporting in preparing meetings and video conferences;
- **Email** service, providing access to email functionality. Certified e-mail may be used;
- **Workflow** service, providing support for execution of multiple Judicial Workflow Processes;
- **Search** service, providing information retrieval on any document the user has access to;
- **Security Services.** They are accessible through the JCP:
  - o Biometric authentication and biometric signature module (fingerprint);
  - o Time stamping module;
  - o Certificate Authority module;

○ Audio/Video Conference modules (H323) and audio/video recording.

Workflows Processes modelling is based on the Workflow Management Coalition specifications (WfMC), while software developments are based on Open-Source and J2EE framework. Communications are based on HTTPS and SSL, SOAP, RMI, LDAP and XML.
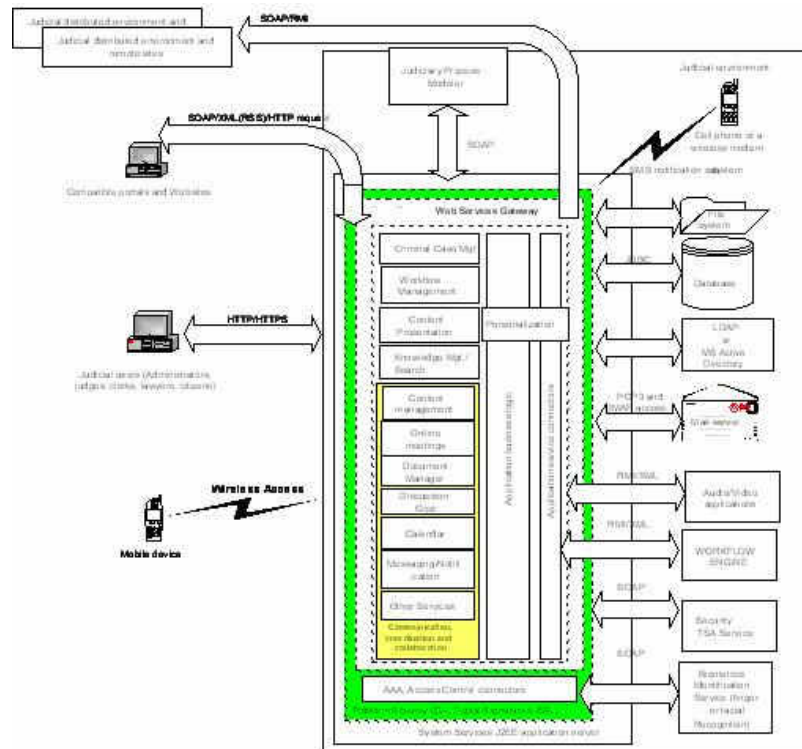

Figure 4: the Judicial Collaboration Platform architecture

Each time a cross-border judicial action starts, a new working group is created, with the information about actors involved in the different countries, their roles, their access rights.

4.2 – Security features and non repudiation.

Security and non repudiation are key elements during investigations and trials. JCP provides interfaces to external Certification Authority (CA), Time Stamping Authority (TSA) and biometric authentication systems. User profiling, secure communications and data integrity through clustering and operational procedures, as set up in ISO17799, complete the picture [2].

JCP supports documents uploading in all standard formats, including XML. The document is uploaded by magistrates' clerks and validated by the magistrate, whose digital signature is essential for non-repudiation. JPC incorporates CA functionalities [3] utilising EJBCA, allowing the CA to operate as part of a Public Key Infrastructure (PKI). Digital signatures involve connection with the CA in:

- **Digital signature** by the signer, using the private key;

- **Digital signature verification** by the receiver.

Public Key Cryptography is used for digital signing, while signer's identity verification is done via X.509 compliant digital certificates [3]. Although secure once encrypted, digital signatures do not guarantee originator's identity. JWeB adopts fingerprints for digital signature and access

authentication. They are unique and stable over time, scanners have acceptable costs and good FAR (False Acceptance Rate) and FRR (False Reject Rate), acceptance in judicial environment is good.

Interface to TSA has been implemented as a Web Service, using SOAP to transport XML messages.

An open issue is the mutual acknowledge of digital signatures, including fingerprints; each document will have multiple signatures for non-repudiation reasons. While the technical building blocks are available, the judicial and organizational constraints are under investigation. The first results are expected in early 2008.

4.3 – Knowledge management(KM) in JCP

JCP supports customs queries for documents and entities. Documents are retrieved based on the relevance to the Natural Entities instead of words. Main user functions are:

- **Automatic upload and ontology based semantic annotation.**

- **Use of the semantically enhanced search engine**.

The core of the Semantic Annotation is the Natural Language Processing (NLP). In the Information Extraction (IE), the used vocabulary of Natural Entities [4] [5] terms is considered. KM relies on GATE (General Architecture for Text Engineering), with its built-in IE component set ANNIE [13], based on finite state algorithms and the JAPE language. KM in JWeB will be based on version 4.0 of GATE, with enhanced ontology interface and high performance OWLIM (Ontology Web Language In Memory) developed in the SEKT IST project [11].

5. Achievements and developments in progress.

Starting from e-Court and SecurE-Justice results, two new projects have been funded: SIDIP and JWeB. Just a summary is provided for SIDIP and more details on JWeB.

5.1 – Trial management system: the SIDIP system in Italy

Based on JCP building blocks, SIDIP covers trials and pre-trial, integrating the outcomes of JWeB project in 2008. SIDIP receive the pre-trial e-folders coming from investigations. The trial folder is updated with hearing activities (see figure 5), including evidences from additional investigations.
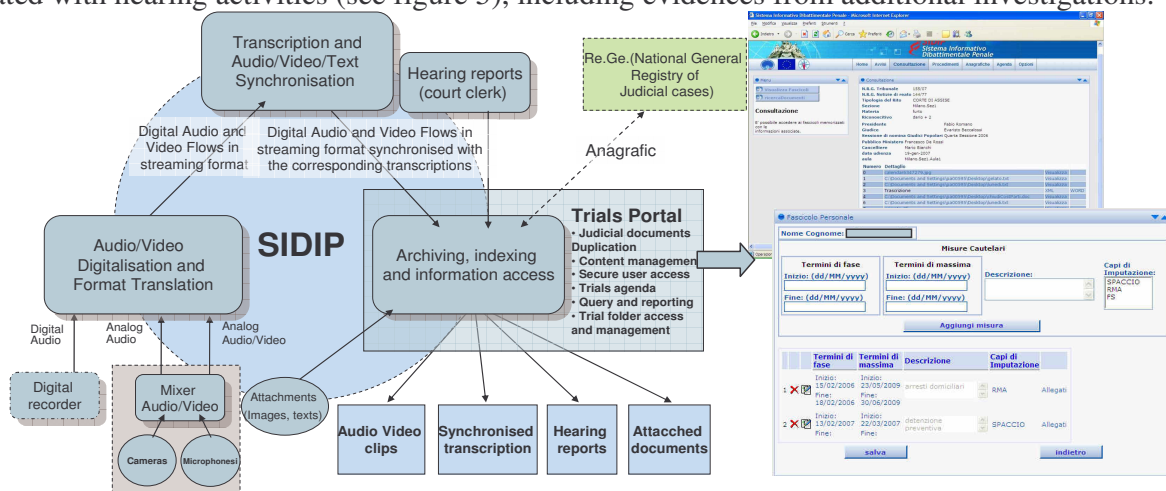

Figure 5: SIDIP system for courtroom and preliminary hearings

5.2 – Judicial cooperation between EU and Western Balkans: the JWeB project.

JWeB system (figure 6) is a JCP linking judicial systems in Italy (SIDIP and its extensions) and Montenegro (PRIS and its future implementations) in joint investigations activities. First prototype is expected at the beginning of 2008.
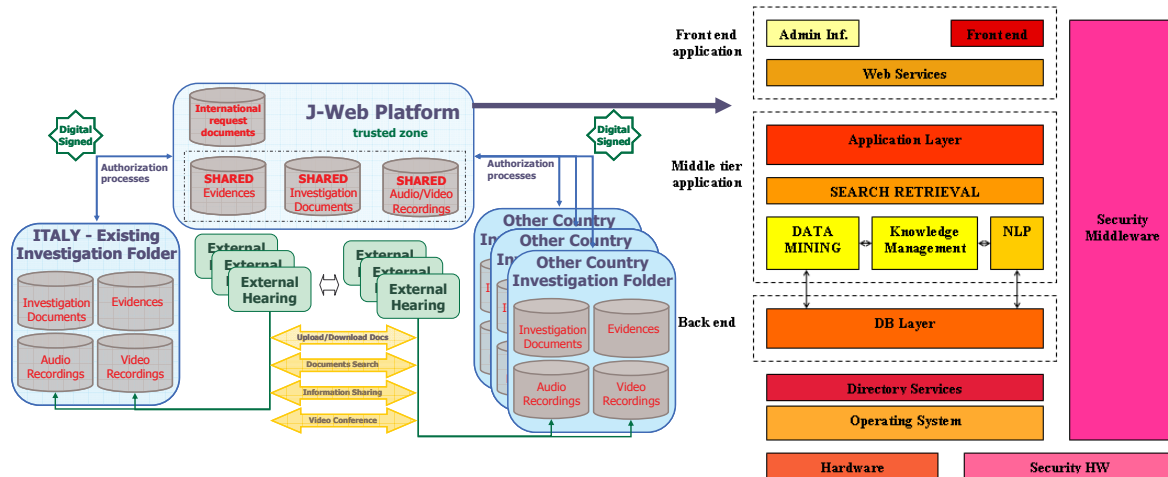

Figure 6: Judicial cross- border collaboration and JWeB platform

JWeB system has been designed to support the full investigation range of cross-border activities, including Liaison magistrates connected with Eurojust. Secure documents exchange and videoconference uses the same technologies and share the same needs for data security and non repudiation independently from judicial cooperation workflows in the different countries.

Each time during a judicial case cross-border cooperation is needed, the judicial clerk having "administrators" privileges creates the related workgroup in a trusted and secure area for the judicial actors: Public Prosecutors, Investigating Judges, Magistrates' Clerks, Judicial Police in involved countries, loading their identities in the workspace. JCP services are available according to each actor roles and access rights. The investigating magistrate in the requesting country is the "owner" of the process. The clerk loads documents and information, the magistrate signs and validates them, making them available to the requesting country. After the signature of the requesting magistrate, the document is ready to be inserted in the investigation folder; XML format and notification through web services are the interfaces to national IT systems. In addition to JCP services, tracking of letter of rogatory is possible (cooperation request accepted, refused, request for clarifications, etc.).

Judicial cooperation activities typically range from 30 to 70 each year in an average judicial district. JCP has to cover a wider geographical, at least at regional level, for a sustainable deployment.

JWeB will also develop data-mining techniques that will allow the system to update the keywords associated to the documents on the base of the use that the users do of each specific document. This process will be particularly useful in a central system, managing thousands cases per year.

6. Conclusions

The reference frame at EU level is strongly supporting cross-border judicial cooperation, creating a favourable context to JCP deployment. Even if too early to have quabtitative data in terms of time and cost saving during investigations, some qualitative achievements and lessons have been gained.

Constraints about JCP deployment are more related to organisational issues. IT based procedures in the Ministries of Justice requests a wide consensus, and pilot projects must involve them from the beginning; awareness in judicial organisations has to be created from now.

JCP encompasses different judicial cooperation procedures, in particular for the country requesting judicial cooperation. JCP services cover Schengen and non Schengen areas. Some horizontal issues are a must in electronic judicial data exchange in JCP: non repudiation, data security, data protection, confidentiality and access control with strong authentication. They have relevant impacts:

- the integration of technologies for multiple digital signature through biometric technologies, based on fingerprints,
- the mutual acknowledge of digital signatures in different States for cross-border cooperation.
- JCP has to grant interoperability and interconnection with different judicial systems
- the system architecture must be designed in order to ensure data protection and availability

both technological and organisational. Management of fingerprints databases is not a static activities, magistrates and actors may change during the investigations, and biometric data of persons involved in fight against terrorism and organised crime request a very high degree of protection. Mutual recognition of fingerprint based digital signature request further investigations on the procedural and organisational point of view.

JCP demonstrated its technical applicability to investigations, offering through JWeB initiative the technological support to judicial stakeholders in finding the answer to these questions, with the final objective to have fully interconnected judicial systems.

References

[1] G. Armone et.al. Diritto penale europeo e ordinamento italiano : le decisioni quadro dell'Unione europea : dal mandato d'arresto alla lotta al terrorismo In: Giuffrè editions, 2006. ISBN 88-14-12428-0.

[2] Italian Committee for IT in Public Administrations (CNIPA), Linee guida per la sicurezza ICT delle pubbliche amministrazioni. In Quaderni CNIPA 2006, http://www.cnipa.gov.it/site/_files/Quaderno20.pdf.

[3] Italian Committee for IT in Public Administrations (CNIPA), CNIPA Linee guida per l'utilizzo della Firma Digitale, in CNIPA May 2004 http://www.cnipa.gov.it/site/_files/LineeGuidaFD_200405181.pdf

[4] A. Maedche, S. Staab. Semi-automatic engineering of ontologies from text. In: Proceedings of the 12th Internal Conference on Software and Knowledge Engineering. Chicago, USA, July, 5-7, 2000. KSI.

[5] S. Staab, J. Angele, S. Decker, M. Erdmann, A. Hotho, A. Maedche, R. Studer, and Y. Sure. Semantic Community Web Portals. In *Proceedings of the 9th World Wide Web Conference (WWW-9), Amsterdam,2000.*

[6] M. Boughanem, F. Cunsolo , M. Di Cocco , G. Pasi, L. Pavese, e-Court: a Multimedia Information System for the management of courtroom information. In: International conference at Toulouse University, 2001.

[7] A.Gangemi, Sagri M.T., Tiscornia D., Metadata for Content Description in Legal Information, Workshop Legal Ontologies, In: press for Journal of Artificial Intelligence and Law, Kluwer, ICAIL2003, Edinburgh.

[8] IDEF organisational modelling. In: http://www.idef.com/IDEF0.htm.

[9] European Commission , ICT in the courtroom, the evidence is clear at:
http://ec.europa.eu/information_society/activities/policy_link/documents/factsheets/jus_ecourt.pdf, 2005

[10] European Commission. Security for judicial cooperation. In:
http://ec.europa.eu/information_society/activities/policy_link/documents/factsheets/just_secure_justice.pdf , 2006

[11] T. Wang, Y. Li, K. Bontcheva, H. Cunningham, and J. Wang. Automatic Extraction of Hierarchical Relations from Text. In *Proceedings of the Third European Semantic Web Conference (ESWC 2006)*, Budva, Montenegro, 2006.

[12] H. Cunningham, D. Maynard, K. Bontcheva, V. Tablan. GATE: A Framework and Graphical Development Environment for Robust NLP Tools and Applications. In: Proceedings of the 40th Anniversary Meeting of the Association for Computational Linguistics (ACL'02). Philadelphia, July 2002.

[13] GATE and ANNIE website at: http://gate.ac.uk/sale/tao/index.html.

[14] EUROJUST website at : http://europa.eu/agencies/pol_agencies/eurojust/index_en.htm

[15] J-Web Consortium, project website at: http://www.jweb-net.com/index.php?option=com_frontpage&Itemid=1

[16] SIDIP project by the Italian Ministry of Justice at: http://www.giustiziacampania.it/file/1012/File/progettosidip.pdf