

Legal Issues about Metadata: Data Privacy vs Information Security

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Project Communication Control
Pau, France

DPM 2013

Egham, UK, September 12th-13th, 2013

This paper

- Information system security is currently one of the most important goals for enterprises.
- New IT: ADSL, BYOD devices, cloud services, . . .
 - ~> Users exchange and store more and more information
 - ~> Users accomplish almost anything from anywhere
 - ~> Information systems are connected to the Internet
 - ~> Data is more and more complex
 - *structured documents*
 - *combination of public data and confidential data*

⇒ Information security concerns ?

This paper

- New information system security mechanisms need to know more about operations
 - user & role, resource, action
 - date, location, tools,...
 - previous operations (traceability), pending obligations,...

⇒ **Metadata** ("data about data")

↪ ~~access control~~ → usage control

↪ contexts & dynamic security policies

↪ indicator computation (confidence, impact risk of a change, trustworthiness, ...).

⇒ Legal issues about (meta)data privacy ?

Outline

- 1 Motivations for Metadata
- 2 Metadata & Legal Issues
- 3 Metadata & Socio-Economic Issues
- 4 Conclusion

Motivations for Metadata

From "information system security" to "information security"

- Our previous work is related to usage control for cross-organizational collaborative work management
 - ▷ "Self-Protecting Documents for Cloud Storage Security" (TrustCom 2012)
 - ▷ Enterprise Digital Right Management (E-DRM)
 - ▷ usage control \equiv security policy to control **how** users operate on documents
 - ▷ dynamic security policy \equiv contextual security rules
- ⇒ The system must collect various **metadata** to enable/disable contexts: *user location, user's confidence in partners, state of related documents, compliance in observing deadlines, revision notes, . . .*

Motivations for Metadata

From "information system security" to "information security"

- By enabling/disabling contexts the system can add/remove permissions, obligations, . . . according to operation history, metadata content, . . .

NB: We work on structured documents \Rightarrow metadata is stored on nodes of the document (\leadsto fine granularity)

- Metadata is used:
 - \rightarrow during the **document lifecycle**: *usage control, indicator computation, . . .*
 - \rightarrow **a posteriori**: *traceability, evidence in case of litigation, . . .*

Our current work

We focus on the information security rather than the security of the system itself.

Motivations for Metadata

From "IT" to "legal domain"

- Metadata is a well-known concept in **computer sciences**
 - in data warehousing → to manage and store the data
 - in business intelligence → usage of the data to facilitate reporting and analysis
- But increasing use of metadata leads to **legal issues** (e.g. between partners on a project)
 - ↪ Metadata impacts on contexts and thus modifies how partners can use the document (and do the job): *add obligation, remove permission,...*
 - ↪ Metadata is used to compute indicators (new metadata) and can reveal opinions, quality of the partners and their work,...
 - ↪ Analysis of metadata can lead to impose penalties: *unfulfilled commitments, missed deadlines,...*

Motivations for Metadata

Sample application: Oil & Gas project

- Consider an Oil & Gas project as the construction of a pipeline or an oil installation
 - ▷ Such a project obviously involves many partners and sub-contractors (and from various countries).
 - ▷ The information system (aka document registry) consists of numerous documents.
 - ↪ *specifications, design documents, drawings, reviews from experts, certifications, good practice guides, standards,...*
 - ▷ Such a project also defines many workflows for collaborative work management
 - ↪ *process monitoring, "up to date" documents between partners, compliance with deadlines,...*

Motivations for Metadata

Sample application: Oil & Gas project

- BackPlan → project communication control
- BackPlan's business aims to provide:
 - collaborative work facilities between companies
 ~> *workflow monitoring, dashboards,...*
 - document registry service
 ~> *common document repository, traceability of changes,...*
- BackPlan & metadata ?
 - ▷ improve workflow management
 - ▷ add new and fine grain indicators to dashboards
 - ▷ "bind" the various documents for traceability and responsibility purposes during and after the project

⇒ Legal issues are central to BackPlan's business !

Motivations for Metadata

New field: Service Oriented Architecture security

- We also decided to apply same practices to SOA security, especially to information systems connected through services
 - ~ usage control policy between service providers, clients, sub-contractors
 - ▷ "Information Security in Business Intelligence based on Cloud" (WOSIS 2013)
 - ~ metadata, traceability, indicators,... for information security risk management (cf. ISO 27005 standard)
 - ▷ "Information Security Risk Management in a World of Services" (PASSAT 2013)
- ⇒ But obviously we can not avoid legal issues when addressing vulnerabilities, threats, SLA,...

Metadata & Legal Issues

Information security \rightsquigarrow metadata \rightsquigarrow legal concerns

- Questions: **computing** \rightarrow **law**
 - ▷ What metadata are we authorized to collect and to store ?
 - ▷ What indicators can we calculate ? (as automated processings)
 - ▷ On the basis of such information, can we legally influence the "normal" usages ?
- Questions: **computing** \leftarrow **law**
 - ▷ Security mechanisms required to use metadata as evidence ? (e.g. authenticity, integrity, stability)
 - ▷ How to use metadata as evidence ? (jurisprudence)
 - ▷ Metadata necessary to anticipate the need for evidences ? (e.g. project achieved with compliance to current regulations)

Metadata & Legal Issues

Information security \rightsquigarrow metadata \rightsquigarrow legal concerns

- Clearly, these questions are not within our competence as IT specialists (**LIUPPA**)

⇒ We got in touch with our jurist colleagues of the **CRAJ** (*Centre de Recherche et d'Analyse Juridique*)

- The CRAJ is a UPPA research center in private law.
- They work on civil law, business law, criminal law and criminology.
- The ODJ team (*Observatoire De la Jurisprudence*) analyses jurisprudence of European, national and local jurisdictions.

Metadata & Legal Issues

What is a metadata in the law ?

Metadata

The concept of metadata is not a well-known concept of the law.

- The Greek prefix *meta-* refers to the reference to itself
 - ↪ The term "metadata" refers to data within data, data which describes other data.
 - ↪ The law does not define, at the moment, a specific legal regime for metadata and handles it as traditional data.
 - ↪ Metadata raises three types of difficulties: its collection, its storage and its use

Metadata & Legal Issues

What is a metadata in the law ?

- Metadata collection
 - ▷ Very often, collection is done unbeknown to the authors, at the least in the ignorance of the concerned entities.
 - ▷ Concerning the law, this raises the two questions:
 1. the right of access to information contained in metadata
 2. the right to know the information is collected
- Metadata storage
 - ▷ authenticity of the metadata (\Rightarrow collection process and reliability of the source)
 - ▷ integrity & stability
- Metadata use
 - ▷ in good faith: implementation of security mechanisms
 - ▷ in bad faith: metadata diverted from its original use, tampering

Metadata & Legal Issues

Evidence of law

- As might be expected, the first references to the metadata in the jurisprudence relate to the field of the law of evidence.
- In civil law, proof of a legal act can be given by any means, nevertheless within some required conditions:
 - ▷ the evidence is reported fairly
 - ▷ the type of evidence is **reliable**
- Article 1316-1 of the Civil Code:

*"The writing in electronic form is admissible in evidence equal to a written document on paper, provided that the person who issued the document and its establishment and storage are executed under the conditions so that **its integrity can be duly identified.**"*

⇒ At the moment, decisions referring to metadata mainly require its reliability.

Metadata & Legal Issues

Evidence of law: some examples

- Investigation regarding email (2011)
 - Even if the legal problem did not directly address the issue of metadata, the Court nevertheless adopted the argument:
"The structure of a particular Outlook mail file and the obligation not to change the state of the computer visited nor the characteristics of a file (metadata in the file itself: title, author size, dates, location, signature, . . .) necessarily imply the complete seizing of the mail file after verifying that it contains elements falling within the scope of the authorization."
 - ⇒ In all cases the emphasis is on the requirement that it should seize the entire Outlook messaging so as not to affect the reliability of the input by an alteration of metadata contained in the messages.

Metadata & Legal Issues

Evidence of law: some examples

- Metadata contained in pictures (2010)
 - An applicant pressed on the metadata contained in photographs to prove his position as author of the photographs.
 - The Court retained the metadata elements (EXIF data) as evidence noting that these included the identity of the author, the date and time of shooting, the name of the manufacturer of the device, the model of the latter and the description of the camera settings.
 - If metadata in itself may not demonstrate the source of the photographs, it is however the elements which can establish the paternity and can therefore be very useful in the case of a counterfeit lawsuit.

NB: Note that the reliability of metadata is not discussed here !

Metadata & Legal Issues

Current work

- Camille Drouiller's research thesis (July 2013)
 - ▷ "*La preuve par les métadonnées*" (the evidence by metadata)
 - ▷ UPPA, Master's degree of general and applied private law
 - ▷ supervised by Pierre-Yves Ardoy
 - ▷ few points from the conclusion:
 - ↪ Nothing opposes that metadata is used, or quite at least examined, during a lawsuit.
 - ↪ Metadata exacerbates issues of imputability and reliability of collected data: retain an evidence imposes to believe in its truthfulness.
 - ↪ The emergence of new technologies has always raised fears about their admission in court as evidence (such as photocopying or sound recordings in the mid 20th century).

Metadata & Legal Issues

Current work

- The first step was therefore to check how metadata could be used as evidence.
 - ▷ Digital forensics become more and more frequent.
 - ⚠ The court must make a judgment based on the arguments given by each party, but does not seek absolute truth
 - ⇒ If nobody complains, even "unreliable" data can sometimes be used as evidence !
 - ⇒ It is the job of the digital forensics experts.
- Digital forensics also implies to consider data privacy
 - ▷ personal data ∼ privacy & individual liberties concerns
 - ▷ confidential business data ∼ socio-economic issues

Metadata & Socio-Economic Issues

Data privacy

Digital society

In the information society today, metadata can become more important than the data which it is associated.

- Whether in the field of privacy (personal data) or professional (business data of a company), many companies have developed their business on such data.
- Lately, the media focus on large multinational companies such as Google, Facebook or Microsoft regarding the protection of privacy and personal data.
 - ▷ This is a hot topic that scares the public.
- In the professional world, same issues arise about critical data of companies.
 - ▷ research & development, business strategy,...

Metadata & Socio-Economic Issues

Data privacy

- Examples:

- ▷ Facebook & tags on photos

- ⇒ Picture of a group of friends can be published on the Internet and may contain the names of the people in the picture, the place where it was taken, the date and time of the snapshot.

- ▷ Google

- ⇒ Interactions between GMail, Calendar, Drive, Maps, Search, Android devices,...

- ▷ BackPlan

- ⇒ Its business uses metadata on information exchanged between participants for project communication control.

Metadata & Socio-Economic Issues

Data is future's power

- We live in a transitional period, the digitization of everything: people, society, organizations, knowledge, interactions,...
- Data is the basic building block of the information society.
- Data is the heart of the economy.
 - ▷ personal data produced by the users (texts, photos, videos,...)
 - ▷ data generated by the systems we use (often unknowingly)
- Data capture is the top priority in some countries such as the United States or China... but also others... !

Metadata & Socio-Economic Issues

Data location

- Outsourced services (as cloud storage or cloud processing) can be located anywhere in the world, sometimes without any possibility to choose the country.

e.g. USA PATRIOT Act ⇒ U.S. law allows security services to access:

- ▷ data from U.S. companies, even if the data is physically stored on the European territory
- ▷ data from their subsidiaries, even if they are located in another country in the world
- ▷ data stored on servers that are hosted in the United States, even if the company that owns the servers is of another nationality

Metadata & Socio-Economic Issues

Data location

- USA PATRIOT Act ⇒ **PRISM** scandal
 - ▷ PRISM is a mass electronic surveillance data mining program known to have been operated by the United States National Security Agency (NSA) since 2007.
 - ▷ Its existence was leaked six years later by Edward Snowden (June 2013)
 - *"The extent of mass data collection was far greater than the public knew."*
 - ▷ PRISM involves collection of data "**directly from the servers**" of several major Internet service providers: Google, Facebook, Microsoft, Apple, . . .
 - *Data encryption is ineffective because the data must be decrypted on the server before it can be processed !*

Metadata & Socio-Economic Issues

Internet wiretapping

- USA PATRIOT Act ⇒ PRISM ⇒ **Bullrun**
 - ▷ The encryption of the contents is not any more a sufficient protection.
 - ▷ The NSA has launched several years ago Bullrun, a clandestine program to break the encryption protection via the weakening of standards, the introduction of backdoors and even theft of encryption keys.
 - *"This includes SSL, VPN and security of GSM networks."*
(New York Times)
 - ▷ The NSA justifies itself in calling upon the National Security and explains that the country would face serious risks if the messages of the foreign spies, the terrorists, . . . could not be hacked.

Metadata & Socio-Economic Issues

Back to information security risk management

- Our aim is not to pass judgment on the "USA PATRIOT Act" and other secret projects.
- We simply point out that in the current legislation, a company (e.g. European) with strong constraints on the information confidentiality **must therefore be vigilant when choosing a service provider** (data location and nationality of the provider).
 - to comply with laws in force
 - to ensure the protection of personal data of its customers and employees
 - to protect its confidential business data
 - to keep secret its relationships with partners or subcontractors

⇒ So we go back to **information security risk management**

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Conclusion

Perspectives

- Confidence in the data that we handle every day is one of the major challenges of the information society.
- There are many mechanisms that allow us to collect, store and process huge amounts of data and especially data on this data: metadata.
- Metadata becomes an essential tool for information security: usage control for document sharing and cloud security, digital forensics, evidence in case of litigation,...
- But IT possibilities must not however make us forget the legal issues.

Conclusion

Perspectives

- Towards a "European CNIL"
 - ▷ The EU has the ambition to become the global standard for data protection.
 - ▷ This will require the creation of a European Data Protection Authority (as an independent administrative authority)
- For the legal community, should metadata receive a specific legal regime ?
- For IT community:
 - ▷ How to define a classification of metadata ?
 - ▷ How to use metadata in SLA ?
 - ▷ How metadata can improve information security risk management ? (e.g. new security criteria like controllability)

