# Stone Boards, Paper, Bit

What has the history of the legal document to do with the security concept of the electronic signature ?

In law history there has been only one real turning point concerning the documentation techniques: i.e. the passage from the oral tradition (OT) to that of the written document (WD).
During the history of the WD in the legal field there can be found only few important changes, which are:

1. The introduction of papyrus as a tool/data-support
2. The passage from papyrus to parchment
3. The passage from parchment to papyrus
4. The invention and diffusion of press
5. The legal recognition of legal written agreements , established without witnesses and without any specific authentication IT documentation technique [1]

## *I. The oral tradition*

At a preliminary analysis, OT doesn't seem to have any distinctive and proper authenticity characteristics. This misleading and wrong impression is due to our modern mentality, since we are now used to consider history from the view of a written document reality.
We can find OT examples in many advanced and progressed societies, which already belong to the era of history and anymore to the prehistory: the ancient Grecian history for example was essentially based on OT, and it is just thanks to the OT if we can now appreciate two of the most important literature masterpieces of all times: Iliad and Odyssey , which for no less than a period of three centuries have been handed down orally to the posterity .
Obviously the OT was a privilege of the leading class, which held the political and economical power.
The main characteristics of OT can be summarized as follows:

- Only a limited number of information could be transmitted
- The authenticity of the content could not at all be proved
- The authenticity of the transmission was only recognisable through habitual and/or structural features of the document
- The transmission could work only within a limited group of people whereas communication towards the outside was hardly even possible

[1] As will be explained in Chapter III, has very special and in some way even contradictory characteristics, proper of a "no-limits cyber-context", so that it gets problematic to analyse them properly.

Without the existence of forts, temples, acropolis, the forums[2] , the OT could not take place outside of the families ( where a child knew his ancestors since the moment of his birth, , because of the lacking of distinctive authenticity characteristics.
The introduction of the WD was followed by social and political violence : (just think of the legend of the retreat of the Aventin in Rome, as an example for the struggle for emancipation, of the peasants' class against knights' one.
Nevertheless documents, didn't have any authentication or representation function for themselves, as they were used only in rituals contexts (without the presence of witnesses, judges, public notaries, or chancellors): the culture of authenticity and the OT technique were still alive, and so they continued to be till now [3].
During the OT period , the physical context of the transmission was important for the authentication function, but it was also the element able to influenced the content of the information.

## *II. The age of the written legal documentation*

### II.1. Stone-boards, papyrus, parchments

The stone-boards were mostly used for religious inscriptions or laws and were often exhibited in public.
As far as they didn't receive legal application within the legal Roman system, they were not used in the commercial practice of ancient Rome. For this function boards made of wax with wooden frames were used, which were closed hermetically and sealed. These boards were signed on the margin by the parties of the contracts, by the witnesses and finally by a judge, later on by a notary.
On the margin also a short summary of the contract's content was given. Con tracts had to be concluded in a place defined before in writing. The parties themselves were responsible for the custody of the contracts.
The replacement of the wax boards with the papyrus and later on with parchment , had no effect on the procedure for the document production. At this time it was no longer mandatory for contracts to be concluded in a determined place. But this was probably rather due to the

[2] For the cultural life the theatre used to cover this function . Grecian mythology has actually been transmitted through the means of the theatre ritual narration and religious liturgies. As a typical consequence of the OT, numerous versions of different myths and legends have developed.

[3] For instance, no Parliament (City Council, and so on) could issue statutes or acts outside the House of Parliament's building. The libraries were already separated from the administrative offices, so that books were kept and deposited (as far as possible) separately from registers

breakdown of the administrative structure of the Roman Empire rather then to the diffusion of papyrus[4].
Seals were used only to authenticate important correspondence documents[5]. Nevertheless important documents were mostly authenticated by means of the transmitter, like in the OT period[6].
Semiotic security characteristics of signatures are known only since the 7th century. They seem to derive from the "Tyron Notes"[7].
In the course of the spread of the written form, for legal acts, we can note down the following :

- For the authentication witnesses still remained more important then the parties of a contract: the signature of witnesses was indispensable , whereas the parties used to sign only from the 13th century on - at least in Italy [8].
- The profession notary derived from the role of a (professional ) witness : in part the presence of up to five notaries was necessary for the drawing up of a document.
- From the 5th century on up to about the 15th one, the quality of the documentation was very low, as legal information were not archived in a systematic way, maybe also because of lack of possibilities.
- Only from about the 15th century on , at the time when commerce started to flourish again and contracts were concluded often in writing, the only known notarial form of a contract was tried to be changed. As a consequence company marks or seals were used for the authentication[9] of a document[10].
- The content of the contract becomes standardised in order that also non-experts could understand it more easily .
- Before the age of Mary Theresa there did no exist any systematic way to collect and store notarial acts; the notarial acts were passed on from notary to notary [11].

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[4] indelible ink was used for the document only several centuries later. For this reason papyrus as a data medium was at first as insecure as wax.

[5] Just like passports and crediting letters

[6] Ambassadors, Notaries, messengers etc.. Usually the credibility of the messenger depended by the content of the document itself and vice versa the provenience of the document (by means of its physical and linguistic characteristics) was normally authenticated by the messenger A certain alikeness to the asymmetric cryptography cannot be denied.

[7] Signs in shorthand used by Tyron, the freedman and biographer of Cicero. These signs remind a bit of the hieroglyphic graphic symbols. Each freedman used his own shorthand, because this guaranteed some confidentiality . The shorthand of Tyron was the most developed one.

[8] This is clearly a heritage of the OT. The presence of a witness remained the indispensable element until the 18th century in spite of the success of the written form. The notaries tried to oppose to the introduction of a signing duty for the parties, but from the 15th century on, imperial edicts became more common. Only from the end of the 19th century on it became common to set up documents without the presence of witnesses.

[9] Nevertheless notaries continued to set up contracts, also those which had to fulfil a specific notary scheme, till the introduction of a special law for written agreements in the 17th century in England first, then in France, Portugal, Spain.

[10] This was an important innovation: the document which at this time had no longer to be set within a ritual context, was not anymore authenticated directly by persons but by a physical sign of distinction.

[11] Unfortunately many documents got lost or faked.

- The authenticity of a contract still was proved mainly by its author and the witnesses . Contracts by now were usually authenticated in the notary's office as a ceremonial place was no longer necessary. Nevertheless, notaries were very much connected to a certain region and therefore could be quite easily identified. All these authentication characteristics developed in the age of the OT.
- From the 13th century on contracts were kept in the notary 's office – at least in Italy.

From a modern point of view[12], you may wonder why documents were authenticated mainly by persons, whereas seals and signatures were much less used and trusted.
Otherwise, if You think of how little the state's organization was formalized , and of how often one single man had the power to decide about law and justice (emperors, kings, princes, etc.) it will already appear less surprising.
When the imperial domination ceased in Italy the cities got independent, and the imperial aristocracy were sent into exile together with the citizens faithful to the Emperor, whereas their properties were sequestered. Only the notaries, the public employees [13], the archivists were spared. The same people who first had worked for the Emperor, kept their job and continued to do the same work they had done before. The reliability of documentation and its availability were thought to be more important then anything else – with very few exceptions to be found.

## II.2 Printed Documents

The invention of print had hardly any influence at all on the layout of legal documents. The archivation techniques became refined as at this time it was finally possible to reproduce a big number of copies of the same book. Therefore libraries became much better stocked then they had ever been before.
Where before things could be handled by human memory, at this time it became necessary to create a well-structure archivation system. Which was based on classification criteria that had to be as objective as possible. The influence on print onto the catolization systems cannot be underestimated[14].

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[12] From the point of view of a society, which often undervalues (the security) the value of the context, and through the development and the diffusion of the graphology, the (security) value of the underwriting signature is emphasized .
[13] the King could hardly be distinguished by the state itself (perhaps
except in England from the period of the *Magna Charta* on)
These people very often came from the guild of the notaries.
[14] This shows how much logic and interpretation (not layout techniques for contracts though) are influenced by way of production and reproduction of written documents as well as by their archivation techniques. Without dynamic research machines, Internet would not work. The question if they will still exist in three years by now when the number of data and Internet users will be ten times as high as now is a burning problem. One of the favourite answer to this question is XML. On the web site www.w3.org you can find other implementations of XML concept, which are of an extreme semantic and semiotic complexity. From a cultural, legal and not at least contextual point of view, it is quite frightening that a classification system which was developed for internet less then ten years ago has already

## II.3 The legal recognition of written legal agreements, concluded in the absence of witnesses, and without any form of authentication

Until the age of the Enlightenment written contracts were mainly set up as notarial acts. Already from the Renaissance on , though some exceptions can be found, the number of which increased in course of time, even if the notarial act continued to be considered as the basic formal scheme for contracts in general and therefore was regulated by the law.
With the codification of the 19th century the situation changed. The notarial act at this time was used only in special cases whereas the majority of the contracts was set up without the presence of the notary.
Since this time, it became usual to demonstrate the special value of public acts to private people by means of a seal.
The contracts which were set up in the absence of witnesses and notary, could only be authenticated by the personal handwriting of the parties involved, whereas graphology's analysis were certainly very difficult to carry out !

At last the eagerness of the Trosième Etat to free itself from the domination of the aristocracy and the representatives of the authoritarian State caused the victory of freedom over the documentation security. Different from the time of the retreat to the Aventin, the emergent class fought for a less secure and less professional method for the setting up and keeping of contracts. It had been realized that not only new rules but also new authors and watchmen for them were necessary.

In a certain way it was not possible to have a secure legal documentation technique that was also free (not unlawful) in its form. Anyway, for the paper documents archivation , the context has always played an important role .
Acts were deposited and stored within chanceries, public and administrative offices (each of which often available in several copies each). Actually the storage of a legal document had the same importance as its content . Only for those documents (not many) for which the form was mandatory, there should be the presence of a certain number of witnesses; there should be more then one copy of each, and parties should personally signed them.
When it became *de facto* impossible to detect handwriting signature, the notary office was the place where the writing signed documents were deposited and kept.
What happen in a digital context ?

become obsolete. The fact that the way to find information on the Internet becomes obsolete so very fast can create big problems in the field of legal information as well as for the public and private administrations.

## *III. The legal document within the present legal system*

No doubt that the huge number of information we receive from Internet, has actually changed the human cultural context. Supporters and adversaries of this innovation often discuss the importance of this cultural change. The central point regards the real possibility we have on Internet to verify the true content of legal information and to identify their authors.
The special characteristics of the legal information must be respected and faithfully reproduced, if we do not want the law system to be altered, even within IT context and IT legal documentation
Since the myth of the retreat of the Aventin it was clear that a written legal documentation should have been the most transparent and well-defined.

How can we recognise a legal document .

1. The minimum characteristics of the legal document within the present legal system, are as follows:
   a) the importance of the linguistic context[15]
   b) the identification of the parties involved[16]
   c) the identification of the legal document
   d) the importance of the semiotic security[17] features
   e) the meaning of the language (especially the legal one )[18]
2. The present legal documents have (inside the context of reference) an author sufficiently identified
3. They have a minimum legally regulated form

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[15] It is generally established that the legal document must be strictly written down in the mother tongue language of the person concerned. When this is not legally mandatory, it often happens in the legal practise that the interested person renounces the document to be translated in to his own language . According to this, it happens that also the legal documents of the European Union are reproduced in all the languages of the member states, even if it do exist a mutual working language, i.e. English.

[16] Author, addressee, other persons concerned, are mostly recognisable on the basis of their own signatures, which also represent the feature-marks of the entities, together with the acts which regulate the incorporation of entities (or of the documents which claim the existence of person). Fortunately, if a person without a legal identity, do exist anyway; nevertheless if you don't know your name, surname, date of birth, if you don't have any residence, if you don't know your parents, it becomes essentially impossible to give force to your own rights. Thus we firstly have to put in force the necessary procedures to assign a person a valid (formal, in accordance with the law) legal identity. "To assign", seams the best concept to these special procedures, since this means for instance, that a name written in one's own mother tongue language (i.e. with the linguistic marks and pronounced following the local pronunciation, which often differs from the official one
) must be translated. Today it is still not possible regarding acts of a EU Member State, for example to write a Greek name in accordance with the Greek alphabetic marks, if it happens outside the Greece.

[17] Stamps, seals, signatures, witnesses presence, paper(or other data-supports' type ), deposit place, access right and so on

[18] It is interesting to note how the terminology used by the German, Austrian, Swiss legislation (contracts) is often different, even if the subject to be regulate is the same. The same can be notices within the Anglo-Saxon countries

4. They are given of (when there are not strict legal procedures) a conventional content, able influence their legal effect

When the legal document is organised in a well-defined system, it becomes a legal system[19].
Legal documents can have a different provenience and the most different functions.
If we look at the provenience, there are lots of public institutions and entities which can issue a legal document. First of all we can separate the legal documents which are regulated by the public law from those which has to follow the private law.
Regarding the function , we can divide the documents which have a general legislative function (and which are directed to everybody[20] ) and those document which set rules and obligations only for the parties[21].
Which are the special characteristics of a legal information ?

- The anonymous information are legally kept as irrelevant or, at least, as simple facts[22].
- A will act without an author (notorious) doesn't exist (being null and void, inconceivable): it belongs to the world of the culture, of the personal representations (diaries, romances, and so on), it is no at all a legal document
- The actual value of a legal document is often immediately recognisable, directly by means of the legal and semantic conditions
- The validity and the efficacy of a legal document can change in course of time[23] ( and this depending on the general semiotic and semantic conditions of the context).

Now the question is : can these characteristics in a cyber-context remain unchanged ?
Will they remain the same?

## III.1. Cyber-context, legal document and legal information

### III.1.1. Is the cyber-context a context ?

The possible solution to this question cannot be totally based on technology.
On the basis of what stated in chapter III, the context can be identified with a contextual and linguistic complex situation, which only in part can be technologically solved : an inscription on a stone-board (like that on the "Rosetta stone-board") can last for centuries, if this is permitted by the specific physical characteristics of the data-support and of the inscriptions[24].

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[19] Especially following the theory of the legal system, for the first time by Kelsen deeply elaborated
[20] For instance statutes, regulations, or within the private law, the general terms of a contract
[21] For instance agreements and private or public contracts.
[22] The facts can legally value as a proof, but they are considered and valued as natural phenomenon and not as human acts or expression of the human will. In this view they don't worth as legal documents.
[23] A cultural, historical meaning of the legal document it is not just possible, but also one of the most studied. This doesn't change the efficacy of special kind of legal documents.
[24] The stability of the data and information support and the necessary informative meaning of the contextual reference is absolutely a technical problem.

Nevertheless it is now difficult to understand the inscription's meaning because of the many semiotic and semantic changes we had in course of time concerning the context.[25].

### III.1.1.1. The technical problems

There are mainly two technical problems regarding the legal document in an open system like internet: only one has been solved. The first one was solved by means of the asymmetric cryptography[26] , which has allowed a sort of communication secure and confidential in an open system.
Mathematical algorithms have been implemented in order to encrypt and sealed information.
It is important for the context to be a well defined one since a legal information have to be transparent and recognisable. Public key Infrastructure (PKI) is the technical solution which has allowed a secure communication in open systems.
Nevertheless if we do no add a sufficient regulation[27] we won't fit the legal dynamics successfully.
The second technical problem coincides with the insecurity of the present hardware and software, which today are constructed in a so complex and confused way[28], that even the producer hardly knows how they work and what they can do. . This is why every day there are attacks directed to down load, to copy, to modify the secret data of a computer. This problem has still not been properly resolved, as there are still a lot of questions regarding what of a PC can really be encrypted (only with a secure signature ) remain unsolved.
The German, Italian, Austrian regulations have found a minimal solution for the problem of the security of the private signature keys, of the identification of the authors and at the same time of the data protection; but they nevertheless cannot represent a satisfactory solution if we analyse the security connected with computers' applications ( especially the security of the interfaces' applications).
At the moment a prescription on the matter is not possible, since if the security was in some way compulsory, it would probably remained not practicable.
The expected solution for the problem of the IT security must be legal and political one .
At the moment there are not legal general basis conditions for legal documents on Internet, since for Internet it is still not given a predefined standard context. As a consequence, the other legal document characteristics, which are all less important then the contextual ones, are negative detriments from that[29].

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[25] In this case any kind of possible technological solution, can only represent a temporary solution, whether not totally apparent.
[26] Since 20 years
[27] Whether it is national or issued by technical regulatory organisation.
[28] Right away for reason bound to competitive techniques.
[29] See above chapter III

### III.1.1.2. The semiotic and semantic problem

The semiotic-semantic problem connected to the cyber context, is directly connected with the international dimension of Internet, which represents the most complex semiotic-semantic context which has ever been developed. The most modern research machines get old in just a few years. With XLM and the new semantic means, we are trying to keep under control the huge number of information[30].
This is why regarding the legal document, Internet has escaped all the national laws.
The reference to a precise linguistic context (cultural, legal) is not always clearly recognisable, and the national regulations to be applied for the identification of the information source are not suitable with the cyber space. The forgery of the identity of the providers, of the information or the authors, is possible not only because of the technical inadequacy, but it's been also very often facilitated by the legal inadequacy proper of the national laws, these being only in theory able to avoid the risk of forgery and information manipulation within the cyber space[31].
The law is a complex conceptual system, since the semiotic[32] and the semantic[33] problems are complex. It doesn't still exist an international conceptual system, legally mutual[34].
For this reason the answer must be both technical and conceptual , which has to result successful in practice (respecting the rules of the language and the context).
In a digital context is very important to have recognisable characteristics, plainly accepted, so that also the context, the author, the law to be applied to a legal document is easy to recognise.
If we want to close a contract we have to follow special standardised procedures, whose elements must be well known even within the cyber context.
The provenience of the cyber information must be in the same way easily recognisable..
For the paper traditional documents things were clearly different.
Nevertheless with the traditional paper documentation it is hard to spread information on a global ground, without special costs and special controls.
Besides a system of control cannot substitute the context standardisation., since it is not possible to value a system of control without having any kind of formal or substantial criteria. Control without criteria is inefficacy and arbitrary. There could only be an "superficial" control, which through a false sense of security, would deepen the problem.

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[30] See www.w3.org, in order to get aware of the activity of the World wide Consortium.
[31] Also within the national legislation, the de-materialisation of the Web-providers has produced in USA big problems, since the legal criteria till now in force only with great difficulties can fit to the Web-sites or to the providers ( for instance in case of electoral propaganda). Also interesting is the Web-site: http://www.albore.com
[32] The problem of the linguistic meaning
[33] The problem of the context meaning
[34] Opposite to what happen in mathematics or physics.

## III.2. Reflections on legal documents in the Cyber-context

At this point it is clear that within this essay solution are not given.
It will also be wrong to think, that on the basis of problems and risks above mentioned, the procedure of digitalisation of the context should be stopped.
It is an inexorable development of the human culture. Apparently it is developing a kind of communication the most international and abstract like never before. The legislation will have to fit to these new conditions.
It is also important to face this complex development, approaching with the right questions , in order to avoid to face false and apparent problems using fetish means (or out-to date tools).
We can now schemitized Some key-points as follows:

- In the cyber context, the context must be recognisable and redefined
- The means used to interact with the cyber context must be recognisable especially in case of forgery
- The interfaces' applications must be standardised, in order to have unique general basis conditions for the interaction on the Cyber context
- The national legislators must accept, that national laws are totally insufficient to regulate internet and the cyber space. At the moment a unique legislation in this field is even unimaginable, even if this will be necessary
- The security is not at all a technical problem. Technology can support the security issue, but central problem to solve remain the concept of security, which is connected to:
- The transparency of the analysis of the security concept , of the components security and of the security implementation
- The introduction of machines for the control where there are sensitive information: specially the applications are important for the four eyes principle
- A secure digital signature in a insecure context or in a context produced (or valued ) in a non-visible way, doesn't give any kind of security to the IT document, but just an apparent and false security.
- At the level where the technology today is, secure means have small displays (not poor in terms of colours9, which do possess a limited representative capacity (contextual-semantic problem); the means which possess suitable displays are from a technological point of view are insecure, since they are too complex to be put under a security valuation.

These are important points, which are not treatable, if we want to reproduce within the digital world the good things of the paper one, without to renounce to the new possibilities offered by the informatisation.
It is not true that no security would be economically bearable. This now seems the easy solution, just in a second moment it will be disguised by intricate problems. Before or after, not differently from the Millennium Bug, we will have to face it.
The expensive and well visible security of the paper offer lower levels of security (and at the same time much more possibilities to access): it is not a good change. It is not a good change, since it doesn't exist any kind of concept able to be reproduced by the paper documentation !

Today we can still influence all this. If huge and uncertain implementations and solutions would be scattered trough out the market, it would not be less traumatic in comparison of the Millennium Bug, but more and more bigger !

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