

# THE DIGITAL TOWER OF BABEL

By Ugo Bechini

**When we pack our things for a trip abroad, the right electrical adapter is often a vital item. This is not only the case for overseas travels: even a simple two hour drive from my home in Genoa, Italy, either north or west, brings me (and, more importantly, my computer) into another electronic jurisdiction. The European Union, who famously enacted strict rules for the size of bananas,<sup>1</sup> seems unable to solve the problem.**

Not that the European Union is always to blame, albeit this is a favourite pastime among its citizens. Other, much more complicated devices, are perfectly at ease in any part of Europe (and in most of the world, for that matter): GSM telephones. As a rule of thumb, every GSM telephone is able to work with any GSM network. European carriers did not have the choice: the use of GSM technology was mandatory. The most interesting consequence is that European consumers can easily change carrier whenever they wish.<sup>2</sup> And actually they do: even department stores offer their own virtual networks at quite affordable rates. Pay-as-you-go services are much more common than the medium-term plans that are popular in the United States of America. It is not at all unusual to carry around a few SIM cards, and use the one that offers the cheapest bargain for a given call. Abroad, we can walk into a shop, buy a new SIM card, and our new local number will be working immediately.

The size of the unified European market granted GSM tremendous momentum, with a lead against its US competitor, CDMA.<sup>3</sup> Most American specialists do not seem too much worried about this. They often point out that several technologies are offered in the US market,

and consumers benefit from the competition.<sup>4</sup> On the other hand, the American consumer, more often than not, is forced to buy a new mobile telephone if he or she wants to switch to another carrier, and this hampers competition. According to Walt Mossberg, a regular contributor to the Wall Street Journal, this situation (that, interestingly enough, stems from a *less* regulated market) allows American carriers to behave as Soviet Ministries.<sup>5</sup>

In the electronic signature field, the European Union partially went the American way: the 93/1999 Directive<sup>6</sup> is technology-neutral. In fact, each country seems to have adopted a different kind of signature. No less than seven different formats are currently in use (.cms .pkcs7 .pdf .p7m .p7s .xml .odt). Italian software, for instance, cannot read digital signatures from France. Even when the extension is the same, there are slight implementation differences that make interoperability a hazy dream. Just when everything seems all right, every detail tested and checked and tested again, a simple umlaut in the certificate (let us suppose the document comes from Häagen-Dazs) is enough to drive any non-German software crazy.

The consequences are far more serious here than in the mobile telephone arena. While I can at least always place a call to a friend in America from my GSM mobile to their CDMA telephone, the official digital copy of an Italian notarial document (file extension: p7m) will be completely useless for my friend on the other side of the Atlantic. He will not even be able to obtain access to the unsigned document, because the p7m format embeds the original document and the signature in a single file that cannot be split without a specific application. My friend should install a new piece of software on his computer, and should do the same for

<sup>1</sup> *To the credit of the EU* ([http://ec.europa.eu/dgs/communication/facts/fact\\_033\\_en.htm](http://ec.europa.eu/dgs/communication/facts/fact_033_en.htm)), the tale is partially legendary.

<sup>2</sup> All they have to do is change the SIM card (Subscriber Identity Module) provided by the new carrier.

<sup>3</sup> *Europe Mobile Handset Market Analysis (2007)*, ReportLinker.com, available at <http://www.reportlinker.com/p019602/Europe-Mobile-Handset-Market-Analysis-2007-.html>. For CDMA statistics, see CDMA Development Group, *Quick Market Statistics as of May 7, 2008* at [http://www.cdg.org/technology/cdma\\_technology/cdma\\_stats.asp](http://www.cdg.org/technology/cdma_technology/cdma_stats.asp). The CDMA technology is often regarded as superior to GSM. I am not able to tell if this claim is correct: as 'losing' standards (Beta

vs. VHS; Dvorak keyboard vs. QWERTY) always seem to enjoy staunch (and sometimes uncritical) support from devoted fans, such issues are slippery (at least).

<sup>4</sup> Christopher S. Yoo commented, in 'Beyond Network Neutrality', *Harvard Journal of Law & Technology*, Volume 19, Number 1 Fall 2005, page 31, 'Had the U.S. followed Europe's example and adopted a uniform standard for second-generation wireless telephony, it would have precluded the realization of the benefits associated with CDMA, which supports a broader range of data services, makes more efficient use of spectrum, and provides the most straightforward migration path to the next generation of wireless technologies'. An ill-fated forecast: US lags well behind Japan and

Europe in the adoption of 3G technologies: Kent German, *Phones in the USA*, CNET April 24, 2007, [http://reviews.cnet.com/4520-3504\\_7-6728815-1.html](http://reviews.cnet.com/4520-3504_7-6728815-1.html). In April 2008 one of the leading US carriers, T-Mobile, had not even started 3G operations yet ([http://www.electronista.com/articles/08/02/12/3g\\_for.t.mobile.by.summer/](http://www.electronista.com/articles/08/02/12/3g_for.t.mobile.by.summer/)) and the much celebrated Apple iPhone still lacked 3G capability at the time this paper was prepared.

<sup>5</sup> <http://mossblog.allthingsd.com/20071021/free-my-phone/>.

<sup>6</sup> *Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures*, OJ L 13, 19.01.2000, p.12.

almost each country he receives documents from. Each application should be kept up-to-date, of course.

This is a nightmarish scenario for everyone. But Civil Law Notaries around Europe are especially concerned. Notarial documents, or certified copies whereof, are often sent to other European countries. Powers of Attorney, mostly, but also European Enforcement Orders, that are issued by Civil Law Notaries in accordance with 805/2004 European Regulation, and are 'recognised and enforced in the other Member States without the need for a declaration of enforceability and without any possibility of opposing its recognition' (Article 5).<sup>7</sup>

Moreover, in a global perspective, notarial deeds enjoy, as any other official document, circulation across international boundaries thanks to the efficiency of the Apostille system,<sup>8</sup> many European countries even have bilateral or multilateral or both bilateral and multilateral Apostille-abolishing agreements<sup>9</sup> in force.

No jurist, to the best of my knowledge, doubts that such agreements apply both to paper and electronic documents; electronic documents can receive electronic Apostilles, or e-Apostilles.<sup>10</sup> The problem is that, at least under this point of view, lawyers look more advanced and far-sighted than computer geeks.<sup>11</sup> Paper crosses the oceans, or at least European boundaries, effortless; bytes do not. That *eeo.p7m* file I sent by e-mail in my own capacity of Civil Law Notary in Genoa, Italy, is a European Enforcement Order that can be used in Athens immediately, but this legal statement is pointless if the people involved in the process in Greece cannot read the document, and cannot establish that it comes from a Civil Law Notary: which they cannot.

This is the framework in which the International Verification Task Force (IVTF)<sup>12</sup> program took form within CNUE, the organization of European Civil Law Notaries.<sup>13</sup> In the technological context, the IVTF platform is a significant achievement that we owe to four European companies (Notarnet from Germany, Real.not from

France, Notartel from Italy, Ancert from Spain), each of which is fully owned by the respective national notarial organization and provides IT services to local Civil Law Notaries on a regular basis. From the point of view of the user, the service, currently (May 2008) in beta, is quite user friendly (as the author currently serves as Chairman of the IVTF, independent verification of this claim is strongly recommended by the author himself). Consider it as a kind of on-line translator. The platform is available over the internet as any other website. The user selects the signed file on his computer; the file is automatically uploaded to the server (currently located in the Notartel headquarters, via Flaminia, Rome) and verified. The site returns a page where the original document is offered for download,<sup>14</sup> and several bits of information about the signature are presented, with detailed comments (in the language of the user), aimed to put those people not-so-familiar with digital signature technicalities at ease. The comments are organized as answers to four different questions:

- (1) Is the signature formally consistent?
- (2) Has the certificate been revoked?
- (3) Has the certificate expired?
- (4) Does the signature come from a notary?

Questions 1, 2 and 3 are everyday fare in the digital signature world. Yet the second and third posed an unexpected challenge. The IVTF team realized that the issue of the expired or revoked certificate is treated differently around Europe, and a compromise had to be reached.

As an Italian Civil Law Notary, I am familiar with the problem. Italy was the first country in the world to go totally paperless for both real estate conveyances and the formation of a company, some years ago, beginning with the Decreto 12 dicembre 2001, *Attivazione della trasmissione per via telematica del modello unico informatico per la registrazione, trascrizione e voltura degli atti relativi a diritti sugli immobili*.<sup>15</sup> Five thousand

<sup>7</sup> Regulation (EC) No 805/2004 of the European Parliament and of the Council of 21 April 2004 creating a European Enforcement Order for uncontested claims, Official Journal L 143, 30/04/2004 P. 0015 - 0039.

<sup>8</sup> The Apostille is a simple certificate (a model is available at the Hague Conference site, <http://hcch.e-vision.nl/upload/apostille.pdf>) introduced by the Hague Convention Abolishing the Requirement of Legalisation for Foreign Public Documents, one of a series of conventions of the Hague Conference on Private International Law. It was signed on October 5, 1961. A notarized or other official document from any member state (they are around 100 now) that has an Apostille attached is accepted with no need for legalisation. For a list of member states and issuing authorities around the world, [http://hcch.e-vision.nl/index\\_](http://hcch.e-vision.nl/index_)

[fr.php?act=conventions.status&cid=41](http://www.e-app.info/fr.php?act=conventions.status&cid=41).

<sup>9</sup> For instance, the Convention abolishing the legalization of documents in the Member States of the European Communities (Deposited with the Ministry of Foreign Affairs of the Kingdom of Belgium) signed in Brussels on May 25th 1987.

<sup>10</sup> <http://www.e-app.info/>.

<sup>11</sup> The opposite is commonly believed to be usually true, of course, note the comments made by Bill Clinton in 2000: 'Bill Gates came here and said that the problems between the high tech community and the government were largely rooted in the fact that they worked on a schedule that was three times faster than regular private-sector economics, and we worked on a schedule that was three times slower, and that put us out of sync by a factor of nine.' Bill Clinton interviewed by Karen Breslau and Katrina Heron, *Wired*, Issue

8.12, December 2000, available at <http://www.wired.com/wired/archive/8.12/clinton.html>.

<sup>12</sup> A demonstration server is available at <http://217.22.209.125/>.

<sup>13</sup> <http://www.cnue.eu>.

<sup>14</sup> In several cases, as it was previously pointed out, the signed document (say, a .pdf) and the signature are embedded in a single file with its own extension (say, .p7m). If no dedicated software is available on the machine, even the original (unsigned) document will be out of reach.

<sup>15</sup> *Gazzetta Ufficiale della Repubblica Italiana* n. 297, December 22nd 2001, which initiated the first phase that ended in 2003 for most notarial acts; a few instances of paper filing survived to 1 June 2007.

Civil Law Notaries send millions of digital notarial documents every year to hundreds of different State offices around the country. Signatures are routinely checked in real time when they are received by the destination server. But if the system is down (for maintenance, for instance), the resulting delay can be fatal. If the Civil Law Notary retires or moves to another location<sup>16</sup> shortly afterwards, the document will be checked by the State Office after the revocation of the certificate, and verification will then be denied. This problem is quite manageable at this level, as such an unfortunate coincidence occurs only a few times a year. This is a system where digital signatures are verified only once, usually minutes within execution. There are other scenarios that can be considered. Let us suppose that I have sent a digitally signed power of attorney to a colleague in Paris, who will execute the deed days or weeks later: the chances that a revocation will take place in the intervening period of time rise exponentially.

Belgian Civil Law Notaries decided not to compromise with the solution they adopted. Their philosophy is: *if there is no time stamp, it is not a signature*. The newest members of the digital notarization world, they took advantage of earlier experiences. If each digital document bears a time stamp, the subsequent revocation of the certificate (or its expiration) will never cause harm, because a time stamp will provide evidence that the document was executed previously.<sup>17</sup>

In all other countries, time stamping is optional, although there are significant differences. In Italy, most specialists consider that expiration or revocation of the certificate means the digital document is no longer of any value: one of the most prominent Italian scholars has suggested that expiration or revocation are tantamount to the physical destruction of the paper document.<sup>18</sup> Interestingly enough, the Germans display a softer, more flexible approach. A failed verification due to the expiry of a certificate that is revoked is regarded as not conclusive: a person can continue to rely on the digital document if there are good reasons for thinking that the signature was executed before the expiration or revocation.<sup>19</sup>

Taking into account such differences, when a signature based on an expired or revoked certificate is submitted, the IVTF platform provides an answer<sup>20</sup> that can be legitimately considered to notify the relying party to be wary; from my self-interested point of view, I prefer to deem it a detailed and well-informed warning. Taking a break from the otherwise rigidly binary ‘traffic lights’ colour coding across the IVTF site,<sup>21</sup> the background will be neither green nor red, but yellow.

The most difficult question is number four: how to establish that a given document comes from a notary currently in office. Once again, there are perhaps as many answers as there are EU member states.

Italy was the first European country to create such an infrastructure and understandably choose the simplest solution, known as FCA (Flat Certification Authority): a dedicated Certification Authority, owned by Italian notaries themselves, that accepts as customers only notaries that are currently in office. Certificates can be used for official use only; if a notary loses his or her license for any reason, the President of the local Notarial Chamber revokes the certificate in real time. In other countries, such as France, notaries also own their dedicated Certification Authority, but the Authority provides certificates both to notaries and other officers; the respective qualification is established in the certificate. In most countries, strict procedures have been put in place in order to ensure that the smart card containing the certificate and private key is safely delivered in the notary’s hands. In some cases (Spain and Italy, for instance) this duty can only be performed by the President of the local Chamber, who personally knows each one of the notaries in his or her jurisdiction. In a few countries, notaries buy their certificates from commercial certification authorities. The IVTF platform was built in order to handle each of these different situations.

The development of the IVTF platform has not been an easy task, for it was necessary to cope with members of a single profession coming from a handful of countries from the same continent, within the reasonably uniform legal framework of the European Directive. While I am very proud of the work undertaken by the team I was

<sup>16</sup> The digital signature certificate includes information about the Civil Law Notary’s location. In case of transfer, the old certificate is revoked and a new one is issued. The certificate is also revoked on retirement. Expiration is not critical because notaries receive a new certificate months before the expiration of the old one.

<sup>17</sup> Although see Stefanie Fischer-Dieskau and Daniel Wilke, ‘Electronically signed documents: legal requirements and measures for their long-term conservation’, *Digital Evidence and Electronic Signature Law Review*, 3 (2006) 40 – 44.

<sup>18</sup> Raimondo Zagami, *Firma digitale e sicurezza giuridica*, Cedam, Padova (Italy) 2000, p. 214.

<sup>19</sup> Ernst-Günter Giessmann and Roland Schmitz, ‘Zum Gültigkeitsmodell für elektronische Signaturen nach SigG und X.509’, *Datenschutz und Datensicherheit*, Volume 24, Number 7, July 2000.

<sup>20</sup> From the IVTF web site: Textually the signature is based on an expired notarial certificate from [name of the Country]. If the signed document does not include a timestamp, it is difficult to tell if the signature was executed before or after expiration.

We advise not to trust this document, unless additional evidence about its validity is available. In some jurisdictions this sort of document will not be admitted. Neither CNUE nor the issuing organization will be held liable in any case for the use of such a document. If the signed file is provided with a timestamp that reliably proves that the signature was performed prior to revocation, the signature should be considered trustworthy.

<sup>21</sup> When the signature is verified, the answer is presented on a green background; if not, the background is red.

honoured to lead, I am not at all sure that the same model is viable as a global solution. I am afraid that the technical, political and legal issues would quickly get out of control.

A new Tower of Babel, in other words, is developing.

Great expectations are placed in the e-Apostille,<sup>22</sup> the paperless equivalent of the well know traditional Apostille, that allows almost worldwide circulation of official documents. There is no technical standard for the e-Apostille: it is basically a short text electronically signed, and any format will suffice. This is the reason for concern. If an Italian Apostille-issuing Authority delivers an e-Apostille in the native .p7m format, it will not be readable, and therefore useless, in most countries. The strength of the traditional Apostille lies in the simple fact that paper documents can be read anywhere; this so evident (and at the same time, not unusually, so hidden) quality is not to be found in its electronic counterpart. Files signed in PDF format are more

popular, but it is likely that a significant number of countries across the world will refuse to depend upon an environment basically under control of a foreign corporation. Issuing official documents continues to be an attribute of sovereignty. The Open Document standard is probably a more interesting challenge.

Briefly put, in order to go beyond the IVTF platform, we are desperately in need of a free, worldwide, GSM-like standard for digital signatures. Unfortunately, a clear winner in this arena is not in sight yet.

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<sup>22</sup> <http://www.e-app.info/>.