

Chapter IV. Durable media with blockchain technology

Introduction

Most reports on the application of blockchain technology indicate the fields of finance and banking as some of the first and greatest beneficiaries of that solution. In practice, the financial sector was one of the first ones to undertake activities to use that technology, and was the first one with successful implementations in that scope.

The financial sector is not the only one interested in the technical aspect of “durable media”. Over the last four years, that term has substantially evolved, from a conservative, traditional (paper) perspective to a very modern one. It is not only the banking sector, or, more broadly, the finance sector, but also the eCommerce, telecommunications sectors, the sector of services not only of the digital, but also hybrid, economy (electronic acts and “traditional” goods), that are interested in its application, in particular in a modern “paperless” form.

Term of durable medium

The term, including the legal definition, of a durable medium, has been introduced in EU law and so, in the respective domestic legal systems, relatively recently. They are included in many pieces of legislation, often different ones.

As for Community regulations, the term or reference to it are included in, among others: Directive 2002/65/EC of the European Parliament and of the Council of 23 September 2002 concerning the distance marketing of consumer financial services and amending Council Directive 90/619/EEC and Directives 97/7/EC and 98/27/EC (OJ L 271, 9.10.2002, p. 16); Directive 2002/92/EC of the European Parliament and of the Council of 9 December 2002 on insurance mediation (OJ L No. 9, 15.01.2003, p. 3); Directive 2008/48/EC of the European Parliament and of the Council of 23 April 2008 on credit agreements for consumers and repealing Council Directive 87/102/EEC (OJ L No. 133, 22.05.2008, p. 66); Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC

of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament (OJ L No. 304, 22.11.2011, p. 64); and Commission Implementing Regulation (EU) No 1203/2012 of 14 December 2012 on the separate sale of regulated retail roaming services (OJ L No. 347, 15.12.2012, p. 1).

In Community regulations, a durable medium should be understood in the following manner:

1. as defined in letter f of article 2 of Directive 2002/65/EC of the European Parliament and Council of 23 September 2002 – “(f) "durable medium" means any instrument which enables the consumer to store information addressed personally to him in a way accessible for future reference for a period of time adequate for the purposes of the information and which allows the unchanged reproduction of the information stored;
2. as defined in point 12 of art. 2 of Directive 2002/92/EC of the European Parliament and Council of 9 December 2002 – durable medium "means any instrument which enables the customer to store information addressed personally to him in a way accessible for future reference for a period of time adequate to the purposes of the information and which allows the unchanged reproduction of the information stored;
3. as defined in letter m of art. 3 of Directive 2008/48/EC of the European Parliament and Council of 23 April 2008 – durable medium “means any instrument which enables the consumer to store information addressed personally to him in a way accessible for future reference for a period of time adequate for the purposes of the information and which allows the unchanged reproduction of the information stored;”
4. as defined in art. 2 of Directive 2011/83/EU of the European Parliament and Council of 25 October 2011 – durable medium means any instrument which enables the consumer or the trader to store information addressed personally to him in a way accessible for future reference for a period of time adequate for the purposes of the information and which allows the unchanged reproduction of the information stored;
5. as defined in point 35 of article 4 of Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC – durable medium means any instrument which enables the payment service user to store information addressed personally to that payment service user in a way accessible for future reference for a period of time adequate to the purposes of the in-

formation and which allows the unchanged reproduction of the information stored.

The issue of s durable medium was also addressed in the judgments issued by the EU Court of Justice. In judgment C-49/11 (of 5 July 2012)²⁰⁴ the Court found that for the given medium to be considered durable, it is necessary to prove that a transmission of information with the use of that medium guarantees a lack of the possibility to amend the contents of the document delivered on such a medium, and guarantees availability in a suitable period, allowing consumers to recover the document contents in an unchanged form.

According to the Court, a website does not constitute an example of a durable medium, as defined in section 1 of article 5 of directive 97/7/EC, because the information included on a website is available to consumers solely by means of a link provided by the seller. The Court invoked the legal view presented in a judgment issued by the European Free Trade Association (EFTA) Court of 27 January 2010,²⁰⁵ that stated that a website may be considered a durable medium if it enables the customer to store information in an unchanged form in a way accessible for future reference for a period of time adequate to the purposes of the information. When issuing the judgment, the EFTA Court invoked, among others, the guidelines presented in a report by a European Securities Markets Expert Group (ESME)²⁰⁶.

In turn, in a recent judgment C-375/15 (of 25 January 2017), the Court of Justice of the EU considered that a Bank website (including the electronic mail within it), could be considered a durable medium, as it

“allows the payment-service user to store information addressed personally to that payment user in a way accessible for future reference for a period of time adequate to the purposes of the information and allows the unchanged reproduction of the information stored. Furthermore, for a website to be regarded as being a ‘durable medium’ within the meaning of that provision, any possibility that the payment-service provider or another professional to whom

204 CJEU judgement of 05.07.2012 in case C-49/11 *Content Services Ltd against Bundesarbeitskammer* (EU:C:2012:419, point 46).

205 Judgment of the European Free Trade Association (EFTA) of 27.01.2010 in case E-4/09 *Inconsult Anstalt ca. Finanzmarktaufsicht* (Official Journal of the EU C No. 305 of 11.11.2010, p. 16).

206 ESME’s report on durable medium – Distance Marketing Directive and Markets in Financial Instruments directive; http://ec.europa.eu/finance/securities/docs/esme/durable_medium_en.pdf [access: 11.11.2018].

the management of that site has been entrusted could change the content unilaterally must be excluded”.

The CJEU invoked the difference between the terms of “providing” and “making available” by the Bank website. It was indicated that

“the information concerned which is transmitted by the payment-service provider to the user of those services by means of an online banking website may be considered to have been provided within the meaning of Article 41(1) of Directive 2007/64, if such a transmission is accompanied by active behaviour of the provider aimed at drawing the user’s attention to the existence and availability of that information on that site”²⁰⁷.

The above judgments questioned the previous practices of banks (judgment C-375/15) but also of other entities (judgment (C-49/11) obliged to provide documents containing declarations of intent or the information, required by the law, consisting of publication of documents on the website of the entity obliged to provide them, without the possibility to “download” them so as to have permanent access to their unchanged contents. In other words, for the given IT tool to be considered a durable medium, the client must have free access to the information sent to that medium, including to documents, and their recording and storage on that durable

207 Justification of the judgment: *Articles 41(1) and 44(1) of Directive 2007/64/EC on payment services in the internal market, read in conjunction with Article 4(25) of that directive, must be interpreted as meaning that changes to the information and conditions, provided for under Article 42 of that directive, and changes to the framework contract as well, which are transmitted by the payment-service provider to the user of those services through the electronic mailbox of an online banking website, may not be considered to have been provided on a durable medium within the meaning of those provisions, unless these two conditions are met:*

– that that website allows the user to store information addressed to him personally in such a way that he may access it and reproduce it unchanged for an adequate period, without any unilateral modification of its content by that service provider or by another professional being possible; and

– if the payment-service user is obliged to consult that internet website in order to become aware of that information, the transmission of that information is accompanied by active behaviour on the part of the provider aimed at drawing the user’s attention to the existence and availability of that information on that website.

In the event of the payment-service user being obliged to consult such a website in order to become aware of the relevant information, that information is merely made available to that user within the meaning of the first sentence of Article 36(1) of Directive 2007/64, as amended by Directive 2009/111, when the transmission of that information is not accompanied by such active behaviour on the part of the payment-service provider.

medium must allow them to be recovered in an unchanged form for a suitable period of time.

Irrespective of whether the term “durable medium” refers to the banking sector and the regulations associated therewith, or to consumers and consumer rights, the attitudes of the European lawmaker and of the Court are similar. It is worth noting an attempt to standardize not only the term “durable medium” in the EU but also private law in the Draft of a Common Frame of Reference, in which art. I. – 1:106:(3) DCFR²⁰⁸ included proposal of a definition of a durable medium as any material on which information is stored so that it is accessible for future reference for a period of time adequate to the purposes of the information, and which allows the unchanged reproduction of this information.

Analyzing the above regulations, it must be stated that, as a rule, the definitions of a “durable medium” are consistent. In practice, there are small differences (e.g., such terms as: instrument, device or material), which mainly follows from the various periods in which they were introduced and from the conceptual framework used in the given legislative act, as well as from the absence of uniform terms related to cyberspace.

The main elements of the definitions, indicating the properties of a durable medium, are uniform and fixed in all of the above-mentioned definitions. These include: 1) the possibility to store information; 2) the possibility to recover stored information in an unchanged form; 3) durability, allowing unhindered access to the contents included therein at least for an adequate period of time, for the purposes for which the information thereon has been used.

The above review of definitions, and also judgments issued by the CJEU and practices applied, indicates a significant evolution of the term “durable medium”, as well as the notion of the document which should be provided under the above provisions. From a paper document and a traditional, physical, durable medium, through electronic documents on a physical durable medium (CD, DVD, etc.) to electronic documents and “dematerialized” digital media²⁰⁹ which was originally in “one place” (the uniform, physical location of a server) to a distributed recording and medium. Tech-

208 Draft of a Common Frame of Reference developed by the Study Group on a European Civil Code and the “Acquis Group” – European Research Group on Existing EC Private Law.

209 It is a sort of simplification, because a physical medium remains physical (servers, disks, etc.), but not necessarily under the control of the document’s addressee.

nological development has a significant effect on the understanding of the term of “durable medium”. A lot indicates the next stage will consist of blockchain technology.

When discussing the term “durable medium”, we should note the evolution of the term “document” to be provided using a durable medium. The definition of “electronic document” from the eIDAS Regulation is particularly significant and standardizing²¹⁰ – in point 35 of article 3 it states that an “electronic document” means any content stored in electronic form, in particular text or sound, visual or audiovisual recording²¹¹.

The issue of correct and practical implementation of “durable medium” is extremely important, taking into account the negative consequences, provided for in community provisions and their domestic implementations, related to financial, consumer and other regulations. That is why it is necessary to analyze the possibility to apply blockchain technology to meeting the requirements of a “durable medium”.

*Blockchain technology and durable media*²¹²

Despite the numerous pieces of legislation in which the term “durable medium” has been defined, that term should be considered uniform in the EU, which, to a considerable extent, results from judgments of the CJEU. A durable medium must perform the three basic functions indicated above. That is why the method of using the blockchain technology to meeting the “durable medium” requirements will be discussed “in abstraction”, without reference to particular legislation, indicating the properties that must be demonstrated.

The initial pilot programs and implementations demonstrate that proper implementation of the blockchain technology allows one to ensure the properties required by provisions of the law in terms of meeting the requirements of a durable medium. However, the application of blockchains alone is not sufficient. It is additionally necessary to introduce proper legal

210 Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC; L 257/73.

211 See also D. Szostek [in:] *Informatyzacja postępowania cywilnego*, ed. D. Szostek, J. Gołaczyński, Warsaw 2016, p. 69 et seq.

212 The issue described below may also apply to the construction of registers, ledgers, records, etc.

and organizational mechanisms, and to implement the system properly, especially considering that there are at least several methods of using the blockchain technology for meeting the requirements of a durable medium.

The whole process of meeting the requirements of the law by the entities bearing information obligations or the obligations to provide proper documents should be divided into the following processes: 1) preparing (generating) a document containing the contents required by provisions of the law (in the proper form required for the given activity²¹³), 2). securing it properly for the purpose of ensuring authenticity and integrity, 3) providing it effectively on a durable medium to the entitled person so as to allow a) storage of information on it; b) the possibility to recover the stored information in an unchanged form; c) durability so as to enable unhindered access to the contents stored for an adequate period of time, for the purpose for which the stored information should be used. This does not mean, however, that the entity obliged to provide a document on a durable medium is to lose the right to review it. In turn, they may not manipulate it, on their own delete it, change its contents or the document metadata, limit the access rights to the document, etc.

So far, in the “paper world”, in the case of the obligation to provide a document, there usually existed two counterparts thereof (the so-called original and a copy or two identical originals), one for each party. The piece of paper guaranteed the impossibility to change and the possibility to verify, in the case of claims of change, manipulation or forgery of a document. The blockchain technology is changing the way of functioning of block-recorded documents. Everyone entitled has the right to possess the register (and the data, to which it is entitled) based on the principle of sharing information. Therefore, “one” document is available to everyone entitled, recorded in a block, stored in a distributed manner by each person entitled. There are no “originals” or “copies”; there is document and access thereto, as well as the technological guarantee of its non-repudiation. On a piece of paper, authenticity and integrity are guaranteed by handwritten signatures (which, nowadays, are not difficult to copy and reuse). In an electronic document, that role is played by cryptographic protection. Proper application of blockchain technology is to guarantee a high level of cryptographic security of the document recorded in a block.

213 The issues of form exceed this study, which concentrates on the issue of using blockchain technology, its admissibility and the consequences of implementation.

Private or public blockchain as technology for durable media?

The contemporary digital trading makes use both of public and private blockchains. Because of legal regulations and obligations of EU entities towards consumers or recipients of financial services, as well as the legal system functioning in the EU, and the regulatory supervision over the financial sector, and the competition and consumer-rights supervision, it might seem that public blockchains are not advisable to be applied to a durable medium. It should be remembered that a public blockchain is fully open-source, within which everyone, without any personal or territorial limitation, may install suitable software on one's device and download the whole or any fragment of a database and, usually, make its "copy" available to other nodes. Operations within public blockchains usually do not require the consent of the ledger operators. However, this does not mean that it may not be used as a tool for meeting the legal requirements of a durable medium.

Use of private blockchains as technology for durable media

One of the proposals for effective provision of documents on a durable medium is use of the private blockchain technology available only to the entitled entity or entities which ensures confidentiality of the data included in the ledger to a higher degree.

The non-repudiation of a public blockchain consisting in its "democratization" and the need to obtain the consensus of all or a majority of the persons entitled to publish a document is not so necessary in the case of entities operating on a regulated market or in the case of entities operating under provisions of the law that bear liability for damages.

The non-repudiation and guarantee of Bitcoin consist in acceptance and consensus by many users and in cryptographic security by the "miners"²¹⁴. The non-repudiation and guarantee of authenticity of documents provided by the entities obliged to provide them on a durable medium result from provisions of the law, penal liability for making false statements or falsifying documents, civil liability (including for damages, in case of damage),

214 This does not mean that these persons do not bear legal liability. However, it is much more difficult to demonstrate, and even more difficult to adjudicate and enforce, taking into account the current "fledgling" stage of the legal aspects of Bitcoin.

as well as administrative liability before competent supervisory authorities. The blockchain technology “only” constitutes an additional technical and cybernetic security mechanism used for protecting those entities against violating the law and for proving effective provision of a document on a durable medium, and ensuring authenticity and integrity of the document provided.

In a private blockchain, the blockchain applied to the durable medium should be made available solely to entitled entities, upon prior consent of the system operator or operators (*permissioned blockchains*). Also, it should be managed by the ledger operator or, even better, operators. It is a very good idea to have multiple operators. That is because it allows a joining of consensus (on which a public blockchain is based) with a private blockchain, where approval of a record in a block may require the consensus of all, most or several operators (depending on the technical solution adopted). In the case of using the blockchain technology for provision of a durable medium by a single entrepreneur, usually that entrepreneur is the sole operator (e.g., for meeting the information obligation under consumer laws). In turn, in the case of a consortium (e.g., of banks), the optimum solution is consensus of multiple operators (e.g., of all the banks within the consortium or banks and technology provider). Such a solution makes protection not originate only from one provider of the service, but is secured with a network of nodes being controlled by various entities participating in the network. When using a private blockchain, blocks may be used for publishing whole documents or only hashes thereof.

Use of public blockchains as technology for durable media

There are many arguments for applying private blockchains as technology for meeting the requirements of a durable medium. However, the benefits of using blockchain technology are not always fully used, particularly if there is only one operator managing all the nodes. Although data is recorded in blocks, the same entity provides verification and acceptance services (which, as such, is not bad and meets the requirements of a durable medium).

An alternative solution to private a blockchain is the use of the benefits and non-repudiation of a public blockchain. It is possible to use it as a durable medium by publishing, in the blocks, not the whole documents provided, but hashes thereof, while recording the documents themselves in an external repository (archive) together with the hashes thereof. The

archive contains documents and hashes, and the blockchain – only the hash that allows the verification of the authenticity and integrity of the document recorded in the archive. Any change, modification or attempt at deletion is always detectable by comparing the document hash with the hash recorded in the blockchain.

Ways of recording documents on durable media

An important issue for meeting the requirements of a “durable medium” is specifying the method, or rather the “place”, or recording the data making up the document in the blocks, i.e., archiving it. It would be difficult to indicate a “place” in the traditional meaning of that word, because the process consists of recording (archiving) with the use of a computational cloud, in a distributed manner. The optimum solution would be to record the ledger with all the participants in the blockchain network, in their archives or repositories (servers), by means of DLT. This guarantees security of data recording, and makes hacking attacks significantly more difficult (an attack would have to take place at the same time on all the nodes). Also, it facilitates node recovery in case of data loss. However, it is not always possible, and in the case of using private blockchain technology – not advisable.

Another solution is storing the data in one location (an archive or repository). Such a situation takes place, for example, when it is one entity that uses blockchain technology. Recordings may be stored either on its servers or on the servers of the blockchain-technology service provider (an external archive), or both. From the point of view of a “durable medium”, it would be more beneficial to use several repositories. First, blockchain technology is based on data recordings grouped in blocks in multiple nodes (the more the better). Second, the more locations of block recording and network nodes there are, the higher the security is. Furthermore, an external archive allows one to meet the requirements of a durable medium indicated in CJEU judgments. Regardless of the archive location, data recording should take place using DLT (distributed ledger technology), ensuring integrity of the documents recorded. If a durable medium is established in a consortium, where many entities make use of the medium, with multiple nodes and “locations” of data recording grouped in blocks, the requirement of availability is fully met. In the case of one participant, in order to take into account judgment C-375-15 or the proceedings conducted in Poland by the President of the Office for Competition and Consumer Protection

(protecting against, among others, bank practices and publication of the information required by the act on electronic payments solely in their ICT system), it is necessary to provide an additional, external archive, either by the blockchain service provider or by another entity. In theory, one may indicate the solution where not only the consortium participants and service provider or another entity providing the external archive service store the data recorded in the blockchain, but the ledgers might be recorded by each entity obtaining a document on a durable medium, while access would be provided solely to the documents to which they are entitled (ensured through proper encryption and access policy), without the possibility to access others. Such a solution, although legal and meeting all the requirements indicated in the quoted judgment by the CJEU, and technologically possible (applied, for example, in Bitcoin, where everyone may download the whole ledger), does not seem practical, for example due to the potential size of the ledgers that need to be downloaded and archived, due to energy consumption of the process and the factual lack of need on the part of the client.

To sum up, in the blockchain technology, in particular in its open-source version, there are various possible ways of archiving documents to meet the requirements of a durable medium and ensure document authenticity and integrity, and to allow subsequent verification of authenticity of the document data and metadata. Blockchain blocks may be used to record the whole document. We then deal with its full verifiability, certainty of authenticity and integrity. The characteristics of an archive based on DLT with archiving of whole documents consist of a lack of the possibility to delete or change the object logs, i.e., the documents recorded or the information on them. It completely meets the requirements of a durable medium, i.e., invariability of the information provided.

Another solution is publishing a document and archiving it in a repository or several repositories with simultaneous recording, in a (private or public) blockchain, of information on the published document together with the result of its hash function. In that variant, the document itself is not recorded in a blockchain. The application of a blockchain-based data register ensures that the value of a hash function of a published document that is recorded may not be removed from the register. That property allows a client of a bank or a consumer, to whom the information is provided on a durable medium, to verify whether the form of the hash function for the document that has been provided to them has the same form as the one that was recorded during document publication. If both values are the same, it means that the document has not been amended after publication.

Technical modification of the document is possible then, but easy to detect (by comparing the hashes). A modified document will no longer have the same hash as the document recorded in a block. The solution described guarantees the possibility to verify document authenticity and integrity and meets the requirements of a durable medium.

“Forgetting” a document on a durable medium

Under a judgment issued by the CJEU, documents provided on a durable medium should be available so as to allow access to them and copy them in an unchanged form for an adequate period of time without the possibility for the provider or another entity to amend the contents thereof unilaterally. The blockchain technology offers such a functionality. What is important is that in case of recording the whole document in a block, the document is irremovable.

However, it is possible to “forget” it. Access to the given document in a block ledger takes place through cryptography that only allows authorized entities to read the document. Forgetting consists of destroying the cryptographic data that allows one to become familiar with the document, and thus making it impossible for anyone to read it. To meet the requirements included in the CJEU judgment, a durable medium must either completely exclude the possibility of “forgetting” (through proper cipher generation) or only allow the document addressee (or the addressee together with another entity, e.g., the bank) to “forget” it (by generating proper keys).

What is important is that in the case of forgetting, the blockchain ledger will keep the metadata which constitutes evidence that the document has existed, but its contents are then no longer available for any party.

“Providing” a document on a blockchain-based durable medium.

Contemporary technology is significantly changing the ways of providing documents. The previous physical transmission of control over a document (as in the case of a paper document) is being replaced by providing “access” to a document that does not exist physically and is only recorded in a cloud in digital form and cryptographically secured. The way of providing access logins (passwords) is also important for a durable medium. Under the judgment of the CJEU, only “*active behaviour on the part of the provider aimed at drawing the user’s attention to the existence and availability*”

of that information” meets the requirement of correct provision of information to the client, without the need for its active behavior, e.g., when entering a website of a bank or of another entity providing a document on a durable medium. The way of providing the login is an element of the organization and processes of the work of the provider of documents in a durable medium and usually follows from a contract or from the regulations applicable to the parties. For example, a login to the document may be sent by email, text message or in a different way. Access to the document ensured also in the case of termination of the basic contract with the client (whose contract provided the basis for the obligation to provide information on a durable medium). From the point of view of the law, access to a document recorded on a durable medium should be treated, in the case of expiry of the basic contract, as an innominate contract separate from the basic one. It may be concluded directly with the provider, but also with a consortium or with the operator providing the software. The term of the access contract should be at least equal to the period of limitation of the claim resulting from the original contract, unless the provisions of the law provide otherwise.

The issue of evidence is also important for the entity providing information on a durable medium, for its integrity and authenticity before court or administrative authorities, in the case of court or administrative proceedings. In the lack of change of civil or administrative procedure in terms of legal presumptions, the application of the blockchain technology makes the evidence process become subject to the general rules for evidence, and thus it is the entity providing a document on a durable medium that is obliged to prove its authenticity and integrity (“originality”). However, before a document is recorded in a blockchain, it may be marked with a qualified electronic stamp or a qualified electronic signature as defined in the eIDAS Regulation, thus obtaining presumption of authenticity and integrity of the document. Such a double security mechanism (using eIDAS and blockchain tools) is not required for technological purposes, but is very beneficial in legal terms for the entity providing a document on a durable medium.