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Digital assets and their use as loan collateral: Headline legal considerations

PHOEBUS L. ATHANASSIOU

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DEAR READER,

Welcome to edition 55 of the Capco Institute Journal of Financial Transformation. Our central theme is cloud computing, which has transformed from an efficiency initiative for our clients, to an indispensable growth driver for financial services.

The pandemic has changed consumer expectations, with consumers now demanding 24/7 access to their financial resources from anywhere, as well as hyper-personalized products that reflect their lifestyle choices.

In this edition of the Journal, we explore the power of cloud and its potential applications through the lens of a joint Capco and Wipro global study, and take a deeper look at the financial services data collected in Wipro FullStride Cloud Services' 2021 Global Survey. The survey was focused on perceptions of cloud and its importance to business strategy from over 1,300 C-level executives and key decision-makers across 11 industries.

The study indicates that cloud is becoming ever more intelligent, hyperconnected, and pervasive, and enables companies to offer their end users the personalized, user-centric experience that they have come to expect. It's clear that only the financial services firms that can successfully leverage cloud, will thrive.

In addition, this edition of the Journal examines important topics around digital assets and decentralized finance, including central bank digital currencies, and bitcoin's impact on the environment, and cybersecurity and resilience.

As ever, you can expect the highest calibre of research and practical guidance from our distinguished contributors, and I trust that this will prove useful in informing your own thinking and decision-making.

Thank you to all our contributors and thank you for reading. I look forward to sharing future editions of the Journal with you.

Lance Levy, **Capco CEO**

DIGITAL ASSETS AND THEIR USE AS LOAN COLLATERAL: HEADLINE LEGAL CONSIDERATIONS

PHOEBUS L. ATHANASSIOU | Senior Lead Legal Counsel, European Central Bank[1]

ABSTRACT

Although substantial in terms of market capitalization, the economic potential of digital assets remains locked, inter alia, on account of their still limited use as loan collateral. The wider use of digital assets as security for credit would both help their holders to capitalize on their digital asset holdings and contribute towards easing liquidity conditions in the market by allowing market actors at both ends of a lending agreement to tap into a substantial, but largely unutilized, repository of collateral. This article explores some of the legal parameters relevant to the use of digital assets as collateral, with an emphasis on how a security interest in digital assets can be created, the modalities for the realization of digital assets accepted as loan collateral, and the ways in which collateral takers (but also collateral givers) can be protected from fluctuations in the value of some of the more volatile types of digital assets tendered as loan collateral.

1. INTRODUCTION

Entrepreneurs routinely need access to credit, and one of the most obvious ways for them to obtain it is by securing their borrowing obligations with something of value, by way of collateral. Apart from being a precondition for entrepreneurs to secure credit in the first place, the availability of good collateral will also determine the affordability of the interest rate. Conversely, without access to good collateral, the funding of research, development, and business growth can be challenging for many a business owner. That being the case, it can be argued that it makes sense for entrepreneurs to only invest in assets that they can readily tender as collateral, should the need to secure extra liquidity arise in the regular course of business.

Recent years have seen substantial growth in the market capitalization of digital assets and, although this has not been linear, the value of the global digital assets market has increased significantly over time.[2] Because of the considerable financial value they represent, digital assets should also be expected to embody substantial potential as a source of good collateral. If digital assets have yet to be "integrated" into the mainstream financial system, and if their appeal remains relatively limited, this is also because of the relatively limited degree to which they were being used, at the time of writing, as loan collateral. The result is the "immobilization" of a substantial repository of value that, if ever exploited to the fullest degree possible, could support the injection into the real economy of much needed liquidity. What largely accounts for the hitherto reluctance of collateral providers and takers to

[1] The views expressed in this article are those of the author and are not in any way representative of the views of the ECB or the Eurosystem. This article builds on Athanassiou, P. L., 2019, "Cryptocurrencies and their use as loan collateral: core legal considerations," 34 Butterworth's Journal of International Banking and Financial Law, and on a draft Report of the European Law Institute, entitled "Use of digital assets as security" (forthcoming), of which the author of this article is the main author.

[2] In November 2021, the market capitalization of the global cryptocurrency market alone was estimated at about U.S.$3 trillion: Sanyal, S., 2021, "Global cryptocurrency market cap reaches the U.S.$3 trillion mark," Analytics Insight, November 10, https://bit.ly/3rhbVx8.

tender and to accept, respectively, digital assets as security is their relative novelty, and the attendant legal uncertainty surrounding the possibility of, and the conditions for, their use as loan collateral. Although I take no position on the advisability of using digital assets as collateral nor, indeed, on the suitability of all of the different types of digital assets as security, I do, nevertheless, see scope for non-partisan reflection on the use digital assets as loan security, so that their full economic potential can be exploited by those who, for whatever reason, choose to invest in and to hold them in their portfolio.

The aim of this article is to explore the basic legal conditions to be fulfilled for digital assets to be used as loan collateral. The analysis in this article revolves around three core questions. The first is how to create a valid security interest in digital assets, and what conditions may need to be fulfilled to facilitate such creation. The second is how collateral takers can concretely realize digital assets they have accepted as collateral in the event of the collateral giver's default on the loan obligations secured against the use of digital assets as collateral. The third is how collateral takers and collateral givers alike can be protected from fluctuations in the value of digital assets that they have accepted or tendered, respectively, as collateral.

Before turning to the substance of my analysis, four remarks are apposite by way of clarification regarding the ambition and scope of this article. The first is that, except where the context requires otherwise, the terms "security" and "collateral" are used interchangeably throughout this article. The second remark is that the scope of the analysis in this article is limited to digital assets that are amenable for use as collateral. What the main characteristics of those digital assets are is explained in Section 2. The third is that none of the three questions explored below can be definitively answered in a legal vacuum, in other words without reference to a specific system of rules to govern the private (mostly property) law effects of holding and transferring control or ownership of digital assets. To avoid tying the analysis in this article to the rules of any particular jurisdiction we draw attention, below, to the main lines of inquiry that collateral providers and their lawyers would need to pursue, regardless of jurisdiction, to determine whether and how digital assets could be used as loan collateral. Finally, the emphasis of this article is on the legal parameters of the mobilization of digital assets as collateral; accordingly, more practical considerations, such as the vulnerability of digital assets to cyberattacks or to market manipulation, important as they are (also in terms of the safe use of digital assets as collateral and their price stability), will not be considered in this article.

2. DIGITAL ASSETS SUITABLE FOR USE AS COLLATERAL

The notion of "digital assets" is closely associated with the relatively recent emergence of distributed data storage technologies and platforms. A survey of the field testifies both to the considerable breadth of that notion and, no less significantly, to the objective difficulty of defining "digital assets" in a monolithic way, given their many variants, the substantive differences amongst them, and the constant evolution in this space, which has, over time, seen new categories of digital assets added to those already in existence.

Not all digital assets are suitable for use as collateral. A digital asset should have at least three qualities before it can be used as loan security. First, it should embody "value", which is to be understood in economic terms (this would, for instance, exclude social media accounts, which, although digital, need not always embody economic value, whatever their emotional worth for their holders). Economic value may either be associated with the asset itself (for instance, in the case of a cryptocurrency or a digital-only security) or be derived from a tangible, real-world asset, which the digital asset either reflects (as in the case of an asset-backed token) or which is there to guarantee the digital asset's price stability (for instance, in the case of so-called "stablecoins"[3]). Second, there should subsist in it a "de facto right of exclusive use", defined as the right to access and enjoy the economic value that a digital asset embodies. Despite their intangible nature, and the uncertainty surrounding their legal characterization as subjects of property law, digital assets can be the object of exclusive control and so-called "rivalrous"[4] enjoyment, which are preconditions for the creation of security interests in them.[5] Finally, a digital asset should have the attribute of "certainty", which is a prerequisite both for the exercise of control over it and for its assignability, in accordance with the terms of a security agreement.

[3] The reference is to class of privately-issued means of payment designed to maintain a stable value relative to fiat currencies by being linked to a "safe" asset or to an external pool of liquid "reserve assets", including cash deposits.

[4] The reference is to the economic quality of certain assets or goods that can only be used or consumed by specific people if their supply or value are not to be adversely affected. It is the risk of the depletion of their supply and the depreciation in their value that accounts for competition (rivalry) with regard to their exclusive use and consumption.

[5] Unlike digital assets, digital data may lack the attribute of certainty, with an impact on assignability and the exclusivity of control over them.

The types of digital assets meeting those qualities include cryptocurrencies and stablecoins, uncertificated (i.e., electronic-only) financial assets (such as security tokens), non-financial asset type tokens (including utility[6] and certain payment[7] tokens), and hybrid tokens (i.e., digital assets that share some of the characteristics of more than one digital asset class).[8] It follows from the foregoing examples of digital assets amenable to use as loan collateral that these encompass both "pure" digital assets (denoting those that have been created and only exist in the digital world, in the form of tokens representing a unique set of valuable attributes, such as cryptocurrencies or security tokens) and "asset-backed tokens" (i.e., digital representations of already existing, physical assets, such as tokenized securities or bonds, tokenized gold bullion, tokenized real estate or patents), as well as so-called "non-fungible tokens" (NFTs), such as tokenized works of art or collectibles.[9]

3. CREATING SECURITY INTERESTS IN DIGITAL ASSETS

Except where it is the object of specific regulation, the creation of security interests in digital assets is, at present, an area of considerable legal uncertainty. This is because of the relative novelty of digital assets as an asset class, as well as their cutting-edge technological underpinnings that make it difficult to "localize" many of them in any particular jurisdiction, the laws of which would govern their use as security. As many digital assets tend to lack a physical location, it is fair to speak, in their case, of a "notional" location. This will depend on a multitude of factors, including the manner of their holding.

The determination of the modalities for the creation of a security interest in digital assets will therefore require, on the one hand, the determination of their notional location at the time of their use as security and, on the other hand, the analogous application to them of national law rules applicable to more conventional asset types. Put differently, to determine the conditions subject to which a security interest can be created in a digital asset, two questions need to be answered. The first is: "What is the law applicable to a particular digital asset?" In other words, within which national legal system's remit a digital asset unit is deemed to fall. The second is: "What type of asset does a given national legal order consider a particular digital asset to be?" These two questions are clearly linked to one another: to work out the requirements for the creation of a security interest in an asset, one must first determine the law applicable to creation. In turn, the type of the asset in question and, in particular, its legal characterization in a given jurisdiction will play a key role both in determining the applicable law (i.e., the law of the creation of security interests in that asset) and in applying it, by helping to identify the types of security interest that can be created in an asset as well as the applicable requirements for creation (e.g., in writing and/or by way of registration).

The answer to the first question (i.e., what is the law applicable to a digital asset) goes to the core of what digital assets are, and, unless definitively answered, it is apt to derail the efficiency of any attempt to establish an enforceable security interest in a digital asset. Taking the example of cryptocurrencies, these can be held in one of three different ways: either directly on the relevant distributed ledger, through an online "wallet" (custodian or non-custodian), or in a "cold storage" device (typically, in the cryptocurrency holder's personal computer – one that is not connected to the internet – or in another "remote" hardware storage device, such as a USB memory stick or an external hard drive). As suggested above, the way the cryptocurrency is held will largely determine the answer to the first question. While the jurisdiction of a given cryptocurrency unit may be easy to determine when held in a wallet (on- or off-line), the same will not be true if the same unit is held directly on the blockchain, which resides, simultaneously, everywhere and nowhere. It follows that only some cryptocurrency holdings may lend themselves to being used as loan collateral, since their jurisdiction (and, by implication, also the law governing the creation and establishment of an enforceable security interest over them) will only be ascertainable in some cases, but not in others.

[6] The reference is to a class of programmable digital asset that grants to its holder the right to exchange it in the future for products or services, actual or under development, digital or physical, which are provided (or are intended to be provided) by the token's issuer. Utility tokens both enhance their issuer's ability to quantify the value of the right that is the object of the token-issuance transaction and facilitate its transfer.

[7] The concept of payment (or currency) tokens refers to digital, non-financial assets aiming to fulfill the properties of "fiat" money, but without amounting to legal tender.

[8] One example of a hybrid token would be a digital asset that both represents a share of ownership in a company and entitles its holder to the right to receive the first product or service that the said company manufactures.

[9] NFTs are cryptographic, digital tokens that represent objects in the real (or the digital) world, such as underlying works of art or collectibles, and may (but need not) embody ownership rights. Their creation and authentication rely mostly on the use of the Ethereum blockchain, utilizing digital signatures to guarantee their uniqueness and indivisibility (hence, also, their non-fungibility).

The answer to the second question (i.e., "What type of asset does a given national legal order consider a particular digital asset to be?") depends mostly on national law considerations, and, without being infinite, the range of options is considerable. Different regulatory and supervisory authorities in different jurisdictions have, at different times, declared different types of digital assets to be "money" or "currency", "securities" or "investment contracts", "commodities", or sui generis digital (intangible) assets.

If the question of the categorization of digital assets arises in the context of a jurisdiction where no regulatory, supervisory, or judicial pronouncements exist, or in a jurisdiction where conflicting judicial or regulatory pronouncements have been made in respect of the categorization of particular types of digital assets, it is only with the benefit of prior legislative intervention that this question could definitively be answered. In any event, which asset class a particular type of digital asset is deemed to fall into is a key question: the answer to that question will determine the "form" of security interest that can be created over it[10] and the "manner" of its creation (different formality requirements will typically apply to the creation and perfection of different forms of security interest, such as registration, the taking of physical control over collateral, or the exercise of possession thereof).

To conclude, in order to create a security interest over a digital asset, clarity is indispensable, both in terms of its "location" and in terms of the "type of asset" that this is deemed to be for the purposes of the national legal order whose laws govern the creation of security interests in it. On the question of location, prior regulatory intervention would appear necessary, at least in those jurisdictions where the legal status of digital assets is either unregulated or otherwise unclear on account of conflicting regulatory, supervisory, or judicial pronouncements. Absent such intervention, many national legal systems are poorly equipped, at the present juncture, to address the issue of the creation of enforceable security interests in digital assets. On the question of the asset categorization of particular types of digital assets, which is crucial to determine the process of, and the modalities for the creation of a security interest in them, legal clarity is also desirable, at least in those jurisdictions where contradictory pronouncements have been made in respect of the legal characterization of digital assets.

> *"The creation of security interests in digital assets is an area of considerable legal uncertainty but, also, great commercial promise."*

Finally, it bears noting that some legal systems approach the question of the creation of security interests separately from that of their third-party effectiveness (i.e., their legal enforceability on third parties with claims over the same asset).[11] For those legal systems, these two questions would need to be addressed independently from one another, with a view to assessing whether or not a security interest created in a digital asset would also enjoy priority over any subsequent claim over the same asset.

4. REALIZATION OF DIGITAL ASSETS USED AS COLLATERAL

Once there is clarity on the asset categorization and location of a digital asset to be used as collateral, the collateral provider and the collateral taker can enter into a security agreement, inter alia, describing the loan collateral by reference to an accurate description (to distinguish it from other digital asset holdings of the collateral provider) and to establish the extent of the collateral taker's security interest in it. The security agreement will only be of value if the collateral taker can realize the collateral in the event of the collateral provider's default on their payment obligations.

Because digital assets are intangibles, they cannot be seized and enforced upon as one might do with tangibles. The modalities for the enforcement of a secured creditor's

[10] The choice will typically be amongst an assignment, a pledge, a mortgage, or a charge, fixed or floating (more than one of these collateralization techniques may also be applicable).

[11] Examples also exist of jurisdictions that apply the same set of requirements to the creation of security interests as well as to their third-party effectiveness.

rights in them will depend on their attributes. For instance, if the digital asset used as security is a token, given as (non-possessory) security to a secured creditor, the latter can only realize such token if they have access to the debtor's private key. One way to overcome the debtor's refusal to grant access to their private key is for the security agreement to foresee the debtor's entry into an escrow agreement with a trusted third party, transferring to that third party, for safekeeping, the private key to the token. Acting as escrow agent, the third party would then cooperate with the secured creditor in the event of the debtor's insolvency, to enforce the creditor's security right (e.g., through a sale of the token to satisfy the secured creditor's claim). Whatever the particular attributes of the digital assets used as security, it will be clear from the aforementioned example that their realization as loan collateral will call for the exercise of "effective control" over them, whether by the creditor or by a third party that both parties trust to hold the collateral for the duration of the creditor-debtor relationship.

What it takes to exercise such effective control over a digital asset is not a question that can be addressed without reference to its features. Using the example of cryptocurrencies, such as bitcoin, it should be noted that their effective owner is the holder of the private key to the account where that cryptocurrency is held.

Considering that, for instance, bitcoin units are linked through one public and one private key to a bitcoin address – or "account" – through which they can be sent, received, or stored, their transfer involves moving those units from one electronic address (within or outside the bitcoin blockchain ledger) into another. It follows that what is essential for the exercise of effective control over a bitcoin unit held in the bitcoin blockchain ledger is control over the private key to the account where this is held, whether directly on the bitcoin blockchain ledger or indirectly through a wallet (on-line or off-line). It also follows that, for as long as collateral providers keep their private keys private, they continue to exercise control over their bitcoin holdings, which they can transfer at will, without the creditor's knowledge (the bitcoin blockchain ledger will record bitcoin transfers but, crucially, it will not record borrowings or security interests in bitcoin units).

As the reader will have deduced from the comments above, borrowers who use digital assets as collateral have an incentive to maintain control over the private key to their account. For their part, collateral takers have an interest in monitoring their borrower's ability to dispose of their cryptocurrency holdings, to ensure that the protection they enjoy, as collateral takers, will not prove illusory in the event of the collateral giver's default on their repayment obligations. Mutual distrust is bound to have an adverse effect on the readiness of both

parties to a lending transaction to part with their funds (in the case of a creditor) or with their digital asset collateral (in the case of a debtor who is a holder of digital assets).

As suggested earlier, one way to "square the circle" is by involving a trusted third party in the process. One such suitable third party is a wallet provider, willing to act as escrow agent for the duration of the creditor-debtor relationship between the collateral provider and the collateral taker. Crucially, provision would need to be made in the security agreement against the risk of the wallet provider's insolvency, which could result in a situation where either the cryptocurrency units tendered as collateral or the private keys to the account(s) where these are held become part of the wallet provider's bankruptcy estate.

There are other ways in which trust can be established between a creditor and a debtor, even without the involvement of a trusted third party. One is through the physical delivery, by the collateral giver to the collateral taker, of control over the collateral, but in a form that protects the collateral provider against the risk of its non-return after the loan has been repaid in full. This could, for instance, be achieved by collateral providers handing-over possession of their digital assets and, more specifically, of the private key to the account where these are held in the form of an encrypted storage device. Although practical, this solution would not protect either party from the risk of the physical loss of the encrypted storage device (this would entail the definitive loss of control over the digital assets tendered as collateral).

Another alternative is through recourse to a smart contract[12] between a lender and a borrower, written on a blockchain or another DLT-run platform (including that of a wallet provider). The aim of the smart contract would be to automate the process of the realization of collateral in the event of the borrower's default on their repayment obligations. Alternatively, the smart contract could be used to release the collateral after the borrower has complied with their repayment obligations, without any possibility for the parties to the security agreement to tamper with the collateral for the duration of the creditor-debtor relationship, and without the need for third-party intermediation, provided the lender's and the borrower's technology and processes are consistent with their participation in a shared platform to host the smart contract.

To conclude, because the process of realizing collateral in the form of a digital asset will involve the exercise of effective control over it, and because effective control over a digital asset necessitates control over the private key to the account where that digital asset is held, the parties to a lending transaction will need to devise ways in which to protect their legitimate interests in the loan collateral, without intruding too much into those of their counterparty.

The three ways in which this can be achieved are by involving in the process a trusted third party (e.g., a wallet provider willing to act as escrow agent), by arranging for the physical delivery of control over the collateral, but in a way that shields the borrower against the risk of its non-return, or by resorting to a smart contract. The first avenue could prove workable, but it is, arguably, difficult to square with the disintermediation goals of digital financial innovation. The second option is vulnerable to the loss of collateral, while the third one presupposes the use of a third-party intermediary or the use, by both the collateral provider and the collateral taker, of technology and processes that are compatible with the use of smart contracts.

5. PROTECTING THE PARTIES TO A SECURITY AGREEMENT FROM FLUCTUATIONS IN THE VALUE OF DIGITAL ASSETS

The valuation of assets offered as security may present certain challenges, especially where these are intangible, as in the case of digital assets. What is more, certain types of digital assets are notoriously volatile. The flagship type of digital assets that is prone to volatility are cryptocurrencies. To draw on the example of bitcoin, its price fluctuated between U.S.$19,783.21 on December 17, 2017, and U.S.$3,874 in early March 2019, following the crash of 2018 (itself preceded by a massive wave in appreciation in the course of 2017; it is telling that, in December 2016, bitcoin's price stood at a mere U.S.$930). On December 31, 2021, the price of bitcoin stood at a staggering U.S.$45,800. Other cryptocurrencies, including Ethereum, have also displayed a similar pattern of volatility. Because of their volatility, which tends to exceed that of more "traditional" assets, cryptocurrencies used as security may appreciate or depreciate substantially in value during the lifetime of a security agreement.

[12] The reference is to a software protocol (i.e., computer code), which is executed automatically (hence, without human intermediation), as soon as certain pre-programmed conditions, agreed upon between the parties to the smart contract, have been satisfied.

The volatility of cryptocurrencies need not prove fatal to their use as collateral, provided the parties to a lending arrangement have factored in the risk of their eventual appreciation or depreciation. One way in which this can be achieved is by the parties making use of a smart contract to track fluctuations in the value of cryptocurrencies tendered as collateral, and to either trigger a "margin call", in the event of a depreciation in the value of the collateral, or to automatically release some of the collateral tendered, in the event of its appreciation. Although theoretically practicable, the use of smart contracts for this purpose is contingent on the technology and processes of the parties to a security agreement being consistent with their participation in a shared platform, where smart contracts can be hosted and applied to the monitoring of fluctuations in the value of cryptocurrencies tendered and accepted as collateral.

Another way in which the parties to a security agreement may cater for the risk of volatility peculiar to cryptocurrencies is by making provision for fluctuations in the value of the cryptocurrency units tendered and accepted as collateral. Security agreements will typically specify the asset or property being held as collateral under the agreement, including its description by type, quantity, and, crucially, value. Absent any contrary provisions or doctrine under the law of contract governing the security agreement, the inclusion in a security agreement of a mechanism for the valuation of the digital asset or assets tendered and accepted as collateral, to cater for potential fluctuations in value, should not vitiate the legal effect and the enforceability of that agreement by rendering it ambiguous, vague, or indefinite.

6. CONCLUSION

Applied to the world of finance, digital innovation holds several promises. These include creating entirely new, investable asset classes, free of the costs, delays, and complications that surround the issuance of traditional assets, such as securities and bonds, and the trading of such traditional assets, especially across borders; facilitating the transfer of ownership in digital assets without the need for intermediaries or a "paper trail", and with immediate finality (at least in operational terms); and simplifying the issuance of, and trading in, tokenized versions of conventional assets classes, including those subsumed under the term "securities".

One of the factors that would help make digital assets even more attractive is the possibility for their holders to use them as security in their borrowing operations. The use of digital assets as security for their holders' borrowing obligations would bring with it several benefits. To start with, it could allow digital asset holders to monetize their holdings without having to divest themselves thereof (thereby not foregoing the benefits of their future appreciation).[13] Moreover, it could help to ease liquidity conditions in the market by allowing market actors at both ends of a prospective lending agreement to tap into a substantial, but unutilized, depository of good collateral. That said, the use of digital assets as collateral would also come with certain challenges. As explained in this article, these would affect both the creation of security interests in digital assets and their realization. Until those challenges have been overcome, in some cases with the benefit of legislative intervention, digital assets are unlikely to represent a source of collateral that many debtors and creditors alike will be willing to draw on for their routine business dealings, not because digital assets lack value but, rather, because market actors lack the tools necessary to "unlock" that value by, inter alia, tendering and accepting them as collateral.[14]

[13] An investor's ability to monetize their digital asset investments, without having to divest themselves thereof, is also likely to provide an additional incentive for them to invest further, increasing demand for digital assets.

[14] At the time of writing, it was mostly specialized venues and platforms, such as SALT, Nexo, and Abra, that extended loans to borrowers against their cryptocurrency holdings (mostly, bitcoin and ethereum) as collateral (on condition that borrowers transfer their cryptocurrencies to custodian wallets). The interest rate on loans is calculated depending on the loan term (the shorter the loan, the lower the interest rate) and the loan-to-value ratio (the more the collateral, the lower the interest rate).

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