Stellar Development Foundation

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

September 30, 2023

Decentralised Finance (DeFi), Trading Protocols and Governance Issues: Discussion Paper
Autorité des Marchés Financiers (AMF)
Submitted via: innovation@amf-france.org

Subject: Response to Discussion Paper on DeFi

To Whom It May Concern:

The Stellar Development Foundation (SDF) is pleased to submit a response to AMF's discussion paper on DeFi in France. This response addresses specific questions raised in the discussion paper related to permissionless networks, open source, and smart contracts. We appreciate the opportunity to inform the important work of AMF on DeFi regulation.

Overview of SDF and the Stellar Network

By way of background, SDF is a U.S.-based nonstock, nonprofit organization that contributes to the development and growth of the Stellar network and the "Stellar ecosystem" – the individuals, developers, and businesses who build on or interact with Stellar. Stellar is an open-source blockchain network that connects the world's financial infrastructure. Founded in 2014, SDF helps maintain Stellar's codebase, supports the technical and business communities building on the network, and serves as a thought partner with policymakers, regulators, and institutions. Our mission is to create equitable access to the global financial system, using the Stellar network to unlock the world's economic potential through blockchain technology.

From a technology standpoint, Stellar is a publicly available, decentralized, fast, scalable, and sustainable network for financial products and services. It is both a cross-currency transaction system and a platform for digital asset issuance that offers unique asset issuer controls. The Stellar network does not privilege any form of currency or digital asset over another: instead, it provides the ability to efficiently and reliably trade any kind of value in a transparent and efficient way. Financial institutions and fintechs worldwide issue assets and settle payments on the Stellar network, which grew to 72.8 million payments in Q2 2023. As of September 2023, over 13 billion operations had been processed on the Stellar network.

As an open, interoperable payments platform, Stellar has an engaged developer community and strong documentation and software tools that support integration and connection to the network. The

Stellar Development Foundation

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

Stellar network brings together digital assets and traditional finance. The core protocol is complemented by ecosystem protocols (SEPs) that facilitate interoperability between financial entities connected to blockchain infrastructure and the traditional banking system. Through these SEPs, the Stellar ecosystem is unique in focusing on connections between traditional financial markets and digital assets. For example, MoneyGram International in 2022 announced MoneyGram Access, a first-of-its-kind global on/off-ramp service for digital wallets utilizing the Stellar network. With the launch of this program, users of digital wallets integrated with MoneyGram can now move seamlessly from cash to digital assets to cash again–all without requiring a bank account or credit card. MoneyGram International agents, as the designated on- and off-ramps, perform required compliance screening, ensuring that strong know-your-customer mechanisms remain in place. MoneyGram Access creates an important bridge between digital assets and cash, demonstrating that blockchain can–and should be–interoperable with traditional financial infrastructure.

Responses to Discussion Points

Discussion point 1 – Permissionless versus permissioned blockchain protocols

SDF strongly believes that any regulation of DeFi should be done after careful study and consideration of the unique characteristics of these new products and services – including the open, permissionless nature of the underlying blockchain technology upon which they are built. . Developing an appropriate regulatory framework for DeFi will drive further innovation and competition, and will promote consumer protection. Because DeFi harnesses open source technology, we urge authorities to keep the benefits of open, public technology in mind while crafting regulatory approaches. Consumers and end users stand to benefit considerably from open system environments, as they promote important features such as interoperability and diversion of power from a centralized entity.

Today, open systems have become an unofficial standard for how many essential technologies work – the Internet is an example of a system that adopted common standards to optimize performance and behavior. In fact, many industries continue to work towards a more standardized ecosystem. For example, SWIFT–a global messaging network for financial institutions–is adopting a new messaging repository to use among financial institutions. This initiative is creating a universally adoptable, open-source platform with data-sharing capabilities to improve cooperation among financial institutions.[1]

It is important to consider the implications of a world in which the pendulum swings back toward closed systems and technology is siloed. In closed systems, software development is privatized,

[1] ISO 20022 Registration Authority, [“APIs and ISO 20022.”]

Stellar Development Foundation

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

user data is created and controlled by only a handful of major corporations, and applications, hardware, and content are subject to "walled gardens"–an environment in which a technology provider exerts significant control and suppresses consumer choice. These conditions lead to a narrow playing field where a few institutions wield disproportionate power and stifle innovation from smaller competitors. Once power is consolidated, it becomes increasingly difficult to dismantle, as seen in the current state of the technology sector, in which a select number of mega companies dominate much of the landscape. Consumers and policymakers alike therefore depend on a world that allows for and encourages connected, essential technology. To do so requires embracing an open system philosophy that promotes interoperability, integration, and compatibility as technologies grow and scale.

An open system accomplishes this goal through three interrelated philosophies: open Source, open Access, and open Data. Although each of these three philosophies has its own characteristics, they share many important commonalities that provide necessary redundancies in a resilient open system. Members of an open system work together by agreeing on standards to reduce software fragmentation, sharing network infrastructure to improve service delivery, and sharing data to build better services. Although applying the open system philosophy broadly may be novel, the importance of an open system is not. A common, interoperable, and flexible environment is critical to the future of systems design to ensure equitable, diverse, and accessible participation and control.

While open access networks are mostly used in the telecommunications industry, this model is relevant and equally as important to other infrastructure corridors as well. One important application is public, open access blockchains. These infrastructures are neutral platforms that anyone can use and are maintained by unaffiliated, independent developers who are interested in supporting the network's infrastructure. Service providers can then build additional features with users in mind, focusing on issues such as improving transaction speed. This creates competitive markets, which are known to lower costs for users and barriers to entry. In both the digital and real world, open access networks create competitive marketplaces by aligning incentives and focusing efforts. Service providers innovate to compete for users and network providers focus on building resilient, effective infrastructure to attract service providers.

Discussion point 2 – Smart contracts

European policymakers have made significant progress on designing a comprehensive legal and regulatory framework for digital assets. The EU published the Markets in Crypto Assets (MiCA) regulation, which provides the regulatory clarity needed to foster competition, innovation, and transparency. Under MiCA, EU policymakers committed to a timeframe to assess decentralized finance and to decide whether further regulations are needed to complement MiCA. In parallel, European

Stellar Development Foundation

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

policymakers enacted the Data Act. The purpose of the Data Act is to regulate data sharing in the context of Internet of Things products, like smart devices, but it also includes a provision on smart contracts. While this legislation is not intended to regulate smart contracts beyond the scope of the Act, the smart contracts provision has damaging, wide-ranging implications. Specifically, the text imposes unworkable requirements on smart contracts built on public blockchains, such as requirements that smart contracts have termination and interruption features, among others. Such features were also highlighted in the discussion paper.

The Stellar blockchain provides fast and low-cost infrastructure for payments. Soroban, a smart contracts platform that seamlessly integrates with and works alongside the existing Stellar network, is currently live on Testnet. Deploying Soroban on the public network is subject to a validator vote, which is expected to take place in the coming months..

Soroban provides the tools for ownership and control of financial tools. It enhances the capabilities of the Stellar network by complementing the many on/off ramps already built on the network. For example, liquidity pools–which are smart contracts that contain and can deploy crypto assets–ease lending and borrowing practices because users can borrow from a pool rather than identifying a specific lender. Smart contracts can also alleviate a variety of common barriers to financial access like credit and operational risk, distance, and service accessibility by allowing builders anywhere to create platforms and products for anyone to use.

Payment and currency programmability are novel features made possible by smart contracts. Payment programmability is a feature that allows transactions to be executed automatically when certain conditions are met. For example, payments can be triggered automatically only when receipt of goods has been confirmed. Programmable payments can also improve consumer protection by introducing clawbacks that automatically reverse payments when conditions are not met. Programmable payments can also support faster disaster relief efforts. For example, parametric insurance could use smart contracts to automatically pay a set amount based on the magnitude of a natural disaster event rather than navigating the traditional claims process. Currency programmability allows currency to be pre-programmed at issuance. This opens up opportunities to ensure that cash assistance and other benefit disbursements are best used for their intended purpose. For example, government agencies can use programmable money to support the distribution of conditional cash transfers or financial aid programs. Additionally, Soroban will further connect the global network of Stellar users to continue supporting humanitarian efforts. Soroban can leverage the global community by allowing anyone to support any number of projects. Rather than being limited by local services and traditional banking, efforts like micro-lending of projects can be facilitated by anyone on the Stellar network via smart contracts.

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

Discussion point 3 – Use of open source software

Source code is the fundamental building block for digital programs and undergirds the core functions of all software. Open systems are powered by source code, but designate code as open-source. Under definitions maintained by the Open Source Initiative–the steward of the Open Source Definition, the set of rules that define open source software–an open-source license allows anyone to freely use, modify, and redistribute software based on open-source code.[2] Among these rules, some are particularly important to note: the source code must not be intentionally obfuscated, the license must allow derivative works and their distribution, and the license must not set parameters that restrict derivative software. In contrast, proprietary software is developed behind closed doors and is subject to strict licensing restrictions that prevent others from accessing and developing the source code. The benefits of open-source software continually shape how the Internet is used: two open-source web servers, Nginx and Apache, account for over 60% of all websites on the Internet.[3]

Open-source software is important for businesses, developers, and users because it enables fast, flexible, and robust development and security that leverages community-driven guidance and expertise. Open-source programs are commonly built on an array of prefabricated source code, so builders can focus on more advanced developments rather than investing time in designing a program's fundamental features. Standardized and open-source code also allows community users and developers to directly affect software development and make changes without waiting for vendor-led updates. Because open-source code is not limited by vendor constraints, developers can build products that are well-suited to user needs by making necessary changes themselves. In fact, the longevity and usefulness of open-source projects underpin much of existing technology and applications. The Linux Foundation estimates that free and open-source software constitutes 70-90% of any given modern software.[4]

Open-source code is also enterprise-independent and permanent. By existing independently of any one group of developers, platforms that use and create derivative products do not have to worry that software will no longer be supported–a major concern from both a usability and a security perspective. Unsupported software means that developers no longer provide patches, fixes, or updates to software, leaving systems open to vulnerabilities and posing security risks for end users and their information.[5] For example, the WannaCry ransomware attack in May 2017 targeted legacy Microsoft

---

[2] Perens, Sroka, Stu, "The Open Source Definition."
[3] W3Techs, "Usage Statistics and Market Share of Web Servers, August 2023."
[4] Perlow, "A Summary of Census II."
[5] Prozac, "5 Security Issues From Using an Unsupported Operating System."

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

operating systems that had reached end-of-life. One of the largest institutions affected was the National Health Service hospital system in England and Scotland, which at the time of the attack had thousands of computers running Windows XP, an operating system that had not been updated since 2014.

In general, the safety concerns and protection of open-source and proprietary code do not differ significantly. Companies and contributors have a common interest to keep projects secure, which requires similar necessary precautions for both open-source and proprietary code. In fact, the National Institute of Standards and Technology, a U.S. government agency that develops, promotes and maintains metrics and standards for several industries, created guidelines highlighting best practices for securing software that apply to both open- and closed-source code.[6] Further, proprietary software does not guarantee security and is often not more secure–in 2022, a hacker group called Lapsus$ stole 90% of Microsoft Bing's source code.

Open-source code has one specific advantage over proprietary code when it comes to security: open-source relies on a network of community contributors that can subject code to more rigorous scrutiny. Researchers from Microsoft and the U.S. Department of Homeland Security concluded that open-source code reinforces sound security practices because it involves many people who can quickly expose bugs and provide reusable, secure, and working code.[7] They maintain that proprietary software patches are often slowed down by process flows while the open-source community can implement fixes faster. The open-source community is not simply a group of hobbyists; the popularity of open-source projects means corporations have vested interests and employ experts who are also devoting their efforts to finding and fixing issues. While improving security and reliability by relinquishing control of a system to a network of individuals may seem counterintuitive, community-led responsibility is a critical feature of open systems. Both users and systems benefit from collective innovation by receiving access to resilient, customized, and secure applications.

Discussion point 7 – Decentralisation and degree of control

While the discussion paper's question on decentralization focuses on governance of DAOs, we want to take the opportunity to share SDF's perspective on decentralization broadly, and how regulators may wish to evaluate a blockchain network's degree of decentralization. In general, a system that is "decentralized" operates through a series of rules that coordinate the contributions of diffuse individual

[6] Black, Guttman, Okun, [Black, Guttman, and Okun, "Guidelines on Minimum Standards for Developer Verification of Software."]
[7] Clarke, Dorwin, and Nash, ["Is Open Source Software More Secure?"]

Stellar Development Foundation

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

components, or nodes. These nodes are self-organized, and interactions among nodes collectively achieve the system's goal without the need for a central guiding or authoritative entity. As such, each node is responsible for contributing to the purpose of the system and one node or component can not operate the system independently. In the case of blockchain, this purpose could be verifying and recording transactions. In open blockchains, that verification is not done by an individual or affiliated group of users, but by a network of independent computers that each act as nodes of the blockchain. These nodes interact and make decisions collectively through a consensus process. No single entity owns or controls the network, and power and trust are distributed among its users. A blockchain can successfully operate in this decentralized way because of protocols that establish the underlying set of rules and standards that define how each node will function and, in turn, how the network will function.

In a centralized system, the behavior of a network is orchestrated by a central influence or control. This is in contrast to a decentralized system, in which there is no central coordinating or governing unit. However, decentralization and centralization are not binary. Instead, decentralization-centralization should be understood to be a spectrum; neither is absolute. Blockchain networks may have some dimensions that are decentralized, and others that are more centralized. These dimensions are rarely static, and may become more decentralized or centralized over time as a network and its ecosystem evolves.

We appreciate efforts in France to develop a comprehensive understanding of what constitutes a decentralized network. Creating a meaningful framework for what determines a network's degree of decentralization will help provide regulatory clarity and support the growth and development of the blockchain industry as a whole. SDF recommends the development of a straightforward, multi-factor framework for evaluating a network's degree of decentralization, one that allows regulators the ability to evaluate *specific attributes* of a network and its underlying protocol. A broad framework that draws on high-level principles allows for adaptability, and avoids a situation in which strict criteria developed today fail to capture future innovations. Such a framework positions policymakers and regulators to address fundamental questions about whether a network has characteristics of centralization, such as:

- Is the network governed by a single entity or affiliated group?
- Is there a risk of collusion or concentration of power among a few participants in the network?
- Can one or more participants acquire enough influence to compromise the decision-making protocol in the network and have outsize power?
- Is there any single point of failure in the system?
- Is the decision-making process for initial and ongoing design decisions open and inclusive?
- Can anyone participate in the validation process without explicit permission?

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

- Can all participants – ordinary users and validators – freely join and leave the network?
- Does the network accommodate participation from a diverse set of stakeholders?

To help answer these questions, SDF created a *simplified* framework that isolates two key dimensions of decentralization and gives policymakers the tools to quickly determine where a network falls on the decentralization-centralization spectrum. SDF recognizes that other dimensions of decentralization exist beyond the two we have identified, and that nuance is lost in developing simplified evaluation criteria. However, a highly complex framework would be incompatible with easily administered policies and would be burdensome to apply in practice. SDF therefore recommends a streamlined, practical framework that can be applied to any blockchain network, regardless of consensus mechanism. Because some systems are designed to become more decentralized over time, the framework may indicate centralization in one or both dimensions if applied early in a network's development. The framework therefore captures only a moment in time, and should be reapplied as a network matures.

Decentralization Dimension	**Definition**	**Metric**
Architecture	This dimension measures whether the number of systems involved in a blockchain network are sufficiently distributed so that there are limited points of failure. A higher degree of architectural decentralization implies a more resilient system: even if one or more systems crash, the network continues to operate.	Measuring a system's robustness in the face of *correlated failures* can help determine that system's degree of architectural decentralization. The severity and likelihood of correlated failures can be evaluated by assessing concentration risk in key areas, such as the following: ● Geographic *(ex: node operators are concentrated in a single region)* ● Network *(ex: nodes are reliant on a limited number of cloud providers)*

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

Governance and Decision-Making	This dimension assesses the distribution of power and decision-making authority within the network. It evaluates the likelihood of centralized power among a limited number of participants. This process can be unintentional and organic, or facilitated by malicious actors that aim to influence protocol changes solely to benefit themselves. This dimension also evaluates whether a protocol's design motivates participant coalescence. As governance converges on a network, select participants accumulate outsize influence in decision-making and the system is no longer decentralized.	The *Nakamoto Coefficient*[8] represents the minimum number of nodes required to disrupt a blockchain network. The larger the Nakamoto Coefficient, the more decentralized the network's effective operational governance is.

* * *

[8] SDF acknowledges that the Nakamoto Coefficient is a simplistic metric for determining a network's degree of governance and decision-making decentralization. Active research is underway within the Stellar Development Foundation to develop a rigorous, quantitative framework for evaluating governance, but this is a longer-term process. In the interim, however, the Nakamoto Coefficient serves as a practical heuristic, one that provides a high level impression of the distribution of power and decision-making authority on a network.

Stellar Development Foundation

475 Brannan Street,
San Francisco, CA 94107
hello@stellar.org

MiCA's finalization has helped establish Europe as a significant international player in blockchain technology. SDF looks forward to further engagement with European and French regulators and policymakers on the design of a comprehensive and effective legal and regulatory framework for DeFi and smart contracts. We appreciate the opportunity to respond to the consultation and would be pleased to provide additional information that AMF might find useful.

Sincerely,

Candace Kelly

Candace Kelly
Chief Legal Officer & Head of Global Policy and Government Affairs
Stellar Development Foundation