

DeepSquare Whitepaper 2.1

April 2023



GENERAL DISCLOSURE

Readers should be aware that the whitepaper has been developed by the founders and advisors based on their respective best knowledge of the current state of blockchain technology, which is rapidly evolving and presenting new challenges and risks. Therefore, it may be subject to discretionary changes and modifications during and after the token sale, and the whitepaper will be updated accordingly. The latest version will be available on the official website.

The whitepaper does not constitute an offer or invitation to sell shares, securities, or rights belonging to the Company or any related or associated company. None of the information or analyses in this whitepaper are intended to provide a basis for an investment decision, and no specific investment recommendation is made. Accordingly, the document does not constitute investment advice or an invitation to invest in any security or financial instrument of any nature whatsoever.

The whitepaper also does not constitute or form part of, and should not be construed as, an offer for sale or subscription, or an invitation to buy or subscribe to securities or financial instruments. The document or any of its component parts should not be used as a basis for, or in connection with, a contract for the sale of securities or financial instruments, or a commitment to sell securities or financial instruments of any kind. No guarantee is given regarding the liquidity of the tokens acquired in the offer, the existence of a secondary market, or the exchange value of said tokens in legal currency. Additionally, the regulatory framework applicable to the offering and the tokens, as well as the tax regime applicable to the holding of tokens, are not yet defined in certain jurisdictions.

Due to the global nature of the token and its legal qualification, which is still developing and may greatly differ per jurisdiction, it is expected that not all persons from all jurisdictions will be allowed to participate. The Company does this to avoid the inadvertent transaction in a non-compliant manner in relation to the token sale. Please note that such exclusion does not imply that the Company assumes such a transaction would be non-compliant with relevant laws in such a jurisdiction, or the reverse if participation is from a specific jurisdiction. The Company uses its discretion to sensibly invest resources and limit potential risk for token holders. If the purchaser has any doubts about the content of the present document, they should consult their accountant, tax consultant, or solicitor.

We aim to disseminate further information on the token sale and further developments in English. From time to time, the information may be translated into other languages. Readers of this whitepaper should be aware that some of the information may be inadvertently omitted or not adequately translated, leading to the risk of mistakes and misinterpretation. The accuracy of such alternative communications cannot be guaranteed. In the event of conflicts or inconsistencies between translations and the original language, the provisions of the document in the English language shall prevail.

EXECUTIVE SUMMARY

High performance computing (HPC) has become a crucial component of the digital economy, providing a means to solve complex problems faster and at lower cost than traditional computing. As the need for powerful computing resources grows and the cost of acquiring HPC clusters increases, **the HPC market must undergo a transition** to keep up with the demand.

DeepSquare strongly advocates for a new generation of decentralised cloud infrastructure for HPC that can enable businesses to access the power of HPC at a lower cost without having to invest in expensive hardware. With the outsourcing of compute and storage, users can simply rent the necessary resources, thus eliminating the need to purchase and operate the resources themselves. This approach can greatly enhance business efficiency and productivity across various industries, such as AI, Metaverse, gaming, and securing Blockchain protocols, as well as verticals such as modelling, simulation, and machine learning.

DeepSquare aims to utilise its expertise, Grid Partners network, and technical infrastructure to effectively address the growing need for HPC in enterprises. By providing greater **flexibility, standardisation, stability, and reduced cost** in accessing HPC resources, DeepSquare can create a more competitive market. The significant increase in computing power needs across various industries necessitates an infrastructure to **optimise the distribution and monetisation of unused and costly acquired computing power**.

DeepSquare proposes a virtuous and evolving ecosystem centred on the HPC needs of companies, bringing together all key players in HPC and **distributing wealth according to each party's contribution**. DeepSquare presents **a novel High-Performance Computing as a Service solution designed to meet the growing demand for computing power in various industries**.

DeepSquare's solution is composed of several complementary components designed to display computer power flows, including:

1. **Pooling decentralised computing power through its network of compute providers (Grid Partners)**, enabling scalability according to HPC flows and providing a more efficient solution for professional users.
2. **Streamlining access to HPC resources at a lower cost and with a seamless experience**, based on the computing power needs of companies, while also optimising the distribution and monetization of unused computing power from Grid Partners.

3. **Standardising the unit of measurement for computing power resources by tokenizing computing resources and empowering Grid Partners**, thus providing an objective standard for consistent and transparent comparisons across various platforms and providers. This facilitates informed decision-making in the HPCaaS market.

DeepSquare leverages Blockchain technology to precisely measure computing resources available on the DeepSquare Federated Grid (DFG) while ensuring the optimal allocation of the computing power delivered by HPC providers and to **monetize them for business-to-business (B2B) clients**.

The DeepSquare **economic fundamentals has a dual-track approach** which combines the measure of the computational power available with a standard unit token called “**GFL**” and provides a right to use computing resources without owning the infrastructure for businesses thanks to **DPS** token. DeepSquare **allows providers to monetize their costly acquired computing power resources** by making them available to the DFG while decreasing the costly entry barrier to use HPC for companies.

DeepSquare's innovative approach offers **benefits to both consumers and providers of computing power**. Having already secured, between 2021-2022, \$3.5 million raised during a seed fund comprising retail and professional investors (Primal Capital, White Loop Capital & Outliers Ventures) and strategic partnerships such as the Ecole Polytechnique de Lausanne and the Swiss Haute Ecole HES-SO, **DeepSquare has already proven his potential to become the leader of the decentralised HPC market, which, according to specialist firm Intersect, is estimated to reach a value of \$60 billion by 2025.**

“Cloud computing, which was a great triumph for its time & dominated its time, is now reaching the end of the line.”

George Gilder¹, cloud computing specialist and inventor of Gilder's Law²

This document **outlines the guiding principles behind DeepSquare which offers a new way for the HPC market to reach a global scale by allowing on-demand and scalable access to computing power, without need to own the infrastructure**. By delivering a **unique value proposition**, DeepSquare sets its sights on a new milestone in the HPC market, championing the cause of on-demand HPC services.

¹ <https://mindmatters.ai/2019/06/george-gilder-cloud-computing-is-reaching-its-limits/>

² Gaivoronski, S., & Gamayunov, D. (2013). Hide and seek: worms digging at the Internet backbones and edges. In *Proceedings of the Spring/Summer Young Researchers' Colloquium on Software Engineering* (No. 7). Федеральное государственное бюджетное учреждение науки Институт системного программирования Российской академии наук.

TABLE OF CONTENT

1. Introduction: On High Performance Computing	5
1.1. New Era for Data & Compute Power.....	5
1.2. The Rise of Artificial Intelligence.....	6
1.3. HPC Impact Beyond AI.....	8
1.4. Embracing the Future with decentralised HPCaaS.....	9
2. DeepSquare: Delivering Decentralised HPCaaS	10
2.1. A PaaS to make HPC as accessible as data storage.....	10
2.2. A platform that facilitates access to HPC resources.....	10
2.3. Leveraging blockchain technology.....	15
3. Infrastructure Providers	18
3.1. Pooling of decentralised compute power.....	18
3.2. Standardised unit of measurement for computing power resources.....	20
3.3. Creation & Growth of the DFG.....	21
3.4. Transparent and competitive HPCaaS offer.....	22
4. Tokenomics	23
4.1. The GFL Token.....	23
4.2. The DPS Token.....	24
4.3. Benefits to users and partners.....	25
4.4. Token distribution and allocation.....	27
4.5. Token sale details.....	29
5. Sustainability at Core	31
5.1. Power efficiency.....	31
5.2. Reward mechanism.....	31
5.3. Sourcing of compute locations.....	32
6. Roadmap	32
7. Hybrid Structure	33
7.1. DeepSquare Association.....	33
7.2. DeepLabs.....	34
8. Disclosure	36
9. Glossary	42

1. Introduction: On High Performance Computing

1.1. New Era for Data & Compute Power

High-Performance Computing (HPC) is the use of powerful computing systems to perform complex and data-intensive calculations, simulations, and analyses. HPC systems are used in a wide range of applications, including scientific research, engineering, weather forecasting, and financial modelling. While HPC systems provide significant advantages over traditional computing systems, they also present unique challenges that must be addressed.

Traditionally, HPC demands were met by large companies owning high-performance clusters, which are costly and inflexible. These clusters require significant capital expenditures to build and maintain, making them out of reach for many smaller companies. However, the rise of cloud computing has made it possible to offer HPC services as a pay-as-you-go model, making it more accessible for companies of all sizes.

High-Performance Computing is a crucial resource for solving complex problems in various domains, but the costs and complexities associated with acquiring, setting up, and maintaining the infrastructure pose significant challenges, particularly for smaller organisations and individuals. Efficient management of HPC resources and code optimization for parallel computing are non-trivial tasks that may hinder productivity. Furthermore, limited availability during periods of high demand can result in extended wait times, reducing efficiency.

High-Performance Computing as a Service (HPCaaS) offers a promising alternative by allowing companies to tailor their computing needs, minimise capital expenditures, and optimise their return on investment. HPCaaS also enables organisations to meet their social responsibility goals by leveraging low-carbon data centres.

In the rapidly evolving world of high-performance computing, HPC clouds and HPCaaS offer distinct approaches to managing and maintaining computing resources. While HPC clouds give access to powerful cloud-based infrastructure, the users are responsible for handling the nitty-gritty of managing it. On the other hand, HPCaaS provides a fully managed solution, allowing users to zero in on their workloads and applications, leaving infrastructure management to the service provider.

The overall High Performance Computing market is growing at 20% annually and its current growth is largely driven by AI and IoT. According to a report from Market Research Future³, **the High-Performance Computing as a Service (HPCaaS) market** is expected to experience significant growth, with its size projected **to increase from USD 36.16 billion in 2023 to USD 63.53 billion by 2032**. This substantial expansion corresponds to a compound annual growth rate of 7.30% over the period.

Although several large software vendors, including GCP, Azure, HPE, AWS, Lenovo, and Oracle, have entered the HPCaaS market, none have managed to dominate the sector or fully satisfy market expectations. This situation suggests that there is ample opportunity for further innovation and improvements in the HPCaaS landscape to address the unmet needs of users and to make high-performance computing more accessible and efficient for a broader range of applications.

1.2. The Rise of Artificial Intelligence

Data is everywhere, and the total data volume transferred is increasing at an exponential pace. The yearly worldwide data usage went from 2 Zeta Bytes in 2010 to more than 70 Zeta Bytes in 2021⁴. A study by IDC⁵ revealed that in 2020, the global production and duplication of data reached approximately 64.2 Zeta Bytes. The study also projects a 23% compound annual growth rate from 2020 to 2025. Using this data effectively involves intense computing tasks, best carried out with specialised High Performance Computing clusters. High Performance Computing (HPC) has become a critical enabler for artificial intelligence (AI) as it allows for massive model training and rapid development and prototyping cycles. HPC has transformed various AI applications, such as Natural Language Processing (GPT3.5, ChatGPT, Bart), computer vision (resGAN, StableDiffusion, midJourney), and drug discovery (Alpha Go), accelerating progress and innovation in these fields.

AI breakthroughs have been consistently achieved, largely driven by an exponentially growing demand for computing power. A 2020 model used 600,000 times more compute than a 2012 model that popularised deep learning⁶. GPT-4 and similar models represent the

³ <https://www.marketresearchfuture.com/reports/high-performance-computing-as-a-service-market-7345>

⁴ Amount of data created, consumed, and stored 2010-2020, with forecasts to 2025

<https://www.statista.com/statistics/871513/worldwide-data-created/>

⁵ Worldwide IDC Global DataSphere Forecast, 2022–2026: Enterprise Organizations Driving Most of the Data Growth <https://www.idc.com/getdoc.jsp?containerId=US49018922>

⁶ AI and Compute -How Much Longer Can Computing Power Drive Artificial Intelligence Progress?

<https://cset.georgetown.edu/publication/ai-and-compute/>

state of the art in compute demand. Training GPT-3 in 2020 required a system equivalent to one of the world's top five supercomputers. Compute consumption for these models is measured in petaFLOPS-days, and training GPT-3 took 3,640 petaFLOPS-days. A petaFLOPS-day represents a computer performing a thousand trillion floating-point operations per second for one day⁷. A standard laptop would take a year to achieve one petaFLOPS-day and several millennia to reach the 3,640 petaFLOPS-days needed to train GPT-3. Translated into dollars, reportedly, training of GPT-3 model came with the price tag of \$5 million⁸. Training the model is not the only cost; operational (inference) costs are even higher when deploying the model at a significant scale. Inference costs for ChatGPT can surpass training costs on a weekly basis. Companies using language models have faced high expenses for years. Training GPT-4 in 2023 required a staggering 22 billion petaFLOPs⁹, resulting in substantial expenses associated with the required computing power for both the training process and later for deployment.

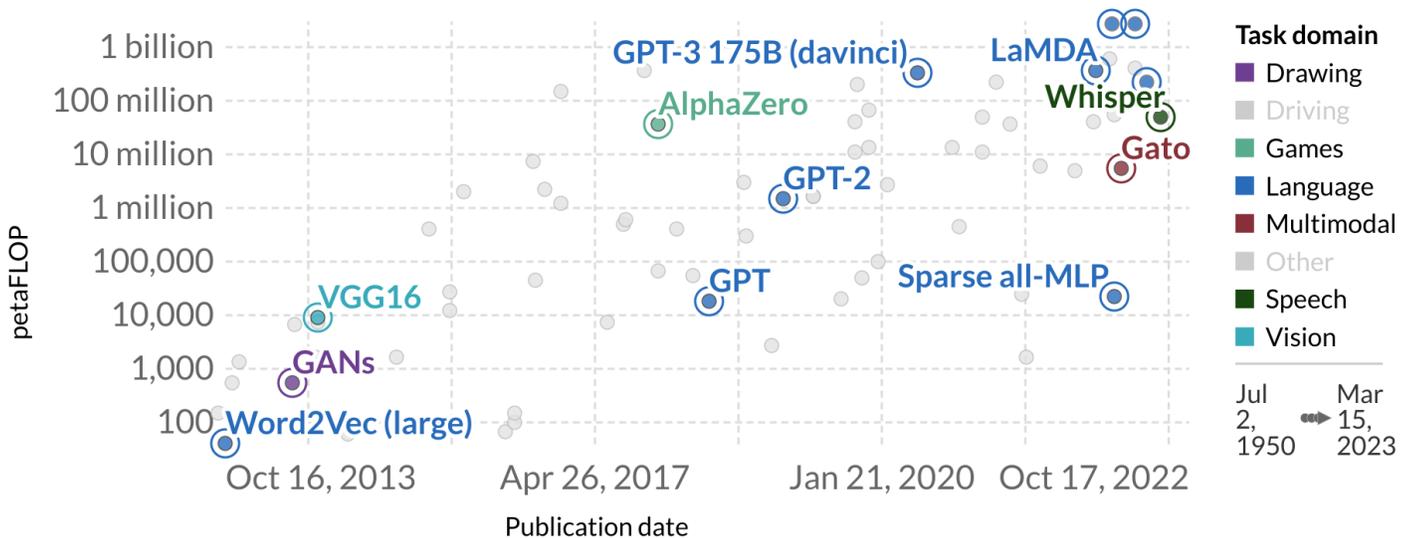


Figure 1: Computation used to train notable artificial intelligence systems. Computation is measured in total petaFlop, corresponding to 10^{15} FLOPS¹⁰,

⁷ What is a teraflop? <https://www.digitaltrends.com/computing/what-is-a-teraflop/>

⁸ The \$5m GPT-3 training cost estimate comes from using V100s at \$10k/unit and 30 TFLOPS. Amortized over a year, this gives about \$1000/PFLOPS-day. Note that this number does not account for the use of Automatic Mixed Precision (AMP) <https://www.alignmentforum.org/posts/N6vZEnCn6A95Xn39p/are-we-in-an-ai-overhang>

⁹ <https://ourworldindata.org/grapher/artificial-intelligence-training-computation?time=2013-06-12..latest&country=~GPT-4>

¹⁰ Sevilla, J., Heim, L., Ho, A., Besiroglu, T. Hobbhahn, M., & Villalobos, P. (2022, July). Compute trends across three eras of machine learning. In *2022 International Joint Conference on Neural Networks (IJCNN)* (pp. 1-8). IEEE. <https://ourworldindata.org/grapher/artificial-intelligence-training-computation>

1.3. HPC Impact Beyond AI

High-Performance Computing has far-reaching effects across various industries, extending well beyond artificial intelligence. Here are some examples of how HPC impacts other sectors.

Health Industry: Conducting studies on the potential side effects of food, medications, and vaccines.

Through HPC, researchers can collect and analyse vast amounts of raw data, such as height, weight, sleep and exercise patterns, and blood work. HPC has also accelerated drug discovery for various illnesses and enabled non-invasive, brain-controlled robotic arms to be developed, potentially transforming the lives of people with missing limbs.

Prototyping & Simulation: Enabling faster, more accurate, and cost-effective development processes.

High Performance Computing is revolutionising prototyping and simulation, enabling faster, more accurate, and cost-effective development processes across various industries. As an striking example, a recent collaboration between NVIDIA, ASML, TSMC, and Synopsys¹¹ highlights the pivotal role HPC plays in the advancement of next-generation chip manufacturing. By leveraging parallel processing, HPC reduces reliance on physical prototypes and accelerates design iterations, resulting in enhanced accuracy, better decision-making, and increased innovation.

The partnership demonstrates how HPC is crucial for chip manufacturing, improving accuracy, enabling complex designs and simulations, and fostering innovation.

Gaming & Metaverse: building / running next generation games requires significant resources for rendering

Rendering involves generating a final image or sequence of images from a digital scene by calculating the appearance of objects, materials, and light sources. HPC accelerates rendering tasks by distributing the workload across multiple resources, allowing artists, designers, and engineers to work more efficiently. HPC also plays a vital role in real-time rendering, essential for interactive applications like video games and virtual reality, by

¹¹ Recent partnership between biggest chip manufacturers
<https://nvidianews.nvidia.com/news/nvidia-asml-tsmc-and-synopsys-set-foundation-for-next-generation-chip-manufacturing>

providing higher frame rates, reduced latency, and a smoother user experience. The metaverse, a virtual world where people can interact in real-time, is an emerging concept that relies heavily on HPC and real-time rendering to provide a seamless and immersive experience for users. As the metaverse becomes a more significant part of our lives, HPC will continue to play a critical role in enabling its development and growth.

1.4. Embracing the Future with decentralised HPCaaS

As discussed, the growing demand for HPC across various industries underscores the need for accessible, efficient, and cost-effective solutions. As the HPC landscape continues to evolve, businesses must adapt to stay competitive and maintain a technological edge.

To address these challenges and empower organisations to harness the full potential of HPC, we introduce the DeepSquare decentralised HPC Platform as a Service (HPCaaS) solution. Our offering combines the flexibility and scalability of cloud-based HPC with the simplicity and convenience of a fully managed service, delivering a seamless and powerful computing experience tailored to your specific needs.

In the next section, we will delve deeper into the features and benefits of the DeepSquare HPCaaS solution, showcasing how it can revolutionise the way organisations leverage HPC. By harnessing the power of DeepSquare, one can unlock new opportunities, drive innovation, and propel businesses into the future of computing.

2. DeepSquare: Delivering Decentralised HPCaaS

2.1. A PaaS to make HPC as accessible as data storage

DeepSquare is a decentralised High-Performance Computing as a Service (HPCaaS) platform that aims to make HPC resources more accessible and cost-effective for individuals and organisations of all sizes. By leveraging the power of blockchain technology, DeepSquare provides a transparent and efficient platform that facilitates access to a wide range of HPC resources, offering users the flexibility to tailor their computing needs and optimise their return on investment. The platform is designed to be user-friendly and scalable, allowing developers to build and deploy applications with ease and without the need for expensive infrastructure investments.

2.2. A platform that facilitates access to HPC resources

The DeepSquare platform serves as a gateway for users to access and manage HPC resources through a decentralised network of supercomputers: the [DeepSquare Federated Grid](#). It consists of various components that work together to provide users with an efficient and powerful computing experience.

To help readers better understand these components, we will use a metaphor of the human body. Like in the human body, each component of the DeepSquare platform plays a vital role in the overall functionality of the system. [The infrastructure](#), much like the skeletal system, provides essential framework and support. Grid partners utilising [ClusterFactory](#) act like muscles, contributing to the system's power and ability to perform tasks. [The blockchain](#) serves as the entry point for accessing and controlling HPC resources, similar to the sensory and peripheral nervous systems. [The meta-scheduler](#), akin to the central nervous system, coordinates information for efficient functioning. [The blockchain validators](#), like the circulatory system and heart, ensure security and integrity, maintaining the overall health and functionality of the system where the consensus algorithm acts as the immune system, protecting the HPC cloud from potential threats and maintaining its overall health. By integrating these components, DeepSquare delivers a seamless and robust HPCaaS solution that ensures efficient, secure and reliable computing experiences for its users. The Figure 2 gives an overview of architecture of the platform.

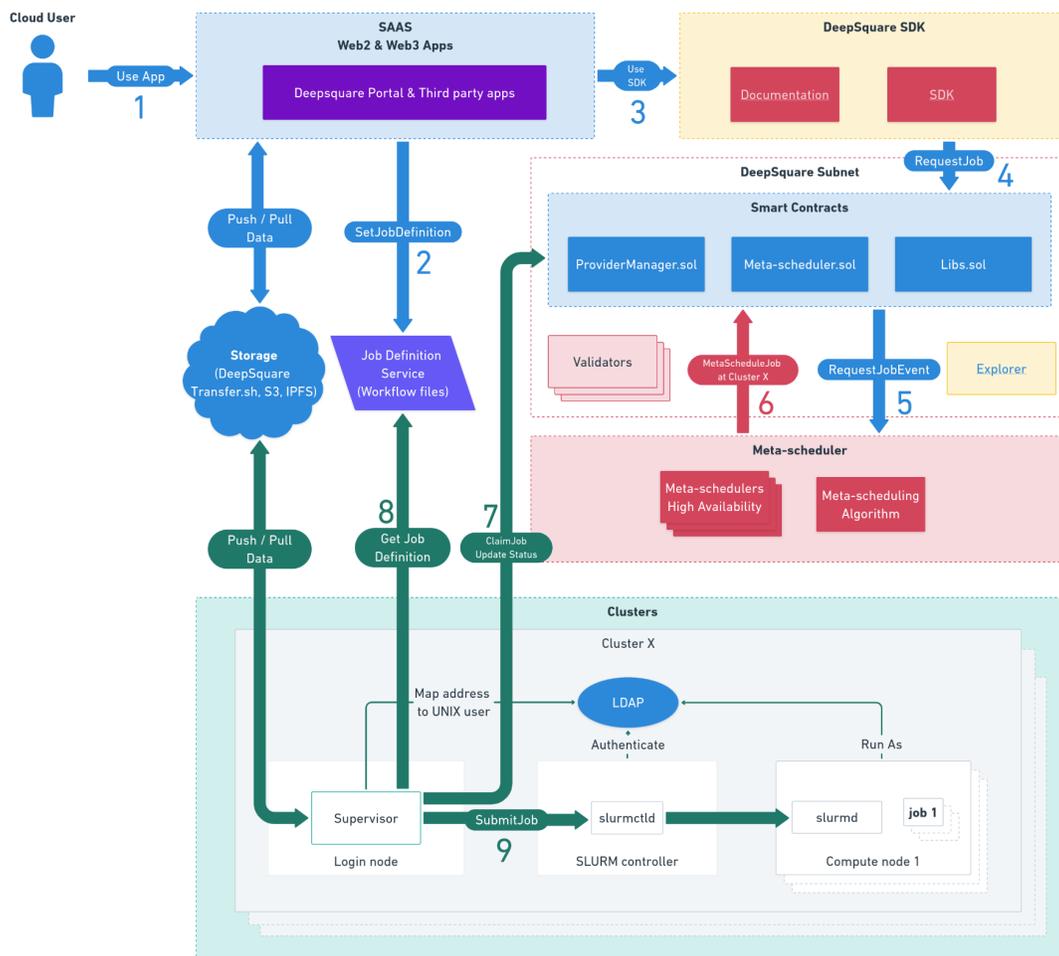


Figure 2: High level architecture of the DeepSquare Platform showing the HPC job submission process. A user requests new compute resources (1) by submitting a job to the Blockchain through the SDK (3) together with its job definition (workflow file) (2). The method RequestJob is called on the DeepSquare Meta-scheduler smart contracts (4). The Meta-scheduler receives a RequestNewJob event and uses its meta-scheduling algorithm to select the best Grid Partners for the job (6). The Supervisor running on the selected Grid Partner's clusters calls the ClaimJob method to inform the network that the job has been added to the local queue (7), and gets the job definition (workflow file) (8). The job is finally submitted to the local Slurm queue (9).

2.2.1. ClusterFactory:

An open, flexible and modern HPC Cluster manager

ClusterFactory¹² is a fully declarative open source cluster management solution that facilitates the deployment, management and scaling of HPC clusters in the DeepSquare ecosystem. It is built on top of the k0s project, a lightweight and flexible Kubernetes distribution which simplifies the process of deploying and maintaining the control plane of modern HPC clusters.

Easy Deployment

ClusterFactory streamlines the deployment process, allowing Grid Partners to quickly set up state of the art HPC clusters within a minimum amount of time. The solution can be deployed on virtually any type of infrastructure, including on-premises, cloud, and edge environments. Thanks to its comprehensive recipe of modular HPC key components, such as a bare-metal provisioning system, job scheduler and workload manager, pre-built OS images and software distribution system, making the most of a fully fledged production-grade HPC cluster has never been so frictionless.

Scalability

ClusterFactory can easily scale from a single node to large, high-available clusters. It makes it easy to handle multiple zones and facilitates inter-zone communications.

Its HPC nature makes it excellent at horizontal scaling, where workloads are distributed across multiple nodes maximising performance. Being extremely customizable, scaling a node or a set of nodes vertically or handling heterogeneous clusters is also made straightforward.

Simplified Management

ClusterFactory follows the GitOps methodology, using Git repositories as a single source of truth for both infrastructure as code (IaC) and application code, enabling organisations to manage changes and collaborate effectively while offering consistency and reliability in deployments. Additionally, *cfctl*, our custom management tool, simplifies the process of

¹² Ressources:

[ClusterFactory Git repository](#)

[ClusterFactory documentation](#)

deploying, updating and backing up clusters at the same time as encrypting your secrets to securely store them on git.

DeepSquare Blockchain

Serving as the entry point for accessing and controlling HPC resources, the blockchain enables users to interact with the system to initiate and manage tasks, such as submitting jobs to the HPC cloud.

Mondrian Testnet

[The Mondrian subnet](#) provides a fully functional HPC environment for developers to test and deploy their applications for free. This alternative to the free credits locking mechanism offered by current cloud providers allows developers to experiment with computationally intensive workloads, streamlining their development process.

DeepSquare Mainnet

The mainnet is a secure and reliable environment for running production workloads on the DeepSquare Grid, offering a wide range of HPC resources, customizable container workflows, and a user-friendly interface for managing tasks.

2.2.2. DeepSquare Access and Development Tools

DeepSquare SDK

The SDK¹³ serves as the external interface between users and the HPC cloud, simplifying the process of incorporating DeepSquare's HPC resources into applications. By providing a straightforward and abstracted interface to the DeepSquare Grid, the SDK empowers users to conveniently submit jobs, monitor their status and associated costs, and retrieve the results.

DeepSquare Customer Portal

The Customer Portal¹⁴ will serve as the central hub for all apps utilising DeepSquare's workflow standard, uniting developers, users, and advanced resources in a cohesive

¹³ <https://github.com/deepsquare-io/deepsquare-client> and <https://www.npmjs.com/package/@deepsquare/deepsquare-client>

¹⁴ <https://app.deepsquare.run>

ecosystem. The platform's goal is to act as a central reference point for the DeepSquare community. This user-friendly platform **implements the DeepSquare SDK**, offering both web2 and web3 experiences to users. The portal features a range of showcase applications that leverage DeepSquare's advanced HPC capabilities, providing developers with a launchpad to build and innovate with the DeepSquare infrastructure.

Workflow Catalogue

The Workflow Catalogue is a repository of workflow files that describe the resources allocation and the suite of instructions necessary to run applications on DeepSquare. These workflow files play a pivotal role in running jobs on DeepSquare, and having people make and share workflow files for the most popular applications will help lower the entry barrier to HPC, making DeepSquare more accessible to a wider audience.

The workflow catalogue will allow users to find and use workflow files for their favourite applications, and run them on DeepSquare as easily as any cloud application. By offering this versatile and accessible platform, DeepSquare aims to foster creativity, collaboration, and the development of groundbreaking applications within the HPC ecosystem, making DeepSquare an essential tool for running computationally intensive tasks.

2.2.3. The meta-scheduler

The DeepSquare meta-scheduler is a trustless, decentralised system designed to optimise workload distribution on a decentralised HPCaaS network. It acts as the central coordinator, routing job requests to the appropriate HPC resources and managing the distribution and allocation of tasks within the system. This enables infrastructure decentralisation, cost reduction, efficiency, and profit redistribution. Its innovative approach bridges the gap between HPC and general-purpose cloud computing, creating an interoperable layer for decentralised compute infrastructure that allows a broader range of users to harness the power of HPC. Additionally, the meta-scheduler facilitates a more transparent use of compute infrastructures by implementing a fault tolerant and auditable meta-routing algorithm, offering the required transparency and scalability on jobs scheduling.

2.2.4. The blockchain validators

Blockchain validators and the consensus algorithm work in tandem to maintain the security, integrity, and overall health of the HPC cloud infrastructure. Validators diligently confirm and secure transactions on the blockchain, ensuring a robust and reliable platform for users.

Meanwhile, the consensus algorithm functions as a safeguard, protecting the system from potential threats and fostering agreement among validators. This cooperation bolsters the system's security, preserves its decentralised nature, and enhances its resilience against malicious activities, making these components integral to the smooth operation and longevity of the HPC cloud infrastructure.

The blockchain operates as an Avalanche subnet¹⁵, benefiting from the robust and efficient consensus algorithm of the Avalanche network^{16,17}. By leveraging this architecture, the system inherits the advantages of Avalanche's consensus and validator ecosystem, ensuring a higher level of security, scalability, and speed. Additionally, this integration enables seamless interoperability with other Avalanche-based platforms and services, further enhancing the system's versatility and potential for innovation. As a result, DeepSquare stands to gain considerable value from the Avalanche network's proven capabilities and thriving ecosystem.

Looking to the future, it is clear that the blockchain ecosystem will continue to evolve, and multi-chain infrastructures will become more prevalent. DeepSquare recognizes this trend and has built its platform to be highly adaptable and scalable, able to plug into any EVM-based blockchain or blockchain that supports Solidity contracts, provided it meets the necessary scalability requirements. This flexibility will enable DeepSquare to tap into new and emerging blockchain networks, expanding its reach and impact in the HPC cloud infrastructure space.

2.3. Leveraging blockchain technology

2.3.1. Enhanced Security and Trustlessness

DeepSquare leverages blockchain technology to create a secure, transparent, and trustless HPC ecosystem. The decentralised nature of the platform eliminates the need for a central authority and reduces the risk of single points of failure. Blockchain's inherent security features, such as cryptographic hashing and distributed consensus, ensure that transactions and interactions on the platform are tamper-proof, fostering trust among users and grid partners. As a result, DeepSquare provides a robust and reliable HPCaaS solution that instils confidence in its users.

¹⁵ <https://docs.avax.network/subnets>

¹⁶ <https://docs.avax.network/overview/getting-started/avalanche-consensus>

¹⁷ <https://www.avalabs.org/whitepapers>

2.3.2. Transparent and Auditable Usage Data

DeepSquare uses blockchain technology to enable a transparent and auditable system for tracking and measuring HPC resources. This is achieved through the use of the [Computational INDEX](#), a standardised unit of measurement for computing power resources. [The Guaranteed Flop Token \(GFL\)](#) represents computing power measured using the INDEX, ensuring that rewards are closely tied to a tangible asset. By providing real-time, accurate, and up-to-date information, the platform fosters trust and accountability within the HPC cloud ecosystem, allowing users and grid partners to easily monitor resource consumption, performance metrics, and billing information in a consistent, comprehensible and immutable manner. The incorporation of the GFL token and the Computational INDEX ensures that rewards are closely tied to the actual value provided by the HPC resources, strengthening the overall trust and accountability within the ecosystem.

2.3.3. Incentivization and Reward Mechanisms for Grid Partners

The halving schedule, which reduces the amount of DPS tokens that are generated over time, is expected to increase the token's scarcity and reduce the overall offer of new tokens on the market. The anticipated scarcity is expected to create a positive impact on the overall demand and supply dynamics of the token, thanks to a halving schedule similar to Bitcoin's. Further details on fostering growth can be found in the section [Creation & Growth of the DFG](#).

In addition, because of the buyback mechanism described in the next section, as more computational power is provided to the grid, more DPS tokens are purchased, which increases the demand for the token.

This increased demand, coupled with the halving schedule, is expected to have a positive impact on the token's overall demand.

2.3.4. Flexible Payment System with Native Token Benefits

DeepSquare's payment system offers users the flexibility to pay for HPC resources either using the native token or other payment methods, such as fiat currency or stablecoins. The platform's pricing is indexed to the U.S. dollar, ensuring predictable pricing for users regardless of their chosen payment method. This approach allows customers to adapt their HPC needs without overcommitting budgets and improves responsiveness to changes, enabling them to focus on innovation.

Customers who choose to pay with the native token will benefit from a discount on their HPCaaS fees, incentivizing the use of the platform's native currency. This payment model not only encourages adoption of the native token but also provides valuable insights into HPC usage patterns, which can inform future offerings and pricing strategies.

The payment system also ensures that grid providers are appropriately compensated for their contributions to the HPC cloud. A portion of the payment received from users, regardless of the payment method, is used to replenish the reward pool for grid partners. This mechanism creates a buying pressure proportional to the amount of compute used in the network, ensuring that grid partners receive fair compensation for their services.

In summary, DeepSquare's flexible payment system allows users to choose their preferred payment method while also encouraging the use of the platform's native token. By indexing compute prices to the dollar and implementing a reward pool for grid partners, **DeepSquare ensures predictable pricing and appropriate compensation for all stakeholders in the ecosystem.**

3. Infrastructure Providers

3.1. Pooling of decentralised compute power

DeepSquare's HPC cloud system relies on a robust infrastructure that acts as the backbone of the entire platform. The infrastructure is built by pooling computing power from various HPC providers, known as Grid Partners. To enable this, DeepSquare utilises [ClusterFactory](#), a cluster management solution that allows Grid Partners to manage and supply their HPC resources to the grid. This interconnected network of resources is called the **DeepSquare Federated Grid** or DFG and offers a flexible and scalable HPCaaS solution. By avoiding reliance on a single entity, the system promotes a more open, competitive, and innovative HPCaaS market.

3.1.1. The DeepSquare Federated Grid (DFG)

The DFG is a decentralised network of participating compute clusters, providing sustainable and cost-competitive compute resources. Strategically located to maximise coverage and environmental efficiency, the DFG aims to create an inclusive, decentralised compute ecosystem powered by heterogeneous supercomputers. Grid partners contribute their computing power to the system, enhancing the overall performance and capabilities of the DeepSquare platform.

3.1.2. Cluster Management with ClusterFactory

ClusterFactory¹⁸ is the keystone to allowing external providers to resell spare compute resources to the DeepSquare grid. Thanks to this cluster management solution, one can easily deploy, manage and monitor HPC clusters. It enables seamless integration of new compute clusters into the network, allowing for easy expansion and resource allocation within the DFG. ClusterFactory also provides monitoring and management tools for grid partners, ensuring the efficient use of resources and optimal performance across the network. Moreover, ClusterFactory's modularity makes it easy for existing HPC clusters to be eligible to join the Grid.

¹⁸ Ressources:

[ClusterFactory Git repository](#)

[ClusterFactory documentation](#)

3.1.3. Sustainable Cluster Deployment and Integration Plan

DeepSquare aims to deploy and run a number of sustainable clusters, integrate with existing third-party compute providers, and facilitate the integration of sustainable solutions through the use of optimised hardware. The growth plan and inclusion of grid partners will depend on the computing power needs of our industrial customers, which will trigger future cluster deployments. Our goal is to efficiently distribute computing power across the DeepSquare network to meet the demand.

3.1.4. Sustainability and Environment-Friendly Practices

DeepSquare has developed blueprint clusters that are currently powering our testnet network. These clusters have been designed for optimal energy efficiency, with a focus on sustainability. While we encourage our Grid Partners to adopt our blueprint configurations to meet many of our sustainability requirements, the use of these configurations is not mandatory. Grid Partners are encouraged to progressively adopt sustainable practices by choosing their own hardware and energy sources, with the ultimate goal of transitioning to renewable energy and efficient heat reuse. We understand that a rapid shift may not be feasible for all partners, so our requirements will evolve over time to promote a smooth yet expedited transition to sustainable HPC. We aim to support and motivate our Grid Partners in their efforts to power each cluster with renewable energy and repurpose the generated heat for industrial processes or heating purposes, while considering the unique challenges and circumstances they may face. We do promote the use of optimised hardware specifically designed for immersion cooling, which reduces the amount of metal and plastics used by 10-15% and ensures up to 98% of heat recovery. At the end of the hardware's life cycle, it is either renewed or responsibly recycled by top organisations. Through these efforts, we hope to offer our blueprint configurations as a guide to promote sustainable and efficient solutions among our Grid Partners, contributing to a more environmentally conscious and decentralised HPC industry. We invite readers to learn more about Sustainable High Performance Computing and the importance of promoting sustainable solutions in this field¹⁹.

¹⁹ A great resource to learn more on this topic is the article "Towards a Sustainable High Performance Computing" <https://deepsquare.io/hpc/sustainable-high-performance-computing/>

3.1.5. Joining the DeepSquare Grid

DeepSquare's Grid is open to professional third parties with significant spare capacity. As DeepSquare prioritises HPC workloads, suitable infrastructure requires powerful CPUs and/or GPUs. The strategy will begin with former GPU miners that are reconverting to HPC, as the competition of mining with GPUs has become too strong, especially since Ethereum switched to proof of stake. This presents an interesting opportunity for DeepSquare to start with. Subsequently, Cloud providers, utility companies, research centres, universities, data centres, and enterprises with professionally managed capacity that meet the following minimum criteria are also welcome to join the DeepSquare Grid:

- ✓ Redundant 10Gb dedicated Internet Connection
- ✓ Infrastructure with a minimum of 20kW capacity and a minimum 10Gb interconnect
- ✓ Signing a Sustainability Pledge to demonstrate commitment to either:
 - Continue providing the most sustainable infrastructure (renewable energy, heat capture and reuse, circular economy practices, etc., as laid out by the DeepSquare Sustainability Working Group), or
 - Collaborate with DeepSquare to ensure future infrastructure refreshes meet these criteria
- ✓ Willingness to install and configure DeepSquare's cluster manager (ClusterFactory) on the provided infrastructure

3.2. Standardised unit of measurement for computing power resources

In the ever-evolving world of HPC, it has become increasingly important to establish a standardised unit of measurement for computing power. With a wide range of HPC platforms, architectures, and technologies available, comparing and quantifying computing resources can be a complex and challenging task. This lack of a universal standard makes it difficult for users and providers to accurately assess the value and performance of different HPC resources.

To address this challenge, DeepSquare has introduced the **Computational INDEX, a standardised unit of measurement for computing power**. The INDEX aims to provide a consistent and objective benchmark for evaluating and comparing various HPC resources,

making it easier for users and providers to understand the true value and capabilities of the available computing power.

The Computational INDEX takes into consideration various factors, such as processing power, memory, storage, and network capabilities, as well as specific features and requirements of individual HPC platforms. By aggregating these diverse factors into a single, consistent metric, the INDEX facilitates better decision-making, resource allocation, and performance assessment.

Implementing a standardised unit of measurement like the Computational INDEX brings numerous benefits to the HPC ecosystem. It allows for more accurate comparisons between HPC resources, enabling users to make informed decisions and optimise their computing needs. Additionally, it simplifies the process of resource allocation and billing, ensuring that all parties involved receive fair compensation for their contributions.

In summary, the Computational INDEX is an essential tool for fostering transparency, accountability, and efficiency within the HPC ecosystem. By establishing a standardised unit of measurement for computing power, DeepSquare ensures that all stakeholders can make informed decisions, optimise their resources, and accurately assess the true value of the available computing power.

3.3. Creation & Growth of the DFG

The development of the **DeepSquare Federated Grid** is based on the idea of tapping into underutilised computing resources from various sources, such as data centres and professional enterprise providers, to create a powerful, decentralised HPCaaS platform. This innovative approach addresses the growing demand for HPC resources and offers a more efficient and cost-effective solution for professional users.

In the DFG, professional resource providers are rewarded with the native DPS tokens for contributing their HPC resources to the platform. The payment system is designed to be proportional to the amount of computing power provided, ensuring fair compensation for the resources contributed. This reward system draws inspiration from the mining process in the cryptocurrency world, where miners receive rewards for validating transactions and securing the network. By adopting a similar mechanism, DeepSquare encourages the participation of professional resource providers and stimulates the growth of its Grid.

The establishment and growth of the DeepSquare Federated Grid are closely connected to reward-based mechanisms that professional providers are familiar with, such as those in

cryptocurrency mining. By taking advantage of this understanding, DeepSquare has designed an ecosystem that incentivizes professional resource providers to contribute their computing power without needing to actively seek customers. Instead, the platform's decentralised nature ensures that users are matched with appropriate resources, streamlining the process for both parties.

As the DeepSquare Federated Grid continues to grow, it benefits from the network effect, attracting more professional users and resource providers to the platform. This growth, in turn, reinforces the value proposition of the network, making it an increasingly attractive option for HPC users and professional providers alike.

3.4. Transparent and competitive HPCaaS offer

DeepSquare's HPCaaS platform is designed to provide a transparent and competitive offering to users, addressing some of the key challenges in the HPC market. The transparency aspect is achieved through the use of the computational index and blockchain technology, which enable a clear and standardised measurement of computing power resources. This transparency allows users to better understand the resources they are utilising and ensures that they are accurately billed for their consumption.

The competitive offering in DeepSquare's HPCaaS platform is closely connected to the reward-based mechanism of DPS tokens. By linking rewards to the amount of GFL (i.e., computational power) provided, the platform decouples demand and supply, allowing for highly competitive pricing. This attractive pricing structure ensures that demand for the platform's services grows, ultimately benefiting grid providers by creating a positive effect on the token's demand.

As a result of this decoupling, DeepSquare's HPCaaS platform can offer its services at highly competitive rates, which not only attracts more users but also fosters a healthy ecosystem for grid providers. The increased demand for the platform's services, in turn, contributes to the overall growth of the DeepSquare Federated Grid, further reinforcing the value proposition of the platform for both HPC users and professional providers. More details can be found in the yellow paper.

In conclusion, DeepSquare's transparent and competitive HPCaaS offering is made possible by the combination of the computational index, blockchain technology, and the innovative reward-based mechanism of DPS tokens. **By providing a clear and standardised measurement of computing power and ensuring a highly competitive pricing structure,**

DeepSquare has established an HPCaaS platform that is poised to revolutionise the way users access and utilise high-performance computing resources.

4. Tokenomics

DeepSquare's HPCaaS platform employs a dual-token system, encompassing **GFL (Guaranteed FLOP)** and **DPS (DeepSquare)** tokens. This state-of-the-art system is not only a standardised computing resources measurement but it also enables its monetization for industrial clients and Grid Partners. **The GFL token is pivotal for the optimal allocation of computing power, while the DPS token serves a dual purpose by providing access to computing resources and functioning as a reward mechanism for Grid Partners. The connection between GFL and DPS tokens guarantees that DPS is anchored by a tangible asset, specifically computing power, rendering it a valuable and dependable asset for users.** In essence, the dual-token system offers a transparent and secure means for users and partners to capitalise on computing resources and benefit from the platform's efficient allocation of compute power. In this section, we will delve into the features of the GFL and DPS tokens and the advantages they bring to users and partners.

4.1. The GFL Token

Building upon the [Computational INDEX](#), a standardised unit of measurement for computing power resources, the GFL (Guaranteed FLOP Token) represents the computing power measured using this INDEX. **This close tie to a tangible asset fosters trust and accountability within the HPC cloud ecosystem, allowing users and grid partners to easily monitor resource consumption, performance metrics, and billing information in a consistent, comprehensible, and immutable manner.**

The GFL token is rebalanced every 15 days, based on the median computing power allocated by providers on the DeepSquare network during that period. This rebalancing mechanism ensures that the quantity of the underlying indicator (computing power) remains in equilibrium with the number of GFL tokens distributed among the network, creating a transparent and auditable system for tracking and measuring HPC resources.

As the DeepSquare network grows and evolves, the provider selection process must adapt to ensure that it remains decentralised and meets the diverse requirements of its users and providers. Initially, the selection of compute resource providers will be managed centrally by DeepSquare, but the goal is to transition to a more decentralised model where stakeholders,

including token holders, Grid Partners, and HPCaaS users, will participate in decision-making processes related to provider selection.

In summary, the GFL token is a crucial component of DeepSquare's HPCaaS solution, leveraging the Computational INDEX to ensure a standardised measurement of computing power and fostering a stable, reliable, and transparent platform for users and providers alike.

The GFL Token	
Name	GFL
Ticker	GFL
Category	Utility - proof of computing power allocation
Initial supply	Computing power initially available on DFG
Periodic rescheduling	15 calendar days (UTC - 00:00)
Total supply:	Dynamic

4.2. The DPS Token

The relationship between GFL and DPS tokens is a crucial aspect of the DeepSquare ecosystem. The initial relationship is defined as:

$$1 \text{ DPS} = 100 \text{ GFL}$$

The emission of DPS tokens is subject to a halving process. This halving process occurs either every year or when a certain cumulative amount of GFL is reached, whichever comes first. This ensures that the amount of DPS issued is mathematically bound and helps maintain the value of the DPS token over time.

The halving formula can be expressed as follows:

$$DPS_n = (GFL_n) / (2^n) * R$$

Where:

- DPS_n is the number of DPS tokens after the nth halving,

- GFL_n is the cumulative amount of GFL at the n th halving,
- n is the number of halvings that have occurred, and
- R is the initial ratio of DPS to GFL (in this case, $R = 1/100$).

The halving process helps maintain the balance between the GFL and DPS tokens, ensuring that the value of DPS tokens remains stable over time. As the halving progresses, the relationship between GFL and DPS tokens is adjusted, providing an increasing value proposition for both businesses that hold DPS tokens and Grid Partners that contribute computing resources to the DeepSquare grid.

By managing the GFL-DPS relationship through the halving process, DeepSquare can create a sustainable and evolving ecosystem that offers preferential access to computing power for its clients, while also incentivizing Grid Partners to maintain or increase the power available on the network.

The DPS Token	
Name	DPS Token
Ticker	DPS
Category	Payment Token
Protocol	Avalanche (Avax)
Total supply:	70.000.000 units

4.3. Benefits to users and partners

DeepSquare acknowledges the importance of offering incentives for businesses to hold and utilise DPS tokens and for Grid Partners to contribute computing resources to the network. Holding DPS tokens provides two primary benefits for businesses:

- **The halving process plays a crucial role in the long-term dynamics** of the DPS token. As the number of DPS tokens associated with GFL decreases over time, the scarcity of the remaining DPS tokens increases, benefiting both businesses that hold

them and Grid Partners providing computing power. This process bears similarities to the halving events in Bitcoin mining, which have had significant effects on the cryptocurrency's dynamics. It is important to note, however, that as the Bitcoin ecosystem has matured, numerous other factors have emerged that can influence the dynamics of the cryptocurrency. While the halving can still be an essential factor, it is not a guarantee of specific outcomes.

- **Discounts on Compute Power:** Businesses can benefit from discounts when paying for compute power with DPS tokens. By using DPS tokens as the payment method, clients can access the necessary computing resources at a lower cost, providing additional incentives to hold and use DPS tokens within the DeepSquare ecosystem.

These benefits encourage businesses to hold and use DPS tokens, further driving demand for computing power on the DeepSquare network. Grid Partners are incentivized to contribute and maintain their computing resources on the network, as they receive a periodic and evolving remuneration paid in DPS tokens. By offering an increasing value proposition and discounts for paying with DPS tokens, DeepSquare can ensure that clients have access to the computing power they need while incentivizing Grid Partners to maintain or increase the power available on the network.

4.4. Token distribution and allocation

Allocation of DPS tokens will be made to ensure the good expansion of the DeepSquare ecosystem and according to the following breakdown.

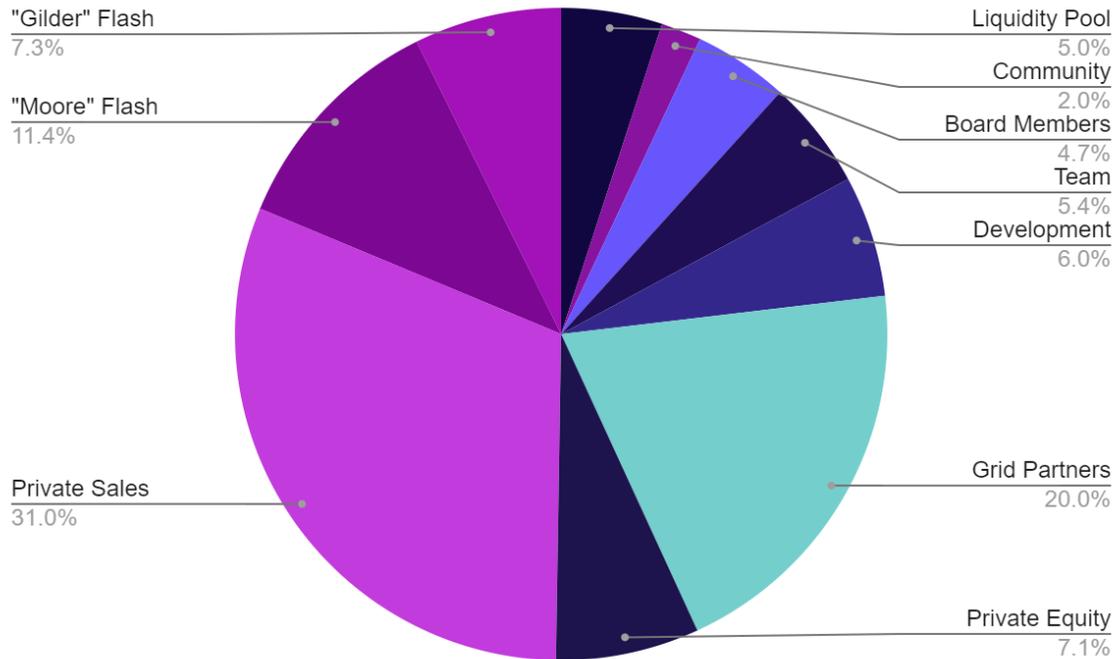


Figure 3: DPS Token Allocation

Private Sale: 31%

Next Private Sale has a lower discount but more beneficial vesting schedule than previous Private Sales.

Discount: 30%, No Cliff, with a monthly Vesting schedule over 6 months. Tokens vest at a rate of 1/6th per month.

Moore & Gilder Flash Sale: 18.7%

Flash sales allow DeepSquare to expand the number of contributors who deeply believe in its capacity to be a pioneer, during a limited period of time. These contributors will have the opportunity to benefit from preferential conditions and immediate availability of DPS tokens. The community of contributors will play a key role in the development of DeepSquare.

Token AirDrop for Equity Investors 7.1%

In order to accelerate future growth, DeepSquare will raise equity funds in the next 3 years through DeepLabs, acting as the IT services Provider of the ecosystem. Equity investors will receive 15% of the amount invested in Tokens.

Tokens received will have a 12 months cliff and a quarterly vesting schedule over 2 years. Tokens vest at a rate of $1/8^{\text{th}}$ per quarter.

DeepSquare Development Fund: 6%

DeepSquare Development Fund (DDF) has been set up to sustain the future expansion of the ecosystem across **Grid Partners** network, and **Applications Services Providers**, in order to ensure the smooth increase of the DPS ecosystem. The DDF will also receive any remaining unsold portion of DPS tokens at the crowd-sale ending date.

Grid Partners: 20%

DeepSquare will bring strategic partners to contribute to the massive development of DeepSquare Federated Grid. Grid Partners will receive GFL tokens as a proof of computational power used to define the remuneration of Grid Partners paid in DPS tokens.

Team: 5%

DeepSquare comes from the vision of the Team who aim to fundamentally transform the HPC market and democratise access to high performance computing power. Founders have received dedicated tokens with a 24 months cliff and a monthly vesting schedule over 36 months. Tokens vest at a rate of $1/36^{\text{th}}$ per month.

In order to attract and retain Key talents and reward individual goals achievement a Token's Annual Incentive Program will be launched for all members of the Team. Tokens received will have a 12 months cliff and a Quarterly vesting schedule over 4 years. 25% of Tokens received each year vest after the Cliff Period, the remaining 75% Token vest at a rate of $1/16^{\text{th}}$ per quarter.

Board Members & Advisors: 5%

In order to ensure strict Governance and strategic advisory, dedicated tokens will be used to reward Board members and Advisors on a yearly basis with the same cliff/vesting conditions as Team members.

Community development: 2%

We aim to build a highly engaged and sustainable community to ensure that we fulfil the Founder's vision. The community will play a key role in our international strategy.

4.5. Token sale details

In order to **accelerate the deployment of its infrastructure on an international scale and to significantly increase its network of strategic partners providing computing power and storage capacity**, DeepSquare plans to initiate a fundraising operation based on the issuance of cryptographic tokens, commonly referred to as an "Initial Token Offering" (hereafter "ITO").

ITOs offer an innovative way to raise capital for young and innovative SMEs enabled by Blockchain technology. DeepSquare has chosen to initiate this method of fundraising instead of traditional fundraising method because it **perfectly fits with its vision to align interest of all stakeholders of the HPC market, having an international and disruptive approach while offering a sustainable token based economy to penetrate and change the HPC industry.**

In order to achieve this vision, DeepSquare aims to raise at least 12 million \$ (soft cap) to mainly carry on **development of key features of the DeepSquare platform, extend Federated Grid, generate traction through marketing actions, research & development, faces to regulatory constraints, hire high skilled professionals & Ambassadors.** The maximum amount needed to accomplish the whole development project and international deployment is evaluated to 21 million of \$ (hard cap).

Timeline & targets

Fundraising campaign has been structured with several stages which allows everyone to contribute to DeepSquare expansion with DPS Token.

	Private Sale	Moore Flash Sale - 72h	Gilder Flash Sale - 72h
Start date	May, 4th 2023	September 11th 2023	October 21st - 1 PM CET
End date	July 30th 2023	September 13th 2023	October 23rd - 1 PM CET
Minimum investment pre-sale amount	\$250	\$100	\$50
Private sale discount	30%	20%	10%
Price per DPS (discount included)	\$0,70	\$0,80	\$0,90
Public listing price per token (without discount)	\$1,00	\$1.00	\$1.00
Cliff Period	No	No	No
Vesting Period	Monthly Vesting schedule over 6 months	No	No

Currencies accepted: fiat (EUR/CHF/KWN/JPY) and crypto (BTC/ETH/USDT/USDC/BNB)

5. Sustainability at Core

5.1. Power efficiency

Power efficiency is essential to reducing greenhouse gas (GHG) emissions and minimising the environmental impact of HPC operations. DeepSquare employs immersion cooling technology to cool its equipment, reducing the electricity needed for cooling by over 25 times compared to traditional air-cooled data centres²⁰. The system recovers up to 94% of the heat generated by computing operations, making it highly efficient. DeepSquare also employs a circular economy approach, where it recovers and sells the heat generated by computing operations, creating a valuable co-product. By replacing carbon-intensive energy sources with renewable energy, DeepSquare further reduces its GHG emissions. Decentralisation is another strategy that DeepSquare uses to optimise its energy use by placing HPC infrastructure in strategic locations to maximise heat reuse and carbon offset.

5.2. Reward mechanism

DeepSquare's commitment to sustainability is deeply ingrained in its reward mechanism, designed to incentivize environmentally responsible behaviour among its Grid Partners. This is achieved by incorporating environmental factors into the GFL calculation, which serves as the foundation for the allocation of computing power and rewards within the platform. Additionally, when faced with choices of equal compute power, the DeepSquare ecosystem prioritises those clusters exhibiting greater sustainability achievements, further reinforcing the adoption of green practices throughout the network.

The reward mechanism is structured to encourage Grid Partners to operate with lower energy consumption, optimise their HPC infrastructure for thermal management, and improve software performance. By rewarding partners who prioritise sustainability in their operations, DeepSquare promotes the adoption of best practices and the use of renewable energy sources across its network.

Furthermore, this sustainability-focused reward mechanism makes DeepSquare an attractive choice for businesses seeking cost-effective, reliable, and environmentally responsible computing resources. As the platform evolves, DeepSquare will continue to refine its reward mechanism and platform to meet the changing needs of its clients and the broader HPCaaS

²⁰ <https://deepsquare.io/sustainability/deepsquare-sustainability-series-2/>

market. In doing so, the platform will address concerns related to security, stability, and regulatory compliance while maintaining its commitment to sustainability at its core.

5.3. Sourcing of compute locations

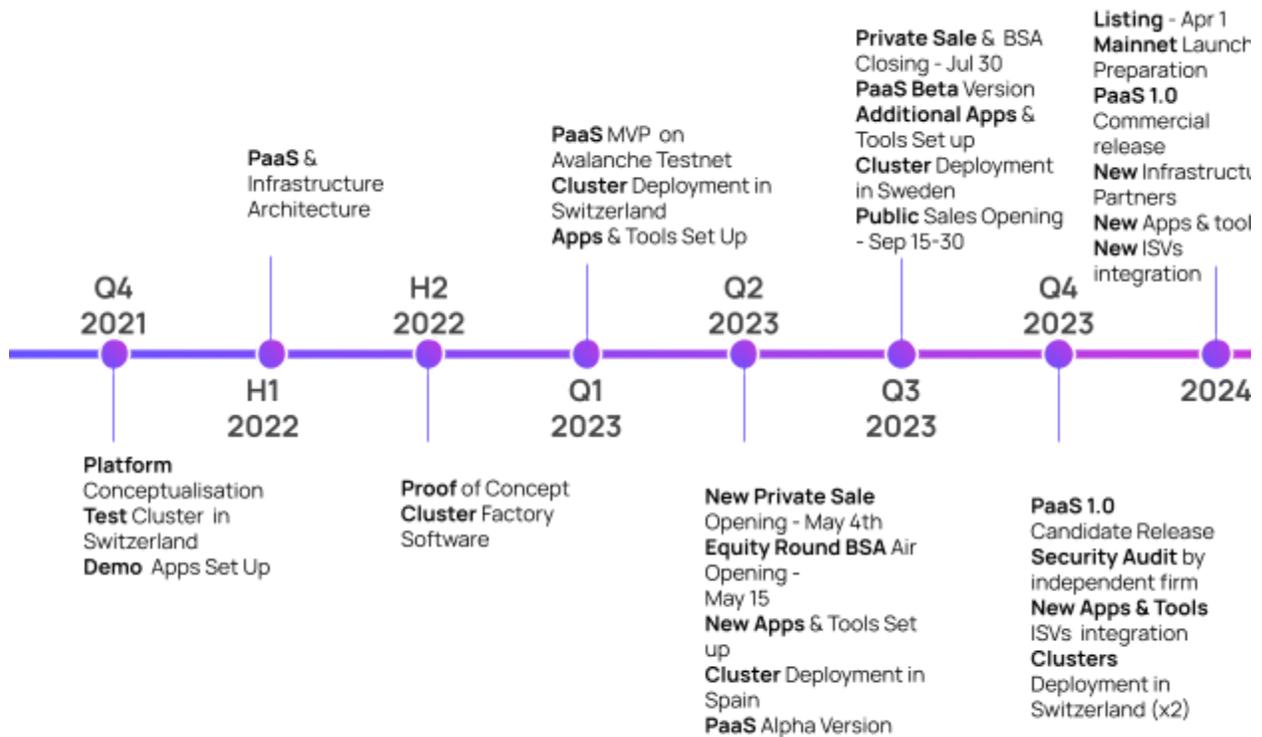
DeepSquare recognizes the importance of sourcing compute locations that are aligned with its sustainability principles. The company prioritises locations with abundant access to renewable energy sources such as hydroelectric, solar, and wind power. By sourcing locations close to its clients, DeepSquare minimises energy consumption and carbon emissions associated with data transmission. Additionally, DeepSquare works closely with its clients to identify their sustainability goals and develop solutions that align with their objectives. The company is committed to fostering sustainable development and environmental stewardship in the communities where it operates. DeepSquare has developed a business model²¹ to sell HPC capacity and serve the heat needs of its clients, while also exploring other business models to make heat recovery financially viable in the long term.

6. Roadmap

DeepSquare roadmap is intended to provide to the stakeholders of the DeepSquare ecosystem the best-case scenario for a good project development. The following is a projected roadmap and is subject to evolve based on changes in developments, criteria and/or market conditions.

Although our goal is to meet timelines, the expected launch is subject to change based on adjustments in developments, criteria and/or market conditions. The team will do everything to follow the roadmap outlined below.

²¹ <https://deepsquare.io/sustainability/sustainability-and-high-performance-computing-a-use-case-in-basel/>



7. Hybrid Structure

DeepSquare adopts a hybrid organisational structure, combining the collaborative governance of the DeepSquare Association with the technological innovation and service delivery of DeepLabs. This structure is designed to foster a sustainable and cooperative ecosystem while ensuring the seamless delivery of high-performance computing resources to users.

7.1. DeepSquare Association

The DeepSquare Association, registered in Zug, Switzerland, plays a critical role in the development and governance of the ecosystem by aggregating and managing computing power from Grid Partners.

The Association brings together all suppliers of computing power, with membership being inherent in the possession of a DPS token received in exchange for the allocation of a specified amount of computing power. Governance within the Association is based on close

collaboration between all the Grid Partners, who provide computing power, and the founders of DeepSquare.

The DeepSquare Association is responsible for issuing, managing, and circulating both the DPS and GFL tokens. By overseeing these critical aspects of the ecosystem, the Association ensures that the DeepSquare platform operates smoothly and transparently for all parties involved.

To foster a thriving and inclusive ecosystem, the DeepSquare Association places a strong emphasis on community involvement. The Association actively encourages participation from its members, ensuring that the voices of all stakeholders, including Grid Partners, businesses, and individual users, are taken into account when making decisions that impact the platform's development and governance.

The Association will organise regular community events, workshops, and online forums, providing opportunities for members to engage in discussions, share their experiences and ideas, and contribute to the platform's ongoing evolution. In addition, the Association maintains open channels of communication, such as newsletters and social media, to keep the community informed of the latest updates, developments, and opportunities for involvement.

By fostering a collaborative environment and actively involving the community in decision-making processes, the DeepSquare Association ensures that the platform remains agile and responsive to the diverse needs of its users and stakeholders. This commitment to community involvement not only drives innovation and growth but also reinforces the platform's commitment to transparency, trust, and long-term sustainability.

7.2. DeepLabs

The establishment of DeepLabs is a strategic move to guarantee the long-term sustainability of DeepSquare's services. DeepLabs serves as the IT service provider for the ecosystem, offering a platform that enables customers to request and manage the computing power provided by Grid Partners through a dedicated interface. As a Platform as a Service (PaaS) solution, DeepLabs makes all the services within the DeepSquare ecosystem easily accessible and frictionless for users.

DeepLabs focuses on developing and maintaining the technological infrastructure required to support the seamless provisioning and management of HPC resources within the DeepSquare ecosystem. It ensures that users can efficiently access and utilise the computing power they need, while also providing Grid Partners with the necessary tools to monitor and maintain their HPC clusters. By combining cutting-edge technology with user-friendly interfaces, DeepLabs plays a vital role in ensuring the ongoing success and growth of the DeepSquare platform.

8. Disclosure

PLEASE READ THIS ENTIRE SECTION AND DO NOT TAKE ANY ACTION UNTIL YOU FINISH IT.

Readers must be aware that these Whitepaper, Yellow Paper and/or Light Paper were developed by founders and advisors on the basis of their respective best knowledge of the current state of the Blockchain technology that is developing at high speed and by its nature will evolve rapidly and continue to present new challenges and risks. Therefore, it may be occasionally changed and modified at their discretion, during and after the token sale. This Whitepaper is subject to be updated from time to time. The latest version is available at the official website.

This White Paper does not constitute a prospectus, an offer or an invitation to sell shares, securities or rights belonging to the Company or any related or associated company.

Accordingly, this Whitepaper and/or Light Paper does not constitute investment advice nor an invitation to invest in any security or financial instrument of any nature whatsoever. In particular it is not composed in accordance with, or subject to laws or regulations of any jurisdiction which prohibits, or, in any manner, restricts transactions in respect of, or with use of, digital tokens. It is, therefore, the responsibility of each potential token holder to determine whether participating in the token sale is allowed in the relevant jurisdiction and the same applies to the use of token functionalities or to any transaction with or in respect of the token.

No investment, legal, tax, regulatory, financial, accounting or other advice is offered nor is the intent to provide the sole basis for any assessment of participation in the token generation event. To the extent that a person wishes to participate in the sale of tokens from the perspective of an investor or saver, the assumption in this White Paper and its future versions is at any time that such a person has previously sought legal, investment, tax, accounting advice, and other advice, or has willingly foregone it, assuming full risk for any consequences thereof. In addition, it is, at all times, the sole responsibility of such a person to ensure that participating in the token generation event is compliant with the laws to which such persons are subject to.

Since the nature of a token and its legal qualification are still under development from a global perspective and may also differ considerably from one jurisdiction to another, not all individuals from all jurisdictions are expected to be allowed to participate.

The company does this to prevent these individuals from inadvertently making non-compliant transactions with respect to the sale of tokens. Please note that such exclusion does not imply that the company assumes that such a transaction would be inconsistent with laws applicable in such jurisdiction. However, the Company uses its discretion to invest resources wisely and limit potential risk for token holders.

No financial information contained in this White Paper and Light Paper has been audited. Financial statements, estimates and financial details contained in the White Paper and Light Paper constitute, in part, future-oriented statements or information that involve known or unknown risks and uncertainties that are in part based on assumptions, which, in whole or in part, may be erroneous and may give rise to substantially different developments in the financial statements, estimates and financial details referred to in this White Paper and Light Paper and their future versions.

We aim to use English to disseminate additional information about token sale and further developments. From time to time, information may be translated into other languages. Readers of the White Paper and Light Paper should be aware that some of the information may be inadvertently omitted or misinterpreted, leading to errors and misinterpretation. The accuracy of such alternative communications cannot be guaranteed. In the event of a conflict or inconsistency between the translation(s) and the original language, the English language provisions of the document shall prevail.

PURCHASERS SHOULD CAREFULLY CONSIDER AND EVALUATE EACH OF THE FOLLOWING RISK FACTORS BEFORE DECIDING TO PARTICIPATE IN THE TOKEN CROWDSFPS. THEY SHOULD ASSESS THE MERITS AND RELEVANCE OF AN INVESTMENT.

THE FOLLOWING DOES NOT PURPORT TO BE A COMPLETE SUMMARY OF ALL OF THE RISKS ASSOCIATED WITH AN INVESTMENT IN THE TOKEN. POTENTIAL INVESTORS SHOULD DISCUSS AN EVENTUAL INVESTMENT WITH THEIR PROFESSIONAL ADVISORS.

NOONE WHO IS NOT PREPARED TO LOSE THEIR ENTIRE INVESTMENT SHOULD PURCHASE A TOKEN. CAPITALISED TERMS USED BUT NOT DEFINED HEREIN SHALL HAVE THE MEANING ASSIGNED IN THE PRESENT DOCUMENT. BY PURCHASING,

HOLDING AND USING TOKENS, PURCHASERS EXPRESSLY ACKNOWLEDGE, UNDERSTAND AND ASSUME THE FOLLOWING RISKS:

HIGHLY SPECULATIVE INVESTMENT RISK

Cryptocurrency transactions are highly speculative and present the risk of total loss of the invested capital. In addition, the fact that there is a certain opacity in the cryptocurrency market, as well as the fact that regulations to date are very limited, if not non-existent, means that there are certain risks of manipulation with insider trading.

VOLATILITY RISK

The value of a token investment may fluctuate and the magnitude of such fluctuation is difficult to predict. There is no guarantee and no assurance can be given that the targeted returns of the said investment will be met or that any other strategic objectives will be achieved.

RISKS ASSOCIATING WITH DEVELOPMENT OF NEW TECHNOLOGIES

The Platform will use a new technology. There is no guarantee that such technology will be bug-free or accepted by the market. Thus, even should the DeepSquare® Platform become operational, Tokens may be exposed to risks of theft, loss, malfunction, or reputational risk, one of which can significantly degrade the value of such an instrument.

ETHEREUM VIRTUAL MACHINE & AVALANCHE PROTOCOL RISK

Tokens and the DeepSquare® Platform are based on the Avalanche protocol. Any malfunction, breakdown or abandonment of the Ethereum protocol may have a significant negative effect on the DeepSquare® Platform or Tokens and their value. In addition, advances in cryptography, or technical advances such as the development of quantum computing, could present risks to Tokens or the Platform by making the cryptographic consensus mechanism that underpins the protocol ineffective. Smart contract concepts, underlying software application and software platform (i.e. the Ethereum Blockchain) are still in an early development stage and unproven. There is no warranty or assurance that the process for creating Tokens will be uninterrupted or error-free and there is an inherent risk that the software could contain defects, weaknesses, vulnerabilities, viruses or bugs causing, amongst other things, the complete loss of Tokens.

RISK OF DISSOLUTION OF THE COMPANY OR PLATFORM

It is possible that, due to any reason, including, but not limited to, an unfavourable fluctuation in the value of the DPS tokens (or other cryptographic and fiat currencies), because of a negative adoption of the DeepSquare® Platform, the failure of commercial relationships, or intellectual property ownership challenges, the Platform may no longer be viable to operate and the Company may dissolve.

REGULATORY RISKS

Government authorities and bodies, at all levels and in all countries, have a considerable influence on the business and investment environments of tokens. Any future regulation, whether French or foreign, on the cryptocurrency market may lead to a limitation of the possibility to hold and/or exchange of cryptocurrencies, which may have a significant impact on the price and liquidity of cryptocurrencies. The extent and type of future changes in the regulatory environment and the impact of additional regulations are unknown and difficult to predict.

RISKS RELATED TO MARKETS AND OTHER UNCERTAIN EVENTS

Cryptocurrency investments may suffer significant losses in case of disruption of conventional markets or the cryptocurrency market in particular. Other more or less extraordinary and/or unpredictable events may cause a rupture with the historical prices of some cryptocurrencies. Failure of communication systems and disruption of the decentralised network also present a significant risk.

COUNTERPARTY RISK

The purchaser is exposed to a counterparty risk when entering into a transaction with the Company, especially if the company is not able to fulfil its obligations. In addition, the Company does business with a number of counterparties to source cryptocurrencies, respectively official currencies that are the subject of transactions with the Client. In this context, the Purchaser is exposed to the risks of default, including bankruptcy incurred by a counterparty of the Company which may lead to the impossibility for the Company to deliver cryptocurrencies and/or official currencies despite the Purchaser's advance payment. It is specified that the Contract between the Purchaser and the Company excludes any liability of the Company in case of the impossibility to deliver cryptocurrencies and/or official currency.

RISK OF TRANSACTIONS RELATED TO THE BLOCKCHAIN

Most cryptocurrencies are based on the technology of the Blockchain. This technology is not adapted to the growing volume of transactions of certain cryptocurrencies. Thus, there is a high risk of delays or blockage in the execution of certain transactions.

RISKS RELATED TO THE PRIVATE KEYS AND CYBER SECURITY

Anyone who holds a private key can dispose of it at his/her discretion. In this context, theft, loss or hacking of private keys means the permanent loss of cryptocurrencies. Therefore, the Purchaser is well advised to (i) keep his private keys in a safe location, off line, and (ii) regularly update the security of his/her computer systems.

CYBERSECURITY RISKS.

This includes transaction information and the sensitive personal information of the Purchasers. Service providers used by the Company may also use, store, and transmit such information. The Company intends to implement detailed Cybersecurity policies and procedures and an incident response plan designed to protect this information and prevent data loss and security breaches. However, such measures cannot provide absolute security. Breach of the Company's information systems may cause sensitive information related to transactions to be lost or stolen.

RISK OF ALTERNATIVE NETWORKS

Alternative networks could be established in an attempt to facilitate services. The DeepSquare[®] Platform may compete with these alternative networks. This could negatively impact the Platform, the Token and its value.

RISK OF HARD FORK AND TOKEN SWAP

The DeepSquare[®] Platform will require significant development work when it could undergo significant conceptual, technical and commercial changes prior to its launch. As part of the development, a Token upgrade (hard fork of Token) or swap to a new one may be required and if the Purchaser decides not to participate in such an event, he/she may no longer be able to use his/her Tokens and all non-upgraded Tokens may lose their full functionality.

RISK OF DISSATISFACTION OF PLATFORM DEVELOPMENT

For a number of reasons, not all purchasers' expectations regarding the Platform or Token function can be met on the launch date, including changes to the design, implementation and execution of the Platform.

For a number of reasons, not all purchasers' expectations concerning the Platform or Token's function can be met on the launch date. Moreover, the value of the DPS TOKENS[®] is strongly correlated to the existence of the DeepSquare[®] Platform and network, which has not yet been implemented. In this respect, DPS TOKENS[®] may lose part or all of their value if the Platform and/or network is never fully developed.

TAX CONSIDERATIONS

There is no established practice regarding the taxation of gains on cryptocurrencies whether in France or abroad. In addition, existing practices may fluctuate. It is the responsibility of the Client to seek relevant tax advice in order to measure the tax impact of envisaged transactions and comply with its tax obligations.

LIQUIDITY RISKS RELATED TO SECONDARY MARKET

In the global context of the development of digital assets in the European Union as well as in other geographical regions of the world, registration of DPS TOKENS[®] on cryptographic exchange platforms may not be allowed or made possible for a discretionary reason from cryptographic exchange platforms. This situation could lead to liquidity risk related to the existence of a very limited secondary market. As a result, subscribers may not be able to sell their DPS TOKENS[®] easily or at a price that would provide them with a valuation gain.

UNANTICIPATED RISKS

Cryptographic tokens such as DPS tokens[®] are based on a young technology. In addition to the risks included in this section, there are other risks associated with the purchase, hold and use of DPS Tokens, including others that the Company cannot anticipate.

9. Glossary

DPS (DeepSquare)	A token that grants access to computing resources and serves as a reward system for Grid Partners.
GFL (Guaranteed FLOP)	A token representing computing power measured using the Computational INDEX.
HPC (High-Performance Computing)	The use of advanced computational capabilities to solve complex problems in various domains such as science, engineering, and finance.
HPCaaS (High-Performance Computing as a Service)	The provision of HPC resources on a pay-as-you-go basis, allowing users to access the required computing power without upfront investments in infrastructure.
DFG (DeepSquare Federated Grid)	A decentralised grid of computing resources connected through DeepSquare's HPCaaS platform.
Grid Partners	Independent providers of computing resources that join the DeepSquare Global Network to offer their HPC resources to users.
ClusterFactory	A software solution that enables the deployment and management of computing clusters within the DeepSquare ecosystem.
Computational INDEX	A standardised unit of measurement for computing power resources, which takes into account various factors such as processing power, memory, storage, and network capabilities.
Halving Event	A process that reduces the rate at which new tokens are generated, increasing the scarcity and potentially affecting the value of the token.
Mondrian Testnet	A testing environment for the DeepSquare platform, allowing developers and users to test and validate the functionality of the platform before the mainnet launch.
Mainnet	The primary public network of a blockchain-based project, where real transactions take place and have value, as opposed to a testnet.