Cere

**VISION 2.0**

# The Next Era of Web3 and Cloud Computing: Cere's Vision 2.0 for a Decentralized, Serverless Internet

# Table of Contents

# Ever since the conception of Cere, our goal has been consistent – to provide sophisticated data solutions that enable all businesses to capitalize on the web's vast opportunities.

We envisaged a decentralized web, providing channels for data to move freely and transparently, without the rip currents of the mega data brokers disturbing the flow.

We're aware that time stops for no one or no thing, and we haven't paused to look back at our successes, just moved forward to ensure we continue to make a real difference. We have created solutions that developers, integration partners, and brands and businesses can use to create an edge, distinguish their product offering, and fulfill the technology demands of insatiable customers.

We have made considerable strides in our protocol development, blockchain network, and token launch, with some amazing innovations becoming real-life success case studies. But we may have had our heads down working for a bit too long. We are taking a breather with this article to reflect on all the innovations we've built – to update the Cere community on where we are and where we're going next.

This Cere Vision 2.0 article follows our previous article, Missing Data Components of dApps, with an updated primer on the general lack of decentralization, scaling difficulty, and poor personalization/user experience in Web3 applications or 'dApps'. We will then explore our approach to these problems with real-world, in-production use cases on trustless content publication, serverless gaming, and next-generation loyalty solutions that show the depth of Cere's vision.

# The Rise and Struggles of Web3

For years, Web3 and decentralized applications (dApps) have been touted as the future of the internet. And for a good reason, given the incredible developments we've seen in novel concepts like DeFi (decentralized finance) and NFTs (non-fungible tokens), powered by trustless blockchain technology. Gone are the days when you were required to utilize 'trusted' Web2 and fintech 'disruptors' such as Google/Apple Pay and Paypal and we cheered for a future in which you could truly own digital assets and content.

A critical look at these applications and their data infrastructure could temper this enthusiasm for the current state of Web3 decentralization.

Top dApps like NBA Topshots and OpenSea are practically centralized since there's no rich data that can be stored on-chain or in smart contracts. On the other hand, well-known dApps like Uniswap and Axie Infinity claim to decentralize user identities via wallets that enable pseudo-anonymous identity, asymmetrical encryption, and decentralized payments via smart contracts. But they still lack the key component to fulfill this claim of real decentralization: the decentralized data component.

True Decentralization-as-a-Service (DaaS) applications are not available in a way that actually enhances real-world use cases and business models – at least not without large upfront investments.

# Negative Effects of Centralization

dApps that run on centralized data infrastructures, using centralized, stored (user) data, still require development teams to launch and maintain front and back-end services to run the application, tie user data and access rights to the application, and track user interactions with the application.

Owning a decentralized NFT doesn't mean that the user owns the asset itself. The centralized server the asset is hosted on may be taken down one day, making the NFT worthless.

Centralizing dApp user data is vulnerable to malicious behavior, with enormous financial consequences, as the OpenSea data breach demonstrated.

Centralized infrastructure providers effectively have a kill switch for (d)Apps. Without a cease and desist, let alone a fair trial, dApps like Tornado Cash can be taken down by law enforcement arbitrarily.

Looking at the above examples, you can see the current way dApps are configured and the lack of true decentralization of Web3 applications fail to meet the dream of a truly decentralized internet. This is only logical, given the rapid increase in Web3 users and usage, which comes with its various scaling and mass adoption challenges for dApp developers. This greater number of users – many of whom are less technical – forces dApp developers to focus on mitigating typical Web3/dApp issues.

Think about complicated user experiences, slowness/latency, and other problems that create hurdles for both new and existing users. But focusing on these challenges alone neglects a fundamental and critical issue: the decentralization of dApps' data.

# Negative Effects of Centralization

As we elaborated in our latest blog, Missing Data Components of dApps, Web3's promise of truly decentralizing applications currently only encapsulates two of the three necessary components of calling a dApp "decentralized". And no, storing NFT metadata on IPFS, as many of these dApps do to claim slightly more decentralization, isn't quite what we mean by "decentralizing data".
Why should the creators of these successful dApps even care about decentralizing data, when they can profit from just being partially decentralized? How can decentralizing data make Web3 truly function at its full capacity?

**Today, Cere presents a new paradigm in which serverless, trustless infrastructure and data management will power incredible user experiences and drive real Web3 adoption by the masses.**

# The Future of dApps is Here

Beyond the ownership of identity and digital assets, data is the next key element that needs to become self-custodied by every consumer and be made available to applications on demand. This data element is the biggest missing piece for Web3 and dApps. The true decentralization of Web3 has served as the singular core purpose and mission behind Cere's data protocol, the DDC (Decentralized Data Cloud), along with its blockchain mainnet powered by the $CERE token, which is designed to provide security and utility to the Cere DDC.

We believe that most of the current, successful dApps will not last into the future. Rather, the approach of bringing DaaS to many Web2 applications that already have large user bases is key to the mass adoption of decentralized utility. This is exactly what Cere is focused on offering to all app developers, content publishers, and brands across Web2 and Web3.

To truly understand how the Cere DDC will empower Web3-enabled applications with its set of decentralized data solutions, we'll need to unveil some of the key features and functionalities that the DDC, along with its vast set of tools, will enable. We'll also elaborate on how some exciting new use cases in many industries/verticals will be unlocked by using these features. As we have already been integrating with application partners in Digital Publishing, Gaming, and Membership/Loyalty, these real-life relatable experiences will provide early insights into the next era of Web3 innovation that's already happening.

# Introducing the Cere Protocol for Serverless and Trustless Applications



The Cere Protocol is the world's first protocol to enable serverless and trustless applications at large. Ready to be utilized by application and game developers, content publishers, and brands, the Cere Protocol is composed of a set of interconnected, industry-transformative and decentralized infrastructure layers primed to serve and supercharge the current and future decentralized data needs of any dApp.

In this Vision article, we'll provide a quick primer on the key components of the Cere Potocol:

# Cere Decentralized Data Cloud (DDC)

The Cere DDC is a public, decentralized network supported by a plethora of data nodes around the world, which will eventually serve as a much-needed alternative to big data and big tech data cloud solutions.

The Cere DDC can be captured in three main narratives:

- "Doing to data what bitcoin did to money" – Cere Network is a censorship-resistant and fully distributed network in which important application and consumer data are encrypted, secured, and stored. Data is no longer siloed inside the walls of big tech.

- "Own your data" – Your data is no longer held hostage by the apps you use (and worse: FB, Google, Apple, et al), but rather stored and organized according to your wallet, the NFT addresses available to you, and the apps you provide access to. Think about what this means to health data in the future, where all of your prescriptions, X-rays, diagnoses, etc, are all at your fingertips, at any time. Think about what this can do for education: every learner's lessons, achievements, transcripts, and test scores are always available so that learning paths can be personalized by teachers and institutions.

- "Solving the blockchain trilemma for data" – A horizontally scalable, high-throughput and highly resilient network with enough capacity to serve millions – and, in a few years, billions – of consumers concurrently, as integrations and network simulations have shown. The Cere DDC infrastructure development team leverages decades of expertise in peer-to-peer, distributed computing, and blockchain/cryptography, enabling the development of the DDC as a much-needed, trusted data platform that can serve everyone.

# Cere Decentralized Content Delivery Network (dCDN)

The dCDN is a decentralized service offered by **CDN nodes**. It acts as a web server and provides content to regular HTTP clients, such as web browsers.

Apps can rely on CDN nodes to serve assets such as content and games, which can even be fully hosted on the Cere DDC. CDN nodes increasingly mitigate the complexity, vulnerability, and slowness of decentralized storage, making its content delivery technology useful both for server-based and serverless apps.

Reliably serving content in a scalable, trustless way comes with a whole range of possibilities and benefits:

- Decentralized content can be tied to NFT ownership (more on this later in the Freeport section). The data linked with NFTs will be delivered via Cere's trustless smart contracts. Music, videos, books, and other content can be directly distributed to fans, free from the censorship of the current Web2 giants like Amazon, Google, and Apple. Cere has already enabled this via first- and third-party content platforms, which we'll touch on later.

- Selling content directly to users via serverless applications and NFTs tied to content/assets enables developers to break free from the big tech app stores. With app developers complaining about paying 30% platform fees for in-game/app purchases, as the recent **Epic games vs Apple lawsuit showed**, it's clear that an app distribution revolution is around the corner, with Cere dCDN spearheading it.

- The economic fundamentals of scaling the Cere CDN will lead the next stage in edge computing, making decentralized content delivery ultimately much cheaper and more efficient than current content delivery networks such as AWS, Cloudflare, Akamai, and Google Cloud. Whether it's Cere or another protocol, it may take years, but it is ultimately inevitable as huge amounts of unused computing power and bandwidth are mobilized in the future.

# Cere Decentralized Consumer Data Platform (dCDP)

Initially, the Cere CDP was Cere's cornerstone innovation. Today, Cere's vision of a decentralized data network is much broader, more developed, and further integrated into first- and third-party platforms. Still, the CDP remains an important part of the Cere ecosystem, being fully integrated with the Cere CDN.

The Cere CDP is a decentralized cloud database backed by the same network of protocol nodes allowing consumers and applications to own their data with 100% control over who can use it and for what purpose in any particular context.

Cere's Core Network blockchain facilitates plug-and-play customer onboarding to the CDP, leveraging identity abstraction technology to achieve data privacy by design. Users can easily plug into the ecosystems with instantly created Cere and white-label branded cryptographic wallets.

By simply using the Cere SDK, wallets are easily embedded and brands can finally unleash a whole range of direct-to-consumer, hyper-personalized, rich experiences. Users will be able to directly give permission to access their data/ records in any application in a trustless and privacy-compliant manner.

# Cere Decentralized Serverless Computing (dSC)

Cere dSC eliminates the need for centralized Infrastructure. With blockchain identity replacing Google/FB oAuth, and blockchain payments becoming viable Web3 alternatives to Google Pay and Apple Pay, an application will no longer have to use centralized databases, data lakes, data warehouses, and other centralized infrastructure to provide rich and personalized user experiences. A soon-to-be-released set of gaming demos on our website will fully demonstrate the vast potential of dSC. Stay tuned.

# The Cere Tools & Services Suite
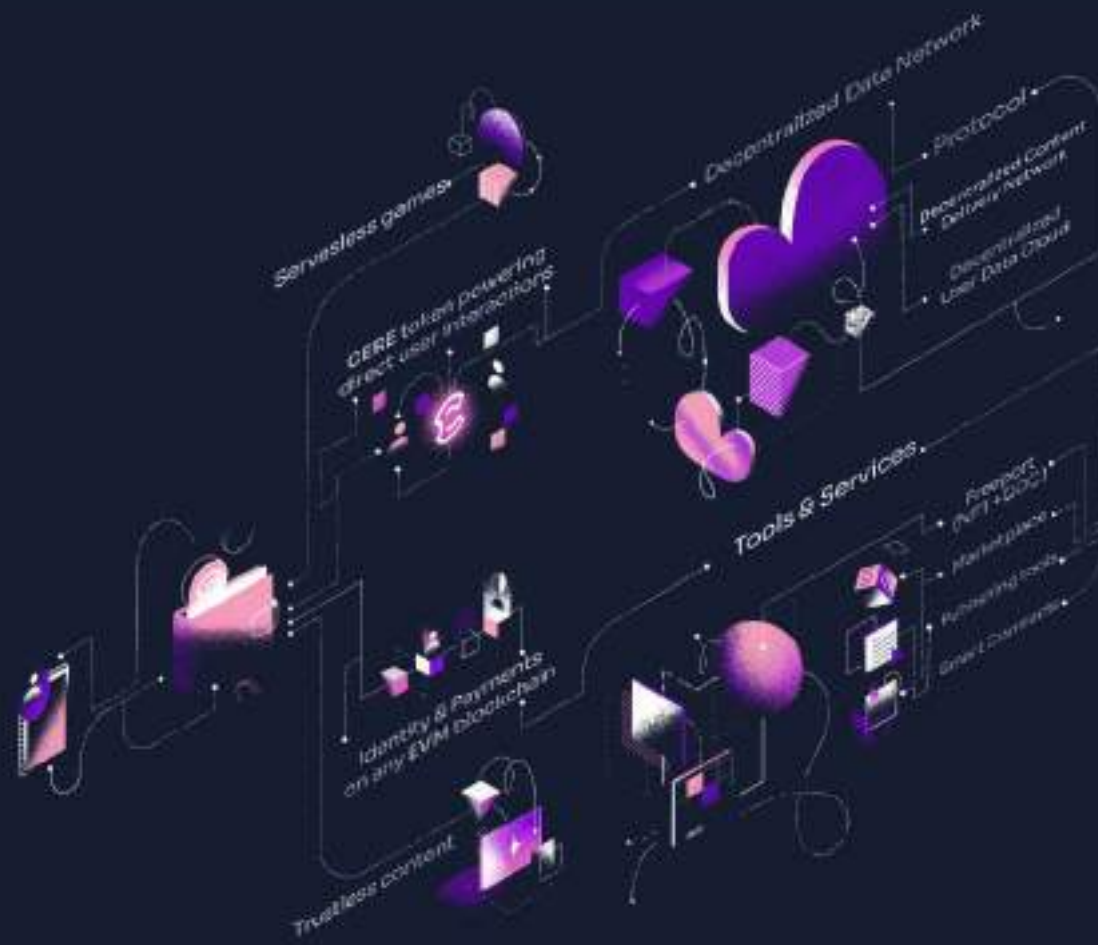


A key part of protocol development is developer support and ready-to-use tools and services that make adoption easier. A key distinction of Cere's projects has been to make its DaaS accessible. Ultimately, many of today's successful apps/games, with billions of users, can become more decentralized and scale much easier than many of the dApps that have been launched for the sake of decentralization.

The Cere Tools & Services suite enables developers, brands, and content publishers to harness the power of all the decentralized deeptech that has been built over the past three years by the Cere team and external contributors.

**Cere Freeport** is a hosted service that simplifies the process of minting NFTs on any EVM-compatible blockchain, such as Polygon, Ethereum, and Solana. These can be used as content-ownership tokens, allowing game developers, musicians, filmmakers, and others to be served content directly from the Cere DDC in a trustless way.

Cere Freeport is a game-changing, self-service tool, effectively functioning as the gateway to the new era of digital media, Web3 gaming, and even brand/product integrations. Freeport comes with a set of integrated Cere/Polygon smart contracts that improve on ERC721/1155 in the areas of royalties, transfer of content, and support of white-label Cere NFT marketplaces.
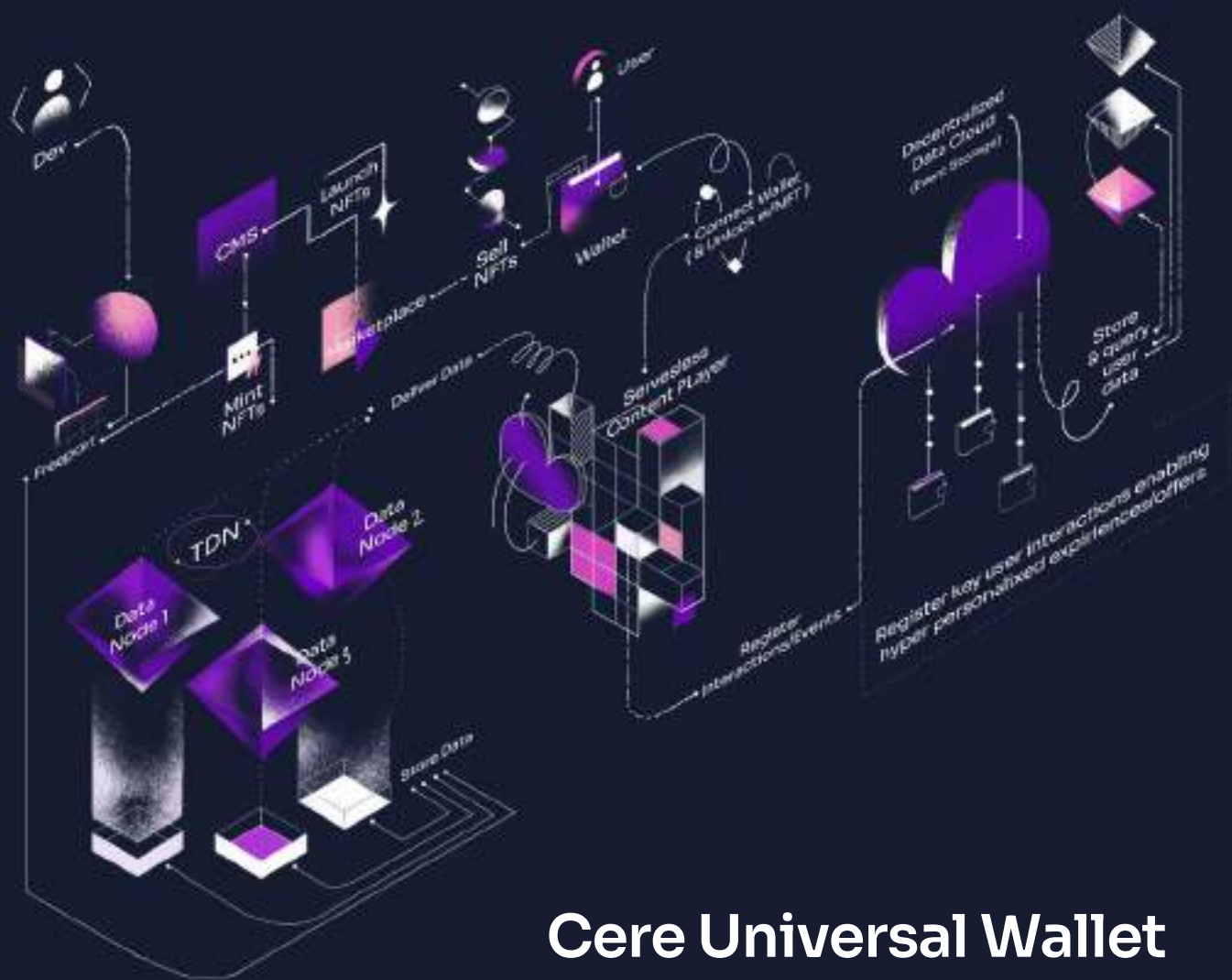
# Cere Universal Wallet

Our white-label, non-custodial wallet can be used by any application to provide a rich set of user experiences and features beyond the capabilities of typical native applications. Users can directly access their content perpetually secured on the Cere DDC, which can be streamed/played/viewed through the Cere wallet in the context of any application.

As individual consumer data is fully encrypted and distributed across the network, data is accessible and directly controlled via a user's wallet, meaning the data is now interoperable across applications. A consumer can connect their wallet with any application so that any information relating to assets owned, content consumed (e.g. music, videos, and books), products bought, flights/hotels/restaurants booked, membership/events attended, and many other purchases can be brought into any application.

# Other Tools and Services

The Cere team and external contributors have delivered even more enterprise-grade toolsets, such as:

The decentralized, universal NFT/Content registry that enables the mapping of NFT-backed assets to any blockchain while keeping the user's data safe on the DDC.

The Cere Real Time Experience Builder (RXB), which supports retargeting of users who interact with NFTs by accessing events stored in a decentralized way on the DDC (Data ETL/Indexing/Extraction App Integration/ Decentralized Events).

Improved SDK/encryption/decryption packages for increased ease of use for application developers who want to launch decentralized off-chain content delivery, video streaming, and gaming use cases.

The open data marketplace for secure and compliant B2B data sharing and data science/analytics jobs. Fully trustless, powered by Cere Smart Contracts.

# Cere NFT Content Management System (CMS) and Marketplace

The NFT CMS and Marketplace enable any game developer, brand, studio, label, artist, musician, filmmaker, etc., to self-publish content that can be directly attached to NFTs minted, marketed, and directly streamed to the purchaser of the NFT.

# Cere Decentralized Data Viewer (DDV)

The Cere DDV allows users to connect their wallets and scan the Cere DDC for the data that they own. Users can look up any public data associated with their wallet or individual NFTs and track provenance data of all the transactions and transfers of any specific NFT token. By integrating the DDV into existing applications, the littering of counterfeits on new and existing NFT marketplaces can be easily countered.

# New-Use Cases Made Possible via Cere DDC and Cere Tools
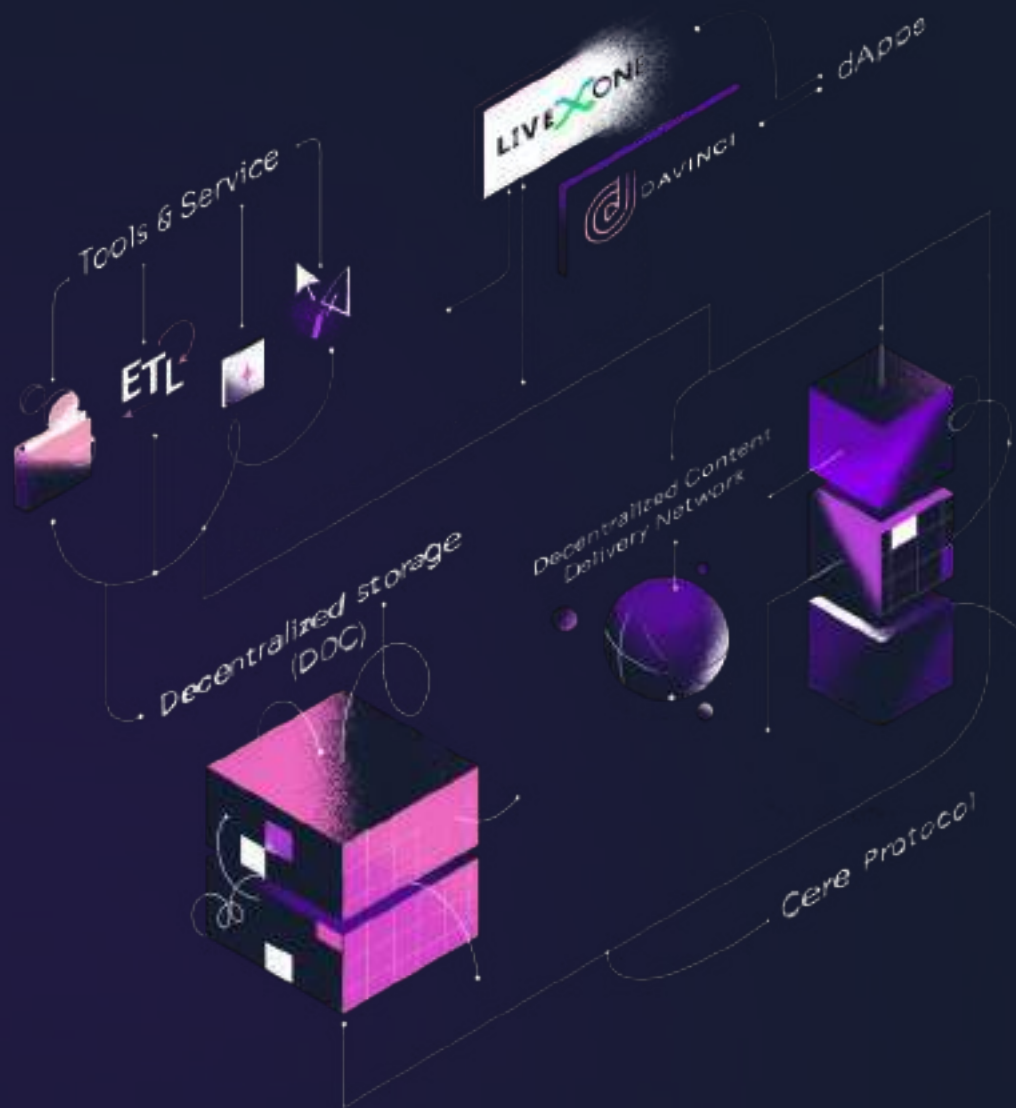


All of these innovations won't amount to much unless they are cleverly applied to real-world pain points and the needs of today's app developers, users, and businesses. Our team's mindset, pooling decades of product-engineering and go-to-market experiences in Silicon Valley, has given traction to numerous integrations in noteworthy industries and verticals.

# Digital Publishing on Cere

We will soon be launching a complete Web3-based streaming platform (think of a mini-Netflix) for a world-class animation studio. This will allow fans not only to acquire subscription/member NFT tokens to unlock and stream episodic content (directly from the Cere DDC without any middlemen) but also to collect primary NFT art based on animation characters. These can be collected and sold on the studio-branded secondary marketplace completely powered by Cere Tools & Services.

- DaVinci, the NFT experience platform, will relaunch with its Cere-powered curated NFT marketplace, allowing visual and performing artists, musicians, filmmakers, and even YouTubers/influencers to self-publish and distribute directly via NFTs to their fans and community.

- Why is this direct content distribution platform for artists so important for the entertainment industry?

  - By removing middlemen and giving back control and power to publishers and, by extension, to the artists, the DaVinci exhibition/auction and marketplace platform enables direct control over productizing and distributing their content.

    DaVinci will be a destination of hyper-personalized art offerings by the world's best artists, labels, and studios, unshackled from current centralized tech overlords (iTunes/Apple, YouTube/Google, Spotify, Patreon, etc.) that have been financially squeezing creators over their intellectual property for years.

  - DaVinci stands for anti-censorship, perpetual and guaranteed royalties, and copyright protection through (content) data re-encryption to NFT token-holders' wallets. DaVinci, by using **Cere Freeport's** NFT <> decentralized data association mechanism, makes content accessible only to content/NFT owners/subscribers, through one-time subscription or pay-per-view payments. It's fully supported directly via the Cere wallet with fiat or cryptocurrency-of-choice payments.

  - Most importantly, aspiring young creators and musicians can easily earn a meaningful income with a few thousand core fans who collect, own, and use these NFTs for unique experiences and content, without the artist having to become an influencer and spend the majority of their time figuring out how to crack the algorithm of the big tech platforms to get discovered. DaVinci is completely decentralized, so users do not have an intrusive platform pushing ads onto their content and taking nearly all of the revenue.

All of our services and tools are constantly refined, such as the usability of the wallet, payment services, and notifications, which will benefit all future applications/developers using these same tools for all other applications.

# Brand Integration/Memberships/ Loyalty on Cere

We will soon launch an NFT platform with a major digital media company that builds on the Cere DDC. Our services will provide the next generation of fully integrated NFT experiences. Cere will enable a large network of creators to tap into a suite of NFT and token offerings for pay-per-view and play-to-earn experiences. More on this in-production integration in the coming weeks!

Enterprise companies are already working with the Cere tech stack to drive the next era of direct consumer loyalty. We are facilitating a new strategy for brands to offer end-to-end, white-label brand NFT platforms so that any brand, its ambassadors, and partners can offer customers exclusive products, content streams, events, memberships, and loyalty offerings on their branded NFT marketplace using Cere DDC and services/tools.

Current NFT solutions for brands are barely scratching the surface of the opportunities and experiences NFTs can power. Cere is at the forefront of devising NFT strategies for enterprise brands and we are onboarding their future customers to Web3 while keeping the Web2-like feel.

Fueling these brand marketplaces with a digital partner and brand ambassador collectibles will further supercharge this consumer-brand engagement and loyalty, instantly enhancing every brand's marketing strategy with a new realm of meaningful customer incentives, loyalty programs, and first-party data.

More on these exciting Web3 use cases for brands will be released shortly at major consumer technology conferences, with end-to-end NFT strategies already nearing production. It won't be long before we demonstrate the engagement and efficacy of our advances in Web3 to brands, consumers, and the general crypto/blockchain audience.

# Games on Cere

We have many integrations underway with game developers who are leveraging our protocol, platform, and tools to package games and/or mini-games. These mini-games are launched from anywhere to bring a set of rich and seamless (mobile browser optimized) game experiences to their users – all while circumventing app store download/installs, Google/Apple payments, and other typical user experience hurdles.

This turnkey package for game developers is a game-changer. The entire set of user interactions can be managed by the Cere wallet in these game packs served directly through the DDC without any middlemen. The wallet can directly communicate with these game packs to handle the end-to-end flows of signup/authentication/payment/custody of assets, delivering the game content directly from the DDC Protocol: the tracking of achievements, progress, and digital content acquired all tied to the user wallet directly.

This not only reduces the huge amount of friction experienced by all Web2/Web3 game developers but also allows these game experiences to be launched anywhere, anytime. The acquired content and experience are truly interoperable and brought into a game studio's 1st/2nd/3rd party games or metaverses.

Users can play a quick puzzle game much like Candy Crush and take the prize/achievement, such as an NFT-backed game piece, straight into Fortnite or League of Legends by simply connecting their wallet. Yes, this is now a reality – it's happening already.

More game developers are looking into browser-based gaming to launch experiences not tied to the iOS or Android app stores, which are subject to a ton of restrictions and rules – not to mention the 30% app store revenue cut. The Cere DDC tech stack fits right into this movement. Cere's decentralized CDN can directly serve game content, and our CDP can function as a decentralized database for storing key user actions and achievements. Content can be unlocked directly via Cere Wallet, making games 100% serverless while freeing up devs from having to develop, run, and maintain all of the infrastructure normally associated with game services.

Beyond typical gaming, the Cere DDC enables a range of novel and immersive use cases around locations or event-specific gaming functionalities that can be integrated from any game into real-world location events. The next phase of brand-integrated gaming is right around the corner, and there will be more featured highlights to come.

# Milestone Reached with More Developments to Come

This Cere Vision 2.0 release marks an important milestone for our ecosystem. We have been tirelessly and methodically validating the vision behind the DDC via an endless amount of integration work with real businesses and use cases.

This is also an appropriate time to thank all those who have supported us on our deep-tech journey. As we added, updated and refined specification with new features and benefits, we have remained true at each stage of development to a key premise from our 2020 Cere vision paper:

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**"A leading premise of Cere Network's solutions is that businesses and developers do not have to plunge into large upfront investment and risk of re-building their applications from scratch, in order to plug into and take advantage of blockchain technology and a decentralized data network."**

We have also stayed true to our adoption strategy of chipping away at the margins of big tech, making all applications more exciting, immersive, and interoperable with every integration of Cere Network's technology stack.

Over the coming weeks, we will follow up with specific release dates/announcements on key protocol upgrades and product launches, and with exciting real-world successful use case studies. Our team and our Cere Extended Developer contributors are opening more than 300 GitHub repos, which have been developed prolifically – even outpacing some of the biggest infrastructure projects in Web3.

# Milestone Reached with More Developments to Come

Together with our early partners, advisers, investors, loyal community members, vetted external developer program participants, and all other partners, we aim to mutually drive and strive for a fully trustless, censorship-resistant internet made fun through incredible customer experiences. Whether you're a developer, businessperson, data scientist, content publisher, creator, or global citizen, we'd like to invite you to contribute to this vision of data decentralization.

Take a look at **Cere's job posts**, or send us an email at team@cere.network if you want to learn more about how to apply Cere's technology to your business, content, or gaming use case!

To stay updated on key tech updates, integrations, and upcoming developer community events, subscribe to our mailing list, and join our social channels!

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