
Metahattan
Start Spreading the News

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Mission

To deliver a blockchain agnostic, Augmented and Virtual Reality experience with decentralized services — providing our community with powerful tools of creation, not gatekeepers, to build a more immersive Metaverse platform in collaboration, utilizing bleeding edge technologies including artificial intelligence.

Belief

The Metaverse signifies the development of a global spatial computing ecosystem that incorporates embedded 2D and 3D experiences, IoT, artificial intelligence and much more. This ecosystem enables us to effortlessly create, explore, socialize and transact. As we embark on this new era of participation, it is crucial to give users agency, ownership and privacy.

01 Introduction

1.1 What is Metahattan™?

Metahattan™ is a dual mode digital twin technology designed to enable both a virtual reality and augmented reality view of the world while empowering citizens of this space to create their virtual world in real time. It is designed to be the first of its kind immersive social media experience whereby both the creation and viewing of virtualized spaces can be done as a collaborative sandbox environment.

1.2 What Is The Metaverse?

The word Metaverse is a portmanteau of the prefix “meta” (meaning “beyond”) and the suffix “verse” (shorthand for “universe”). Thus it literally means a universe beyond the physical world. More specifically this “universe beyond” refers to a computer-generated world, distinguishing it from metaphysical or spiritual conceptions of domains beyond (ACM Computing Surveys, Vol. 45, No. 3, Article 34, Publication date: June 2013 3D Virtual Worlds and the Metaverse 34:7) the physical realm. In addition, the Metaverse refers to a fully immersive three-dimensional digital environment in contrast to the more inclusive concept of cyberspace that reflects the totality of shared online space across all dimensions of representation.

Although the Metaverse always references an immersive three-dimensional digital space, conceptions about its specific nature and organization have changed over time. The general progression has been from viewing the Metaverse as an amplified version of an individual virtual world to conceiving it as a large network of interconnected virtual worlds. Neal Stephenson, who coined the term in his 1992 novel Snow Crash, vividly conveyed the Metaverse as a Virtual World perspective.

In Stephenson’s conception of the Metaverse, humans-as-avatars interact with intelligent agents and each other in an immersive world that appears as a nighttime metropolis developed along a neon-lit, hundred-meter-wide grand boulevard called the Street, evoking images of an exaggerated Las Vegas strip. The Street runs the entire circumference of a feature- less black planet considerably larger than Earth that has been visited by 120 million users, approximately 15 million of whom occupy the Street

at a given time. Users gain access to the Metaverse through computer terminals that project a first-person perspective virtual reality display onto goggles and pump stereo digital sound into small earphones that drop from the bows of the goggles and plug into the user's ears. Users have the ability to customize their avatars with the sole restriction of height (to avoid mile-high avatars), to travel by walking or by virtual vehicle, to build structures on acquired parcels of virtual real estate and to engage in the full range of human social and instrumental activities. Thus, the Metaverse that Stephenson brilliantly imagined is, in both form and operation, essentially an extremely large and heavily populated virtual world that operates, not as a gaming environment with specific parameters and goals, but as an open-ended digital culture that operates in parallel with the physical domain.

Since Stephenson's novel appeared, technological advances have enabled real-life implementation of virtual worlds and more complex and expansive conceptions of the Metaverse have developed. In 2007, the Metaverse Roadmap Project [Smart et al.2007] offered a multifaceted conception of the Metaverse that involved both "simulation technologies that create physically persistent virtual spaces such as virtual and mirror worlds" and "technologies that virtually-enhance physical reality such as augmented reality" (i.e., technologies that connect networked information and computational intelligence to physical objects and spaces).

Although this effort is notable in its attempt to view the Metaverse in broader terms than an individual virtual world and is itself advancing quite rapidly (but then again what technology isn't), the inclusion of augmented reality technologies served to redirect attention from the core qualities of immersion, three-dimensionality and simulation that are the foundations of virtual world environments. We consider the augmented reality space to be a subset of the Metaverse that constitutes a crossroads between purely virtual environments and purely real or visceral environments. Like any virtual world system, augmented reality constructs also access assets and data from a self-contained or shared world state, overlaying them on a view of the physical world rather than a synthetic one.

In contrast to the Metaverse Roadmap, a 2008 white paper on Solipsis, an open-source architecture for creating large systems of virtual environments using a peer-to-peer topology, provided the first published account of the contemporary Metaverse as Network of Virtual Worlds perspective. The Solipsis white paper defined the concept as "a massive infrastructure of inter-linked virtual worlds accessible via a common user interface (browser) and incorporating both 2D and 3D in an Immersive Internet" [Frey et al. 2008]. Frey et al. and the IEEE Virtual World Standard Group (http://www.metaversestandards.org) also offered a clear developmental progression from an individual virtual world to the Metaverse using concepts and terminology (ACM

Computing Surveys, Vol. 45, No. 3, Article 34, Publication date: June 2013.34:8 J. D. N. Dionisio et al.) aligned with the organization of the physical universe [Burns 2010; IEEE VW Standard Working Group 2011b]. This progression starts with separate virtual worlds or MetaWorlds (analogous to individual physical planets) with no interworld transit capabilities (e.g., Second Life, Entropia Universe and the Chinese virtual world of Hipihi). MetaGalaxies (sometimes referred to as hypergrids) then involve multiple virtual worlds clustered together as perceived collectives under a single authority.

As such, the revised comprehension for what constitutes a Metaverse et al. includes virtual worlds, augmented reality and technologies which supplement or are dependent upon the ecosystem of Spatial Computing as a disparate network of interoperable spaces and moving parts working in unison with the perceptual interconnectivity of a single system. As such, no single entity will arise as “the” Metaverse or “a” Metaverse, but instead many spaces and technologies will coexist to create the entirety of the network. In much the same manner as we do not consider a single website the entire Internet, going forward, we do not consider any particular platform or technology “the” entire Metaverse or a Metaverse of its own.

It is the findings of Metahattan, therefore, that attempting to create an entire Metaverse single handed is a fool's errand at best and should be approached only as component and platform participant. In this manner, we propose a unified system whereby both augmented reality and virtual reality components come together in which a mirror world with layers is present for the end-user and also interfaces seamlessly with the virtual world component. These two aspects of the Metahattan™ project constitute the baseline of the platform as part of a greater spatial computing ecosystem participant.

1.3 Our Approach

In order to narrow the scope of this endeavor into milestones, it is prudent to acknowledge that one modality over the other must be immediately prioritized. Due to the constraints of resource and time, it is best to move forward under the assumption that a majority of the Metaverse will be experienced as “daily driver” through IoT and Augmented Reality applications, while Virtual Reality will remain a predominantly escapist form of entertainment. For the purposes of this paper, we begin with a Digital Twin aspect and Augmented Reality, geared toward the general public as consumer facing application, with an eye on integrating virtual reality at a later date as a unified environment.

Furthermore, the Augmented Reality component will consist of a user generated content space divided among participants with their own layers of the entire world. Building a baseline system which fosters user creativity and connection is therefore key to this endeavor and Metahattan™ strives to create the applicable toolset native to the application in real time, allowing end-users (prosumers) to create, monetize and design their own world as they see fit, (Reimagine Your World).

Through digital assets that are either common or through unique NFT assets, users of the Metahattan™ AR application can construct an environment in real time and share it with the world. This will require partnerships with asset repositories as well as NFT marketplace systems in order to deliver such functionality.

Of note in this synopsis is the reality aspect of Augmented Reality, in that real world spaces are by default protected and already owned by an entity. Therefore these locations (or Virtual Digital Plots) can only be represented by the actual owners without incurring possible legal action. As this is the likely case, Metahattan™ proposes a multi-layered approach to the digital twin where Layer 0 constitutes the tax ID layer as database of reserved ownership, giving access to Layer 1 which is a general layer viewable by the public by default but buildable only by domain holders on Layer 0.

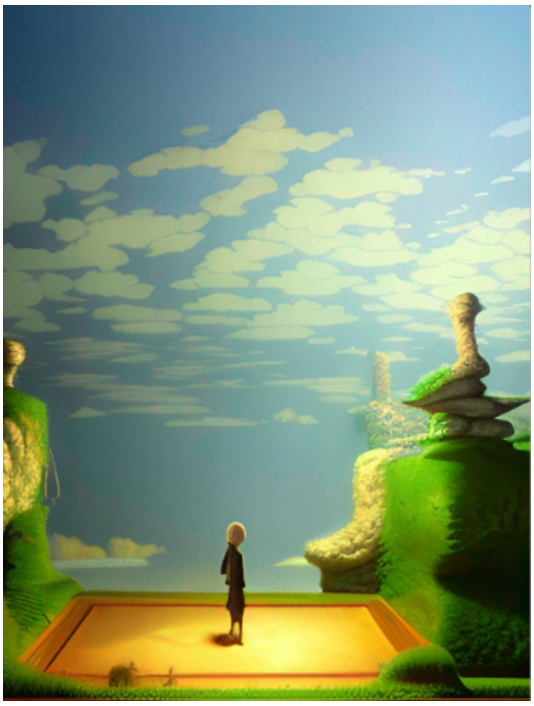
While each entity may also have a personal layer to subscribe to as a social aspect, the Layer 1 added value proposition in conjunction with Layers 2 through ∞ constitute the first ever Immersive Social Media platform in the Metaverse. Adding social media elements and connectivity to the application for the end-users while also giving them their own augmented reality layer by which to create virtual environments fosters utility from the consumer side and therefore drives FOMO for the Layer 0 and Layer 1 user cases whereby real world real estate owners are able to own the digital plot variant via blockchain, therefore gaining access to the audience of Layer 2 through Infinity.

This multi-layered approach to augmented reality allows for a more immersive and interactive experience for end-users. By adding social media elements and connectivity, users can connect with each other and share their experiences in the virtual world. The ability for real world property owners to own the digital versions of their properties on the blockchain adds an additional layer of ownership and control for these entities. This also opens up new opportunities for businesses and organizations to engage with their audience in a more interactive and dynamic way.

Another benefit of this approach is the ability for users to create and customize their own virtual environments on their personal layers. This allows for a more personalized and unique experience for each user, adding to the overall enjoyment and utility of the platform.

Additionally, the use of blockchain technology to manage and secure the virtual property ownership adds an additional level of trust and transparency to the platform. This ensures that the ownership and control of these virtual properties is clearly defined and cannot be tampered with or altered, while also ensuring that only those who own the properties in the real world are able to own the virtual property deeds in augmented reality. This also allows for a more seamless and secure transfer of ownership when needed, while avoiding the anticipated legalities surrounding virtual property ownership based on the real world in the future.

One key benefit of layer 0 and layer 1 for real world property holders is the ability to own and control the digital versions of their properties. This allows them to extend their ownership and control into the virtual world and potentially create new revenue streams through the use of these virtual properties. For example, a real estate owner may be able to rent out their virtual property for events or as a virtual meeting space, or they may be able to sell virtual goods or experiences within their property.



Another advantage is the ability to connect with and engage their audience in a more immersive and interactive way. By creating a virtual presence on layer 1, property holders can provide their audience with a more dynamic and engaging experience, potentially driving more interest and engagement with their real world properties.

Furthermore, the use of blockchain technology to manage and secure virtual property ownership ensures that the ownership and control of these properties is clearly defined and cannot be tampered with. This adds an additional level of trust and transparency to the platform.

The multi-layered approach to augmented reality allows for each individual to have their own personal layer, in addition to the general layer 1 viewable by the public by default. This personal layer allows each individual to create and customize their own virtual environments, allowing for a more personalized and unique experience.

These personal layers can seamlessly intertwine with the virtual reality digital twin of the same space, providing each individual with an augmented reality view of the real world space. This allows for a more immersive and interactive experience, as users can see and interact with the virtual elements within the space, as well as connect with other users in the virtual world.

The virtual reality aspect of the platform can also provide additional utility and functionality for users. For example, users may be able to access virtual tours of properties on the platform, or they may be able to use virtual tools and applications within their personal layers to enhance their experience. This adds to the overall enjoyment and utility of the platform, driving more interest and engagement from users.

The ideal tools for an augmented reality application on a phone would be those that are easy to use and intuitive, allowing end-users to quickly and easily create and collaborate in the virtual environment. Some examples of such tools could include:

- A 3D environment toolset for creating and customizing virtual objects and environments
- A tool for importing and exporting 3D models from other applications
- A tool for adding and manipulating lighting and other visual effects within the virtual environment
- A tool for adding and controlling audio and other sensory effects within the virtual environment
- A tool for sharing and collaborating with other users in real-time within the virtual environment.
- The ability to imbue such environments with intelligent action, animation, etc through either a scripting engine or a no-code feature.

1.4 Use Cases

Applications

A scripting language will allow the development of applications, games, gambling and dynamic 3D scenes. This scripting language will be designed to handle a wide range of capabilities, including creating objects, loading textures, handling physics, encoding user interactions, sounds, payments and external calls, among others.

Content Curation

Users in Metahattan™ will gather around neighborhoods of shared interest. Being located near high-traffic hubs will drive users to the landowners' content. Advertising Brands may advertise using billboards near, or in, high-traffic land parcels to promote their products, services and events. Some neighborhoods may become virtual versions of Times Square in New York City. Additionally, brands may position products and create shared experiences to engage with their audience through our VIPER Protocol or through bespoke creation.

Digital Collectibles

We expect users to publish, distribute and collect rare digital assets issued on the blockchain by their creators. Just as it occurs today in other virtual worlds or through

online forums, these digital assets will be traded inside this world through the scripting system and be backed by the aforementioned naming system.

Social Groups that currently gather in online forums, chat groups, or even other centralized multiplayer games could port their communities into Metahattan. Offline communities could also find in Metahattan™ a space to gather. Other use cases There are no technical specifications to what could be built in Metahattan. Therefore, other use cases could emerge, such as training and professional development, education, therapy, 3D design and virtual tourism, among others.

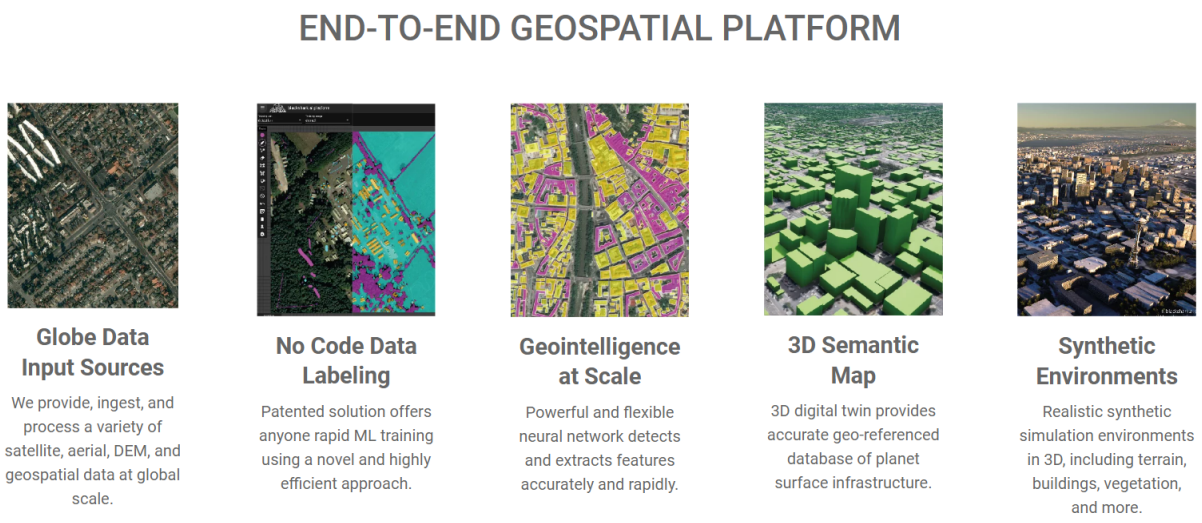
Enterprise

One of the most compelling use cases, outside the front facing consumer sandbox application and immersive social media, is that of the Enterprise model. Various digital twin partnerships give us access to a plethora of real-time data and IoT applications. In combination with BIM modeling for internal buildings and in conjunction with smart sensors and artificial intelligence, a functional smart city or town may arise providing a seamless application for predictive and qualitative spatial computing that is invisible to the end-user until specifically needed in context to their situation.

02 Technology Stack

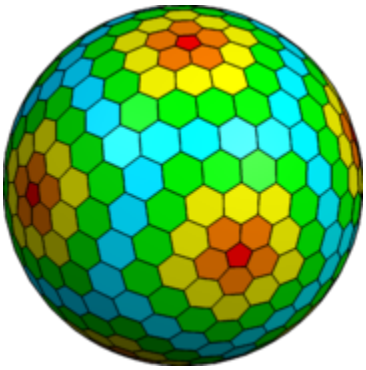
2.1 End-To-End Geospatial Platform

Utilizing services such as http://www.blackshark.ai that improve the detail and ability of virtual and augmented reality products can potentially enhance the user experience and make the product more engaging and immersive. This could include services that enhance the realism and fidelity of the virtual environments, or that provide additional tools and functionality for creating and interacting with these environments. These enhancements can help to make the product more appealing and useful to end-users, potentially driving more interest and adoption of the product.



Other considerations for inclusion can be through such adoptions as prometheanai.com and Unreal Engine 5.1 whereby we can take advantage of the absolute cutting edge in real-time computer graphics, including Nanite and Lumen. However, given the consideration with Promethean AI, such a system is limited to pre-existing databases of objects and so in order to expand upon this database it is also in our scope to possibly include brand3d.com and access to both their tools and 3D asset database, while exploring bleeding edge options which utilize artificial intelligence in order to create 3D assets from text descriptions.

2.2 Topology



In regard to the suggested topology for such layers, one can immediately see the need for equilateral spaces on a curved surface that is the planet Earth. Utilizing the standard latitude and longitude as square plots (nodes) will result in severe disfigurement of nodes around the equator and the higher north or south one travels, making the uniformity a unattainable factor.

However, if one were to utilize a Goldberg Polyhedron model for the nodes in augmented reality layers, each node will be uniformly distributed with twelve pentagons as “restricted” spaces.

In mathematics and more specifically in polyhedral combinatorics, a Goldberg polyhedron is a convex polyhedron made from hexagons and pentagons. They were first described in 1937 by Michael Goldberg (1902–1990). They are defined by three properties: each face is either a pentagon or hexagon, exactly three faces meet at each vertex and they have rotational icosahedral symmetry. They are not necessarily mirror-symmetric; e.g. GP(5,3) and GP(3,5) are enantiomorphs of each other. A Goldberg polyhedron is a dual polyhedron of a geodesic sphere.

A consequence of Euler's polyhedron formula is that a Goldberg polyhedron always has exactly twelve pentagonal faces. Icosahedral symmetry ensures that the pentagons are always regular and that there are always 12 of them. If the vertices are not constrained to a sphere, the polyhedron can be constructed with planar equilateral (but not in general equiangular) faces.

Simple examples of Goldberg polyhedra include the dodecahedron and truncated icosahedron. Other forms can be described by taking a chess knight move from one pentagon to the next: first take m steps in one direction, then turn 60° to the left and take n steps. Such a polyhedron is denoted GP(m,n). A dodecahedron is GP(1,0) and a truncated icosahedron is GP(1,1).

A similar technique can be applied to construct polyhedra with tetrahedral symmetry and octahedral symmetry. These polyhedra will have triangles or squares rather than pentagons. These variations are given Roman numeral subscripts denoting the number of sides on the non-hexagon faces: $GP_{III}(n,m)$, $GP_{IV}(n,m)$ and $GP_{V}(n,m)$.

The subsequent loss within this structure is therefore 12 spaces out of a possible 64.7 billion will therefore be 0.0000000186%. However, because the Earth is approximately 71% water, this leaves us with a viable 29% landmass at best, though one could suppose viable use cases for ocean based augmented reality. Therefore, one can assume that a total of viable space can be stated as 18,943,000,000 cells using the Goldberg Polyhedron model and 12 reserved spaces for pentagons being 0.63% of those viable spaces.

2.3 Artificial Intelligence

As our goal is to create a toolbox that is intuitive and easy to use for the consumer in regard to augmented reality, we recommend minimalist design, adaptive radial menus and the inclusion of Luma AI for text to 3D asset generation on the fly. In conjunction with speech recognition, this combination of tools will allow the end-user to effectively speak any item into existence.

Luma AI is a company that uses artificial intelligence (AI) to generate 3D models and animations from text descriptions (via DreamFusion). In the context of an augmented reality (AR) real-time toolbox application for generating virtual environments, this technology has the potential to offer a number of benefits for users.

One potential benefit is increased efficiency and convenience for consumers (Failing & Smith, 2014). By allowing users to quickly generate 3D assets from text descriptions, rather than having to create them manually or with traditional computer-aided design (CAD) software, Luma AI's technology can save users time and effort. This can be especially useful for consumers who want to quickly create and customize virtual environments for AR applications, such as for use in home design or visualization.

Another benefit is improved accuracy and realism in the generated 3D assets. By using text descriptions to specify the intended look and behavior of the assets, Luma AI's technology can help to ensure that the generated 3D models are faithful to the user's intentions. This can be important for creating lifelike and immersive virtual environments for AR applications.

In terms of user experience (Molich & Nielsen, 1990), the ability to easily modify and update 3D assets by simply changing the text descriptions can be beneficial for users who want to quickly make changes or updates to their virtual environments. This can help to enhance the flexibility and versatility of the AR real-time toolbox application,

allowing users to easily customize and adjust their virtual environments to suit their needs.

Overall, Luma AI's text-to-3D asset generation technology has the potential to significantly improve the user experience of creating virtual environments for AR applications. By offering increased efficiency, accuracy and flexibility, it can help to make the process of generating 3D assets for AR more convenient and accessible for consumers.

The inclusion of speech-to-text technology in Luma AI's text-to-3D asset generation system can make the process of creating virtual environments for AR applications even simpler and more convenient for users. By allowing users to describe their desired 3D assets using natural language, rather than having to type out text descriptions, speech-to-text technology can make the process of generating 3D assets more intuitive and easy to use (Failing & Smith, 2014). This can be especially useful for users who may not be comfortable with typing or who prefer to use voice commands for input.

In addition to improving the user experience, the inclusion of speech-to-text technology can also make it easier for users to generate more complex or detailed 3D assets. By allowing users to speak their descriptions out loud, rather than having to carefully type them out, speech-to-text technology can help to facilitate the creation of more precise and nuanced 3D assets. This can be useful for users who want to create highly detailed or intricate virtual environments for AR applications.

Overall, the inclusion of speech-to-text technology in Luma AI's text-to-3D asset generation system can significantly improve the usability and flexibility of the system, making it easier and more convenient for users to create virtual environments for AR applications. By allowing users to input their descriptions using natural language, speech-to-text technology can enhance the user experience and make it easier to create more complex and detailed 3D assets for AR applications.

Breakthroughs in text-to-image synthesis have been driven by diffusion models trained on large amounts of image-text pairs. Adapting this approach to 3D synthesis would require labeled 3D assets and efficient ways to clean 3D data, but these do not currently exist. In DreamFusion (https://dreamfusion3d.github.io/), a method was developed to perform text-to-3D synthesis using a pretrained 2D text-to-image diffusion model. A loss function based on probability density distillation was introduced, which allows for the use of a 2D diffusion model as a guide for optimizing a parametric image generator. By using this loss in a DeepDream-like process and optimizing a randomly-initialized 3D model (called a Neural Radiance Field) through gradient descent, low loss can be achieved for 2D renderings from random angles. The

resulting 3D model of the given text can be viewed from any angle, under different lighting conditions, or added to other 3D environments. This approach does not require 3D training data or changes to the image diffusion model, showing that pretrained image diffusion models can be useful for 3D synthesis.

The ability to generate 3D models from text descriptions has the potential to revolutionize and democratize the creation of 3D objects for augmented reality. With this approach, the barrier to entry for content creation is significantly lowered, as it eliminates the need for specialized knowledge of 3D modeling tools. Instead, users can simply describe the desired object using natural language and the system will automatically generate a realistic 3D model.

In addition to making content creation more accessible, this approach also simplifies the user experience for creating 3D objects in augmented reality. Traditional 3D modeling tools can be complex and require a steep learning curve, which can be a barrier for many users. By contrast, the text-based interface for creating 3D models is far more intuitive and requires minimal training. This will make it easier for a wider range of users to create 3D content for augmented reality applications.

Overall, the combination of text-to-3D synthesis and speech recognition has the potential to greatly simplify the process of creating 3D objects for augmented reality, making it accessible and intuitive for a wide range of users.

Of other applications, LumaAI also offers the ability to scan keyframe photos in the real world and generate photorealistic assets for virtual worlds through their API structure.

2.4 Hybrid Peer to Peer Technology

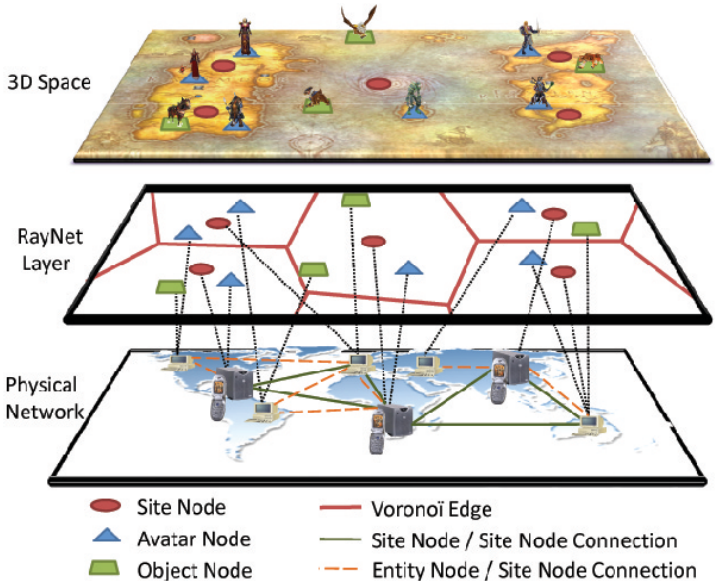
Metahattan's novel methodology for network communication is based on a peer-to-peer (P2P) network architecture, in which nodes (i.e., users or servers) communicate and share data directly with each other rather than relying on a central authority. This is in contrast to a client-server architecture, in which clients (i.e., users) request data from a central server, which then processes and responds to the request.

In the network, each node maintains a list of other nodes that it is connected to, known as its "neighbors." When a node wants to send data to another node, it can transmit the data directly to that node, or it can route the data through one or more intermediate nodes. This allows the network to adapt and route data efficiently, even if some nodes go offline or become disconnected.

One advantage of a P2P network is that it can be more resilient and scalable than a traditional client-server architecture. Because there is no central server, there is no single point of failure that could cause the entire network to go down. Additionally, because nodes can communicate directly with each other, the network can support a larger number of users without requiring a corresponding increase in the number of servers.

There are also some potential challenges to consider when implementing a P2P network. For example, it can be more difficult to enforce security and privacy controls, as data is transmitted directly between nodes rather than being processed by a central server. Additionally, it may be more difficult to maintain consistent data across the network, as nodes may have different versions of the data or may not always be online to receive updates.

In response to these challenges, Metahattan™ proposes a novel methodology called a hybrid peer-to-peer (P2P) network architecture, in which nodes (i.e., users or servers) communicate and share data directly with each other as well as with a central server. The central server acts as a "permanent neighbor" in the network and is responsible for maintaining a global view of the network and



providing certain services to the nodes. These “permanent neighbors” are located up to twelve spaces on the overall polyhedron network as reserved anchors in edge computing, but may include more as needed.

In this hybrid P2P architecture, each node maintains a list of other nodes that it is connected to, including the central server and other peer nodes. When a node wants to send data to another node, it can transmit the data directly to that node, or it can route the data through one or more intermediate nodes, including the central server for stability. This allows the network to adapt and route data efficiently, even if some nodes go offline or become disconnected.

One advantage of this hybrid P2P architecture is that it can provide a balance between the benefits of a decentralized network and the benefits of a centralized server. For example, the central server can provide certain services, such as authentication and authorization, that may be more difficult to implement in a purely decentralized network. Additionally, the central server can help to ensure the consistency and integrity of the data, as it can act as a central point of authority for data updates and conflicts.

Overall, this approach is a powerful platform for exploring and creating virtual spaces, with a hybrid P2P network architecture that offers a number of benefits, including scalability, resilience and adaptability. By including a central server as a permanent neighbor, the network can alleviate some of the challenges associated with a purely decentralized architecture, while still retaining many of the benefits.

Overall, Metahattan™ is a powerful platform for exploring and creating virtual spaces, with a decentralized network architecture that offers a number of benefits, including scalability, resilience and adaptability.

2.5 Standard 3D Assets

When it comes to easily accessible 3D Asset libraries for both virtual reality and augmented reality, two sites come to mind. Sketchfab is a platform for publishing and sharing 3D models, while Clara.io is a cloud-based 3D modeling and rendering software. Both of these platforms offer APIs and SDKs that can be integrated into augmented reality applications to provide access to a library of 3D assets. Combined with partnerships with Brand3D.com and others, we can create a robust offering for assets.

One benefit of integrating Sketchfab and Clara.io into an augmented reality application is the ability to provide users with a unified and accessible library of 3D assets. This would allow users to easily browse, search and access a wide variety of 3D models and scenes to use in their virtual environments. This could include everything from 3D models of real-world objects and environments, to abstract shapes and designs.

Including this library of 3D assets in an augmented reality application would make it easier for users to build virtual environments, as they would have access to a wide variety of pre-made models and scenes that they can use as a starting point. This would save users time and effort in creating their own 3D models from scratch and allow them to focus on building and customizing their virtual environments.

Overall, the integration of Sketchfab and Clara.io into an augmented reality application would provide users with a rich library of 3D assets to use in their virtual environments, making it easier and more efficient for them to build and customize these environments.

2.6 Blockchain and NFT

Web2, which introduced a period of rapid innovation and widespread access to entertainment, information and goods on a global scale, also brought about significant changes to the way that content and personal data were owned and controlled. Streamlined tools and usability made it easier for creators and innovators to build digital storefronts and engage with their customers, leading to a proliferation of digital content and data. However, the growing ecosystem of content and data also became a lucrative opportunity for major corporations, who used consumer behavior recorded on centralized company servers to monetize human emotion and attention.

This digital disruption, followed by corporate opportunism, led to a resetting of the value of creative IP and had a negative impact on the creative process. Agencies and

intermediaries siphoned revenue from creators, data was harvested, sold, commoditized and misused and naivety and convenience were exploited. Even personal family photos became session bait for an insatiable ad model.

Web3, on the other hand, envisions a better world through the redesign of our online lives and the implementation of stronger advocacy for our interests, freedom and rights. Much as Web2 flourished with the maturity of tools and services that offered ease of use for creators and consumers, the Open Metaverse will benefit from open protocols for payments and data and a set of interoperating decentralized services to support virtual worlds. As such, Metahattan™ has chosen to seek partnership with Lamina1 as it will serve as a rallying point for an ecosystem of open-source tools, open standards and enabling technologies that are co-developed with a vibrant community of creators.

Other blockchain services can and likely will be available to incorporate into the ecosystem as we develop further, including popular services such as OpenSea, Rarible, Veve and so on.

2.7 3D Spatial Audio

3D spatial audio is a critical component of virtual environments and augmented reality (AR) experiences, as it helps to create a sense of presence and immersion for the user. When implemented properly, 3D spatial audio can make the user feel like they are physically present in the virtual or augmented space, rather than simply observing it from a distance.

There are a number of tools and frameworks available for implementing 3D spatial audio in virtual environments, including those that are compatible with Unreal Engine 5.1. Some options include FMOD (https://www.fmod.com/studio), Wwise (https://www.audiokinetic.com/products/wwise/) and Google Resonance (https://developers.google.com/resonance-audio/).

FMOD is a popular choice for game developers, as it offers a wide range of features and is easy to use. It allows users to create complex audio environments with ease and supports a range of platforms, including PC, console, mobile and VR/AR. One potential downside is that it can be resource-intensive, which may not be ideal for all projects.

Wwise is another popular choice for game developers and is known for its advanced features and flexibility. It supports a range of platforms, including PC, console, mobile and VR/AR and offers a wide range of tools for creating immersive audio environments. One potential downside is that it may have a steeper learning curve compared to some other options.

Google Resonance is a newer entrant to the field, but has already gained a reputation for its high-quality audio and ease of use. It is designed specifically for use in VR and AR applications and supports a range of platforms, including PC, console and mobile. One potential downside is that it may not offer as many advanced features as some other options.

Overall, the choice of 3D spatial audio framework will depend on the specific needs of the project, including the platform(s) being targeted, the desired level of complexity and control and the resources available for implementation. Metahattan™ as a company will incorporate tools to allow end-users to easily incorporate such audio into their AR creations in real time to enhance the user experience and create a more immersive environment.

03 Marketing in the Metaverse

3.1 Overview

In the novel and movie adaptation of "Ready Player One," the OASIS is a virtual reality world in which users can access and create content. As such, it is likely that the creator of the Metaverse platform, James Halliday, would have had to think about how to reconcile intellectual property rights within the virtual world while allowing users to incorporate those intellectual properties into their virtual lives without repercussions (Welkowitz, 2007 | Intellectual Property in Virtual Worlds).

One potential solution to this problem, known as Halliday's Paradox, could be a novel advertising model in which IP owners grant permission to use their content within the Metaverse without charging license fees, in exchange for a percentage of generated revenue at the point of sale for digital assets within the virtual world (Adegbesan & Abubakar, 2015 | The Impact of Affiliate Marketing on Consumer Purchase Intentions). This model, similar to the concept of affiliate marketing, would allow users to legally incorporate a wide variety of intellectual property into their virtual lives, while also providing a source of revenue for both the IP holders and the Metaverse creators.

Under this model, when a digital asset is sold in the Metaverse, a percentage of the sale price would go to the IP holder as a license fee, a percentage would go to the Metaverse creators and the remaining percentage would go to the user who made the sale. The benefits of this approach include the enhancement of the user experience through the incorporation of a wide range of content into the virtual world (Edelman & Smith, 2009 | Virtual Worlds: Building the Business Case), the provision of a source of revenue for IP holders and the generation of revenue for the Metaverse creators to fund the ongoing development and maintenance of the virtual world.

When a 3D asset is not sold within the Metaverse, but is instead linked to the real version for sale as a point of sale, the novel advertising and affiliate system can still provide benefits for all parties involved. For the IP holder, this system can still provide a source of revenue through the sale of the real-world version of the item. Even if the 3D asset is not sold within the Metaverse, the presence of the asset within the virtual world can serve as a form of advertising and promotion, potentially leading to increased sales of the real-world version.

For the Metaverse creators, the novel advertising and affiliate system can still provide a source of revenue through the sale of the real-world version of the item, as well as through the percentage of the sale price that is allocated to the creators under the system. Additionally, the presence of the 3D asset within the Metaverse can serve as a form of advertising for the virtual world itself, potentially attracting more users and increasing overall revenue. For the user who creates and links the 3D asset to the real-world version, the system can provide a source of income through the percentage of the sale price that is allocated to the user.

Overall, the novel advertising and affiliate system described in the previous responses can provide benefits for all parties involved, even when the 3D asset is not sold within the Metaverse but is instead linked to the real-world version for sale as a point of sale.

While this concept is purely hypothetical and has not been explicitly described in "Ready Player One," it is a feasible solution to the problem of intellectual property rights in the Metaverse as the implied solution for Halliday's Paradox.

In order to implement the novel advertising and affiliate system described in the previous responses, a 3D asset repository would be required to store and manage the assets within the Metaverse. This repository would need to provide various functions for different users, including the IP holders, users within the Metaverse and the main Metaverse platform company.

For the IP holders, the 3D asset repository would need to provide a dashboard or interface through which they can manage and track the use of their assets within the Metaverse. This could include features such as the ability to view data on asset usage and sales, set permissions for asset use and upload and manage new assets.

For users within the Metaverse, the 3D asset repository would need to provide a user-friendly interface through which they can browse, search and purchase assets. This could include features such as the ability to view asset previews, read descriptions and user reviews and make purchases using in-world or real-world currency.

For the main Metaverse platform company, the 3D asset repository would need to provide a backend system through which the company can manage and track the use and sale of assets within the Metaverse. This could include features such as the ability to track revenue and user data, set policies and rules for asset use and sales and enforce compliance with intellectual property laws.

Overall, the 3D asset repository would need to provide a range of functions and features to support the novel advertising and affiliate system described in the previous

responses, enabling IP holders, users and the Metaverse platform company to effectively manage and track the use of assets within the virtual world.

As a result, this novel form of advertising (Spatial Computing Asset Network | S.C.A.N.) or V.I.P.E.R. (Virtual Intellectual Property Engagement and Recourse) system would satisfy the needs of user generated virtual worlds, the IP holders and the main company platform through affiliate, real world and virtual microtransaction use cases.

3.2 Metaphor Shear and Traditional Advertising

In the book "In the Beginning was the Command Line" by Neal Stephenson, the concept of Metaphor Shear is described as a phenomenon that occurs when different computer systems or user interfaces are based on different underlying metaphors, or conceptual models. According to Stephenson, these different metaphors can create barriers to communication and understanding between users of different systems, as each system may have its own unique vocabulary and set of assumptions about how the system should work.

One example of Metaphor Shear that Stephenson discusses in the book is the difference between the command-line interface (CLI) and the graphical user interface (GUI). The CLI is based on a metaphor of the computer as a powerful and flexible tool that can be controlled through the use of precise and specific commands, while the GUI is based on a metaphor of the computer as a virtual desktop or workspace that can be interacted with through the use of graphical icons and menus. These different metaphors can create confusion and frustration for users who are accustomed to one interface and are trying to use a system based on the other interface.

Stephenson argues that Metaphor Shear can be a significant barrier to the adoption and integration of new technologies, as users may have difficulty understanding and using systems that are based on different metaphors than the ones they are accustomed to. He suggests that designers of new technologies should be mindful of this issue and try to choose metaphors that are intuitive and familiar to users, in order to minimize the impact of Metaphor Shear.

Metaphor Shear can be a significant source of frustration and anger for users when a system does not work as expected. This is because the metaphor of interaction that underlies a system shapes the user's expectations of how the system should behave and what actions should produce which outcomes. When the system behaves in a way

that is contrary to these expectations, it can be jarring and disorienting for the user, leading to frustration and anger.

One example of Metaphor Shear in traditional advertising is the interruption of the expected user experience. For example, consider a user who is browsing the internet and expects to be able to access content without interference. If this user encounters an advertisement that pops up unexpectedly or takes over the screen, it can be jarring and disrupt the expected flow of the user's experience. This type of Metaphor Shear can create a sense of dissonance and frustration for the user, leading to a negative reaction to the advertisement and potentially damaging the effectiveness of the ad.

Another example of Metaphor Shear in traditional advertising is the use of unfamiliar or confusing metaphors in the ad itself. For example, consider an advertisement that uses a metaphor of a car as a jungle predator in order to sell the car's performance and power. If this metaphor is unfamiliar or confusing to the viewer, it may create a sense of dissonance and hinder the effectiveness of the ad.

Metaphor Shear in traditional advertising can have a significant impact on user retention and brand association during interruptions to media. When an advertisement interrupts the expected user experience, it can create a sense of dissonance and frustration for the viewer, potentially leading to a negative reaction to the ad and decreasing the effectiveness of the message. This can be particularly true if the advertisement uses unfamiliar or confusing metaphors, as these can create additional barriers to understanding and further decrease the effectiveness of the ad.

In terms of user retention, advertisements that create a sense of dissonance or frustration may cause viewers to disengage from the ad or the media content being watched. This can lead to a decreased ability to retain information about the advertised product or brand, as the viewer may be less likely to pay attention or remember the details of the ad.

In terms of brand association, advertisements that create a negative reaction may lead to a negative association with the advertised brand. If a viewer experiences frustration or anger as a result of an ad, they may be less likely to consider the advertised product or brand in the future. This can be particularly damaging if the ad is intended to create a positive association with the brand, as the negative reaction may counteract or negate any intended positive effects.

Overall, Metaphor Shear in traditional advertising can shape user retention and brand association by creating barriers to understanding and causing negative reactions, potentially decreasing the effectiveness of the ad and damaging the advertised brand.

3.3 VIPER Protocol

Virtual Intellectual Property Engagement and Recourse is able to address most of the issues related to Metaphor Shear in traditional advertising by drastically increasing engagement. One potential benefit of this approach is that it could provide a more seamless and unobtrusive advertising experience for users, potentially reducing the impact of interruptions to media.

For example, Virtual Intellectual Property Engagement and Recourse could allow for the integration of advertising into the virtual world in a way that is more closely tied to the user's experience, rather than interrupting it. This could include the incorporation of advertising into the virtual environment or the use of 3D assets that are related to the advertised product or brand. By integrating advertising more closely with the user's experience, this approach may be able to create a more seamless and unobtrusive advertising experience that is less likely to cause frustration or negative reactions.

Additionally, Virtual Intellectual Property Engagement and Recourse could allow for the use of more familiar and intuitive metaphors in advertising, potentially reducing the impact of confusing or unfamiliar metaphors and increasing the effectiveness of the ad. For example, this approach could allow for the use of 3D assets that are based on familiar real-world objects or concepts, rather than abstract or unfamiliar metaphors. This could make it easier for users to understand and relate to the advertised product or brand, potentially increasing the effectiveness of the ad and improving brand association.

Overall, Virtual Intellectual Property Engagement and Recourse may be able to address some of the issues related to Metaphor Shear in traditional advertising by providing a more seamless and unobtrusive advertising experience and using more familiar and intuitive metaphors, potentially increasing the effectiveness of the ad and improving brand association.

Imagine the ability to reach a global audience in a more targeted and personalized manner. By allowing for virtual experiences that are tailored to specific demographics or interests, companies can more effectively reach and engage with their target market. The Metaverse also allows for the creation of interactive and immersive campaigns that can be designed to capture the attention and interest of users in a way that traditional marketing channels cannot.

04 State of Play

4.1 Overview

The growth and development of persistent virtual worlds and online communities has been exponential in recent years. Every day, millions of people from all corners of the globe connect to the internet to engage in activities such as gameplay, world-building and socialization within virtual environments. The economic impact of these virtual worlds is significant, with worldwide spending on virtual goods estimated to have reached $110 billion in 2021. A significant portion of this spending is attributed to the virtual customization of avatars, with some virtual items commanding exorbitant prices. For instance, a digital version of a Gucci Dionysus bag was sold for $4,115 in the virtual world of Roblox, surpassing the physical bag's retail value of $3,400. In another example, a virtual plot of land in The Sandbox adjacent to a property owned by musician Snoop Dogg was sold for the equivalent of nearly $450,000.

But it is not just virtual goods that are driving the economic success of these virtual worlds. The popular video game Fortnite generated over $20 billion in revenue from in-game transactions from 2018 to 2021, with a large portion of players choosing to make purchases within the game to enhance their virtual experiences.

As various industries, including media, entertainment, sports, education and enterprise, look to enter the virtual space, it is becoming increasingly evident that the Metaverse has the potential to bring about a new era of economic and digital disruption. In fact, some reports estimate that the sector could be worth upwards of $5 trillion by 2030. The increasing prevalence and influence of these virtual worlds cannot be denied and it will be interesting to see how they continue to shape the future of commerce and communication.

At Metahattan™, we see the need to build a compelling platform for this where an emphasis on ease of use and accessibility has the potential to create a powerful combination that empowers the end user. By designing the user interface to be intuitive and user-friendly, more people will be able to easily adopt and utilize the technology. This will allow a wider range of individuals to take advantage of the benefits that the space has to offer, such as increased efficiency in various industries and enhanced experiences in entertainment and education.

In addition, a focus on accessibility will ensure that the technology is available to all users, regardless of their technological proficiency or physical abilities. By eliminating barriers to entry, more people will be able to experience the transformative power of augmented reality.

In recent years, there has been a growing movement among creators and consumers to advocate for data privacy, transaction and asset ownership. The frequent reports of data misuse have raised awareness among consumers about the data practices of large platforms, causing many to become increasingly concerned about how their virtual identities will be stored, tracked and monetized online. In fact, a survey of U.S. internet users found that 74% are more concerned about their online privacy than ever before.

This newfound awareness of data privacy has prompted individuals to demand greater control over their personal information and how it is used. In response, some platforms have begun to offer more transparent and user-friendly privacy policies, as well as tools that allow users to manage their data and control who has access to it.

The increasing focus on data privacy and ownership is a significant development, as it has the potential to not only protect individuals' personal information, but also to level the playing field for creators and small businesses. By giving creators and consumers more control over their data and assets, these developments have the potential to foster a more equitable and sustainable online ecosystem.

The Metaverse has the potential to revolutionize the way that creators monetize their digital assets and experiences. However, many creators have grown wary of the current model, in which the largest platforms often take a significant percentage of sales revenues. As a result, there has been a shift towards alternative pathways for monetization and publishing in the online world.

One of the most significant developments in this regard has been the rapid growth of Web3 technologies, such as non-fungible tokens (NFTs). NFTs allow creators to have direct access to their markets and have exploded in popularity over the past few years. In 2021, collectors sent over $41 billion to online marketplaces and the first half of 2022 saw over $37 billion in NFT sales. The use of NFTs has been driven in part by Ethereum's ability to provide Web3 features, security and anonymity for consumers, leading to a nearly 200x increase in the market between 2020 and 2021. In fact, last year alone saw NFT sales skyrocket from $100 million to $18 billion. The direct marketplace OpenSea was responsible for nearly 60% of those transactions, but NFTs are also being used to create and monetize entire virtual worlds.

Overall, the proliferation of Web3 technologies and NFTs has the potential to disrupt traditional models of monetization and publishing in the Metaverse, giving creators more control and autonomy in the process.

In order to fully understand and accommodate the complex and constantly evolving nature of the Metaverse, it will be necessary to go beyond the basics and implement deeper integrations of persistent digital objects, virtual real estate and interoperability services. These integrations should be designed with the specific needs of those building the Metaverse in mind, as this will ensure that the Metaverse can meet the diverse and evolving needs of its users.

As this new digital economy takes shape, there is also an opportunity to reimagine the financial systems and foundational structures that support it. This could include rethinking traditional models of monetization and publishing, as well as exploring alternative approaches to asset ownership and data privacy. By doing so, it may be possible to create a more equitable and sustainable online ecosystem that benefits all stakeholders.

However, the success of this movement depends on the conviction of companies, creators and consumers to demand something different. There is already evidence that this shift is happening, as seen in the rapid growth of Web3 technologies such as non-fungible tokens (NFTs). NFTs allow creators to have more control over the monetization and publishing of their digital assets and their popularity has exploded in recent years. In 2021, collectors sent over $41 billion to online marketplaces and the first half of 2022 saw over $37 billion in NFT sales. This trend is expected to continue as more creators and consumers embrace the benefits of NFTs, including increased ownership and autonomy.

The next era of digital ownership will require a more holistic and considerate approach to the Metaverse. By working together, companies, creators and consumers can shape the future of the digital economy in a way that meets the needs of all stakeholders and creates a fair, sustainable and empowering online ecosystem.

05 Community & Growth

5.1 Content & Creator System

Metahattan™ aims to create an augmented reality (AR) content creation system that enables real-time collaboration and world-building through a simple app on a phone could have a user interface that includes the following features:

- A 3D modeling tool that allows partners to create and customize 3D objects and environments. This could include features such as texture mapping, lighting and physics simulation.

- A collaboration tool that enables partners to work together in real-time on the same AR project, regardless of their physical location. This could include features such as shared editing, chat and version control.

- A publishing tool that allows partners to publish their AR projects to a platform or marketplace, where they can be accessed and experienced by other users.

- Integration with a framework such as Brand3d.com, which provides a range of assets and tools for creating AR experiences. This could include pre-built models, textures and effects, as well as scripting and customization tools.

Overall, the interface for this AR content creation system should be intuitive and easy to use, with a focus on enabling partners to quickly and effectively collaborate and build immersive AR worlds.

5.2 Brand Values

Our brand values at Metahattan™ are centered around empowering our users to create and monetize within our virtual reality and augmented reality platform. We believe that by giving our users the tools and resources they need to bring their ideas to life, we can foster a vibrant and innovative community within our digital twin of the real world.

As a B-Corporation, we are committed to using our platform to benefit the public and make the world a better place. We believe that through the power of technology, we can bring people together and facilitate positive change in the world.

In addition to empowering our users, we also prioritize ease of use in our platform. We understand that for many people, virtual and augmented reality may be new and intimidating and we strive to create an intuitive and user-friendly experience for all of our users on Metahattan.

Ultimately, our goal is to build a platform that brings people together and enables them to create, learn and grow in a virtual space. We believe that by aligning our brand values with this mission on Metahattan, we can create a truly transformative experience for our users.

06 Challenges

6.1 Decentralized Content Distribution

Content distribution through a P2P network has two main issues. The first involves download speed: retrieving a file from a DHT or distributed peer-to-peer storage system has traditionally been too slow. In a graphical application like Metahattan, users will be adverse to using a system that does not load the experience quickly. The second issue involves availability: ensuring that content is sufficiently distributed around the network without loss. IPFS and the upcoming FileCoin protocol are addressing these issues and we're looking forward to when they become production ready.

Metahattan™ is exploring novel methodologies in which the traditional Peer to Peer architecture may best be used as a method to facilitate the benefits of such without the side effects. As such, we are seeking to integrate the world's first hybrid peer to peer protocol system in order to assure stability and speed in any circumstance.

6.2 Scripting

Scripting will be the most important element used to create valuable experiences for users in Decentraland. Its APIs will need to be secure enough for clients to hold private keys and authorize micropayments frequently. Ease-of-use is also critical to penetrate a broad audience of developers.

6.3 Content Curation

The issue of filtering content for mature audiences (like pornography, violence, or gambling) is difficult to solve within a decentralized network. We expect a market to emerge here: with a reputation-based approach, users could select one or more providers of whitelists/blacklists that track the type of content being served on each parcel. Moreover, it is possible to apply novel artificial intelligence stacks for the purpose of content moderation and detection.