

THE BUILDING BLOCKS OF **THE METAVERSE**

December 2021

EXECUTIVE SUMMARY:

- The metaverse is becoming a meaningful parallel economy with many subsectors e.g., manufacturing, gaming, social & advertising, finance, art, etc. and varying levels of adoption
- We analyzed the different layers of the metaverse and believe that the best risk/reward opportunities are “the building blocks”, which include **Infrastructure, Spatial Computing, and Decentralization**
- Companies that lie at the intersection of these three layers are disproportionately positioned to benefit. We strongly favor companies with platform agnostic business models at this point in the adoption cycle
- Examples would be **Nvidia (NVDA), Unity (U), and Microsoft (MSFT)**

DEFINING THE METaverse

- **What is the metaverse?**

The metaverse is a virtual world(s) where one can have an identity and interact with others real-time (connect, collaborate, create, transact etc.)

- **What is Web3?**

Web 3 is a future version of the internet which is decentralized and based on a public blockchain. As background, Web 1 provided desktop browser access; Web 2 is the current version of the internet mainly defined by mobile and social features and dominated by several large companies that have build successful platforms on top of it






While the metaverse, by definition, does not mean a decentralized platform, we believe that Web 3, which enables decentralization, will be a critical building block of future metaverses

Parallel economy with many different sectors

	Manufacturing Industry	Gaming & Entertainment	Social & Advertising	Financial Industry	Art Industry
Physical world					
The Metaverse					
Examples	Omniverse	Roblox, Epic Games	Decentraland Sandbox, Facebook	Cryptocurrencies, digital wallets	OpenSea, NFTs

Quote from NVIDIA CEO, Jensen Huang: "I'm fairly sure that at this point, Omniverse or the metaverse is going to be a new economy that is larger than our current economy".




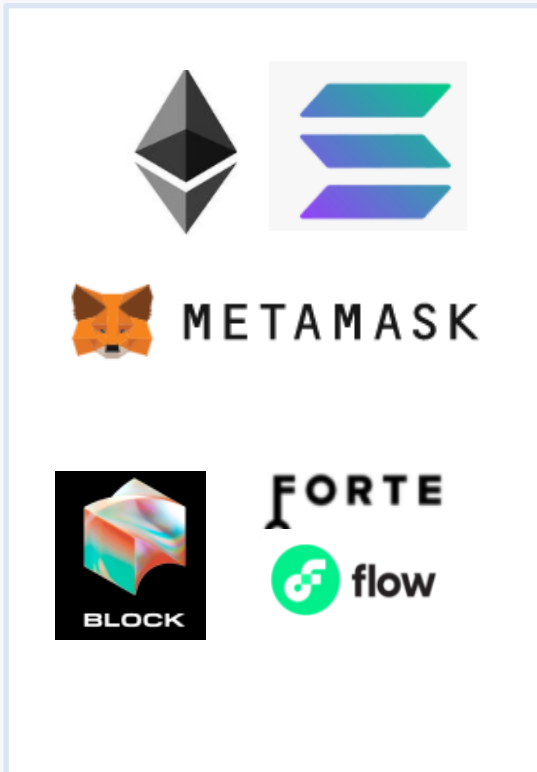
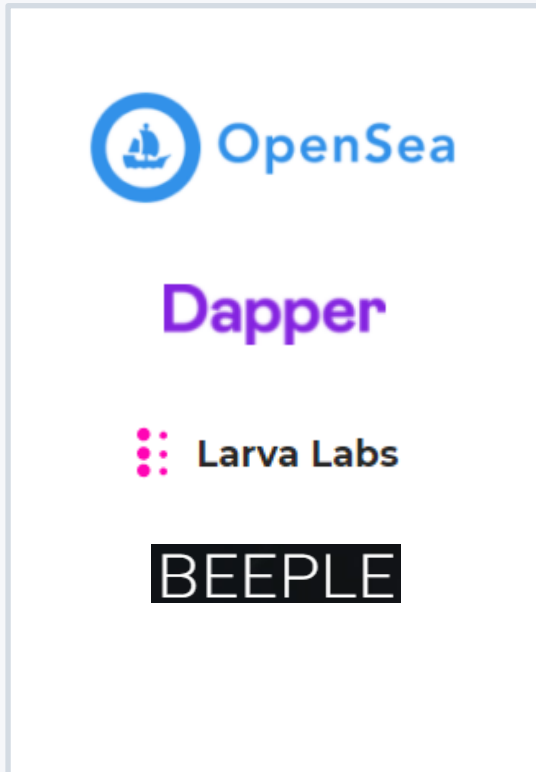
...with different levels of adoption and maturity

	Manufacturing Industry	Gaming & Entertainment	Social & Advertising	Financial Industry	Art Industry
Adoption level	 <ul style="list-style-type: none"> ▪ Concept introduced 10+ years ago labeled as Industrie 4.0 ▪ Slow adoption driven by lack of technology 	 <ul style="list-style-type: none"> ▪ Furthest adoption in gaming with significant market cap today 	 <ul style="list-style-type: none"> ▪ Newer concept that has recently captured attention post Facebook's name change ▪ Several social platforms already exist – users can buy land etc. 	 <ul style="list-style-type: none"> ▪ Web 3.0 Metaverse virtual worlds have nearly 50,000 active wallets today - up ~10x since the beginning of 2020 	 <ul style="list-style-type: none"> ▪ Art in the form of NFTs is a relatively new concept allowing artists to sell art online with - NFT part enabling provenance and identification
Recent Examples	<ul style="list-style-type: none"> ▪ Case studies from 2021: <ul style="list-style-type: none"> – BMW/Omniverse digital twin - 30% reduction in planning; – Siemens HRSG digital twin ▪ Design/simulation market (2020): <ul style="list-style-type: none"> – Global PLM market ~\$26bn – Global simulation ~\$10bn – 3D CAD market ~\$10bn 	<ul style="list-style-type: none"> ▪ Roblox has 47.3million daily active users as of Q3 21 and ~\$70bn market cap ▪ Virtual concerts hosted on Fortnite (Epic Games) where users attend with avatars– 12.3mm viewers of an Ariana Grande virtual concert 	<ul style="list-style-type: none"> ▪ Decentraland (token MANA) was launched in 2015; \$9bn token market cap (up ~5x post Facebook's announcement) ▪ Sandbox (token SAND) just launched its alpha; \$6bn token market cap (up ~7x post Facebook's announcement) 	<ul style="list-style-type: none"> ▪ Currencies (e.g. Ethereum) ▪ Digital wallets – (e.g Metamask, Flow) enabling users on digital platforms to trade and purchase goods 	<ul style="list-style-type: none"> ▪ Exchanges (e.g. OpenSea) eliminate the middleman ▪ NFT art can sell for \$10s+mm – (e.g., CryptoPunk, Beeple) ▪ Estimated ~\$3.5bn in sales of NFTs in the first 3 quarters of this year

Source: Company reports, Grand View Research, Grayscale Investments, SPEAR Invest

The metaverse has gained furthest adoption in gaming which today serves as a proof of concept for other sectors.

...and many companies and platforms within each sector

	Manufacturing Industry	Gaming & Entertainment	Social & Advertising	Financial Industry	Art Industry
Participants					

Source: SPEAR Invest; Grayscale; companies mentioned are examples only – the list is not exhaustive

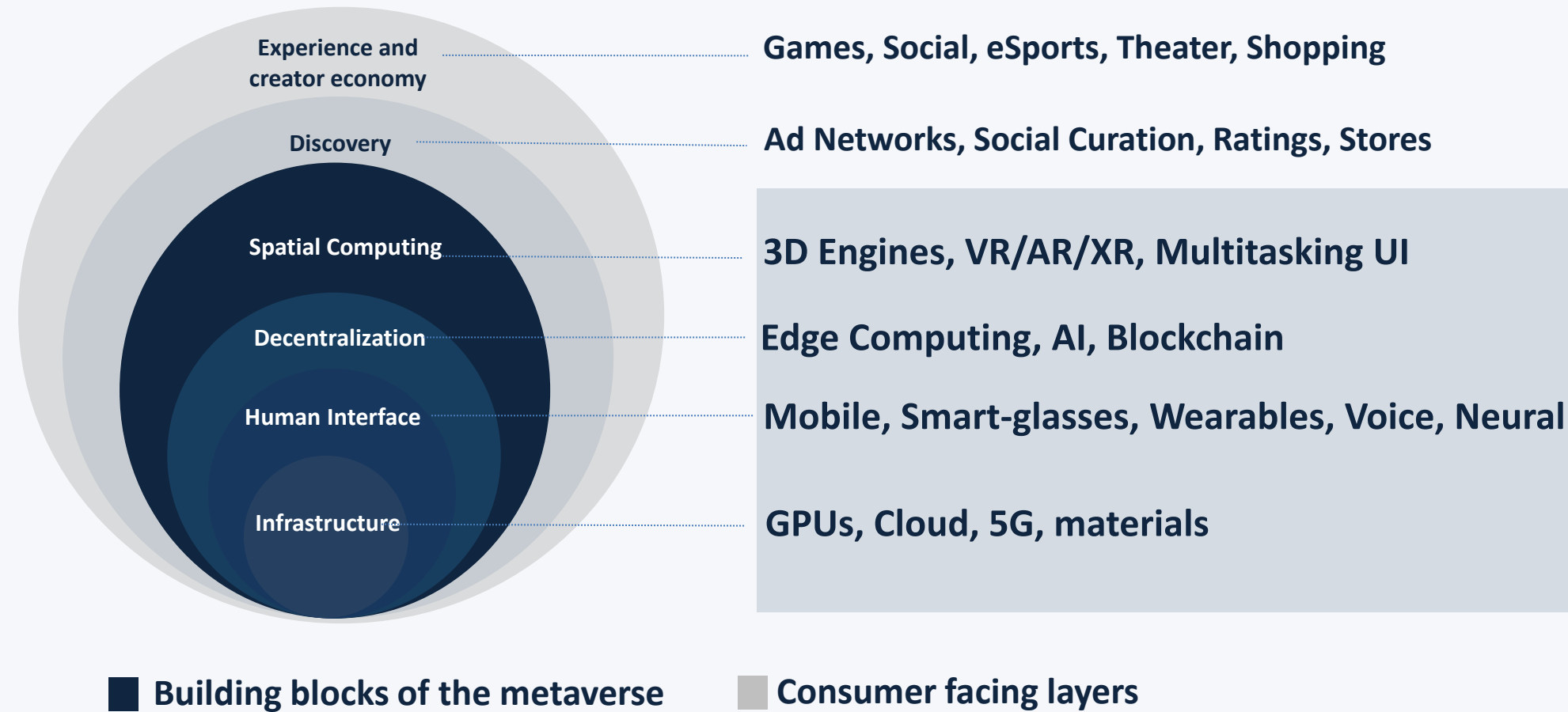
The market cap of Web 3 based Metaverse is only ~\$27.5billion today compared to the Gaming&eSports market at ~\$2trillion and Facebook market cap of \$0.9 trillion, implying significant growth potential

Why now?

- Key technology developments are bringing the metaverse concept to reality – we refer to them as building blocks:
 - **Infrastructure:** accelerated computing (e.g., real-time ray tracing), connectivity (5G)
 - **Spatial computing:** improvements in the software stack
 - **Decentralization:** EDGE computing and Blockchain
- Old concept – new dimension
 - For industrial companies, the concept of digital twins has been around for 10+ years; Industrie 4.0 i.e., the fourth industrial revolution, originates in 2011 and had similar concepts, but...
 - The technology 10+ years ago wasn't ready for implementation. Critical bottlenecks often cited were ease of deployment, compute speeds, centralized computing, and connectivity (reliability and latency)

Until recently we have not had the infrastructure to make this concept real, but today we do, and the technology will only improve.

THE LAYERS OF THE METaverse



SPEAR's focus is on the building blocks of the metaverse

Source: SPEAR Invest, Building the Metaverse - Jon Rodoff

While opportunities exist across all layers of the metaverse, SPEAR believes that the best risk/reward is in the building blocks that are platform and technology agnostic.

Diving into the building blocks

Infrastructure

Infrastructure is the materials, semiconductors, GPUs, cloud computing, and telecommunication networks (5G bringing reliability and reduced latency) critical for real time rendering



Spatial Computing

Software that brings objects into 3D, simulates environments, enables 3D design. AI supports image and movement recognition, conversations etc.



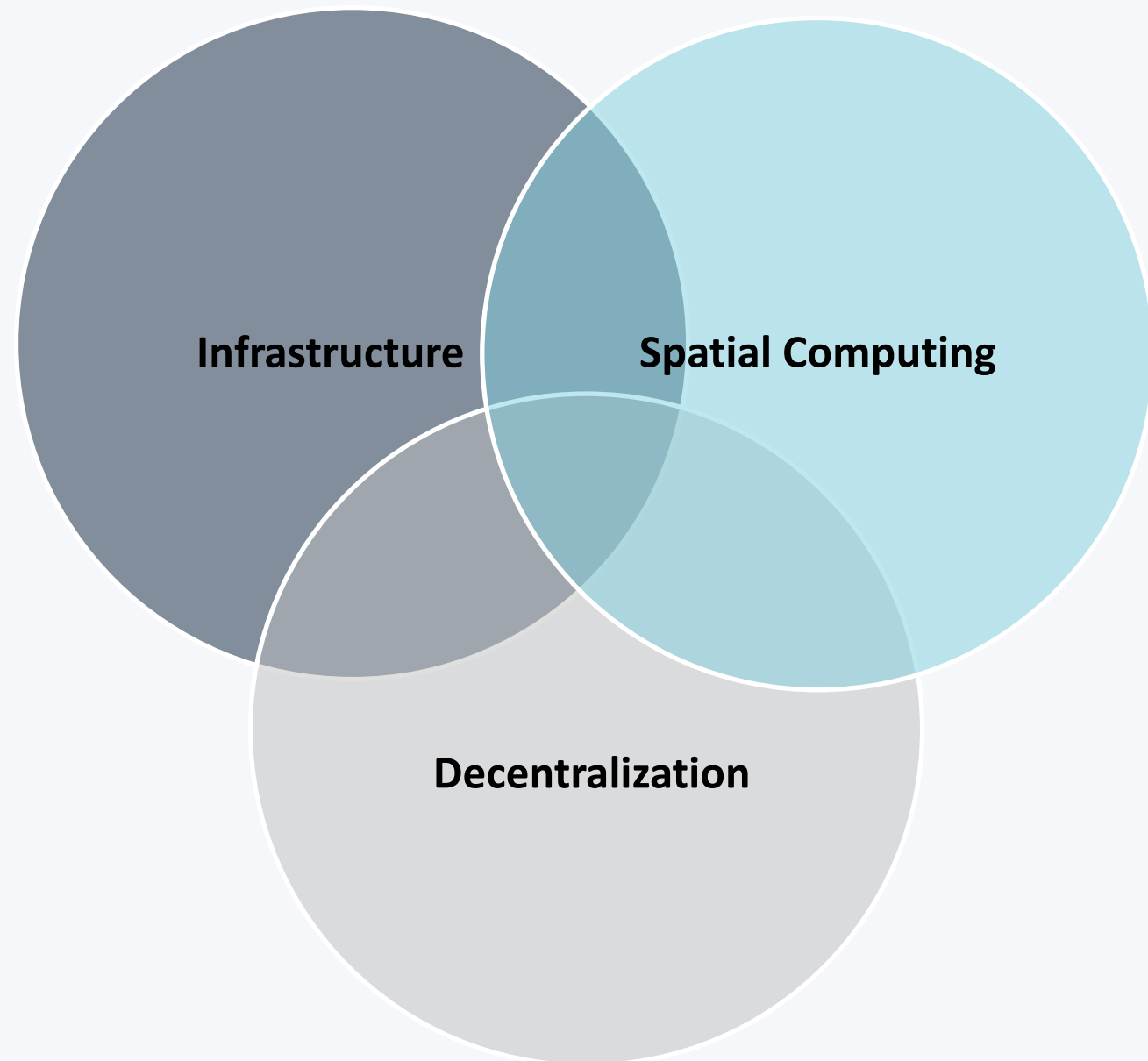
Decentralization

Decentralization allows moving to a permissionless, democratized structure; Blockchain enables value exchange (smart contracts) and identity; Edge computing enables compute at the source



Source: SPEAR Invest

Not all metaverses are decentralized, but decentralization is important



Metaverse does not mean decentralization

- Companies like **Nvidia, Unity, and Microsoft**, are decentralized platforms where creators use the hardware, software, and tools/SDKs to develop end products, which we believe would be crucial in creating future metaverses
- Companies like **Apple, Facebook**, have historically had centralized business models; it remains to be seen how will these translate to a concept of a metaverse

Why is decentralization important

- Decentralization has been one of the forces behind metaverse adoption in several end markets eliminating intermediaries (financial/currencies, art etc.)
- Benefit is that there is no authority over the consumer data, no company owns your identity, and users can move between platforms
- We expect that there will be both centralized and decentralized metaverses, with the former one leveraging existing user base, and the latter one benefiting from meaningful network effects

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