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The Metaverse: What It Is, Where to Find it, Who Will Build It, and Fortnite — Matthew Ball

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An Introduction…

Technology frequently produces surprises that nobody predicts. However, the biggest developments are often anticipated decades in advance. In 1945 Vannevar Bush described what he-called the "Memex", a single device that would store all books, records and communications, and mechanically link them together by association. This concept was then used to formulate the idea of "hypertext" (a term coined two decades later), which in turn guided the development of the World Wide Web (developed another two decades later). The "Streaming Wars" have only just begun, yet the first streaming video took place more than 25 years ago. What's more, many of the attributes of this so-called war have been hypothesized for decades, such as virtually infinite supplies of content, on-demand playback, interactivity, dynamic and personalized ads, and the value of converging content with distribution.

In this sense, the rough outlines of future solutions are often understood and, in a sense, agreed upon well in advance of the technical capacity to produce them. Still, it's often impossible to predict how they'll fall into place, which features matter more or less, what sort of governance models or competitive dynamics will drive them, or what new experiences will be produced. By the time Netflix launched its streaming service, much of Hollywood knew that the future of television was online (IP TV had been deployed in the late 1999s). The challenge was timing and how to package such a service (it took another 10 years for Hollywood to accept all of their channels, genres and content needs to be collapsed into a single app/brand). The popularity of video game broadcasting and YouTubers still elude many in the media industry, as does the idea that the best way to monetize content might be to give it away for free and charge for optional $0.99 items of no consequential value. The acquisition of media conglomerate Time Warner by landline internet giant AOL was set in 2000 based on the idea media and tech/distribution needed to converge, but was unwound in 2009 after it failed to produce much benefit. Nine years later, it was then bought by mobile internet giant AT&T under the same premise.

While many technologists imagined some sort of "personal computer", its attributes and timing were so unpredictable that Microsoft dominated the PC era that began in the 1990s rather than the mainframe domineer IBM. And while Microsoft clearly foresaw mobile, it misread the role of the operating system and too much of the hardware, hence the rise of iOS and Android globally (and Microsoft's shift from the OS layer to the app/services one). In a similar sense, Steve Jobs' priorities for computing were always "right", they were just too early and focused on the wrong device. More broadly, the two most dominant cases of the early Internet were instant messaging and email, and yet the importance of social apps/networks was still unexpected until the late 2000s. And for that matter, all of the prerequisites for building Facebook existed pre-Y2K, but Facebook didn't come along until 2005 – and even then, it was an accident.

Since the late 1970s and early 1980s, many of those in the technology community have imagined a future state of, if not quasi-successor to, the Internet – called the "Metaverse". And it would revolutionize not just the infrastructure layer of the digital world, but also much of the physical one, as well as all the services and platforms atop them, how they work, and what they sell. Although the full vision for the Metaverse remains hard to define, seemingly fantastical, and decades away, the pieces have started to feel very real. And as always with this sort of change, its arc is as long and unpredictable as its end state is lucrative.

To this end, the Metaverse has become the newest macro-goal for many of the world's tech giants. As I outlined in February of 2019, it is the express goal of Epic Games, maker of the *Unreal Engine* and

Fortnite. It is also the driver behind Facebook's purchase of Oculus VR and its newly announced Horizon virtual world/meeting space, among many, many other projects, such as AR glasses and brain-to-machine communications. The tens of billions that will be spent on cloud gaming over the next decade, too, is based on the belief that such technologies will underpin our online-offline future.

Ultimately, you'll find many of the same items in the offices of Big Tech CEOs. However, the most well-worn is likely to be a copy of Neal Stephenson's *Snow Crash*, which first described and essentially coined the terms "Metaverse" and "Avatar". And there are many reasons why.

CHAPTER 1: WHAT IS THE "METAVERSE"

The most common conceptions of the Metaverse stem from science fiction. Here, the Metaverse is typically portrayed as a sort of digital "jacked-in" internet – a manifestation of actual reality, but one based in a virtual (often theme park-like) world, such those portrayed in *Ready Player One* and *The Matrix*. And while these sorts of experience are likely to be an *aspect* of the Metaverse, this conception is limited in the same way movies like *Tron* portrayed the Internet as a literal digital "information superhighway" of bits.

Just as it was hard to envision in 1982 what the Internet of 2020 would be — and harder still to communicate it to those who had never even "logged" onto it at that time — we don't really know how to describe the Metaverse. However, we can identify core attributes.

The Metaverse, we think, will...

1. **Be persistent** – which is to say, it never "resets" or "pauses" or "ends", it just continues indefinitely

2. **Be synchronous and live** – even though pre-scheduled and self-contained events will happen, just as they do in "real life", the Metaverse will be a living experience that exists consistently for everyone and in real time

3. **Have no real cap to concurrent participations with an individual sense of "presence"** – everyone can be a part of the Metaverse and participate in a specific event/place/activity together, at the same time and with individual agency

4. **Be a fully functioning economy** – individuals and businesses will be able to create, own, invest, sell, and be rewarded for an incredibly wide range of "work" that produces "value" that is recognized by others

5. **Be an experience that spans** both the digital and physical worlds, private and public networks/experiences, and open and closed platforms

6. **Offer unprecedented interoperability** of data, digital items/assets, content, and so on across each of these experiences – your "Counter-Strike" gun skin, for example, could also be used to decorate a gun in *Fortnite*, or be gifted to a friend on/through Facebook. Similarly, a car designed for *Rocket League* (or even for Porsche's website) could be brought over to work in *Roblox*

7. Be populated by "content" and "experiences" **created and operated by an incredibly wide range of contributors**, some of whom are independent individuals, while others might be informally organized groups or commercially-focused enterprises

There are a few other ideas that may be core to the Metaverse, but are not widely agreed upon. One of these concerns is whether participants will have a single consistent digital identity (or "avatar") that they will use across all experiences. This would have practical value but is probably unlikely as each of the leaders in the "Metaverse era" will still want their own identity systems. Today, for example, there are a few dominant account systems – but none have exhaustive coverage of the web and they often stack atop one another with only limited data sharing/access (e.g. your iPhone is based around an iOS account, then you might log into an app using your Facebook ID, which itself is your Gmail account).

There is also disagreement on how much interoperability is required for the Metaverse to really be "the Metaverse", rather than just an evolution of today's Internet. Many also debate whether a true Metaverse can have a single operator (as is the case in *Ready Player One*). Some believe the definition (and success) of a Metaverse requires it to be a heavily decentralized platform built mostly upon community-based standards and protocols (like the open web) and an "open source" Metaverse OS or platform (this doesn't mean there won't be dominant closed platforms in the Metaverse).

Another idea relates to the fundamental communications architecture of the Metaverse. This is described in more detail later in the piece, but while today's Internet is structured around individual servers "talking" to one another on an as-needed basis, some believe the Metaverse needs be "wired" and "operated" around persistent many-to-many connections. But even here, there's no consensus around exactly how this would work, nor the degree of decentralization required.

It's also helpful to consider what the Metaverse is often, but incorrectly, likened to. While each of these analogies is likely to be a part of the Metaverse, they aren't actually the Metaverse. For example, The Metaverse is not…

1. **A "virtual world"** – Virtual worlds and games with AI driven characters have existed for decades, as have those populated with "real" humans in real time. This isn't a "meta" (Greek for "beyond") universe, just a synthetic and fictional one designed for a single purpose (a game).

2. **A "virtual space"** – Digital content experiences like *Second Life* are often seen as "proto-Metaverses" because they (A) lack game-like goals or skill systems; (B) are virtual hangouts that persist; (C) offer nearly synchronous content updates; and (D) have real humans represented by

digital avatars. However, these are not sufficient attributes for the Metaverse. Instead, they are just virtual bulletin/message boards that are set in a visual world that includes visual representations of the posters.

3. **"Virtual reality"** – VR is a way to experience a virtual world or space. Sense of presence in a digital world doesn't make a Metaverse. It is like saying you have a thriving city because you can see and walk around it.

4. **A "digital and virtual economy"** – These, too, already exist. Individual games such as *World of Warcraft* have long had functioning economies where real people trade virtual goods for real money, or perform virtual tasks in exchange for real money. In addition, platforms such as Amazon's Mechanical Turk, as well as technologies such as Bitcoin, are based around the hiring of individuals/businesses/computational power to perform virtual and digital tasks. We are already transacting at scale for purely digital items for purely digital activities via purely digital marketplaces.

5. **A "game"** – *Fortnite* has many elements of the Metaverse. It (A) mashes up IP; (B) has a consistent identity that spans multiple closed platforms; (C) is a gateway to a myriad of experiences, some of which are purely social; (D) compensates creators for creating content, etc. However, as is the case with *Ready Player One*, it remains too narrow in what it does, how far it extends, and what "work" can occur (at least for now). While the Metaverse may have some game-like goals, include games, and involve gamification, it is not itself a game, nor is it oriented around specific objectives.

6. **A "virtual theme park or Disneyland"** – Not only will the "attractions" be infinite, they will be not be centrally "designed" or programmed like Disneyland, nor will they all be about fun or entertainment. In addition, the distribution of engagement will have a very long tail

7. **A "new app store"** – No one needs another way to open apps, nor would doing so "in VR" (as an example) unlock/enable the sorts of value supposed by a successor Internet. The Metaverse is substantively different from today's Internet/mobile models, architecture, and priorities.

8. **A "new UGC platform" -** The Metaverse is not just another YouTube or Facebook-like platform in which countless individuals can "create", "share", and "monetize" content, and where the most popular content represents only the tiniest share of overall consumption. The Metaverse will be a place in which proper empires are invested in and built, and where these richly capitalized businesses can fully own a customer, control APIs/data, unit economics, etc. In addition, it's likely that, as with the web, a dozen or so platforms hold significant shares of user time, experiences, content, etc.

(If you want a simpler way to think about the Metaverse, you can imagine it as the Nightmare Before Christmas *– you can walk into any experience or activity, and potentially address almost any of your needs, from a single starting point or world that's also populated by everyone else you know).*

CHAPTER 2: WHY DOES THE METAVERSE MATTER

Even if the Metaverse falls short of the fantastical visions captured by science fiction authors, it is likely to produce trillions in value as a new computing platform or content medium. But in its full vision, the Metaverse becomes the gateway to most digital experiences, a key component of all physical ones, and the next great labor platform.

The value of being a key participant, if not a driver, of such a system is self-evident – there is no "owner" of the Internet today, but nearly all of the leading Internet companies rank among the 10 most valuable public companies on earth. And if the Metaverse does indeed serve as a functional "successor" to the web — only this time with even greater reach, time spent, and more commercial activity — there's likely to be even more economic upside. Regardless, the Metaverse should produce the same diversity of opportunity as we saw with the web – new companies, products and services will emerge to manage everything from payment processing to identity verification, hiring, ad delivery, content creation, security, and so forth. This, in turn, will mean many present-day incumbents are likely to fall.

More broadly, the Metaverse stands to alter how we allocate and monetize modern resources. For centuries, developed economies have transformed as the scarcity of labor and real-estate waxed and waned. Under the Metaverse, would-be laborers who choose to live outside cities will be able to participate in the "high value" economy via virtual labor. As more consumer spending shifts to virtual goods, services, and experiences, we'll also see further shifts in where we live, the infrastructure that's built, and who performs which tasks. Consider, for example, "Gold Farming". Not long after in-game trade economies emerged, many "players" – often employed by a larger company and typically in lower-income countries — would spend a workday collecting digital resources for sale inside or outside the game. These sales were typically to higher-income players in the West. And while this "labor" is typically menial, repetitive, and limited to a few applications, the diversity and value of this "work" will grow as the Metaverse itself does.

CHAPTER 3: HOW DOES ONE SIMPLY BUILD A MORDORVERSE

The Metaverse will require countless new technologies, protocols, companies, innovations, and discoveries to work. And it won't directly come into existence; there will be no clean "Before Metaverse" and "After Metaverse". Instead, it will slowly emerge over time as different products, services, and capabilities integrate and meld together. However, it's helpful to think of three core elements that need to come into place.

(One way I try to think about these three areas is via the Book of Genesis – first, "God" must create the underlying universe ("concurrency infrastructure"), then s/he must define its laws of physics and rules ("standards and protocols"), then s/he must fill it with life ("content") that's worthwhile, evolves, and

iterates against selection pressures. God, in other words, doesn't create and design the world as though it were a miniature model, but enables one to grow across a mostly blank tableau etc.)

Concurrency Infrastructure

At a foundational level, the technology simply does not yet exist for there to be hundreds, let alone millions of people participating in a shared, synchronous experience. Consider *Fortnite*'s 2019 Marshmello concert. An astounding 11MM people experienced the event in real time. However, they did not do so together. In truth, there were more than 100,000 instances of the Marshmello concert, all of which were slightly out of sync and capped at 100 players per instance. Epic can probably do more than this today, but not into several hundred, let alone millions.

Not only does the Metaverse require infrastructure that currently does not exist, the Internet was never designed for anything near this experience. After all, it was designed to share files from one computer to another. As a result, most of the Internet's underlying systems are oriented around one server talking to one other server or an end-user device. This model continues today. There are billions of people on today's Facebook, for example, but each user shares an individual connection with the Facebook server, not with any other user. Accordingly, when you access content from another user, you're really just pulling the latest information that Facebook is giving you. The earliest form of pseudo-synchronous programs were text chats, but you're still just pushing largely static data to a server and pulling the latest information from it when/where/how/as it's needed. The Internet simply wasn't designed for persistent (versus continuous) communication, let alone persistent communication that is synchronized in precise real time to countless others.

To operate, the Metaverse requires something more akin to video conferencing and video games. These experiences work because of persistent connections that update each other in real-time and with a degree of accuracy that other programs don't generally need. However, they tend not to have high levels of concurrency: most video chat programs max out beyond a few people, and once you hit 50, you tend to need to "live stream" a broadcast to your viewers, rather than share a two-way connection. To this end, these experiences neither need to be, nor are they, exactly live.

To this end, part of the reason that the battle royale genre is only recently popular in video games now is because it's only recently possible to play live with so many other users. Although some games with highest concurrencies have existed for more than twenty years, such as *Second Life* or *Warcraft*, they essentially spoofed the experience by "sharding" and splitting users into different "worlds" and servers. *Eve Online*, for example, can technically have more than 100,000 players "in the same game", but they are split across different galaxies (i.e. server nodes). As a result, a player only really sees or interacts with a small handful of other players at any one time. In addition, traveling to another galaxy means disconnecting from one server and loading another (which the game is able to narratively "hide" by forcing players to jump to light speed in order to cross the vastness of space). And if/when *Eve Online* did get to battles involving hundreds of users, the system slowed to a crawl. And this still worked because the gameplay dynamic was based on predominantly large-scale, pre-planned ship-based combat. If it was a "fast-twitch" game such as *Rocket League* or *Call of Duty*, these slowdowns would have been unplayable.

A number of companies are working hard to solve this problem, such as the aptly named Improbable. But this is an enormous computational challenge and one that fights against the underlying design/intent of the Internet.

Standards, Protocols, and their Adoption

The Internet as we experience it today works because of standards and protocols for visual presentation, file loading, communications, graphics, data, and so forth. These include everything from consumer-recognizable .GIFs filetypes to the websocket protocol that underlies almost every form of real-time communication between a browser and other servers on the internet.

The Metaverse will require an even broader, more complex, and resilient set of S&Ps. What's more, the importance of interoperability and live synchronous experiences means we'll need to prune some existing standards and "standardize" around a smaller set per function. Today, for example, there are a multitude of image file formats: .GIF, .JPEG, .PNG, .BMP, .TIFF, .WEBP, etc. And while the web today is built on open standards, much of it is closed and proprietary. Amazon and Facebook and Google use similar technologies, but they aren't designed to transition into one another — just as Ford's wheels aren't designed to fit a GM chassis.

This will be enormously difficult and take decades. And the more valuable and interoperable the Metaverse is, the harder it will be to establish industry-wide consensus around topics such as data security, data persistence, forward compatible code evolution, and transactions. In addition, the Metaverse will need altogether new rules for censorship, control of communications, regulatory enforcement, tax reporting, the prevention of online radicalization, and many more challenges that we're still struggling with today.

While the establishments of standards usually involve actual meetings, negotiations, and debates, the standards for the Metaverse won't be established upfront. The standard process is much messier and organic, with meetings and opinions changing on an ad hoc basis.

To use a meta analogy for the Metaverse, consider *SimCity*. In ideal circumstances, the "Mayor" (i.e. player) would first design their mega-metropolis, then build from day one to this final vision. But in the game, as with real life, you can't just "build" a 10MM person city. You start with a small town and optimize for it first (e.g. where the roads are, schools are, utility capacity, etc.). As it grows, you build around this town, occasionally but judiciously tearing down and replacing "old" sections, sometimes only if/when a problem (insufficient supply of power) or disaster hits (a fire). But unlike *SimCity*, there will be many mayors, not one — and their desires and incentives will often conflict.

We don't know exactly what the Metaverse will need, let alone which existing standards will transfer over, how, to what effects, when, or through which applications and groups. As a result, it's important to consider *how* the Metaverse emerges, not just around which technological standard.

The 'On-Ramp' Experience

Just as the standards for the Metaverse can't simply be "declared", consumers and businesses won't embrace a would-be proto-Metaverse simply because it's available.

Consider the real world. Just making a mall capable of fitting a hundred thousand people or a hundred shops doesn't mean it attracts a single consumer or brand. "Town squares" emerge organically around existing infrastructure and behaviors, to fulfill existing civilian and commercial needs. Ultimately, any place of congregation — be it a bar, basement, park, museum or merry go-round — is attended because of who or what is already there, not because it's a place in of itself.

The same is true of digital experiences. Facebook, the world's largest social network, didn't work because it announced it would be a "social network", but because it emerged first as a campus hot-or-not, then became a digital yearbook turned photo-sharing and messaging service. As with Facebook, the Metaverse needs to be "populated", rather than just "populable", and this population must then fill in this digital world with things to do and content to consume.

This is why considering *Fortnite* as video game or interactive experience is to think too small and too immediately. *Fortnite* began as a game, but it quickly evolved into a social square. Its players aren't logging in to "play", per se, but to be with their virtual and real-world friends. Teenagers in the 1970s to 2010s would come home and spend three hours talking on the phone. Now they talk to their friends on *Fortnite*, but not about *Fortnite* – but school, movies, sports, news and more. After all, *Fortnite* doesn't have a story or IP – the plot is what happens on it and who is there.

Furthermore, *Fortnite* is rapidly becoming a medium through which other brands, IP, and stories express themselves. Most famously, this includes last year's live Marshmello concert. However, such examples have rapidly expanded since. In December 2019, *Star Wars: The Rise of Skywalker* released a clip of the hotly-anticipated film exclusively in *Fortnite* as part of a larger, in-game audience-interactive event that included a live interview with director J.J. Abrams. What's more, this event was explicitly referenced in the opening moments of the film. The band Weezer produced a bespoke island where fans could get an exclusive first listen to their new album (while dancing with other "players". *Fortnite* has also produced several themed "limited-time modes" involving the likes of Nike's Air Jordan and Lionsgate's John Wick film series. In some cases, these "LTMs" transform part of *Fortnite*'s map into a mini-virtual world that, when entered, changes the aesthetics, items and playstyle of the game to resemble another. This has included the universe of the game Borderlands, Batman's hometown of Gotham, and the old west.

To this end, *Fortnite* is one of the few places where the IP of Marvel and DC intersects. You can literally wear a Marvel character's costume inside Gotham City, while interacting with those wearing legally licensed NFL uniforms. This sort of thing hasn't really happened before. But it will be critical to the Metaverse.

More broadly, a whole sub-economy on *Fortnite* has emerged where "players" can build (and monetize) their own content. This can be as small as digital outfits ("skins") or dances ("emotes"). However, it has rapidly expanded into creating all new games and experience using *Fortnite*'s engine, assets, and aesthetics. This includes everything from simple treasure hunts, to immersive mash-ups of the Brothers Grimm with parkour culture, to a 10-hour sci-fi story that spans multiple dimensions and timelines. In fact, *Fortnite*'s Creative Mode, already feels like a proto-Metaverse. Here, a player loads their avatar — one specific to them and which is used in all *Fortnite*-related experiences — and lands in a game-like lobby and can choose from thousands of "doors" (i.e. space-time rifts) that send them to one of thousands of different worlds with up to 99 other players.

This speaks to the longer term-vision for the game, one that creative director Donald Mustard is increasingly clear about. *Fortnite* isn't the Metaverse, but nothing is closer to the Metaverse today in spirit and it is clear how the "game" might eventually underpin one.

Epic Games' Epic Game Plan

The best example of *Fortnite*'s potential is demonstrated by its ability to persuade many supposed competitors into cooperation (or early "interoperability") with one another. Today, *Fortnite* works across each major entertainment platform – iOS, Android, PlayStation, Nintendo, PC, Xbox — allowing full cross-play that spans multiple identity/account systems, payment methods, social graphs, and typically closed ecosystems. For years, this was heavily resisted by the major gaming platforms as they believed that enabling such an experience would undermine their network effects and reduce the need to buy their proprietary hardware. As a result, a friend with *Call of Duty* on PlayStation could never play with their friend with *Call of Duty* on Xbox, even though both Sony and Microsoft knew they wanted to.

Similarly, it's rare to see IP owners allow their characters and stories to be intermingled with other IP. This does happen from time to time (e.g. there are several Marvel v DC comic book crossovers and video games). However, it's rare to see it crossed over in an experience they don't control editorially, let alone one based around unpredictability (not even the creative team behind *Fortnite* knows what it will do in 2021) and with such a wide range of IP.

This organic evolution can't be overemphasized. If you "declared" your intent to start a Metaverse, these parties would never embrace interoperability or entrust their IP. But *Fortnite* has become so popular and so unique that most counterparties have no choice but to participate – in fact, they're probably desperate to integrate into the "game" – just as P&G can't say "eh, Facebook isn't for us". *Fortnite* is too valuable a platform.

At the same time, Epic is bringing far more than a plausible on-ramp to its efforts to build the Metaverse. In addition to operating *Fortnite* — which was in theory a side project — Epic Games also owns the second largest independent gaming engine, Unreal. This means thousands of games already operate on its "stack" of tools and software (to simplify things), making it easier to share assets, integrate experiences, and share user profiles. Over time, the sophistication of Epic's gaming engine has grown so significant it now powers a variety of traditional media experiences. Disney's *The Mandalorian* was shot and fully rendered in Unreal, with director Jon Favreau able to literally enter its digital sets to frame a shot and position characters. If Disney so chooses, audiences could freely investigate much of these sets — most of the environment and assets already exist. And outside film and TV, Unreal is increasingly being used for live events, too: Unreal powers Fox Sports's NASCAR set, for example.

Still, the Metaverse requires everyone be able to create and contribute 'content' and 'experiences,' not just well-staffed corporations and technically skilled individuals trying to make games or movies. To this end, Epic acquired the company Twinmotion in April of last year. The company was/is focused not on VFX engineers or game designers, but on offering intuitive, icon-based software that enables "architecture, construction, urban planning and landscaping professionals" to produce realistic, immersive digital environments based in Unreal "in seconds". According to Epic Games Founder/CEO Tim Sweeney, this means that there are now three ways to create in Unreal: the standard "coding" engine itself, the more simplified and "visual" Twinmotion, and *Fortnite* Creative Mode for those with no experience in programming and design. Over time, each option is likely to become more capable, easier to use and integrated.

Another increasingly important part of Epic's offering is its "Online Services" suite, which allows developers to immediately support cross-play across Sony + Microsoft + Nintendo + PC + iOS + Android and leverage Epic's account systems/social graph (which has 1.6B player connections). This itself isn't that unique — Microsoft spent $400MM acquiring PlayFab and millions more to support Xbox Live, while Amazon has bought both GameSparks and GameLift in order to sell services to game developers that need lots of servers and tools for their online games to work. Valve doesn't offer server infrastructure, but its Steamworks solution gives developers match-making and account services for free — but only for the Steam Store, Valve's core business. This reveals Epic's play with Online Services. Unlike today's market leaders, Epic doesn't charge. It's also available free to any engine, any platform, and any game. And it operates at the scale of *Fortnite*'s player network, allowing any title to leverage the world's largest player graph to kickstart their userbases. There is obviously value in such an offering, but to Epic, it is "more valuable if free" as it makes it extends the company's already enormous social graph, makes it much easier for more games to "talk to" one another, and enables players to more seamlessly jump from experience to experience. All of this, too, diminishes Epic's reliance upon *Fortnite* when it comes to building the Metaverse. And while Epic Online Services are still in private beta, the company has suggested it will be publicly available in Q2 2020 and should support "hundreds or thousands of games in 2020". Note, too, that this all reduces Epic's reliance on *Fortnite* in its long-term efforts to build the Metaverse.

Epic also operates one of the largest (albeit a still small) digital game store – which means players already access a wide variety of digital content and experiences through Epic. Few consumers were clamoring for greater fragmentation of digital content, and most were reasonably happy with market leader Steam. However, Epic Games Founder/CEO Tim Sweeney has been vocal about the fact that today's standard 30% commissions for digital content sales (e.g. iOS or Amazon or Google Play) are not just usurious, they prevent the creation of a real digital world economy. Just imagine, for example, if credit card fees weren't 0.5-2.5% but up to 60-20x as much; whole sectors of the physical economy

wouldn't be able to operate (such as a coffee shop or grocery store). To this end, Epic charges only 12% (which includes the 5% Unreal licensing fee, too, making it only 7% for many customers). Notably, rumors persist that Sweeney had fought for even lower fees but settled with his board at 12% – a sum he himself admits doesn't always cover operating costs. This doesn't mean there isn't an overall business here – and operating a storefront will doubtlessly help build the Metaverse – but Sweeney's efforts seem much broader. He openly implores Google and Apple, which generate several thousand times the revenue of Epic's fledgling store, to match Epic's rates.

CHAPTER 4: WHO ELSE WILL TRY TO RUN THE METAVERSE AND WHO CAN

Although the Metaverse has the potential to succeed the Internet as a computing platform, its underlying development process is likely to share little in common with its antecedent. The Internet came from public research universities and US government programs. This was in part because few in private business understood the commercial potential of a World Wide Web, but it was also true that these groups were essentially the only entities with the computational talent, resources, and ambitions to build it. None of this is true when it comes to the Metaverse.

Not only is private industry fully aware of the potential of the Metaverse, it probably has the most aggressive conviction in this future, not to mention the most cash (at least when it comes from a willingness to fund Metaverse R&D), the best engineering talent, and greatest desire for conquest. The major tech companies don't just want to lead the Metaverse, they want to own and define it. There will still be a large role for open-source projects with non-corporate ethos — and they will attract some of the most interesting creative talent in the Metaverse — but there are only a few likely leaders in the early Metaverse. And you'll recognize each one.

Microsoft is a good example. The company has hundreds of millions of federated user identities via Office 365 and LinkedIn, is the second largest cloud vendor in the world, has an extensive suite of work-related software and services that span all systems/platforms/infrastructure, clear technical experience in massive shared online content/operations, and a set of potential gateway experiences via Minecraft, Xbox + Xbox Live, and HoloLens. To this end, the Metaverse offers Microsoft the opportunity to reclaim the OS/hardware leadership it ceded during the handoff from PC to mobile. But more importantly, CEO Satya Nadella understands Microsoft, at a minimum, needs to be wherever work happens. Having successfully adapted from enterprise to consumer, PC to mobile, and offline to online, all while maintaining a dominant role in the "work" economy, it's hard to envision Microsoft won't be a primary driver in the virtualized future of labor and information processing.

Although **Facebook** CEO Mark Zuckerberg has not explicitly declared his intent to develop and own the Metaverse, his obsession with it seems fairly clear. And this is smart. More than any other company, Facebook has the most to lose from the Metaverse as it will build an even larger and more capable social graph and represent both a new computing platform and a new engagement platform. At the same time, the Metaverse also allows Facebook to extend its reach up and down the stack. Despite several efforts to build a smartphone OS and deploy consumer hardware, Facebook remains the one FAAMG company stuck purely at the app/service layer. Through the Metaverse, Facebook could become the next Android or iOS/iPhone (hence Oculus), not to mention a virtual goods version of Amazon.

Facebook's Metaverse advantages are immense. It has more users, daily usage and user-generated content created each day than any other platform on earth, as well as the second largest share of digital ad spend, billions in cash, thousands of world-class engineers, and conviction from a founder with majority voting rights. Its Metaverse-oriented assets are also growing rapidly and now include patents for semiconductor and brain-to-machine computing interfaces. At the same time, Facebook has a very troubled track record as a platform for where third-party developers/companies can build sustainable businesses, as a ringleader in a consortium (e.g. Libra), and in managing user data/trust.

Amazon is interesting in a few regards. Most obviously, it will always want to be the primary place in which we buy 'stuff.' Whether that's bought inside a game engine, a virtual world, or web browser is irrelevant (it already sells inside Twitch). In addition, the company already has hundreds of millions of credit cards, the largest share of ecommerce globally (ex-China), is the world's largest cloud vendor, operates numerous different consumer media experiences (video, music, ebooks, audiobooks, video game broadcasting, etc.) and third-party commerce platforms (e.g. Fulfilled by Amazon, Amazon Channels), is building what they hope will be the first major gaming/rendering engine purpose-designed for the cloud computing era, reportedly working on AR glasses, and is the leader in in-home/office digital assistants.

More importantly, Founder/CEO Jeff Bezos feels very strongly about underlying infrastructure plays. The web, for example, runs on AWS (Amazon's best business). 80% of its revenue is actually via "Fulfilled by Amazon," where the company sells, packages, and delivers products sold by other businesses, instead of Amazon buying and then selling the inventory directly (like most retailers). And while the goal of Elon Musk's private aerospace company, SpaceX, is to colonize mars, Bezos has been clear his goal with Blue Origin is to facilitate the buildout of space infrastructure similar to early web protocols and his AWS, so that "we could build gigantic chip factories in space and just send little bits down." To this end, Amazon is likely to be more supportive of a truly "open" Metaverse than any other FAAMG company — it doesn't need to control the UX or ID because it benefits from enormous increases in back-end infrastructure usage and digital transactions.

The Internet is a mine of data and the Metaverse will have both more data and perhaps greater returns on it than today's web. And no one monetizes this data better at global scale than **Google**. In addition, the company is not just the market leader in indexing both the digital and physical world (nearly 10,000 employees contribute to its mapping initiatives), but it is also the most successful digital software and services company outside of China. It also operates the most used operating system on earth (Android), as well as the most open of the major consumer computing platforms. Though unsuccessful, Google was first to really run after the wearable computing opportunity via Google Glass, and is making an aggressive move into digitizing the home via Google Assistant, its Nest suite of products and FitBit. Accordingly, the Metaverse is likely the only initiative that can unite all of Google's sprawling investments to date, from edge computing on Stadia, to Project Fi, Google Street View, its extensive purchases of dark fiber, wearables, virtual assistants and more.

Apple is unlikely to drive or operate the underlying Metaverse. True, it operates the second largest computing platform of the modern era (and by far the most valuable one), as well as the largest game stores on the planet (which also means it pays more to developers than anyone else on earth). In addition, the company is investing heavily into AR devices and "connective tissue" that will aid the Metaverse (e.g. beacons, Apple Watch, Apple Earbuds). However, building an open platform for creation — where everyone can access the full range of user data and device APIs — is antithetical to Apple's ethos and business strategy. All of which is to say, Apple is more likely to be the dominant way the Western world engages with Metaverse rather than the operator/driver. As with the Internet, this will probably work out pretty well for everyone.

If the Metaverse requires a broad interplay of assets, experiences, and common APIs, **Unity** will have a foundational role. This engine is used by more than half of mobile games and is even more widely deployed in real-world rendering/simulation use cases (e.g. architecture, design, engineering) than Unreal. And while director Jon Favreau produced Disney's *The Mandalorian* in Unreal, he also produced and shot the photo realistic *Lion King* in Unity. It also operates one of the largest digital ad networks (a nice side effect of powering 10B daily minutes of mobile entertainment). However, it's not yet clear what role Unity will have in driving the Metaverse. It doesn't have a store, a user account system, or a real direct-to-consumer experience. Most of its ancillary (i.e. non-engine or advertising) services have not been widely adopted. In addition, most (though not all) Unity-powered games are relatively simple mobile titles rather than those likely to serve as gateways to the Metaverse. However, its inevitable influence over standards, playtime, and content creation are so large that it's difficult to imagine it won't be acquired by and integrated into a major technology player with a wider range of assets and advantages.

In the past, an acquisition of Unity was hard to justify. Even though the company is enormously valuable, any would-be acquirer has to keep Unity fully platform-agnostic in order to preserve its market share, developer support, and influence (e.g. Google couldn't make Unity exclusive to or best on Android/Chrome exclusive without losing hordes of developers). This doesn't mean turning Unity into a proprietary engine can't be strategically smart. The value destroyed by such a decision and the premium required to buy Unity is likely to make such a move prohibitive. But if the goal of a Unity acquisition is to ensure a foundational role in the new Internet, an acquirer instead has an incentive to keep the engine open/available across platforms, and the price can easily become irrelevant.

If Epic has a viable path to the Metaverse, **Valve** must too. Valve's Steam is orders larger than the Epic Games Store in terms of users, revenue, and playtime. It owns several of the most popular, long-running multiplayer games (*Counter-Strike, Team Fortress, DotA*). The company also has a lengthy history in content and monetization innovation (it was the first to experiment at scale with AAA free-to-play games and with player-to-player marketplaces). Valve has also spent years developing and releasing VR hardware, generates billions in profits each year, and is privately owned by a team of technologists focused on open-source technologies with a disdain for closed ecosystems. At the same time, Valve's engine, Source, has seen limited adoption, and unlike Epic, it does not seem to be corralled around uniting its capabilities and assets to create the Metaverse.

Others

While it's convenient to think of a single lead company or experience ushering in the Metaverse, the process itself will really be led through a Cambrian explosion of different "things" coming together (not that there can't be a leader or big winner). To this end, there is also a myriad of start-ups trying to build early, proto-Metaverse styled experiences. Ubiquity6, as an example, hopes to use millions of individual content creators to "map" the real world then build smartphone/AR/VR-accessible digital experiences atop these maps. The similarly named Singularity6 is building a virtual world that, unlike *Fortnite*, is intended to develop into a Metaverse from day one. Other companies, such as Genvid (a portfolio company), are building SDKs that allow anyone to build server-rendered experiences that millions can participate in together using livestreams with light client-side interactivity. While this lacks several of the key attributes of the Metaverse today, such as individual "presence", it begins amassing enormous

volumes of "players" into fully shared virtual environments that aren't currently possible via cloud or locally-rendered gaming.

Magic Leap seems to believe that by owning the hardware layer, it can be the core driver of the Metaverse (*Snow Crash* author Neal Stephenson is the company's Chief Futurist). In fact, most of the FAAMG companies seem to believe that glasses will be a key gateway into our digital future and are collectively investing billions into the form factor. With this in mind, Snapchat, which boasts a large and heavily-engaged social graph and has strongly anchored itself around cameras, glasses, location-based experiences, and digital avatars, could have a key role in the Metaverse (especially if acquired).And for all of its uniqueness, *Fortnite* isn't even the only *Fortnite* — there are several other online "games" that share many of the same attributes, behaviors, and potential. *Minecraft* and *Roblox*, for example, both boast more than 100MM monthly users (*Fortnite* probably has fewer) and have also been able to mash up various intellectual properties (such as Marvel and DC). What's more, these "games" are even more reliant on user-generated content and user-led experiences — there is no underlying game-like goal such as "winning" or "surviving" in *Minecraft*, the "game" is creation (which isn't to say that users haven't created many "games" with game-like goals). In 2019, Roblox says it will have paid out more than $100MM to its game creators around the world (a group that ranges from single "developers" to studios of "10 or 20 people"). The company also notes that it doesn't even pay these developers directly — unlike the iOS app store — they receive direct payment from users. And in the fall of 2019, Roblox launched its "Developer Marketplace", which allows developers to monetize not just their games, but also the assets, plug-ins, vehicles, 3D models, terrains, and other items they produce for these games. Meanwhile, many other games, such as *Grand Theft Auto Online* (which has an estimated 50MM+ monthly active players), has added socializing-oriented modes (such as a casino) where users can create, operate, or participate in activities purely for the sake of "hanging out".

Building Together

Ultimately, too much of the Metaverse remains unclear for us to have strong convictions on who will lead it or how they'll get us there. And in truth, it's most likely the Metaverse emerges from a network of different platforms, bodies, and technologies working together (however reluctantly) and embracing interoperability. The Internet today is a product of a relatively messy process in which the open (mostly academic) internet developed in parallel with closed (mostly consumer-oriented) services that often looked to "rebuild" or "reset" open standards and protocols.

To this end, it's hard to imagine any of the major technology companies to being "pushed out" by the Metaverse and/or lacking a major role. Not only will the Metaverse grow the pie by too much, big transitions tend to disrupt when they're hard to see and incumbents are slow to respond or capital constrained. None of this is true today (which doesn't mean market share won't shift, or that some companies, such as Epic, won't surge to the forefront).

At the same time, it's likely that China's forked Metaverse will be even more different from (and centrally controlled compared to) the Western one. And here, the tech/media conglomerate Tencent (which also publishes most of the Western games released in China, as well as those of Japan's Nintendo and Square Enix), is an obvious anchor. The company also owns a reported 40% of Epic Games.

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The visions, technologies, and capabilities I've described above still feel like science fiction – even if they come to be, they're decades away. At the same time, many of the pieces are starting to come together. Thus, the questions are ones of who and why and to which ends. And so, it's helpful to return to the (lengthy) creation of the World Wide Web. Imagine if instead of being designed by nonprofits and technologists looking to share research files and messages, it was designed to sell ads or collect user data for profits.

This is why it's so important to Sweeney for his company to lead early efforts to establish the Metaverse — he fears who might instead. "As we build up these platforms toward the Metaverse, if these platforms are locked down and controlled by these proprietary companies, they are going to have far more power over our lives, our private data, and our private interactions with other people than any platform in previous history," Sweeney said in May 2017. Two months later, he was even more explicit: "The amount of power possessed by Google and Facebook. President Eisenhower said it about the military-industrial complex. They pose a grave threat to our democracy." As "founder and controlling shareholder of Epic", Sweeney "would never allow" Epic to "share user data…with any other company. We [won't] share it, sell it, or broker access to it for advertising like so many other companies do."

There may not be 100 players, but it's still a battle royale.

Matthew Ball (@ballmatthew).

PS: This is obviously a very hard topic to nail down. Any thoughts, comments, disagreements, additions, ideas - please email me at mb at matthewball dot vc and I will make updates. All digital content should be living, after all. And thanks to Gady Epstein. Also, that is indeed my Fortnite outfit at the top.