METAVERSE CHEAT SHEET: EVERYTHING YOU NEED TO KNOW

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Is the metaverse the same as VR? Which companies are building the metaverse? What is the metaverse's connection to hybrid work? Get answers to these questions and much more in this metaverse primer.

BY VERONICA COMBS

Is metaverse the latest easily dismissed buzzword or a new platform you might have to understand? That's the most important question about the metaverse right now. The easiest answer is "vaporware," but that ignores the business reality of 2021. The biggest tech companies are pouring a lot of money into this next iteration of the internet, and the building blocks of the metaverse are available on the market.

Here is a look at what the metaverse is, why it's relevant to your work and what components you can experience right now.

IMAGE: SHUTTERSTOCK/IS.A.BELLA

WHAT IS THE METAVERSE?

The metaverse is a vision for a new place to interact with other humans and bots to play games, conduct business, socialize and shop. That's the metaverse of the future. Right now, the metaverse is a grab bag of hardware, software and unrelated experiences. You likely have seen one piece of the metaverse in a standalone form, as a game or maybe a training session. There is no connective tissue to bring all these components together–yet.

If you've played Pokemon Go and caught a creature that you can only see via your phone, that's augmented reality (or location-based entertainment, if you want to get picky about it).

Facebook's Horizon Workrooms are an example of mixed reality. You use the Oculus Quest 2 to join a virtual office space, but you also can see your hands and your keyboard. Also, colleagues not joining the meeting via a VR headset can join via a video feed that shows up in the virtual world just as it would in a live conference room.

IMAGE: FACEBOOK

A Horizon Workroom can hold 16 people in the virtual space and 34 more people can join via video conference.

With the virtual office platform Virbela, you navigate an office in the cloud with a full-body avatar via your keyboard. The platform uses directional sound, which means that a person's voice changes as he or she moves closer to your avatar or farther away. The experience is not quite like a video game but it definitely feels like a new space for interacting with colleagues.

If you've played Animal Crossing or Fortnite, those online worlds give a hint of what the metaverse could look like. You'll be able to build your own world or visit someone else's in your true-to-life form or in a completely new shape.

Companies and military trainers are using virtual reality and augmented reality for training as well. Penske Truck Leasing uses the XR Mentor training platform to train technicians and support them in the field. Instructors live stream classes to students, and students can use assisted reality devices to refer to training documents when working on vehicles.

It is possible to buy real estate in virtual worlds, such as Decentraland and Cryptovoxels, although those are definitely the world of early adopters. If you've made it as far as buying cryptocurrency or NFTs, you've also gotten a taste of the metaverse.

The difference between these experiences and the full-on metaverse is the physical sensation of being in another place and sharing it with other people. For most of these experiences, you are interacting with the online world through a controller or other piece of hardware. Although VR worlds are immersive, the headsets are still awkward, which currently defines the entire experience as something out of the ordinary.

Adam Compton, director of strategy for Schneider Electric, sees the metaverse as a fully immersive, partially real life, partially digital experience that runs in parallel with the physical world. "It's something that we don't recognize when we're stepping in and out of the two spaces," he said.

Mark Zuckerberg and other tech leaders imagine a very different metaverse when they talk about it. The metaverse currently under development would be right next to reality and always on. It would have its own currency and objects in the metaverse would be interoperable–for instance, you could wear a hoodie bought in one corner of the metaverse in every other spot you visit.

World leaders and individuals are starting to recognize the downside of one company running a giant social experiment, such as Facebook. It's easy to imagine the biases that are built into algorithms showing up in the metaverse as well. Figuring out ethics for AI will be a good training ground for making sure that the metaverse is equally accessible to everyone and that there's no automatic penalty for a thin bank account or a slow internet connection.

Facebook announced in September 2021 a $50 million investment designed to avoid the mistakes of the past while building the metaverse. The company will work with Howard University, Seoul National University and the University of Hong Kong to study safety, ethics, equity and design concepts for the metaverse.

WHAT ARE THE KEY TECH TERMS I NEED TO KNOW TO UNDERSTAND THE METAVERSE?

Some of these terms are used interchangeably. Some experiences mix the various versions of reality; for instance, Horizon Workrooms require an Oculus Quest 2 headset to join a virtual meeting, but colleagues can also join via video conference.

Assisted reality: This refers to any technology that allows a person to view a screen and use hands-free controls to interact with it. Realwear devices fit in this category.

Augmented reality: This technology uses the real world as the setting and adds computer-generated images to this view. Retailers use this to show how a new sofa would look in a customer's living room.

Meatspace: This is the physical world where most of us spend most of our time.

Mixed reality: This term describes a view of the real world with the addition of virtual objects that look and act like real objects. Users can interact with both virtual objects and real ones.

Multiverse: The general definition this term generally refers to many distinct universes operating independently of each other. In a tech/internet/social media context, this is Facebook, Minecraft, Instagram, Twitch, Roblox, Fortnite, Discord and all the other virtual social media and gaming places where people socialize, play and shop. In theory, the metaverse could bring all these multiverses into one place

Virtual reality: This is an immersive experience that requires a headset. There are VR games that take users to different worlds as well as training sessions that are set in the real world.

IS THE METAVERSE THE SAME AS VIRTUAL REALITY?

"Calling the metaverse virtual reality is like saying the mobile internet is an app."

That's how venture capitalist Matthew Ball explained it during a conversation with Gene Park and Shanon Liao from the Washington Post. Ball wrote a blog post about the metaverse in January 2020 as he saw the "pieces" of the metaverse become more real. In June 2021, Ball expanded his thoughts on the metaverse with a nine-part primer that covers a framework, hardware, networking, computer, virtual platforms, payments, content services and evolving user behaviors.

Ball initially wrote about the metaverse to explain why the last year or so has been a turning point for virtual reality. He saw the worldbuilding of Fortnite and the growing popularity of the game as significant milestones for the metaverse.

"In 2018, you could really start to see that this was not a game, it was something quite different," he said. "It was taking ideas that had been slowly growing for quite some time and then changing them in a way that feels critically different."

He compared these developments to the way that the iPhone and the app store represented game-changing moments for the mobile internet. "You could tell that the mobile internet, something that had existed for 15 years, was entering a new phase," he said. "Fortnite felt a lot like that to me, Roblox was feeling a lot like that to me."

Ball also mentioned recent comments from Epic Games CEO Tim Sweeney, who tweets frequently about the metaverse. Sweeney had shared code from Unreal from the '90s to illustrate that people have been thinking about virtual spaces as social spaces for economies for decades.

"His point was that it was only in the last few years that not just have the experiences emerged to bring that to fruition but the core underlying technologies required started to be real and not science fiction," Ball said in the conversation with the Post.

Ball said it's a mistake to use inconsistent definitions of the metaverse as proof that the idea is just the latest buzzword.

"If the metaverse were crisply known and codified, it would not be so disruptive," he said in the conversation with the Washington Post reporters. "Clarity is the antithesis of change."

DO I NEED A HEADSET TO VISIT THE METAVERSE?

Ideally, you won't need a headset in the metaverse at some point in the future when that iteration arrives. In 2021, you need an Oculus Quest 2, a Rift S or a Sony PlayStation VR or a HTC Vive to play virtual reality games. If you need to take a training class in virtual reality or augmented reality, you'll need Microsoft's HoloLens or one of Lenovo's headsets. VRFocus named the Magic Leap the best enterprise solution in its 2020 "Better-Than-Reality Awards" for its spatial computing collaboration package. Magic Leap and VMWare just announced a partnership that includes support for the Workspace ONE XR Hub on Magic Leap 2.

When all the parts and pieces mature, Gil Elbaz, CTO and co-founder of Datagen, predicts that people will want AR glasses instead of a MacBook Pro or even a cell phone. VR devices could replace TVs and

computers. "It's going to turn into one device, we're just technically not ready for it yet," he said, adding that it will take three to five years for devices to get to some level of maturity. "It's a smart investment but it is a long-term investment," he said.

Facebook's Reality Labs Research is working to improve the form factor of VR hardware. The team sees wristbands and glasses as interfaces for AR that "won't force us to choose between interacting with our devices and the world around us." The lab is also developing a VR headset that makes the user's eyes visible to other people in the room.

Lenovo's AR/VR product line includes smartglasses, monocular and binocular devices. The company's ThinkReality platform includes a software development kit, cloud and device services.

Lenovo's ThinkReality A3 Smart Glasses have multiple cameras, integrated speakers and microphones, binocular 1080p resolution displays and software that runs voice, object and image recognition, reads barcodes and includes head/gaze tracking. Factory and repair technicians use the devices during training and also to get guidance from experts when working on site.

IS THE METAVERSE RELEVANT TO MY WORK?

If you are responsible for training or if you work in the manufacturing sector, you'll be among the first to work with the building blocks of the metaverse. Nathan Pettyjohn, commercial AR/VR lead of the Lenovo intelligent devices group, said manufacturing is the number one vertical for Lenovo's AR/VR product line, particularly companies that want their field workers or people in the warehouse to have hands free assistance through augmented reality.

"For an industrial worker who needs their hands free, they can use voice commands to pull up schematics and blueprints without touching the device," he said.

Lenovo's Think Reality A3 device is designed for mixed reality experiences, such as a technician using an online tutorial while repairing a machine. The smartglasses provide hands-free operation and can overlay digital objects onto physical ones.

"You can look over at what you're working on and the digital content stays out of your view, but then you can turn back to the guidance when you need to," he said.

Lenovo also has a partnership with Realwear, a company that makes an assisted reality device designed for technical work.

"It's like putting an Android tablet in front of your eye," he said. "Also, it's an all-in-one device so you're not tethered to a compute box or a phone."

Lenovo's goal with the ThinkReality platform is to be hardware agnostic for all the company's AR/VR customers.

"The software platform allows customers to manage Lenovo or third party devices as well as applications and users," he said.

Pettyjohn has been working with augmented reality and virtual reality for more than 10 years. He is the founder and president of The AR/VR Association, a group with 21 chapters in the U.S., four in Canada, 15 in Europe, seven in Asia, two in the Middle East and one each in Africa, South America, and Australia. The group has weekly online meetings and 22 committees that cover 20 industry verticals ranging from energy and real estate to story-telling and location-based entertainment.

Pettyjohn said that the AR/VR market has the potential to grow to more than $1 billion for Lenovo.

WHAT'S THE METAVERSE CONNECTION TO HYBRID WORK?

As the debate rages about remote work, hybrid schedules and in-person work, virtual reality and offices in the cloud could be a way to create a common experience for all employees, regardless of where they are physically located. Forrester's recent report, "Your Virtual Office in the Cloud," suggests that creating an office in a virtual setting could be an antidote to Zoom fatigue. Benefits could include:

- Replicating the in-person office experience.
- Creating a shared experience and reinforcing corporate values.
- Developing a shared culture.
- Ending the open office plan vs. private office debate.

New and established companies are already trying out this kind of virtual space. Accenture has an Nth floor, a virtual space that connects the company's 500,000 employees and customers in virtual meeting rooms and event spaces.

eXp Realty is a remote-first company that has about 60,000 agents in 17 countries but no physical headquarters. Instead the company operates in a "cloud-based campus," doing everything from recruiting agents to holding board meetings in a virtual office.

WHAT COMPANIES ARE BUILDING THE METAVERSE?

The metaverse will need a massive technological infrastructure, ranging from compute power to edge computing to 3D imaging to content to finance and commerce systems. And, as the metaverse is seen as

the next iteration of the internet, every company that has an internet presence will want to stake a claim in the metaverse as well.

Ball, the venture capitalist interested in the metaverse, also is a co-founder of Ball Metaverse Research Partners, which maintains the Roundhill Ball Metaverse ETF, which trades on the New York Stock Exchange. The top 10 holdings in the exchange are:

1. Nvidia Corporation
2. Microsoft Corp.
3. Roblox Corp.
4. Facebook Inc.
5. Unity Software Inc.
6. Snap, Inc.
7. Autodesk Inc.
8. Amazon Com Inc.
9. Tencent HLDGS LTD
10. Sea LTD

Sea is a consumer internet company that includes entertainment, e-commerce and digital financial services. Tencent Holdings is a multinational internet company based in China.

Apple, Intel, Qualcomm, Alphabet, Coinbase, Electronic Arts, Samsung, Adobe, Alibaba, Disney, PayPal and Square are also in the fund.

WHAT ARE REAL-WORLD USE CASES OF THE METAVERSE?

Training is one of the more common use cases. Entertainment is one of the first industries to offer virtual reality experiences for customers, while manufacturing and healthcare have been among the first to incorporate mixed reality and augmented reality experiences for employees.

Here are a few examples of how companies are using the building blocks of the metaverse today to conduct remote training and create new products and services.

Sports and entertainment

At the game company Unity, Peter Moore is the head of the sports and live entertainment and recently launched Unity Metacast. This platform will mirror professional sports in 3D in real time.

Cameras capture athletes on the field and the data is used to create digital twins. The first 3D broadcast was a match between two mixed martial arts fighters filmed in a small arena with 106 cameras. Moore told the Financial Times that he expects to expand the technology to fewer cameras and bigger playing spaces. Capturing life action and digitizing it immediately could make it easier to create NFTs from memorable moments from games. The NBA's approach to NFTs–Top Shots cards–could expand to other sports.

Healthcare

Doctors have been one of the first groups to use AR for collaboration. Microsoft's mixed reality headsets are also enabling medical professionals from around the globe to virtually collaborate during procedures for a 21st century take on surgical operations. Surgeons can operate Microsoft's HoloLens with hand gestures and voice commands to bring up 3D images from scans, access patient data and contact other specialists. This hands-free control is a significant benefit to the hardware for doctors and other healthcare professionals.

Training

NASA uses AR and VR aboard the space station for remote control of robots or to complete maintenance tasks with an AR assist. In one particular project, astronaut Scott Kelly used a Microsoft HoloLens headset to conduct ISS training and do future mission prep. During these tests, a member of mission control on Earth streamed Kelly's field of view via the headset and also drew images rendered in 3D on the astronaut's HoloLens display.

Astronaut Scott Kelly wearing a HoloLens headset on the International Space Station.

WHAT ARE THE BARRIERS TO THE GROWTH OF THE METAVERSE?

Elbaz of Datagen said it's still very early days for the metaverse because the software and devices are not ready, VR is still in the early stages of development and AR is not even that far along yet. "We haven't found a useful application for it internally and we deal with 3D all the time," he said.

Adam Compton, director of strategy for Schneider Electric, said that gaming and entertainment will continue to be the tip of the spear for virtual experiences. "Early adopters tend to find the easiest path and follow that, and that gets people used to it and then something else comes along for a different application for the same technology," he said.

Right now learning of all kinds is the most applicable use case for VR, he said. This includes learning how to use or repair a product, how to complete a maintenance procedure, or simply learning a new skill.

"This could be a differentiator for some companies, in that they're going to sell you this thing, but also going to make sure you are using it right," he said.

Compton sees the current workforce as one barrier to the metaverse. The metaverse will require extensive compute power, not to mention enough engineers, designers and network admins to keep it running.

"The Wall Street Journal recently wrote that annual job postings for cloud engineers in data centers have gone up 90% in the last year and they can't fill them," he said. "Without the human workforce to standardize the infrastructure, engineer it, deploy and maintain it, that will be a big gating factor."

Another gating factor is a robust edge computing infrastructure. Compton said that the metaverse will benefit from smart city networks.

"Some cities are talking about putting high bandwidth capable microdata centers into public places to make smart city initiatives possible," he said. "All of these things are coming along now that will help this infrastructure be ready in the future."

Compton said that using VR now for training, customer care and marketing are good use cases for companies who want to test out the technology now.

Compton said Schneider has used VR to give tours of modern data centers with a 360-degree view of the facility and to create other immersive experiences for customers.

"I don't think it will break away from fringe usage and specifically entertainment and gaming in the next five years," he said.

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