Web 3.0 – Are you ready Player One?

In this article we will describe the history and direction of Web 3.0 and the Metaverse, but more importantly try to make sense of it from an investors' point of view. To do so, we will define the various necessary technology layers and look at both consumer and enterprise use cases to find which companies or industries could benefit from this tailwind in the next decade or so.

This information has been prepared by Northcape Capital, the underlying investment manager for the Warakirri Ethical Global Equities Fund

History and background

Wandering around Nikeland on my newly acquired Roblox account, plenty of Robux burning a hole in my virtual pocket, looking for some virtual sneakers… all in the name of deep-dive research! Note however, if you have no idea what that first sentence means, you are not alone. Roblox is a trailblazer for the 'newly' coined Metaverse, which is the main example of where 'Web 3.0' will take us.

The terms 'Metaverse' and 'Web 3.0' have become popular buzzwords in 2021, as tech investors searched for the 'new new thing'. Poorly defined, they mean different things to different people and are widely misused in the popular press. In this article we will use the Metaverse as the main manifestation of Web 3.0, which we'll define as a broader future direction for the Internet.

The term 'Metaverse' was first used in Neil Stephenson's science fiction novel 'Snow Crash' in 1992, where it was described as a virtual reality-based next generation Internet (which by then had hardly come off the ground in its original form). It resembled a massive multiplayer online game populated with user-controlled avatars.

The common elements of the original novel still play an important role however: a logical successor to the current Internet, a virtual 3D world on top of or extending the physical world that may be accessed by using Augmented or Virtual Reality headsets.

This of course leaves plenty of room for interpretation and strongly reminds us of the early days of the World Wide Web. When the Internet moved beyond its initial military and academic applications and gave consumers access by using the browser and URL web addresses, it was little more than a giant database for information access. The smartphone delivering mobility, social media and the concept of the Cloud all created new dimensions that triggered the move to the current phase of Web 2.0.

## Search for Metaverse on Google Trends Worldwide
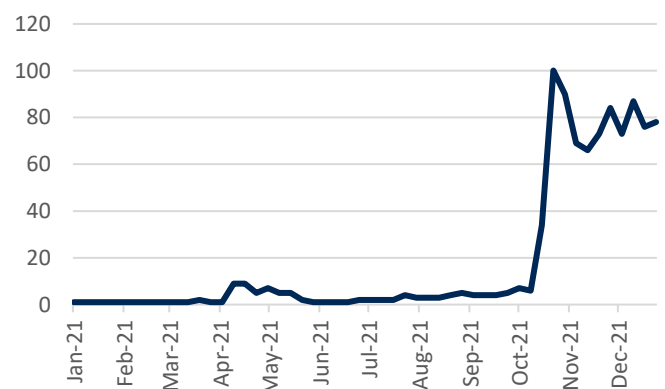
Source: Google Trends

Layers of the Metaverse

Given that Web 3.0 will be built on and not replace the current 2.0 concepts, the necessary infrastructure and hardware is not wildly different to what Web 2.0 uses today, but to deliver the promise of the kind of virtual world that Meta's Zuckerberg described below we will need to see significant technological advances.

"It's a virtual environment where you can be present with people in digital spaces. And you can kind of think about this as an embodied Internet that you're inside of rather than just looking at, and we believe that this is going to be the successor to the mobile Internet… The defining quality of the metaverse is presence, which is this feeling that you're really there with another person or in another place." – Mark Zuckerberg, October 2021.

We have identified 5 'layers' of the Metaverse and give examples of potential stocks that might benefit.

The evolution of the Web
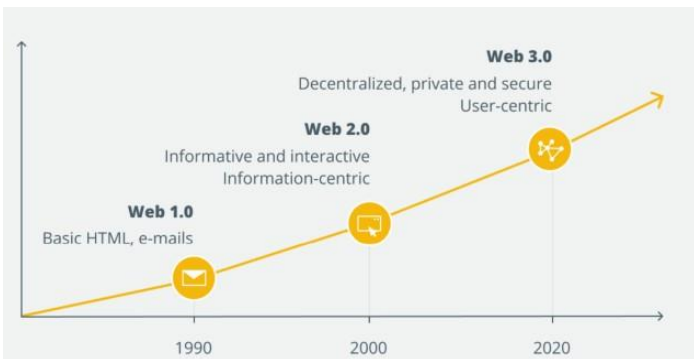
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o Networks & Data centres
o Semiconductors
o Hardware
o Software
o Payments & Databases

1. Networks & Data centres

By definition the Internet needs a well-functioning network, but we have seen the demands for a) bandwidth/speed, b) low latency and c) reliability, increase significantly and the wish list for the Metaverse will see these demands grow exponentially. Moving to a virtual reality world, i.e., creating 3D images in real-time, is a whole new level of demand for bandwidth and low latency.

Whilst it doesn't matter if an email arrives 50 milliseconds later and a Netflix stream can be optimized for nearly any level of connection, the demands of realistic 3D virtual worlds are multiples higher.

The current mix of fixed (fiber, cable, copper) and wireless networks will remain and we will need both to see a step up in all 3 variables of network performance. We will also need to see an increase in available spectrum, which remains the ultimate bottleneck in wireless networks. The other critical piece of infrastructure at this layer is the data centre.

Data centres are essential in that they connect, store and compute data that travels over networks. The demand for high end computing in virtual worlds will simply mean more 'local' compute facilities to support and relieve the computational efforts that will be necessary on a device (e.g., Oculus headset) level. An Edge data center will be nothing like a traditional large-scale data center and can be anything from a small facility at a mobile tower or indeed an autonomous car.

It is unlikely in our view that the traditional telcos will benefit from these tailwinds, simply given their horrendous track record over the last three decades to do exactly that with the developments in Web 1.0 and 2.0, itself a function of a competitive industry and need to regularly bid for spectrum in this environment. More likely, the true beneficiaries are the Tower and Data center companies and potentially some of the network equipment companies.

One of the best examples in our current portfolio is **American Tower**. American Tower is the world largest owner/operator of wireless communication infrastructure. With its truly global presence it is uniquely positioned to benefit from the demand of increased network traffic driven by the Metaverse. Especially its recent acquisition of CoreSite, a data center operator specialised in Edge, puts them in a unique position to deliver the necessary network capabilities.

2. Semiconductors

Semiconductors are the new oil, critical in nearly every technological development that we have seen in the last 50 years or so. Semiconductors play an important role in every step of the way, from the FPGAs (field programmable gate array or integrated circuit that can be custom programmed by a user) in wireless base-stations, GPUs (graphics processing unit) accelerators in datacentres, basebands in smartphones, CPUs (central processing unit) in notebooks and PCs to the specialised Qualcomm processor in your Oculus headset.

Given the immense compute complexity in 3D virtual reality, the developments in the Metaverse are closely linked to the cutting edge of semiconductor development.

What is important to know is that more transistors on a chip have not only supported processing speed but also miraculously lowered the amount of energy consumption per calculation.

The Intel 4004 (1971) versus the Apple M1 Max (2021)

This brings us back to the incredible compute power that is needed to create 3D virtual worlds, whether this is done on a headset, smartphone, PC or in a datacenter. This compute power will be done on a range of architectures, from specifically designed ASICs (application specific chips) to CPUs and GPUs and hence there will be many companies that benefit from this demand.

We highlight two of our current portfolio positions that are especially well positioned, **ASML** and **Nvidia**.

ASML is the most important technology company in the world that you have likely never heard of. The company is the dominant market leader in lithography tools. Its current generation EUV (extreme ultraviolet) tools, where the company has a solid monopoly position, is the key driver of Moore's Law for this coming decade and the only reason why companies like Samsung, Intel and TSMC are able to make chips on 5 nanometer and below dimensions.

Nvidia is the market leader in GPUs (graphical processor units). Where GPUs were once limited to the Gaming market and Nvidia and AMD were the dominant duopoly, the use case for GPUs (or specifically parallel processing) has widened to data centres, autonomous cars, and other processing intensive tasks.

The Metaverse is the ultimate end market for Nvidia, as it is both a very large TAM (total addressable market) in addition to being a use case where GPUs will likely dominate in both data centres as well as in hardware (headsets, consoles, PCs, notebooks and potentially smartphones). We see Nvidia as the most likely company in our global equity universe to benefit materially from the Metaverse.

3. Hardware

While the form factors that end users will need to participate in the Metaverse are still unknown, it is clear that there will be demand for user friendliness and significant local processing power. One of the debates is whether Augmented Reality (AR), Virtual Reality (VR) or a combination of both will dominate. We have already seen early adoptions of simple AR applications, like Pokémon Go, where real world environments are enhanced by computer generated information like audio, visual or haptic overlays.

While AR is relatively 'processing power light', so it can be implemented in a smartphone form factor, it is hardly the Metaverse experience that most people would envision. It is therefore very likely that VR will play a dominant role. The current VR form factor is a clunky headset that typically still needs to be attached to an external processing console/PC to get the full experience.

Early leaders in this field are: Meta (Facebook) that bought Oculus in 2014, Alphabet that launched Google Glass in 2014 and Microsoft with their internally developed HoloLens based on their Kinect product. While all these products give a taste of what's to come, most of them are still not ready for wide adoption and hence it is therefore not surprising to see that unit sales have been in the millions versus the billions we have seen in the smartphone market.

We believe that the current situation is comparable to the early days of the 'smartphone' where Nokia, Ericsson and Blackberry dominated until the Apple iPhone was launched in 2007. It is therefore much harder to find early beneficiaries in the hardware space

in our view, especially given the fact that the current market (which will include Apple shortly as they enter the AR/VR market) is dominated by the tech giants whose stocks are driven by other more material factors than the small dent that these devices are currently making.

4. Software

The developments in Software are at a similar preliminary stage making it relatively hard to find early winners. Looking at the software drivers of Web 1.0 and Web 2.0, it also took years to come to common standards. In Web 1.0 the tools to access (PCs and notebooks) had decades in the making and when webpages and the browser started to go

mainstream in the 1990's, the market had mostly settled on WinTel (the combination of Microsoft Windows and Intel processors). MacOS (the Apple version) and Linux (predominantly for enterprise users) were present but had limited share.

The developments of Web 2.0 were a bit more complicated as the main access point, the smartphone, had a bit of a false start. The early 'smartphones' pre-2007 used either BlackBerry OS (mainly limited to enterprise usage) or WAP (wireless application protocol) used by then market leaders Nokia and Ericsson.

Everything changed with the launch of the Apple iPhone in 2007 (or really the second-generation iPhone 3G in 2008) that deeply integrated an operating system (IOS) with great hardware. The rest of the market then rallied around Android, developed by Google as an alternative operating system, and the global smartphone market since then has been split between just these two platforms.

The Metaverse, as the main early manifestation of Web 3.0, has not seen any convergence on platform level yet as most of the early examples are company specific and not widely used. Platform developments are mostly coming from the gaming industry and two of the most advanced companies are Roblox and Unity, both of which unfortunately have been caught up in the early market hype around the Metaverse but are potential investment candidates.

Roblox is an online game platform and allows users to develop their own games using the Lua programming language. It is very popular with young children, and it is estimated that more than half of all children under 16 in the US are active players on the platform. Next to its unique feature of being a platform for both playing and designing new games it recently introduced its own virtual currency known as Robux. This combination makes it an early contender for a more standardised Metaverse platform. Roblox had its IPO in March 2021, is expected to generate about US$3bn of revenues this year and has a market cap of US$60bn.

Welcome to Nikeland

Source: Roblox

Unity Software is a gaming software development company that licenses a so-called gaming engine to create 2D and 3D applications on a variety of desktop, mobile, console and VR platforms. Unity built software is running on about 1.5bn devices, which includes monster hits like Pokémon Go and Call of Duty Mobile. Unity has moved into the simulation market as well, with the help of design software leader Autodesk.

One of its famous use cases has been the development of a 'digital twin' or simulated 3D-environment for Hong Kong Airport to optimise passenger movement and other operational efficiencies.

5. Payments & Databases

The rise of ecommerce has not been met with more efficient payment 'rails', as most of the offline structures have simply been copied online. Moving into a Web 3.0 world where unlimited micropayments play an important role, there has been a big debate about better payment infrastructure. There have been multiple attempts to change these fundamental issues and the demands of Web 3.0 will likely be a driver for some of the new solutions to take hold.

The ideas behind the Metaverse are usually based on forms of virtual payments, which can remain virtual or be transacted into 'real' currency and often are in the form of micro-payments. The move to ecommerce in Web 1.0 has seen many of the existing 'rails', i.e., banking networks or Visa/Mastercard, remain highly relevant in the online world. Even recent innovations like Buy Now Pay Later are usually dependent on linked credit and debit cards that use existing infrastructure.

While this current infrastructure is efficient and safe, it is also expensive (typically between 2-3% of the transaction value), which makes it less than ideal for the Metaverse. One of the most fundamental technologies that will likely play a role is Blockchain and while crypto currencies have been heralded as the solution, its limited acceptance and especially the volatility of the price of the currency itself make it far from ideal.

In our view it is very unlikely that the existing players will be replaced, and they are more likely to become part of the solution instead of the problem.

One of the companies that is well positioned to benefit is **PayPal**. PayPal has been a pioneer in online transactions. Not only did they make online transactions safe and convenient, but they also developed new concepts like peer-to-peer payments through Venmo. Its tight partnership with Visa shows that they have a foot in both camps and are ready for any direction that Web 3.0 will go into.

PayPal is currently a strong player in peer-to-peer, Buy Now Pay Later, crypto currencies and has strong ambitions to create a super app for financial services that will also include functionality for investments, savings, crypto, shopping etc.

Conclusion

The move to Web 3.0 and the development of the Metaverse will take many years to complete and will be an evolution not a revolution. For us it is however clear that this Web 3.0 direction is inevitable and will have a profound impact on many industries, companies, and us as potential users. The challenge for us as investors is to separate hype from reality and not fall into the same trap of 20 years ago during the Dotcom bubble.

Given the current valuation levels of Metaverse 'pure plays' that risk is very high in our view, and we therefore like to stick with the companies that will be able to make the shift to the Metaverse in a profitable way. As is usually the case with these transformational technologies, it is more profitable to bet on the 'picks and shovels' as there is every intention to build the necessary infrastructure. The winning factors in the current offline and online worlds, like brand, scale and efficiency are not going to go away and hence we will see plenty of examples of companies making the transformation successfully in the coming decade.

For more information, please contact us on 1300 927 254 or visit warakirri.com.au