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Making the Metaverse a Reality

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The next wave of digital change will usher in a revolution in commerce, economics, and culture brought forth by the metaverse(s), a range of digitally augmented worlds, realities, and business models. It is anticipated that by 2030, [the metaverse economy will be worth between \\$8 and \\$13 trillion](#). Fundamental advancements in key technologies such as semiconductors, software, AI/ML, cloud, blockchain, virtual reality (VR), augmented reality (AR), extended reality (XR), and 5G/6G will be critical in the development of this more immersive world.



The technologies associated with metaverse and Web3 will have some of the biggest effects, changing the fundamental principles that govern how the virtual world functions. Web 3.0 and the metaverse are frequently regarded as complementary but not mutually exclusive. The decentralization and tokenization of Web3, including blockchains and NFTs, will be useful for some metaverse manifestations. And metaverse elements will be present in Web3's experiential and social use cases.

Advancements in human augmentation and digital-physical fusion will fundamentally change how people interact in a combined physical and digital reality. The primary goals of human augmentation are to improve human-computer interfaces and create fully immersive experiences. Users will be able to interact in the metaverse by wearing VR goggles and XR glasses, receiving remote-controlled haptic feedback, and using brain-machine interfaces. Digital-physical fusion relates to the creation, understanding, and manipulation of dynamic representations of real-world objects, systems, and processes in the digital world. This will be made possible through ubiquitous, next-generation networking, advanced sensing, AI-based physical world understanding, and real-time and dynamic rendering engines.

There are numerous real-world business opportunities in the metaverse that will open a plethora of new opportunities in the consumer, enterprise, industrial, and public sectors, leading to not just one, but multiple metaverses. These virtual worlds will share technologies, devices, and interfaces with one another. The degree to which they are connected to one another will vary depending on the applications they use and the business models they choose to implement.

The industrial metaverse

Because it will be a few more years before VR and XR devices become user-friendly from an ergonomic and design perspective, as well as affordable, the development of the consumer metaverse may take longer to come to fruition than the development of the industrial and enterprise metaverses.

Industries are quickly advancing their digital transformations and using metaverse technologies like AR and digital twins in their operations. Industries hold some of the metaverse's most significant and extensive potential. The sectors of our economies that serve as the backbones, such as the manufacturing, energy, logistics, construction, and transportation sectors, stand to benefit the most from the metaverse. Industrial and enterprise metaverses will invariably interact. A single product from the same company will pass through both as it moves from the drawing board to the factory floor. As the information technology (IT) systems in headquarters merge with the operational technology (OT) systems on the factory floor, the distinctions between these two business-focused metaverses will blur. The industrial and enterprise metaverses can revolutionize how organizations engage, carry out operations, create, and deliver goods and services, and manage their business relationships.

The network must evolve

Without a robust and pervasive connectivity architecture, the metaverse, with all of its immense powers, cannot grow. As a result, the network will serve as the critical enabler for the opportunities that the metaverse will bring. This will require networks that are robust, adaptable, and incredibly powerful. This means there need to be significant advancements in latency, bandwidth, speed, reliability, and accessibility.

5G is already providing the basis for metaverse connectivity; nevertheless, to attain the full potential of the metaverse, a networking journey that spans the next ten years is required. If the networks of the next decade are going to be able to satisfy the growing requirements of the metaverse, then they will need to provide optimal connectivity as well as vast capacity and scale. As the metaverse spreads across all industries, it will also be supported by private, specialized wireless networks.

It is expected that by the year 2025, powerful new 5G-advanced networks will come into existence. These networks will provide the foundation for authentic XR experiences, which will ultimately result in the convergence of the digital and physical worlds as well as the augmentation of people. Nokia Bell Labs' research estimates that by 2027, XR mobile traffic will supersede the traffic created by smartphone video. The traffic that dominates the network will not be driven by smartphones. It will be dominated by the immersive, extended reality of the metaverse.

However, the full potential of the metaverse won't be realized until the 6G era, which is expected to begin around the year 2030.

What does the metaverse mean for CSPs?

The most obvious opportunity is connectivity. Communication service providers (CSPs) can translate their expertise in providing networks and connecting real-world assets into a metaverse opportunity. First, the metaverse enables CSPs to accelerate 5G adoption and monetize their investments. 5G and 5G-advanced mobility, speed, and throughput capabilities, combined with cutting-edge technologies and established customer trust, can give CSPs an advantage in bringing new metaverse solutions to life. CSPs can use emerging technologies such as 5G, edge cloud, analytics, and AI to transition from simple bandwidth providers to metaverse co-creators. Taking advantage of CSPs' presence at the network's edge can give them a leg up on the competition. Edge capabilities are crucial for the wide-scale deployment of metaverse use cases because of the exponential rise in data that will need to be processed as near the user device as possible. CSPs should make use of their extensive edge presence, which they have built up through their nationwide mobile networks, to process metaverse data workloads.

CSPs also have important capabilities to bring to an enterprise digitization solution due to their expertise in network management and operation, but they will almost certainly need to rely on strong industry partners to integrate these capabilities into end-to-end solutions. They can do more than just provide connectivity by forming alliances, by taking on roles beyond simply providing connectivity, and by working with specialized partners with industrial domain expertise. They must find their place in the metaverse ecosystem and seize the opportunities to position themselves as co-creators of the metaverse rather than just participants. This will enable them to provide new solutions for businesses and industries.

Innovating and building the metaverse together

The establishment of a robust, best-of-breed ecosystem is necessary for the growth of the metaverse. We are going to require a significant number of innovations and technological advancements. We will require far more processing power as well as networks that are much faster and more adaptable. We will require artificial intelligence that is even more potent, semiconductors that are more advanced, and extended reality technology that is even further along.

A great number of other developments are currently in the works. [IoT now connects more than 13 billion devices](#), and that number is expected to increase to more than 29 billion over the course of this decade. In addition, when 5G and integrated space-air-ground networks become widely available, high-connectivity and low-latency networks will be accessible in any region of the world. Massive progress is being made in technologies such as AR and VR glasses, edge computing, cloud computing, distributed ledger technology (blockchain), and AI, which will eventually make it possible for us to construct, explore, and cultivate the metaverse, bringing us one step closer to making the metaverse a reality.