Trend 01

WebMe

Putting the Me in Metaverse

FEDERAL TECHNOLOGY VISION 2022

Accenture Federal Services

THE BIG PICTURE

The internet is evolving rapidly to accommodate greater expectations in the wake of the pandemic.

In a recent Accenture survey of 24,000 consumers around the world, 70% report spending substantially more time online, 69% call it a lifeline for connecting with others, and 55% say more of their life and livelihood is moving towards digital spaces. Increasingly, our physical and virtual worlds are converging, as individuals distinguish between the two less and less.

Two distinct technology shifts — the rise of metaverses and the arrival of Web3 — are defining the latest evolution of the internet. Together, these disruptive technologies are conveying us to a realm where the virtual and the physical worlds overlap and where anyone can bend and shape their surroundings to their liking and conduct affairs with far greater agency than ever before.

Defining our terms

Thought leaders in this space often have varying definitions of terms like metaverse and Web3 because, admittedly, they are still-emerging concepts and can mean different things to different people. This fuzziness can make discussions tricky.

Metaverse

Accenture sees the ***metaverse*** as "an evolution of the internet that enables a user to move beyond browsing to inhabiting and participating in a persistent shared digital experience that spans the spectrum of immersion."

Web3

While ***Web3*** is an evolving term, in this report we use it to refer to the emerging initiatives that are leveraging technologies like blockchain and tokenization to build a more distributed data layer into the internet.

Metaverse and Web3 innovations are transforming the fundamental underpinnings and operation of the virtual world. Whereas the internet might be thought of as a disparate collection of dynamic websites and apps, metaverses envision persistent 3D environments, imbued with a sense of place and presence, where moving from an enterprise system to a social platform is as simple as walking from the office to the movie theater across the street. Web3 further shapes this evolution by introducing a data framework that generates veracity, trust, and consensus — things we've long had conventions for in the physical world but which have often eluded us in the virtual world.

Together they are driving a shift towards a more decentralized but also more human-centric internet, and federal agencies will need to prepare for these imminent changes.

Already,

64%

of U.S. federal government executives predict that metaverses will have a positive impact on their agency with 25% calling it breakthrough or transformational.

Of the one quarter anticipating the most significant impact,

94%

believe it will happen in the next four years.

The metaverse

For the uninitiated, the metaverse is an evolution for how we will experience the internet. It is a collection of rich, immersive, persistent virtual worlds where people can explore, play, socialize, train, collaborate, and create with others. Many first experienced immersive environments though online gaming like Fortnite, Roblox, and Minecraft, but broader use cases are fast emerging due to the rapid growth in creation tools, platforms, and technologies that enable new possibilities.

Rapid advancements in 3D digital content creation, digital twin, simulation, extended reality (XR), artificial intelligence (AI), graphics processors, and other technologies have spawned a growing global industry of metaverse creators, developers, builders, and investors. These companies include Nvidia, Microsoft, Apple, Roblox, Unity, Epic Games, Adobe, Qualcomm, Google, and many more. One of the most bullish steps taken into this brave, new world was by Mark Zuckerberg, who rebranded Facebook into Meta and is investing $10 billion in developing the metaverse.[1]

Most notably, this is fueling the emergence of dedicated metaverse platforms, virtual worlds that individuals can explore, interact with, and inhabit 24/7/365. These have historically been social platforms where users can take digital forms, engage with others, and chart their own adventure. In some cases, the use of virtual reality headsets and similar technologies create more immersive, even tactile, experiences in these fully dimensional digital worlds.

These metaverses are being quickly populated not only by gamers and creators, but also by bigtime brands and investors. We're seeing an increasing number of use cases to include collaboration and enterprise enablement. Recognizing that the next generation of consumers are already in the metaverse, Adobe has created a metaverse playbook and is partnering with leading brands like Coca-Cola and NASCAR to bring it to life.[2] Artists and entertainment companies are staging concerts in it. Disney is planning to build a theme park in the metaverse. Accenture plans to onboard 150,000 employees in the metaverse.[3]

Going a step further, car companies are using the metaverse to plan more efficient and safe factory operations and market their products. For example, there are more than 40 BMW models with over 2,100 potential configurations each (99% of the company's 2.5m vehicles are customized).

Using Nvidia's Omniverse platform, BMW created a digital twin of its factory to simulate and optimize assembly line production, enabling a 30% improvement in planning efficiency.[4]

Industry analyst Gartner projects that by 2026, 25 percent of people will spend at least an hour a day in the metaverse for work, shopping, education, social, or entertainment.[5] "Vendors are already building ways for users to replicate their lives in digital worlds," said Marty Resnick, research vice president at Gartner. "From attending virtual classrooms to buying digital land and constructing virtual homes, these activities are currently being conducted in separate environments. Eventually, they will take place in a single environment – the metaverse – with multiple destinations across technologies and experiences." That's the hope of most consumers, as 57% in our survey note that they expect organizations to "help unify my digital experiences."

While activity around a single platform metaverse is intensifying, we have yet to see a single, federated metaverse materialize, and we likely won't for several years. Experts like Forrester say this won't occur until there is interoperability across disparate platforms built upon a foundation of standard protocols for the presence, persistence, and transfer of identity and assets. As Richard Kerris, Nvidia's VP of Omniverse Platform Development, put it, "The metaverse requires connective tissue for it to be a reality."[6]

The building blocks of a future metaverse are being laid today in the form of 3D digital creation tools, real-time 3D gaming engines and single-vendor platforms, and federal agencies need to be aware of this future world in the making because they — like all organizations — will have a role to play, just as they did when the Internet emerged as a global requirement more than two decades ago.

Web3

The other big trend driving WebMe is Web3, which provides an enhanced, distributed data layer to the internet. When the internet first hit the world stage in the 1990s (Web1), it was all about freedom, decentralization, and sharing ideas. This changed in the 2000s into today's highly centralized internet dominated by large companies like Google, Amazon, and Facebook (Web2).

Web3 intends to challenge this paradigm and "democratize the internet" — as advocates put it — by employing decentralized, multi-party technologies and design architectures like blockchain, digital assets, and smart contracts - what some call the internet of ownership. In our survey, nearly three-quarters (72%) of consumers say "...the next technology revolution needs to be led by people-centric experiences, giving me more control over my data."

By often building services and applications atop often permissionless blockchains outfitted with open protocols and open standards, Web3 will allow for more freedom, decentralization, and democracy for individual users, content creators, and projects. For example, one prominent feature of Web3 is decentralized autonomous organizations (DAOs), which are groups of people of any size that organize around a shared community or resource and democratically decide how to manage those resources and interact with the world.

Another core Web3 activity is DeFi, which also plays a key role in metaverses. DeFi refers to decentralized finance, which is about creating internet-native financial systems that use blockchains to replace traditional intermediaries and trust mechanisms. Instead of having traditional intermediaries — such as banks or stock exchanges — send and receive money, DeFi employs blockchain-based "smart contracts" and other distributed ledger technologies (DLTs) to ensure that transactions are fair and trustworthy.

Using DeFi tools and methods, people can do everything from buy or sell stock or real estate and borrow and lend cryptocurrency.

These financial assets are often based on nonfungible tokens (NFTs), which consist of digital data, stored on a blockchain, that attests to and verifies the asset's provenance. Because the ownership of an NFT is securely recorded on the blockchain and can be transferred by the owner, it can be sold and traded like any physical asset.[7] Roughly speaking, DeFi-related assets are valued in the tens of billions of dollars, and trading activity on decentralized exchanges — though largely unregulated — has grown by triple-digit percentages in the past year.[8]

Web3 also can deliver content creators greater ownership and control over what they create. Traditionally, online content gets aggregated on large platforms, such as YouTube, Spotify, and Medium, which get the lion's share of any monetary value that the content produces. Web3 advocates promise a more equitable reward for content creators.

For example, more artists are selling their art directly to consumers as NFTs, which enables the artist to collect a royalty on it for the lifetime of the art — so every time it's sold, the artist gets a cut. This ability to move away from big, centralized platforms can have a significant financial impact on artists and content creators.

> **Web3 is also a reaction to the internet's centralization and monetization of people's data, such as by social media platforms.**

As some envision it, future Web3 capabilities will empower individuals to decide how they want to collect, store, share, and, if they want, monetize their personal data.

"Your individual profile will identify what can and cannot be done with your data through blockchain-backed smart contracts, allowing advertisers or intermediaries to aggregate your data in exchange for payment through a clearinghouse," wrote Jeff Bell, CEO of LegalShield and IDShield.[9]

While most of the world still operates in Web2 today, Web3 has gained a solid foothold and is growing fast. In January 2022, the Oslo-based browser and web innovation company, Opera, launched the Crypto Browser Project, a dedicated Web3 browser for PC, Mac, and mobile phones that has an integrated cryptocurrency wallet and other Web3 functionality. The company claims to have "an engaged and growing base of hundreds of millions of monthly active users who seek a better internet experience."[10]

Metaverse + Web3

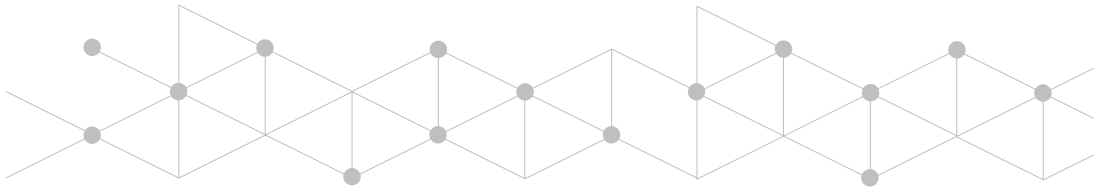
While powerful in their own right, many metaverse platforms are also adopting Web3 to enable more realistic, lifelike scenarios. For example, two of the leading platforms today, The Sandbox and Decentraland, are employing Web3 technologies so inhabitants can purchase virtual land and other assets and use them to create their own worlds and, importantly, even monetize their own content, games, and other applications. Both The Sandbox and Decentraland are developed on the Ethereum blockchain, so the land and other assets are represented and stored as NFTs, and metaverse transactions are conducted in the platform's native currency.

And with Web3, metaverses are not just places to hang out and play games.

> They are fast becoming thriving digital economies, powered by DeFi applications, which enable users to trade assets, get loans and store deposits, and enjoy play-to-earn (P2E) games where they can potentially earn cryptocurrency.

In fact, participating in many metaverse platforms requires not just a computer, smart phone, or extended reality (XR) headset, but also a crypto wallet. In a sign of how far things have progressed, many fashion brands are already releasing direct-to-avatar (D2A) digital collections in which digital apparel is being sold to and for consumers' avatars![11]

Clearly, the metaverse and Web3 are in nascent stages, but they are also emerging and developing fast. We have seen many similar technological developments — including the internet, smart phones, and, most recently, online video collaboration tools — redefine our everyday lives and work experiences. As with those, we should expect to see significant volatility and evolution associated with WebMe in the months and years ahead. But, given the enormous potential that WebMe offers in terms of creating powerfully compelling digital environments for us to collaborate, train, engage, and conduct business in, federal leaders should start thinking now about how this trend will intersect with their agencies' future trajectories.



THE ANALYSIS

Where do federal agencies fit in a WebMe world?

For many, this may all sound a bit fantastical and futuristic. But be forewarned: it is closer than you think. Some federal agencies are already exploring the possibilities.

One of the most ambitious efforts underway is the Army's Synthetic Training Environment (STE), which aims to revolutionize the Army's entire training paradigm by allowing units and soldiers to conduct realistic, multi-echelon, collective training anywhere in the world. Currently scheduled to be fully operational in 2023, the STE will combine live, virtual, constructive, and gaming training environments that simulate real-world terrain in its full complexity.

The Army is designing the STE to be AI- and machine learning-enabled; accessible "at the point of need"; and capable of joint, interagency, and multi-national interoperability. Ultimately, STE will give soldiers "unprecedented access to realistic virtual training, while open architecture enables interoperability across echelons, domains, forces and with partners," according to an Army description of the program.[12]

The appearance of U.S. Department of Defense (DoD) visual information does not imply or constitute DoD endorsement.

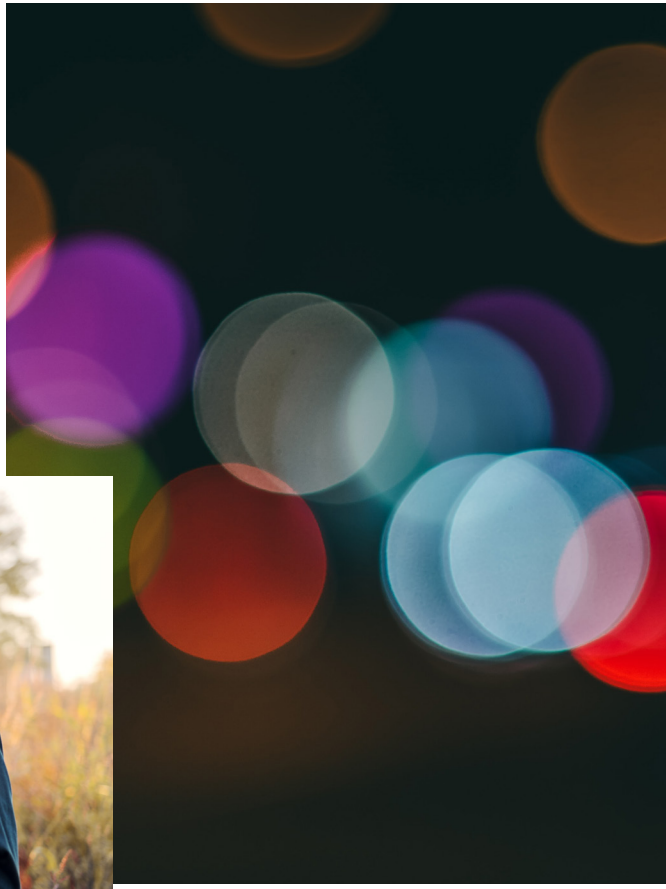
Other agencies are edging their way into the metaverse as well.

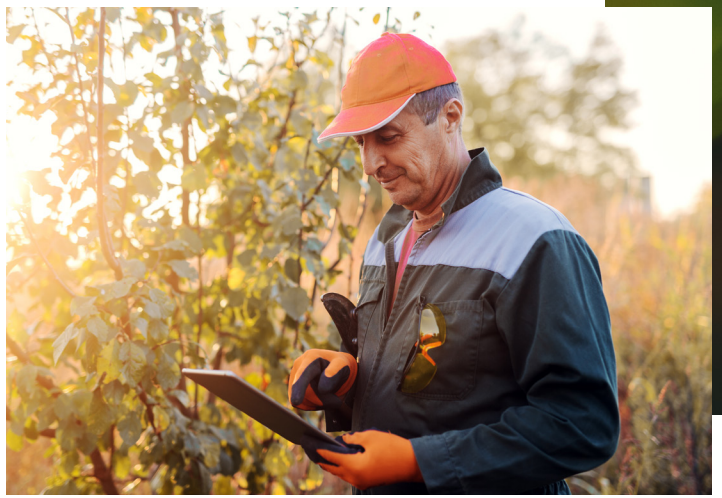
The Veterans Health Administration Innovation Ecosystem (VHA IE) Extended Reality Network was developed to explore new care models for Veterans suffering from post-traumatic stress disorder (PTSD), anxiety, depression, chronic pain, and other challenges. They can experience XR-based care to reduce stress, spending 30 minutes, for example, walking along a beach.

As one Veteran noted, "That was like going to see a good movie – you don't want it to end." For those suffering chronic pain, XR sessions have reduced the use of opioids – a 72% reduction in opioid usage for post-operative patients in one study.[13]

The Department of Agriculture's Forest Service is relying on AI and digital twin simulation technology operating in the metaverse to better understand wildfires and stop their spread. Specifically, Nvidia is helping to create the world's first AI-centric lab dedicated to predicting and responding to wildfires. "The lab will use Nvidia AI infrastructure and the Nvidia Omniverse advanced visualization and virtual world simulation platform to process a fire's magnitude and forecast its progress. By recreating the fire in a physically accurate digital twin, the system will be able to suggest actions to best suppress the blaze," according to an Nvidia blog.[14]

The U.S. Air Force is pondering the creation of a space-themed metaverse and has even trademarked a name for it: SpaceVerse. According to the Air Force's trademark application, SpaceVerse will be "a secure digital metaverse that converges terrestrial and space physical and digital realities and provides synthetic and simulated extended-reality (XR) training, testing, and operations environments."[15]





NASA: Welcome to our metaverse

Perhaps one of the most compelling cases of a federal agency employing WebMe capabilities to design and create its own virtual environment is occurring at NASA's Jet Propulsion Laboratory near Los Angeles, which is developing a future collaboration space for its engineering and design teams.

Like most federal agencies, JPL shifted to a mostly remote-work model in the early days of the COVID 19 pandemic. "As the Lab's workforce dispersed across the country, employees wondered what this new phase meant for JPL's culture, particularly the move from in-person collaboration and meetings to videoconferencing and the now-all-too-familiar impacts of 'Zoom fatigue,'" wrote JPL's Chris Mattmann, chief technology and innovation officer, and Whitney Haggins, an IT communication strategist, in an April 2022 article in IT Talk, a quarterly journal published by NASA's Office of the CIO.[16]

"JPL's key business of engineering future planetary and deep space remote sensing satellites, landers, and autonomous robots is predicated on dynamic communication and collaboration among teams. Enabling that via videoconference is extremely challenging."

In response, JPL's IT organization launched the "Welcome to Our MetaVerse" project. The project team began scanning workspaces and rooms at JPL and then digitally reconstructing and importing them into an application by Spatial.io, which creates 3D virtual worlds.

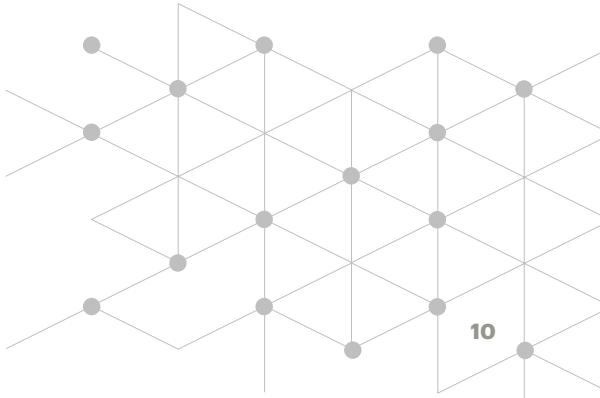
> JPL employees can then wear Oculus Quest 2 headsets to attend virtual meetings in those scanned locations.

The project then plans to bring JPL employees themselves into the metaverse by using Spatial.io's 3D face-scanning technology to create realistic avatars to represent them.

"JPL participants can congregate, meet, and take advantage of VR capabilities from the Quest 2, including spatial audio and gestures (e.g., high-five, thumbs up), as well as other features that add to the sense of realism and interactivity and the experience of 'being together' in as full a sense as possible," Mattmann and Haggins wrote. "With the MetaVerse, remote and hybrid teams can innovate, create, and perform engineering activities without having to physically procure and manipulate actual materials and assemblies."

JPL teams in this homegrown metaverse can even use the lab's custom collaboration tool for engineering activities, called ProtoSpace, to do things like import complex computer-aided design (CAD) drawings, including JPL mission hardware, which can then be visualized and realized in a clean room alongside partially finished builds of the same hardware. "Engineers can perform just-in-time and early phase assessments and adjustments, evolving engineering design activities for missions at an extremely low cost with a high payoff," they wrote.

One challenge the project team had to figure out was how to include more people into the metaverse than the allowable platform limit. They devised a solution that mimicked a videoconference integration using screen and audio sharing. "In testing, 25 people joined the MetaVerse in VR while an additional 30 joined via videoconference through the workaround solution.



Participants from either platform were able to interact with those in the other platform seamlessly. This not only provided a solution to the limit on the number of participants but also offered a lower barrier to entry for those who are VR-hesitant," Mattmann and Haggins wrote.

Being able to integrate these various technologies for different types of users carries potential cost-saving implications. Engineers, for example, could enter a clean room and, using augmented reality (AR) capabilities, look at a partially completed, physically built spacecraft assembly for a particular mission and then compare it to a fully realized virtual NISAR spacecraft using ProtoSpace. "Seeing the full, realized, and completed assembly in mixed reality enables assessment, adaptation, and full end-to-end engineering without having to finish and test the CAD [computer-aided design] model and fabricate it fully in production, thus saving costs, energy, and critical resources," Mattmann and Haggins wrote.

"Using the [Microsoft AR head-mounted display] HoloLens and with ProtoSpace loaded, JPL engineers can build the elements for complex interplanetary missions much earlier, faster, and more collaboratively than if they were performing these activities solely based on what was occurring in real life."

Extending today's digital operations into the metaverse continuum

Clearly, NASA's JPL is on the cutting edge of exploring the WebMe trend. But it is paving a path that other federal agencies will eventually follow by taking technologies and capabilities already in wide use today — such as digital twins, blockchain, office collaboration tools, virtual and augmented reality — and extending them into more fully realized, self-contained, highly functional virtual environments.

Potential federal use cases for this approach abound. Military organizations today, for example, already employ digital twins to quickly and efficiently design and test new weapon systems, improve weapons system maintenance, and run industrial operations more efficiently.[17] In the not-so-distant future, we should expect military organizations to deploy digital twins into richer, immersive virtual environments where dispersed engineers and designers can more easily collaborate on the same tools and integrate AI and machine learning capabilities.

There are also many commercial examples of this already. For example, Shanghai is one of the world's largest cities with 26 million inhabitants and it now boasts its own digital twin. Metaverse creater 51World modeled the city with over 100,000 elements – from garbage cans to e-bike charging stations – to enable interactive planning and simulate the effect of natural disasters like flooding on city operations.[18]

P&G LifeLab allows the consumer packaged goods giant to explore how different audience segments engage with its products[19] while Hyundai has opened a next generation showroom.[20] Microsoft is working with Boeing, Heinz, and Kawasaki to create an industrial metaverse for each company's operations, combining AR, IoT and digital engineering to digitize their manufacturing processes.[21]

In the same way, federal agencies could conceivably employ digital twins in the metaverse to optimize warehouse and logistics operations; mitigate vulnerabilities and improve resilience in industrial processes and operational technology (OT); conduct 'what if' scenarios on infrastructures and in environments that would otherwise be impractical; and deliver improved maintenance to weapons systems, equipment, and fleet vehicles in austere locations.

This same approach of extending current technologies into richer, more immersive environments for greater capability applies as well to today's popular office collaboration tools. Today's standard is to connect remote employees through video calls and conferences. But tech firms are already starting to bring more robust WebMe capabilities to market, enabling enterprises to actually place remote employees in the same virtual space and using the same tools, much like we see at NASA's JPL.

For example, Microsoft is already building a mixed reality metaverse for office collaboration within its popular Microsoft Teams app. In March 2022, Microsoft previewed Mesh, which enable people to connect holographically as 3D avatars as they conduct meetings, engage in design sessions, conduct training, help others remotely, and host virtual meetups.[22] Mesh integrates with Microsoft 365 so that connections, calendars, content, and workflows transition to these mixed-reality workspaces.

Numerous similar offerings — including Meta's Horizon Workrooms, MeetinVR.com, and Immersed — are rapidly emerging in the marketplace as well.

> The emerging capabilities of WebMe offer enormous benefits to a wide array of other federal missions and programs as well.

Citizen services, for example, can become personalized virtual experiences where citizens can be more easily assisted — or assist themselves — through visual aids. Instead of having to travel to a federal office building that may be many miles away, a citizen can discuss their case in a virtual setting where all relevant resources and information are within arm's reach.

WebMe also holds enormous promise for training and education, healthcare, and recruitment. Consider recruitment, for example. We already know that younger generations spend more time in the metaverse, mostly because of the youth-oriented gaming and online social culture that helped spark its incredible growth from the start.

It is this digitally native demographic that federal agencies need to connect with for military recruitment, federal hiring, and the many citizen services that federal agencies deliver. For these citizens, the promise and reality of the metaverse and Web3 are not futuristic in the least — they are the unfolding reality of today. And their heightened expectations of what digital experiences and interactions should look like are already raising the bar for how federal agencies must present themselves in our fast-evolving virtual world.

How some governments are diving into WebMe

Governments around the world are taking note of the exploding economic and cultural growth of the metaverse — and some are going all in.

The city of Seoul, South Korea, for example, is laying the foundation for a metaverse ecosystem called "Metaverse Seoul" for all areas of its municipal administration. The effort combines digital twins, VR, and collaboration to improve city services as well as planning, administration, and support for virtual tourism.[23] Longer term, the city aims to use its metaverse to support business development services, education, and city services for filing complaints, inquiring about real estate, and filing taxes.

For its part, the Caribbean nation of Barbados announced plans in November 2021 to open the world's first metaverse embassy in Decentraland. The country is clearly leaning into this new virtual world by championing digital advancements and adopting a digital currency. It plans to post embassies in other virtual platforms as well. Gabriel Abed, Barbados' ambassador to the United Arab Emirates (UAE) (another metaverse proponent on the global stage), said the new virtual embassy offers "a fully immersive way to showcase our culture and business opportunities."[24]

The glamorous Middle East city of Dubai in the UAE has created an entire government agency to regulate digital assets. Moreover, the agency — called the Virtual Assets Regulatory Authority (VARA) — plans to set up a metaverse headquarters in The Sandbox virtual world. "Our presence in the metaverse... marks the beginning of a new phase in the Dubai government's march for the future; one that will have a positive impact in the long run," Sheikh Hamdan bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of the Dubai Executive Council, said in a statement.

The VARA intends to serve as Dubai's "primary channel to engage [Virtual Asset Service Providers] across the globe to initiate applications, enable younger licensees [to] enter the metaverse, openly share knowledge and experiences with consumers and peer regulators to raise awareness, enable safe adoption, and drive global interoperability," according to a statement.[25]

Federal agencies need to start thinking now about how to establish a presence in the metaverse and how to effectively employ Web3 technologies to advance their missions and programs. Secondarily, agency leaders will need to think about how they will do this: which human, technical, data, and other resources will they need — and which outside partners are best positioned to assist them — to competently move forward in this arena?

38%

of consumers globally agree their digital life is increasingly becoming their "real life."

THINGS TO LOOK OUT FOR

Regulating WebMe for today and tomorrow

Federal leaders are bullish on this future.

Most (88%) say that the realization of Web3 over the next decade will fundamentally change how enterprises engage with users online, and nearly all (97%) agree that digital platforms must support interoperable user data to deliver unified experiences regardless of environment. However, challenges must be accounted for as well.

Many federal agencies need to think about these emerging capabilities not only from a use case perspective, but also from a regulatory and policy perspective.

To what extent do existing laws, policies, and regulations apply to the economic, financial, business, and social activities occurring in the metaverse? And what particular skill sets and capabilities are needed to provide adequate industry oversight and regulatory enforcement over those activities?

In fact, agencies across the federal government are already thinking through these challenging questions.

In March 2022, President Biden signed an Executive Order on Ensuring Responsible Development of Digital Assets, directing agencies across the government to develop consistent controls and policies to promote responsible behaviors in the digital economy.[26] The executive order notes that, in late 2021, non-state issued digital assets reached a combined market capitalization of $3 trillion, up from approximately $14 billion only five years earlier.

"The United States has an interest in responsible financial innovation, expanding access to safe and affordable financial services, and reducing the cost of domestic and cross-border funds transfers and payments, including through the continued modernization of public payment systems," the executive order reads.

"We must take strong steps to reduce the risks that digital assets could pose to consumers, investors, and business protections; financial stability and financial system integrity; combating and preventing crime and illicit finance; national security; the ability to exercise human rights; financial inclusion and equity; and climate change and pollution."

With this executive order, scores of federal agencies are having to ponder large questions about how traditional government concerns — such as consumer protection and fraud, antitrust behavior, market and currency manipulation, public and child safety, counterterrorism, national security, law enforcement jurisdictions, transparency, privacy and security, and financial integrity — extend into a borderless, virtual environment that is almost entirely unregulated today.

Hardly a government agency will be untouched by this effort, and all will need to think through policies and programs that promote innovation while also mitigating any risks to consumers, investors, and businesses, broader financial stability, and the environment.

57%

of consumers globally state "I expect companies to help me unify my digital experiences."

Other WebMe challenges for federal agencies

Because virtual interaction and transactions are key components of WebMe, particular emphasis will need to be placed on digital identities and the ability to verify, protect, and secure those identities and the security clearances associated with them. For a couple of random avatars crossing paths at a virtual concert, that may not be especially important. But for a federal agency holding a virtual meeting among employees or assisting a veteran with her medical benefits, it will be critical.

For that matter, how will agencies verify the integrity of a fungible or non-fungible token? For government interactions that require financial transactions, will they accept cryptocurrency payments and, if so, how will that be done?

Another challenge: creating satisfying citizen experiences for federal services will take an even more demanding turn.

Some agencies today still struggle with meeting people's elevated expectations that have been shaped by the leading brands in technology, entertainment, fashion, and other industries. As we all move headlong into 3D virtual environments, the bar for acceptable customer and citizen experience will get even higher.

There are also digital divides to think about. Many communities — particularly those that are underserved and underrepresented — still lack adequate access to the internet so they can leverage the government's digital services. Agencies will need to factor those communities into their strategies and planning as they strike out for the metaverse.

But those divides exist also across the government itself. Digital maturity and presence vary dramatically from one agency to the next. While this divide is certainly noticeable on the Web2 internet, the contrast will be even greater in the Web3 metaverse. Agencies will need to think about how to bridge those divides and create a more consistent and seamless experience for citizens.

ACTIONS TO TAKE

Taking your agency to tomorrow's internet

There are four steps that federal agencies can start taking today:

01 Understand the developing landscape around the metaverse and Web3

02 Lay the needed technical foundation

03 Acquire the talent, expertise, and tools needed to gain proficiency

04 Define standards and protocols that will deliver the greatest interoperability for your digital offerings and systems

First, federal agency leaders should start learning, understanding, and building new strategies today. This means exploring the potential that new digital products and services have to impact your mission as well as training your executives on the technologies that will soon be foundational to their missions and programs.

> You can start by gaining a firm understanding of the foundational building blocks of WebMe: blockchain, digital assets, digital twins, data management, the cloud, the metaverse, and Web3, among others.

See how other governments and analogous industries are preparing for and envisioning the next major evolution of our digital landscape.

As metaverse and Web3 technologies continue to mature, the governments and companies that are prepared and willing to be the first to experiment with these new platforms and data structures will be the ones who define what the next generation of digital services looks like.

Success also hinges on putting your technical foundation into place. At a minimum, cloud will be essential, as will rebuilding your applications with microservices architectures and APIs to be easily usable by and shareable with others. The metaverses that emerge (whether enterprise or consumer-driven) will be defined by the services and platforms they encompass. Put another way: enterprises must have the infrastructure in place to share applications widely and securely. These steps can, and should, be taken today – even if the end state of the metaverse remains uncertain.

Next, start identifying – and working toward – the Web3 and metaverse skills and capabilities you will need. For example, federal agencies looking to create metaverse experiences will require 3D artists and experts on the platforms on which they plan to build. And leveraging the opportunities and features of Web3 will demand that agencies stock up on staff and partners that possess expertise in distributed ledger technologies (DLTs) such as blockchain and the distinct business and operating models that they support.

This might sound like a lot of new skills to develop in a short amount of time, but in many cases, you don't have to start entirely from scratch. The increasing sophistication and democratization of immersive design tools, for instance, is making it easier than ever to start experimenting with these technologies. A plethora of tools — such as Epic Games' Unreal Engine and Nvidia's Omniverse — has already emerged in the marketplace to help people create 3D environments and experiences.

For many of these technologies, the best way to be an early innovator is by deploying them internally. This is what Accenture did by creating its own enterprise metaverse, the "Nth floor."[27] Accenture is deploying VR headsets to employees around the world and expects to provide immersive VR environments for onboarding, learning, and collaboration for 150,000 employees this year — all while demonstrating best practices for VR rollouts and projects to clients. Aside from gaining the necessary in-house skills and expertise, it is also a critical to form new partnerships and ensure you can participate in future partnerships and collaborations.

The appearance of U.S. Department of Defense (DoD) visual information does not imply or constitute DoD endorsement.

Lastly, strive early on for as much interoperability in your digital products and services as possible, such as through the use of microservices, API connectivity, open standards, and open architectures. This will help ensure that your offerings are able to leverage internal and external data and systems as needed. For example, in architecting and developing its STE, the Army aims to achieve joint, interagency, and multi-national interoperability. The STE will interact with multiple operational networks, virtual military equipment, and live training instrumentation. The STE will also be compatible with the Army's Common Operating Environment (COE), which is an approved set of computing technologies and standards that enable secure and interoperable applications to be rapidly developed and executed across a variety of computing environments.[28]

Agencies also can tap into existing consortiums like the Khronos Group, which comprises more than 150 organizations including Apple, Google, and Amazon and is working to set open industry standards for extended reality, 3D graphics, and more. If you plan to build Web3 applications, consider linking with the InterWork Alliance, which has created the Token Taxonomy Framework so that multiple parties can work together to define a "common language, behaviors, and properties" for digital tokens. The importance of consortiums and industry standards like these is twofold. They enable greater interoperability between entities, making it easier to deliver cross-platform experiences or to jointly collaborate on an experience, and they often make it possible to do so securely and without jeopardizing privacy. And, by agreeing to a common framework when a technology is in its infancy, agencies and businesses can set themselves up to provide more compatible services to future shared consumers, which will help them stand the test of time as the internet continues to evolve.

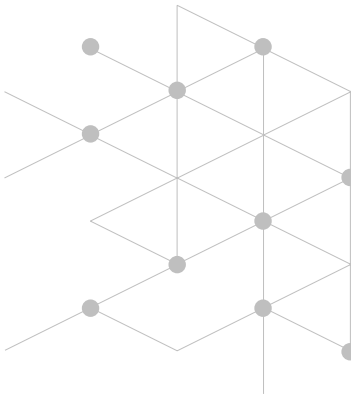
Conclusion

Today's efforts around metaverse and Web3 are creating the next version of the internet. They are two momentous technology shifts, simultaneously working to eliminate the friction that exists between today's many digital platforms and to reinvent how data moves and is used across digital experiences. And in the process, they are driving new lines of business, new ways of working, and new means of interaction between governments, businesses, and people. For most, this is the first and best chance they have ever had to define and architect a new kind of digital world.

Decision Points

Is your agency ready for the next generation of the internet?

- A significant transformation is coming to our digital world, and even if the end state is not yet fully formed, many changes are already underway. Leaders should kick off a market and technology scan to understand what is evolving today and how it may impact or disrupt current digital efforts, then prioritize the opportunities and partners available.
- Use case development will be key as enterprises track the maturity of the underlying metaverse and Web3 technologies. Every federal agency will be impacted differently, with no clear best practices. Maintaining focus on desired outcomes will mean developing a concise set of use cases for how enterprises intend to drive value from these emerging worlds.
- There are technology investments you can already make today to improve your short-term and long-term ability to adapt to the impending changes. Cloud is the table stakes for every agency. More discrete industry impacts are happening across spaces like VR, AR, digital twins, distributed ledgers, and virtual marketplaces.



How are you developing the skills needed for the next digital world?

- Just as federal enterprises needed to hire interaction designers, software engineers, and more to execute their digital transformations, a new set of skills will be required for a future driven by metaverses and Web3. Start by identifying where you expect to have a presence and what skills gaps will prevent successfully executing those strategies.
- Developing the pipeline for new talent will be a longer-term effort that should nevertheless begin today. In the interim, companies should explore upskilling existing employees through vendor-based training and building familiarity and skills with the metaverse and Web3 platforms they intend to use.
- Low-code and no-code platforms are another avenue that may jumpstart an agency's ability to pursue metaverse and Web3 initiatives.

How are you going to start?

- Already, there are some standard metaverse use cases that agencies can leverage without high levels of risk. For instance, immersive technologies for training or productivity have been tested and experimented with for years.
- To guide their pilots, agencies should investigate the ways their enterprise platforms may be holding them, their stakeholders, or their users back. They should empower development teams to design and test new kinds of experiences that eliminate or circumvent these pain points.
- To keep up with – and influence – the development of metaverse and Web3 technologies, fast track participation in consortiums.

What security (and safety) will your agency need to operate and fully engage with citizens and other constituents and partners in the metaverse?

- Begin planning for the metaverse architecture with new identity and data governance and frameworks and Web3. As cryptocurrency services may form the building blocks for user identity and transparent transactions, evaluate how practiced your company is in these technologies.
- Strategize on what your agency wants to become in the metaverse. What is your role in creating a secure and trusted metaverse, and shaping the future of human and enterprise interaction? Could you become a leader in bringing your agency values of trust, security, privacy, and safety to the metaverse?
- Have product and services teams begin planning for the compound risk of new services and integrated experiences in a shared marketplace. Assess how this changes the risk exposure of those initiatives.

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The Accenture Technology Vision takes a systematic look across the enterprise landscape each year to identify evolving technology trends with highest possibilities to disrupt businesses, governments, and societies over the next three years. For 22 years, corporate and government leaders have relied upon this research to prepare their organizations for what's next.

The Accenture Technology Vision is produced by Accenture Labs and Accenture Research. It draws on internal research and analysis, insight from the Technology Vision External Advisory Board, and results of a global survey of 4,660 c-suite executives spanning 23 industries and 24,000 consumers worldwide. Instead of focusing just on the drivers of technological change, the Accenture Technology Vision is distinguished by its examination of the broader themes poised to have the most enduring and transformative impact on how enterprises operate.

The Accenture Federal Technology Vision 2022 applies these insights and findings to the unique challenges and demands facing the U.S. federal government. It features in-depth analysis from more than 50 Accenture Federal Services experts and results of a survey of 200 U.S. federal government executives.

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