Trendlines: Experiences without boundaries

When devices don't matter

(15-minute read)

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Brave new world of experiences

A year and a half ago, we started tracking a trend we call "experiences without boundaries." Signals like "holoportation" demonstrations and cross-device gaming platforms (e.g., Google's Stadia) gave us experiences that cross the physical-digital divide. They open up new ways of interacting and new business models, pushing us to rethink how we deliver experiences.

Then COVID-19 hit. The pandemic brought significant challenges that have accelerated technology adoption and changed how we interact with each other day to day. Organizations of all kinds are working to provide the same level of services and experiences without the benefit of physical proximity. Schools and universities are attempting to teach the same coursework with limited control over the devices or connectivity that their students have. In the business world, people are trying to collaborate, be creative and stay connected across a variety of tools and technologies.

On top of those shifts, consumers are looking to recreate experiences that used to occur in a physical location like eating out, going to the gym or watching a concert, without being able to interact with the associated location. COVID-19 has escalated our desire for experiences that help us connect with other humans.

The question is: How can we fulfill these needs and desires using technology that delivers experiences across locations and devices?

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Meet "ConnectedMe"

We foresee the creation of a new type of operating system, one that's built not for any single technology ecosystem but built for and with people as the central nodes of their own ecosystem of experiences. An operating system that allows any experience to flow to any device – experiences without boundaries.

It's the next wave of future systems – a form of ambient computing, where anything and everything can be a connected device.

Because the connective tissue, or the key value in this system, is the person and not the hardware, we call it "ConnectedMe." Building the types of experiences powered by the ConnectedMe OS requires us to rethink how software and hardware integrate across ecosystem silos and cloud platforms. This new type of operating system will act as the connective layer built on a foundation of secure data sharing, context-aware personalization and digital identity.

The way we use physical and digital assets won't go back to a pre-COVID "normal." Users will demand interoperability, which will fuel the next generation of experience innovation. Building the ConnectedMe OS will require us to form new types of partnerships and business models. The enablement of your remote workforce was just the first step in what will be a profound shift that will keep accelerating.

This initial report identifies the steps you should take now to put the foundational layers in place to create experiences without boundaries. As you design products and services, you'll need to ask new questions like:

- How do we build something that can span all the contexts a person might want to use it in? (e.g., Microsoft's move toward working with competitors like Amazon and Slack)

- How do we anticipate people's needs and behaviors to build experiences that excite them? (e.g., Nike's new digital store format Nike Rise)

- How do we ensure our products are ethical and inclusive? (e.g., Microsoft's commitment to accessibility)

- How do we make sure our hardware and devices are as smart as our software? (e.g., Google's Advanced Technology & Projects division)

Experiences without boundaries is the latest in the Avanade Trendlines series on emerging trends that impact the design, innovation and technology choices of large organizations. Even this report is jettisoning traditional boundaries: We invite your input as we build out our thoughts with deep-dive chapters over the coming months in our blog and podcast series.

Bringing the world to you
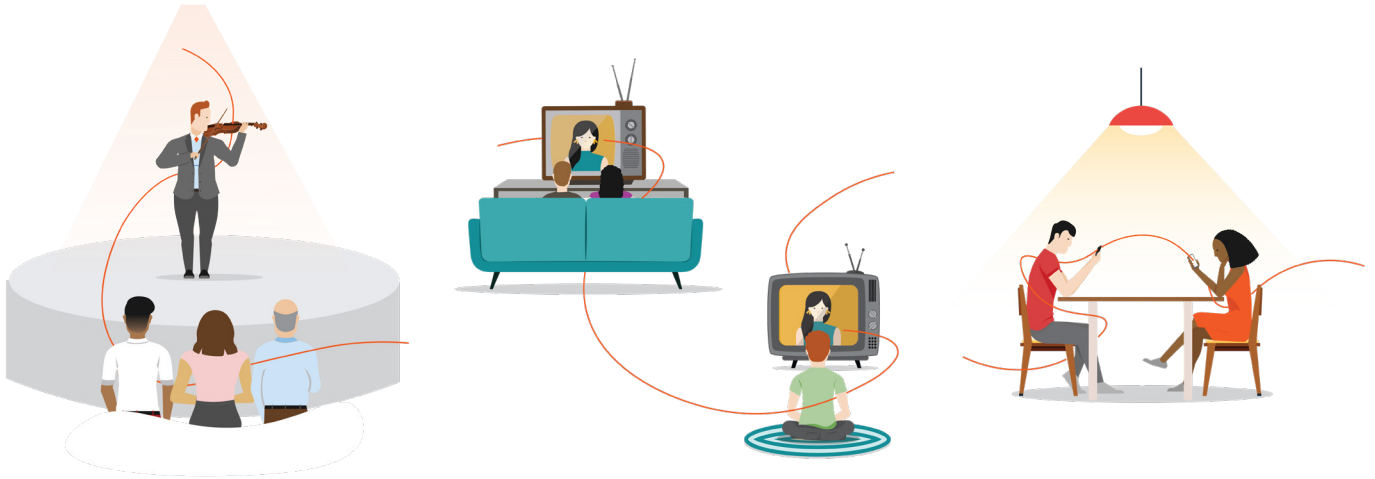
For most of human history, you had to be near something to experience it – in terms of both time and location. That began to change with new technologies, from audio recordings to radio and television. And now, with the internet and mobile devices, we can access content and experiences without any constraints on time or place.

Along the way, however, we introduced a new constraint – the very technology that freed us from the limitations of time and space. For decades, computers were large, physical objects tethered to one place, until the emergence of the laptop, then smartphone. Old-style personal digital assistants, digital cameras and MP3 players all laid the foundation for mobile computing.

But it wasn't until companies like Samsung, Apple and Google combined all those functions into one device, with a flexible touch screen, that context-aware computing took off.

In 2010, then CEO of Google Eric Schmidt professed at Mobile World Congress that "the answer should always be mobile first. You should always put your best team and your best app on your mobile app."

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The signals:
It's no longer mobile first

Our phones are now an extension of ourselves, as are a growing number of connected devices. And now a generation of people has never known life without the internet and a variety of connected devices constantly around them. As a result, we're seeing a shift; instead of thinking of computers as fixed devices, we're thinking of them as part of the computational material that we can mold and shape into entirely new ways of interacting with the people and the world around us.

The graphical user interface (GUI) literally changed the face of computing, opening up new interaction paradigms and democratizing access to technological power. Experiences without boundaries represent the next step in that evolution. This will include augmented reality (AR) and vast networks of connected machine-to-machine devices. Companies delivering new kinds of experiences using these technologies today are innovators; those that don't deliver them tomorrow will fail.

Cloud is the foundational layer, but not cloud as we know it today. The future of cloud will extend to the network's edge and will rely on confidential computing – an emerging technology that encrypts data in use while it's being processed. Products and services will leverage encrypted services that give users confidence and control over their data. These confidential virtual machines are available at Microsoft and Google and we'll move to a world where different organizations combine their data for computation. With COVID-19 as context, think about the power of hospitals to combine patient data for analysis.

One very simple example of this today is Fluid Framework, a prototype developed by Microsoft for knowledge workers to manage content without the typical constraints of files and devices. A user can create a simple to-do list on their phone and then place it on their computer's desktop and in an email to their boss. As soon as they cross something off in one place,

the other presentations of the list will also automatically update regardless of location.

In today's new remote-first paradigm, companies are also finding ways for formerly in-person events like conferences and sports to thrive in virtual and augmented reality. Advances like spatial anchors and new devices like the Oculus AR glasses create new opportunities for experiences that span devices and locations.

Imagine this: You're in a car accident. Using your AR glasses, you send live images and information about the crash to your insurance company to start your claim process. Within a few minutes, your phone buzzes: Your car manufacturer offers you 10% off the repair bill if you agree to share anonymized information about the damage to your car, which they'll feed into their design algorithms to improve overall safety. They even help you navigate safely to the repair shop with step-by-step instructions shared to your glasses.

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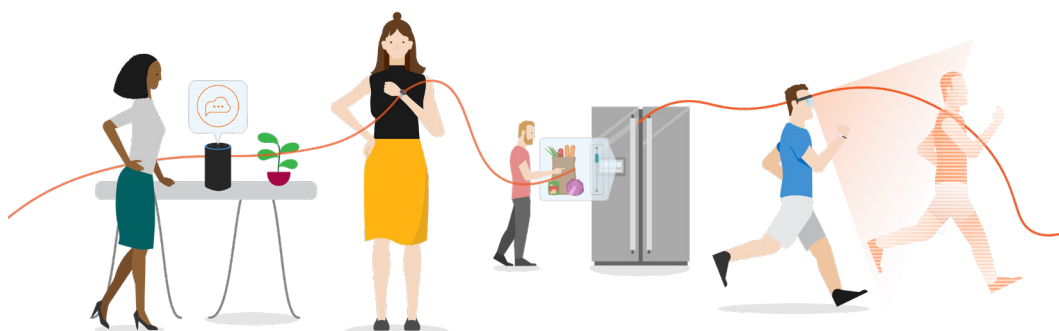
New needs are bringing down boundaries

The shift to experiences without boundaries cannot truly happen without significant improvement in cross-platform integration. Google and Apple dipped their toes in these waters in May 2020 when they released interoperable Bluetooth features for their respective mobile operating systems to support COVID-19 exposure notification. Alliances like this, as well as Amazon's voice interoperability initiative, will become more commonplace to enable people to more easily switch between devices without interrupting their experiences.

Traditional boundaries between "businesses" and "customers" are also coming down. While many consumer experiences have long relied on advertising, new models are emerging. For example, Instagram features encourage people to turn their personal brand into a business.

Meanwhile, companies in China are creating seamless experiences across boundaries using mega-apps. Within WeChat, customers can quickly and easily access restaurants, retail and entertainment, and manage their social contacts, allowing for experiences like discounted group purchasing from popular restaurants. During the pandemic, local farmers have taken advantage of the platform to keep their businesses alive through livestream selling. These experiences are predicated on organizations really understanding their customers through the use of customer data platform technology.

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ConnectedMe: Future experiences lie on the edge

Social networks, supply chains, even smart home systems are all manifestations of the ever-more-connected network of human interactions that our world is made of. The future of our experiences lies on the edges connecting those nodes, and the technologies and processes you use to create those experiences need to take them all into account.

We want our experiences to be delivered as quickly and locally as possible. For the foreseeable future, the network is the computer. You may not have heard of Cloudflare, but it powers 14% of the internet today. Its Workers product provides developers the ability to run applications on the infrastructure edge (the space between the telecommunications company and the cloud provider). Today products and services run on content delivery networks and telco equipment.

The edge enables the ability for products and services to run without roundtrips on the cloud.

This means that computing is everywhere, and the connection point isn't the specific device – it's the operating system. Organizations will be able to use confidential computing to exchange user data securely for processing, and these distributed multi-party systems will allow experiences to flow to and from any device.

The ConnectedMe OS is the bridge that communicates and understands the user's context. We see ConnectedMe functioning like the company Mint, which tracks personal income, investments, spending, financial goals, etc. across a range of different accounts. Banks haven't agreed to adopt a common ledger system; Mint just learned how to normalize the data between them.

For the vast universe of digital experiences we're building, the ConnectedMe OS provides a similar layer of normalization via distributed contracts.

By its very nature of working across boundaries, this new OS cannot be owned and controlled by one organization. Instead, we see it as a distributed effort, akin to open-source models. Each participant will need to take a systems-thinking approach to the design, development and deployment of their products and services, and determine how they, in particular, will connect to the greater ConnectedMe OS.

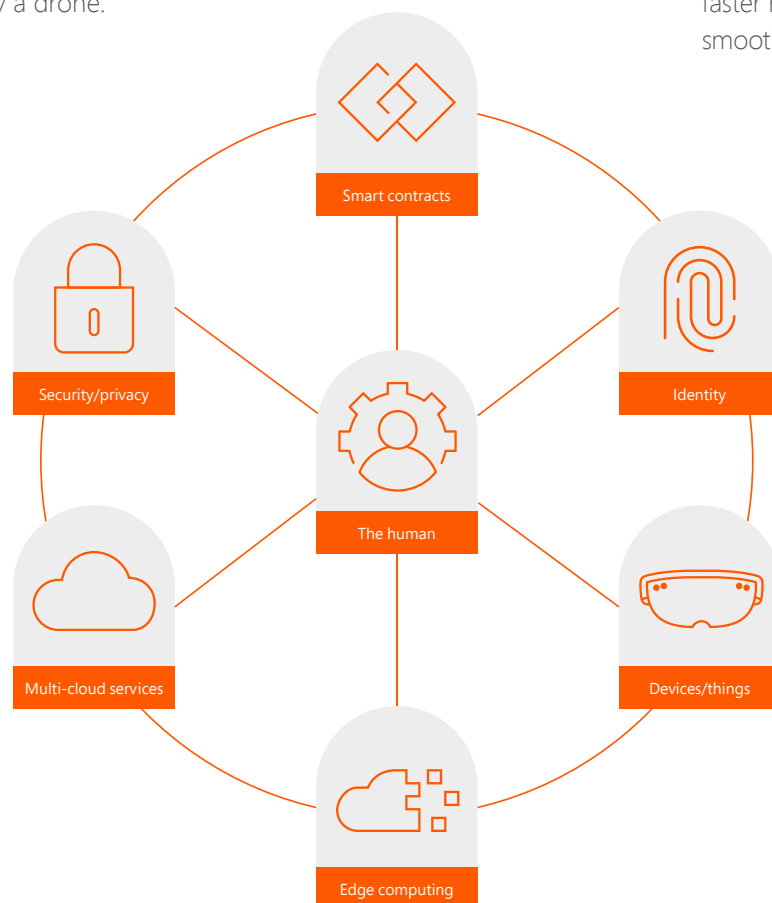avanade
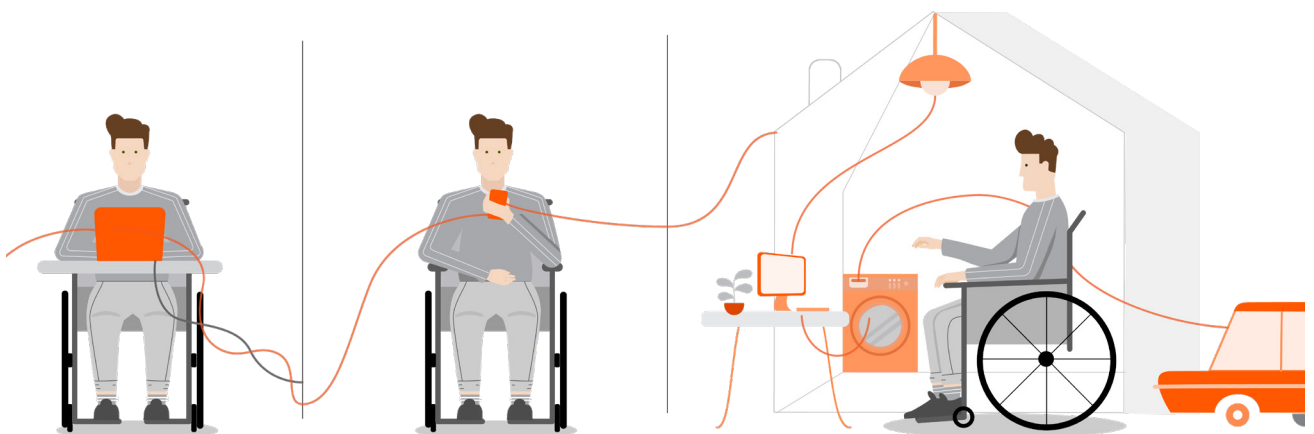
What ConnectedMe can do for you

The key features of the tech stack for ConnectedMe include:

- **Confidential computing and interoperability.** This will ensure that different organizations can confidently share and process data across cloud platforms.

- **Alternate interfaces.** Already we use our face and our hands to interact with devices; voice user interfaces are exploding in popularity too. Research in advanced haptics points to a future where we can physically feel virtual objects and interactions; we can even use our own muscles to fly a drone.

- **Identity.** At the heart of ConnectedMe is a system-wide understanding of who you are and what you want to do. Look for customer data platform software and identity management systems that are robust, secure and portable to grow as people need to manage more and more of their lives online.

- **Constant connectivity.** Next-generation connectivity services (5G, LiFi) could allow for near-ubiquitous connection, enabling more consistent experiences (as people move across devices) as well as more options for where and how to experience the virtual world (as more devices become connected).

- **Edge computing and federated models of machine learning.** The ideal state may be ubiquitous connection, but there are reasons why people may choose to go offline – for privacy or to reduce distractions during focused work time. By processing on various devices, services on ConnectedMe can help maintain anonymity and continue to function even while disconnected. When connected, computing on the edge means faster response times for a smoother experience.

Smart contracts · Identity · Devices/things · Edge computing · Multi-cloud services · Security/privacy · The human

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Ethical considerations become more important

As we move full speed ahead with experiences without boundaries, we have to bring digital ethics into the design, development, implementation and operation of these systems. There will never be a complete framework that solves all the ethical issues that might arise. However, as we continue to transform every significant aspect of our personal and professional lives, we must challenge ourselves to keep asking the difficult and necessary questions.

While Avanade recently covered how you can address such questions in a systematic way, there are a few core ethical tenets that should guide our discussions.

- **Prioritize inclusion and diversity.** The tech industry continues to suffer from a lack of diversity, and the large firms that will drive much of the innovation we've discussed here are no exception. Invariably, the homogeneity of the tech makers will exclude segments of the population from tech benefits as well. In Avanade's Digital Ethics Survey of business and tech leaders from around the world, 27% of respondents admitted feeling that their companies weren't doing enough to address inclusion and diversity in technology, including 5% who said that their companies have experienced negative consequences because of this inaction. To mitigate risk to the business and empower people who have historically been excluded, we are obligated to fight daily for better inclusion and diversity.

- **Prioritize privacy as a human right.** Building experiences without boundaries will require amounts of personal data that are difficult to imagine even in our current high-surveillance, always-connected world. If we're going to maintain trust in technology-fueled institutions, we have to grant people the ability to decide what personal information they're willing to share with a clear understanding of what they get in return.

- **Make transparency and oversight core to everything you build.** If technology continues to drive more and more of the physical world around us, and if technology providers are plugged into the operating system that drives it all, it will be too easy for systems to make decisions and take actions without our knowledge or consent. We must require these systems to be transparent and investigable, with robust oversight to assure proper system behavior and options for personal recourse in case something goes wrong.

What to do now:
Think multi-party and multi-cloud

While some aspects of experiences without boundaries are several years out, now is the time to start ensuring you have the foundation in place. To get ready for these new kinds of experiences that span devices and ecosystems, we recommend taking the following steps:

Implement a customer data platform to truly understand your customers, especially across other products and services with which they're likely to interact.

Create strong ethics, privacy and security programs to ensure the safety and responsibility of your products and services (see accompanying sidebar for more on the ethical considerations).

Rethink your approach to data sharing and the supporting infrastructure, tools, processes and pipeline to make it as seamless as possible.

Build up systems-thinking and human-centered design capabilities across all functions to ensure that everyone has the tools and skills to think across boundaries. Service design is a must-have skillset.

Understand edge computing architecture for digital products and services so you can decide what to move to the cloud, what to keep on-premises, and where edge processing can benefit you and/or your customers.

Rethink today's devices and interaction models and get your [designers, data scientists, developers and infrastructure ready](#) to support new design paradigms and connected experiences for consumers and employees always on the move. This means taking a systems-thinking approach, considering context, intent, the device ecosystem being used and more. Experiences without boundaries will often feel like the world-building game Minecraft; users (whether they're your customers or your employees) will benefit from tools and signs to navigate rather than being pushed through predefined steps.

Prepare for multi-party relationships that will be needed for improved customer and employee experiences. Users may soon have more control and choices over whether, when and how they interact with you, so create experiences that attract people and business partners rather than proprietary ecosystems that lock them in.

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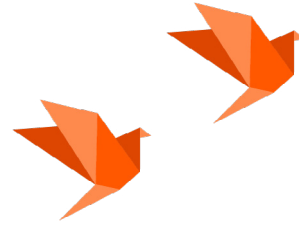
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Continue the conversation

We'll be exploring more of the underlying technologies for experiences without boundaries in our Avanade Insights blog. Visit and click the subscribe button to make sure you receive updates on our latest Trendlines reports and perspectives. We'd love to hear what you think.

For more information about the trends that will affect you and your business over the next 12 to 18 months, visit us at Avanade Trendlines.

References

Andreessen Horowitz, "Outgrowing Advertising: Multimodal Business Models as a Product Strategy," December 7, 2018

Apple, "Amazon, Apple, Google, Zigbee Alliance and board members form working group to develop open standard for smart home devices," December 18, 2019

Automation World, "Digital Twin Consortium Founded," June 11, 2020

CNBC, "Slack is working on integrating with rival Microsoft Teams for calls, says CEO Stewart Butterfield," March 26, 2020

Eye on Design, "Designers, This is How to Speak 'Computer' While Still Speaking 'Human,'" December 16, 2019

Fast Company, "Google's secretive ATAP lab is imagining the future of smart devices," July 13, 2020

TechCrunch, "Facebook is launching smart glasses in 2021," September 16, 2020

The Verge, "Amazon creates a huge alliance to demand voice assistant compatibility," September 24, 2019

The Verge, "Google's Nest changes risk making the smart home a little dumber," May 9, 2019

The Verge, "Microsoft previews the future of Office documents with Fluid Framework for the web", November 4, 2019

The Verge, "Microsoft to allow Alexa to integrate further into Windows 10," July 15, 2019

About Avanade

Avanade is the leading provider of innovative digital and cloud services, business solutions and design-led experiences on the Microsoft ecosystem. With 38,000 professionals is 25 countries, we are the power behind the Accenture Microsoft Business Group, helping companies to engage customers, empower employees, optimize operations and transform products, leveraging the Microsoft platform. Majority owned by Accenture, Avanade was founded in 2000 by Accenture LLP and Microsoft Corporation. Learn more at www.avanade.com.

North America
Seattle
Phone +1 206 239 5600
America@avanade.com

South America
Sao Paulo
AvanadeBrasil@avanade.com

Asia-Pacific
Australia
Phone +61 2 9005 5900
AsiaPac@avanade.com

Europe
London
Phone +44 0 20 7025 1000
Europe@avanade.com