REDISCOVERED IN THE CL

How the cloud has helped us rediscover, reevaluate, and reengage with influential industries, companies, technologies, and products

BY DAVID NEEDLE

To paraphrase Visa's classic ad slogan, cloud computing technology is everywhere you want to be. Cloud infrastructure and cloud-native software are bringing speed, scalability, flexibility, and cost-effectiveness that's changing the trajectory of technologies and brands large and small in almost every industry. And while the cloud is often seen as enabling a new generation of digital-first companies, it has also helped the world rediscover the power and importance of many existing companies, products, technologies, and industries.

This rediscovery isn't due to the cloud alone, of course. Combining cloud computing's unique benefits with parallel advancements in areas such as user experience, mobility, artificial intelligence, and big data are driving the digital transformation of everything from pizza delivery to supersonic aircraft.

It's even happening in some of the most traditional businesses. "Look at a company like H&R Block, their entire pitch was they offered a tax preparer who could sit with you in a physical office and share a financial relationship," Rebecca Wettemann, Principal Analyst at research firm Valoir, said in an interview. Now, she notes, H&R Block serves clients remotely via the cloud, using cloud-based features like screen sharing and video chat to mimic the rapport developed in an office visit.

From startups to legacy, brands and products, to entire industries, here are five examples of the cloud sparking a rediscovery of what is possible—and what is profitable. The litmus test for inclusion: How has the cloud made us look at this industry, product, or technology differently?

Creative collaboration: real-time brainstorming

Cloud computing gives designers a giant virtual whiteboard to scope out ideas and collaborate with partners around the world to bring the next great inventions to life. One of the companies leading the charge is Figma, which offers a browser-based service where designers collaborate and share reusable components (more than 800 plug-ins), styles, and tools from anywhere they can access a web browser.

As with other cloud-based or Software-as-a-Service (SaaS) offerings, Figma users don't have to download software to their computer to view a file. Designers can collaborate and share a Figma file with a simple hyperlink.

Kimberly-Clark, the company behind such well-known brands as Kleenex, Scott, and Huggies, uses Figma to transform the design process by consolidating all of its tools on a single platform. "With Figma, everything is just there," noted Kimberly-Clark UX Manager Andy Ford in a Figma blog post. "It becomes the single source of truth .... Feedback meetings transformed into collaborative real-time working sessions with our various stakeholders. Everyone started to participate in the making process and could see design updates come to life in front of their eyes."

WHY IT MATTERS: Creative professionals are no longer limited to tools designed for a particular operating system or physical device, and can collaborate in real-time from anywhere.

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Manufacturing and industrial design: leveling the playing field

"What does cloud computing have to do with how we fly through actual clouds?"

Blake Scholl, Founder and CEO of Boom Supersonic—which is using cloud-based design tools and procedures to speed the design of a new, faster-than-sound airliner—answered his own question in a keynote at AWS re:Invent 2020: The cloud is "the key to a new era of aircraft design that levels the playing field in aerospace," he said, "saving Boom years of schedule and millions of dollars" by letting the startup company test more designs more quickly. This kind of power was previously available only to governments and huge enterprises, not tiny startups.

Boom uses AWS' cloud-based high-performance computing (HPC) capability to accelerate the design and construction of its XB-1 demonstrator plane and the commercial Overture airliner to follow.

Boom said the XB-1 project has already generated more than 525 terabytes of design and test data that the company is transferring over to AWS.

Looking ahead, Scholl told CNBC that Boom will use AWS to "coordinate the entire supply chain and how that happens digitally." As a result, Boom will know where every single part is in the supply chain as it goes into the factory for assembly and can trace each part on the aircraft.

Denver-based Boom says it has 30 of its aircraft on pre-order and hopes to launch its first flight in 2021, with commercial service starting before the end of the decade.

WHY IT MATTERS: Industrial design in the cloud is helping startups challenge giant, entrenched industry leaders, speeding the pace of innovation.

Sports stats: not just for the pros any more

Pro scouts and agents might have been the initial market for statistics and in-depth analysis of how players perform, but the cloud changed all that. Now real-time analytics are a broadcast staple and even casual fans have instant access to advanced stats.

Major League Baseball is leading the way using cloud technology to calculate, track, personalize and share stats in real time. After moving to AWS in 2014, MLB Advanced Media switched to Google Cloud in 2020 as part of a move to offer fans more personalized features. Now, for example, prominently featured clips and data will be those most relevant to an individual fan (e.g., based on their favorite team) as calculated by Google Cloud-powered algorithms. And there's plenty of data to work with: MLB can use Google Cloud's data warehousing technology to process and store more than 100 data points from every pitch in every game.

The NBA, meanwhile, is upping its cloud game via

a multiyear agreement to use Microsoft's Azure cloud that started with the 2020-2021 season. As part of the deal, a new streaming platform leverages AI and machine learning from Microsoft to learn fan preferences and recommend content based on a user's favorite team and players. If a player reaches a significant milestone during a game, for example, viewers are immediately presented with video clips of previous players to reach that milestone. The system will also give fans a lot more options, including an alternate audio feed of the crowd sounds (when crowds are allowed back in the arenas) without broadcast commentary.

According to the NBA, the cloud system will make it easier for fans to search its archives and integrate existing NBA products, services, and merchandise. If the system detects a person's interest in, say, Giannis Antetokounmpo, the league's reigning MVP, it will present content and offers highlighting the Milwaukee Bucks superstar. "Our goal, working with Microsoft, is to create customized content that allows fans—whether they are in an NBA arena or watching from anywhere around the world—to immerse themselves in all aspects of the game and engage directly with our teams and players," NBA Commissioner Adam Silver said in a statement.

This data is being used online right now, and the deal to move more of the NBA's systems into the cloud means this sort of detailed info will be more accessible than ever. For example, the league's player stats pages have an API that fans are already using to create their own shot charts and other analysis tools. This is critical as younger fans often prefer to follow the league on social media and online rather than watch full games on TV.

WHY IT MATTERS: Cloud computing has democratized advanced sports analytics, making an unprecedented amount of statistics and analysis available to fans and pros alike. This kind of engagement is critical for sports leagues dealing with fans—especially younger ones, "watching a lot less conventional television," Silver noted in an interview with Stratechery's Ben Thompson.

Media and gaming: distributed production and better streaming

From streaming replacing broadcasting to virtual movie making and more affordable spectacular special effects—not to mention the transformation of video games to deeply interactive and widely shared experiences—cloud computing is revolutionizing the entertainment industry in a wide variety of ways. Paul Cheesbrough, CTO and President of UK media company Fox Corp., told viewers of an AWS re:Invent 2020 keynote that the way media companies stream and use video content "has radically changed in the last five years in the cloud." Increased

cloud capacity is now letting distributed production teams create and deliver uncompressed video—which offers a vastly improved viewing experience—from and through the cloud, with full redundancy. "It enables us to produce live events with less latency, increase reliability and [do it] more efficiently," noted Cheesbrough.

Cloud computing has also helped startups and established studios rediscover the different ways movies and games can be produced and distributed—improving the quality, the economic model, and the subscription value of the delivery services. Universal Filmed Entertainment Group (UFEG) has started a multi-year process of moving its film and TV production from in-house servers to Microsoft's Azure cloud platform. In 2020, UFEG CTO Michael Wise told Variety the company wants to take advantage of the platform's "hyper-scale" storage and compute capabilities for studios to tap into on an as-needed basis, predicting the move "will unlock a new way to make movies in a way we haven't been able to do before."

Working with Microsoft, UFEG wants to extend DreamWorks Animation's proprietary production platform to include live-action content that is housed in the cloud, making it easier for partners to connect with them in a more open, standards-based way. A major film can involve dozens of third-party partners and anything that streamlines the process figures to be a huge time-saver.

Smaller production studios are also moving to the cloud. *Like After Death*, a darkly comic interactive "choose your own adventure" film, was produced by Heredia Vision and new media company All Together Now. "With the help of cloud-based software we can build a stage, broadcast a live show internationally, and provide more seats than anything we could do in person," Jessica Ryan, CEO of All Together Now, said in an email.

The scalability of cloud computing also helped create Massively Multiplayer Online Games (MMOGs) and helps enable a wide variety of MMOG features. These
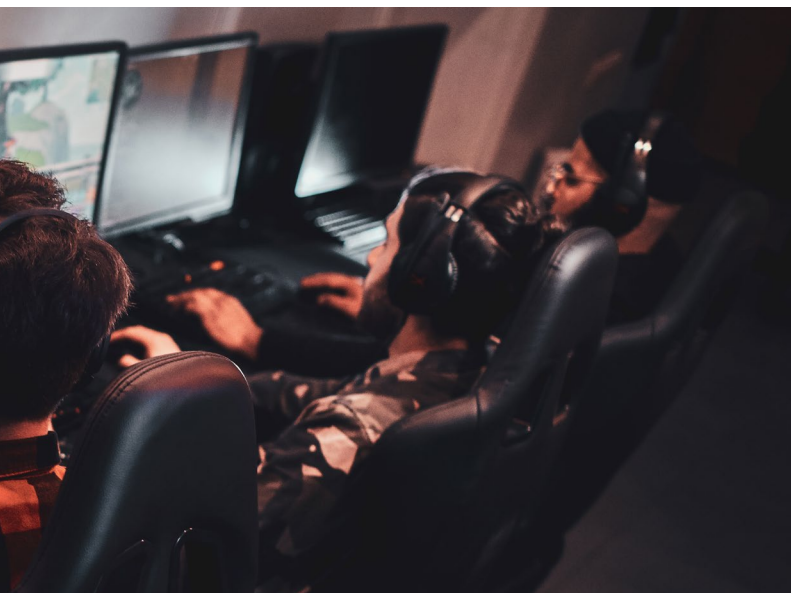
fantasy and role-playing adventures, like *World of Warcraft, Final Fantasy, RuneScape*, and many others, change the gaming experience from a solitary pursuit to one shared with hundreds of thousands of simultaneous players. And while die-hard gamers can spend thousands of dollars tricking out their systems with high-end graphic cards and other performance add-ons, a robust cloud and edge infrastructure is essential to providing a fast and level playing field no matter where players are located.

And don't forget mobile gaming—mobile esports games platform Skillz uses the cloud to host more than 30 million players competing in over 3.5 million daily tournaments.

WHY IT MATTERS: The cloud is remaking both production and distribution of media and gaming, smashing barriers to entry for content creators while creating more choices for consumers.

Electronic healthcare records (EHR): more personalized care

The days when your physician based your care on detailed, personal knowledge of your medical history have largely passed, but that's not as bad as it sounds. Medical records in the cloud promise to help bridge that knowledge gap, eliminating inefficient, hard-to-share paper records while delivering smarter, more personalized treatments and better health outcomes.

But there are still growing pains—like the fact that medical records are stored in a wide variety of formats and are still not all online, making them notoriously hard to pull together. The holy grail is to digitize all these disparate records to build a holistic view of the patient.

One promising effort is the DrChrono platform, an

Electronic Health Records (EHR) service with more than 24 million patients under provider care. The DrChrono app functions as a gateway to a backend cloud infrastructure that lets doctors see lab work, a picture of a patient's face, or their medical history, and even write a prescription right from their phone.

AWS and Rackspace provide the primary infrastructure for all of DrChrono's DevOps and business operations. "It's a huge benefit to us because we never have to touch any servers, Amazon and Rackspace manage all that," DrChrono Co-Founder and COO Daniel Kivatinos said in an interview. "If there's an issue with one of their servers, they have redundancy so they can bring another one on quickly and customers never know there was an issue."

As DrChrono and other medical providers grow their reliance on cloud services, they can take advantage of the compliance foundation built by the cloud providers. And there's another huge potential benefit: unlocking what has historically been proprietary databases on cancer patients and other diseases housed in on-premises data centers. Kivatinos says that it is far easier to securely access anonymized data in the cloud than extract something from an on-premises, proprietary database. For example, a real-time analysis of COVID-19 patients in a cloud-based EHR system might show that something they're eating or drinking reduces or eliminates symptoms of the virus.
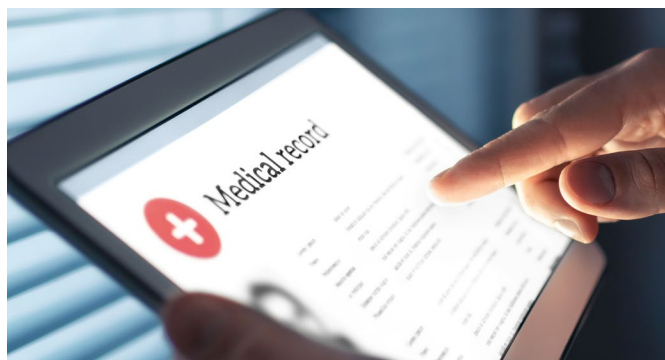
"We launched as a cloud service in 2009 when others were shipping on CDs you had to install," said Kivatinos. That was important, he added, because "doctors are not sedentary creatures—they go home, they travel." But if there's an emergency with a patient at another location, critical information stored on disk might not be available.

Kivatinos recalls a White House healthcare meeting with then Vice President Joe Biden who was frustrated by the difficulty of getting medical records sent from one hospital to another when his son was battling brain cancer. "Biden is very passionate on the subject," Kivatinos said, predicting that with Biden in the Oval Office, "you'll see the cloud embraced way more than it is today."

WHY IT MATTERS: EHR in the cloud promises more informed, personalized, and efficient health care, less time spent on redundant paperwork, and ultimately better health outcomes.

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